First Named Inventor	James Edwin Gifft	INFORMATION DISCLOSURE STATEMENT FORM PTO-1449
Serial No.	Unknown	
Filing Date	Herewith	
Group Art Unit	Unknown	
Examiner Name	Unknown	
Confirmation No.	Unknown	
Attorney Docket No.	292.001US1X	
Title: Re-examination application for patent 5,904,172		Sheet 1 of 1

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	Country	No.			

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Examiner Initials	Author, Title, Date, Pages, etc.

Examiner Signature		Date Considered	

*Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Based on Form PTO-FB-A820 Patent and Trademark Office, U.S. Department of Commerce

United States Patent [19]
Mennona, Jr.

[11] **Patent Number:** **5,006,073**
[45] **Date of Patent:** **Apr. 9, 1991**

[54] **SNAP FIT CONTACT ASSEMBLY**

[75] Inventor: **Vincent J. Mennona, Jr.,** Boca Raton, Fla.

[73] Assignee: **Motorola, Inc.,** Schaumburg, Ill.

[21] Appl. No.: **524,674**

[22] Filed: **May 15, 1990**

Related U.S. Application Data

[63] Continuation of Ser. No. 357,913, May 30, 1989, abandoned.

[51] **Int. Cl.**[5] **H01R 9/09**
[52] **U.S. Cl.** **439/77**; 439/80; 439/81; 439/872
[58] **Field of Search** 439/77, 80–83, 439/493, 871, 872, 66, 876

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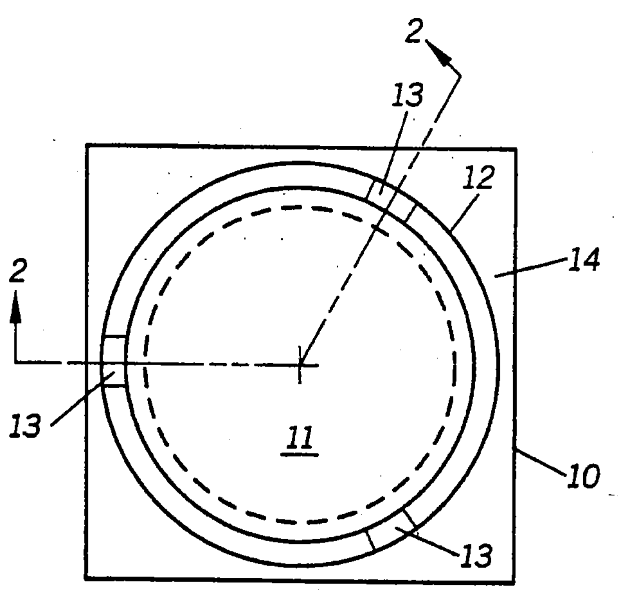
Primary Examiner—Paula A. Bradley
Attorney, Agent, or Firm—Daniel K. Nichols; Pablo Meles

[57] **ABSTRACT**

A snap fit contact (30) is provided for attachment to a housing (40) wall. The contact (30) includes a contact surface (31) having a peripheral depending wall (32). Snap features (34) are formed in the wall. A flange or lip (35) is carried by the wall for attachment to a flex circuit (41). The contact is received in an opening (44) in the housing. The opening includes a shoulder (47) with the snap feature engaging the shoulder.

20 Claims, 2 Drawing Sheets



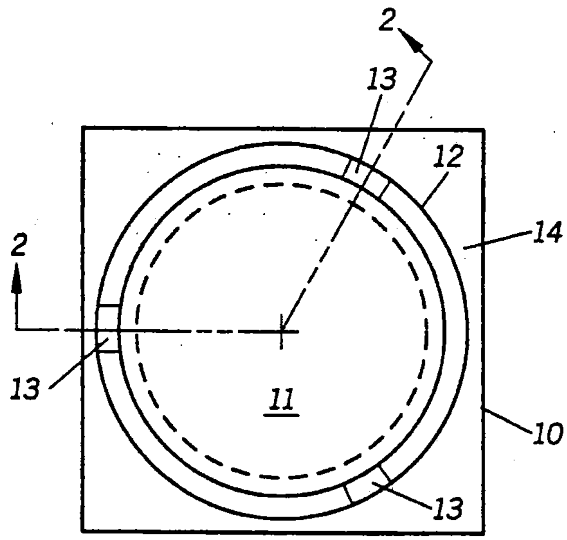


FIG. 1

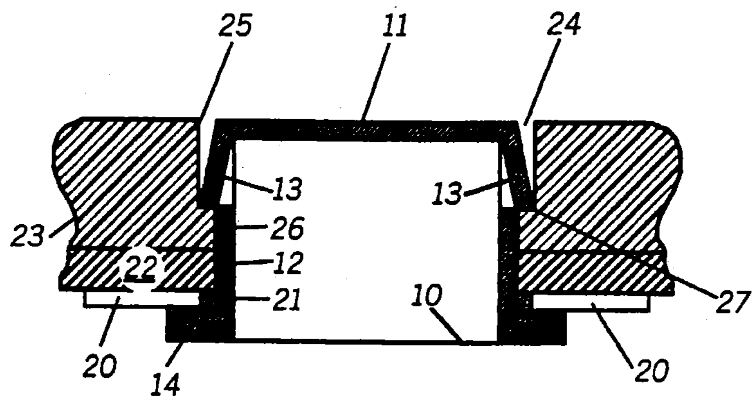


FIG. 2

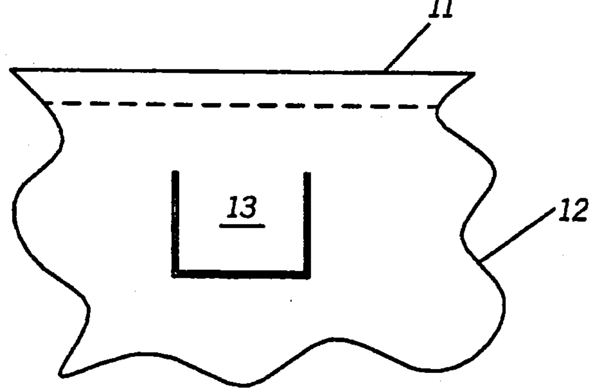


FIG. 3

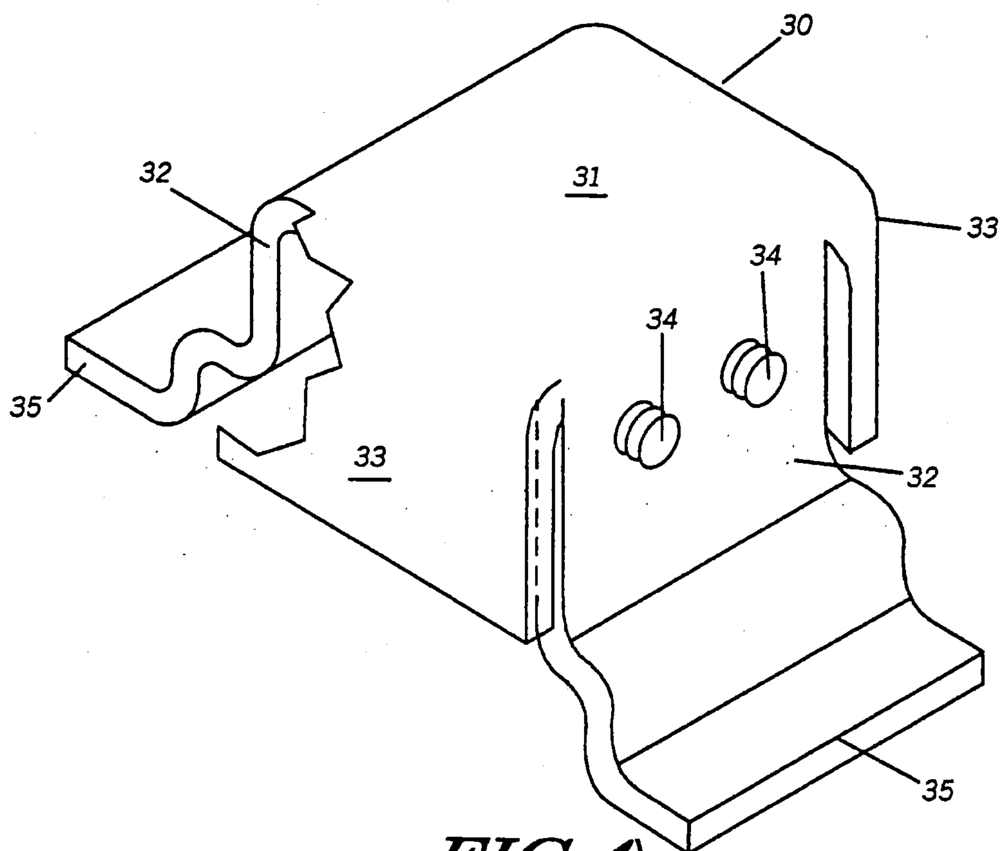


FIG. 4

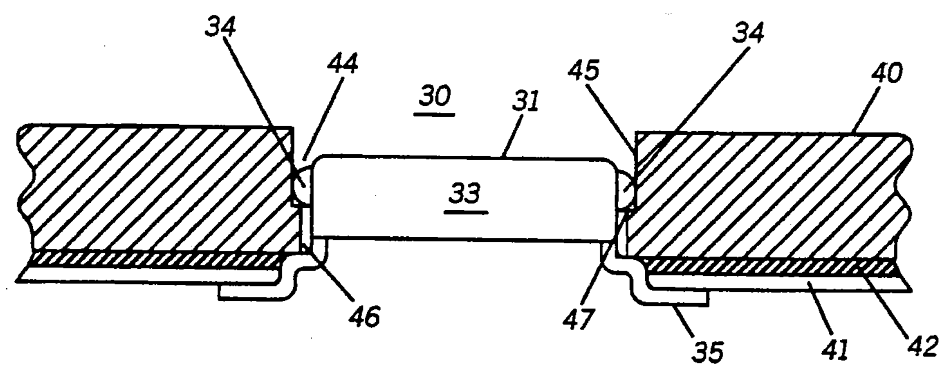


FIG. 5

SNAP FIT CONTACT ASSEMBLY

This is a continuation of application Ser. No. 07/357,913, filed 05/30/89 and now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to electrical contacts in general and particularly to an electrical contact which can be snap fit into a housing. It is often desirable to have electrical contacts which are mounted into a housing wall. For example, a portable two-way radio typically includes a battery portion which has both charger contacts and contacts for connection to the radio. Various approaches are used for mounting the contacts, such as ultrasonic welding of contact carriers or use of molded in contacts. It is also necessary to connect the contacts to the circuitry on the inside of the housing. One known approach uses the rivets which are affixed to a flex circuit. Rivets, however, do not produce highly reliable electrical connections to flex circuits and require the ultrasonic welding or heat staking of the contact carrier to the housing wall. It is desirable to have a contact that can be surface mounted to a flex circuit and snap fit into a housing opening.

SUMMARY OF THE INVENTION

This contact can be snap fit into a housing opening having a shoulder and furthermore, is surface mountable. The contact includes a contact surface having a wall depending from the periphery of the surface. The wall includes a snap feature. An electrical circuit connection means is carried by the wall. In one aspect of the invention, the electrical circuit connection means is a peripheral lip. In another aspect of the invention, the contact surface wall and peripheral lip constitute an integrally formed metal member. In still another aspect of the invention, the snap feature is a tab formed in the wall. In yet another aspect of the invention, the snap feature constitutes protrusions formed in the wall.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a snap fit contact in accordance with the present invention.

FIG. 2 is a cross-sectional view of the contact of FIG. 1 taken on lines 2—2 shown assembled to a housing.

FIG. 3 is a fragmentary elevational view of the contact of FIG. 1.

FIG. 4 is an isometric view of another contact in accordance with the present invention.

FIG. 5 is a side elevational view of the contact of FIG. 4 shown assembled to a housing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now by characters of reference of the drawings, and first to FIG. 1, it will be understood that a contact 10 includes an upper contact surface 11 which in this case is formed in a circular shape. A side wall 12 depends from the periphery of contact surface 11. As is more clearly seen in FIG. 3, tabs 13, constituting snap features, are formed in the side wall 12, as by a "U" shaped cut. A peripheral lip, or base 14 extends about the base or flange of the wall 12 and constitutes electrical circuit connection means carried by the wall.

As is illustrated in FIG. 2, the contact 10 is assembled to a flex circuit 20 that has an opening 21. The contact 10 extends through the opening 21 with the flange 14 engaging and being soldered to the flex circuit 20. If desired, a gasket 22 can be positioned about the contact 10 between the flex circuit 20 and a wall of a housing 23. The housing 23 includes an opening 24 that has a larger outside portion 25 and a narrower inside neck portion 26. A shoulder 27 defines the transition between the opening portions 25 and 26.

After soldering the flange 14 of the contact 10 to the flex circuit 20, and positioning the gasket 22 about the contact, the contact can be pushed through the opening 24 from the inside of a housing 23. The tabs 13 flex or bend to permit the contact 10 to pass through the narrow opening 26 and are received in the wider opening 25. The shoulder 27 between the opening 25 and 26 provides a stop for preventing withdrawal of the contact 10 from the housing opening 24.

A modified contact 30 is illustrated in FIG. 4. In this case a rectangular or square contact surface 31, is provided with a first pair of opposed side depending walls 32 and a second pair of opposed side depending walls 33. The walls 32 and 33 depend from the periphery of the contact surface 31. In this case, protrusions 34, constituting snap features, are formed in the walls 32. Lips or flanges 35 are provided at the base of the walls 32 for providing electrical connection of contact 30 as to a flex circuit. As shown in the drawings of FIGS. 1–5, the contact surfaces 11 and 31 are substantially planar.

FIG. 5 illustrates the contact 30 after assembly to a housing 40. A flex circuit 41 receives contact 30 with flanges soldered to the circuit. A gasket 42 is also provided for rain sealing purposes. A housing opening 44 includes a narrower inside portion 46 and wider outside portion 45 with shoulders 47 defining the transition. The walls 32 can flex to permit the protrusions 34 to pass the narrower portion 46 and seat at the shoulders 47.

The contacts 10 and 30 can be stamped and formed from thin metal. Preferably they are plated. Attaching the contacts to a flex circuit first, then snapping the contacts into housing openings provides a low cost, easily manufacturable contact assembly.

I claim as my invention:

1. A snap fit contact for insertion into a housing opening having a shoulder therein comprising:
   - a substantially planar top contact surface,
   - a wall depending from the periphery of the top contact surface, the wall including a snap feature protruding from the wall, and
   - electrical circuit connection means carried by said wall.

2. A snap fit contact as defined in claim 1, in which: said snap feature engages a shoulder within an opening in a housing for retaining the electrical circuit connection means.

3. A snap fit contact as defined in claim 1, in which: the substantially planar top contact surfaces include battery charger contacts.

4. A snap fit contact as defined in claim 1, in which: the substantially planar top contact surfaces include battery contacts.

5. A snap fit contact as defined in claim 1, in which: the substantially planar top contact surface is substantially circular shaped.

6. A snap fit contact as defined in claim 1, in which: the substantially planar top contact surface is substantially rectangular shaped.

7. A snap fit contact as defined in claim 1, in which:

said electrical circuit connection means comprises at least portions of a peripheral lip.

8. A snap fit contact as defined in claim **7**, in which: the contact surface, wall and portions of the peripheral lip constitute an integrally formed metal member.

9. A snap fit contact as defined in claim **1**, in which: said snap feature comprises tab means formed in said wall.

10. A snap fit contact as defined in claim **9**, in which: said tab means is formed in the upper portion of said wall.

11. A snap fit contact as defined in claim **1**, in which: said snap feature comprises protrusions formed in said wall.

12. A snap fit contact as defined in claim **11**, in which: said protrusions are formed in the upper portion of said wall.

13. A housing and snap fit contact assembly comprising:

a housing having an opening with a shoulder therein;

a contact including, a substantially planar top contact surface, a wall peripherally depending from the top contact surface, the wall including a snap feature, and electrical circuit connection means carried by said wall,

the contact surface being received in said housing opening with said snap feature engaging said shoulder.

14. A housing and snap fit contact assembly as defined in claim **13**, further including:

a flex circuit, the contact electrical circuit connection means being electrically affixed to the flex circuit.

15. A snap fit contact as defined in claim **13**, in which: the substantially planar top contact surface is substantially circular shaped.

16. A snap fit contact as defined in claim **13**, in which: the substantially planar top contact surface is substantially rectangular shaped.

17. A snap fit contact as defined in claim **13**, in which: said snap feature comprises tab means formed in said wall.

18. A snap fit contact as defined in claim **17**, in which: said tab means is formed in the upper portion of said wall.

19. A snap fit contact as defined in claim **13**, in which: said snap feature comprises protrusions formed in said wall.

20. A snap fit contact as defined in claim **19**, in which: said protrusions are formed in the upper portion of said wall.

* * * * *

US005560057A

United States Patent [19]

Madsen et al.

[11] **Patent Number: 5,560,057**

[45] **Date of Patent: Oct. 1, 1996**

[54] **TURNING AIR MATTRESS**

[76] Inventors: **Roger T. Madsen**, 14272 Acacia Dr., Tustin, Calif. 92680; **Thomas H. Ludden**, 25095 Owens Lake, Lake Forest, Calif. 92630

[21] Appl. No.: **269,557**

[22] Filed: **Jul. 1, 1994**

[51] **Int. Cl.**^{6} **A61G 7/04**

[52] **U.S. Cl.** **5/715**; 5/710; 5/711; 5/713; 5/737

[58] **Field of Search** 5/453, 455–457, 5/468, 469, 470, 499, 500, 914

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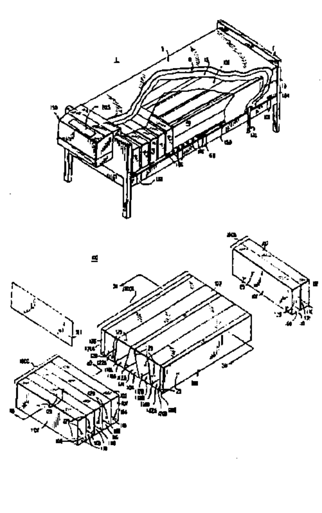
Primary Examiner—Michael F. Trettel

[57] **ABSTRACT**

A turning air mattress serving to facilitate the therapeutic benefits of turning a bed ridden patient includes a combination of elongated transverse and longitudinal air cells disposed on a base and encompassed by a cell liner. The air cells are attached to a plurality of cell manifolds in communication with a control system. A top cover covering the air cells is attached to the base, and a fleece and top sheet are fittedly retained over the air cells.

The control system having a microprocessor monitors the pressure within the air cells, along with overall system functions. The control system also enables a patient to be rotated from side to side, and leveled after being turned, in a smooth transition from a level position to a turned position, or from a turned position to a level position, while substantially maintaining spinal alignment.

27 Claims, 35 Drawing Sheets



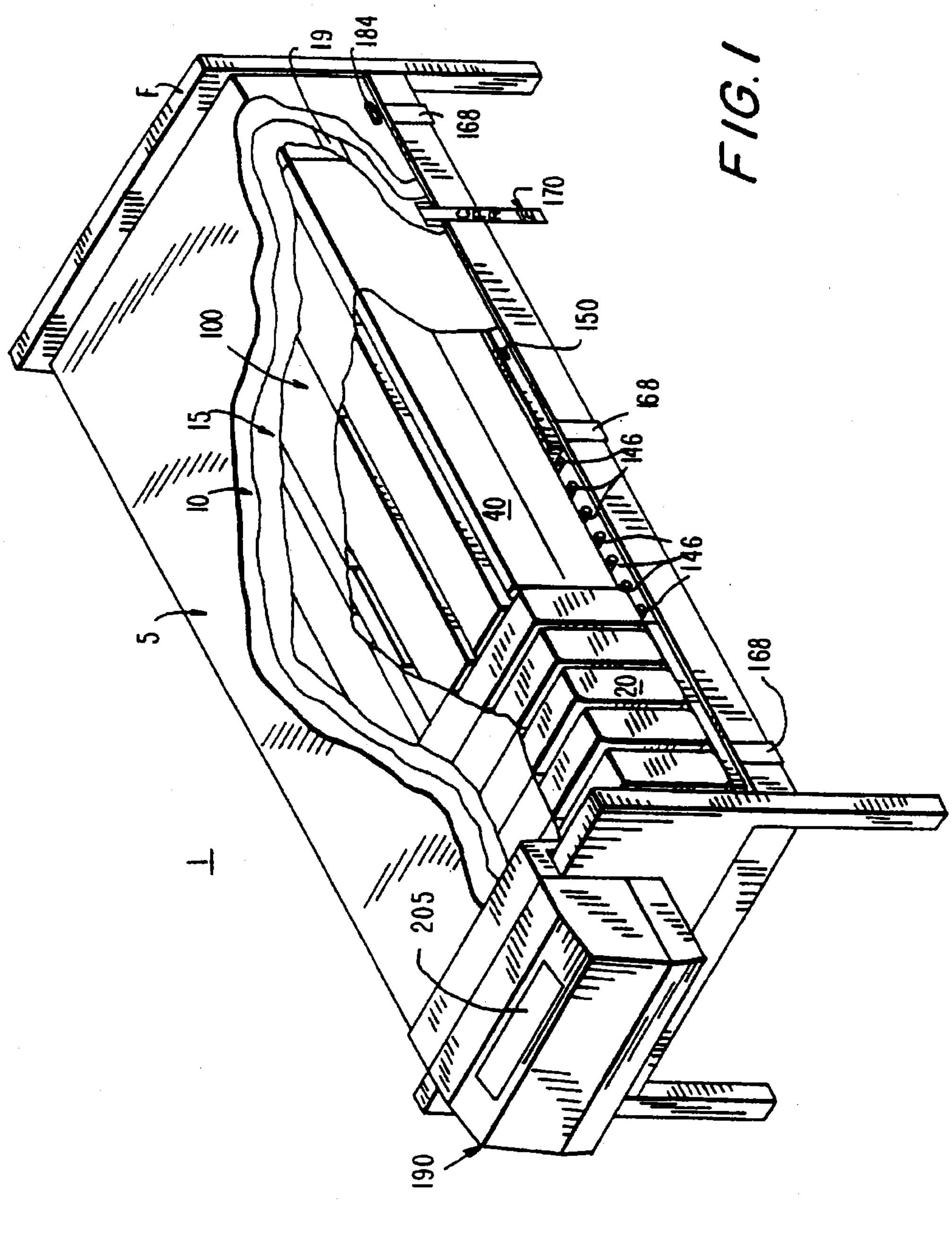


FIG. 1

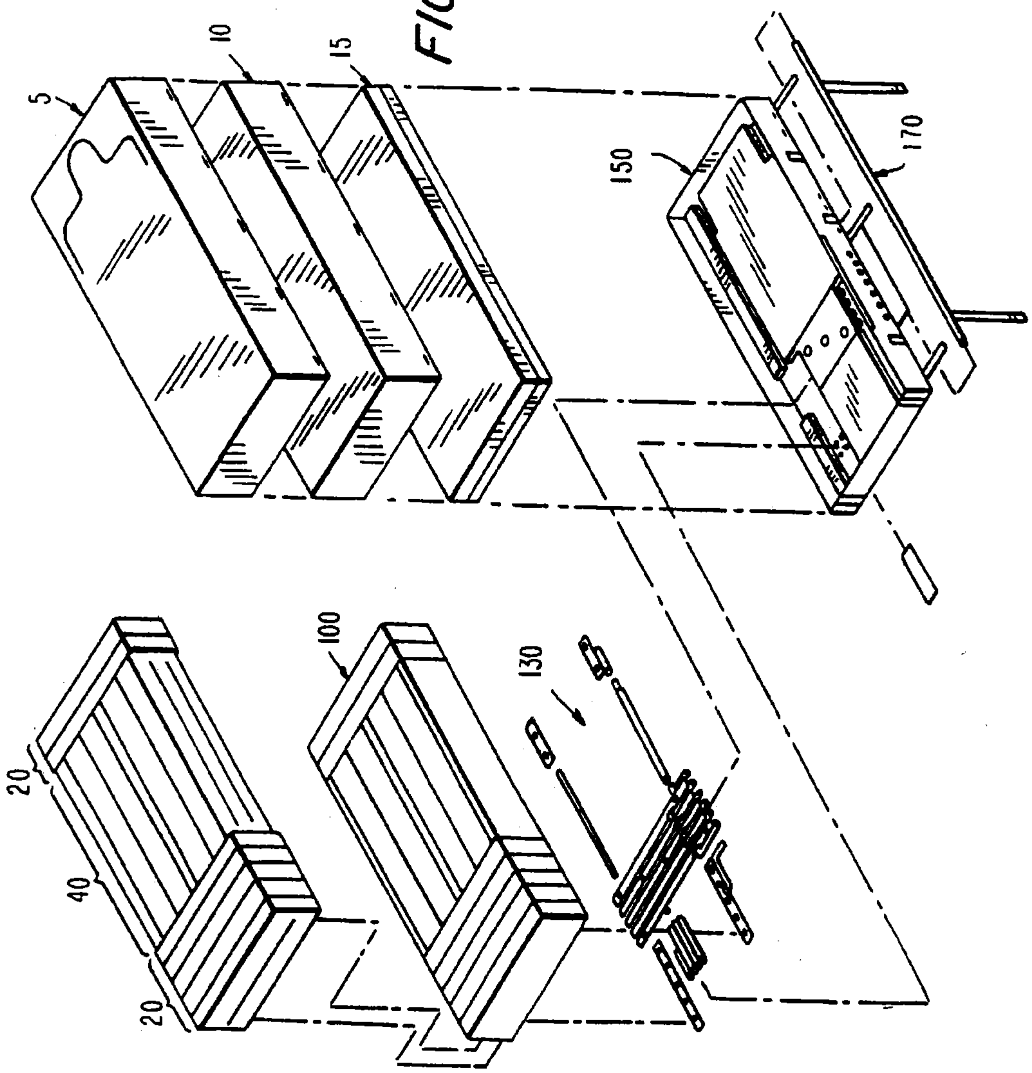


FIG. 2

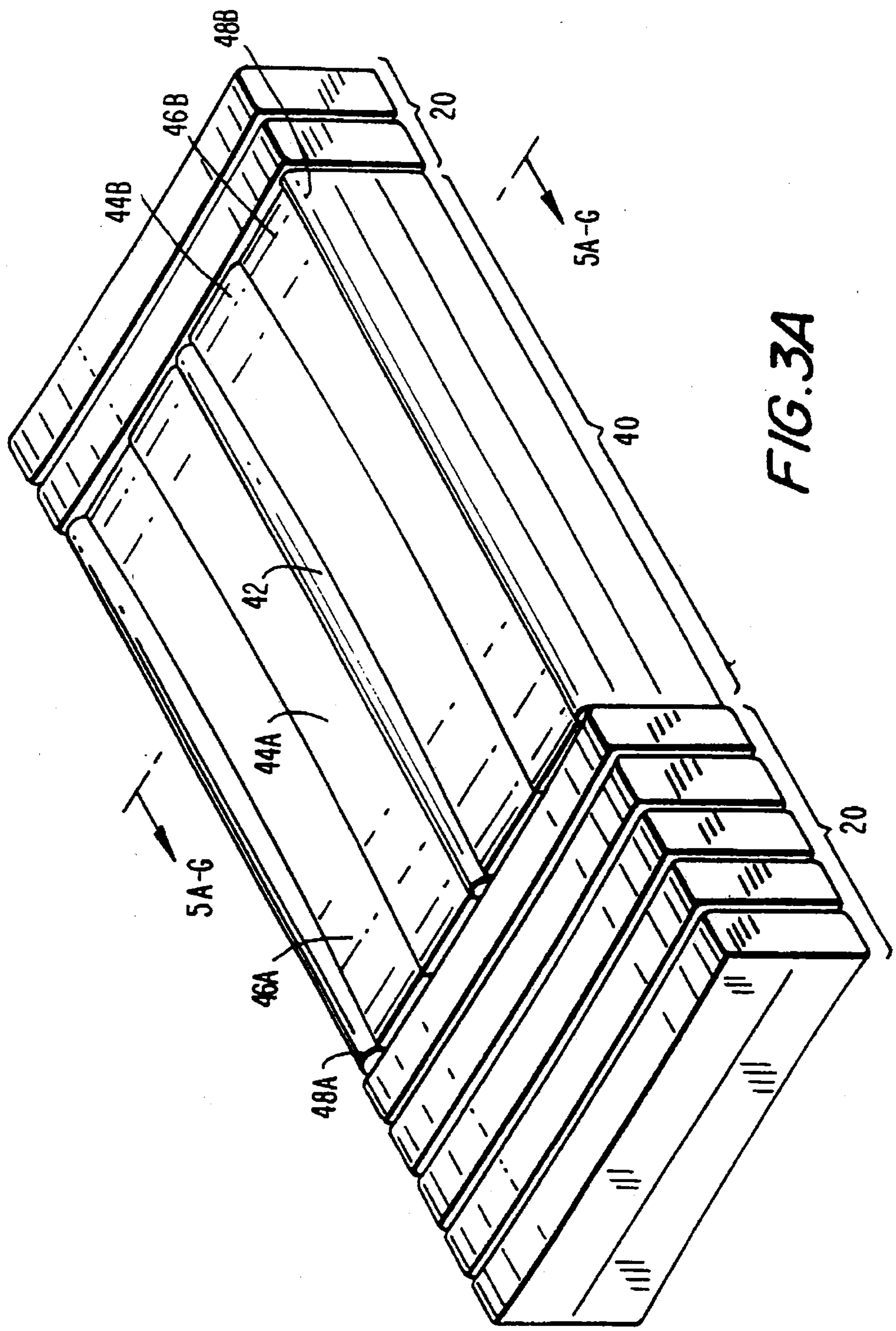


FIG.3A

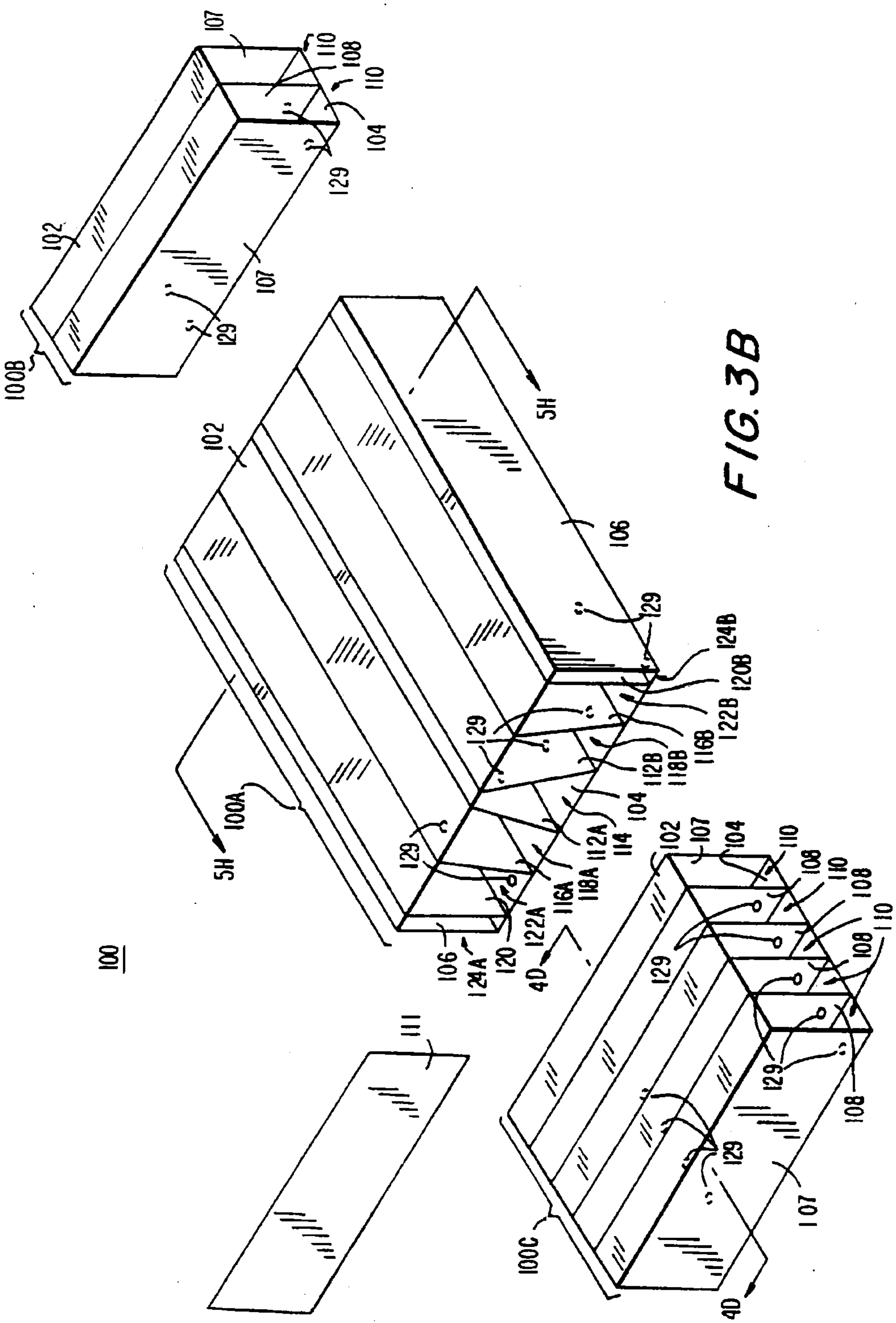

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FIG. 3B

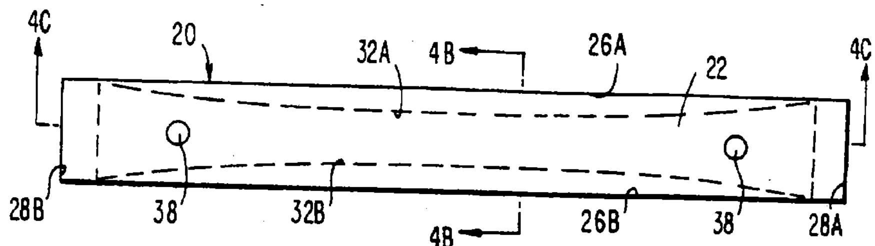
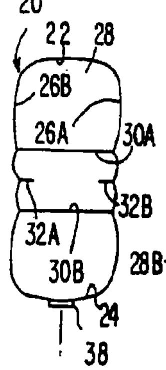


FIG.4A

FIG.4B



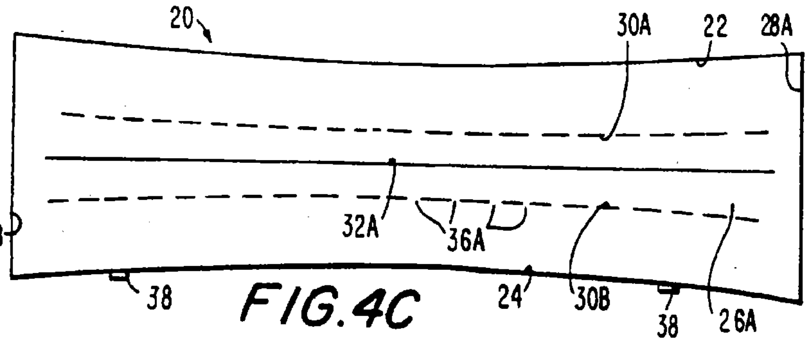


FIG.4C

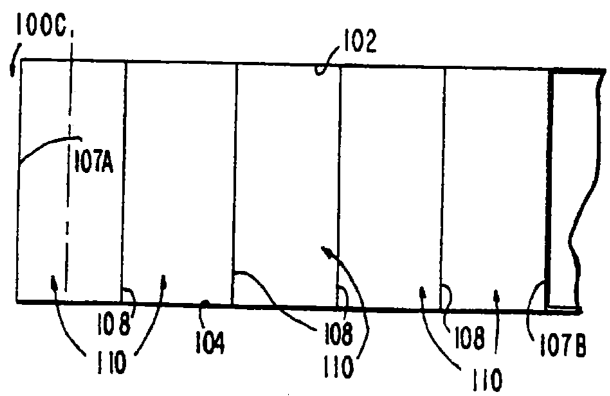


FIG.4D

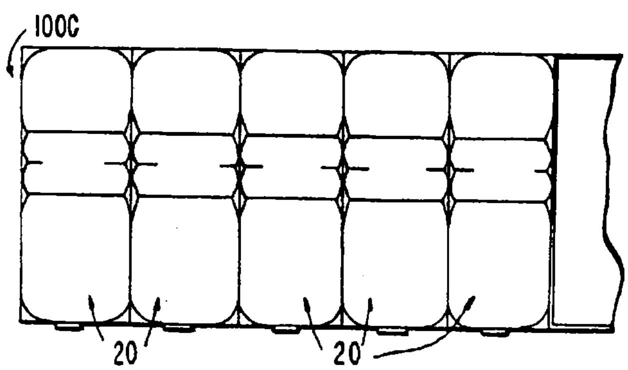


FIG. 4E

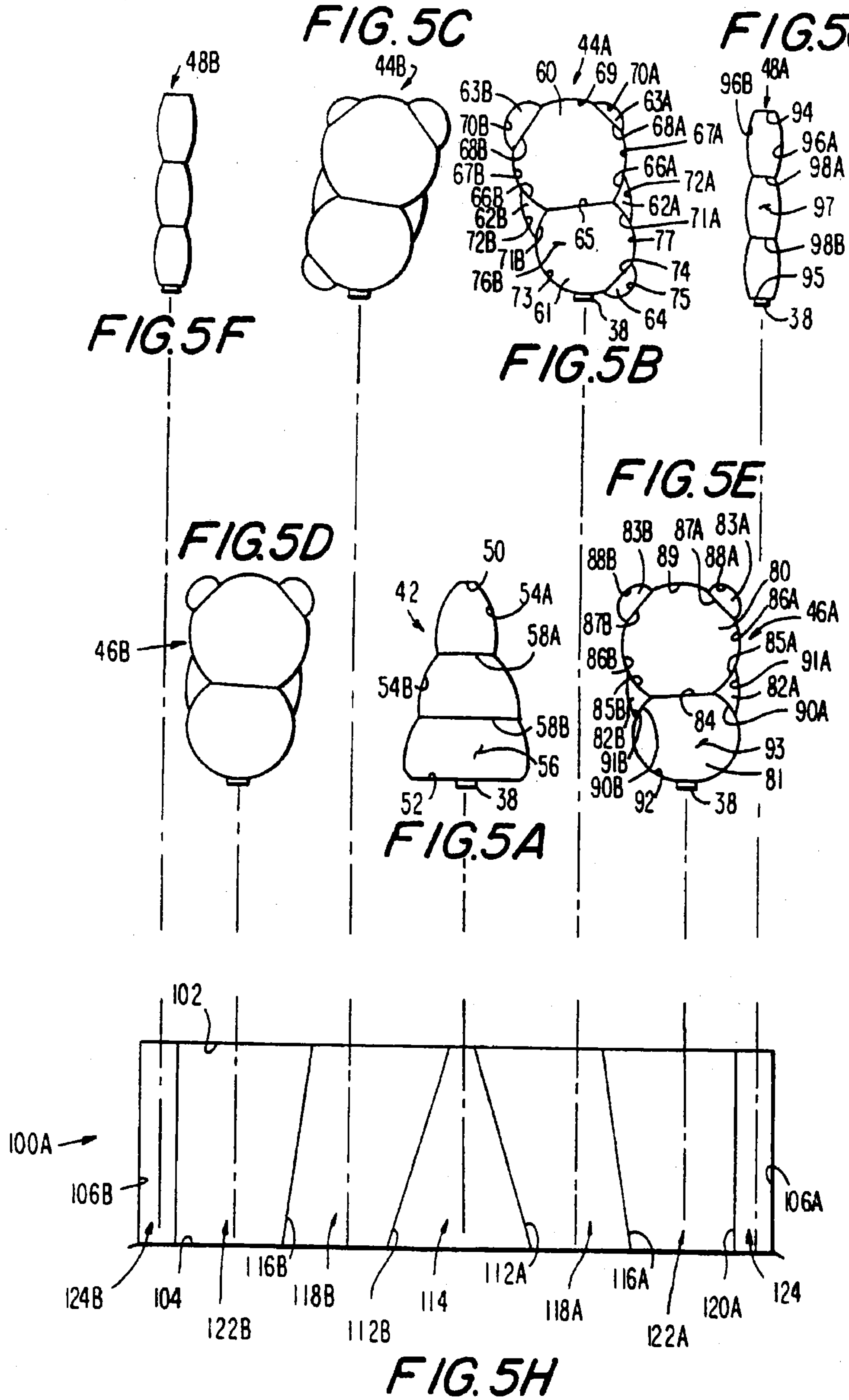


FIG. 5C
FIG.5G
FIG.5F
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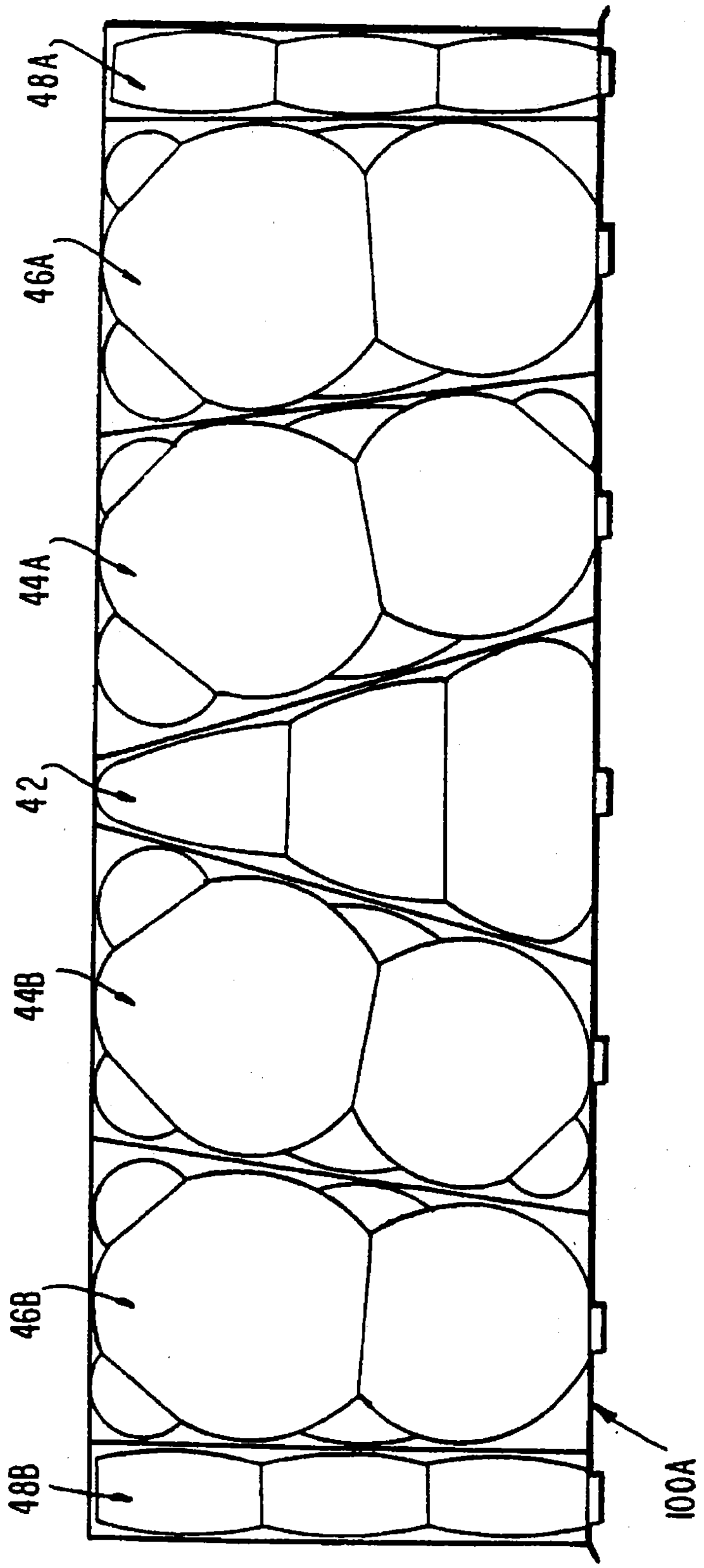

FIG. 5I

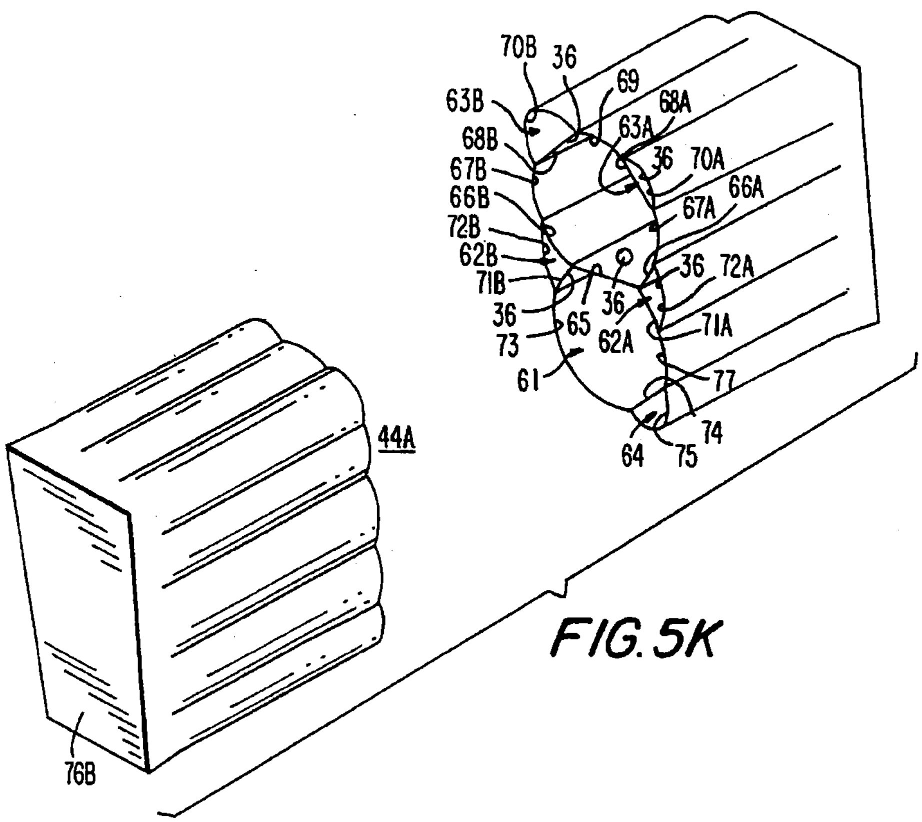
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FIG. 5K

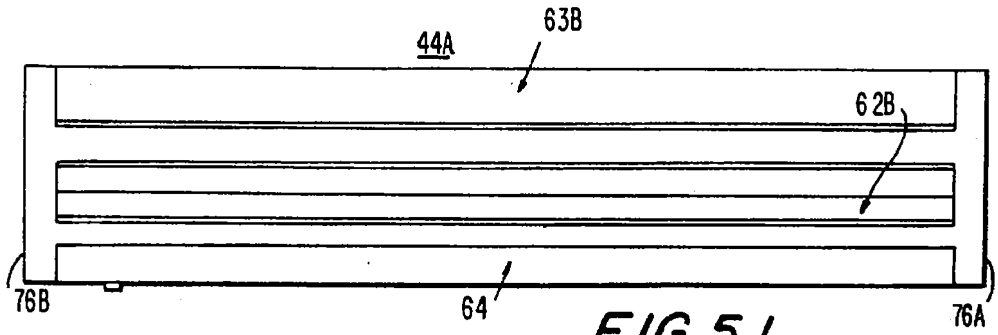
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FIG. 5J

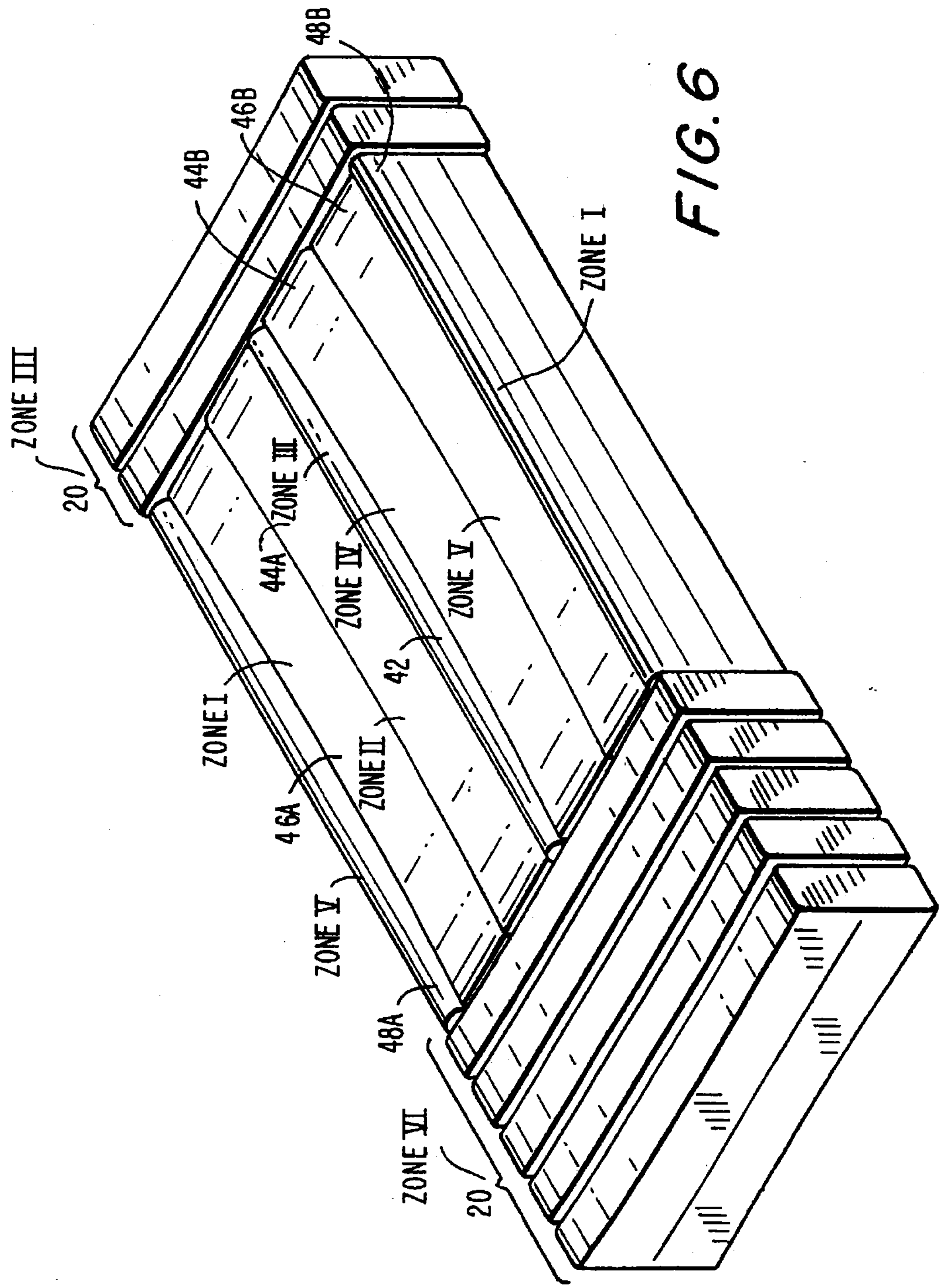
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FIG. 6

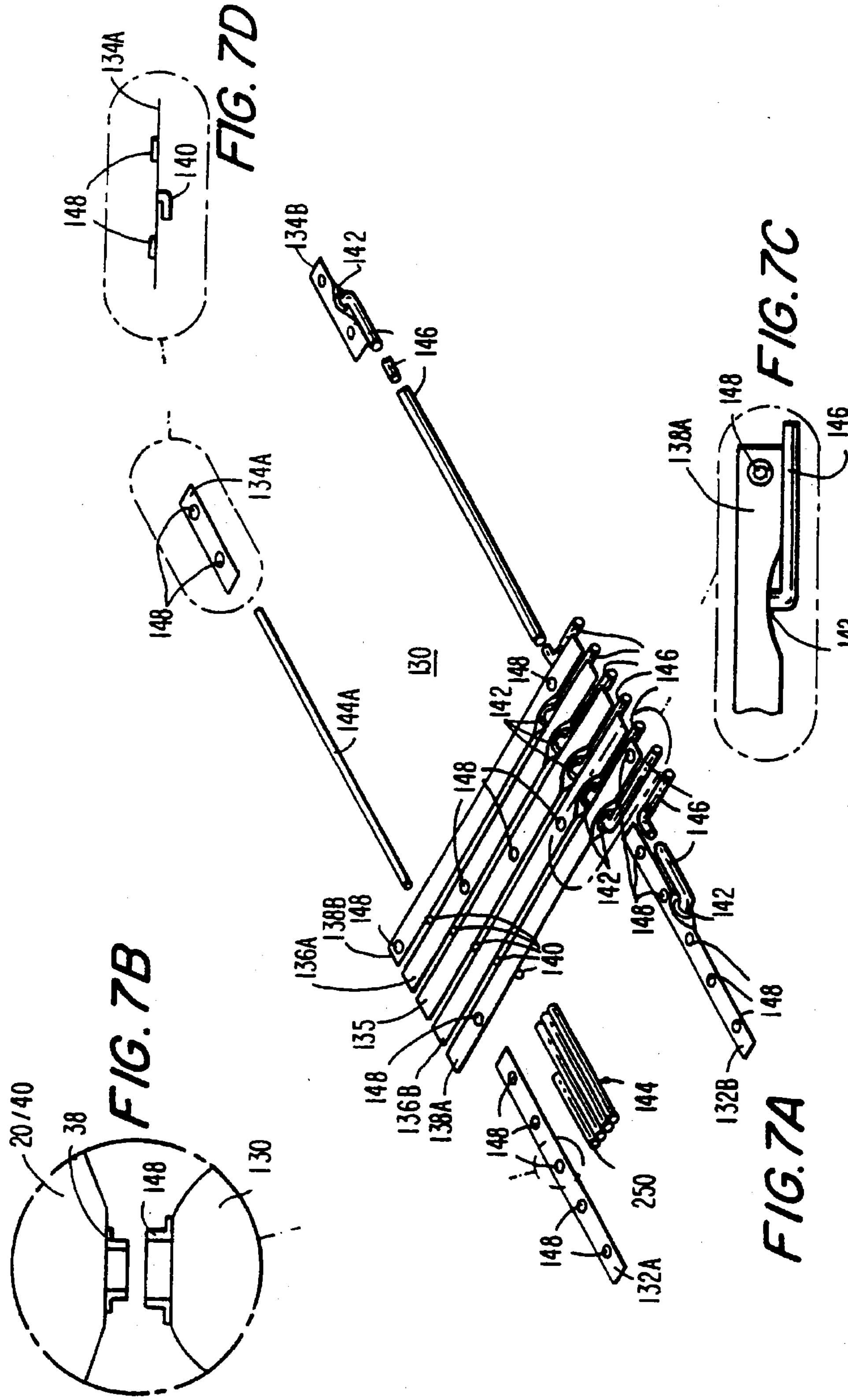
FIG. 7D
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FIG. 7C
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FIG. 7A
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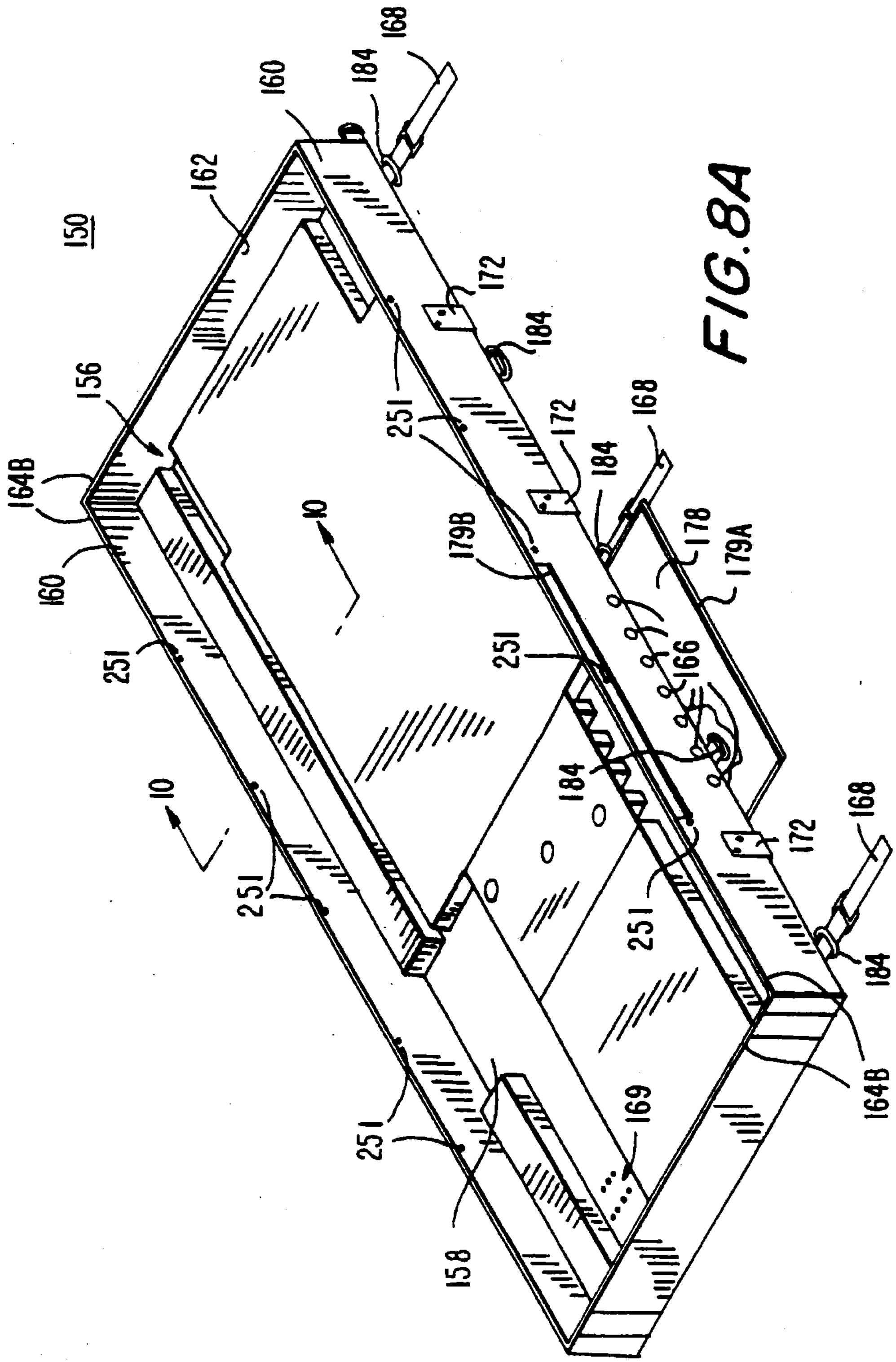
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FIG.8A

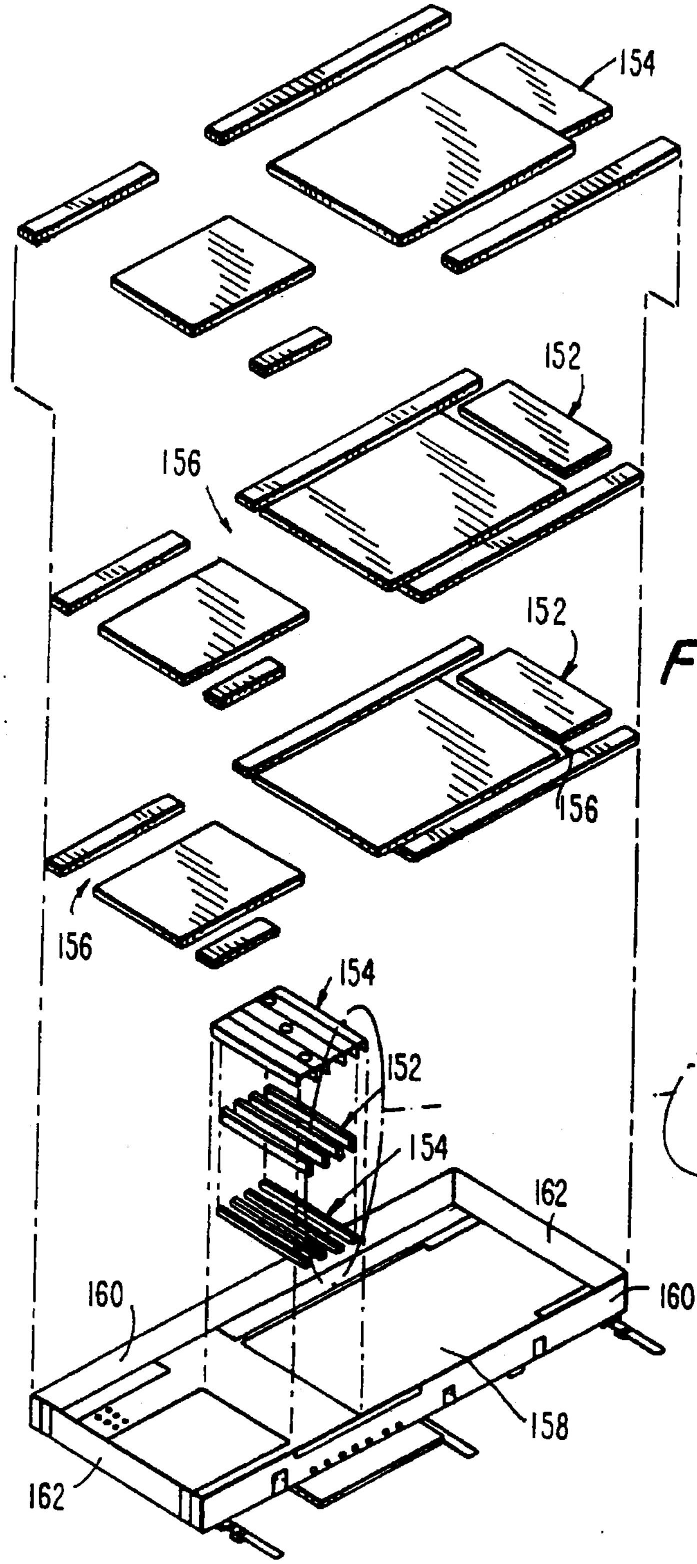
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FIG. 8B

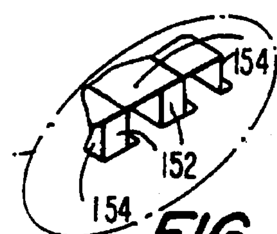
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FIG. 8C

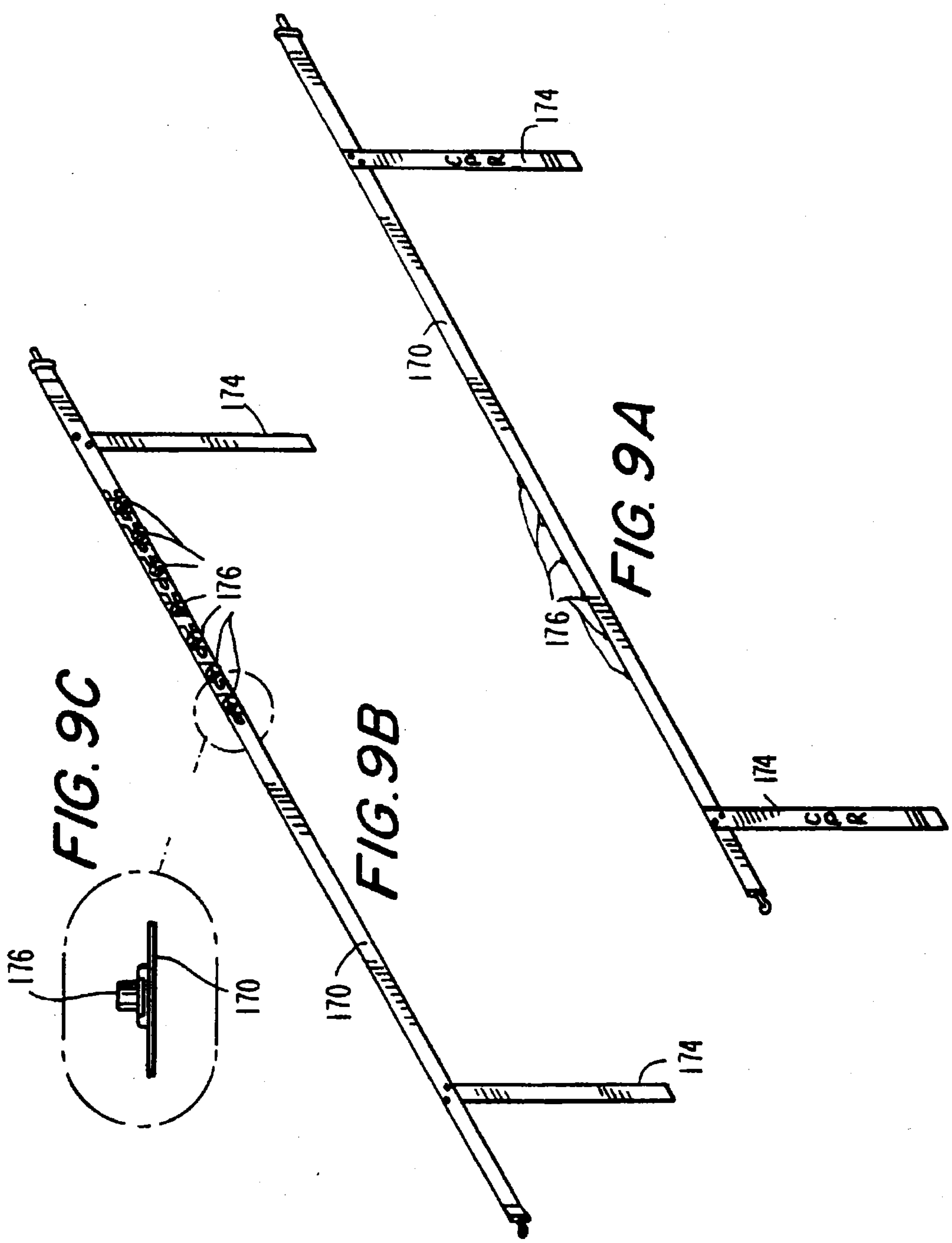


FIG. 9A

FIG. 9B

FIG. 9C

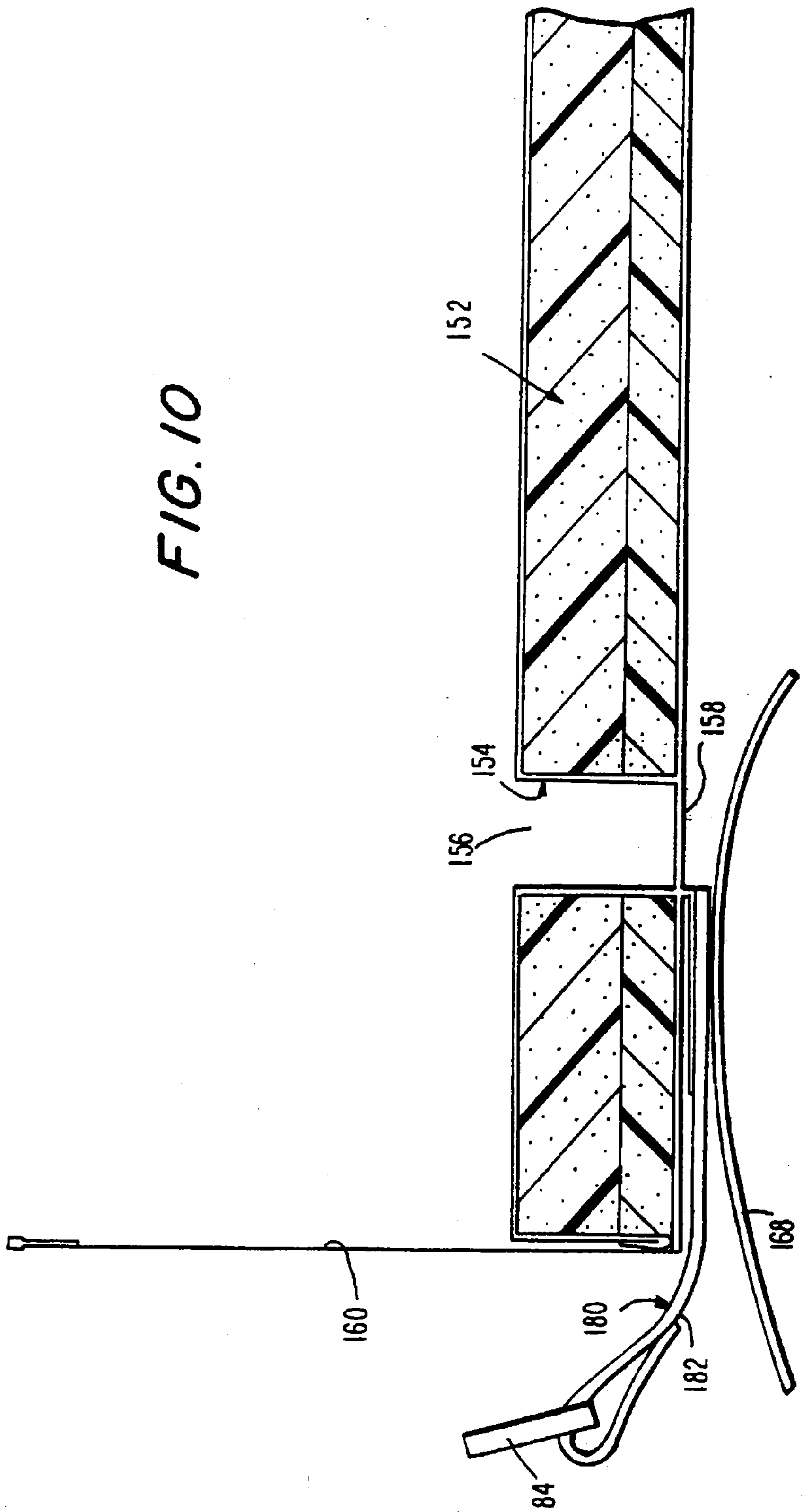


FIG. 10

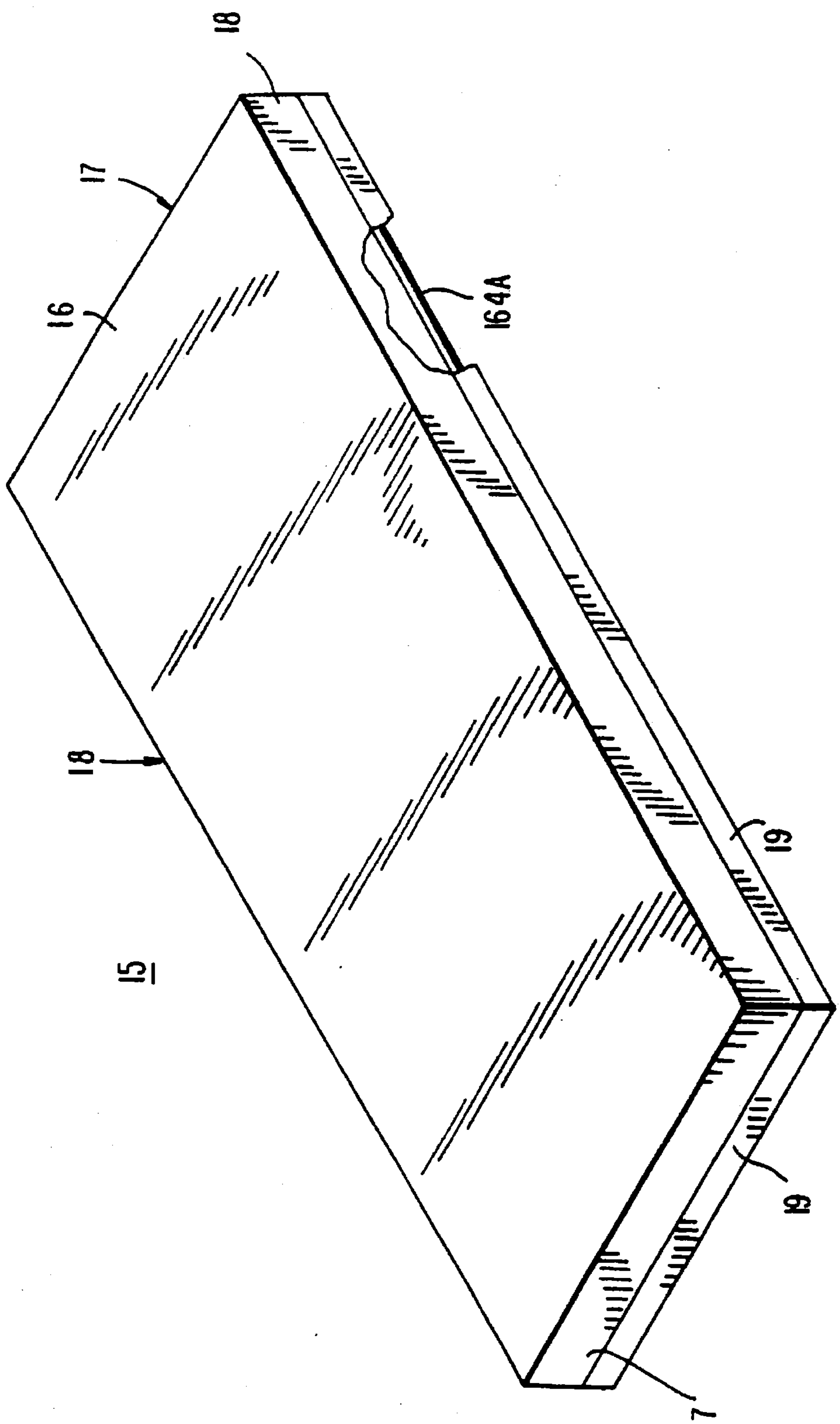


FIG. 11

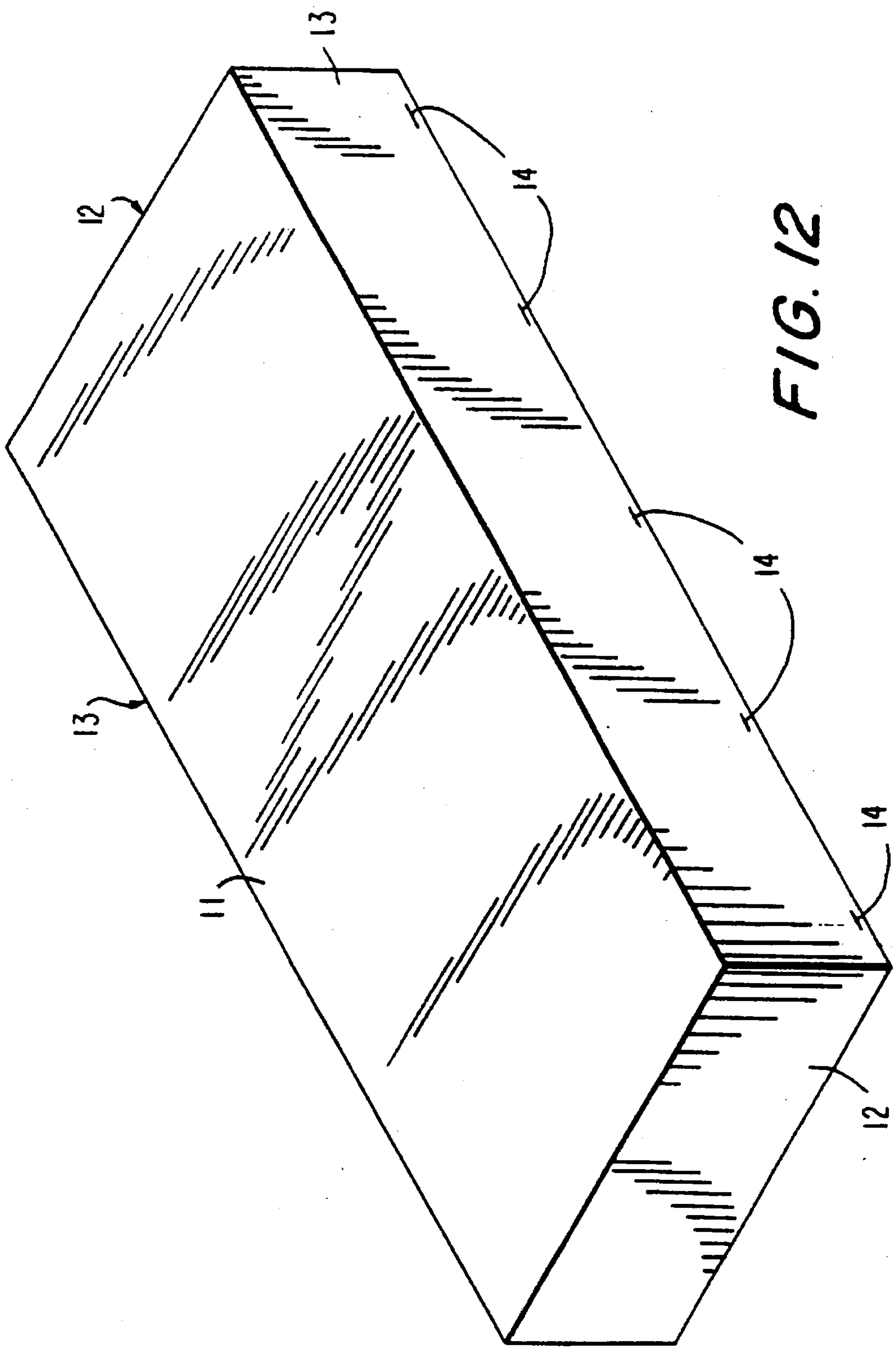


FIG. 12

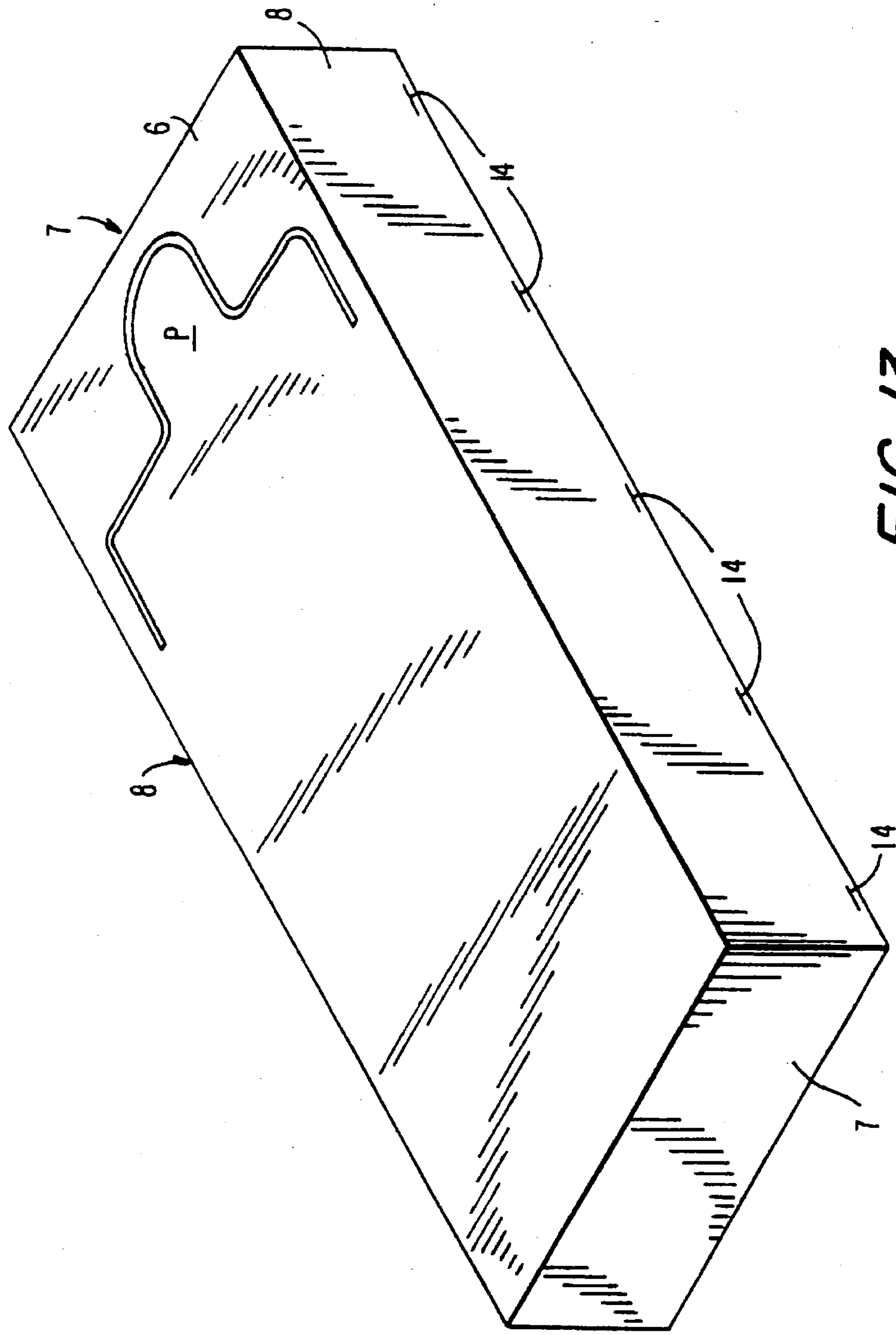


FIG. 13

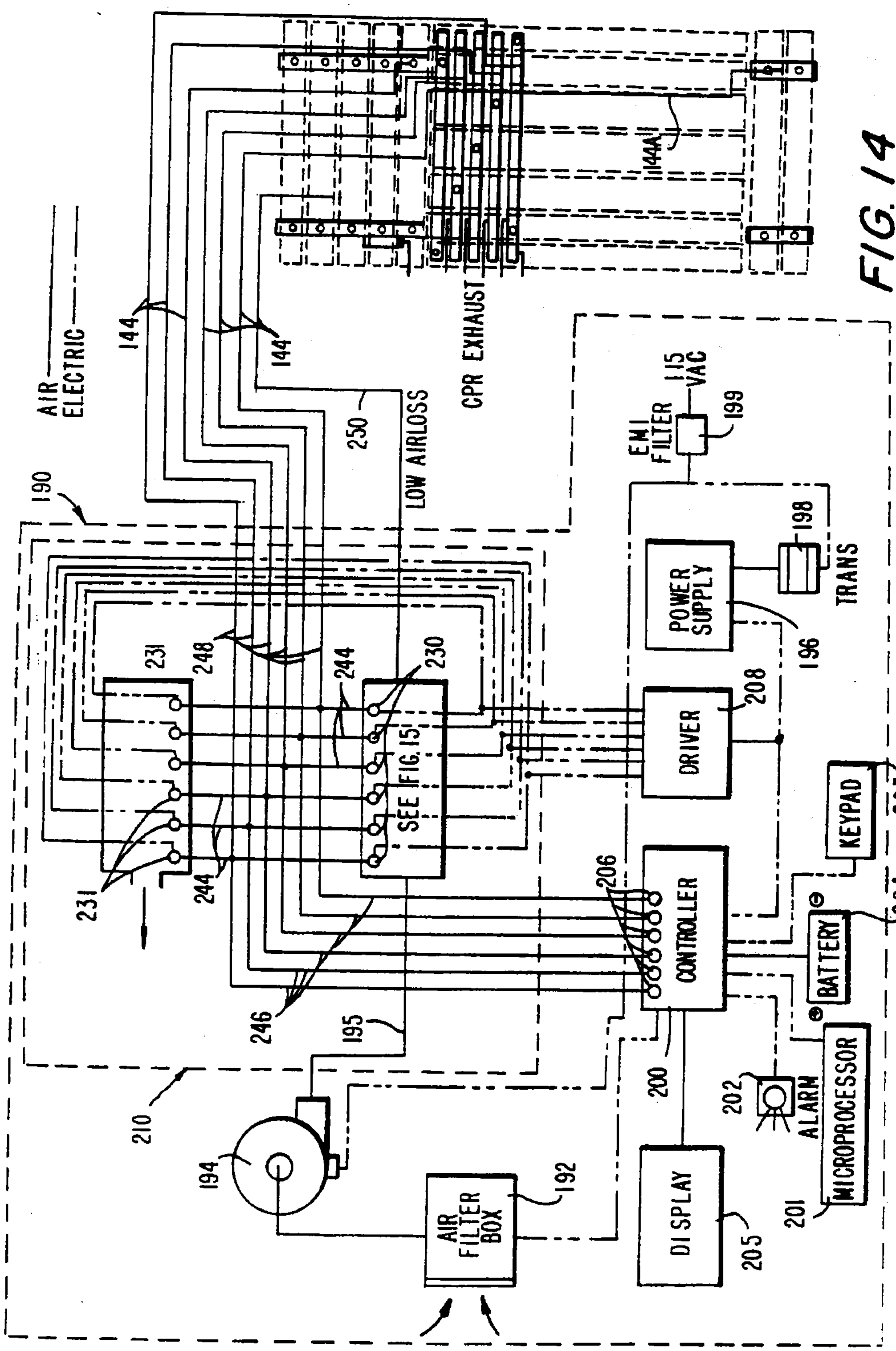

AIR
ELECTRIC
144
144
144A
CPR EXHAUST
LOW AIRLOSS
250
190
EMI FILTER
115 VAC
199
198
TRANS
POWER SUPPLY
196
231
248
244
230
SEE FIG. 15
DRIVER
208
KEYPAD
203
206
CONTROLLER
204
BATTERY
231
244
246
195
210
194
200
202
ALARM
MICROPROCESSOR
192
AIR FILTER BOX
DISPLAY
205
201

FIG. 14

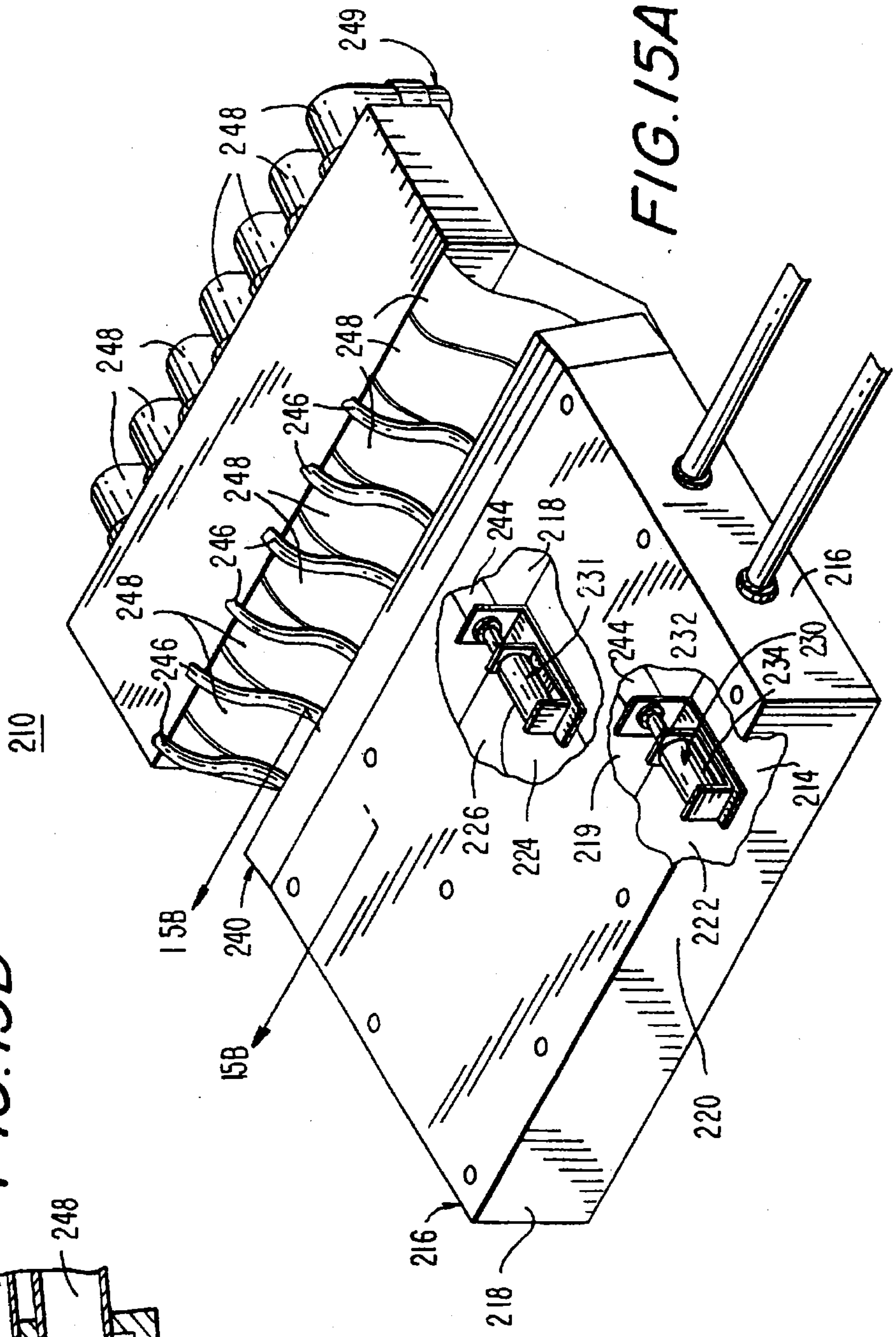


FIG. 15A

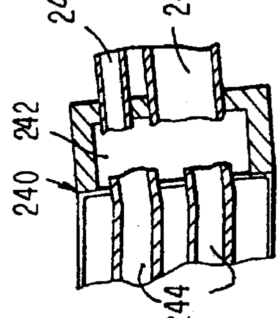


FIG. 15B

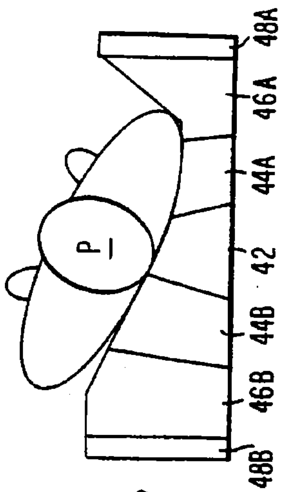


FIG. 16B

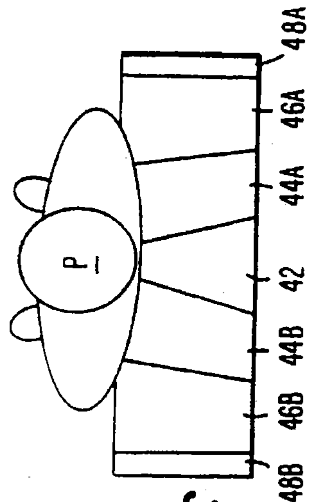


FIG. 16C

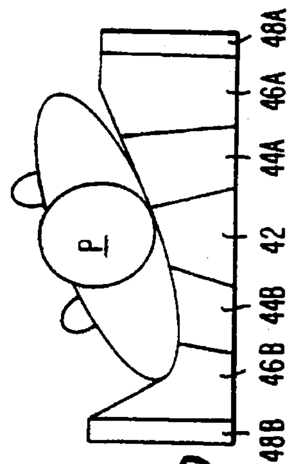


FIG. 16D

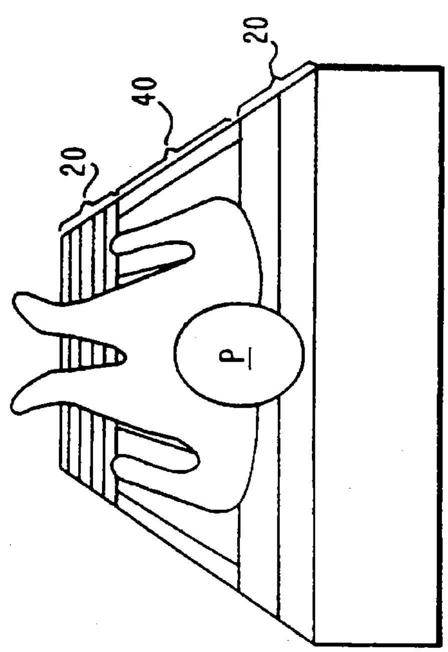
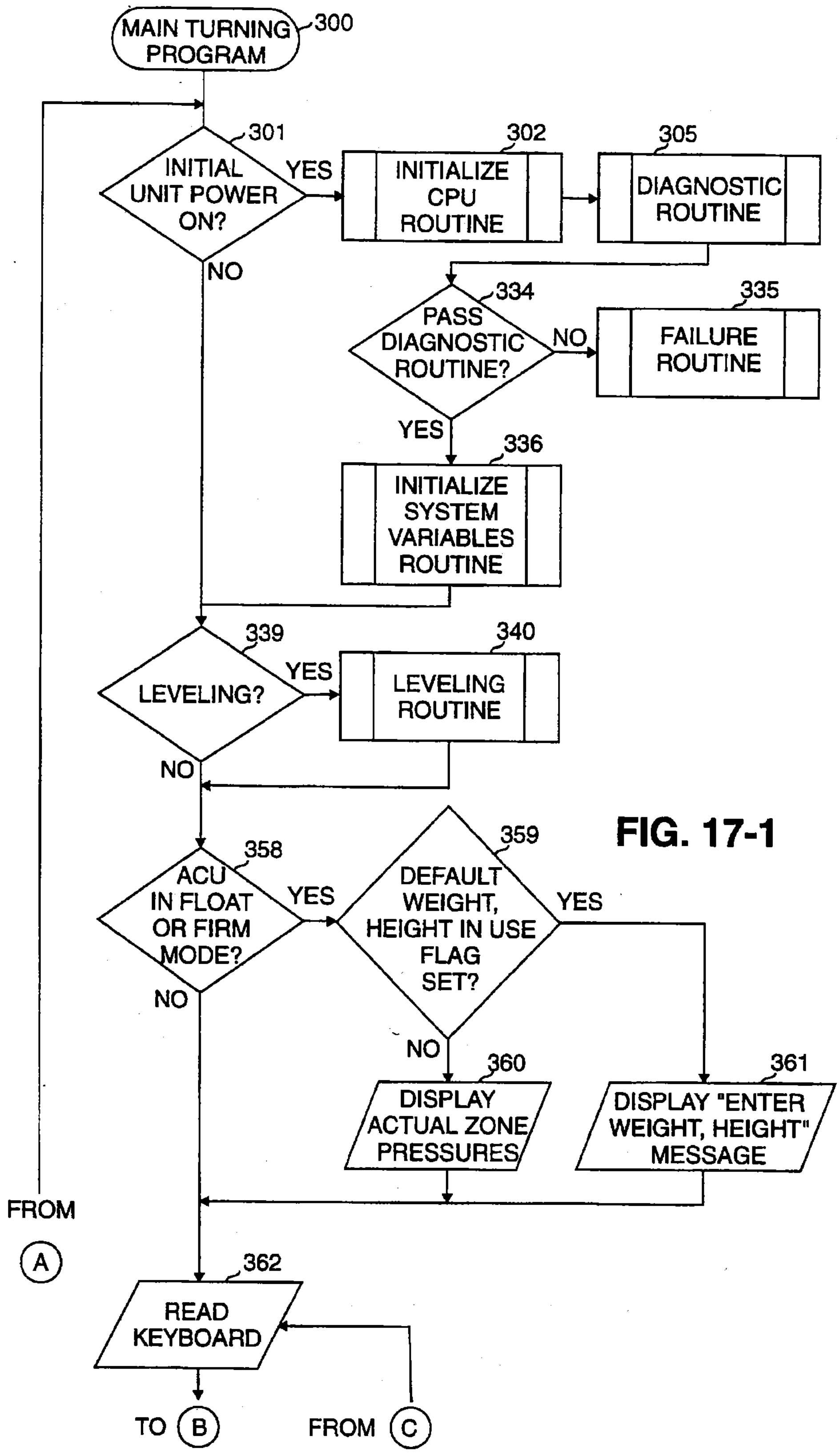


FIG. 16A



MAIN TURNING PROGRAM
300
INITIAL UNIT POWER ON?
301
YES
NO
INITIALIZE CPU ROUTINE
302
DIAGNOSTIC ROUTINE
305
PASS DIAGNOSTIC ROUTINE?
334
NO
FAILURE ROUTINE
335
YES
INITIALIZE SYSTEM VARIABLES ROUTINE
336
LEVELING?
339
YES
LEVELING ROUTINE
340
NO
ACU IN FLOAT OR FIRM MODE?
358
YES
NO
DEFAULT WEIGHT, HEIGHT IN USE FLAG SET?
359
YES
NO
DISPLAY ACTUAL ZONE PRESSURES
360
DISPLAY "ENTER WEIGHT, HEIGHT" MESSAGE
361
FROM
A
READ KEYBOARD
362
TO
B
FROM
C

FIG. 17-1

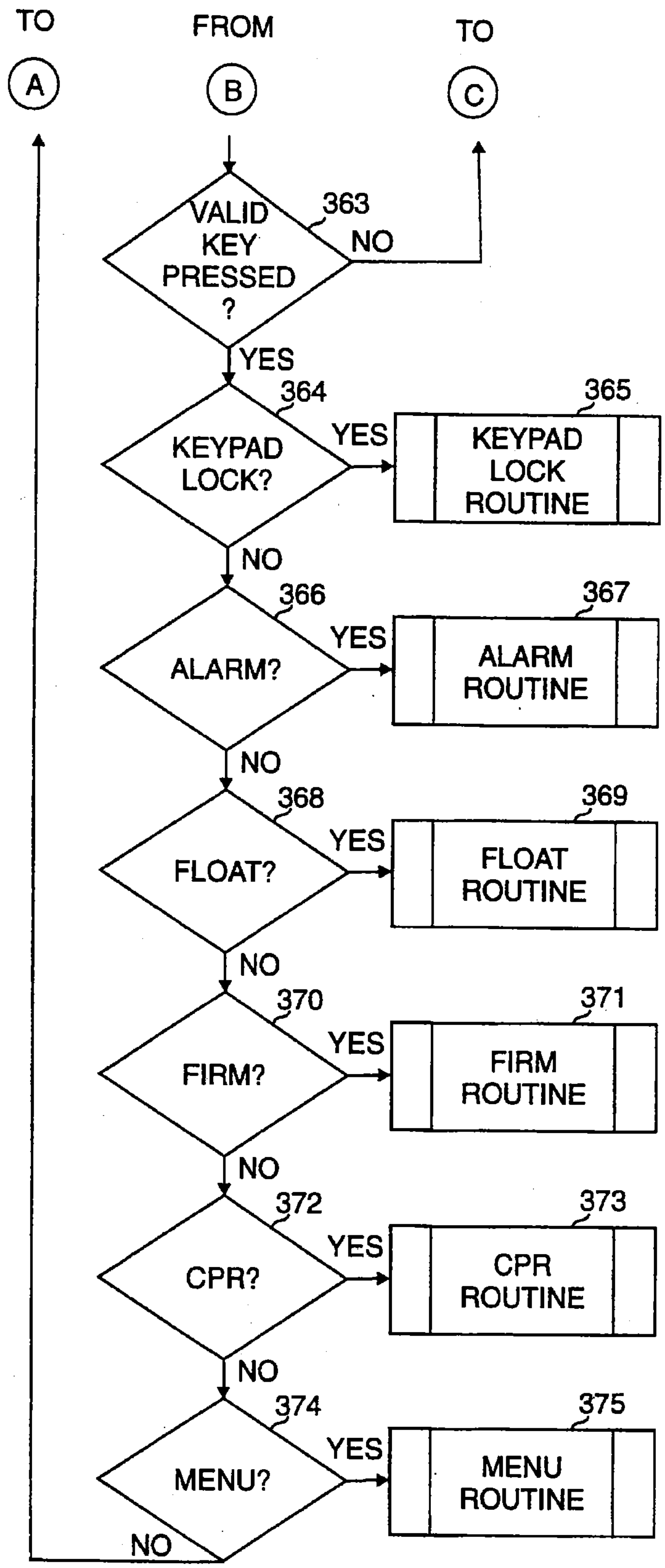

TO
A
FROM
B
TO
C
VALID KEY PRESSED ?
363
NO
YES
364
KEYPAD LOCK?
YES
365
KEYPAD LOCK ROUTINE
NO
366
ALARM?
YES
367
ALARM ROUTINE
NO
368
FLOAT?
YES
369
FLOAT ROUTINE
NO
370
FIRM?
YES
371
FIRM ROUTINE
NO
372
CPR?
YES
373
CPR ROUTINE
NO
374
MENU?
YES
375
MENU ROUTINE
NO

FIG. 17-2

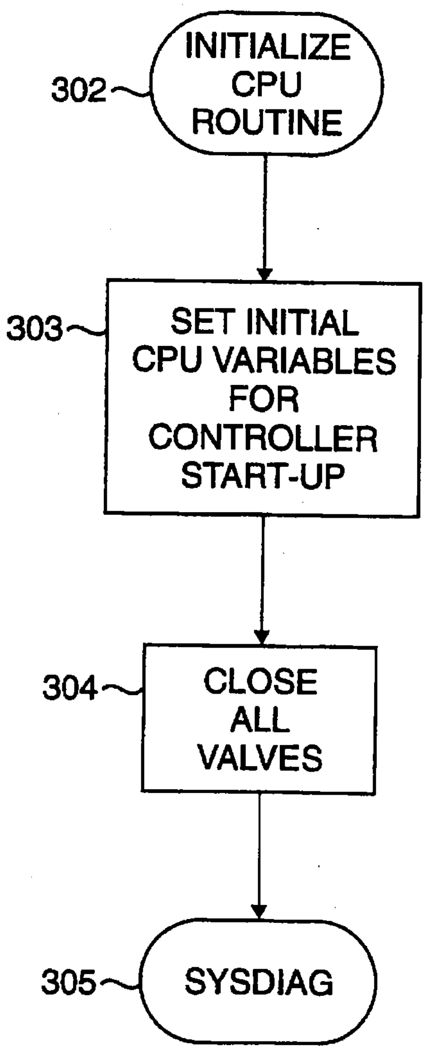

302
INITIALIZE CPU ROUTINE
303
SET INITIAL CPU VARIABLES FOR CONTROLLER START-UP
304
CLOSE ALL VALVES
305
SYSDIAG

FIG. 18

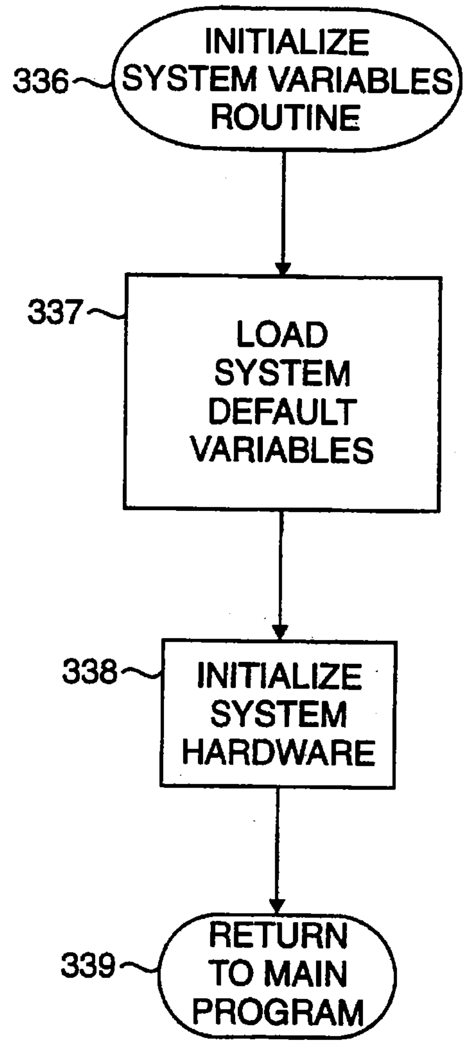

336
INITIALIZE SYSTEM VARIABLES ROUTINE
337
LOAD SYSTEM DEFAULT VARIABLES
338
INITIALIZE SYSTEM HARDWARE
339
RETURN TO MAIN PROGRAM

FIG. 19

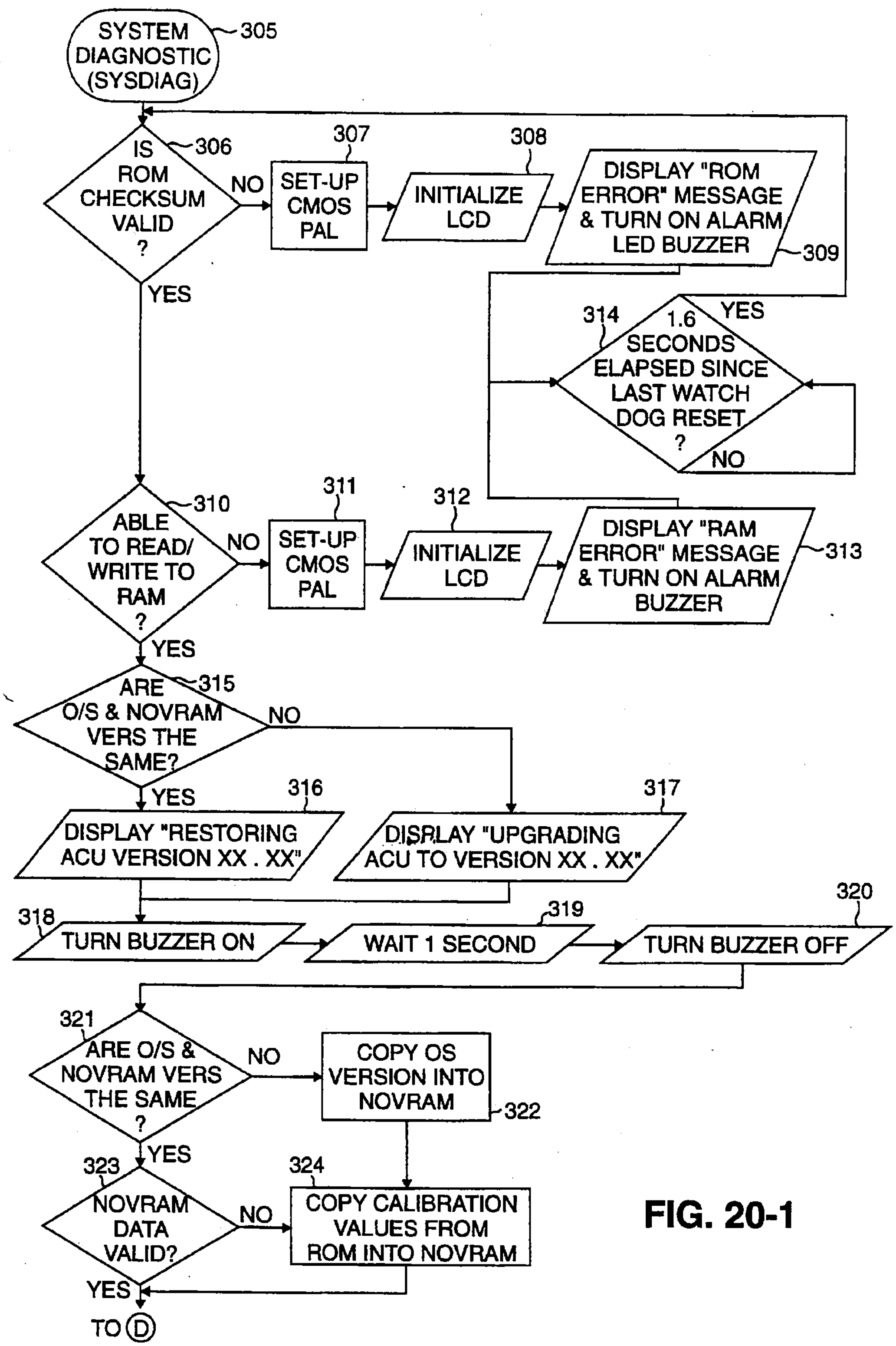

SYSTEM DIAGNOSTIC (SYSDIAG)
305
IS ROM CHECKSUM VALID ?
306
NO
YES
SET-UP CMOS PAL
307
INITIALIZE LCD
308
DISPLAY "ROM ERROR" MESSAGE & TURN ON ALARM LED BUZZER
309
1.6 SECONDS ELAPSED SINCE LAST WATCH DOG RESET ?
314
YES
NO
ABLE TO READ/ WRITE TO RAM ?
310
NO
YES
SET-UP CMOS PAL
311
INITIALIZE LCD
312
DISPLAY "RAM ERROR" MESSAGE & TURN ON ALARM BUZZER
313
ARE O/S & NOVRAM VERS THE SAME?
315
NO
YES
DISPLAY "RESTORING ACU VERSION XX . XX"
316
DISPLAY "UPGRADING ACU TO VERSION XX . XX"
317
TURN BUZZER ON
318
WAIT 1 SECOND
319
TURN BUZZER OFF
320
ARE O/S & NOVRAM VERS THE SAME ?
321
NO
YES
COPY OS VERSION INTO NOVRAM
322
NOVRAM DATA VALID?
323
NO
YES
COPY CALIBRATION VALUES FROM ROM INTO NOVRAM
324
TO D

FIG. 20-1

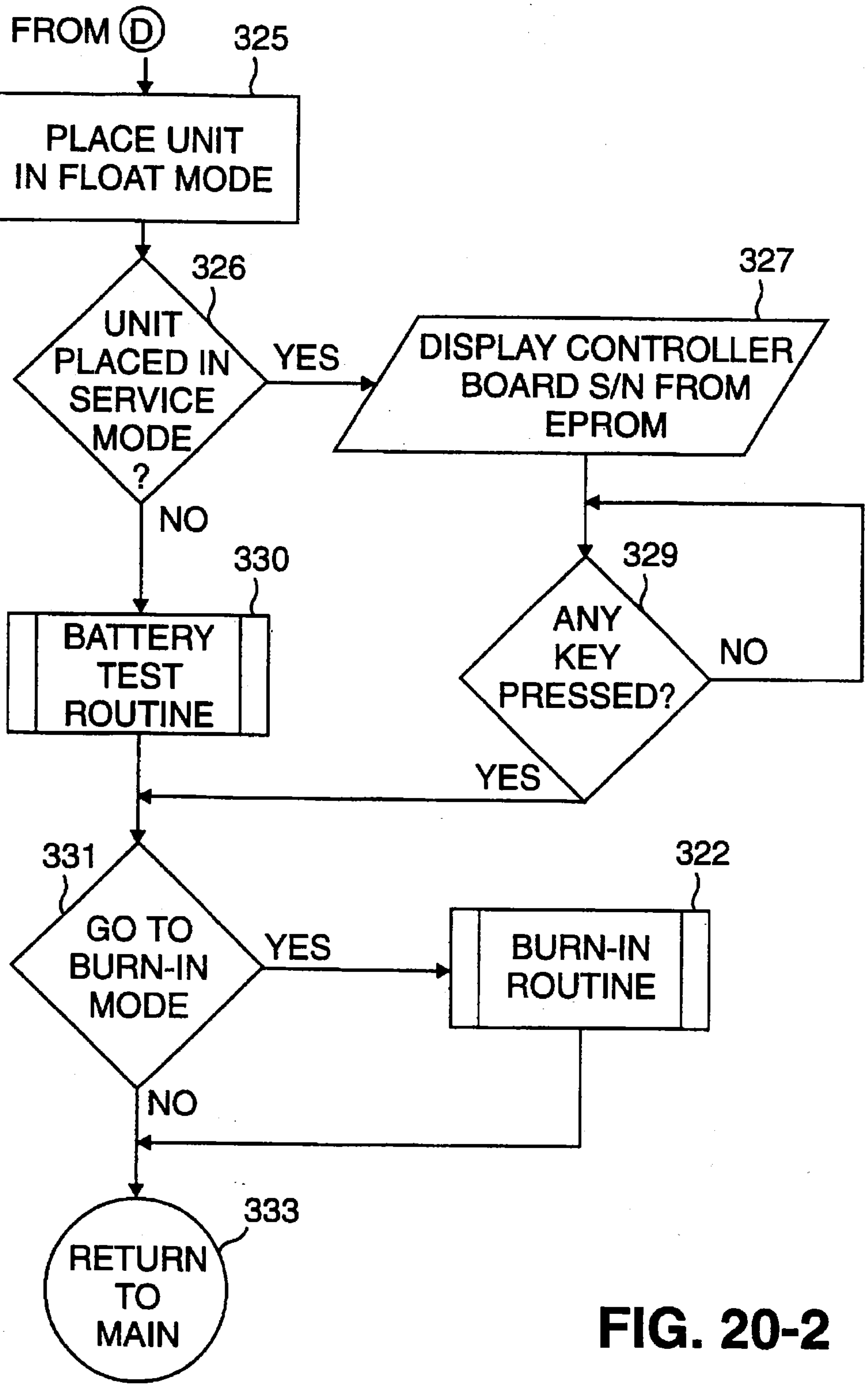

FROM D
325
PLACE UNIT IN FLOAT MODE
326
UNIT PLACED IN SERVICE MODE ?
YES
327
DISPLAY CONTROLLER BOARD S/N FROM EPROM
NO
330
BATTERY TEST ROUTINE
329
ANY KEY PRESSED?
NO
YES
331
GO TO BURN-IN MODE
YES
322
BURN-IN ROUTINE
NO
333
RETURN TO MAIN

FIG. 20-2

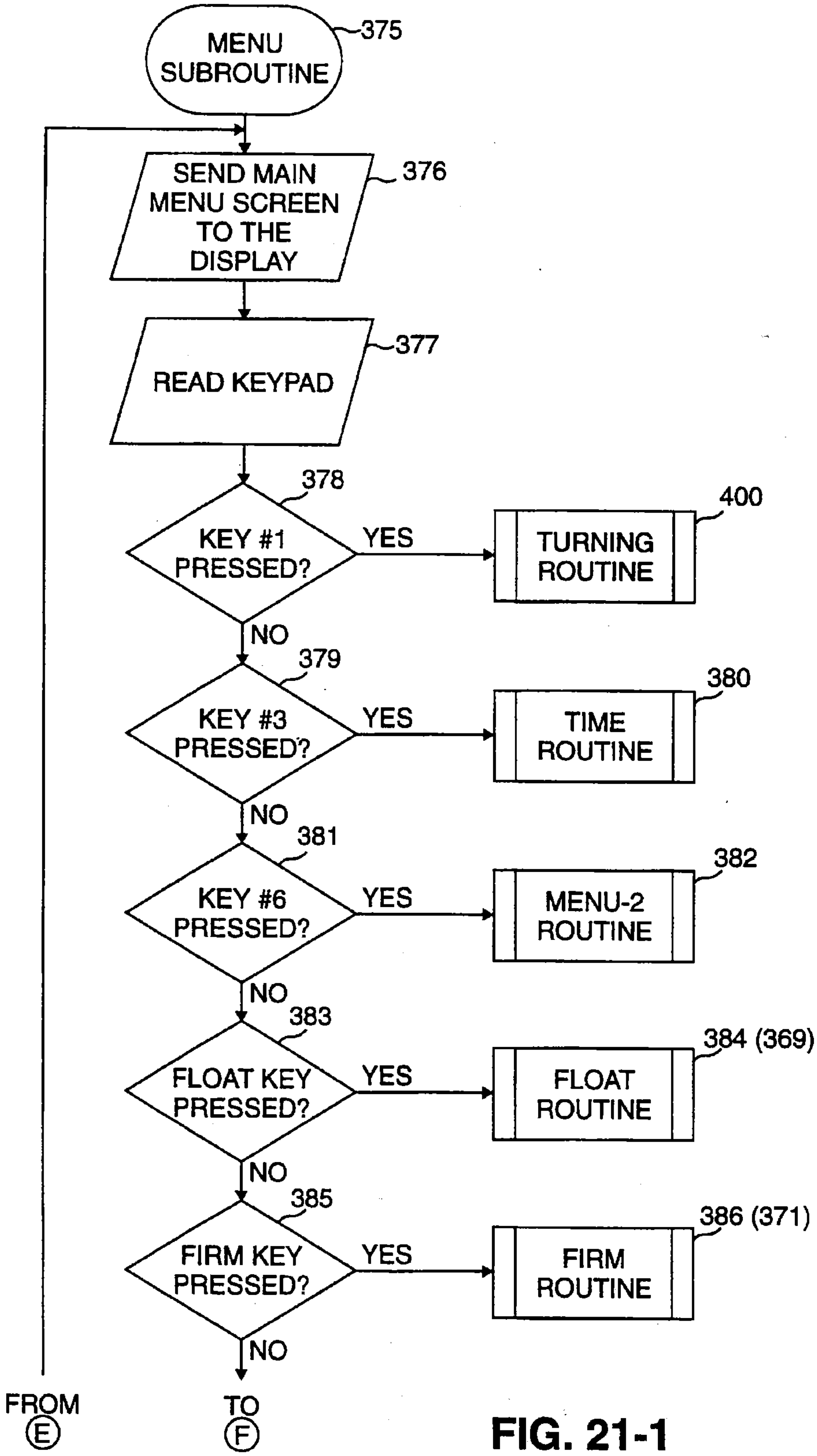
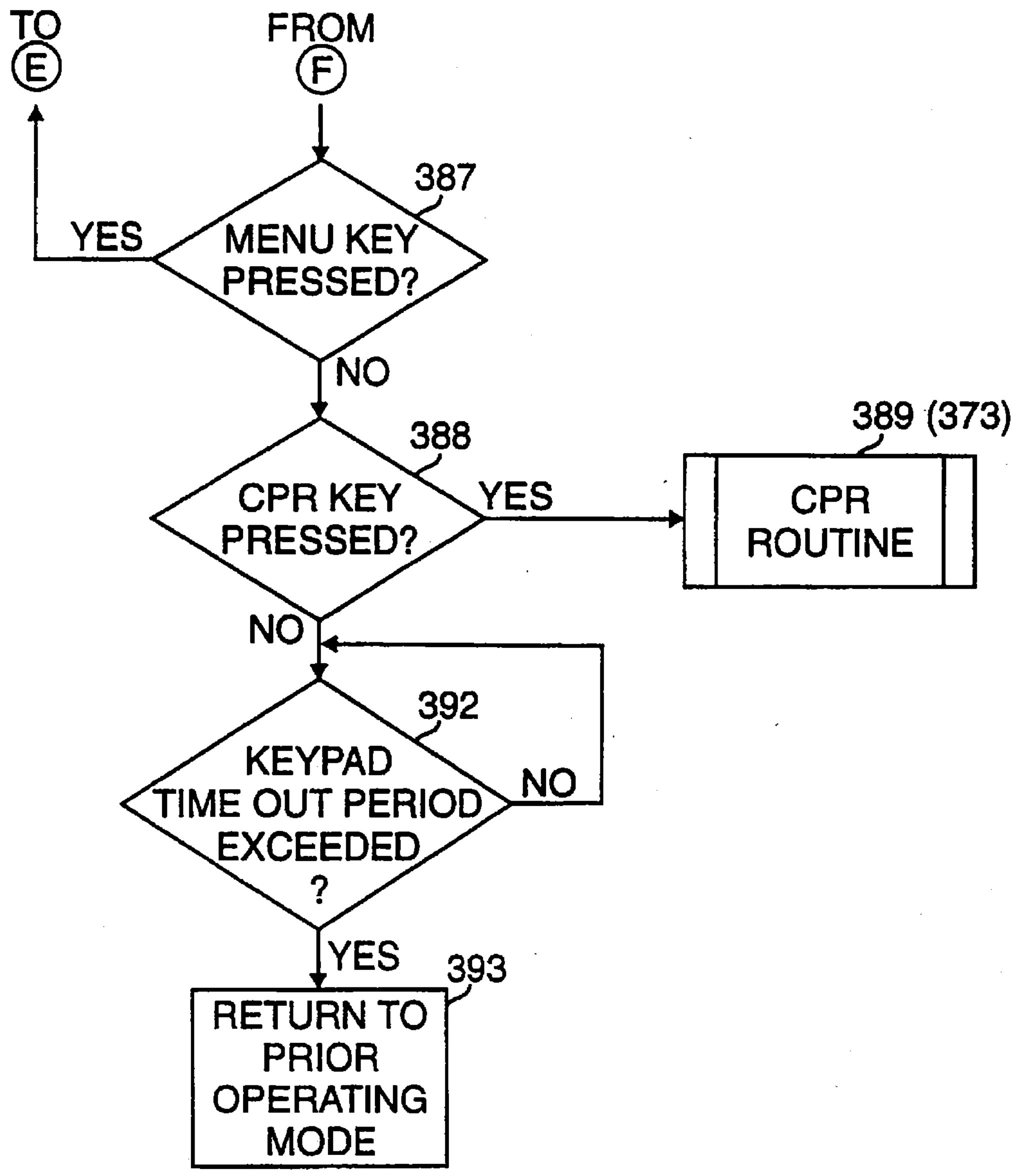

MENU SUBROUTINE
375
SEND MAIN MENU SCREEN TO THE DISPLAY
376
READ KEYPAD
377
378
KEY #1 PRESSED?
YES
TURNING ROUTINE
400
NO
379
KEY #3 PRESSED?
YES
TIME ROUTINE
380
NO
381
KEY #6 PRESSED?
YES
MENU-2 ROUTINE
382
NO
383
FLOAT KEY PRESSED?
YES
FLOAT ROUTINE
384 (369)
NO
385
FIRM KEY PRESSED?
YES
FIRM ROUTINE
386 (371)
NO
FROM E
TO F

FIG. 21-1



TO
E
FROM
F
387
YES
MENU KEY PRESSED?
NO
388
CPR KEY PRESSED?
YES
389 (373)
CPR ROUTINE
NO
392
KEYPAD TIME OUT PERIOD EXCEEDED ?
NO
YES
393
RETURN TO PRIOR OPERATING MODE

FIG. 21-2

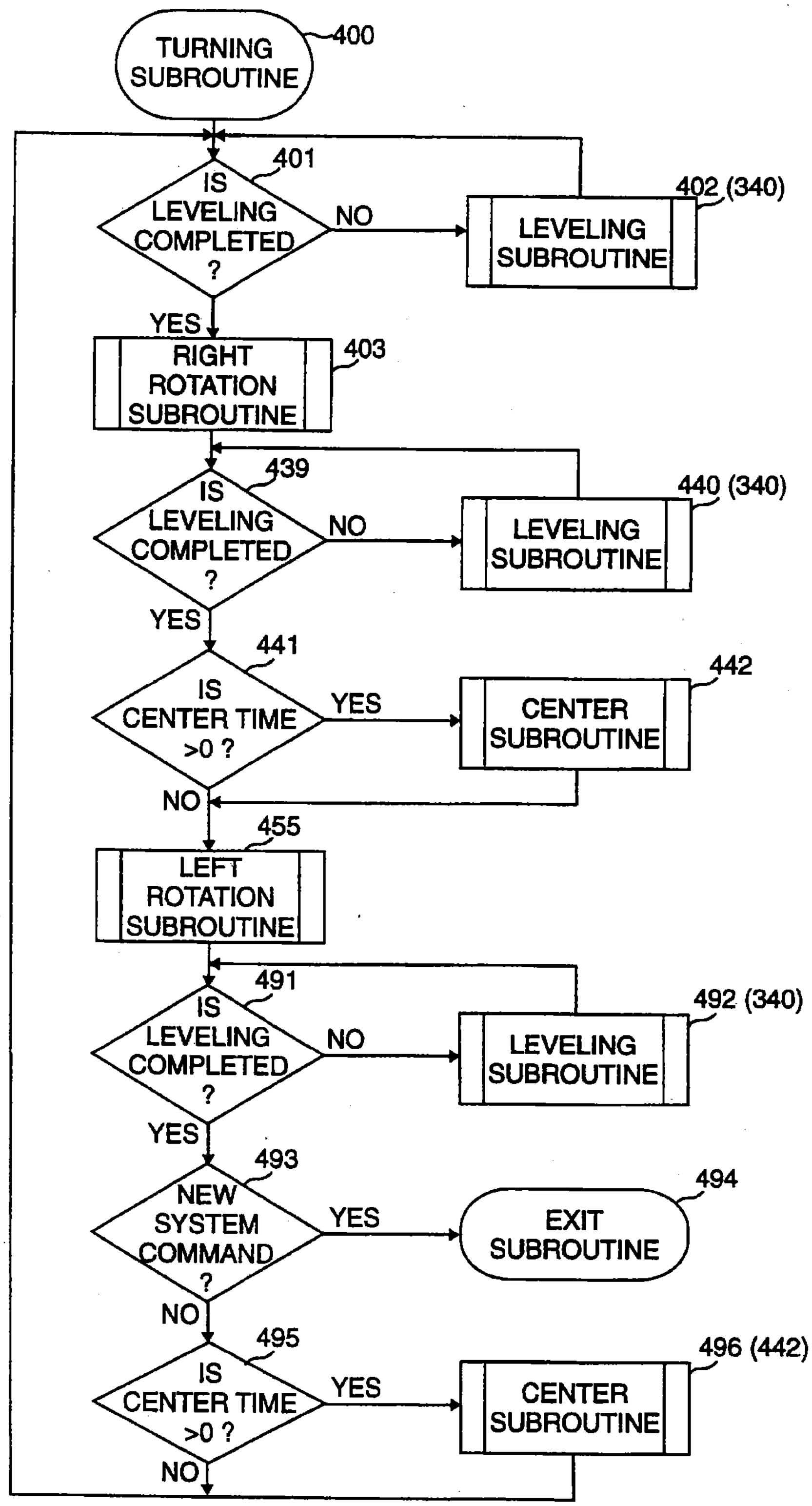

TURNING SUBROUTINE
400
IS LEVELING COMPLETED ?
401
NO
LEVELING SUBROUTINE
402 (340)
YES
RIGHT ROTATION SUBROUTINE
403
IS LEVELING COMPLETED ?
439
NO
LEVELING SUBROUTINE
440 (340)
YES
IS CENTER TIME >0 ?
441
YES
CENTER SUBROUTINE
442
NO
LEFT ROTATION SUBROUTINE
455
IS LEVELING COMPLETED ?
491
NO
LEVELING SUBROUTINE
492 (340)
YES
NEW SYSTEM COMMAND ?
493
YES
EXIT SUBROUTINE
494
NO
IS CENTER TIME >0 ?
495
YES
CENTER SUBROUTINE
496 (442)
NO

FIG. 22

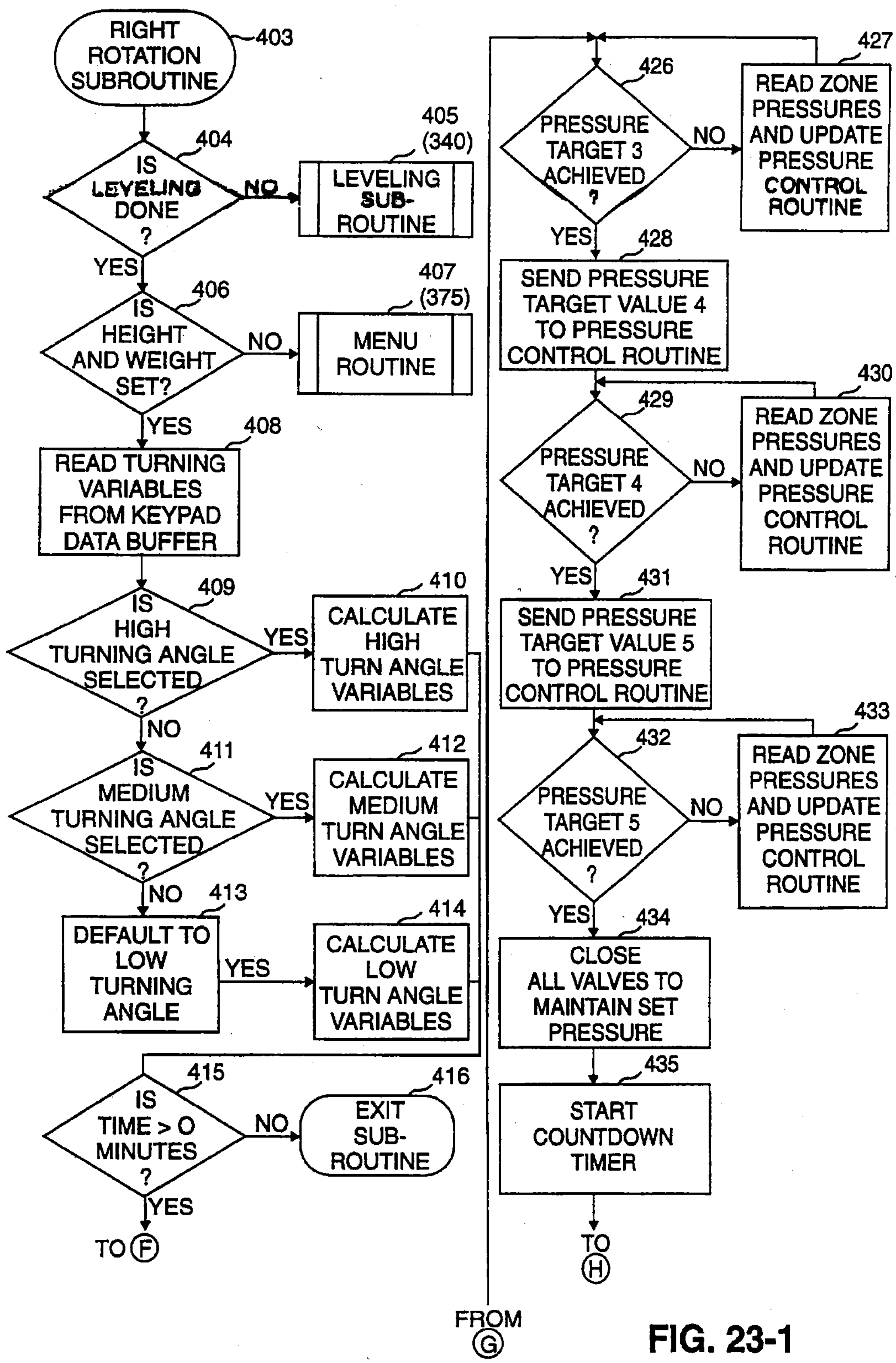

RIGHT ROTATION SUBROUTINE
403
404
IS LEVELING DONE ?
NO
YES
405 (340)
LEVELING SUB-ROUTINE
406
IS HEIGHT AND WEIGHT SET?
NO
YES
407 (375)
MENU ROUTINE
408
READ TURNING VARIABLES FROM KEYPAD DATA BUFFER
409
IS HIGH TURNING ANGLE SELECTED ?
YES
NO
410
CALCULATE HIGH TURN ANGLE VARIABLES
411
IS MEDIUM TURNING ANGLE SELECTED ?
YES
NO
412
CALCULATE MEDIUM TURN ANGLE VARIABLES
413
DEFAULT TO LOW TURNING ANGLE
YES
414
CALCULATE LOW TURN ANGLE VARIABLES
415
IS TIME > O MINUTES ?
NO
YES
416
EXIT SUB-ROUTINE
TO F
426
PRESSURE TARGET 3 ACHIEVED ?
NO
YES
427
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
428
SEND PRESSURE TARGET VALUE 4 TO PRESSURE CONTROL ROUTINE
429
PRESSURE TARGET 4 ACHIEVED ?
NO
YES
430
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
431
SEND PRESSURE TARGET VALUE 5 TO PRESSURE CONTROL ROUTINE
432
PRESSURE TARGET 5 ACHIEVED ?
NO
YES
433
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
434
CLOSE ALL VALVES TO MAINTAIN SET PRESSURE
435
START COUNTDOWN TIMER
TO H
FROM G

FIG. 23-1

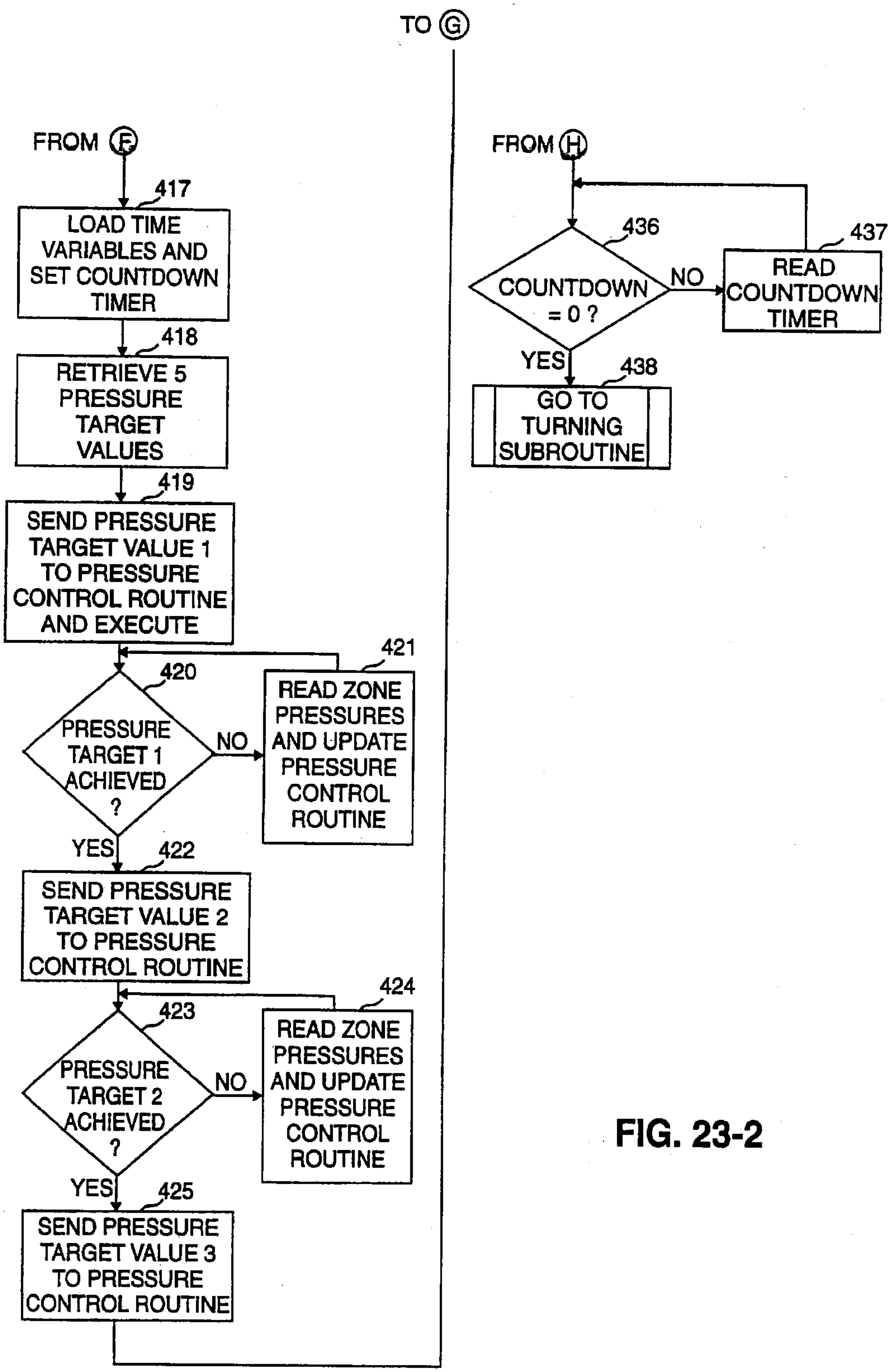

TO G
FROM F
417
LOAD TIME VARIABLES AND SET COUNTDOWN TIMER
418
RETRIEVE 5 PRESSURE TARGET VALUES
419
SEND PRESSURE TARGET VALUE 1 TO PRESSURE CONTROL ROUTINE AND EXECUTE
420
PRESSURE TARGET 1 ACHIEVED ?
NO
421
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
YES
422
SEND PRESSURE TARGET VALUE 2 TO PRESSURE CONTROL ROUTINE
423
PRESSURE TARGET 2 ACHIEVED ?
NO
424
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
YES
425
SEND PRESSURE TARGET VALUE 3 TO PRESSURE CONTROL ROUTINE
FROM H
436
COUNTDOWN = 0 ?
NO
437
READ COUNTDOWN TIMER
YES
438
GO TO TURNING SUBROUTINE

FIG. 23-2

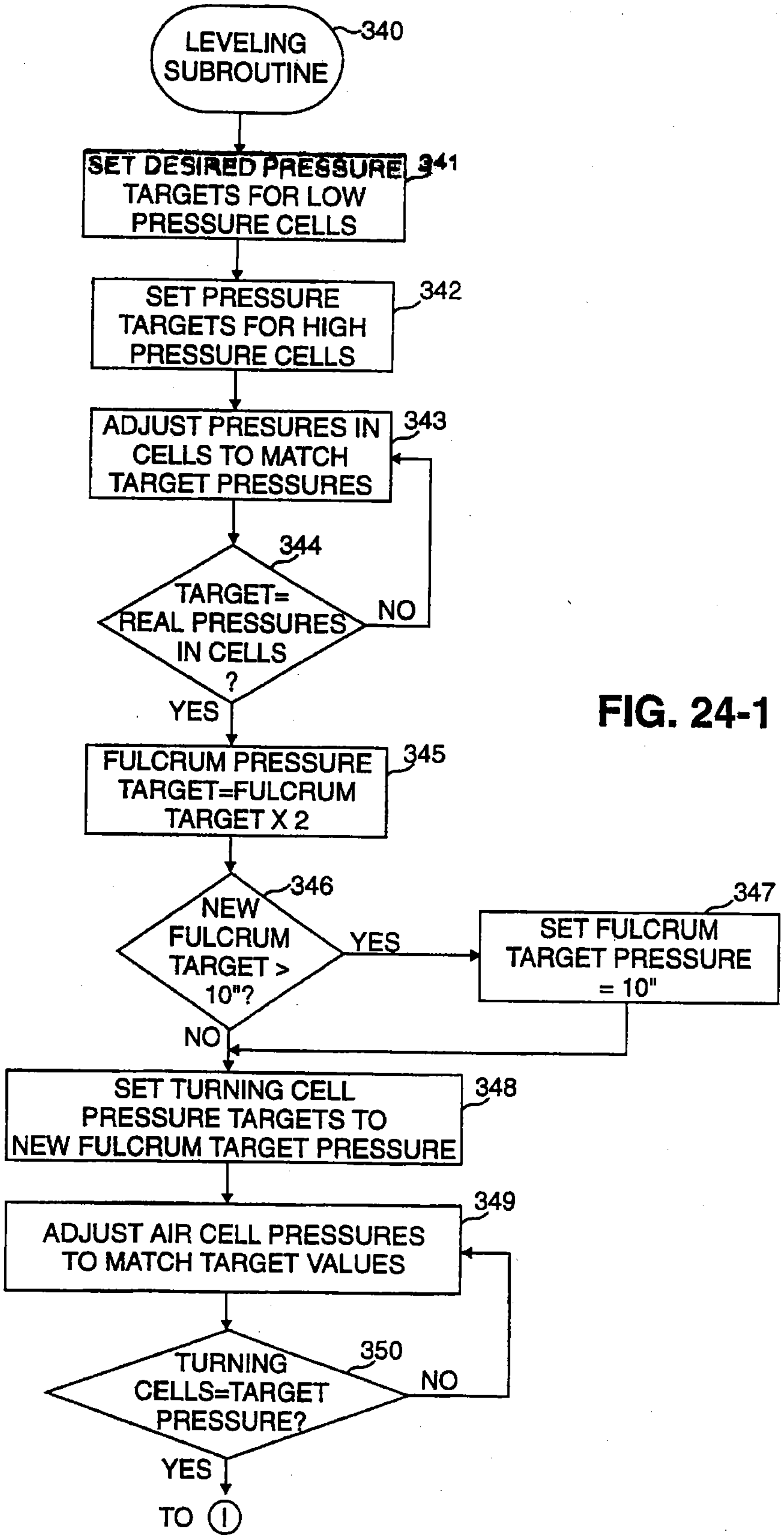

LEVELING SUBROUTINE
340
SET DESIRED PRESSURE TARGETS FOR LOW PRESSURE CELLS
341
SET PRESSURE TARGETS FOR HIGH PRESSURE CELLS
342
ADJUST PRESURES IN CELLS TO MATCH TARGET PRESSURES
343
TARGET= REAL PRESSURES IN CELLS ?
344
NO
YES
FULCRUM PRESSURE TARGET=FULCRUM TARGET X 2
345
NEW FULCRUM TARGET > 10"?
346
YES
SET FULCRUM TARGET PRESSURE = 10"
347
NO
SET TURNING CELL PRESSURE TARGETS TO NEW FULCRUM TARGET PRESSURE
348
ADJUST AIR CELL PRESSURES TO MATCH TARGET VALUES
349
TURNING CELLS=TARGET PRESSURE?
350
NO
YES
TO 1

FIG. 24-1

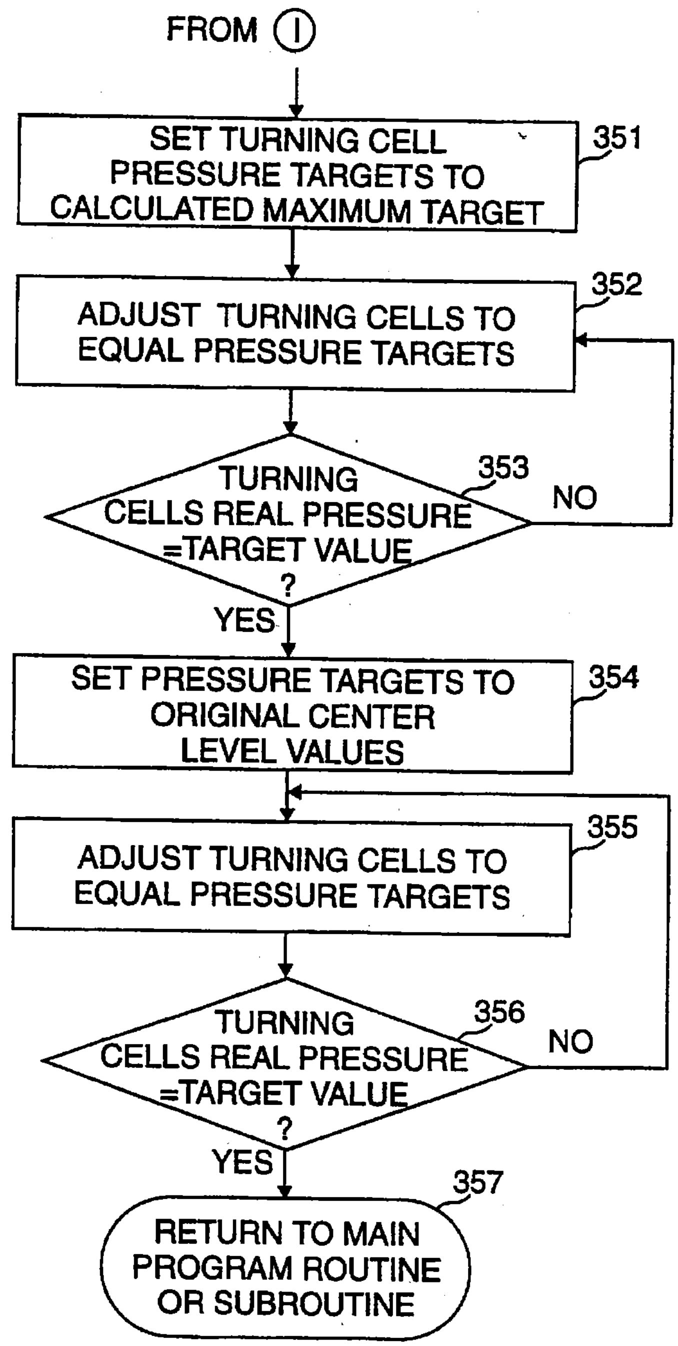

FROM I
SET TURNING CELL PRESSURE TARGETS TO CALCULATED MAXIMUM TARGET
351
ADJUST TURNING CELLS TO EQUAL PRESSURE TARGETS
352
TURNING CELLS REAL PRESSURE =TARGET VALUE ?
353
NO
YES
SET PRESSURE TARGETS TO ORIGINAL CENTER LEVEL VALUES
354
ADJUST TURNING CELLS TO EQUAL PRESSURE TARGETS
355
TURNING CELLS REAL PRESSURE =TARGET VALUE ?
356
NO
YES
RETURN TO MAIN PROGRAM ROUTINE OR SUBROUTINE
357

FIG. 24-2

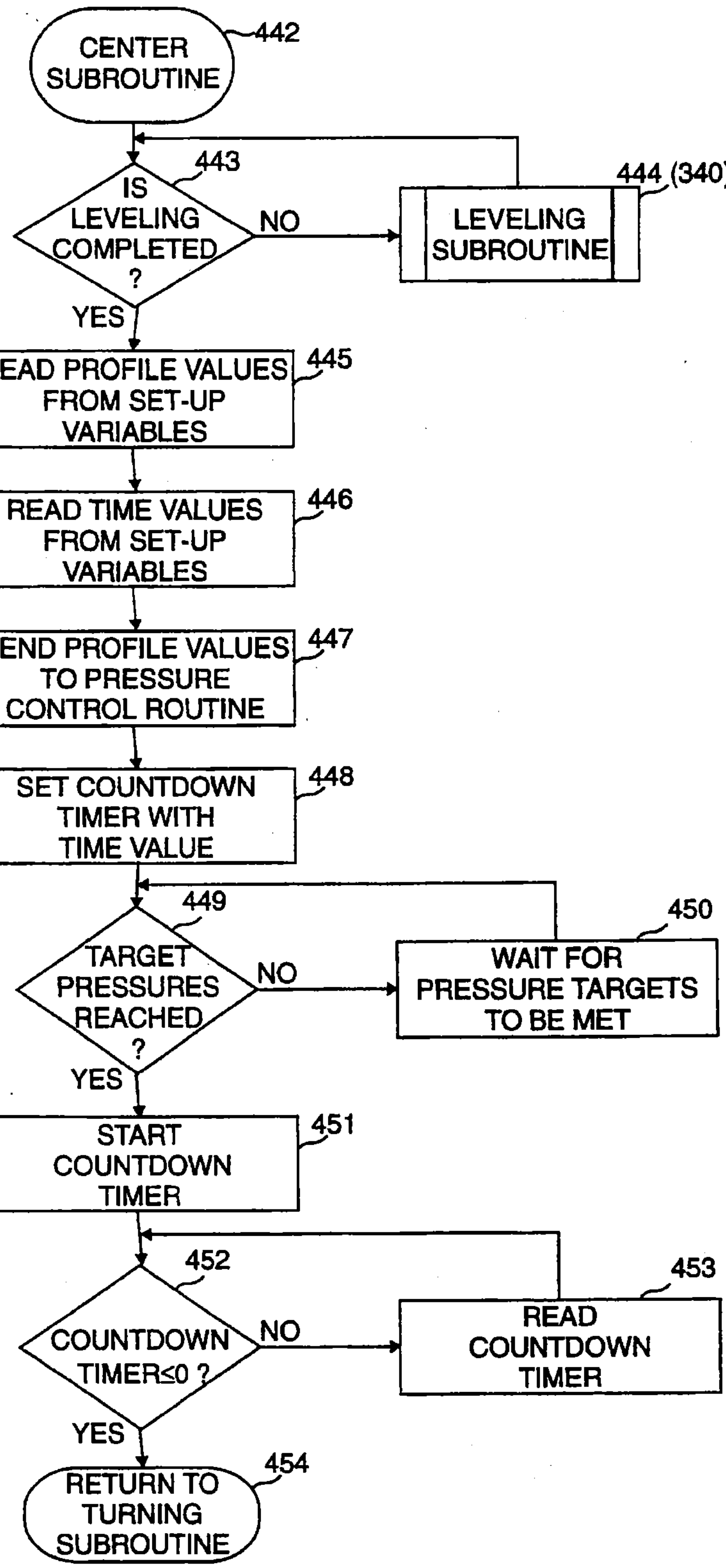

CENTER SUBROUTINE
442
IS LEVELING COMPLETED ?
443
NO
LEVELING SUBROUTINE
444 (340)
YES
READ PROFILE VALUES FROM SET-UP VARIABLES
445
READ TIME VALUES FROM SET-UP VARIABLES
446
SEND PROFILE VALUES TO PRESSURE CONTROL ROUTINE
447
SET COUNTDOWN TIMER WITH TIME VALUE
448
TARGET PRESSURES REACHED ?
449
NO
WAIT FOR PRESSURE TARGETS TO BE MET
450
YES
START COUNTDOWN TIMER
451
COUNTDOWN TIMER≤0 ?
452
NO
READ COUNTDOWN TIMER
453
YES
RETURN TO TURNING SUBROUTINE
454

FIG. 25

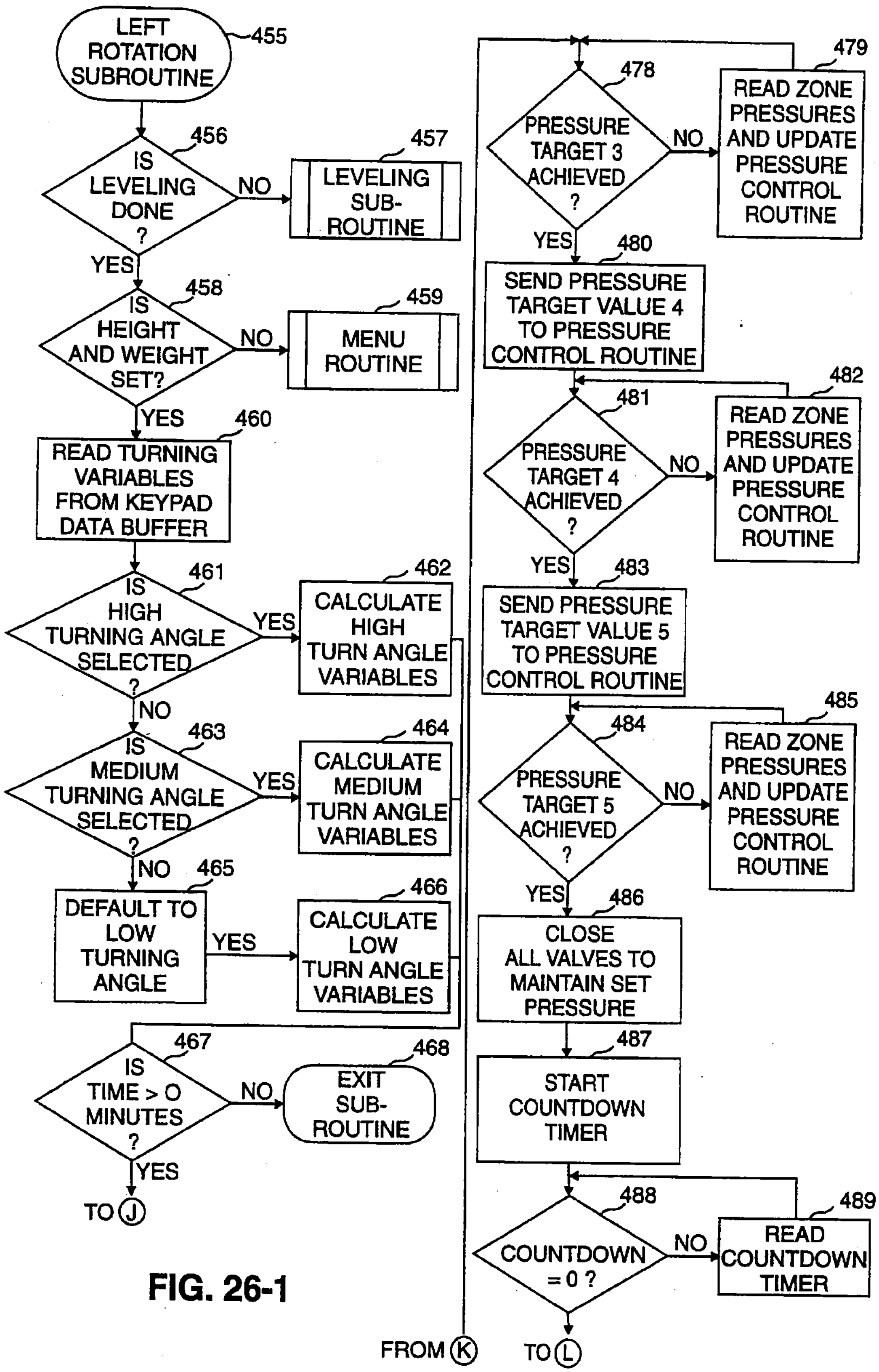

LEFT ROTATION SUBROUTINE
455
IS LEVELING DONE ?
456
NO
LEVELING SUB-ROUTINE
457
YES
IS HEIGHT AND WEIGHT SET?
458
NO
MENU ROUTINE
459
YES
READ TURNING VARIABLES FROM KEYPAD DATA BUFFER
460
IS HIGH TURNING ANGLE SELECTED ?
461
YES
CALCULATE HIGH TURN ANGLE VARIABLES
462
NO
IS MEDIUM TURNING ANGLE SELECTED ?
463
YES
CALCULATE MEDIUM TURN ANGLE VARIABLES
464
NO
DEFAULT TO LOW TURNING ANGLE
465
YES
CALCULATE LOW TURN ANGLE VARIABLES
466
IS TIME > O MINUTES ?
467
NO
EXIT SUB-ROUTINE
468
YES
TO J
PRESSURE TARGET 3 ACHIEVED ?
478
NO
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
479
YES
SEND PRESSURE TARGET VALUE 4 TO PRESSURE CONTROL ROUTINE
480
PRESSURE TARGET 4 ACHIEVED ?
481
NO
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
482
YES
SEND PRESSURE TARGET VALUE 5 TO PRESSURE CONTROL ROUTINE
483
PRESSURE TARGET 5 ACHIEVED ?
484
NO
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
485
YES
CLOSE ALL VALVES TO MAINTAIN SET PRESSURE
486
START COUNTDOWN TIMER
487
COUNTDOWN = 0 ?
488
NO
READ COUNTDOWN TIMER
489
FROM K
TO L

FIG. 26-1

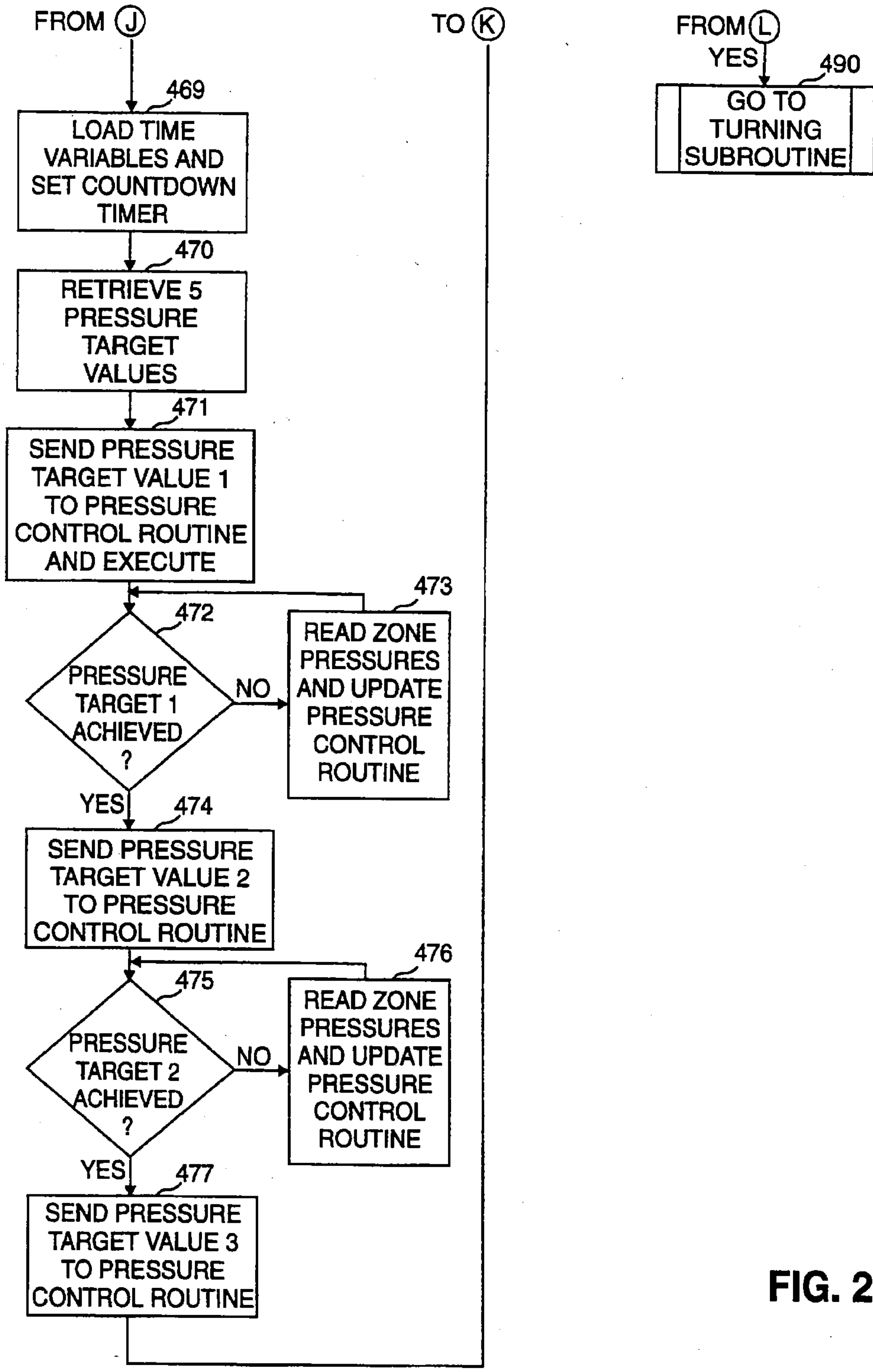

FROM J
TO K
FROM L
YES
490
GO TO TURNING SUBROUTINE
469
LOAD TIME VARIABLES AND SET COUNTDOWN TIMER
470
RETRIEVE 5 PRESSURE TARGET VALUES
471
SEND PRESSURE TARGET VALUE 1 TO PRESSURE CONTROL ROUTINE AND EXECUTE
472
PRESSURE TARGET 1 ACHIEVED ?
NO
473
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
YES
474
SEND PRESSURE TARGET VALUE 2 TO PRESSURE CONTROL ROUTINE
475
PRESSURE TARGET 2 ACHIEVED ?
NO
476
READ ZONE PRESSURES AND UPDATE PRESSURE CONTROL ROUTINE
YES
477
SEND PRESSURE TARGET VALUE 3 TO PRESSURE CONTROL ROUTINE

FIG. 26-2

TURNING AIR MATTRESS

FIELD OF THE INVENTION

This invention relates to air support beds and, more particularly, to an air support mattress that facilitates the therapeutic benefits of turning a patient.

BACKGROUND OF THE INVENTION

Many patients are confined to a bed for extended periods of time for a variety of reasons. Lengthy bed stays, especially where the patient is elderly, unable to or too weak to move, or simply lethargic, can cause additional complications that could be as serious or more threatening than the underlying ailment requiring the bed rest.

Bed sores and decubitus ulcers are some of the common problems that arise for bedridden individuals. During a lengthy stay in bed, the weight of various body parts tend to press the tissue against the bed mattress at a pressure exceeding the capillary occlusion pressure in that area. As a result, there is a significant reduction of blood flow through the tissue which, in areas of bony prominence such as the heel and hip, can result in the development of deep penetrating ulcers.

Another common problem for bedridden individuals is the accumulation of pulmonary fluids in a patient's lungs, especially for those suffering from trauma such as surgery. As a result, the patient is more susceptible to respiratory illnesses, such as pneumonia.

A further common problem for bedridden individuals is the lack of proper stimulation of a patient's kidneys and lymphatic system. The kidneys and lymphatic system are normally stimulated by the movement of the patient's large muscles, such as the leg or arm muscles. The lack of patient activity allows toxins and excess body fluids to build up which, in turn, slows the healing process.

However, it has been found that turning bedridden patients has many therapeutic benefits that combat the occurrence of such complications in patients. Turning a patient to different positions serves to reduce the interface pressure on a patient's skin over a large portion of the patient's body, and thus diminishes the likelihood that decubitus ulcers will develop. The turning action also serves to stimulate the patient's kidneys and lymphatic system, and thus diminishes the presence of toxins and fluids that tend to build up from a lack of patient activity. Additionally, the rotation of the patient's body aids the patient's lungs in eliminating the accumulation of pulmonary fluids, causing a "respiratory toilet" effect, and thus diminishing the likelihood of respiratory complications.

A number of different devices have been developed to accomplish patient turning with an air support mattress. All of these devices, however, utilize the basic underlying concept of inflating and deflating adjacent air cells or groups of air cells to accomplish patient turning. Some of the more common turning air mattress devices include the use of a group of full body length turning cells which are inflated and deflated in a specific sequence in order to turn a patient. Variations on this concept include longitudinal cells being used in combination with transverse cells and/or being overlaid on top of other air cells to prevent a patient from "bottoming out" during the turning process. Another device utilizes a matrix of small cells arranged to fully support the patient in which a combination of cells is inflated and deflated in specific order to turn the patient. A further device employs the use of air cells that have a cutaway design in alternating orientation between adjacent air cells, such that a cavity is formed for the patient to rotate into.

Notwithstanding the therapeutic benefits these turning mattresses may provide, they are not without shortcomings. These turning air mattresses do not necessarily ensure that the patient is in proper spinal alignment during the turning process. As a result, undue stress may be placed on the patient's spinal column which may cause the patient to experience severe discomfort and possibly spinal injury. Poor spinal alignment tends to be caused by the turning mattress's inability to properly adjust the leg and foot angle or maintain the leg and foot at a proper angle relative to the patient's torso during the turning operation, or the turning mattress's inability to restore a patient to the center position of the mattress surface after completing a turn to prevent or reduce a patient's tendency to drift to one side of the bed during the turning operation.

Therefore, it would be desirable to have a turning air mattress that is capable of reducing the stress on a patient's spinal column created during the turning process by having the ability to restore a patient to a center position on the mattress surface, to reduce the patient's tendency to drift during the turning operation, to properly adjust the angle or maintain a proper angle of a patient's leg and foot during the turning operation, and to generally maintain proper spinal alignment.

SUMMARY OF THE INVENTION

The turning air mattress of the present invention serves to facilitate the therapeutic benefits of turning a bed ridden patient by tending to reduce the stress on a patient's spinal column created during the turning process and by generally maintaining proper spinal alignment of a patient's spine.

According to an exemplary embodiment of the present invention, the turning air mattress is mounted on a bed frame and comprises a combination of elongated transverse and longitudinal air cells disposed on a base. The air cells are encompassed by a cell liner and attached to a plurality of cell manifolds in communication with a control system. In addition, a top cover is attached to the base and covers the air cells. Also a fleece and top sheet are fittedly retained over the air cells.

The transverse air cells preferably have a catenary shape along their top and bottom surfaces. The longitudinal air cells are preferably configured to include a fulcrum cell, inside right and left cells adjacent opposing sides of the fulcrum cell, outside right and left cells adjacent inside right and left cells, respectively, and right and left border cells adjacent right and left outside cells, respectively. This configuration serves to enable the turning air mattress to more efficiently and accurately achieve a patient turn angle, and more efficiently bring a patient out of a turn.

Preferably, the pressures within the air cells are controlled within six zones. The air cells are grouped in the six zones by interconnecting the air cells to the cell manifolds which distribute air to and exhaust air from the air cells. The cell manifolds are, in turn, interconnected to the control system of the turning air mattress.

The control system of the turning air mattress preferably comprises a microprocessor to monitor the pressure within the air cells, along with overall system functions. The control system also preferably comprises a valve box that includes inlet and exhaust valves, respectively, communicating with high pressure and exhaust plenums, respectively, and a plurality of manifold chambers. The manifold chambers distribute air to and from the respective cell zones. In addition, pressure sensors are preferably used to sense the pressure in each cell zone at the corresponding manifold chamber.

In operation, the microprocessor monitors the sensed pressure and opens ones of inlet and exhaust valves to adjust the pressure within the air cells to correspond to the different modes of operation, such as Float mode, Firm mode, or Turning mode.

In the Turning mode of operation, a patient is preferably turned to a desired angle of rotation, to either the patient's left or right, in a smooth transition from a center position to a turned position. The smooth transition is accomplished by successively achieving a series of target pressures in the longitudinal cells until the target pressures corresponding to the desired angle of rotation are achieved. Additionally, the pressures in the air cells in the foot/leg zone are adjusted serving to substantially maintain proper spinal alignment.

Before the patient is rotated in the opposite direction or taken out of the Turning mode of operation to enter the Float or Firm mode of operation, the patient is leveled and centered on the bed. The patient is leveled and centered by adjusting the pressures in low pressure longitudinal cells to a pressure tending to be greater than the fulcrum cell pressure and in high pressure longitudinal cells to a pressure tending to be less than the fulcrum cell pressure. The longitudinal cells are then pressurized to a maximum inflation level before returning to a center pressure profile. The transition from a turned position to a level position is accomplished in a similarly smooth fashion by successively achieving a series of target pressures in the longitudinal cells. The leveling process serves to maintain the patient in the center of the bed, above the fulcrum cell, thus serving to substantially maintain proper spinal alignment and increase turning efficiency.

A CPR mode of operation is also incorporated in the control system which closes all inlet valves and opens all exhausts valves. The operator can then pull a CPR strap connected to the cell manifolds to rapidly exhaust air from the air cells, thus tending to enable the operator to perform CPR on the flat surface of the base.

Accordingly, the primary object of the present invention is to provide an improved turning air mattress.

Another object of the present invention is to provide an improved turning air mattress that serves to maintain proper spinal alignment of the patient during the turning of a patient.

Further objects and advantages of this present invention will become apparent from a consideration of the drawings and ensuing description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view with a partial cut-away of a preferred embodiment of the turning air mattress device of the present invention.

FIG. 2 is a partial exploded view of the turning air mattress device depicted in FIG. 1.

FIG. 3A is a perspective view of the air cells of FIGS. 1 and 2.

FIG. 3B is an exploded view of the cell liner of FIGS. 1 and 2.

FIG. 4A is a top view of a transverse air cell.

FIG. 4B is a cross-sectional view of the transverse air cell taken along a line 4B—4B in FIG. 4A.

FIG. 4C is a cross-sectional view of the transverse air cell taken along a line 4C—4C in FIG. 4A.

FIG. 4D is a partial cross-sectional view of a cell liner taken along line 4D—4D in FIG. 3B.

FIG. 4E is a partial cross-sectional view showing several transverse air cells of FIG. 4B, retained within a cell liner of FIG. 4D.

FIG. 5A is a cross-sectional view of a fulcrum air cell taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5B is a cross-sectional view of an inside right cell taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5C is a cross-sectional view of an inside left cell taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5D is a cross-sectional view of an outside left cell taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5E is a cross-sectional view of an outside right taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5F is a cross-sectional view of a left border cell taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5G is a cross-sectional view of a right border cell taken along a line 5A-G—5A-G in FIG. 3A.

FIG. 5H is a cross-sectional view of the cell liner taken along a line 5H—5H in FIG. 3B.

FIG. 5I is a cross-sectional view showing the turning cells of FIGS. 5A through 5G, retained within the cell liner FIG. 5H.

FIG. 5J is a side view of the inside right cell.

FIG. 5K is a partial perspective view of the side right cell.

FIG. 6 is a perspective view of the pressure zones of the turning air mattress device of the present invention.

FIG. 7A is an exploded view of the manifolds, air supply tubing, and exhaust tubing of FIGS. 1 and 2.

FIG. 7B is a detailed view of a cell and manifold connection.

FIG. 7C is a side detail view of a manifold showing cell connectors and a manifold inlet connection.

FIG. 7D is a partial side detail view of a manifold showing a manifold connector, a CPR outlet and CPR exhaust tubing.

FIG. 8A is a perspective view of the base of FIGS. 1 and 2.

FIG. 8B is an exploded view of the base of FIG. 8A.

FIG. 8C is a detailed view of part of the base assembly.

FIG. 9A is a perspective view of the CPR strap of FIGS. 1 and 2.

FIG. 9B is a mirror image perspective view of the CPR strap in FIG. 9A.

FIG. 9C is a partial detail view of the CPR strap and plug in FIG. 9B.

FIG. 10 is a partial cross-sectional view of the base, ties and straps taken along a line 10—10 in FIG. 8A.

FIG. 11 is a perspective view of the top cover of FIGS. 1 and 2.

FIG. 12 is a perspective view of the fleece of FIGS. 1 and 2.

FIG. 13 is a perspective view of the top sheet of FIGS. 1 and 2.

FIG. 14 is a schematic diagram of the preferred control system of the present invention.

FIG. 15A is a perspective view of the valve box of the present invention.

FIG. **15B** is a cross-sectional view of the manifold chamber of the valve box taken along a line **15B—15B** in FIG. **15A**.

FIG. **16A** is a perspective view of a patient in the center and level position on top of air cells of the present invention.

FIG. **16B** is an end view of a patient rotated to a right turn angle on the turning cells the present invention.

FIG. **16C** is an end view of a patient in a center and level position on the turning cells of the present invention.

FIG. **16D** is an end view of a patient rotated to a left turn angle on the turning cells of the present invention.

FIG. **17** is a flow chart of the turning air mattress control system.

FIG. **18** is a flow chart of the initialize CPU routine of FIG. **17**.

FIG. **19** is a flow chart of the initialize system variables routing of FIG. **17**.

FIG. **20** is a flow chart of the system diagnostics routine of FIG. **17**.

FIG. **21** is a flow chart of the menu subroutine of FIG. **17**.

FIG. **22** is a flow chart of the turning subroutine of FIG. **21**.

FIG. **23** is a flow chart of the right rotation subroutine of FIG. **22**.

FIG. **24** is a flow chart of the leveling subroutine of FIGS. **17**, **22**, **23**, **25** and **26**.

FIG. **25** is a flow chart of the center subroutine of FIG. **22**.

FIG. **26** is a flow chart of the left rotation subroutine of FIG. **22**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings, therein illustrated is a preferred embodiment of a novel turning air mattress system of the present invention. Referring to FIGS. **1** and **2**, the major components of the turning air mattress system **1** are shown comprising a control box **190**, a plurality of air cells **20** and **40**, a cell liner **100**, a plurality of air distribution manifolds **130**, a base **150**, a top cover **15**, a fleece **10**, and a top aeration sheet **5**. In brief, to be described in more detail below, the system **1** is assembled as follows, beginning with the base **150** and moving upward: the manifolds **130** are mounted on the base **150**, the cells **20** and **40** are placed or positioned within the cell liner **100** and then connected to the manifolds **130**, the top cover **15** is then placed over the assembly and attached to the base **150**, and the fleece **10** and the top sheet **5** are then fitted over the top cover **15** and base **150**. As shown in FIG. **1**, the assembled system **1** is preferably mounted on a bed frame F with the base **150** of the system **1** preferably being fixedly attached to the frame F and the control box **190** of the system **1** preferably hanging off the frame F at the foot of the bed.

Referring now in further detail to each of the major components of the turning air mattress system **1**, the air cells **20** and **40**, as shown in FIGS. **2** and **3A**, comprise a combination of transverse cells **20** and longitudinal, or turning, cells **40**. This combination facilitates the efficient turning of a patient, while maximizing the patient's comfort and substantially ensuring the patient's positioning is anatomically correct during the turning process. It is preferred that the air cells **20** and **40** be used in groups or zones to control the air pressure within the air cells **20** and **40**, ensuring that proper support is given to the different regions of a patient's body and that the patient is properly positioned while being turned. This embodiment of the present invention preferably utilizes a total of six pressure zones which will be described below with the air cells **20** and **40**.

Each of the air cells **20** and **40** is preferably leak-tight, making them air and water impermeable. In a preferred construction of the air cells **20** and **40**, each of the cells **20** and **40** is made from vinyl, allowing the air cells **20** and **40** to be flexible while remaining air and fluid impermeable. Thus, the air cells **20** and **40** are unlikely to capture infectious material from one patient and pass it onto another patient. In addition, the surface of the air cells **20** and **40** can easily be washed or cleaned to help maintain a non-infectious environment.

As shown in FIGS. **1**, **2** and **3A**, the transverse cells **20** are located in the head and foot/leg regions of the bed. The head region preferably comprises two transverse cells **20**. The foot/leg region preferably comprises five transverse cells **20**, two cells **20** for the foot region and three cells for the leg region.

Each of the transverse cells **20** is preferably the same size and is generally rectangular in cross-section, as shown in FIGS. **1**, **3A**, **4A–4C**. The transverse cells **20** preferably span the width of a patient's bed. As shown in FIGS. **4A–4C**, the transverse cells **20** generally have a pair of side walls **26A** and **26B** held in spaced arrangement by narrower top and bottom walls **22** and **24** respectively, and terminated by a pair of opposing end walls **28A** and **28B**. The walls **22**, **24**, **26A** and **26B**, and **28A** and **28B** are attached together along their edges. The preferable method of attachment includes adhesive or electronic bonding.

In the preferred construction, two horizontal interior walls **30A** and **30B**, as shown in FIG. **4C**, are located equidistant from a midway point between the top and bottom walls **22** and **24** and attached to the side walls **26A** and **26B**, preferably by the methods noted above. The horizontal interior walls **30A** and **30B** are used to maintain the generally rectangular cross-section of the cells **20** and to diminish bowing of the side walls **26** when the cells **20** are inflated. The horizontal walls **30A** and **30B** include a series of apertures **36** therethrough to allow passage of air between chambers formed by the horizontal walls **30A** and **30B** and to balance the air pressure therebetween.

The transverse or lengthwise cross-section of the transverse cells **20**, as shown in FIG. **4C**, preferably has a substantially catenary-like or concave shape along the top and bottom walls **22** and **24**. The transverse cross-section of the cells **20**, as shown in FIG. **4C**, is narrower at a midpoint between the end walls **28A** and **28B** than at a point nearer the end walls **28A** and **28B**. The shape of the cell **20** is accomplished by folding and pulling inwardly on the material of the side walls **26A** and **26B** to form darts **32A** and **32B** along the side walls' **26A** and **26B** transverse or lengthwise axis. The thickness of the darts **32A** and **32B** is the greatest at a midpoint between the end walls **28** and the least as the darts **32A** and **32B** approach the end walls **28A** and **28B**, as shown in FIGS. **4A**.

The shape of the cells **20** serves to prevent the cells **20** from bulging or ballooning upward from the bed. If allowed to bulge or balloon upward from the bed, the cells **20** would cause the head, and/or feet and legs to ramp upward from the torso. This ramp effect would cause spinal misalignment during turning. The catenary shape, however, serves to limit outer spinal misalignment. In addition, the catenary shape serves to limit the motion of the patient's head during turning, thus diminishing the occurrence of motion sickness in the patient. Also, the catenary shape maintains the natural orientation of the head to the torso by preventing overturn of the patient's head. Without the catenary shape, the patient's face would tend to sink into the cells **20** due to the center of gravity of a patient's head being located toward the front of the patient's face.

As is further shown in FIGS. 4A–4C, the preferred cell **20** also includes two manifold connectors **38** bonded to the bottom wall **24**. The manifold connectors **38** are preferably spaced apart equidistantly from a midpoint between the end walls **28**.

The turning cells **40** preferably longitudinally span the torso region of the bed, as shown in FIGS. **1** and **3**A. Referring to FIGS. **3**A and **5**A–G, the turning cells **40** preferably comprise a total of seven longitudinal cells **40** of the following configuration: a center fulcrum cell **42**, inside right and left cells **44**A and **44**B, outside right and left cells **46**A and **46**B, and right and left border cells **48**A and **48**B. The inside right and left cells **44**A and **44**B are mirror images of one another and border the fulcrum cell **42** on its opposing sides. The right and left border cells **48**A and **48**B are identical and are located on opposing side edges of the bed to prevent the patient overturning or rolling off of the turning air mattress. The outside right and left cells **46**A and **46**B are also mirror images of one another and are interposed between the border cells **48**A and **48**B and the right and left inside cells **44**A and **44**B on opposing sides of the bed, respectively.

As noted above, the preferred embodiment of the present invention comprises six zones: Zones I–VI. However, other embodiments may comprise additional zones for greater control and more precise turning. As shown in FIG. **6**, Zone III comprises the fulcrum cell **42** in combination with the transverse cells **20** of the head region. Other zones are configured as follows: Zone I comprises the outside right cell **46**A and the left border cell **48**B; Zone II comprises the inside right cell **44**A; Zone IV comprises the inside left cell **44**B; Zone V comprises the outside left cell **46**B and the right border cell **48**A; and Zone VI comprises the five transverse cells **20** of the foot/leg region of the bed.

The cross-sectional configuration of the turning cells **42**, **44**A and **44**B, **46**A and **46**B, and **48**A and **48**B are such that they adapt to a theoretical cross-sectional configuration. This theoretical cross-sectional configuration is illustrated by the configuration of the turning cell liner **100**A for the turning cells **40** in the torso region of the bed. Referring to FIGS. **3**B, **5**H, and **5**I, the turning cell liner **100**A for the turning cells **40** has a top liner wall **102**, a bottom liner wall **104**, and two opposing vertical side liner walls **106**A and **106**B positioned perpendicular to the top and bottom walls **102** and **104**. In addition, the cell liner **100**A has internal boundaries defined by: two fulcrum walls **112**A and **112**B that incline upwardly and inwardly toward one another and which, along with the top and bottom walls **102** and **104**, form a truncated triangular cross-sectional fulcrum cell receptacle **114** that is adapted to receive the fulcrum cell **42**; two inner walls **116**A and **116**B that incline upwardly and inwardly toward one another and which, along with the top, bottom, and fulcrum walls **102**, **104**, **112**A and **112**B, form mirror image trapezoidal cross-sectional inside cell receptacles **118**A and **118**B on opposing sides of the fulcrum cell receptacle **114** that are adapted to receive the inside right and left cells **44**A and **44**B; and two border liner walls **120**A and **120**B which, along with the top, bottom and inner walls **102**, **104**, **116**A and **116**B, form mirror image trapezoidal cross-sectional outside cell receptacles **122**A and **122**B adjacent the inside cell receptacles **118**A and **118**B that are adapted to receive the outside right and left cells **46**A and. **46**B, and the border liner walls **120**A and **120**B also form, along with top, bottom, and side walls **102**, **104**, and **106**A and **106**B, two rectangular cross-sectional border cell receptacles **124**A and **124**B which are adapted to receive the right and left border cells **48**A and **48**B.

This cross-sectional configuration serves to enable the turning air mattress system **1** to more efficiently and accurately achieve a turn angle due to the slopes of the fulcrum and inside walls **112**A, **112**B, **116**A and **116**B, which the fulcrum cell **42**, the right and left inside cells **44** and **44**B, and outside left and right cells **46**A and **46**B adapt to. In addition, the turning air mattress system **1** is able to more efficiently bring a patient out of a turn due to an upward force vector (not shown) created by the trapezoidal cross-sections of the cells **44**A and **44**B and **46**A and **46**B as defined by the inside and outside cell receptacles **118**A, **118**B, **122**A and **122**B. The force vector tends to parallel the slope of the fulcrum and inside walls **112**A, **112**B, **116**A and **116**B, and be directed toward the center of the turning air mattress.

In a preferred embodiment of the turning cells **40**, the fulcrum cell **42**, as shown in FIG. **5**A, comprises a top wall **50**, a bottom wall **52**, two opposing inclining side walls **54**A and **54**B, and two opposing end walls **56** (the end walls **56** are located similarly to the end walls **76**A and **76**B of FIGS. **5**J and **5**K); all of which are bonded together about their edges. The top, bottom, and side walls **50**, **52**, and **54**A and **54**B form a substantially truncated triangular cross-section. However, when fully inflated as shown in FIG. **5**A, the walls **50**, **52**, **54**A and **54**B appear to be slightly arcuate. Therefore, internal horizontal walls **58**A and **58**B are provided approximately equidistant from a midpoint between the top and bottom walls **50** and **52** and bonded about their edges to the side walls **54**A and **54**B. The internal walls **58**A and **58**B are used to substantially maintain the preferred cross-sectional truncated triangular shape. The internal walls **58**A and **58**B include apertures (not shown, but like **36** of FIG. **4**C), therethrough, to allow passage of air between chambers formed by the horizontal walls **58**A and **58**B and enable the balance of air pressure therebetween. In addition, the bottom wall **52** includes a manifold connector **38**.

The inside right and left cells **44**A and **44**B, as noted above and as shown in FIGS. **5**B and **5**C, are mirror images of one another. The inside right and left cells **44**A and **44**B are shown to comprise a plurality of chambers with arcuate external walls. This unique combination of chambers, with arcuate external walls, enables the inside right and left cells **44**A and **44**B to substantially adapt to and maintain the theoretical trapezoidal cross-section of the inside cell receptacles **118**A and **118**B, as shown in FIG. **5**I, even though the cells **44**A and **44**B are made from a flexible material such as vinyl.

Referring to FIG. **5**B, the chambers of the inside right cell **44**A comprise an upper main chamber **60**, lower main chamber **61**, two upper bulbous chambers **63**A and **63**B angularly extending outwardly and upwardly from the upper main chamber **60**, two lateral chambers **62**A and **62**B extending laterally from the upper and lower main chambers **60** and **61**, and a lower bulbous chamber **64** angularly extending outwardly and downwardly from the lower main chamber **61**.

The upper main chamber **60** is substantially octagonal in cross-sectional shape, having a main baffle **65** acting generally as a horizontal base, two upper lateral baffles **66**A and **66**B angularly extending outwardly and upwardly from opposing ends of the main baffle **65**, two arcuate upper side walls **67**A and **67**B extending upwardly from upper ends of the lateral baffles **66**A and **66**B, two upper bulbous baffles **68**A and **68**B angularly extending inwardly and upwardly from upper ends of the arcuate upper side walls **67**A and **67**B, and an arcuate top wall **69** extending between upper ends of the upper bulbous baffles **68**A and **68**B.

The upper bulbous chambers **63**A and **63**B are substantially semicircular in cross-sectional shape, with the upper bulbous chamber **63**B being slightly larger than upper bulbous chamber **63**A to enable the cell **44**A to adapt to the slope of the trapezoidal cross-section of the upper end of the cell receptacle **118**A. The chambers **63**A and **63**B are formed by upper bulbous arcuate walls **70**A and **70**B extending from one end of the upper bulbous baffles **68**A and **68**B, respectively, to the other end of the upper bulbous baffles **68**A and **68**B, respectively.

The lower main chamber **61** is similarly shaped to the upper main chamber **60** (i.e., approximately octagonal in cross-section) and shares the main baffle **65** with the upper main chamber **60** as a common baffle between the chambers. However, with the lower main chamber **61**, the main baffle **65** generally acts as a horizontal ceiling. In addition, the lower main chamber comprises lower lateral baffles **71**A and **71**B angularly extending outwardly and downwardly from opposing ends of the main baffle **65**, arcuate lower side walls **73** and **77** downwardly extending from lower ends of the lower lateral baffles **71**A and **71**B, and a lower bulbous baffle **74** angularly extending downwardly and inwardly from the lower end of the arcuate lower side wall **77** and to lower end of the arcuate lower side wall **73**. The arcuate lower side wall **73** doubles as an arcuate bottom wall extending between the lower lateral baffle **71**A and the lower bulbous baffle **74**. In addition, the bottom wall portion of the lower side wall **73** includes a manifold connector **38**.

The lower bulbous chamber **64** is substantially semicircular in cross-sectional shape, being formed by a lower bulbous arcuate wall **75** extending from one end of the lower bulbous baffle **74** to the other end of the lower bulbous baffle **74**. The lower bulbous chamber **64** enables the cell **44**A to adapt to the slope of the lower end of the trapezoidal cross-section of the cell receptacle **118**A.

The lateral chambers **62**A and **62**B are substantially pie wedge shaped in cross-section (e.g., approximately triangular with three substantially arcuate sides), being formed by lateral arcuate walls **72**A and **72**B extending from the upper ends of the upper lateral baffles **66**A and **66**B to lower ends of the lower lateral baffles **71**A and **71**B.

Each of the baffles **65**, **66**A, **66**B, **68**A, **68**B, **71**A, **71**B, and **74** include apertures **36** therethrough, as shown in FIG. **5**K. The apertures allow passage of air between the various chambers to balance air pressure therebetween.

Preferably, the external walls **67**A, **67**B, **69**, **70**A, **70**B, **72**A, **72**B, **73**, **75**, and **77** of the chambers **60**, **61**, **62**A, **62**B, **63**A, **63**B, and **64** are constructed out of a single sheet of vinyl having its two longitudinal edges bonded to one another. The bulbous chambers **63**A, **63**B, and **64** are formed by bonding opposing longitudinal edges of the bulbous baffles **68**A, **68**B, and **74** to the single sheet of vinyl. Preferably, the length of the single sheet of vinyl that is essentially trapped between the bonded edges of the baffles **68**A, **68**B, and **74** is greater than the width of each of the baffles **68**A, **68**B, and **74**. As a result the baffles **68**A, **68**B, and **74** form chords to arcs, with the arcs being the bulbous arcuate walls **70**A, **70**B, and **75** of the bulbous chambers **63**A, **63**B, and **64**, respectively.

The lateral chambers **62**A and **62**B are similarly constructed. Upper longitudinal edges of the upper lateral baffles **66**A and **66**B and lower longitudinal edges of the lower lateral baffles **71**A and **71**B are bonded to the single sheet of vinyl. Lower longitudinal edges of the upper lateral baffles **66**A and **66**B and upper longitudinal edges of the lower lateral baffles **71**A and **71**B are then bonded together to seal off the chambers **62**A and **62**B, thus forming pie-wedge-shaped (e.g., approximately triangular) chambers in cross-section.

Opposing longitudinal edges of the main baffle **65** are then bonded to the edges of the lateral baffles **66**A and **71**A, and **66**B and **71**B, respectively. The main baffle **65** effectively divides the remaining chamber of the cell **44**A into two chambers, the upper main chamber **60** and the lower main chamber **61**, and thus helps retain the overall shape of the cell **44**A.

In order to finish construction of the cell **44**A, end walls **76**A and B are bonded about their edges to opposing ends of the single sheet of vinyl making up the arcuate external walls **67**A, **67**B, **69**, **70**A, **70**B, **72**A, **72**B, **73**, **75**, and **77** of the cells **44**A and **44**B, as shown in FIGS. **5**J and K.

The outside right and left cells **46**A and **46**B are similarly shaped to the inside right and left cells **44**A and **44**B (shown in FIGS. **5**B, **5**C, **5**J and **5**K), and, as noted above and shown in FIGS. **5**D and **5**E, are mirror images of one another. Referring to FIGS. **5**D and **5**E, the outside right and left cells **46**A and **46**B comprise a plurality of chambers with arcuate external walls. As above, this unique combination of chambers with arcuate external walls enables the outside right and left cells **46**A and **46**B, to substantially adapt to and maintain the theoretical trapezoidal cross-section of the outside cell receptacles **122**A and **122**B, as shown in FIG. **1**, even though the outside cells **46**A and **46**B are made from a flexible material such as vinyl.

Referring to FIG. **5**E, the chambers comprise an upper main chamber **80**, a lower main chamber **81**, two upper bulbous chambers **83**A and **83**B angularly extending outwardly and upwardly from the upper main chamber **80**, and two lateral chambers **82**A and **82**B extending laterally from the upper and lower main chambers **80** and **81**.

The upper main chamber **80** is substantially octagonal in cross-sectional shape, having a main baffle **84** acting generally as a horizontal base, two upper lateral baffles **85**A and **85**B angularly extending outwardly and upwardly from opposing ends of the main baffle **84**, two arcuate upper side walls **86**A and **86**B extending upwardly from upper ends of the lateral baffles **85**A and **85**B, two upper bulbous baffles **87**A and **87**B angularly extending inwardly and upwardly from upper ends of the arcuate upper side walls **86**A and **86**B, and an arcuate top wall **89** extending between upper ends of the upper bulbous baffles **87**A and **87**B.

The upper bulbous chambers **83**A and **83**B are substantially semi-circular in cross-sectional shape, with upper bulbous chamber **83**B being slightly larger than upper bulbous chamber **83**A to enable the cell **46**B to adapt to the slope of the trapezoidal cross-section of the upper end of the outside cell receptacle **122**A and **122**B. The chambers **83**A and **83**B are formed by upper bulbous arcuate walls **88**A and **88**B extending from one end of the upper bulbous baffles **87**A and **87**B, respectively, to the other end of the upper bulbous baffles **87**A and **87**B, respectively.

The lower main chamber **81** is substantially approximately circular in cross-sectional shape. The upper and lower main chambers **80** and **81** share the main baffle **84** as a common baffle between the chambers. However, with the lower chamber **81**, the main baffle **84** acts generally as a horizontal ceiling. In addition, the lower main chamber **81** comprises lower lateral baffles **90**A and **90**B angularly extending outwardly and downwardly from opposing ends of the main baffle **84** and an arcuate bottom wall **92** extending between lower ends of the lower lateral baffles **90**A and **90**B. The arcuate bottom wall **92** doubles as side walls for the lower main chamber **81**. In addition, the bottom wall **92** includes a manifold connector **38**.

The lateral chambers **82**A and **82**B are substantially pie-wedge shaped in cross-section (e.g., approximately triangular with three substantially arcuate sides), being formed by lateral arcuate walls **91**A and **91**B extending from upper ends of the upper lateral baffles **85**A and **85**B to lower ends of the lower lateral baffles **90**A and **90**B.

Each of the baffles **84**, **85**A and **85**B, **87**A and **87**B, **90**A and **90**B include apertures (not shown, but like **36** of FIG. **5**K) therethrough. The apertures **36** allow passage of air between the various chambers to balance the air pressure therebetween.

Preferably, the external walls **86**A, **86**B, **88**A, **88**B, **89**, **91**A, **91**B, and **92** of the chambers **80**, **81**, **82**A, **82**B, **83**A and **83**B are constructed out of a single sheet of vinyl having its two longitudinal edges bonded to one another. The upper bulbous chambers **83**A and **83**B are formed by bonding opposing longitudinal edges of the upper bulbous baffles **87**A and **87**B to the single sheet of vinyl. Preferably, the length of the single sheet of vinyl that is essentially trapped between the bonded edges of the baffles **87**A and **87**B is greater than the width of each of the baffles **87**A and **87**B. As a result the baffles **87**A and **87**B form chords to arcs, with the arcs being the bulbous arcuate walls **88**A and **88**B of the bulbous chambers **83**A and **83**B, respectively.

The lateral chambers **82**A and **82**B are similarly constructed. Upper longitudinal edges of the upper lateral baffles **85**A and **85**B and lower longitudinal edges of the lower lateral baffles **90**A and **90**B are bonded to the single sheet of vinyl. Lower longitudinal edges of the upper lateral baffles **85**A and **85**B and upper longitudinal edges of the lower lateral baffles **90**A and **90**B are then bonded together to seal off the chambers **82**A and **82**B, thus forming pie-wedge shaped (e.g., approximately triangular) chambers in cross-section.

Opposing longitudinal edges of the main baffle **84** am then bonded to the edges of the lateral baffles **85**A and **90**A, and **85**B and **90**B, respectively. The main baffle **84** effectively divides the remaining chamber of the cell **46**A into two chambers, the upper main chamber **80** and the lower main chamber **81**, and thus helps retain the overall shape of the cell **46**A.

In order to finish construction of the cell **46**A, an end wall **93** is bonded about its edges to opposing ends of the single sheet of vinyl making up the arcuate external walls **86**A, **86**B, **88**A, **88**B, **89**, **91**A, **91**B, and **92** of the cells **46**A and **46**B (similarly located to end walls **76**A and **76**B of FIGS. **5**J and **5**K).

Referring to FIGS. **5**F and **5**G, the border cells **48**A and **48**B comprise a top wall **94**, a bottom wall **95**, two opposing side walls **96**A and **96**B, and two opposing end walls **97** (similarly located to end walls **76**A and **76**B of FIGS. **5**J and **5**K), all of which are bonded together about their edges. The top, bottom, and side walls **94**, **95**, **96**A and **96**B form a substantially rectangular cross-sectional shape. Internal horizontal walls **98**A and **98**B are located approximately equidistant from a midpoint between the top and bottom walls **94** and **95**, and are bonded about their edges to the side walls **96**A and **96**B. The horizontal walls **98**A and **98**B include apertures (not shown) therethrough to allow passage of air between chambers formed by the horizontal walls **98**A and **98**B and enable the balance of or pressure therebetween. The internal horizontal walls **98**A and **98**B are used to help maintain this substantially rectangular cross-sectional shape. The bottom wall **95** of the border cells **48**A and **48**B includes a manifold connector **38**.

A cell liner **100**, shown in FIG. **3**B and partially in FIGS. **4**D, **4**E, **5**H, and **5**I, and briefly discussed above, is configured to receive and retain the air cells **20** and **40**. Preferably, the cell liner **100** is constructed from "ripstop" material, which is a nylon fabric akin to parachute nylon, to allow the cells **20** and **40** to easily slide against adjacent cell liner walls. This is particularly beneficial during the turning operation. Each cell **40** can properly deflate and then inflate while sliding against an adjacent cell inner wall. Without the cell liner **100**, adjacent cells **40** could catch on one another and force or be forced out of position.

As is shown in FIG. **3**B, the cell liner **100** is configured into three regions, a torso region or turning cell liner **100**A, a head region liner **100**B, and a foot/leg region liner **100**C. The torso region or turning cell liner **100**A is discussed above. The head region **100**B and foot/leg region **100**C comprise cell liners for the transverse cells **20**. The regions **100**B and C each comprise a top wall **102**, a bottom wall **104**, and two opposing side walls **107**A and **107**B which are bonded together at their respective edges. Internal walls **108**, are spaced substantially equidistantly apart and parallel to the side walls **107**A and **107**B, and are each bonded to the top and bottom walls **102** and **104** to form generally equally sized transverse cell receptacles **110** adapted to receive and retain the transverse cells **20**. The ends of the cell liner **100**B and **100**C may remain open to allow the cells **20** to be easily slid in or out. In addition, the bottom walls **104** of the cell liners **100**B and **100**C have apertures **129** therethrough for cell and manifold connectors **148** (discussed below) and **38** to interconnect.

The torso region or turning cell liner **100**A comprises top, bottom, side, fulcrum, inner, and border walls **102**, **104**, **106**, **112**, **116** and **120**, as discussed above. In addition, the torso liner region **100**A is closed on one end by an end wall **111**, as shown in FIG. **3**B. The torso liner **100**A also has a dart (not shown) pulled in each of the side, fulcrum, inside, and border walls **106**, **112**, **116**, and **120** along an area near the foot/leg region. The dart is largest at a point near the foot/leg region. The dart is used to substantially downwardly retain the ends of the turning cells **40** near the foot/leg region at a level equal to the foot/leg region air cells **20** and to minimize the "hammock" effect caused when a patient is retained on the turning cells **40**. The bottom wall **104** of the cell liner **100**A has apertures **129** therethrough for cell and manifold connectors **148** (discussed below) and **38** to interconnect.

The cell liner regions **100**A, **100**B, and **100**C may be hingedly connected at top edge seams **128**A, **128**B and **128**C or the top walls **102** of each cell liner region **100**A, **100**B, and **100**C may be comprised of a single wall encompassing all three cell liner regions **100**A, **100**B, and **100**C. These configurations allow easy storage of the turning air mattress cells **20** and **40** and cell liner **100**, in addition to easy access to the different liner regions **100**A, **100**B and **100**C.

Referring to FIG. **7**A, a plurality of cell manifolds **130** distribute air to and from the different Zones I, II, III, IV, V, and VI of air cells **20** and **40** (shown in FIG. **6**). There are preferably two head region manifolds **134**A and **134**B, two foot/leg region manifolds **132**A and **132**B, and five torso region manifolds **135**, **136**A, **136**B, **138**A and **138**B. The manifolds **130** are oriented to lie substantially flat on the base **150** and generally traverse the base **150** in a perpendicular direction to the longitudinal axis of the cells **20** and **40** of the respective regions. The head region manifolds **134**A and **134**B comprise an inlet/exhaust manifold **134**A and a CPR exhaust manifold **134**B, each manifold having two cell connectors **148** to enable connections to the manifold connectors **38** on the transverse air cells **20**, as shown in FIG. 7B. The inlet/exhaust manifold **134**A supplies air to and exhausts air from the transverse cells **20** in the head region during normal operation through an air supply connection **140**, as shown in FIG. 7C. The CPR exhaust manifold **134**B has a CPR outlet connection **142**, as shown in FIG. 7D, to exhaust air rapidly from the transverse cells **20** to administer CPR.

The foot/leg region manifolds **132**A and **132**B similarly comprise an inlet/exhaust manifold **132**A having an air supply connection **140** and a CPR exhaust manifold **132**B having a CPR outlet connection **142**. However, the foot/leg region manifolds **132**A and **132**B each comprise five cell connectors **148** to communicate with five transverse cells **20**—the three cells **20** in the leg region and the two cells **20** in the foot region.

The torso region manifolds **135**, **136**A, **136**B, **138**A and **138**B comprise a fulcrum manifold **135** connected to the fulcrum cell **42** and interconnected to the head region inlet/exhaust manifold **134**A via air supply tubing **144**A; an inside right manifold **136**A connected to the inside right cell **44**A; an inside left manifold **136**B connected to the inside left cell **44**B; an outside right manifold **138**A connected to a combination of the outside right cell **46**A and the left border cell **48**B; and an outside left manifold **138**B connected to a combination of the outside left cell **46**B and the right border cell **48**A. Each of the manifolds has an air supply inlet **140** and a CPR outlet connection **142**, and a cell connector **148** for each turning cell **40** that is to be connected to the manifold **135**, **136**A, **136**B, **138**A and **138**B (i.e., manifolds **138**A and **138**B include two cell connectors **148** each because each manifold **138**A and **138**B is to be connected to two turning cells **40**—an outside cell **46** and a border cell **48**).

In a preferred construction, the manifolds **130** are constructed from vinyl to insure that they are substantially air and fluid impermeable while remaining flexible. Additionally, the cell connectors **148**, as well as the manifold connectors **38** attached to the air cells **20** and **40**, are a flexible Halkey-Roberts, U.S. Pat. No. 2,777,490 type connector that ensures the passage of air between the air cells **20** and **40** and manifolds **130** in a substantially air-tight manner. As seen in FIG. **7B**, the male manifold connector **38** is bonded to an air cell **20** or **40**, and the female cell connector **148** is bonded to a manifold **130**.

Turning back to FIG. **1**, a base **150** is retained atop of the bed frame F with interengaging straps **168**. Referring to FIGS. **8**A–C and **10**, the base **150** comprises foam padding **152** strategically placed on top of a bottom cover **158** of the base **150** to form channels **156** in the foam. The channels **156** are adapted to receive and unconnectedly retain the manifolds **130**, and also, to accommodate air supply and CPR exhaust tubing **144** and **146** (shown in FIG. 7A). The padding **152**A and **152**B serves a dual purpose of supporting the patient when the air cells **20** and **40** are deflated to administer CPR and to ensure that the air passages through the manifolds **130**, as well as through the air supply and CPR exhaust tubing **144** and **146**, remain unobstructed. The air supply tubing **144**, which includes a low air loss line **250** (shown in FIG. 7A), enters the base **150** through a series of holes **169** in the bottom cover **158**.

The foam padding **152** is held in place by padding covers **154** which are bonded to the bottom cover **158** of the base **150**. The base **150** also includes opposing end and side covers **162** and **160** bonded to the bottom cover **158**. The end and side covers **162** and **160** extend above the foam padding **152** forming an inverted fitted sheet type configuration to receive the air cells **20** and **40**. A fastener **164**B, such as a zipper, is attached to the top unbonded edges of the side and end covers **160** and **162**. The fastener **164**B enables connecting the base **150** and the top cover **15** as is described below.

As shown in FIG. **1**, a CPR pull strap **170**, made from, for example, a band of heavy cloth, is retained against a side cover **160** of the base **150** by a series of retaining loops **172** (shown in FIGS. **8**A and **8**B). Referring to FIGS. **9**A, **9**B and **9**C, the CPR strap **170** includes a series of plugs **176** used to plug the CPR exhaust tubing **146** which is connected to the CPR outlets **142** of the manifolds **130**. Two pull handles **174** are attached to the CPR strap **170** and are used to pull the CPR strap **170** to dislodge the plugs **176** from the exhaust tubing **146**. Dislodging the plugs **176** allows the rapid exhaust of air from the cells **20** and **40**.

As is shown in FIG. **8**A, the plugs **170** access the tubing **146** through a series of holes **166** located in the side cover **160** of the base **150**. A protective flap **178**, bonded at one edge to the side cover **160** and connected at another edge to the side cover **160** by a fastener **179**A and **179**B, such as a zipper, helps prevent the plugs **176** from being inadvertently dislodged from the tubing **146**.

Referring to FIGS. **1** and **2**, after the manifolds **130** and air cells **20** and **40** are received within the base **150**, a top cover **15** is attached to the base **150** to retain the cells **20** and **40**. Referring to FIG. **11**, the top cover **15** comprises a top wall **16**, two opposing side walls **18**, and two opposing end walls **17** bonded to each other about their edges. A top cover fastener **164**A, such as a zipper, is attached to the lower unbonded edges of the side and end walls **18** and **17**. The top cover fastener **164**A is used to engage the base fastener **164**B to attach the top cover **15** to the base **150**. A protective flap **19** hangs down from the non-bonded edges of the side and end walls **18** and **17** to cover the fasteners **164**A and **164**B.

Also shown in FIGS. **1** and **2**, a fleece **10**, used to cushion the contact between the patient and the top cover **15** and underlying cells **20** and **40**, is placed over the top cover **15** and base **150** in a similar fashion to a fitted sheet over a standard mattress. Referring to FIG. **12**, the fleece **15** is preferably constructed from a soft blanket-like material and comprises a top wall **11**, two opposing end walls **12**, and two opposing side walls **13**. A series of tie slits **14**, preferably a total of five tie slits **14**, are approximately equally spaced along the lower end of the side walls **13**.

The fleece **10** is preferably held in place by a series of ties **180** attached to the underside of the bottom cover **158** of the base **150**, as shown in FIGS. **1**, **8**A and **10**. The ties **180** comprise an elastic tie strap **182** and a tie clasp **184** attached to the end of the tie strap **182**. The tie clasps **184** may pass through the tie slits **14** in the side walls **13** of the fleece **10** and thereby retain the fleece **10** in communication with the tie straps **182**.

Referring to FIG. **13**, a top sheet **5** comprising a top wall **6**, two opposing end walls **7**, and two opposing side walls **8** with five approximately equally spaced tie slits **14**, is held in place like a fitted sheet, in like fashion to the fleece **10**, over the fleece **10**, by the same ties **180** described above. The top sheet 5 is a semi-permeable sheet designed to receive pressurized air and disburse the air across the total width and length of top wall 6 of the top sheet 5, providing a blanket of gentle flowing air passing upward around the patient's body. The air is needed to maintain the dryness of the patient's skin so that contact with the sheet 5, fleece 10, top cover 15, and cells 20 and 40 reduces the development of rashes or other forms of irritation. The top sheet 5, preferably, should also be substantially impervious to passage of liquids so that it will not allow moisture to pass down toward the top cover 15 and cells 20 and 4. The top sheet 5 receives air from the valve box via a low air loss line 250. The line 250 enters the base 150 and distributes air about the cells 20 and 40. The air then exits the base 150 through holes 251 located in the side covers 160 just below the fastener 164B.

The turning air mattress control system is located within the control box 190, schematic of which is shown in FIG. 14. Referring to FIG. 14, the control box 190 comprises a blower 194, a power supply 196, a controller 200, and a valve box 210. The blower 194 is powered by an electric motor (not shown) connected to the power supply 196. The blower 194 preferably is a single speed, constant-volume type air compressor. However, other embodiments may include a blower that is a variable-speed type compressor. The blower 190 preferably receives atmospheric air through an air filter box 192 comprising an air filter. The blower 194 provides air at a pressure in excess of the maximum required inflation pressure of the air cells 20 and 40.

The power supply 196 supplies power to all the components of the control system through an EMI filter 199. The control system comprises a resistant/compacistance-type network; thus, the EMI filter is used to trim any current spikes or pulses that might enter through the power supply. In addition, a transformer 198 is used to step down the power from the power supply 196 and supply operating and "kick voltages" to be discussed below, and also a logic voltage.

The valve box 210 distributes high pressure air to and exhausts air from the manifolds 130 of the different Zones I–VI of cells 20 and 40. Referring to FIG. 15, the valve box 210 comprises top, bottom, opposing side, and opposing end walls 212, 214, 216, and 218. An internal wall 219 located approximately midway between the end walls 218 divides the valve box into a high pressure plenum 222 and an exhaust plenum 226. The high pressure plenum 222 includes a high pressure inlet 220 connected to the blower 194 via a main air supply tube 195 (shown in FIG. 14). The exhaust plenum 226 includes an exhaust outlet 224 open to atmosphere.

Within the high pressure plenum 222 and the exhaust plenum 226 are a series of normally closed on/off inlet and exhaust valves 230 and 231, respectively. Preferably, pairs of inlet and exhaust valves 230 and 231 correspond to the different Zones I–VI of cells 20 and 40, and are used to control the air pressure within the Zones I–VI of cells 20 and 40. The valves 230 and 231 are identical in construction and predominantly comprise a piston 232 that is actuated by activating a solenoid coil 234. When the solenoid coil 234 is activated, the piston 232 is drawn into the solenoid coil 234 opening the valves 230, 231.

A valve box manifold 240 is attached to one end of the valve box 210. The manifold 240 is preferably divided into a series of chambers 242 corresponding to the different Zones I–VI of cells 20 and 40. As shown in FIG. 15B, the chambers 242 communicate with valve tubing 244A and 244B which, in turn, communicate with valves 230 and 231. The chambers 242 distribute air to the Zones I–VI of cells 20 and 40 via output tubing 248. The air supply tubing 144 connects to the output tubing 248 via quick disconnects 249 to allow for speedy assembly and disassembly. Pressure sensor tubing 246 also accesses the chambers 242, enabling the monitoring of pressure within each Zone I–VI of the turning air mattress.

Referring back to FIG. 14, the controller 200, which includes a microprocessor 201, measures cell 20 and 40 air pressures, calculates the differential between the desired and actual cell 20 and 40 air pressures, and issues electronic commands that control the inlet and exhaust valves 230 and 231 to adjust and maintain the air pressure within each cell Zone I–VI. In addition, the controller 200 includes a display 205 and a key pad 203. The display 205 is provided to show the operator the normal and existing conditions of the turning air mattress. The key pad 203 is provided to input commands to the controller's 200 microprocessor 201 and to call up various readouts on the display 205.

The controller 200 also includes a pressure sensor 206 for each Zone I–VI of cells 20 and 40 to enable the monitoring of pressure within the cells 20 and 40. The pressure sensors 206 preferably include a temperature compensated solid state pressure transducer. The output voltage of the transducers should be linearly proportional to the pressure within the cells 20 and 40 of a particular Zone I–VI, as measured at the manifold chamber 242. The output voltage may be converted to digital logic levels usable by the microprocessor 201. The microprocessor 201 may determine which pressure sensors 206 are to be read at any point in time.

A solenoid driver 208 is provided to operate the solenoid coil 234 of the inlet and exhaust valves 230 and 231. The driver 208 includes a pair of switching transistors for each solenoid 234 on each valve 230, 231. The driver 208 provides a "kick voltage" to activate the solenoid coil 234 and open the valves 230, 231. A second voltage, the "hold voltage" or normal operating voltage, is provided to hold the valves 230, 23 1 open. The voltage is supplied through the switching transistors, with the kick voltage being at least two times the normal operating voltage for the solenoid coil.

In operation, computer software routines may be used to control all system functions. Referring to FIGS. 17–25, the turning air mattress system's computer software routines are illustrated in flow chart form. A main turning program 300, comprising the steps 301–362, is shown in FIG. 17. Upon initial receipt of power, the microprocessor 201 preferably enters a subroutine of the main program 300 to initialize the central processing unit (CPU) 302. The routine 302, as shown in FIG. 18, first sets the initial CPU variables 303 by calling up these variables, such as the main turning program 300, from the non-volatile read-access-memory (NOVRAM) or other non-volatile forms of memory. Because there are no relays within the control system, electrical states throughout the control system may be random upon start-up. Therefore, the microprocessor 201 preferably closes 304 all valves 230, 231 by directing the driver 208 to cease sending any voltage to the solenoid coils 234. The microprocessor 201 then preferably performs system diagnostics in a system diagnostic subroutine 305.

In the system diagnostic routine 305, as shown in FIG. 20, the microprocessor 201 initially determines whether the read-only-memory (ROM) checksum is valid 306. If the checksum is invalid, the microprocessor 201 will command the complementary metal oxide semiconductor (CMOS) programmable array logic (PAL) to turn the alarm light-emitting diode (LED) and buzzer 202 on indicating the checksum is invalid, and command the display 215 to show a "ROM ERROR" message **307**, **308**, and **309**. The microprocessor **201** continues within this loop of the routine **305** after waiting 1.6 seconds **314**. After determining that the system did not pass the diagnostic routine **334**, the microprocessor **201** preferably enters a failure routine **335**. As a result, the control system is effectively locked up and must be returned to the factory for servicing.

However, if the checksum is valid **306**, the microprocessor **201** determines whether the controller **200** is able to read and write to the NOVRAM **310**. If not, the microprocessor **201** will command the CMOS PAL to turn the alarm LED and buzzer **202** on indicating the problem, and command the display **215** to show a "RAM ERROR" message **311**, **312** and **313**. The microprocessor **201** then waits 1.6 seconds **314** before continuing within this loop. After determining that the system did not pass the diagnostic routine **334**, the microprocessor **201** preferably enters a failure routine **335**. As a result, the control system is effectively locked up and must be returned to the factory for servicing.

The microprocessor **201** moves on to check whether the current operating system and NOVRAM are the same version **315**,**321**. This is important, especially in situations where updates to the operating system have been made. The microprocessor **201** displays the status of this check **316**, **317** and remedies any inconsistencies by copying the current operating system to the NOVRAM **322** and the calibration values from the ROM into the NOVRAM **324**. The calibration values are also copied to the NOVRAM **324** when the routine determines that the NOVRAM data is invalid **323**. An alarm **202** buzzer check is also performed **318**, **319**, and **320**.

After completing the system diagnostics **305** and determining that the controller **200** has passed the diagnostics **334**, the microprocessor **201** returns to the main program **300** to initialize the system variables within an initialize system variable routine **336**. As shown in FIG. **19**, the system default variables are loaded **337**, such as the default patient height and weight of 5'6" and 150 pounds, and the system hardware **338** is initialized closing any open valves **230**, **231** and turning off the alarm **202**, and also checking all switches.

After initializing the system, the microprocessor **201** initiates the Float mode of operation (discussed below) and enters a continuous loop within the program **300**, as shown in FIG. **17**, in which microprocessor **201** continuously monitors the system to see what mode of operation the system is in or what key pad **203** choices the operator has made. If the microprocessor **201** determines the system mode of operation is currently leveling the patient or that leveling is required by a subroutine **339**, the microprocessor **201** enters or remains within the leveling subroutine **340** (which will be discussed below in regard to patient rotation). The leveling subroutine **340** preferably cannot be exited until it is completed, unless the operator desires to put the controller **200** in the CPR mode of operation to administer CPR.

If, while monitoring the system, the microprocessor **201** determines that the system is in Float or Firm mode **358**, it will check to see whether the patient default values of height and weight (noted above) are in use **359**. If the default values are in use, the microprocessor **201** will display an "Enter Weight, Height" message **361**, thus reminding the operator to customize the system for the current patient. If the patient height and weight have already been entered, the microprocessor **201** will display **360** the actual pressures in each Zone I–VI.

The microprocessor **201** also continuously reads **362**, within the program **300**, the key pad **203** to determine whether a valid key stroke has been made **363**. If a valid key stroke has been made, a short audio beep is sounded (for approximately 20 ms). If an invalid key stroke has been made, a longer audio beep is sounded (for approximately 120 ms) alerting the operator that the key stroke was invalid.

The key pad **203** comprises keys to lock the key pad, to shut the alarm **202** off if it has been activated, to place the system in Float, Firm, or CPR mode of operation, and to access other menus. If, while monitoring the key pad **203**, the microprocessor **201** determines that one of these keys has been chosen **364**, **366**, **368**, **370**, **372**, and **374**, the microprocessor **201** will enter the corresponding subroutine **365**, **367**, **369**, **371**, **373**, and **375**.

The keypad lock subroutine **365**, when entered, preferably prevents the key pad **203** from accepting any more commands. The alarm subroutine **367** allows the operator to silence the alarm **202** if it has been triggered. The alarm **202** is preferably triggered in such instances as when the system enters the CPR mode, the system is unable to attain a desired pressure, or there is a control system failure.

In the Float subroutine **369**, the microprocessor **201** sends a desired pressure profile to a pressure control routine (not shown). The pressure profile comprises the desired pressures for each of the respective Zones I–VI of cells **20** and **40**. After a patient's height and weight have been entered, the microprocessor **201** calculates the pressures desired per cell Zone I–VI which may effectively diminish the interface pressure on a patient's skin over a large portion of the patient's body. The height and weight of a patient modifies the weight/mass distribution of the patient's body over the cells **20** and **40**. Thus, the pressure profile is patient-specific. Other embodiments may compensate for the various body types and adjust the desired pressures based on whether a patient is a male or female, or whether the patient is lean or corpulent.

Within the pressure control routine, the microprocessor **201** preferably maintains the pressures in each Zone I–VI to within 0.1 inch of water by opening and closing inlet and exhaust valves **230** and **231**. The length of time that a valve **230** and **231** remains open is dependent on the difference between the desired and actual pressures and whether the actual pressure is lower or higher in relation to the desired pressure.

The actual pressure in each Zone I–VI is determined by using the pressure sensors **206** to preferably take twenty-five data samples at ten millisecond intervals and average them. The pressure sampling begins approximately three hundred milliseconds after all valves **230** and **231** are closed to diminish the effects of "fluid hammer" on the pressure sensor **206** readings.

In the Firm subroutine **371**, the microprocessor **201** similarly sends a pressure profile to the pressure control routine. However, the pressure profile for the Firm mode of operation is not patient-specific. The Firm mode simply requires that each Zone I–VI be maintained at a pressure of ten inches of water.

The CPR subroutine **373** is entered to administer CPR on the patient. Since it is desired to have a flat, firm surface to perform CPR on, the CPR subroutine **373** closes all inlet valves **230** and opens all exhaust valves **231** to aid in exhausting air from the cells **20** and **40**. In addition, the microprocessor **201** disables all alarm functions after the initial sounding of the alarm **202**. In the CPR mode of operation, the operator would also pull the CPR strap **170** to dislodge the plugs **176** from the CPR exhaust tubing **146** to rapidly exhaust air from the cells **20** and **40**. The exhaust valves **231** remain open to ensure that the cells **20** and **40** remain uninflated until the operator chooses another mode of operation.

If the operator chooses to enter the menu subroutine **375**, the operator will continue to have the key pad **203** options of entering the Float, Firm, and CPR mode of operation. Therefore, if, as the microprocessor **201** continues monitoring the system, the microprocessor determines that the Float, Firm, or CPR keys have been chosen **383**, **385**, and **388**, the microprocessor **201** will enter the corresponding subroutines **384** **(369)**, **386** **(371)**, **389** **(373)**.

However, the operator will have an additional three key options presented **376** in the menu subroutine **375**. As shown in FIG. **21**, these key options comprise a key for entering a turning mode of operation, for determining the time for which the patient has been on the system, and for setting up the patient height, weight, and rotation parameters. If while monitoring the system, i.e., reading the key pad **377**, the microprocessor **201** determines that one of these key options has been chosen **378**, **379**, and **381**, the corresponding subroutine **400**, **380**, and **382** will be entered into.

While the microprocessor **201** is within the Menu-2 subroutine **382**, the operator is able to enter a patient's height and weight for calculating the desired pressure profile for the patient. In addition, the operator is able to manually adjust the pressure profile and vary the pressures within the different Zones I–VI. However, the microprocessor **201**, upon entering the turning mode of operation, will return to the profile calculated to correspond to the patient's specific height and weight.

In addition to the patient and profile parameters, the operator is also able to enter and adjust the rotation parameters for the turning mode of operation while the microprocessor **201** is in the Menu-2 subroutine. The rotation parameters comprise selecting a low, medium, or high angle of rotation in either a left or right direction of rotation, and the time a patient is to remain rotated at a specific angle, or in the center position. The nominal angles of rotation are 15 (low), 30 (medium) and 45 (high) degrees.

The microprocessor **201**, while in the menu subroutine **375**, also monitors whether the menu key has been pressed **387** or whether a predetermined period of time has been exceeded **392** without any key pad **203** input. If the menu key has been pressed, the microprocessor **201** returns to the beginning of the menu subroutine **375** and displays the initial options. If the time has been exceeded, the system returns to the prior mode of operation **393**.

In the turning subroutine **400**, as shown in FIG. **22**, the microprocessor **201** first determines whether the patient is level **401**. If the patient is not level, the microprocessor **201** enters or remains within the leveling subroutine **402(340)**. However, if the patient is level, the microprocessor **201** enters the right rotation subroutine **403** and rotates the patient to the right. Upon completing the right rotation subroutine **403**, the microprocessor **201** enters the leveling subroutine **440(340)** and continues to monitor whether the patient is level **439**. When the patient is level, the microprocessor **201** enters the center subroutine **442** if the operator has chosen a time greater than zero for the patient to remain in the centered position **441**. If the time is not greater than zero, the microprocessor **201** immediately enters the left rotation subroutine **455** to rotate the patient to the left. Upon completing the left rotation subroutine **445**, the microprocessor again enters the leveling subroutine **492(340)** and continues to monitor whether the patient is level **491**. As above, after the patient is level, the microprocessor **201** will enter the center subroutine **496(442)** if the time is greater than zero **495** or continue on to the right rotation subroutine **403** if the time is not greater than zero. These subroutines **340**, **403**, **442**, and **455** are discussed in more detail below.

In the right rotation subroutine **403**, as shown in FIG. **23**, the microprocessor **201** first determines whether the patient is level before proceeding **404**. If the patient is not level, the microprocessor **201** enters, or remains within, the leveling subroutine **405(340)**. Next, the microprocessor **201** determines whether the patient's height and weight have been entered **406**. If the patient parameters have not been entered, the microprocessor **201** enters the menu subroutine **407(375)** to allow the operator to access the menu-2 subroutine **382** to enter the patient's height and weight.

With the patient parameters entered, the microprocessor **201** reads the rotation parameters from the key pad **203** data buffer. The microprocessor **201** then calculates **410**, **412**, and **414**, preferably, a set of five target pressures for each Zone I–VI that correspond to a high, medium, or low turning angle, depending on whether the operator has chosen a high, medium, or low angle **409**, **411**, and **413**. The five target pressures tend to gradually rotate the patient in five steps to the desired turn angle. Thus, a smooth transition for the patient from a level position, as seen in FIGS. **16**A and **16**C, to an angled position, as seen in FIGS. **16**B and **16**D, is achieved. This method of rotation serves to increase the accuracy in which the turning angle is achieved, and also serves to diminish the potential for motion sickness in the patient. The following is an example of the five target pressures in each zone for a high turn angle:

TABLE I

Step	Zone I	Zone II	Zone III	Zone IV	Zone V	Zone VI
Start	6.0"	6.0"	6.0"	6.0"	6.0"	1.0"
1	4.9"	5.0"	5.8"	6.4"	6.8"	1.0"
2	3.8"	4.0"	5.6"	6.8"	7.6"	1.0"
3	2.7"	3.0"	5.4"	7.2"	8.4"	1.0"
4	1.6"	2.0"	5.2"	7.6"	9.2"	1.0"
5	0.5"	1.0"	5.0"	8.0"	10.0"	1.0"

The cell pressures in Zone VI, as shown in Table I, which corresponds to the foot/leg region, tend to be lower than the cell pressure in Zone VI during Float mode. This lower pressure adjusts and/or maintains a proper foot/leg angle relative to the patient's torso, thus tending to maintain proper spinal alignment during turning.

If the operator has input a time for which the patient is to remain rotated that is greater than zero **415**, the microprocessor **201** will continue within the right rotation subroutine **403** and the patient will be turned. However, if the time is not greater than zero, the microprocessor **201** will exit the subroutine **416** and the patient will not be turned to the right.

Next, the microprocessor **201** sets the countdown timer to the above-referenced time **417** and the calculated pressure targets are retrieved **418**. The first target pressure for each Zone I–VI is sent to the pressure control routine **419**. As above, the pressure control return opens and closes valves **230**, **231** to achieve the target pressures. The microprocessor **201** continues to monitor whether the first target pressures are achieved **420** and update the pressure control routine until the first target pressures are achieved **421**. The program continues to duplicate these steps **419**, **420**, and **421** to achieve the remaining second, third, fourth and fifth target pressures 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433.

The program preferably adjusts the tolerances within which the target pressure must be achieve to increase the speed and efficiency by which the program steps through the five desired target pressures. The tolerances preferably vary depending on the desired target pressure. For example, for target pressures between 0.0 inches and 2.0 inches of water, the accuracy by which the pressure shall be achieved is +0.2 inches of water; for target pressures between 2.0 inches and 5.0 inches of water, the accuracy by which the pressure shall be achieved is +0.3 inches of water; and, for target pressures between 5.0 inches and 10.0 inches of water, the accuracy by which the pressure shall be achieved is ±0.5 inches of water.

As shown in FIG. 16B, while the microprocessor 201 is within the right rotation subroutine 403, the patient tends to rotate to the right about the fulcrum cell 42 on to the "low pressure" cells, which comprise the inside and outside right cells 44A and 46A in this instance. The inside and outside left cells 44B and 46B achieve an elevated pressure, thus causing an angle to be formed across the tops of the cells.

Once the fifth set of target pressures is achieved, the microprocessor 201 closes all valves 230 and 231 to maintain the inflation within the cells 20 and 40 at the level achieved at the fifth set of target pressures and, thus, essentially maintain the turn angle achieved. By closing the valves 230 and 231, the patient will not "bottom out" on the base 150. If the valves 230 and 231 did not close, the pressure control routine would continue to cause the controller 200 to open the exhaust valves 231 to maintain the pressure in the cells 44A and 46A as the weight of the patient's body causes the volume of the inside and outside right cells 44A and 46A to reduce, and the pressure within these cells 44A and 46A to rise.

Upon closing the valves 434, the microprocessor 201 starts and monitors the countdown timer 435 and 437. When the time reaches zero 436, the microprocessor 201 returns to the turning routine 400. Within the turning routine 400, the microprocessor 201 determines that the patient is not level 439 and thus enters the leveling subroutine 440(340) to level the patient.

The leveling subroutine 340 is very important to ensure proper turning of the patient. The leveling subroutine 340 diminishes the potential for a patient to travel or drift away from the center of the bed or the fulcrum cell 42, and serves to maintain the patient in a proper position to be turned.

In the leveling subroutine 340, as shown in FIG. 24, the microprocessor 201 first sets the desired leveling target pressure for the low pressure cells, in this instance the inside and outside right cells 44A and 46A, to the actual pressure of the fulcrum cell 42 plus two inches of water pressure. Next, the microprocessor 201 sets the desired leveling target pressure for the high pressure cells, in this instance the inside and outside left cells 44B and 46B, to the actual fulcrum cell 42 pressure minus two inches of water pressure. The program then calculates six intermediate target pressures in relation to the actual pressures of the inside and outside cells 44A, 44B, 46A, and 46B and the desired leveling target pressures. The pressure in the cells 44A–B and 46A–B are adjusted to the intermediate and leveling target pressures 343 and 344 in seven successive steps, which tends to provide a smooth transition for the patient from a turned position, as seen in FIG. 16B, to an overcompensated center position (not shown).

When the desired leveling target pressures are achieved, the microprocessor 21 then sets the fulcrum cell 42 to an elevated target pressure which is twice the fulcrum cell's 42 actual pressure 345. However, if this target pressure is greater than ten inches of water pressure, the elevated fulcrum target pressure is set to ten inches of water pressure 346 and 347. The microprocessor 201 then sets the turning cells 40 target pressures to the elevated fulcrum target pressure 348. The pressure in the turning cells 40 are then adjusted to achieve the elevated fulcrum target pressure 349 and 350.

After reaching the elevated fulcrum target pressure, the microprocessor 201 sets the turning cells' 40 pressures to a maximum target pressure 351. The maximum target pressure is based on a patient's height and weight, and is calculated to make sure all the turning cells 40 are fully inflated. The turning cells 40 are then adjusted to achieve the maximum target pressure 352 and 353.

After reaching the maximum target pressure, the microprocessor 201 sets the turning cells' 40 pressures to the original center level pressures 354. The center level pressures are equivalent to the pressure profile values determined for the Float mode of operation. The turning cells 40 are then adjusted to achieve the center level pressures 355 and 356. When these pressures are reached 356, the microprocessor 201 returns to either the main program routine 300 or the turning subroutine 400.

Upon exiting the leveling subroutine 340 and re-entering the turning routine 400, the microprocessor 201 determines whether the operator selected a time greater than zero for the patient to remain in a center position 441. If the time is greater than zero, the microprocessor 201 enters the center subroutine 442.

In the center subroutine 442, as shown in FIG. 25, the microprocessor 201 first determines if the patient is level 443 and levels the patient if need be 444(340). Next, the microprocessor 201 reads from memory the pressure profile corresponding to the patient parameters of height and weight 445, and the time input by the operator for the patient to remain in the center position 446. The pressure profile is then sent to the pressure control routine 447 and the countdown timer is set to the above-reference input time value 448.

Once the microprocessor 201 determines that the profile pressures are achieved 449 and 450, the countdown timer is started 451. The patient remains in the center level position, as shown in FIGS. 16A and 16C, until the timer expires. After determining that the countdown timer value is less than or equal to zero 452 and 453, the microprocessor 201 exits the center subroutine 454 and re-enters the turning routine 400 to enter the left rotation subroutine 455.

While in the left rotation subroutine 455, as shown in FIG. 26, the microprocessor 201 performs steps 456–490 to turn the patient to the left, as shown in FIG. 16D. In performing steps 456–490, the microprocessor 201 effectively performs the identical steps 404–438 performed in the right rotation subroutine 403. After completing the left rotation subroutine 455, the microprocessor 201 re-enters and continues within turning routine 400.

The operator, however, may choose to interrupt the turning mode of operation and return the patient to either the Float or Firm mode of operation, or enter the CPR mode of operation. The turning subroutine 400 can be interrupted and the system sent into the Float, Firm, or CPR mode of operation 493, 494 at any time. However, the microprocessor 201 will first go into or complete the leveling subroutine 340 before going into the Float or Firm modes of operation, but not before entering the CPR mode.

Thus, the turning air mattress device of the present invention provides many benefits over the prior art. While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as an exemplification of one preferred embodiment thereof. Many other variations are possible.

Accordingly, the scope of the present invention should be determined not by the embodiments illustrated above, but by the appended claims and their legal equivalents.

What is claimed is:

1. A turning air mattress system comprising

a base,

a plurality of elongated air cells disposed on said base, said plurality of air cells including a combination of transverse and longitudinal air cells, the transverse air cells having generally catenary-shaped top and bottom surfaces and the longitudinal air cells being generally configured to comprise a fulcrum air cell and left and right side cells adjacent opposing sides of said fulcrum air cell,

a control system including

a plurality of pressure sensors,

a plurality of inlet and exhaust valves,

a microprocessor electrically communicating with said plurality of pressure sensors and said plurality of inlet and exhaust valves,

a valve box having a high pressure plenum communicating with said plurality of inlet valves, an exhaust plenum communicating with said plurality of exhaust valves, and a plurality of manifold chambers interconnected to said plurality of air cells, to said plurality of inlet and exhaust valves, and to said plurality of pressure sensors, and

a blower interconnected to said high pressure plenum.

2. The turning air mattress in claim **1**, further comprising a plurality of air cell manifolds interconnected to said plurality of air cells and to said plurality of manifold chambers, said plurality of cell manifolds being disposed on said base.

3. The turning air mattress in claim **2**, further comprising a CPR strap interconnected to the said plurality of cell manifolds.

4. The turning air mattress in claim **1**, further comprising a cell liner encompassing said plurality of air cells.

5. The turning air mattress in claim **1**, further comprising a top cover fastened to said base and covering said plurality of air cells.

6. The turning air mattress in claim **1**, further comprising a fleece fittedly retained over said plurality of air cells.

7. The turning air mattress in claim **1**, further comprising a top sheet fittedly retained over said plurality of air cells.

8. The turning air mattress in claim **6**, further comprising a low air loss tube to supply aeration air to be distributed upwardly around a patient and wherein the top sheet further comprises air semi-permeable material.

9. A turning air mattress comprising

a plurality of elongated air cells longitudinally and transversely disposed on a base, said plurality of air cells being grouped in a plurality of cell zones comprising,

a first cell zone including a longitudinal fulcrum cell interconnected to a first plurality of interconnected transverse cells, said fulcrum cell having first and second sides and ends, said first plurality of transverse cells being adjacent said first end of said fulcrum cell,

a second cell zone including a right side longitudinal air cell having first and second sides, said first side of said right side cell being adjacent said first side of said fulcrum cell,

a third cell zone including a left side longitudinal air cell having first and second sides, said first side of said left side cell being adjacent said second side of said fulcrum cell,

a fourth cell zone including a second plurality of interconnected transverse cells, said second plurality of transverse cells being adjacent said second end of said fulcrum cell.

10. The turning air mattress of claim **9**, further comprising

a fifth cell zone including an outside right longitudinal air cell interconnected to a left border longitudinal air cell, said outside right cell having first and second sides, said first side of said outside right cell being adjacent said second side of said right side cell, and

a sixth cell zone including an outside left longitudinal air cell interconnected to a right border longitudinal air cell, said outside left cell having first and second sides, said first side of said outside left cell being adjacent said second side of said left side cell, said second side of said outside left cell being adjacent said left border cell, said right border cell being adjacent said second side of said outside right cell.

11. An elongated air cell comprising

a top wall,

a bottom wall,

opposing end walls attached to said top wall and said bottom wall,

opposing side walls attached to said top wall, said bottom wall, and said opposing end walls, and

a dart in each of said opposing side walls, said dart causing said air cell to have a substantially catenary-like shape along said top wall and said bottom wall.

12. The air cell of claim **11**, further comprising

an interior wall attached to said opposing side walls, said interior wall having apertures therethrough, and

an air connector attached to said bottom wall.

13. An elongated air cell comprising

an upper main chamber,

a lower main chamber connected to said upper main chamber,

a first upper chamber connected to and angularly extending upwardly and outwardly from said upper main chamber,

a second upper chamber connected to and angularly extending upwardly and outwardly from said upper main chamber, and angularly extending away from said first upper chamber, and

first and second lateral chambers connected to and laterally extending from said upper and lower main chambers.

14. An elongated air cell comprising

a top wall,

a bottom wall,

opposing side walls inwardly and upwardly extending from said bottom wall to said top wall, said opposing side walls being attached to said top and bottom walls,

opposing end walls attached to said top, bottom and opposing end walls, and at least two opposing internal walls attached to said side walls forming at least three chambers within said air cell, said opposing internal walls being spaced apart from one another.

15. The air cell in claim **14**, wherein said internal walls are equidistant from a midpoint between the top and bottom walls.

16. The air cell in claim **14** wherein said top walls, said bottom walls, and said side walls form a substantially truncated triangular cross-section.

17. A turning air mattress comprising

a plurality of elongated air cells longitudinally disposed on a base comprising,

a fulcrum cell having a pair of upwardly and inwardly sloping side walls and opposing top and bottom walls, and

first and second side cells located adjacent and on opposing sides of said fulcrum cell and having a plurality of chambers substantially forming opposing top and bottom walls and a first at least one sloping side wall, with said first at least one sloping side wall of said first and second side cells being adjacent said fulcrum cell and having a slope substantially equal to the slope of said sloping side walls of said fulcrum cell.

18. The turning air mattress of claim **17**, wherein said first and second side cells further comprises a second at least one sloping side wall, and further comprising

first and second outside cells located adjacent said first and second side cells, respectively, and having a plurality of chambers substantially forming opposing top and bottom walls and a third at least one sloping side wall, with said third at least one sloping side wall of said first and second outside cells being adjacent said second at least one sloping side wall of said first and second side cells, respectively, and having a slope substantially equal to the slope of said second at least one sloping side wall of said first and second side cells, and

first and second border cells located adjacent said first and second outside cells, respectively, and having opposing top, bottom, and side walls.

19. A method of turning a patient on an air mattress, said method comprising the steps of

providing an air mattress including a plurality of elongated longitudinally disposed air cells comprising at least a fulcrum cell and right and left cells adjacent opposing sides of said fulcrum cell,

calculating a center pressure profile comprising a center pressure for each of said plurality of air cells,

choosing a patient turn angle,

calculating a plurality of target pressures for each of said plurality of air cells relative to said center pressure profile and said patient turn angle, and

adjusting the pressure in each of said plurality of air cells until each of said plurality of target pressures for each of said plurality of air cells is successively achieved, thereby rotating the patient about the fulcrum cell.

20. The method of claim **19**, further comprising the step of adjusting a tolerance value for an accuracy by which said plurality of target pressures of each of said plurality of air cells are achieved.

21. The method of claim **19**, wherein the first step further comprises providing a plurality of inlet and exhaust valves communicating with said plurality of air cells, and wherein the fifth step further comprises the steps of

calculating a period of time necessary to keep ones of said plurality of inlet or exhaust valves open to achieve said plurality of target pressures in each of said plurality of said air cells, and

opening ones of said plurality of inlet or exhaust valves for said period of time.

22. The method of claim **19** further comprising the step of determining whether the patient is level prior to turning the patient, and, if necessary, leveling the patient prior to turning.

23. A method of leveling a turned patient on an air mattress, said method comprising the steps of

providing an air mattress including a plurality of elongated longitudinally disposed air cells comprising at least a fulcrum cell and right and left side cells adjacent opposing sides of said fulcrum cell, with each of said plurality air cells being inflated to pressures corresponding to a patient turn angle wherein said right side cell would be a low pressure cell and left side cell would be a high pressure cell if said patient turn angle is a right turn angle,

setting a leveling target pressure for said low pressure cell to be equal to a pressure above the actual pressure in said fulcrum cell, a leveling target pressure for said high pressure cell to be equal to a pressure lower than the actual pressure in said fulcrum cell, and a leveling target pressure for said fulcrum cell to be substantially equal to the actual pressure of said fulcrum cell,

adjusting the pressure in ones of said plurality of air cells successively through a plurality of intermediate pressures until said leveling target pressures of each of said plurality of air cells are achieved,

setting the pressures in each of said plurality of air cells to be substantially equal to maximum target pressures, said maximum target pressures being pressures that ensure that each of said plurality of air cells are substantially fully inflated,

adjusting the pressure in ones of said plurality of air cells until said maximum target pressures of each of said plurality of air cells are achieved,

setting the pressures in each of said plurality of air cells to be equal to center profile pressures, and

adjusting the pressure in ones of said plurality of air cells until said center pressures of each of said plurality of air cells are achieved.

24. A method of forming an air cell, said method comprising the steps of

providing first, second, third, fourth, fifth, sixth, seventh, and eighth elongated sheets of flexible material having first and second opposing longitudinal edges and first and second opposing transverse edges, said first and second longitudinal edges of said first sheet being at least equal in length to said first and second longitudinal edges of said second, third, fourth, fifth, sixth, seventh, and eighth sheets, said first and second transverse edges of said second, third, fourth, fifth, sixth, seventh, and eighth sheets being shorter in length than said first and second transverse edges of said first sheet,

attaching said first longitudinal edge of said first sheet to said second longitudinal edge of said first sheet,

attaching said first and second longitudinal edges of said second and third sheets to said first sheet forming first and second chambers, respectively, therebetween, with the transverse length of said first sheet substantially retained between said first and second longitudinal edges of said second and third sheets being longer the transverse length of said second and third sheets,

attaching said first longitudinal edge of said fourth, fifth, sixth, and seventh sheets to said first sheet and said second longitudinal edge of said fourth and sixth sheets, respectively, to said second longitudinal edge of said fifth and seventh sheets, respectively, and forming third and fourth chambers, respectively, therebetween, and

attaching said first and second longitudinal edges of said eighth sheet, respectively, to said second longitudinal edges of said fourth and fifth sheets and said second longitudinal edges of said sixth and seventh sheets, respectively, and forming fifth and sixth opposing chambers.

25. A turning air mattress having a plurality of longitudinal air cells positioned under at least a portion of the torso of a patient, the air cells comprising:

a center fulcrum cell;

inside right and left cells positioned on either side of the fulcrum cell;

outside right and left cells positioned adjacent the inside right and left cells, respectively; and

right and left border cells positioned adjacent the outside right and left cells, respectively, wherein,

the outside right cell and the left border cell comprise a first air zone, the inside right cell comprises a second air zone, the center fulcrum cell comprises a third air zone, the inside left cell comprises a fourth air zone, and the outside left cell and the right border cell comprise a fifth air zone.

26. The turning air mattress of claim **25** further comprising at least one first transverse air cell for positioning under the head of a patient and at least one second transverse air cell for positioning under the foot/leg region of a patient.

27. The turning air mattress of claim **26** wherein the first transverse air cell is connected to the first air zone and the second transverse air cell comprises a sixth air zone.

* * * * *

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	James Edwin GIFFT
Filer:	Thomas Leffert/Jennifer Inoue
Attorney Docket Number:	292.001US1X

Filed as Large Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Request for ex parte reexamination	1812	1	2520	2520
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**2520**

Electronic Acknowledgement Receipt	
EFS ID:	13616602
Application Number:	90012456
International Application Number:	
Confirmation Number:	5505
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	James Edwin GIFFT
Customer Number:	27073
Filer:	Thomas Leffert/Jennifer Inoue
Filer Authorized By:	Thomas Leffert
Attorney Docket Number:	292.001US1X
Receipt Date:	29-AUG-2012
Filing Date:	
Time Stamp:	15:09:12
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$2520
RAM confirmation Number	1534
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		Request_for_Ex_Parte_Reexamination.pdf	14500215 de44821ce5f5fad693b80625de131770ed1aced2	yes	277

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	2
Miscellaneous Incoming Letter	3	16
Other Reference-Patent or Application Document	17	30
Information Disclosure Statement (IDS) Form (SB08)	31	31
Other Reference-Patent or Application Document	32	38
Other Reference-Patent or Application Document	39	46
Other Reference-Patent or Application Document	47	62
Other Reference-Patent or Application Document	63	68
Other Reference-Patent or Application Document	69	91
Other Reference-Patent or Application Document	92	96
Other Reference-Patent or Application Document	97	125
Other Reference-Patent or Application Document	126	175
Other Reference-Patent or Application Document	176	248
Other Reference-Patent or Application Document	249	277

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	29850 ab33808bdf682a3c67ee643d64d731483e168770	no	2

Warnings:

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Total Files Size (in bytes): 14530065

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/57 (02-09)
Approved for use through 02/28/2013. OMB 0651-0064
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(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: 292.001US1X

Date: August 29, 2012

1. [X] This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 5,904,172 issued May 18, 1999. The request is made by:
   [ ] patent owner. [X] third party requester.

2. [X] The name and address of the person requesting reexamination is:
   LEFFERT JAY & POLGLAZE, P.A.
   P.O. Box 2230
   Minneapolis, MN 55402-0230

3. [ ] a. A check in the amount of $__________ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);
   [ ] b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. __________ ; **or**
   [X] c. Payment by credit card. Form PTO-2038 is attached.

4. [ ] Any refund should be made by [ ] check or [ ] credit to Deposit Account No. __________ 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.

5. [X] A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4)

6. [ ] CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
   [ ] Landscape Table on CD

7. [ ] Nucleotide and/or Amino Acid Sequence Submission
   If applicable, items a. – c. are required.
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM (2 copies) or CD-R (2 copies); **or**
      ii. [ ] paper
   c. [ ] Statements verifying identity of above copies

8. [ ] A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.

9. [X] Reexamination of claim(s) 1-18 is requested.

10. [X] A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.

11. [ ] An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

12. [X] The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1)
b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).

13. [ ] A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)

14. [X] a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:
Schwegman Lundberg & Woessner
P.O. Box 2938
Minneapolis MN 55402
Date of Service: August 29, 2012; **or**

[ ] b. A duplicate copy is enclosed because service on patent owner was not possible. An explanation of the efforts made to serve patent owner **is attached**. See MPEP 2220.

15. Correspondence Address: Direct all communications about the reexamination to:

[X] The address associated with Customer Number: 27073

OR

[ ] Firm or Individual Name

Address		
City	State	Zip
Country		
Telephone	Email	

16. [X] The patent is currently the subject of the following concurrent proceeding(s):
[ ] a. Copending reissue Application No.
[ ] b. Copending reexamination Control No.
[ ] c. Copending Interference No.
[X] d. Copending litigation styled:
Select Comfort Corporation v. The Sleep Better Store, et al.
CASE 0:12-cv-01148-JNE-JSM

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

[signature]
Authorized Signature

August 29,2012
Date

Daniel J. Polglaze
Typed/Printed Name

39,801
Registration No.

[ ] For Patent Owner Requester
[X] For Third Party Requester

<table>
<tr><td>First Named Inventor</td><td>Gifft, James Edwin</td><td rowspan="7">Request for Ex Parte Reexamination of U.S. Patent 5,904,172</td></tr>
<tr><td>Serial No.</td><td>08/901,144</td></tr>
<tr><td>Filing Date</td><td>July 28, 1997</td></tr>
<tr><td>Issued Patent No.</td><td>5,904,172</td></tr>
<tr><td>Issue Date</td><td>May 18, 1999</td></tr>
<tr><td>Examiner Name</td><td>unassigned</td></tr>
<tr><td>Attorney Docket No.</td><td>292.001US1X</td></tr>
<tr><td colspan="3">Title: VALVE ENCLOSURE ASSEMBLY</td></tr>
</table>

Mail Stop: Ex Parte Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This is a request for Ex Parte Reexamination pursuant to 37 C.F.R. § 1.510 of U.S. Patent No. 5,904,172, issued May 18, 1999.

DETAILED REQUEST FOR *EX PARTE* REEXAMINATION

Ex Parte Reexamination of United States Patent 5,904,172 (hereinafter "the '172 patent") is requested under 35 U.S.C. §§ 301-307 and 37 C.F.R. § 1.510. The '172 patent issued May 18, 1999, to James Edwin Gifft et al., and is assigned to Select Comfort Corporation.

The '172 patent issued from U.S. Patent Application Serial No. 08/901,144 (filed July 28, 1997).

I. Request For Reexamination And Identification Of Claims For Which Reexamination is Requested

Reexamination is requested for claims 1-18 of U.S. Patent 5,904,172, on the basis of the substantial new questions of patentability supplied herein.

II. Discussion Of General Pertinence And Application Of New And Old Art

Shafer et al. (U.S. Patent 5,509,154) was used in rejecting original claims of the '172 patent, but none of the claims that ultimately issued in the '172 patent. Kalavitz et al. (U.S. Patent 4,583,566) in view of Walker (U.S. Patent 4,890,344) was used in rejecting original claims of the '172 patent, but none of the claims that ultimately issued in the '172 patent.

The new art, Kwok (U.S. Patent 3,729,205), Rible (U.S. Patent 4,564,990), Pagani (U.S. Patent 4,836,235), Mennona, Jr. (U.S. Patent 5,006,073) Madsen et al. (U.S. Patent 5,560,057), Stacy et al. (U.S. Patent 5,586,346), and Yavets-Chen (U.S. Patent 5,873,137) was neither cited nor used in any rejection in the prosecution of the '172 patent. Further, the new art is not cumulative of art already cited in the '172 patent, and the same question of patentability has not been decided by the Office. Still further, issued claims 1-16 received no prior art rejections at all in prosecution of the '172 patent. The proposed rejections present a substantial new question of patentability regarding at least one claim, and the same question of patentability has not previously been decided by the Office. The proposed rejections apply Shafer in view of new art, or apply Kalavitz et al. in view of Walker in view of new art, or apply Kalavitz et al. in view of Walker in view of Sember in view of new art, which is specifically allowed (See MPEP 2217(III) and MPEP 2258(F)(2)).

Kwok issued April 24, 1973; Rible issued January 21, 1986; Pagani issued June 6, 1989; Mennona, Jr. issued April 9, 1991; Madsen et al. issued October 1, 1996, and was filed July 1, 1994; Stacy et al. issued December 24, 1996, and was filed February 15, 1994; and Yavets-Chen issued February 23, 1999, and was filed June 17, 1996. Kwok, Rible, Pagani, and Mennona, Jr. each qualify as prior art under 35 U.S.C. §§ 102(a) and (b). Stacy et al., Yavets-Chen, Madsen et al., and Balaton each qualify as prior art under 35 U.S.C. § 102(a), or in the alternative, each qualify as prior art under 35 U.S.C. § 102(e).

III. Substantial New Questions Of Patentability And Proposed Rejections

A. Shafer et al. (U.S. Patent 5,509,154) in view of Yavets-Chen (U.S. Patent 5,873,137), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claim 1.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74. It would have been obvious to use the sensor of Yavets-Chen to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Yavets-Chen do not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

B. Shafer et al. (U.S. Patent 5,509,154) in view of Yavets-Chen (U.S. Patent 5,873,137), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claim 1.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74. It would have been obvious to use the sensor of Yavets-Chen to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Yavets-Chen do not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

C. Shafer et al. (U.S. Patent 5,509,154) in view of Yavets-Chen (U.S. Patent 5,873,137), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claim 1.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74. It would have been obvious to use the sensor of Yavets-Chen to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Yavets-Chen do not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

D. Shafer (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claim 1.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

E. Shafer (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claim 1.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

F. Shafer (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claim 1.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

G. Shafer (U.S. Patent 5,509,154) in view of Stacy et al. (U.S. Patent 5,586,346) raises a substantial new question of patentability for claims 2, 3 and 12.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach guides and stops for disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. with the Shafer et al. system to correctly position components within the enclosure.

H. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claims 4-5.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

I. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claims 4-5.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in any Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

J. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claims 4-5.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

K. Shafer (U.S. Patent 5,509,154) in view of Stacy et al. (U.S. Patent 5,586,346) and further in view of Kwok (U.S. Patent 3,729,205) raises a substantial new question of patentability for claims 6-8 and 16-18.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach that the enclosure is a multi-part enclosure with an enclosure portion and a rear cover portion. Stacy et al. teaches an air box 46 (Figures 7, 31) that clearly shows an enclosure portion and a cover that is attached to the enclosure portion. It would have been obvious to use the air box of Stacy et al. with the Shafer et al. system to make the enclosure more accessible.

Shafer et al. in view of Stacy et al. do not teach a flexible seal between the enclosure portion and the cover. Flexible seals such as gaskets were well known in the art at the time of the application for the '172 patent, and it would have been obvious to include a gasket between the enclosure and the cover to more fully seal the housing. Such a flexible gasket is taught in Kwok (10, col. 3, ll. 32-46) and gaskets in general are discussed at Kwok col. 1, ll. 14-46.

Regarding claims 7-8 and 17-18, Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. as lead grooves for the passing of leads into the enclosure, and a flexible seal inherently seals.

L. Shafer (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,586,346) and further in view of Kwok (U.S. Patent 3,728,205) raises a substantial new question of patentability for claims 6-8 and 16-18.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach that the enclosure is a multi-part enclosure with an enclosure portion and a rear cover portion. Madsen et al. teaches a housing 90 comprising front and rear portions 158 and 159 that n air box 46 (Figures 7, 31) that clearly shows an enclosure portion and a cover that is attached to the enclosure portion. It would have been obvious to use the air box of Stacy et al. with the Shafer et al. system to make the enclosure more accessible.

Shafer et al. in view of Madsen et al. do not teach a flexible seal between the enclosure portion and the cover. Flexible seals such as gaskets were well known in the art at the time of the application for the '172 patent, and it would have been obvious to include a gasket between the enclosure and the cover to more fully seal the housing. Such a flexible gasket is taught in Kwok (10, col. 3, ll. 32-46) and gaskets in general are discussed at Kwok col. 1, ll. 14-46.

Regarding claims 7-8 and 17-18, Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. as lead grooves for the passing of leads into the enclosure, and a flexible seal inherently seals.

M. Kalavitz et al. (U.S. Patent 4,583,566) in view of Walker (U.S. Patent 4,890,344) and further in view of Yavets-Chen (U.S. Patent 5,873,137) raises a substantial new question of patentability for claim 9.

Claim 9 is unpatentable under 35 USC 103(a) over Kalavitz et al. in view of Walker, and further in view of Madsen et al. Kalavitz et al. discloses all the claimed features with the exception of being used with an air inflatable mattress. Kalavitz et al. teaches air pressure selector 211 for selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating with valve 220 to place the desired air pressure in the bladder. Air supply 102 is fluidly coupled to the bladder, and energized to supply compressed air to the bladder. It is noted that while the patent to Kalavitz et al. does not specifically disclose a pump, the vehicle air supply disclosed is considered to include all types of compressed air supply including a pump. The patent to Walker discloses that it is known in the art to employ a control system for an air mattress for the purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the control system of Kalavitz et al. for an air mattress for the purpose of allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker.

Kalavitz et al. in view of Walker does not explicitly teach continuous monitoring of pressure in the bladder at a tap on a valve enclosure assembly. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74. It would have been obvious to use the sensor of Yavets-Chen to monitor pressure in the chamber of Kalavitz et al., to more accurately know at all times the pressure.

N. Kalavitz et al. (U.S. Patent 4,583,566) in view of Walker (U.S. Patent 4,890,344) and further in view of Madsen et al. (U.S. Patent 5,560,057) raises a substantial new question of patentability for claim 9.

Claim 9 is unpatentable under 35 USC 103(a) over Kalavitz et al. in view of Walker, and further in view of Madsen et al. Kalavitz et al. discloses all the claimed features with the exception of being used with an air inflatable mattress. Kalavitz et al. teaches air pressure selector 211 for selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating with valve 220 to place the desired air pressure in the bladder. Air supply 102 is fluidly coupled to the bladder, and energized to supply compressed air to the bladder. It is noted that while the patent to Kalavitz et al. does not specifically disclose a pump, the vehicle air supply disclosed is considered to include all types of compressed air supply including a pump. The patent to Walker discloses that it is known in the art to employ a control system for an air mattress for the purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the control system of Kalavitz et al. for an air mattress for the purpose of allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker.

Kalavitz et al. in view of Walker does not explicitly teach continuous monitoring of pressure in the bladder at a tap on a valve enclosure assembly. Madsen et al. discloses at col. 6, ll. 18-19 continuously monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Kalavitz et al., to more accurately know at all times the pressure.

O. Shafer (U.S. Patent 5,509,154) in view of Stacy et al. (U.S. Patent 5,586,346) raises a substantial new question of patentability for claim 10.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach pressure monitor means formed integral with the valve housing. Stacy et al. teaches (col. 6, ll. 10-19) each valve having a pressure feedback tube coupled between an outlet side of the valve and a pressure sensor to monitor pressure at the valve. It would have been obvious to use the integral pressure monitor in the valves of Stacy et al. with the Shafer et al. system to accurately monitor pressure at the valve.

P. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claims 11 and 14.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

Q. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claims 11 and 14.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

R. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claims 11 and 14.

Shafer et al. discloses an air control system having an enclosure which is coupled to a pump (152), pressure monitor means (156, 158), and valve members coupled to the enclosure being in fluid communication with the air bladders of the mattress (338, 340).

Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

CONCLUSION

In view of the above, Requester submits that substantial new questions of patentability exist with respect to claims 1-18 of the '172 patent, and requests that reexamination be granted.

Any inquiry regarding this request should be directed to Daniel J. Polglaze at Telephone No. (612) 312-2203, Facsimile No. (612) 312-2250.

Respectfully submitted,

Date: 29 Aug. 2012

Daniel J. Polglaze
Reg. No. 39,801

Attorneys for Requester
Leffert Jay & Polglaze

Customer No. 27073

T 612 312 2200
F 612 312 2250

US005904172A

United States Patent [19]

Gifft et al.

[11] **Patent Number: 5,904,172**

[45] **Date of Patent: May 18, 1999**

[54] **VALVE ENCLOSURE ASSEMBLY**

[75] Inventors: **James Edwin Gifft**, Maple Grove; **Paul James Mahoney**, Stillwater, both of Minn.

[73] Assignee: **Select Comfort Corporation,** Minneapolis, Minn.

[21] Appl. No.: **08/901,144**

[22] Filed: **Jul. 28, 1997**

[51] **Int. Cl.^{6}** **A47C 27/08**

[52] **U.S. Cl.** **137/224**; 137/271; 137/596.16; 137/596.2; 5/710; 5/713

[58] **Field of Search** 137/223, 229, 137/596.2, 596.16, 884, 271; 5/710, 713

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[57] **ABSTRACT**

An improved valve enclosure assembly for use with an air inflatable mattress includes at least one air bladder, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle. The improved valve enclosure assembly is fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder. An enclosure defines a substantially fluidly sealed air chamber and has at least one air inlet to the air chamber being fluidly coupled to the pump. A pressure monitor is operably coupled to the processor and is in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder. A method of effecting a desired pressure in a bladder of an air inflatable mattress is also disclosed.

18 Claims, 7 Drawing Sheets

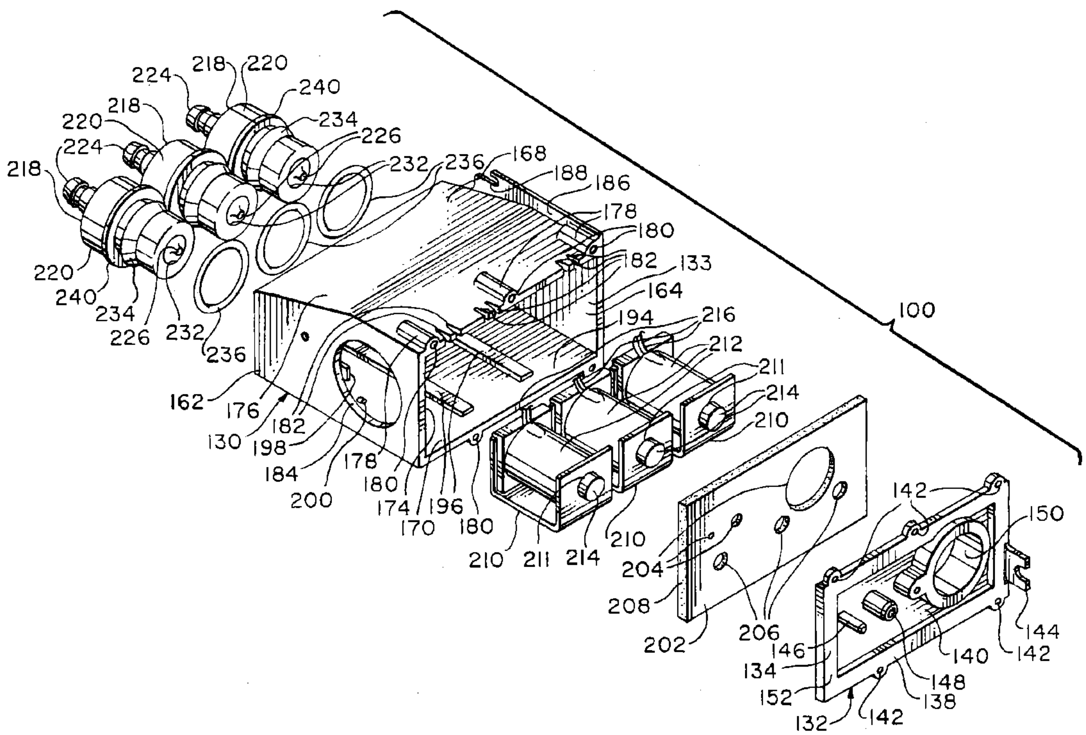


Fig. 1
PRIOR ART

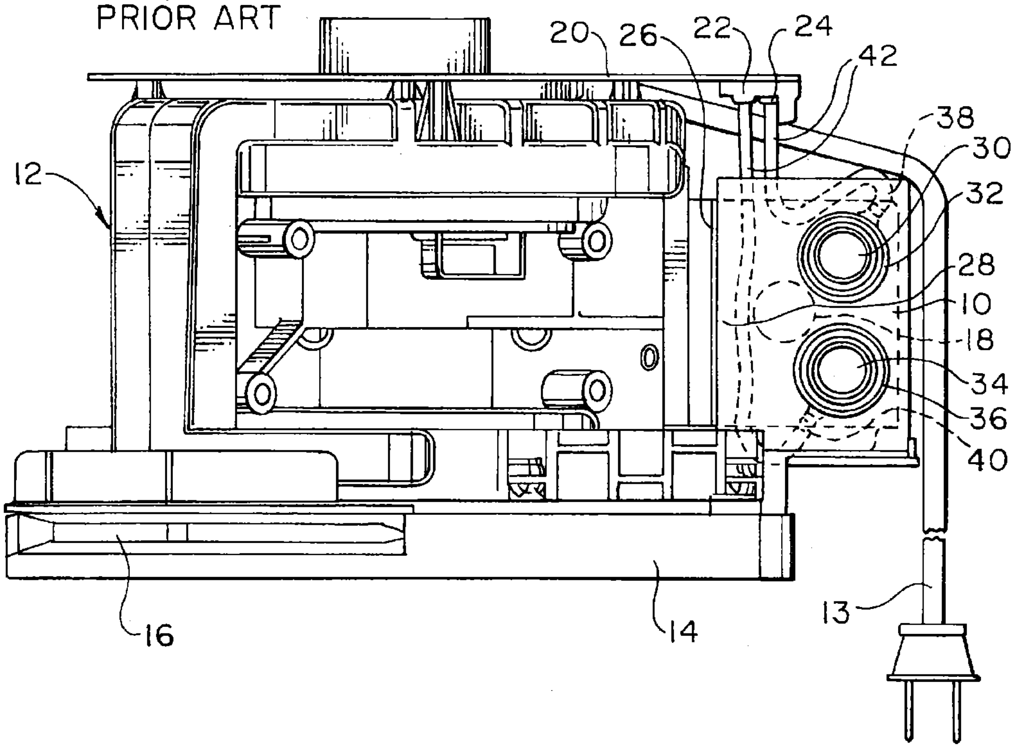


Fig. 2

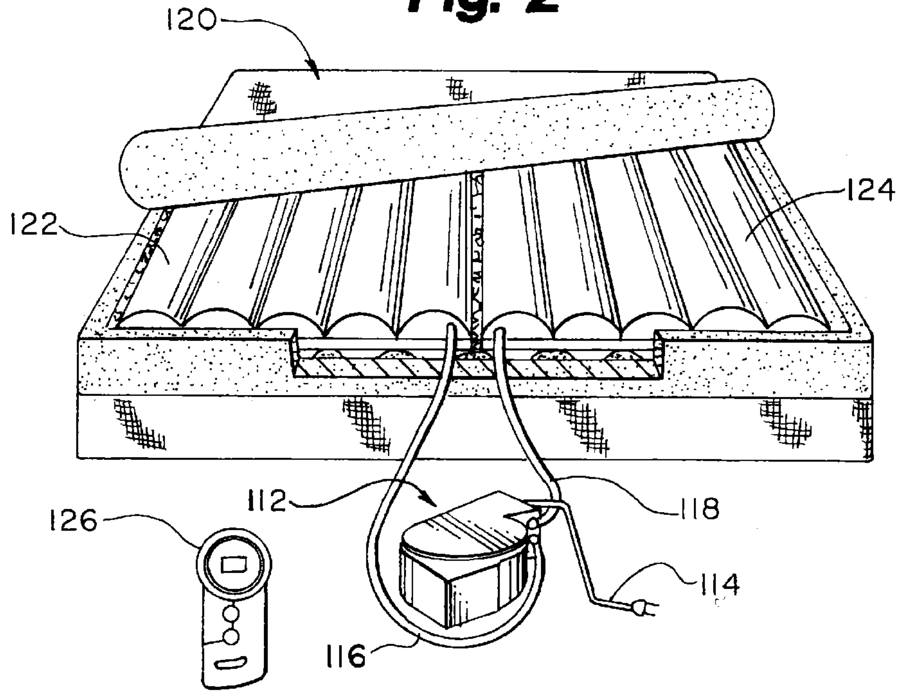
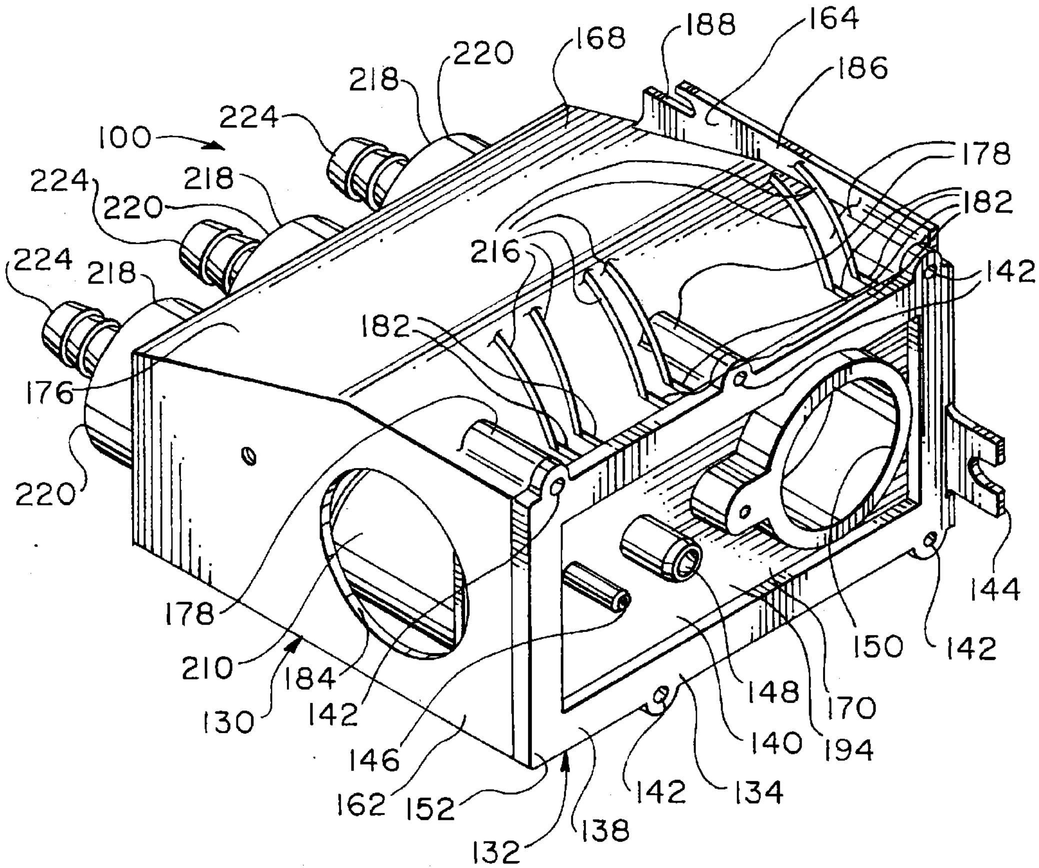


Fig. 3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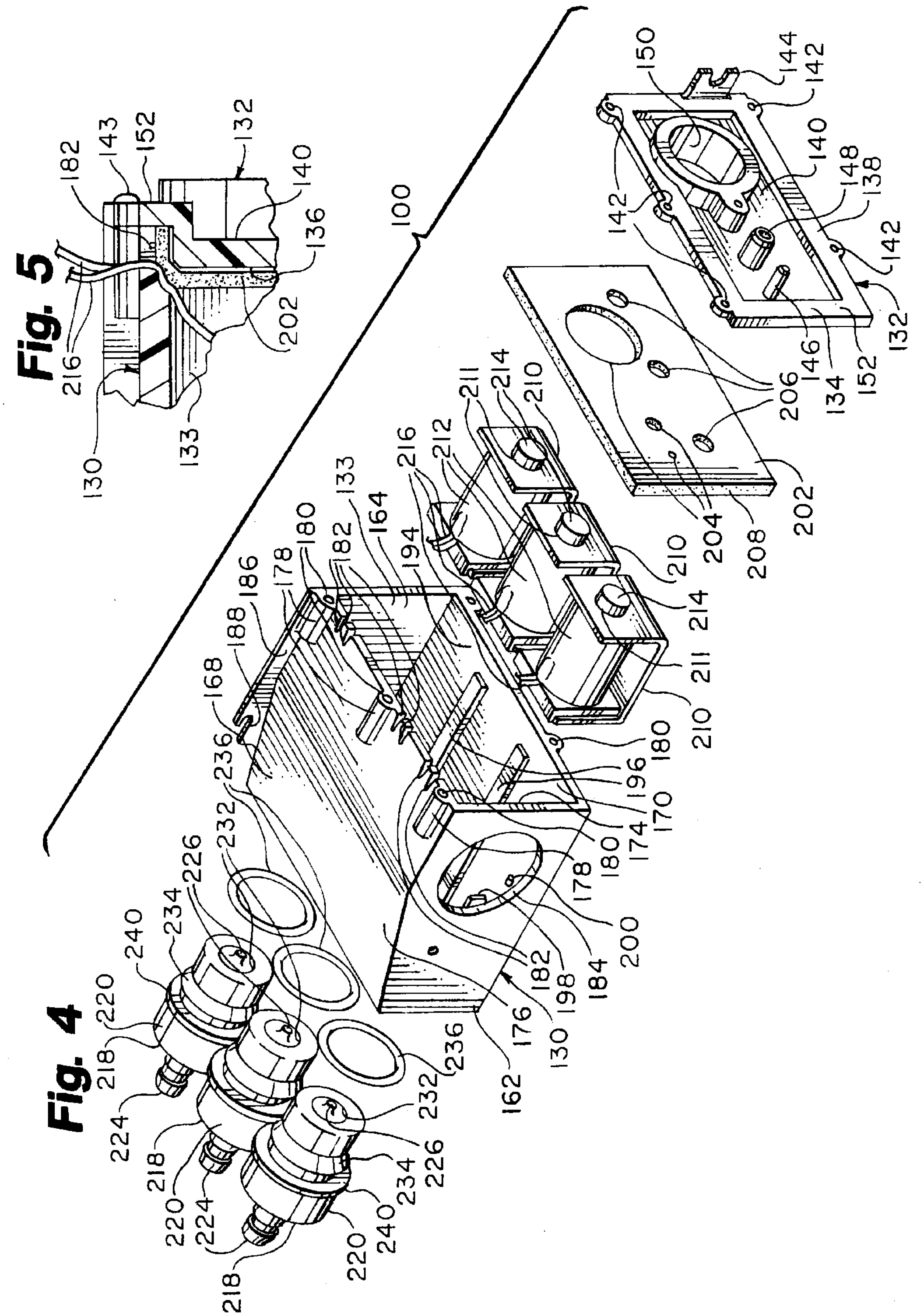


Fig. 5
Fig. 4

Fig. 6

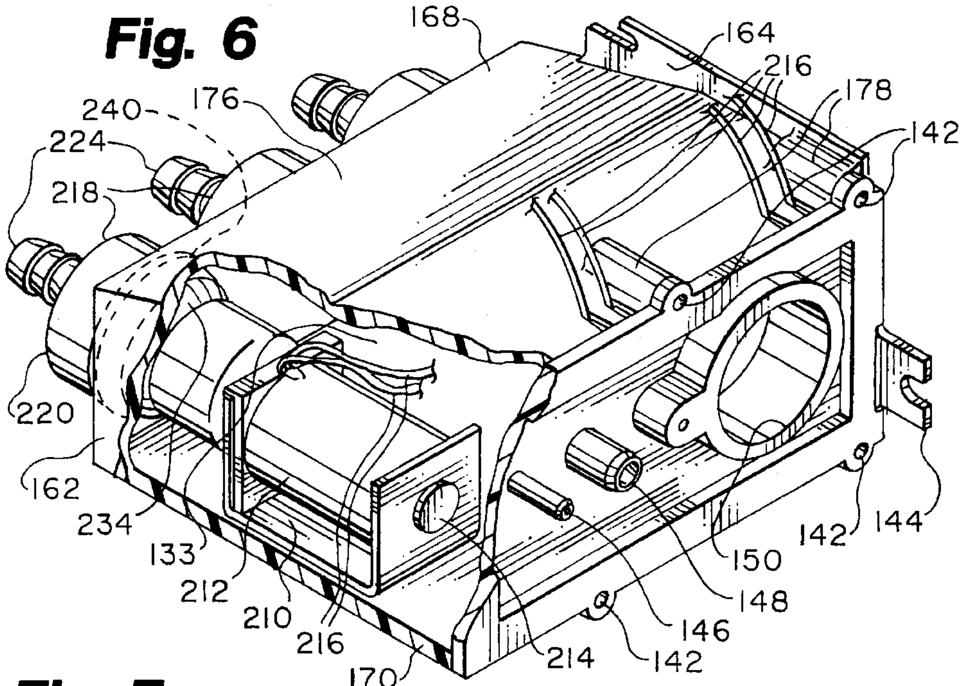


Fig. 7

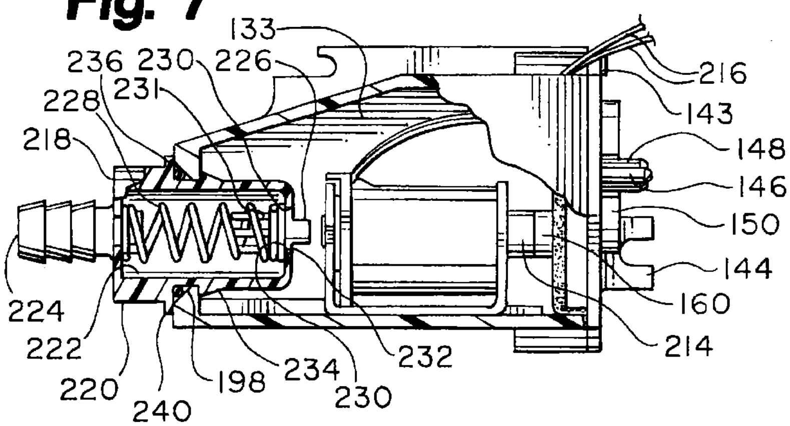
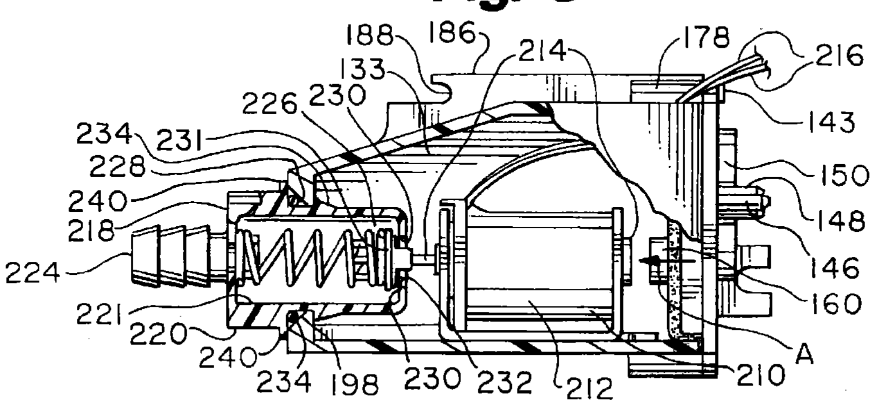


Fig. 8



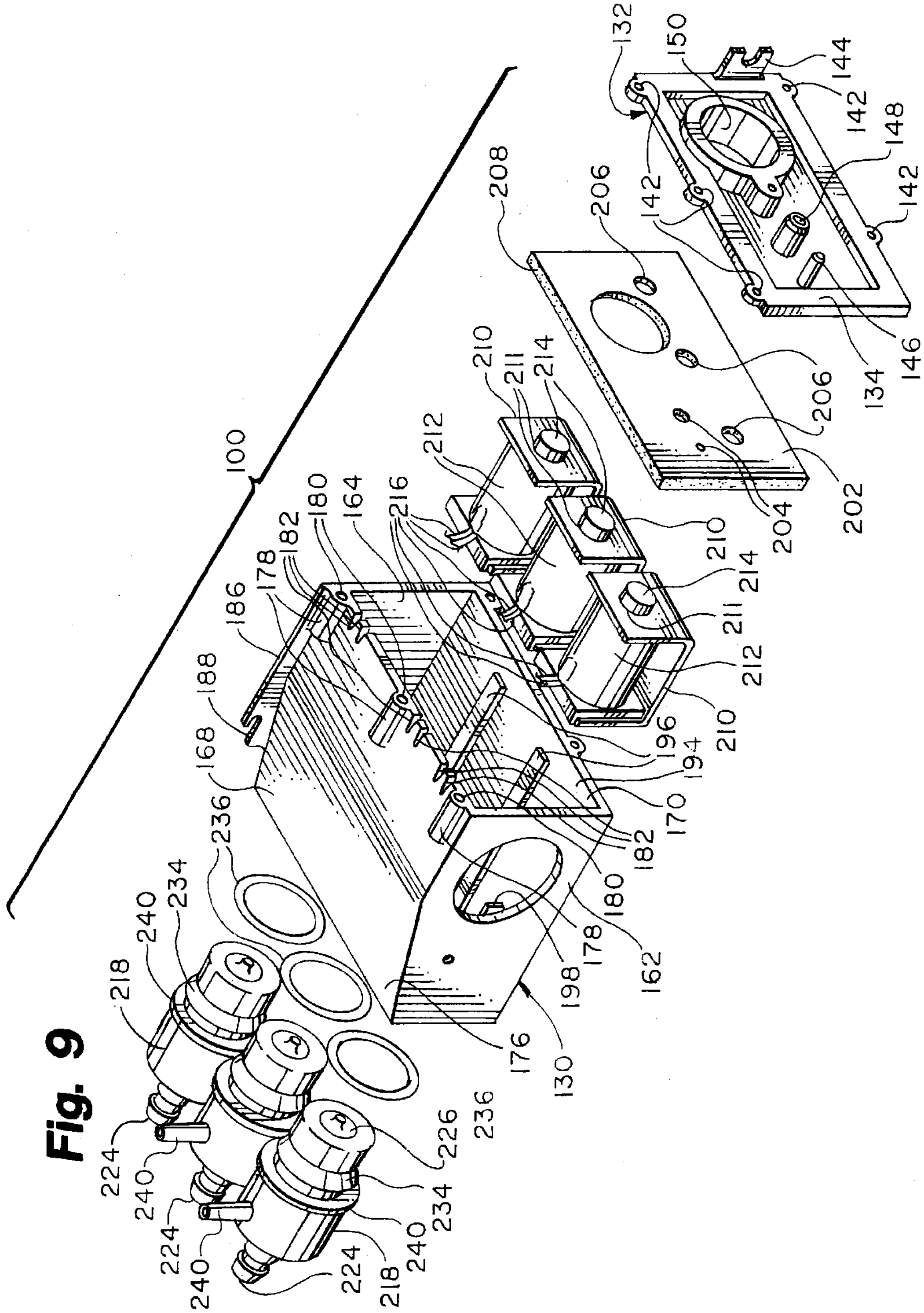
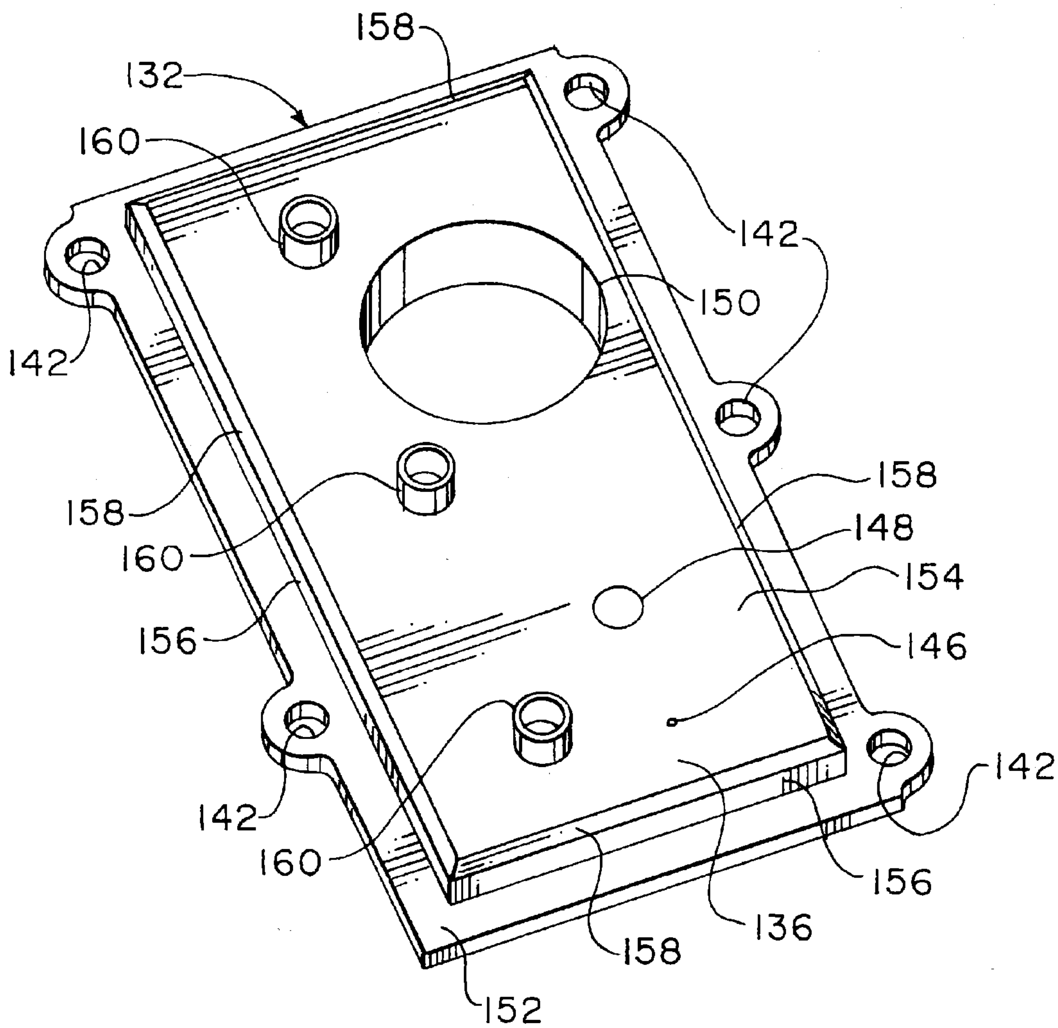


Fig. 9

Fig. 10


158
132
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142
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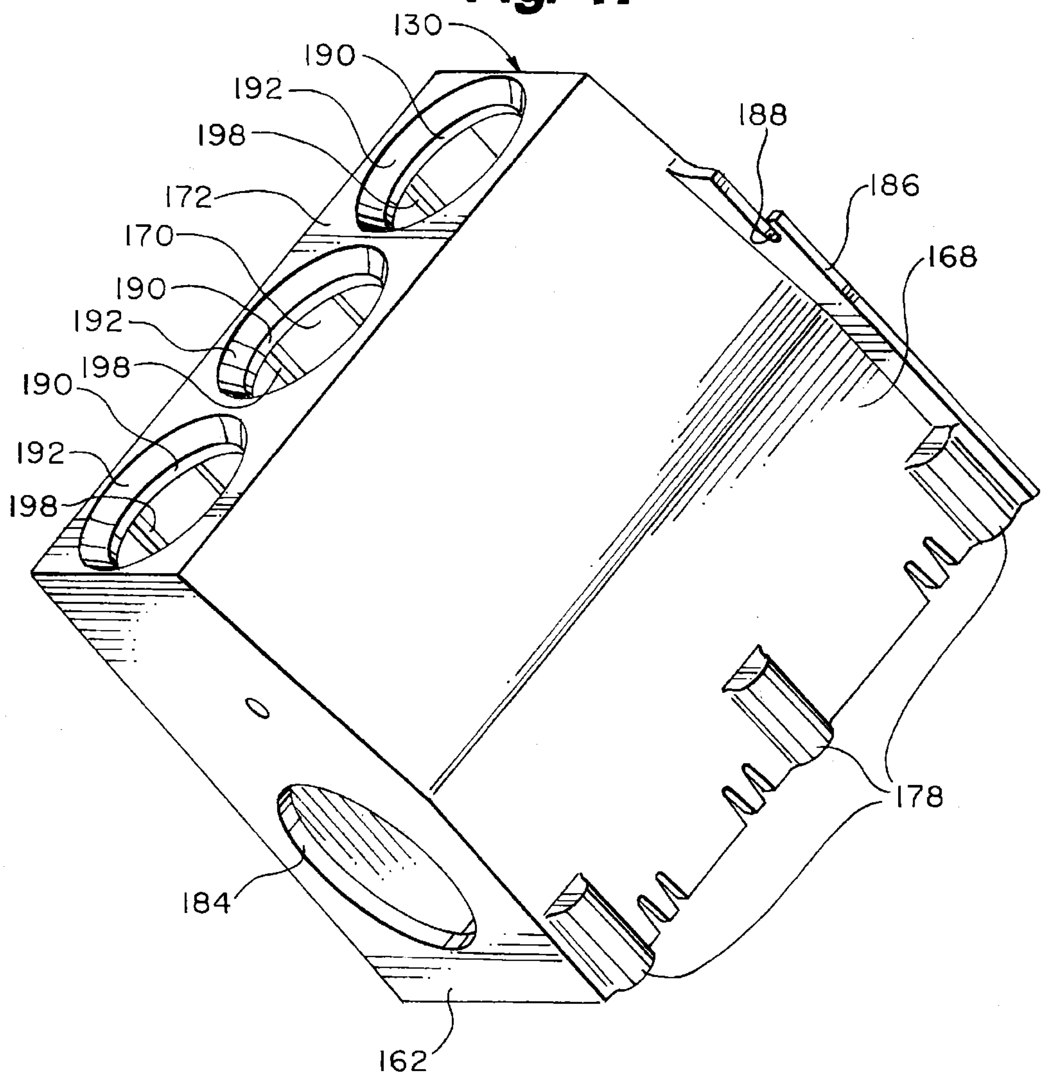
136
158
152

Fig. 11


130
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190
192
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186
168
178
184
162

VALVE ENCLOSURE ASSEMBLY

TECHNICAL FIELD

The present invention relates to an electric pump for use with an inflatable mattress. More particularly, the present invention relates to an improved valve enclosure assembly used to control the pressure in the inflatable mattress and method to inflate the mattress.

BACKGROUND OF THE INVENTION

A prior art valve enclosure assembly is shown generally at **10** in FIG. 1. Valve enclosure assembly **10** is preferably coupled to a pump **12**. The pump **12** is preferably electrically powered by common household current through cord **13**. The pump **12** is mounted on a base **14**. An air inlet **16** defined in the base **14** provides inlet air to the pump **12**. Pressurized air is discharged from the pump **12** into the valve enclosure assembly **10** through an air outlet **18** defined in the rear face of the valve enclosure assembly **10**. A processor board **20** is mounted on the upper surface of the pump **12**. A left pressure sensor **22** and a right pressure sensor **24** are mounted on the processor board **20**.

The prior art valve enclosure assembly **10** is formed of two major subcomponents; enclosure **26** and front face **28**. The enclosure **26** has four sides and a rear face. After the various valve components have been mounted within the enclosure **26**, the front face **28** is chemically bonded to the enclosure **26**.

A right air outlet **30** is defined within outlet sleeve **32**. A left air outlet **34** is defined within the left outlet sleeve **36**. The outlet sleeves **32, 36** are formed integral with the front face **28** and project outward therefrom such that an air hose may be slipped over the outer surface of the outlet sleeves **32, 36**. A monitor port **38** may be formed on the outlet sleeve **32**. The monitor port **38** is fluidly coupled to the right air outlet **30**. Likewise, a monitor port **40** is formed on the outlet sleeve **36** and is fluidly coupled to the left air outlet **34**. Pressure monitor tubes **42** couple the outlet sleeves **32, 36** to the right pressure sensor **24** and the left pressure sensor **22**, respectively.

A right and left solenoid (not shown) are mounted within the prior art valve enclosure assembly **10**. Each solenoid has a shiftable plunger (not shown) coupled thereto. A sealing disk (not shown) is mounted on the end of the plunger. In the closed configuration, the sealing disks close the right air outlet **30** and the left air outlet **34** by sealingly engaging the inner peripheral surface of the respective outlet sleeves **32, 36**. A coil spring (not shown) is mounted concentric with the plunger between solenoid and the sealing disk to bias the sealing disk to the closed configuration, thereby fluidly sealing the mattress off from the prior art valve enclosure assembly **10**.

In operation of the prior art device, a command is received by the processor board **20** to inflate either the right or the left bladder of the mattress, as selected. The pump **12** is energized, drawing air in through air inlet **16**, compressing the air, and discharging the compressed air into the valve enclosure assembly **10** through air outlet **18**. The pressure differential between the commanded pressure and the existing pressure in either the right or left bladder is determined by the processor board **20** using inputs from either the left pressure sensor **22** or the right pressure sensor **24**. The left or right solenoid is actuated opening the sealing disk on the right air outlet **30** or left air outlet **34**, as selected, to inflate the desired bladder of the air mattress. While the bladder is being inflated, the solenoid must be periodically disengaged so that the sealing disk seats closing off the air outlet **30, 34** in order to provide to the processor board **20** a reading of the existing pressure in the bladder.

While the prior art valve enclosure assembly **10** has proved to be a useful device, certain problems existed. The sealing disk on the solenoid has a considerable area. The pressure in the bladder of the air mattress constantly acts upon the area of the sealing disk, generating a significant force thereon. Accordingly, the coil spring biasing the sealing disk into the closed configuration must have substantial strength in order to counteract the force exerted by the pressure in the bladder of the air mattress. This further necessitated having a very large solenoid to overcome the bias of the coil spring in order for the solenoid to unseat the sealing disk and open the valve. Such solenoids were prone to overheating. Additionally, with the need to periodically seat the sealing disk in order to monitor the pressure in the bladder the solenoid needed to be actuated many times while a bladder was being inflated, further adding to the heat buildup.

A further problem was that, since the pressure in the bladder was constantly acting on the sealing disk, the sealing disks tended to develop leaks around the periphery resulting in the slow deflation of the bladder. Over time, the sealing disks acquired a layer of dust that contributed to the leaky condition.

Accordingly, there is a need in the industry to minimize bladder leaks, to provide for continuous monitoring of existing pressure in a bladder of the mattress, and to provide for increased production efficiencies. Such production efficiencies include reducing assembly time and eliminating chemical sealants on the valve air enclosure.

SUMMARY OF THE INVENTION

The present invention substantially meets the aforementioned needs of the industry. A new valve design is incorporated in which the pressure in the respective bladders acts to hold the valve in a closed disposition. The area of the valve that is subject to the pressure from the bladder has been substantially reduced. As result of the aforementioned improvements, the actuating solenoids now have to merely unseat the valve against the force of a small spring in combination with a reduced force generated by the pressure in the bladder acting on the valve. Much smaller solenoids are required for this function, thereby reducing the amount of heat generated in the improved valve enclosure assembly.

Additionally, the pressure in the bladders may be continuously monitored by means of a tap on the improved valve enclosure assembly. The new valve design minimizes leaks from the bladders. Further, assembly time for assembling the improved valve enclosure assembly has been substantially reduced with respect to the prior art valve enclosure assembly and chemical sealants formerly used in the assembly have been eliminated.

The improved valve enclosure assembly of the present invention includes at least one air bladder, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle. The improved valve enclosure assembly is fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder. An enclosure defines a substantially fluidly sealed air chamber and has at least one air inlet to the air chamber being fluidly coupled to the pump. A pressure monitor is operably coupled to the processor and is in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

The method of the present invention for effecting a desired pressure in a bladder of an air inflatable mattress is also disclosed. The method includes the steps of:

providing a commanded desired pressure of the bladder;

opening a valve fluid coupled to the bladder;

continuously monitoring the existing pressure in the bladder;

determining the differential between the existing pressure in the bladder and the desired pressure in the bladder;

exhausting air from the bladder through the valve when the differential indicates that the existing pressure in the bladder is greater than the desired pressure;

energizing a pump fluidly coupled to the valve for providing compressed air to the bladder when the differential indicates that the desired pressure in the bladder is greater than the existing pressure in the bladder to inflate the bladder; and

closing said valve when the existing pressure in the bladder substantially equals the desired pressure in the bladder.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front elevational view of a prior art valve enclosure assembly coupled to a pump;

FIG. **2** is an air inflatable mattress system having right and left inflatable bladders;

FIG. **3** is a perspective view of the improved valve enclosure assembly of the present invention;

FIG. **4** is an exploded perspective view of the improved valve enclosure assembly;

FIG. **5** is a sectioned side elevational view of the interface of the enclosure, rear cover and the gasket of the improved valve enclosure assembly;

FIG. **6** is a perspective view of the improved valve enclosure assembly with a corner broken out to reveal the solenoid and valve;

FIG. **7** is a side elevational view of the improved valve enclosure assembly with a portion broken out to reveal the solenoid and valve, with the valve being sectioned and depicted in the sealed disposition;

FIG. **8** is a side elevational view of the improved valve enclosure assembly with a portion broken out to reveal the solenoid and valve, with the valve being sectioned and depicted in the open disposition;

FIG. **9** is an exploded perspective view of the improved valve enclosure assembly having two valves with pressure taps;

FIG. **10** is perspective view of the inner face of the rear cover of the improved valve enclosure; and

FIG. **11** is a perspective view of the enclosure of the improved valve enclosure.

DETAILED DESCRIPTION OF THE DRAWINGS

The improved valve enclosure assembly of the present invention is shown generally as **100** in the Figures. Referring to FIG. **2**, improved valve enclosure assembly **100** is preferably incorporated into the air mattress system depicted therein. The improved valve enclosure assembly **100** is incorporated into the housing of the pump **112**. Pump **112** may be made substantially in accordance with the pump **12** of FIG. **1**. Other types of pumps are also suitable for use with the improved valve enclosure assembly **100**. Accordingly, pump **112** is electrically powered from household current via cord **114**. The pump **112** has an air inlet, an air outlet that is fluidly coupled to the improved valve enclosure assembly **100**, and a processor board similar in function to the processor board **20** of prior art FIG. **1**. Left and right air hoses **116, 118** are fluidly coupled to the improved valve enclosure assembly **100**. The left and right air hoses **116, 118** are fluidly coupled to the left and right bladders **122, 124** respectively of the air inflatable bed **120**. A manually operated controller **126** may be utilized to communicate with the processor board **20** to command either increased or decreased pressure in either the left bladder or right bladder **122, 124** as desired, by transmitting a signal to the processor **20**. A controller that is wired to the pump **112** may also be used.

The improved valve enclosure assembly **100** has two major structural components; enclosure **130** and rear cover **132**. When mated together, the enclosure **130** and rear cover **132** define an air chamber **133** internal thereto. Referring to FIGS. **3, 4, 5** and **10**, the rear cover **132** is a generally rectangular-shaped device having an outer face **134** and an inner face **136** (FIG. **10**). The outer face **134** has a periphery **138** that extends substantially around a recessed portion **140**. The periphery **138** includes a plurality of screw bores **142** at the outer margin thereof. A mounting tab **144** is formed at an edge thereof to facilitate coupling the improved valve enclosure assembly **100** to a particular configuration of the pump **112**.

The recessed portion **140** has three air ports defined therein; pressure monitoring port **146**, first inlet port **148**, and second inlet port **150**. The pressure monitoring port **146** is fluidly coupled to the interior of the improved valve enclosure assembly **100** and has an outwardly directed portion designed to receive a small tube thereover for conveying pressure to a pressure sensor.

The first inlet port **148** and second inlet port **150** are used in the alternate depending upon the configuration of the pump **112** that the improved valve enclosure assembly is mated to. The first inlet port **148** has an outwardly directed projecting portion for receiving an air tube thereover. Such air tube may have an inside diameter of approximately five-sixteenths of an inch. A second inlet port **150** is designed to mate flush with a similarly sized outlet port from the pump **112**. Depending upon the configuration of the pump **112**, either the first inlet port **148** or the second inlet port **150** is formed in a sealed configuration when the rear cover **132** is formed and another inlet port is used with the particular configuration of the pump **112**.

Referring to FIG. **10**, the inner face **136** of the rear cover **132** is formed in substantially mirror image to the outer face **134**. Accordingly, the periphery **152** is recessed with respect to the projected portion **154**. The projected portion **154** has four side walls **156** and a beveled upper margin **158**. Three inwardly directed gasket hangers **160** are formed on the surface of the inner face **136**.

Referring now to FIGS. **3, 4, 6**, and **11**, the enclosure **130** that is the second of the two main structural components of the improved valve enclosure assembly **100** is generally box-shaped having two opposed sides **162, 164**, a top **168**, a bottom **170** and a front face **172**, evident in FIG. **11**. A rear cover opening **174** is defined opposite the front face **172**. In a preferred embodiment, the top **168** has an inclined portion **176** that inclines downward toward the front face **172**. For some applications of the improved valve enclosure assembly **100**, the inclined portion **176** accommodates disposing the improved valve enclosure assembly **100** next to the generally circular fan housing of the pump **112**.

A plurality of screw receivers **178** are disposed peripheral to the rear cover opening **174** of the enclosure **130**. The bores **180** defined in the screw receivers **178** are disposed such that the bores **180** will be in registry with the screw bores **142** of the rear cover **132** when the rear cover **132** is positioned over the rear cover opening **174**.

A plurality of lead grooves **182** are defined in the top **168** of the enclosure **130** intersecting the rear cover opening **174**. A third inlet port **184** is defined in the side **162**. Like the second inlet port **150**, third inlet port **184** is designed to mate with an outlet port in the fan housing. The third inlet port **184** is an alternate inlet and is formed sealed off if either the first or second inlet ports **148, 150** are to be utilized in the particular application of the improved valve enclosure assembly **100**.

For use with a particular configuration of the pump **112**, the improved valve enclosure assembly **100** has an upwardly directed flange **186** formed on the side **164**. The flange **186** has a screw slot **188** defined therein for coupling to the fan **112** by means of a screw inserted therein and threaded into a bore defined in the housing of the fan **112**.

Referring to FIG. **11**, the front face **172** of the enclosure **130** preferably has three valve openings **190** formed therein. Certain applications of the improved valve enclosure assembly **100** require the use of either one, two or three valves. In applications where fewer than three valves are needed, one or two of the valve openings may be formed sealed when the enclosure **130** is made. Each of the valve apertures **190** has a circumferential beveled face **192** to assist in the insertion of the valve into the valve aperture **190**, as will be later described.

Referring to FIG. **4**, the inner surface **194** of the bottom **170** has two solenoid guides **196** formed therein, the solenoid guides **196** laterally position solenoids within the improved valve enclosure assembly **100**, as will be later described. Additionally, toward the front face **172** of the enclosure **130**, solenoid stops **198** are formed on the inner surface of the bottom **170**. The solenoid stops **198** act to limit the travel of a solenoid motor in relation to the front face **172**. A plurality of screw bores **200** are formed in the bottom **170** through which screws may be passed to affix a solenoid to the bottom **170**.

As depicted in FIG. **4**, a deformable gasket **202** is interposed between the rear cover **132** and the enclosure **130**. The deformable gasket **202** has a plurality of port bores **204** defined therein. The port bores **204** are designed to be in registry with the pressure monitoring port **146**, the first inlet port **148**, and the second inlet port **150**. Additionally, three hanger bores **206** are formed in the deformable gasket **202**. When the deformable gasket **202** is mated to the rear cover **132**, the hanger bores **206** are positioned over the gasket hangers **160** to properly position the deformable gasket **202** with respect to the rear cover **132**. It should be noted that the outer margin **208** of the deformable gasket **202** has substantially the same dimensions as the margin of the periphery **152** of the rear cover **132**.

At least one paired solenoid **210** and valve **218** are disposed within the improved valve enclosure assembly **100**. Each solenoid **210** has a solenoid coil **212** and an axially translatable plunger **214**, as depicted in FIGS. **4** and **6–8**. A pair of electrical leads **216** are connected to the solenoid coil **212**. Application of electrical power to the solenoid coil **212** causes the tip of the translatable plunger **214** to extend from the solenoid **210**. FIG. **8** depicts the extended disposition of the plunger **214**.

Each of the valves **218** has a valve body **220**. An axial air passageway **222** is defined through the valve body **220**, as depicted in FIGS. **7** and **8**. The air passageway **222** has an air outlet **224**. A valve member **226** is disposed at the opposite end of the air passageway **222** from the air outlet **224**.

The valve member **226** is biased in the closed disposition depicted in FIG. **7** by a valve spring **228**. Preferably, the valve spring **228** exerts about a quarter of a pound of force on the valve member **226**. The valve member **226** is biased into contact with a valve seat **230** formed peripheral to the air inlet **232**. It should be noted that the O-ring seal **231** of the valve member **226** is substantially smaller in area than the area of the prior art plunger in order to minimize the force necessarily exerted by the valve spring **228** acting on the O-ring seal **231** of the valve member **226**.

The valve body **220** has a ramped snap fit ring **234** formed slightly spaced apart from an expanded diameter portion **240** of the valve body **220**. An O-ring **236** is preferably disposed between the ramped snap fit ring **234** and the expanded diameter portion **240**.

In an alternative preferred embodiment depicted in FIG. **9**, a pressure monitor tab **240** is disposed on the valve body **220** of two of the valves **218**. The pressure monitor tab **240** has an air passageway **222** defined therein that is fluidly coupled to the air passageway **222** of the valve body **220**.

In assembly, the valves **218** are press fit into the valve openings **190**. Preferably a small press is utilized to insert the valves **218** into the valve openings **190**. The ramped snap-fit ring **234** of the valve **218** rides up the beveled face **192** of the valve opening **190** as the valve **218** is pressed into the valve opening **190**. As the ramped snap-fit ring **234** passes through the valve opening **190** and compressively engages the inner peripheral surface of the valve opening **190**, this disposition puts the O-ring **236** into a compressive sealed engagement between the expanded diameter portion **240** of the valve **218** and the beveled face **192** of the valve opening **190**.

A solenoid **210** is paired with each valve **218**. Solenoid **210** is slidably positioned by the solenoid guides **196** and slid into the enclosure **130**. Travel into the enclosure **130** is arrested by the solenoid **210** coming into contact with the solenoid stops **198**. The solenoid **210** is then held in position by screws passing through the screw bores **200** into the underside of the solenoid **210**. The leads **216** of the solenoid **210** are passed out of the enclosure **130** through the lead grooves **182**. Plunger **214** is inserted into an axial bore **211** defined in the coil **212**. The plunger **214** is free to translate in the bore. At its right-most disposition, as depicted in FIG. **7**, the plunger **214** is stopped by the gasket hanger **160**. At its left-most disposition, as depicted in FIG. **8**, the plunger **214** acts to open the valve **218**.

The gasket **202** is then positioned on the inner face **136** of the rear cover **132** by means of the gasket hangers **160**. The rear cover **132** and the gasket **202** are then positioned in registry with the rear cover opening **174** of the enclosure **130**. The rear cover **132** is affixed to the enclosure **130** by screws **143** passed through the screw bores **142** and engaging the screw receivers **178** of the enclosure **130**. As the screws are drawn up, the periphery of the deformable gasket **202** is compressed between the margin of the rear cover opening **174** and the side walls **156** of the projected portion **154** of the rear cover **132**, as depicted in FIG. **5**. The compression of the deformable gasket therein fluidly seals the rear cover **132** and the enclosure **130**, including sealing around the solenoid leads **216** that are passed out of the enclosure **130** through the lead grooves **182**.

The improved valve enclosure assembly **100** is designed to be utilized with a number of different pump types, pump configurations, and air inflatable beds **120**. Accordingly, some inflatable beds **120** have only a single bladder. In such case, a single solenoid **210** and valve **218** is utilized with the improved valve enclosure assembly **100**. With the single bladder inflated to a given pressure, that pressure bears on the back side of the valve member **226**, thereby assisting the valve spring **228** in biasing the valve member **226** against the valve seat **230**. When an increased pressure in the bladder is desired, the pump **112** is energized and floods the improved valve enclosure assembly with compressed air. At this point in the inflate/deflate cycle, the valve **218** and the solenoid **210** are in the sealed disposition as depicted in FIG. **7**.

The solenoid **210** is then actuated and the translatable plunger **214** advances from the disposition in contact with the gasket hanger **160**, as depicted in FIG. **7**, into contact with the valve member **226** to unseat the valve member **226** from the valve seat **230**, as depicted by arrow A in FIG. **8**. In a preferred embodiment, the combined force of the valve spring **228** and the air pressure from the bladder against which the solenoid **210** must act is less than one pound, with the preferred range of force being between 0.25 and 0.4 pounds and the optimum force being approximately 0.4 pounds. When the valve member **226** is unseated, compressed air passes through the air passageway **222** in the valve body to inflate the bladder.

When the inflate/deflate cycle commanded by the controller **126** calls for deflation of the bladder, the pump **112** is left unenergized and the valve **218** is opened as previously described. Certain types of pumps **112** permit the exhausting of compressed air through the pump **112** by effectively running the pump in reverse. With such types of pumps **112**, this is the preferred means of deflating the bladder.

Certain types of pumps **112** are fluidly sealed when they are in the unpowered state. Accordingly, an alternative route to deflate the bladder must be provided. In such case, a second solenoid **210** and valve **218** is incorporated in the improved valve enclosure assembly **100**. The second valve **218** simply opens into the interior of the housing of the pump **112**. Accordingly, to deflate the bladder the first valve **218** is opened as previously described and the second valve **218** is also opened, thereby permitting compressed air from the bladder to flow through the first valve **218** into the enclosure **130** and out through the second valve **218** to the interior of the housing of the pump **112**, from which the air is ultimately exhausted.

As depicted in FIG. **2**, inflatable bed **120** may have a left bladder **122** and a right bladder **124**. In such case, the improved valve enclosure assembly **100** must incorporate two solenoids **210** and two valves **218**, one valve **218** being connected to the left air hose **116** and the second valve **218** being connected to the right air hose **118**. The two valves function to inflate and deflate the left and right air bladders **122**, **124** as previously described for the single bladder embodiment. In the case of using a pump **112** that is sealed when powered down, the third valve **218** is utilized to exhaust air from the left and right bladders **122**, **124** as previously described in relation to the single bladder embodiment.

Further, with the controller **126** as depicted in FIG. **2**, a desired inflation of either the left bladder **122** or the right bladder **124** may be commanded. Such command may require either an inflation or a deflation of the left or right bladders **122**, **124**. In order to meet the command, the processor of the pump **112** must be able to continuously monitor pressure in the respective left bladder or right bladder **122**, **124** as desired. With some configurations of the pump **112**, monitoring can be provided by coupling the pressure monitoring port **146** of the rear cover **132** to the processor.

Alternatively, with other types of pumps **112**, such monitoring must be taken from the valve **218** and may not be continuous, as provided for above. Accordingly, the valves **218** include the optional pressure monitor tab **240**. In such case, the pressure monitor tab **240** of the valve **218** to the left pressure sensor **22**, as depicted in FIG. **1**. The valve **218** that is fluidly coupled to the right bladder **124** includes a fluid coupling from the right pressure sensor **24** to the pressure monitor tab **240**.

It will be recognized that the foregoing embodiments are merely exemplary of the invention, and that modifications and extensions will be obvious which do not depart from the scope of the invention as defined by the following claims.

What is claimed is:

1. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and

at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.

2. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

3. The improved valve enclosure assembly of claim **1** further including at least one solenoid operated valve disposed within the enclosure, said plurality of guides and stops for disposing the solenoid with respect to the valve.

4. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

5. The improved valve enclosure assembly of claim **4** wherein the at least one valve has a circumferential ramped face, said ramped face for compressively engaging a circumferential beveled face of the aperture to effect the snap fit of the at least one valve.

6. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

7. The improved valve enclosure assembly of claim **1** wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure.

8. The improved valve enclosure assembly of claim **7** wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

9. A method of effecting a desired pressure in a bladder of an air inflatable mattress, comprising the steps of:

providing a commanded desired pressure of the bladder;

opening a valve fluid coupled to the bladder;

continuously monitoring the existing pressure in the bladder at a tap on a valve enclosure assembly;

determining the differential between the existing pressure in the bladder and the desired pressure in the bladder;

exhausting air from the bladder through the valve when the differential indicates that the existing pressure in the bladder is greater than the desired pressure;

energizing a pump fluidly coupled to the valve for providing compressed air to the bladder when the differential indicates that the desired pressure in the bladder is greater than the existing pressure in the bladder to inflate the bladder; and

closing said valve when the existing pressure in the bladder substantially equals the desired pressure in the bladder.

10. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve having a valve housing, pressure monitor means being formed integral with said valve housing; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

11. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

12. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

13. The improved valve enclosure assembly of claim **1** further including at least one solenoid operated valve disposed within the enclosure, said plurality of guides and stops for disposing the solenoid with respect to the valve.

14. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

15. The improved valve enclosure assembly of claim **14** wherein the at least one valve disposed therein has a circumferential ramped face, said ramped face for compressively engaging a circumferential beveled face of the aperture to effect the snap fit of the at least one valve.

16. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

17. The improved valve enclosure assembly of claim **16** wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure.

18. The improved valve enclosure assembly of claim **16** wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

* * * * *

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Bib Data Sheet

CONFIRMATION NO. 5505

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/012,456	08/29/2012 RULE	137	3993	292.001US1X

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** **CONTINUING DATA** *************************

This application is a REX of 08/901,144 07/28/1997 PAT 5904172

** **FOREIGN APPLICATIONS** ********************

	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ yes ☐ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged ______ Examiner's Signature ______ Initials			18	10

ADDRESS
21186

TITLE

VALVE ENCLOSURE ASSEMBLY

FILING FEE RECEIVED		
2520	FEES: Authority has been given in Paper No. _________ to charge/credit DEPOSIT ACCOUNT No. _________ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other ______________ ☐ Credit

Patent Assignment Abstract of Title

Total Assignments: 9

Application #: 08901144 **Filing Dt:** 07/28/1997 **Patent #:** 5904172 **Issue Dt:** 05/18/1999
PCT #: NONE **Publication #:** NONE **Pub Dt:**
Inventors: JAMES EDWIN GIFFT, PAUL JAMES MAHONEY
Title: VALVE ENCLOSURE ASSEMBLY

Assignment: 1

Reel/Frame: 008658 / 0309 **Received:** 09/03/1997 **Recorded:** 07/28/1997 **Mailed:** 09/16/1997 **Pages:** 4
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
Assignors: GIFFT, JAMES EDWIN **Exec Dt:** 07/28/1997
MAHONEY, PAUL JAMES **Exec Dt:** 07/28/1997
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Assignment: 2

Reel/Frame: 011904 / 0102 **Received:** 06/22/2001 **Recorded:** 06/14/2001 **Mailed:** 08/29/2001 **Pages:** 14
Conveyance: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS).
Assignor: SELECT COMFORT CORPORATION **Exec Dt:** 06/06/2001
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Assignment: 3

Reel/Frame: 012066 / 0633 **Received:** 10/17/2001 **Recorded:** 10/17/2001 **Mailed:** 10/18/2001 **Pages:** 17
Conveyance: SECURITY AGREEMENT
Assignors: SELECT COMFORT CORPORATION **Exec Dt:** 09/28/2001
SELECT COMFORT RETAIL CORPORATION **Exec Dt:** 09/28/2001
SELECT COMFORT DIRECT CORPORATION **Exec Dt:** 09/28/2001
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Assignment: 4

Reel/Frame: 020976 / 0070 **Received:** 05/21/2008 **Recorded:** 05/21/2008 **Mailed:** 05/21/2008 **Pages:** 5
Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).
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Assignment: 5

Reel/Frame: 021006 / 0079 **Received:** 05/28/2008 **Recorded:** 05/28/2008 **Mailed:** 05/28/2008 **Pages:** 6

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

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Assignment: 6

Reel/Frame: 021076 / 0230 **Received:** 06/11/2008 **Recorded:** 06/11/2008 **Mailed:** 06/11/2008 **Pages:** 9

Conveyance: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS).

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Assignment: 7

Reel/Frame: 024151 / 0673 **Received:** 03/30/2010 **Recorded:** 03/30/2010 **Mailed:** 03/30/2010 **Pages:** 30

Conveyance: SECURITY AGREEMENT

Assignors: SELECT COMFORT CORPORATION **Exec Dt:** 03/26/2010
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Assignment: 8

Reel/Frame: 024213 / 0729 **Received:** 04/12/2010 **Recorded:** 04/12/2010 **Mailed:** 04/12/2010 **Pages:** 6

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

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Assignment: 9

Reel/Frame: 028459 / 0241 **Received:** 06/28/2012 **Recorded:** 06/28/2012 **Mailed:** 06/29/2012 **Pages:** 7

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

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Search Results as of: 08/30/2012 04:59 PM

Litigation Search Report CRU 3999

Reexam Control No. 90/012,456

TO: Examiner **Location: CRU** **Art Unit: 3999** **Date: 08/30/2012**	**From: Shanette Brown** **Location: CRU 3999** **MDW 07C71** **Phone: (571) 272-6632** **Shanett.Brown@uspto.gov**

Search Notes

RE: 90/012,456 –Litigation was found for US Patent Number: 5,904,172

Patent	Class	Subclass	Description	Court	Docket Number	Filed	Date Retrieved
5,904,172	137	224	Select Comfort Corporation V. The Sleep Better Store, Llc Et Al	US-DIS-MND	0:12cv1148 OPEN	5/11/2012	8/30/2012
5,904,172	137	224	Select Comfort Corp v. Halcyon Waterspring	US-DIS-MND	0:03cv3325 CLOSED	6/3/2003	5/23/2005

Sources:

1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Westlaw.

Date of Printing: Aug 30, 2012

KEYCITE

C US PAT 5904172 VALVE ENCLOSURE ASSEMBLY, Assignee: Select Comfort Corporation (May 18, 1999)

History

Direct History

=> 1 **VALVE ENCLOSURE ASSEMBLY,** US PAT 5904172, 1999 WL 1556155 (U.S. PTO Utility May 18, 1999)

Patent Family

2 VALVE ENCLOSURE ASSEMBLY FOR INFLATABLE MATTRESS, Derwent World Patents Legal 1999-326120

Assignments

3 Action: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS). Number of Pages: 006, (DATE RECORDED: Apr 12, 2010)

4 Action: SECURITY AGREEMENT Number of Pages: 030, (DATE RECORDED: Mar 30, 2010)

5 Action: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 009, (DATE RECORDED: Jun 11, 2008)

6 Action: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS). Number of Pages: 006, (DATE RECORDED: May 28, 2008)

7 Action: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS). Number of Pages: 005, (DATE RECORDED: May 21, 2008)

8 ACTION: SECURITY AGREEMENT NUMBER OF PAGES: 017, (DATE RECORDED: Oct 17, 2001)

9 ACTION: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS). NUMBER OF PAGES: 014, (DATE RECORDED: Jun 14, 2001)

10 ACTION: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). NUMBER OF PAGES: 004, (DATE RECORDED: Jul 28, 1997)

Docket Summaries

11 SELECT COMFORT CORPORATION v. THE SLEEP BETTER STORE, LLC ET AL, (D.MINN. May 11, 2012) (NO. 0:12CV01148), (35 USC 145 PATENT INFRINGEMENT)

12 SELECT COMFORT CORP v. HALCYON WATERSPRING, (D.MINN. Jun 03, 2003) (NO. 0:03CV03325), (35 USC 271 PATENT INFRINGEMENT)

Litigation Alert

13 Derwent LitAlert P2012-20-28 (May 11, 2012) Action Taken: cause - 35 USC 145 - complaint for PATENT INFRINGEMENT

14 Derwent LitAlert P2003-39-84 (Jun 10, 2003) Action Taken: A complaint was filed.

Prior Art (Coverage Begins 1976)

C 15 AIR CONTROL SYSTEM FOR AN AIR BED, US PAT 5509154Assignee: Select Comfort Corporation, (U.S. PTO Utility 1996)

C 16 AIR CONTROL SYSTEM FOR AIR BED, US PAT 4890344 (U.S. PTO Utility 1990)

C 17 APPARATUS FOR ADJUSTING SIMULTANEOUSLY FLUID PRESSURE IN A PLURALITY OF PRESSURE VESSELS, US PAT 4427022Assignee: Frost, Eugene A., (U.S. PTO Utility 1984)

C 18 BLADDER PRESSURE CONTROL SYSTEM AND METHOD, US PAT 4915124Assignee: Jasco Products, Inc., (U.S. PTO Utility 1990)

C 19 CLOSED LOOP FEEDBACK AIR SUPPLY FOR AIR SUPPORT BEDS, US PAT 4797962Assignee: Air Plus, Inc., (U.S. PTO Utility 1989)

C 20 MODULAR LOW AIR LOSS PATIENT SUPPORT SYSTEM, US PAT 5095568Assignee: SSI Medical Services, Inc., (U.S. PTO Utility 1992)

C 21 PATIENT SUPPORT STRUCTURE, US PAT 4745647Assignee: SSI Medical Services, Inc., (U.S. PTO Utility 1988)

C 22 PORTABLE MATTRESS FOR TREATING DECUBITUS ULCERS, US PAT 5542136Assignee: Stryker Corporation, (U.S. PTO Utility 1996)

C 23 PRESSURE CONTROL SYSTEM, US PAT 4583566 (U.S. PTO Utility 1986)

C 24 RUNNING INFLATION AND DEFLATION.SYSTEM, US PAT 2685906 (U.S. PTO Utility 1954)

C 25 VALVE MANIFOLD MODULE AND SYSTEM, US PAT 3513876Assignee: AKRO?MEDIC ENGINEERING, INC., (U.S. PTO Utility 1970)

US District Court Civil Docket

U.S. District - Minnesota
(Minneapolis)

0:12cv1148

Select Comfort Corporation v. The Sleep Better Store, Llc et al

This case was retrieved from the court on Thursday, August 30, 2012

Date Filed:	**05/11/2012**	**Class Code:**	**OPEN**
Assigned To:	**Judge Joan N Ericksen**	**Closed:**	**No**
Referred To:	**Magistrate Judge Janie S Mayeron**	**Statute:**	**35:145**
Nature of suit:	**Patent (830)**	**Jury Demand:**	**Plaintiff**
Cause:	**Patent Infringement**	**Demand Amount:**	**$0**
Lead Docket:	**None**	**NOS Description:**	**Patent**
Other Docket:	**None**		
Jurisdiction:	**Federal Question**		

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Date	#	Proceeding Text	Source
05/11/2012	1	COMPLAINT against Merrick Group Capital 1, Ltd., The Merrick Group, LLC, The Sleep Better Store, LLC (Filing fee $ 350 receipt number 4064872.) assigned to Chief Judge Michael J. Davis per Patent List referred to Magistrate Judge Steven E. Rau, filed by Select Comfort Corporation. (Attachments: # 1 Civil Cover Sheet) (jz) M (Entered: 05/11/2012)	
05/11/2012	--	Summons Issued as to Merrick Group Capital 1, Ltd., The Merrick Group, LLC, The Sleep Better Store, LLC. (jz) (Entered: 05/11/2012)	
05/15/2012	2	RULE 7.1 DISCLOSURE STATEMENT. There is no parent corporation, publicly held corporation or wholly-owned subsidiary to report for Plaintiff Select Comfort Corporation. (Hellfeld, Samuel) (Entered: 05/15/2012)	
05/16/2012	3	ORDER OF DIRECTION TO THE CLERK OF COURT FOR REASSIGNMENT OF RELATED CASE. Case reassigned to Judge Joan N. Ericksen and Magistrate Judge Janie S. Mayeron for all further proceedings. Chief Judge Michael J. Davis, Magistrate Judge Steven E. Rau no longer assigned to case. NOTE: the new case number is 12cv1148 JNE/JSM . Please use this case number for all subsequent pleadings. Signed by Judge Joan N. Ericksen on 5/14/2012 and Chief Judge Michael J. Davis on 5/15/2012. (JME) (Entered: 05/16/2012)	
05/23/2012	4	SUMMONS Returned Executed by Select Comfort Corporation. The Sleep Better Store, LLC served on 5/14/2012, answer due 6/4/2012. (Hellfeld, Samuel) (Entered: 05/23/2012)	
05/23/2012	5	SUMMONS Returned Executed by Select Comfort Corporation. The Merrick Group, LLC served on 5/14/2012, answer due 6/4/2012. (Hellfeld, Samuel) (Entered: 05/23/2012)	
05/23/2012	6	SUMMONS Returned Executed by Select Comfort Corporation. Merrick Group Capital 1, Ltd. served on 5/14/2012, answer due 6/4/2012. (Hellfeld, Samuel) (Entered: 05/23/2012)	
06/05/2012	7	NOTICE of Change of Address by Edward M Laine. (Laine, Edward) Modified on 6/5/2012 (RLR). (Entered: 06/05/2012)	
06/11/2012	8	NOTICE of Appearance by David T Schultz on behalf of All Defendants. (Schultz, David) (Entered: 06/11/2012)	

06/11/2012	9	NOTICE of Appearance by Nadege J Souvenir on behalf of All Defendants. (Souvenir, Nadege) (Entered: 06/11/2012)
06/12/2012	10	STIPULATION FOR EXTENSION OF TIME TO ANSWER PLAINTIFFS COMPLAINT by Merrick Group Capital 1, Ltd., Select Comfort Corporation, The Merrick Group, LLC, The Sleep Better Store, LLC. (Schultz, David) (Entered: 06/12/2012)
06/13/2012	11	ORDER: 1. Defendants' time to answer Plaintiff's Complaint in this matter shall be extended to June 18, 2012. Signed by Magistrate Judge Janie S. Mayeron on 6/13/12. (jam) (Entered: 06/13/2012)
06/18/2012	12	Defendants' ANSWER to Complaint , COUNTERCLAIM against All Plaintiffs by The Sleep Better Store, LLC, Merrick Group Capital 1, Ltd., The Merrick Group, LLC. (Schultz, David) (Entered: 06/18/2012)
06/18/2012	13	RULE 7.1 DISCLOSURE STATEMENT. There is no parent corporation, publicly held corporation or wholly-owned subsidiary to report for Defendants Merrick Group Capital 1, Ltd., The Merrick Group, LLC, The Sleep Better Store, LLC. (Schultz, David) (Entered: 06/18/2012)
07/13/2012	14	Letter and ORDER: Pretrial Conference set for 8/27/2012 01:30 PM in Judge's Chambers, Suite 632 (STP) before Magistrate Judge Janie S. Mayeron. Signed by Magistrate Judge Janie S. Mayeron on 7/12/12. (Attachments: # 1 Consent Form)(jam) (Entered: 07/13/2012)
07/30/2012	15	STIPULATION for Plaintiff to File Reply to Defendants' Counterclaims by Merrick Group Capital 1, Ltd., Select Comfort Corporation, The Merrick Group, LLC, The Sleep Better Store, LLC. (Hellfeld, Samuel) (Entered: 07/30/2012)
07/31/2012	16	ORDER THAT Plaintiff Select Comfort Corporation shall be permitted to file a Reply to Defendants' Counterclaims in the form attached as Exhibit A to the Stipulation on or before August 6, 2012. Signed by Magistrate Judge Janie S. Mayeron on 7/31/12. (jam) (Entered: 07/31/2012)
07/31/2012	17	REPLY to Counterclaim by Select Comfort Corporation. (Hellfeld, Samuel) (Entered: 07/31/2012)
08/13/2012	18	REPORT of Rule 26(f) Planning Meeting by Merrick Group Capital 1, Ltd., Select Comfort Corporation, The Merrick Group, LLC, The Sleep Better Store, LLC. (Attachments: # 1 Exhibit(s) A)(Hellfeld, Samuel) (Entered: 08/13/2012)
08/13/2012	19	STIPULATION For Protective Order (Patent Cases) by Merrick Group Capital 1, Ltd., Select Comfort Corporation, The Merrick Group, LLC, The Sleep Better Store, LLC. (Hellfeld, Samuel) (Entered: 08/13/2012)
08/15/2012	20	PROTECTIVE ORDER. Signed by Magistrate Judge Janie S. Mayeron on 8/14/12. (RMS) (Entered: 08/15/2012)

US District Court Civil Docket

U.S. District - Minnesota
(Minneapolis)

0:03cv3325

Select Comfort Corp v. Halcyon Waterspring

This case was retrieved from the court on Thursday, August 30, 2012

Date Filed:	**06/03/2003**	**Class Code:**	**CLOSED**
Assigned To:	**Judge Donovan W Frank**	**Closed:**	**Yes**
Referred To:	**Judge Susan Richard Nelson**	**Statute:**	**35:271**
Nature of suit:	**Patent (830)**	**Jury Demand:**	**None**
Cause:	**Patent Infringement**	**Demand Amount:**	**$0**
Lead Docket:	**None**	**NOS Description:**	**Patent**
Other Docket:	**None**		
Jurisdiction:	**Federal Question**		

Litigants	**Attorneys**
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email: Elaine@oppenheimer.Com

Date	#	Proceeding Text	Source
06/03/2003	1	COMPLAINT - Summons issued. Assigned to Judge Donovan W. Frank per Patent list and referred to Magistrate Judge Susan R. Nelson Receipt# 427686. 7pg(s) (GJS) (Entered: 06/05/2003)	
06/03/2003	--	Copy of complaint sent to the Commissioner Patent and Trademarks, Washington DC (GJS) (Entered: 06/05/2003)	
06/26/2003	2	ANSWER to complaint [1-1] and COUNTERCLAIM by Halcyon Waterspring against Select Comfort Corp. 5pg(s) (VEM) (Entered: 07/03/2003)	
07/16/2003	3	REPLY by Select Comfort Corp to Counterclaim [2-2] 3pg(s) (VEM) (Entered: 07/21/2003)	
07/21/2003	4	NOTICE (Magistrate Judge Susan R. Nelson) Pretrial conference set for 2:15 pm on 8/20/03 ; Rule 26(f) report ddl set for 8/11/03 5 pg(s) (cc: all counsel) (VEM) (Entered: 07/23/2003)	
08/11/2003	5	JOINT REPORT OF RULE 26(f) MEETING jury trial demanded. 5pgs (VEM) (Entered: 08/15/2003)	
08/22/2003	6	PRETRIAL SCHEDULING ORDER (Magistrate Judge Susan R. Nelson / 8/21/03) ; amd complaint set for 2/1/04 ; discovery set for 11/1/03 ; non-dispositive motions set for 9/15/04 ; dispositive motions set for 11/1/04 ; ready for trial set for 2/1/05. 9 pg(s) (cc: counsel) (VEM) (Entered: 09/03/2003)	
01/27/2004	7	STIPULATION AND ORDER (Judge Donovan W. Frank) Pltf's claims against deft are dismissed without prejudice. 2pg(s)(cc: all counsel) (VEM) Additional attachment(s) added on 12/14/2004 (akl). (Entered: 01/29/2004)	

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901144 (08) 5904172 May 18, 1999

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

5904172

Get Drawing Sheet 1 of 7
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May 18, 1999

Valve enclosure assembly

INVENTOR: GIFFT; JAMES EDWIN - ; MAHONEY; PAUL JAMES -

APPL-NO: 901144 (08)

FILED-DATE: July 28, 1997

GRANTED-DATE: May 18, 1999

CORE TERMS: valve, enclosure, bladder, pump, solenoid, port, rear, outlet, inlet, coupled, fluidly, depicted, sealing, gasket, processor, mattress, screw, disk, bore, monitor, air bladder, plunger, inflatable, prior art, disposition, monitoring, inflate, sealed, compressed, sensor

ENGLISH-ABST:

An improved valve enclosure assembly for use with an air inflatable mattress includes at least one air bladder, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle. The improved valve enclosure assembly is fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder. An enclosure defines a substantially fluidly sealed air chamber and has at least one air inlet to the air chamber being fluidly coupled to the pump. A pressure monitor is operably coupled to the processor and is in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder. A method of effecting a desired pressure in a bladder of an air inflatable mattress is also disclosed.

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or	or	w/seg	in same segment
w/N	within N words	w/s	in same sentence
pre/N	precedes by N words	and not	and not

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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,456	08/29/2012	5904172

CONFIRMATION NO. 5505
REEXAMINATION REQUEST NOTICE

LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

OC000000056454198

Date Mailed: 09/11/2012

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 08/29/2012, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
21186
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,456	08/29/2012	5904172

CONFIRMATION NO. 5505

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OC000000056454199

21186
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

Date Mailed: 09/11/2012

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3993. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

cc: Third Party Requester(if any)
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P O BOX 2230
MINNEAPOLIS, MN 55402-0230

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456	08/29/2012	5904172	292.001US1X	5505

21186 7590 09/21/2012
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
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EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
09/21/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Commissioner for Patents
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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

Date: MAILED

SEP 21 2012

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90012456
PATENT NO. : 5904172
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

UNITED STATES PATENT AND TRADEMARK OFFICE

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(For Patent Owner)

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MINNEAPOLIS, MN 55402

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CENTRAL REEXAMINATION UN

(For Requester)

LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

In re Gifft et al.	:
Reexamination Proceeding	: DECISION *SUA SPONTE*
Control No. 90/012,456	: VACATING *EX PARTE*
Request Deposited: August 29, 2012	: REEXAMINATION
For: U.S. Patent No. 5,904,172	: FILING DATE

The *ex parte* reexamination request papers deposited on August 29, 2012, and assigned Control No. 90/012,456, are before the Office of Patent Legal Administration for consideration of whether to vacate the assigned filing date for failure to comply with the provisions of 37 CFR 1.510.

This decision constitutes notice that, pursuant to 37 CFR 1.510(c), **the filing date** of August 29, 2012, which was assigned to the request papers for the above-captioned *ex parte* reexamination proceeding, is hereby **vacated**, because the papers fail to comply with the filing date requirements for an *ex parte* reexamination proceeding set forth in 37 CFR 1.510, for the reasons set forth below.

See MPEP 2214, 2217, and 2227.

In order to obtain a filing date for the request papers, the requester must, within **thirty (30) days** of the mailing date of this decision, file a response to this decision which remedies the defects set forth in this decision and makes the request papers compliant with the requirements of 37 CFR 1.510.

REVIEW OF RELEVANT FACTS

1. U.S. Patent No. 5,904,172 (hereinafter, the '172 patent), issued to *Gifft et al.* on May 18, 1999.

2. On August 29, 2012, a third party deposited a request for *ex parte* reexamination of claims 1-18 of the '172 patent. The reexamination proceeding was assigned Control No. 90/012,456 (hereinafter, the '456 proceeding).

3. On September 11, 2012, a "Notice of *Ex Parte* Reexamination Request Filing Date" was mailed for the '456 proceeding. The notice stated the filing date of the request for reexamination to be August 29, 2012.

DECISION

Pursuant to 37 CFR 1.510(b), any request for *ex parte* reexamination must include:

> "(1) A statement pointing out each substantial new question of patentability based on prior patents and printed publications.
> "(2) An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested. If appropriate the party requesting reexamination may also point out how claims distinguish over cited prior art.
> "(3) A copy of every patent or printed publication relied upon or referred to in paragraph (b)(1) and (2) of this section accompanied by an English language translation of all the necessary and pertinent parts of any non-English language patent or printed publication.
> "(4) A copy of the entire patent including the front face, drawings, and specification/claims (in double column format) for which reexamination is requested, and a copy of any disclaimer, certificate of correction, or reexamination certificate issued in the patent. All copies must have each page plainly written on only one side of a sheet of paper.
> "(5) A certification that a copy of the request filed by a person other than the patent owner has been served in its entirety on the patent owner at the address as provided for in § 1.33(c). The name and address of the party served must be indicated. If service was not possible, a duplicate copy must be supplied to the Office."

Upon further review of the request papers, the request is not compliant with 37 CFR 1.510. Specifically, the request is not compliant with:

> (I) the 37 CFR 1.510(b)(1) requirement for "[a] statement pointing out each substantial new question of patentability based on prior patents and printed publications," and

(II) the 37 CFR 1.510(b)(2) requirement for "...a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested," and

I. The request is incomplete as to compliance with 37 CFR 1.510(b)(1) for the following reason:

The request has failed to provide the requisite identification and explanation, in compliance with 37 CFR 1.510(b)(1), of what substantial new questions of patentability (SNQs) are being raised by the prior art documents cited under 37 CFR 1.510(b). The request fails to explicitly state, for ***each*** proposed rejection as applied to ***every*** claim, the subject matter taught by at least one of the printed publication or patents which was not taught in the prior examination. As pointed out in MPEP 2216:

> "[i]t is not sufficient that a request for reexamination merely proposes one or more rejections of a patent claim or claims as a basis for reexamination. <u>It must first be demonstrated that</u> a patent or printed publication that is relied upon in a proposed rejection presents <u>a new, non-cumulative technological teaching</u> that was not previously considered and discussed on the record during the prosecution of the application that resulted in the patent for which reexamination is requested, and during the prosecution of any other prior proceeding involving the patent for which reexamination is requested." [Emphasis added]

The request fails to clearly state the substantial new questions of patentability, which the requester believes are raised by the cited references. Page 2 states whether the cited document was considered in the prior examination and that the "new art" provides teachings that are not cumulative to already cited art, and pages 3-13 of the request provide the explanation of the cited documents to the claims under 37 CFR 1.510(b)(2). The request, however, fails to explicitly assert what substantial new questions of patentability the requester believes are raised by the cited documents. In other words, the request fails to clearly identify what the requester believes to be the new technical teachings. To assert a substantial new question of patentability, the request must explain how at least one of the references cited in each proposed rejection provides a new, non-cumulative teaching (e.g., by citing to a specific teaching in the document and applying it to a claim limitation deemed to be not taught in the prior examination). In summary, the request is not sufficient to establish what the requester believes to be the substantial new questions of patentability because it fails to clearly demonstrate what are the new, non-cumulative technological teachings, which are disclosed in the cited documents, that were not previously considered and discussed on the record during the prosecution of the application that resulted in the '172 patent. In other words, the request does not first clearly demonstrate a substantial new question of patentability for at least one of the references cited in each proposed rejection as applied to every claim, which requester believes will support the proposed rejection.

Accordingly, any corrected request filed in response to this decision must clearly point out and explain, for each proposed rejection that is identified in the request, what new, non-cumulative technical teaching is being provided by the applied references. See MPEP 2242.

II. The request is incomplete as to compliance with 37 CFR 1.510(b)(2) for the following reasons:

The request has failed to provide the requisite explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested, because of the failure to provide (1) an explanation for each claim for which reexamination is requested and (2) explanations that are complete.

Specifically, the explanation on pages 3-13 of the request fails to apply any of the cited documents to claims 13 and 15. Any corrected or replacement request must provide at least one detailed explanation as to how the cited documents apply to claims 13 and 15 or alternatively, must not include claims 13 and 15 in the listing of claims for which reexamination is requested.

In addition, the explanation on pages 3-13 of the request fails to fully explain how each of the cited references teaches every claim limitation. For example, the proposed rejection labeled "A" on page 3 of the request provides a very brief and incomplete explanation as to how the cited documents teach all the limitations of claim 1. This explanation does not apply the references in sufficient detail because it fails to adequately address each structural element and its claimed connections to the other elements. Specifically, the explanation on page 3 of the request does not address whether the enclosure that Shafer teaches has at least one air inlet to the air chamber and whether the pressure monitor means of Yavets-Chen is operably coupled to a processor. The explanations for all the proposed rejections are incomplete for substantially the same reason. See MPEP 2214 and 2217 for sample detailed explanations and requirements.

Furthermore, the explanations for the proposed rejections for claims 3, 7, and 8 are incomplete. Specifically, the proposed rejections for these claims, which depend on claim 1, do not include every reference that was applied to claim 1. For example, pages 6-7 of the request identify a proposed rejection for claim 3 based on the combined teachings of Shafer in view of Stacey et al. Claim 3 depends on claim 1, and therefore, includes all the limitations of claim 1. However, the proposed rejections for claim 1 rely on other references (e.g., Yavets-Chen, Rible, Mennona, Pegani, and Madsen et al.) to teach certain limitations for claim 1 (see, e.g., proposed rejections A-F on pages 3-6 of the request). Therefore, the explanation for claim 3 is incomplete because it fails to state how Shafer or Stacey teaches certain limitations of claim 1 (e.g., the pressure monitor means and snap-fit engagement). The explanations for the proposed rejections for claims 7 and 8 on pages 8 and 9 of the request are incomplete for substantially the same reasons. Therefore, the requests fail to apply the identified documents as the basis for the proposed rejections to each and every limitation in claims 3, 7, and 8.

In summary, the requester has not provided a clear detailed explanation of how the cited references apply to each of claims 1-18 in the '172 patent, in ***each*** of the rejections proposed in the request.

As a result of the above-mentioned defects, the request is unclear as to what SNQs are being asserted for the claims, as required by 37 CFR 1.510(b)(1). Also, without a complete explanation for each of the possible grounds, the request lacks the required regulatory "detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested," as required by 37 CFR 1.510(b)(2).

Since the request has not properly advanced, and explained, a substantial new question with respect to all of the '172 patent claims for which reexamination has been requested, the request fails to comply with the requirements for granting a filing date for a reexamination request.

Each proposed rejection must be identified separately.[1] For each identified rejection, the request must explain how the cited documents identified for that proposed rejection are applied to meet/teach the patent claim limitations to thus establish the identified proposed rejection.

If the requester were permitted to omit such an explanation, an undue burden would be placed on the Office to address each document in the determination on the request, without a clear explanation of what requester believes to be the specifics of the proposed rejection and the basis for making it. Accordingly, such an omission is prohibited by law.

REQUESTER'S RECOURSE

In view of the September 11, 2012 "Notice of Reexamination Request Filing Date" mailed for the '456 proceeding, the requester is given one opportunity to correct the request, should requester so desire.[2]

I. Requester has the option to respond to this identification of defects in the request papers by applying the appropriate option(s) set forth below:

1) Providing an identification of each substantial new question of patentability for each proposed rejection and/or application of the art, as required by 37 CFR 1.510(b)(1), by addressing the discussion in Part I above.

[1] "Shot-gun" statements, or lumping of multiple SNQ permutations together is **not permitted**.

[2] MPEP 2227, part B.1, states: "After a filing date and control number are assigned to the request papers, the examiner reviews the request to decide whether to grant or deny it. If, in the process of reviewing the request, the examiner notes a non-compliance item not earlier recognized, the examiner will forward a memo to his/her SPRE detailing any such non-compliance item(s).... Upon confirmation of the existence of any such non-compliant item(s), OPLA will issue a decision vacating the assigned reexamination filing date. In OPLA's decision, the requester will be notified of the non-compliant item(s) **and given time to correct the non-compliance**....absent extraordinary circumstances, requester will only be **given one opportunity to correct the non-compliant item(s)** identified in the Decision Vacating Filing Date." [Emphasis Added]

2) Providing a detailed explanation of how the references apply to the claims for which reexamination is requested, as required by 37 CFR 1.510(b)(2), by addressing the discussion in Part II above.

3) Withdrawing (i.e., not including) the request to reexamine any patent claim for which both (a) an identification of a substantial new question of patentability as required by 37 CFR 1.510(b)(1), and (b) the detailed explanation of how the reference(s) apply to the claims as required by 37 CFR 1.510(b)(2), are not provided and replacing the presently-submitted listing of the claims for which reexamination is requested with a new listing of claims for which reexamination is requested, the new listing *being confined to those claims for which for which (a) and (b) are both provided*).

4) Withdrawing (i.e., not including) any proposed rejection and/or application of the art (including any combination of references) for which (a) an identification of a substantial new question of patentability (supporting the proposed rejection) as required by 37 CFR 1.510(b)(1), and (b) the detailed explanation required by 37 CFR 1.510(b)(2) are not provided, by replacing the presently-submitted identification of the proposed rejections and/or application of the art with *a new identification*, the new identification *being confined to those proposed rejections and/or applications of the art for which (a) and (b) are both supplied.*

5) Explicitly withdrawing <u>any document</u> for which (a) the requisite identification of the SNQ or (b) explanation of proposed rejection are not to be provided, and submitting <u>a new listing</u> confined to the documents for which (a) or (b), as required by 37 CFR 1.510(b)(1) or (2), has been provided via the request papers. As to any of the documents withdrawn, if reexamination is ultimately ordered, the patent owner may, in accordance with MPEP 2280, submit an Information Disclosure Statement (IDS) in compliance with 37 CFR 1.555 "within two months of the date of the order granting reexamination, or as soon thereafter as possible."

6) Supplying the *ex parte* reexamination fee in effect when any corrected or replacement request is filed. See the change to 37 CFR 1.20(c)(1) in "Changes to Implement the Supplemental Examination Provisions of the Leahy-Smith America Invents Act and To Revise Reexamination Fees," 77 Fed. Reg. 48828, 48851 (August 14, 2012). **The fee paid ($2,520) on August 29, 2012 will be applied as credit towards the new filing fee ($17,750). The balance ($15,230) of the new filing fee must be paid with the filing of any corrected or replacement request for reexamination.**

II. **In order to obtain a filing date for the request papers, the requester must, within thirty (30) days of the mailing date of this decision, file a response to this decision which makes the request papers filing date compliant.** The response must be supplied as a corrected request.

The response may be mailed to the Central Reexamination Unit (CRU), attn: "Box *Ex Parte* Reexam" at the USPTO address indicated below, or hand carried to the CRU at the address indicated below. A replacement statement and explanation under 37 CFR 1.510(b)(1) and (2) must not be facsimile transmitted. Any response may be followed up by a telephone call to the Central Reexamination Unit at (571) 272-7705 to ensure receipt.

The requester has one opportunity to make the request papers filing date compliant. If the response to this decision fails to cure the defect(s) identified in this decision or adds a new defect, then processing of the request papers will be terminated, and the request papers will either be discarded or treated as a prior art citation under 37 CFR 1.501, at the Office's option.

If the request papers are made filing date compliant, the date of the receipt of the response will be the filing date of the reexamination proceeding.

CONCLUSION

1. **The filing date** assigned to the request papers for *ex parte* reexamination proceeding Control No. 90/012,456 is hereby **vacated** for failure of the request papers to comply with the filing date requirements for an *ex parte* reexamination proceeding, as set forth in 37 CFR 1.510(b)(1) and (2).

2. In order to obtain a filing date for the request papers, the requester must, within **thirty (30) days** of the mailing date of this decision, file a response to this decision which makes the request papers filing-date compliant, pursuant to the guidelines set forth above, and must include the balance ($15,230) of the *ex parte* reexamination filing fee currently in effect.

3. The requester is being provided with only one opportunity to make the request papers filing-date compliant. *If the response to this decision fails to cure the defects identified in this decision, or adds a new defect, processing of the request papers will be terminated*, and the request papers will either be discarded/expunged or treated as a prior art citation under 37 CFR 1.501, at the Office's option. If the request papers are made filing date compliant, the date of the receipt of the response will be the filing date of the reexamination proceeding.

4. Jurisdiction over the present *ex parte* reexamination request papers is being retained in the Office of Patent Legal Administration pending response to this decision, or the expiration of time to respond.

5. Any response to this decision should be directed to:

By EFS: Registered users may submit the response via the electronic filing system EFS-Web, at: https://efs.uspto.gov/efile/myportal/efs-registered

By Mail:

Mail Stop *Ex Parte* Reexam"
Attn: Central Reexamination Unit
Commissioner for Patents
P. O. Box 1450
Alexandria VA 22313-1450

By hand:

Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

6. A REPLACEMENT STATEMENT AND EXPLANATION UNDER 37 CFR 1.510(b)(1) and (2) MAY NOT BE FACSIMILE TRANSMITTED.

7. Any response to this decision may be followed up by a telephone call to the Central Reexamination Unit at (571) 272-7705, as soon as possible, to ensure receipt and processing.

8. Telephone inquiries related to this decision should be directed to Andres Kashnikow, Supervisory Patent Examiner, at (571) 272-4361, or in his absence, to Legal Advisors Cynthia Nessler at (571) 272-7724, or Pinchus M. Laufer at (571) 272-7726.

___/Cynthia L. Nessler/____________
Cynthia L. Nessler
Senior Legal Advisor
Office of Patent Legal Administration

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456		5904172	292.001US1X	5505

21186 7590 09/26/2012
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
09/26/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patents and Trademark Office
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Alexandria, VA 22313-1450
www.uspto.gov

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

Date:
MAILED

SEP 2 6 2012

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90012456
PATENT NO. : 5904172
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Ex Parte Reexamination Interview Summary – Pilot Program for Waiver of Patent Owner's Statement	**Control No.** 90/012,456	**Patent For Which Reexamination is Requested** 5,904,172
	Examiner JOSEPH KAUFMAN	**Art Unit** 3993

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --

All participants (USPTO official and patent owner):

(1) SHANETTE BROWN (3)

(2) ADAM KIEDROWSKI (4)

Date of Telephonic Interview: 09/20/2012.

The USPTO official requested waiver of the patent owner's statement pursuant to the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☒ The patent owner **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

☐ The patent owner **did not agree** to waive its right to file a patent owner's statement under 35 U.S.C. 304 at this time.

The patent owner is not required to file a written statement of this telephone communication under 37 CFR 1.560(b) or otherwise. However, any disagreement as to this interview summary must be brought to the immediate attention of the USPTO, and no later than one month from the mailing date of this interview summary. Extensions of time are governed by 37 CFR 1.550(c).

*For more information regarding this pilot program, see *Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings*, 75 *Fed. Reg.* 47269 (August 5, 2010), available on the USPTO Web site at http://www.uspto.gov/patents/law/notices/2010.jsp.

☐ USPTO personnel were unable to reach the patent owner.

The patent owner may contact the USPTO personnel at the telephone number provided below if the patent owner decides to waive the right to file a patent owner's statement under 35 U.S.C. 304.

/Shanette Brown/ 571-272-6632
Signature and telephone number of the USPTO official who contacted or attempted to contact the patent owner.

cc: Requester (if third party requester)

First Named Inventor	Gifft, James Edwin	Corrected Request for *Ex Parte* Reexamination of U.S. Patent 5,904,172
Control No.	90/012,456	
Filing Date	July 28, 1997	
Issued Patent No.	5,904,172	
Issue Date	May 18, 1999	
Examiner Name	unassigned	
Attorney Docket No.	292.001US1X	
Title: VALVE ENCLOSURE ASSEMBLY		

Mail Stop: Ex Parte Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This is a corrected request for Ex Parte Reexamination pursuant to 37 C.F.R. § 1.510 of U.S. Patent No. 5,904,172, issued May 18, 1999.

DETAILED REQUEST FOR *EX PARTE* REEXAMINATION

Ex Parte Reexamination of United States Patent 5,904,172 (hereinafter "the '172 patent") is requested under 35 U.S.C. §§ 301-307 and 37 C.F.R. § 1.510. The '172 patent issued May 18, 1999, to James Edwin Gifft et al., and is assigned to Select Comfort Corporation.

The '172 patent issued from U.S. Patent Application Serial No. 08/901,144 (filed July 28, 1997).

I. Request For Reexamination And Identification Of Claims For Which Reexamination is Requested

Reexamination is requested for claims 1-2, 4-6, 9-12, and 14-18 of U.S. Patent 5,904,172, on the basis of the substantial new questions of patentability supplied herein. This revised request for reexamination drops the request for reexamination of claims 3, 7-8, and 13 as they are facially invalid.

II. Discussion Of General Pertinence And Application Of New And Old Art

Shafer et al. (U.S. Patent 5,509,154) was used in rejecting original claims of the '172 patent, but none of the claims that ultimately issued in the '172 patent. Kalavitz et al. (U.S. Patent 4,583,566) in view of Walker (U.S. Patent 4,890,344) was used in rejecting original claims of the '172 patent, but none of the claims that ultimately issued in the '172 patent.

The new art, Kwok (U.S. Patent 3,729,205), Rible (U.S. Patent 4,564,990), Pagani (U.S. Patent 4,836,235), Mennona, Jr. (U.S. Patent 5,006,073) Madsen et al. (U.S. Patent 5,560,057), Stacy et al. (U.S. Patent 5,586,346), and Yavets-Chen (U.S. Patent 5,873,137) was neither cited nor used in any rejection in the prosecution of the '172 patent. Further, the new art is not cumulative of art already cited in the '172 patent, and the same question of patentability has not been decided by the Office. Still further, issued claims 1-16 received no prior art rejections at all in prosecution of the '172 patent. The proposed rejections present a substantial new question of patentability regarding at least one claim, and the same question of patentability has not previously been decided by the Office. The proposed rejections apply Shafer in view of new art, or apply Kalavitz et al. in view of Walker in view of new art, which is specifically allowed (See MPEP 2217(III) and MPEP 2258(F)(2)).

Kwok issued April 24, 1973; Rible issued January 21, 1986; Pagani issued June 6, 1989; Mennona, Jr. issued April 9, 1991; Madsen et al. issued October 1, 1996, and was filed July 1, 1994; Stacy et al. issued December 24, 1996, and was filed February 15, 1994; and Yavets-Chen issued February 23, 1999, and was filed June 17, 1996. Kwok, Rible, Pagani, and Mennona, Jr. each qualify as prior art under 35 U.S.C. §§ 102(a) and (b). Stacy et al., Yavets-Chen, Madsen et al., and Balaton each qualify as prior art under 35 U.S.C. § 102(a), or in the alternative, each qualify as prior art under 35 U.S.C. § 102(e).

III. Substantial New Questions Of Patentability And Proposed Rejections

A. Shafer et al. (U.S. Patent 5,509,154) in view of Yavets-Chen (U.S. Patent 5,873,137), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claim 1.

1. A substantial new question of patentability of claim 1 exists in a combination of Shafer et al. in view of new, non-cumulative reference Yavets-Chen in view of new, non-cumulative reference Rible.

Yavets-Chen provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Yavets-Chen teaches in Fig. 10 a sensor 84 that continuously monitors pressure in a chamber 74. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Rible provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Rible teaches a snap-fit valve 200 that is used to contain fluid. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74, and control unit 86 in electrical communication with and operably coupled to the valves and sensors of Yavets-Chen. It would have been obvious to use the sensor of Yavets-Chen coupled to the processor of Shafer et al., as Shafer et al.'s sensors are coupled to the processor, to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Yavets-Chen do not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 200 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

B. Shafer et al. (U.S. Patent 5,509,154) in view of Yavets-Chen (U.S. Patent 5,873,137), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claim 1.

1. A substantial new question of patentability of claim 1 exists in a combination of Shafer et al. in view of new, non-cumulative reference Yavets-Chen in view of new, non-cumulative reference Mennona, Jr.

Yavets-Chen provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Yavets-Chen teaches in Fig. 10 a sensor 84 that continuously monitors pressure in a chamber 74. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Mennona, Jr. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74, and control unit 86 in electrical communication with and operably coupled to the valves and sensors of Yavets-Chen. It would have been obvious to use the sensor of Yavets-Chen coupled to the processor of Shafer et al., as Shafer et al.'s sensors are coupled to the processor, to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Yavets-Chen do not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. It would have been obvious to engage the valves of Shafer et al. in view of Yavets-Chen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

C. Shafer et al. (U.S. Patent 5,509,154) in view of Yavets-Chen (U.S. Patent 5,873,137), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claim 1.

1. A substantial new question of patentability of claim 1 exists in a combination of Shafer et al. in view of new, non-cumulative reference Yavets-Chen in view of new, non-cumulative reference Pagani.

Yavets-Chen provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Yavets-Chen teaches in Fig. 10 a sensor 84 that continuously monitors pressure in a chamber 74. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Pagani provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74, and control unit 86 in electrical communication with and operably coupled to the valves and sensors of Yavets-Chen. It would have been obvious to use the sensor of Yavets-Chen coupled to the processor of Shafer et al., as Shafer et al.'s sensors are coupled to the processor, to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Yavets-Chen do not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer et al. in view of Yavets-Chen with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

D. Shafer et al. (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claim 1.

1. A substantial new question of patentability of claim 1 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Rible.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Rible provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Rible teaches a snap-fit valve 200 that is used to contain fluid. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 200 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

E. Shafer et al. (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claim 1.

1. A substantial new question of patentability of claim 1 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Mennona, Jr.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Mennona, Jr. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

F. Shafer et al. (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claim 1.

1. A substantial new question of patentability of claim 1 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Pagani.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Pagani provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

G. Shafer et al. (U.S. Patent 5,509,154) in view of Stacy et al. (U.S. Patent 5,586,346) raises a substantial new question of patentability for claims 2 and 12.

1. A substantial new question of patentability of claims 2 and 12 exists in a combination of Shafer et al. in view of new, non-cumulative reference Stacy et al.

Stacy et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such use of guides and stops.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not teach guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. with the Shafer et al. system to correctly position components within the enclosure.

H. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claims 4-5.

1. A substantial new question of patentability of claims 4-5 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Rible.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Rible provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Rible teaches a snap-fit valve 200 that is used to contain fluid, and which has a ramped portion in body 202. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 200 with ramped body 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

I. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claims 4-5.

1. A substantial new question of patentability of claims 4-5 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Mennona, Jr.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48.. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Mennona, Jr. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact with a ramped face. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure. Shafer et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact with a ramped face. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

J. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claims 4-5.

1. A substantial new question of patentability of claims 4-5 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Pagani.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Pagani provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

K. Shafer (U.S. Patent 5,509,154) in view of Stacy et al. (U.S. Patent 5,586,346) and further in view of Kwok (U.S. Patent 3,729,205) raises a substantial new question of patentability for claims 6 and 16-18.

1. A substantial new question of patentability of claims 6 and 16-18 exists in a combination of Shafer et al. in view of new, non-cumulative reference Stacy et al. and further in view of new, non-cumulative reference Kwok.

Stacy et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. Stacy et al.'s air box 46 clearly shows an enclosure portion and a cover attached to the enclosure portion. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such use of guides and stops.

Kwok provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a flexible seal between the enclosure portion and the cover. Flexible seals such as gaskets were well known in the art at the time of the application for the '172 patent. Such a flexible gasket is taught in Kwok (10, col. 3, ll. 32-46) and gaskets in general are discussed at Kwok col. 1, ll. 14-46. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such use of a flexible seal.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not teach guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. with the Shafer et al. system to correctly position components within the enclosure. Shafer et al. in view of Stacy et al. do not teach a flexible seal between the enclosure portion and the cover. Flexible seals such as gaskets were well known in the art at the time of the application for the '172 patent, and it would have been obvious to include a gasket between the enclosure and the cover of Shafer et al. in view of Stacy et al. to more fully seal the housing. Such a flexible gasket is taught in Kwok (10, col. 3, ll. 32-46) and gaskets in general are discussed at Kwok col. 1, ll. 14-46.

Regarding claims 17-18, Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. as lead grooves for the passing of leads into the enclosure, and a flexible seal inherently seals.

L. Shafer (U.S. Patent 5,509,154) in view of Madsen et al. (U.S. Patent 5,586,346) and further in view of Kwok (U.S. Patent 3,728,205) raises a substantial new question of patentability for claims 6 and 16-18.

1. A substantial new question of patentability of claims 6 and 16-18 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Kwok.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Kwok provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a flexible seal between the enclosure portion and the cover. Flexible seals such as gaskets were well known in the art at the time of the application for the '172 patent. Such a flexible gasket is taught in Kwok (10, col. 3, ll. 32-46) and gaskets in general are discussed at Kwok col. 1, ll. 14-46. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such use of a flexible seal.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. do not teach a flexible seal between the enclosure portion and the cover. Flexible seals such as gaskets were well known in the art at the time of the application for the '172 patent, and it would have been obvious to include a gasket between the enclosure and the cover to more fully seal the housing. Such a flexible gasket is taught in Kwok (10, col. 3, ll. 32-46) and gaskets in general are discussed at Kwok col. 1, ll. 14-46.

Regarding claims 17-18, Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. as lead grooves for the passing of leads into the enclosure, and a flexible seal inherently seals.

M. Kalavitz et al. (U.S. Patent 4,583,566) in view of Walker (U.S. Patent 4,890,344) and further in view of Yavets-Chen (U.S. Patent 5,873,137) raises a substantial new question of patentability for claim 9.

1. A substantial new question of patentability of claim 9 exists in a combination of Kalavitz et al. in view of new, non-cumulative reference Walker and further in view of new, non-cumulative reference Yavets-Chen.

Kalavitz et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not explicitly teach, show, or suggest determining pressure differential, selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure at a tap on the assembly, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating with valve 220 to place the desired air pressure in the bladder. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such method steps.

Walker provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not explicitly teach, show, or suggest employing a control system such as that in Kalavitz et al. for an air mattress for the specific purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. Walker discloses that exact teaching. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such adjusting.

Yavets-Chen provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Yavets-Chen teaches in Fig. 10 a sensor 84 that continuously monitors pressure in a chamber 74. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Claim 9 is unpatentable under 35 USC 103(a) over Kalavitz et al. in view of Walker, and further in view of Madsen et al. Kalavitz et al. discloses all the claimed features with the exception of being used with an air inflatable mattress. Specifically, Kalavitz et al. teaches air pressure selector 211 for selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating (e.g., exhausting air when the differential indicates too high a pressure in the bladder, and energizing a pump to provide compressed air to the bladder when the differential indicates that the bladder pressure is lower than the desired air pressure) with valve 220 to place the desired air pressure in the bladder, closing the valve when the desired pressure is reached. Air supply 102 is fluidly coupled to the bladder, and energized to supply compressed air to the bladder. It is noted that while the patent to Kalavitz et al. does not explicitly disclose a pump, the vehicle air supply disclosed is considered to include all types of compressed air supply including a pump, given a reasonable interpretation of Kalavitz et al.

Kalavitz et al. does not explicitly teach, show, or suggest that its pressure control system is usable for an air inflatable mattress. Walker discloses that it is known in the inflatable mattress art to employ a control system for an air mattress for the purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. As Kalavitz et al. provides just such an pressure control system, and is relevant to bladder inflation, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the control system of Kalavitz et al. for an air mattress for the purpose of allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker.

Kalavitz et al. in view of Walker does not explicitly teach continuous monitoring of pressure in the bladder at a tap on a valve enclosure assembly. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74. It would have been obvious to use the sensor of Yavets-Chen to monitor pressure in the chamber of Kalavitz et al. in view of Walker, to more accurately know at all times the pressure.

N. Kalavitz et al. (U.S. Patent 4,583,566) in view of Walker (U.S. Patent 4,890,344) and further in view of Madsen et al. (U.S. Patent 5,560,057) raises a substantial new question of patentability for claim 9.

1. A substantial new question of patentability of claim 9 exists in a combination of Kalavitz et al. in view of new, non-cumulative reference Walker and further in view of new, non-cumulative reference Madsen et al..

Kalavitz et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not explicitly teach, show, or suggest determining pressure differential, selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure at a tap on the assembly, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating with valve 220 to place the desired air pressure in the bladder. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such method steps.

Walker provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not explicitly teach, show, or suggest employing a control system such as that in Kalavitz et al. for an air mattress for the specific purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. Walker discloses that exact teaching. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such adjusting.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Claim 9 is unpatentable under 35 USC 103(a) over Kalavitz et al. in view of Walker, and further in view of Madsen et al. Kalavitz et al. discloses all the claimed features with the exception of being used with an air inflatable mattress. Specifically, Kalavitz et al. teaches air pressure selector 211 for selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating (e.g., exhausting air when the differential indicates too high a pressure in the bladder, and energizing a pump to provide compressed air to the bladder when the differential indicates that the bladder pressure is lower than the desired air pressure) with valve 220 to place the desired air pressure in the bladder, closing the valve when the desired pressure is reached. Air supply 102 is fluidly coupled to the bladder, and energized to supply compressed air to the bladder. It is noted that while the patent to Kalavitz et al. does not explicitly disclose a pump, the vehicle air supply disclosed is considered to include all types of compressed air supply including a pump, given a reasonable interpretation of Kalavitz et al.

Kalavitz et al. does not explicitly teach, show, or suggest that its pressure control system is usable for an air inflatable mattress. Walker discloses that it is known in the inflatable mattress art to employ a control system for an air mattress for the purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. As Kalavitz et al. provides just such an pressure control system, and is relevant to bladder inflation, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the control system of Kalavitz et al. for an air mattress for the purpose of allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker.

Kalavitz et al. in view of Walker does not explicitly teach continuous monitoring of pressure in the bladder at a tap on a valve enclosure assembly. Madsen et al. discloses at col. 6, ll. 18-19 continuously monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Kalavitz et al. in view of Walker, to more accurately know at all times the pressure.

O. Shafer (U.S. Patent 5,509,154) in view of Stacy et al. (U.S. Patent 5,586,346) raises a substantial new question of patentability for claim 10.

1. A substantial new question of patentability of claim 10 exists in a combination of Shafer et al. in view of new, non-cumulative reference Stacy et al.

Stacy et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such use of guides and stops.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10) integral to valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not teach pressure monitor means formed integral with the valve housing. Stacy et al. teaches (col. 6, ll. 10-19) each valve having a pressure feedback tube coupled between an outlet side of the valve and a pressure sensor to monitor pressure at the valve. It would have been obvious to use the integral pressure monitor in the valves of Stacy et al. with the Shafer et al. system to accurately monitor pressure at the valve.

P. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Rible (U.S. Patent 4,564,990) raises a substantial new question of patentability for claims 11 and 14-15.

1. A substantial new question of patentability of claims 11 and 14-15 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Rible.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Rible provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Rible teaches a snap-fit valve 200 that is used to contain fluid, and which has a ramped portion in body 202. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Rible teaches a snap-fit valve 200 with ramped body 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

Q. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Mennona, Jr. (U.S. Patent 5,006,073) raises a substantial new question of patentability for claims 11 and 14-15.

1. A substantial new question of patentability of claims 11 and 14-15 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Mennona, Jr.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Mennona, Jr. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact with a ramped face. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Mennona, Jr. teaches (Abstract, Fig. 2) a snap-fit contact with a ramped face. It would have been obvious to engage the valves of Shafer et al. in view of Madsen et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Mennona, Jr. to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

R. Shafer (U.S. Patent 5,509,154) in view of 5,509,566) in view of Madsen et al. (U.S. Patent 5,560,057), and further in view of Pagani (U.S. Patent 4,836,235) raises a substantial new question of patentability for claims 11 and 14-15.

1. A substantial new question of patentability of claims 11 and 14-15 exists in a combination of Shafer et al. in view of new, non-cumulative reference Madsen et al. in view of new, non-cumulative reference Pagani.

Madsen et al. provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest monitoring of chamber pressure during an inflate/deflate cycle. Madsen et al. teaches at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such monitoring.

Pagani provides a new, non-cumulative teaching as follows. The art of record in the application as examined does not teach, show, or suggest a valve that is snap-fit into an aperture. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. This new, non-cumulative teaching provides a substantial new question of patentability given the failure of the cited art in the examination to teach or suggest such a snap-fit configuration and valve.

Shafer et al. discloses an air control system base unit enclosure (44) which contains a pump (152), pressure monitor means (156, 158, see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress (338, 340) via tubes (166, 168). The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338, 240 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, ll. 34-59).

Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, ll. 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know at all times the pressure.

Shafer et al. in view of Madsen et al. does not teach a snap-fit valve. However, the benefits of a snap-fit valve were well known in the art at the time of filing the application for the '172 patent. Pagani teaches (col. 1, ll. 5-9, and Figures 5-7) a valve 20 that snap-fits into a structure 10, the valve having a ramped face engaging a beveled aperture face. It would have been obvious to engage the valves of Shafer et al. in view of Pagani with an aperture in the valve enclosure via a snap-fit engagement as shown in Pagani to make assembly easier and faster, and/or to provide a fluid-tight and/or fast and easy connection of a valve.

CONCLUSION

In view of the above, Requester submits that substantial new questions of patentability exist with respect to claims 1-2, 4-6, 9-12, and 14-18 of the '172 patent, and requests that reexamination be granted.

Any inquiry regarding this request should be directed to Daniel J. Polglaze at Telephone No. (612) 312-2203, Facsimile No. (612) 312-2250.

Respectfully submitted,

Date: 17 Oct. 2012

Daniel J. Polglaze
Reg. No. 39,801

Attorneys for Requester
Leffert Jay & Polglaze
Customer No. 27073
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CERTIFICATE OF SERVICE

It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c). The name and address of the party served and the date of service are:

Schwegman Lundberg & Woessner
P.O. Box 2938
Minneapolis, MN 55402

Daniel J. Polglaze

Date of Service: October 17, 2012

Electronic Patent Application Fee Transmittal

Application Number:	90012456
Filing Date:	
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Filer:	Thomas Leffert/Jennifer Inoue
Attorney Docket Number:	292.001US1X

Filed as Large Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
REQUEST FOR EX PARTE REEXAMINATION	1812	1	17750	17750
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - months with $0 paid		1	0	0
Miscellaneous:				
		Total in USD ($)		**17750**

Electronic Acknowledgement Receipt

EFS ID:	14009363
Application Number:	90012456
International Application Number:	
Confirmation Number:	5505
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Customer Number:	21186
Filer:	Thomas Leffert/Jennifer Inoue
Filer Authorized By:	Thomas Leffert
Attorney Docket Number:	292.001US1X
Receipt Date:	17-OCT-2012
Filing Date:	
Time Stamp:	16:20:37
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$17750
RAM confirmation Number	3231
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Receipt of Corrected Original Ex Parte Request	Corrected_Request_for_Ex_Parte_Reexamination.pdf	1550559 23f4e5f2bfe62e5ed0e26405249968650d8a2fa2	no	29
Warnings:					
Information:					
2	Reexam Certificate of Service	Certificate_of_Service.pdf	15854 83f6c6fba2312b9eb71a0887bbaf0558db0255e9	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31836 c7d7f4a861ed92342713fc3c422629f1f29dcef6	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1598249		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

First Named Inventor	Gifft, James Edwin	REQUEST FOR REFUND
Control No.	90/012,456	
Filing Date	July 28, 1997	
Issued Patent No.	5,904,172	
Issue Date	May 18, 1999	
Examiner Name	Unassigned	
Attorney Docket No.	292.001US1X	
Title: VALVE ENCLOSURE ASSEMBLY		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant respectfully requests a refund of $2,520.00 in the above-identified application, and that said refund be credited to the credit card which was authorized for payment of the *Ex Parte* Reexamination fee.

On August 29, 2012, Applicant electronically submitted a Request for *Ex Parte* Reexamination of U.S. Patent 5,904,172 and paid the $2,520.00 filing fee. On September 26, 2012, Applicant received a Decision *Sua Sponte* Vacating *Ex Parte* Rexamination Filing Date. On page 6 of the decision it states, "The fee paid ($2,520) on August 29, 2012 will applied as credit towards the new filing fee ($17,750). The balance ($15,230) of the new filing fee must be paid with the filing of any corrected or replacement request for reexamination." On October 17, 2012, Applicant electronically submitted a Corrected Request for *Ex Parte* Rexamination of U.S. Patent 5,904,172, and was given no other option but to pay the entire $17,750.00 filing fee. Therefore, Applicant is requesting that the authorized credit card be credited a total of $2,520.00.

Respectfully submitted,

Date: 17 Oct 2012

Daniel J. Polglaze
Reg. No. 39,801

Attorneys for Applicant
Leffert Jay & Polglaze
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Electronic Acknowledgement Receipt

EFS ID:	14010769
Application Number:	90012456
International Application Number:	
Confirmation Number:	5505
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Customer Number:	21186
Filer:	Thomas Leffert/Jennifer Inoue
Filer Authorized By:	Thomas Leffert
Attorney Docket Number:	292.001US1X
Receipt Date:	17-OCT-2012
Filing Date:	
Time Stamp:	17:21:36
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Refund Request	Request_for_Refund.pdf	43260 54b1117def9d76b096b41e214fa4d9a0df97cafe	no	1

Warnings:

Information:

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Bib Data Sheet

CONFIRMATION NO. 5505

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/012,456	10/17/2012 RULE	137	3993	292.001US1X

APPLICANTS

5904172, Residence Not Provided;
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LEFFERT JAY & POLGLAZE, PA, MINNEAPOLIS, MN

** **CONTINUING DATA** *************************
This application is a REX of 08/901,144 07/28/1997 PAT 5904172

** **FOREIGN APPLICATIONS** ********************

	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ yes ☐ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged _____ Examiner's Signature Initials			18	10

ADDRESS
21186

TITLE
VALVE ENCLOSURE ASSEMBLY

FILING FEE RECEIVED		
20270	FEES: Authority has been given in Paper No. _________ to charge/credit DEPOSIT ACCOUNT No. _________ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other ____________ ☐ Credit

Patent Assignment Abstract of Title

Total Assignments: 9

Application #: 08901144 **Filing Dt:** 07/28/1997 **Patent #:** 5904172 **Issue Dt:** 05/18/1999
PCT #: NONE **Publication #:** NONE **Pub Dt:**
Inventors: JAMES EDWIN GIFFT, PAUL JAMES MAHONEY
Title: VALVE ENCLOSURE ASSEMBLY

Assignment: 1

Reel/Frame: 008658 / 0309 **Received:** 09/03/1997 **Recorded:** 07/28/1997 **Mailed:** 09/16/1997 **Pages:** 4
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
Assignors: GIFFT, JAMES EDWIN **Exec Dt:** 07/28/1997
MAHONEY, PAUL JAMES **Exec Dt:** 07/28/1997
Assignee: SELECT COMFORT CORPORATION
6105 TRENTON LANE NORTH
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Assignment: 2

Reel/Frame: 011904 / 0102 **Received:** 06/22/2001 **Recorded:** 06/14/2001 **Mailed:** 08/29/2001 **Pages:** 14
Conveyance: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS).
Assignor: SELECT COMFORT CORPORATION **Exec Dt:** 06/06/2001
Assignee: ST. PAUL VENTURE CAPITAL VI, LLC
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10400 VIKING DRIVE,
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Assignment: 3

Reel/Frame: 012066 / 0633 **Received:** 10/17/2001 **Recorded:** 10/17/2001 **Mailed:** 10/18/2001 **Pages:** 17
Conveyance: SECURITY AGREEMENT
Assignors: SELECT COMFORT CORPORATION **Exec Dt:** 09/28/2001
SELECT COMFORT RETAIL CORPORATION **Exec Dt:** 09/28/2001
SELECT COMFORT DIRECT CORPORATION **Exec Dt:** 09/28/2001
SELECT COMFORT SCCORPORATION **Exec Dt:** 09/28/2001
DIRECT CALL CENTERS, INC. **Exec Dt:** 09/28/2001
SELECTCOMFORT.COM CORPORATION **Exec Dt:** 09/28/2001
Assignee: MEDALLION CAPITAL, INC.
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Assignment: 4

Reel/Frame: 020976 / 0070 **Received:** 05/21/2008 **Recorded:** 05/21/2008 **Mailed:** 05/21/2008 **Pages:** 5
Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).
Assignor: ST. PAUL VENTURE CAPİTAL VI, LLC **Exec Dt:** 05/20/2008

Assignee: SELECT COMFORT CORPORATION
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Assignment: 5

Reel/Frame: 021006 / 0079 **Received:** 05/28/2008 **Recorded:** 05/28/2008 **Mailed:** 05/28/2008 **Pages:** 6

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

Assignor: MEDALLION CAPITAL, INC. **Exec Dt:** 05/22/2008

Assignees: SELECT COMFORT CORPORATION
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SELECT COMFORT RETAIL CORPORATION
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Assignment: 6

Reel/Frame: 021076 / 0230 **Received:** 06/11/2008 **Recorded:** 06/11/2008 **Mailed:** 06/11/2008 **Pages:** 9

Conveyance: SECURITY INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: SELECT COMFORT CORPORATION **Exec Dt:** 05/30/2008

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Assignment: 7

Reel/Frame: 024151 / 0673 **Received:** 03/30/2010 **Recorded:** 03/30/2010 **Mailed:** 03/30/2010 **Pages:** 30

Conveyance: SECURITY AGREEMENT

Assignors: SELECT COMFORT CORPORATION **Exec Dt:** 03/26/2010
SELECT COMFORT RETAIL CORPORATION 03/26/2010

Exec Dt:

SELECT COMFORT CANADA HOLDING INC. — **Exec Dt:** 03/26/2010

SELECTCOMFORT.COM CORPORATION — **Exec Dt:** 03/26/2010

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Assignment: 8

Reel/Frame: 024213 / 0729 **Received:** 04/12/2010 **Recorded:** 04/12/2010 **Mailed:** 04/12/2010 **Pages:** 6

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

Assignor: JPMORGAN CHASE BANK, N.A., AS COLLATERAL AGENT — **Exec Dt:** 03/26/2010

Assignee: SELECT COMFORT CORPORATION
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Assignment: 9

Reel/Frame: 028459 / 0241 **Received:** 06/28/2012 **Recorded:** 06/28/2012 **Mailed:** 06/29/2012 **Pages:** 7

Conveyance: RELEASE BY SECURED PARTY (SEE DOCUMENT FOR DETAILS).

Assignor: WELLS FARGO BANK, NATIONAL ASSOCIATION — **Exec Dt:** 06/04/2012

Assignee: SELECT COMFORT CORPORATION
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Correspondent: SUSAN ORPEN
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MINNEAPOLIS, MN 55402-3338

Search Results as of: 11/01/2012 07:36 AM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,456	10/17/2012	5904172

CONFIRMATION NO. 5505
REEXAMINATION REQUEST NOTICE

LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

OC000000057408532

Date Mailed: 11/02/2012

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 10/17/2012, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
21186
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,456	10/17/2012	5904172

CONFIRMATION NO. 5505

REEXAM ASSIGNMENT NOTICE

21186
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

OC000000057408533

Date Mailed: 11/02/2012

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3993. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

cc: Third Party Requester(if any)
LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456	10/17/2012	5904172	292.001US1X	5505

21186 7590 11/19/2012
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
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EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
11/19/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

LEFFERT JAY & POLGLAZE, PA

P O BOX 2230

MINNEAPOLIS, MN 55402-0230

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,456*.

PATENT NO. *5904172*.

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Order Granting / Denying Request For Ex Parte Reexamination	**Control No.** 90/012,456	**Patent Under Reexamination** 5904172
	Examiner JOSEPH KAUFMAN	**Art Unit** 3993

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed *17 October 2012* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☒ PTO/SB/08, c)☐ Other: ______

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2. ☐ The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 (c) will be made to requester:

a) ☐ by Treasury check or,

b) ☐ by credit to Deposit Account No. ______, or

c) ☐ by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).

cc:Requester (if third party requester)

DECISION

A substantial new question of patentability affecting claims 1, 2, 4-6, 9-12 and 14-18 of United States Patent Number 5,904,172 to Gifft et al. is raised by the request for *ex parte* reexamination.

Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c).

Submissions

In order to insure full consideration of any amendments, affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and by 37 CFR 41.33 after appeal, which will be strictly enforced.

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No 5,904,172 throughout the course of this reexamination proceeding. Likewise, if present, the third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Scope of Reexamination

Since requester did not request reexamination of claims 3, 7, 8 and 13 and did not assert the existence of a substantial new question of patentability (SNQP) for such claims (see 35 U.S.C. § 311(b)(2); see also 37 CFR 1.915b and 1.923), such claims will not be reexamined. This matter was squarely addressed in *Sony Computer Entertainment America Inc., et al. v. Jon W. Dudas*, Civil Action No. 1:05CV1447 (E.D.Va. May 22, 2006), Slip Copy, 2006 WL 1472462. (Not Reported in F.Supp.2d.) The District Court upheld the Office's discretion to not reexamine claims in an *inter partes* reexamination proceeding other than those claims for which reexamination had specifically been requested. The Court stated:

> To be sure, a party may seek, and the PTO may grant, *inter partes* review of each and every claim of a patent. Moreover, while the PTO in its discretion may review claims for which *inter partes* review was not requested, nothing in the statute compels it to do so. To ensure that the PTO considers a claim for *inter partes* review, § 311(b)(2) requires that the party seeking reexamination demonstrate why the PTO should reexamine each and every claim for which it seeks review. Here, it is undisputed that Sony did not seek review of every claim under the '213 and '333 patents. Accordingly, Sony cannot now claim that the PTO wrongly failed to reexamine claims for which Sony never requested review, and its argument that AIPA compels a contrary result is unpersuasive.

(Slip copy at page 9.)

The *Sony* decision's reasoning and statutory interpretation apply analogously to *ex parte* reexamination, as the same relevant statutory language applies to both *inter partes* and *ex parte* reexamination. 35 U.S.C. § 302 provides that the *ex parte* reexamination "request must set forth the pertinency and manner of applying cited prior art <u>to every claim for which reexamination is requested</u>" (emphasis added), and 35

U.S.C. § 303 provides that "the Director will determine whether a substantial new question of patentability affecting any claim of the patent concerned is raised by the request..." (Emphasis added). These provisions are analogous to the language of 35 U.S.C. § 311(b)(2) and 35 U.S.C. § 312 applied and construed in *Sony*, and would be construed in the same manner. As the Director can decline to reexamine non-requested claims in an *inter partes* reexamination proceeding, the Director can likewise do so in *ex parte* reexamination proceeding. See *Notice of Clarification of Office Policy To Exercise Discretion in Reexamining Fewer Than All the Patent Claims* (signed Oct. 5, 2006) 1311 OG 197 (Oct. 31, 2006). See also MPEP § 2240, Rev. 5, Aug. 2006.

Therefore, claims 3, 7, 8 and 13 will not be reexamined in this *ex parte* reexamination proceeding.

Substantial New Question of Patentability

It is agreed that Yavets-Chen raises a substantial new question of patentability with regard to claims 1, 2 and 9 of United States Patent Number 5,904,172 to Gifft et al.. The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach monitoring the pressure chamber during the inflate/deflate cycle in a mattress system. Yavets-Chen teaches a sensor 84 that monitors pressure chamber 74 in a mattress system.

Yavets-Chen was not considered in the prosecution of the application that became the Gifft et al. patent. Further, there is a substantial likelihood that a reasonable examiner would consider the teachings in this reference important in deciding whether or not the claims are patentable. Accordingly, the above reference raises a substantial new question of patentability as to claims 1, 2 and 9, which question has not been decided in a previous examination of what became the Gifft et al. patent.

It is agreed that Rible raises a substantial new question of patentability with regard to claims 1, 2, 4, 5, 11, 14 and 15 of United States Patent Number 5,904,172 to Gifft et al.. The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach a valve snap fit into an aperture. Rible teaches a snap fit valve 200.

Rible was not considered in the prosecution of the application that became the Gifft et al. patent. Further, there is a substantial likelihood that a reasonable examiner would consider the teachings in this reference important in deciding whether or not the claims are patentable. Accordingly, the above reference raises a substantial new question of patentability as to claims 1, 2, 4, 5, 11, 14 and 15, which question has not been decided in a previous examination of what became the Gifft et al. patent.

It is **not** agreed that Mennona, Jr. raises a substantial new question of patentability with regard to claims 1, 2, 4-6, 9-12 and 14-18 of United States Patent Number 5,904,172 to Gifft et al.. The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach a valve snap fit into an aperture. Mennona, Jr. teaches a snap fit, but does not disclose a valve nor is in the environment of an air pressure system. The teachings of Mennona, Jr. are cumulative to those in the prior art cited in the prosecution of the Gifft et al. patent and therefore, it does not raise an SNQ with respect to the above claims.

It is agreed that Pagani raises a substantial new question of patentability with regard to claims 1, 2, 4, 5, 11, 14 and 15 of United States Patent Number 5,904,172 to Gifft et al. The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach a valve snap fit into an aperture. Pagani teaches a snap fit valve as discussed in column 1, lines 5-9.

Pagani was not considered in the prosecution of the application that became the Gifft et al. patent. Further, there is a substantial likelihood that a reasonable examiner would consider the teachings in this reference important in deciding whether or not the claims are patentable. Accordingly, the above reference raises a substantial new question of patentability as to claims 1, 2, 4, 5, 11, 14 and 15, which question has not been decided in a previous examination of what became the Gifft et al. patent.

It is agreed that Madsen et al. raises a substantial new question of patentability with regard to claims 1, 2, 4-6, 9, 11 and 14-18 of United States Patent Number 5,904,172 to Gifft et al. The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach monitoring the pressure chamber during the inflate/deflate cycle in a mattress system. Madsen et al. teaches monitoring the pressure chamber in mattress system as discussed in column 16, lines 7-18.

Madsen et al. was not considered in the prosecution of the application that became the Gifft et al. patent. Further, there is a substantial likelihood that a reasonable examiner would consider the teachings in this reference important in deciding whether or not the claims are patentable. Accordingly, the above reference raises a substantial new question of patentability as to claims 1, 2, 4-6, 9, 11 and 14-18, which question has not been decided in a previous examination of what became the Gifft et al. patent.

It is agreed that Stacy et al. raises a substantial new question of patentability with regard to claims 2, 10 and 12 of United States Patent Number 5,904,172 to Gifft et al.. The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach guides and stoops for positioning components in the enclosure. Stacy et al. teaches guides and stops as seen in Figure 7 in a mattress system.

Stacy et al. was not considered in the prosecution of the application that became the Gifft et al. patent. Further, there is a substantial likelihood that a reasonable examiner would consider the teachings in this reference important in deciding whether or not the claims are patentable. Accordingly, the above reference raises a substantial new question of patentability as to claims 2, 10 and 12, which question has not been decided in a previous examination of what became the Gifft et al. patent.

It is agreed that Kwok raises a substantial new question of patentability with regard to claims 6 and 16-18 of United States Patent Number 5,904,172 to Gifft et al..

The prosecution history of the Gifft et al. patent indicates that the prior art of record did not teach the flexible seal between the enclosure and the cover. Kwok teaches a flexible seal 10 between structures.

Kwok was not considered in the prosecution of the application that became the Gifft et al. patent. Further, there is a substantial likelihood that a reasonable examiner would consider the teachings in this reference important in deciding whether or not the claims are patentable. Accordingly, the above reference raises a substantial new question of patentability as to claims 6 and 16-18, which question has not been decided in a previous examination of what became the Gifft et al. patent.

Note, the Kalavitz et al., Walker and Schafer et al. references were considered before and there is nothing in the Request that indicates that they are viewed in a new light. Therefore, they will be considered as secondary references as they are combined with publications that do raise an SNQ..

.

Conclusion

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

Please mail any communications to:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered.

By Mail to: Attn: Mail Stop "Ex Parte Reexam"
Central Reexamination Unit
Commissioner for Patents

United States Patent & Trademark Office
P. O. Box 1450
Alexandria VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By Hand: Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i)(C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Joseph A. Kaufman/
Joseph A. Kaufman
Primary Examiner
Art Unit 3993
(571) 272-4928

Conferees:
/RMF/

/EDL/

Reexamination	Application/Control No. 90/012,456	Applicant(s)/Patent Under Reexamination 5904172
	Certificate Date	**Certificate Number**

Requester Correspondence Address: ☐ **Patent Owner** ☒ **Third Party**
LEFFERT JAY & POLGLAZE, PA P O BOX 2230 MINNEAPOLIS, MN 55402-0230

LITIGATION REVIEW ☒	**JAK** (examiner initials)	**11/8/2012** (date)

Case Name	Director Initials
Select Comfort Corporation v. The Sleep Better Store, LLC et al.; 0:12cv1148 US Dist. Ct, Minnesota; open.	/EDL/ FOR IY
Select Comfort Corp. v. Halcyon Waterspring; 0:03cv3325, US Dist, Ct. Minnesota;closed.	/EDL/ FOR IY

COPENDING OFFICE PROCEEDINGS

TYPE OF PROCEEDING	NUMBER
1. none	
2.	
3.	
4.	

Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination
90/012,456	5904172
Examiner	**Art Unit**
JOSEPH KAUFMAN	3993

SEARCHED

Class	Subclass	Date	Examiner
none			

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	DATE	EXMR
Reviewed patented file's prosecution history	11/8/2012	JAK

First Named Inventor	James Edwin Gifft
Serial No.	Unknown
Filing Date	Herewith
Group Art Unit	Unknown
Examiner Name	Unknown
Confirmation No.	Unknown
Attorney Docket No.	292.001US1X

Title: Re-examination application for patent 5,904,172

INFORMATION DISCLOSURE STATEMENT FORM PTO-1449

U.S. Patent References

Examiner Initials	Document No.	Issue/Publication Date	Name	Filing Date
	3,729,205	04/24/1973	Kwok, Michael	01/07/1971
	4,564,990	01/21/1986	Rible, Richard A.	02/16/1984
	4,583,566	04/22/1986	Kalavitz et al.	08/16/1983
	4,836,235	06/06/1989	Pagani, Ezio	03/03/1987
	4,890,344	01/02/1990	Walker, Robert A.	01/31/1989
	5,006,073	04/09/1991	Mennona, Jr., Vincent J.	05/15/1990
	5,509,154	04/23/1996	Shafer et al.	11/01/1994
	5,560,057	10/01/1996	Madsen et al.	07/01/1994
	5,586,346	12/24/1996	Stacy et al.	02/15/1994
	5,873,137	02/23/1999	Yavets-Chen, Yehuda	06/17/1996

Foreign Patent References

Examiner Initials	Foreign Patent		Name	Publication Date	Translation
	Country	No.			

Other References

Examiner Initials	Author, Title, Date, Pages, etc.

Examiner Signature	/Joseph Kaufman/	Date Considered	11/08/2012

*Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Based on Form PTO-FB-A820 Patent and Trademark Office, U.S. Department of Commerce

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.K./

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456	10/17/2012	5904172	292.001US1X	5505

21186 7590 04/24/2013
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
04/24/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

LEFFERT JAY & POLGLAZE, PA

P O BOX 2230

MINNEAPOLIS, MN 55402-0230

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,456*.

PATENT NO. *5904172*.

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Office Action in Ex Parte Reexamination	**Control No.** 90/012,456	**Patent Under Reexamination** 5904172
	Examiner JOSEPH KAUFMAN	**Art Unit** 3993

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a☐ Responsive to the communication(s) filed on _____ . b☐ This action is made FINAL.
c☒ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *2* month(s) from the mailing date of this letter.
Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**
If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1,2,4-6,9-12 and 14-18* are subject to reexamination.

1b. ☒ Claims *3,7,8 and 13* are not subject to reexamination.

2. ☐ Claims _____ have been canceled in the present reexamination proceeding.

3. ☐ Claims _____ are patentable and/or confirmed.

4. ☒ Claims *1, 2, 4-6, 9-12 and 14-18* are rejected.

5. ☐ Claims _____ are objected to.

6. ☐ The drawings, filed on _____ are acceptable.

7. ☐ The proposed drawing correction, filed on _____ has been (7a)☐ approved (7b)☐ disapproved.

8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some* c)☐ None of the certified copies have

   1☐ been received.

   2☐ not been received.

   3☐ been filed in Application No. _____ .

   4☐ been filed in reexamination Control No. _____.

   5☐ been received by the International Bureau in PCT application No. _____.

   * See the attached detailed Office action for a list of the certified copies not received.

9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.

10. ☐ Other: _____

cc: Requester (if third party requester)

Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c).

Submissions

In order to insure full consideration of any amendments, affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and by 37 CFR 41.33 after appeal, which will be strictly enforced.

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No 5,904,172 throughout the course of this reexamination proceeding. Likewise, if present, the third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Scope of Reexamination

As a reminder, claims 3, 7, 8 and 13 will not be reexamined in this *ex parte* reexamination proceeding.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Yavets-Chen and Rible.

As discussed in the Request (with modification):

Shafer et al. discloses an air control system base unit enclosure 44 which contains a pump 152, pressure monitor means 156, 158, (see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress 30, 32 via tubes 166, 168. The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al.

further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338,340 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, lines.34-59).

While Shafer et al. teaches pressure monitoring, Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74, and control unit 86 in electrical communication with and operably coupled to the valves and sensors of Yavets-Chen. It would have been obvious to use the sensor of Yavets-Chen coupled to the processor of Shafer et al., in order to monitor pressure in the chamber of Shafer et al. to more accurately know the pressure at all times.

While Shafer et al. teaches the use of valves, Shafer et al. does not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the ' 172 patent. Rible teaches a snap-fit valve 200 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and to provide a fluid-tight and fast and easy connection of a valve.

Claims 2, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Stacey et al.

As discussed in the Request (with modification):

Shafer et al. discloses an air control system base unit enclosure 44 which contains a pump 152, pressure monitor means 156, 158, (see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress 30, 32 via tubes 166, 168. The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338,340 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, lines.34-59).

Regarding claims 2 and 12, while Shafer et al. shows an enclosure, Shafer et al. does not teach guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. with the Shafer et al. system to correctly position components within the enclosure.

Further, regarding claim 10, while Shafer et al. shows a pressure monitoring means, Shafer et al. does not teach pressure monitor means formed integral with the valve housing. Stacy et al. teaches (col. 6, lines 10-19) each valve having a pressure feedback tube coupled between an outlet side of the valve and a pressure sensor to monitor pressure at the valve. It would have been obvious to use the integral pressure monitor in the valves of Stacy et al. with the Shafer et al. system to accurately monitor pressure at the valve.

Claims 4, 5, 11, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Madsen et al. and Rible.

As discussed in the Request (with modification):

Shafer et al. discloses an air control system base unit enclosure 44 which contains a pump 152, pressure monitor means 156, 158, (see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress 30, 32 via tubes 166, 168. The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338,340 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, lines.34-59).

While Shafer et al. teaches the use of valves, Shafer et al. does not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the ' 172 patent. Rible teaches a snap-fit valve 200 with ramped body 202 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and to provide a fluid-tight and fast and easy connection of a valve.

Further, while Shafer et al. teaches pressure monitoring means, Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Madsen et al. discloses at col. 6, lines 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48. It would have been obvious to use the pressure feedback tube sensor of Madsen et al. to monitor pressure in the chamber of Shafer et al., to more accurately know the pressure at all times.

Claims 6 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Stacey et al. and Kwok

As discussed in the Request (with modification):

Shafer et al. discloses an air control system base unit enclosure 44 which contains a pump 152, pressure monitor means 156, 158, (see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress 30, 32 via tubes 166, 168. The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al. further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump

152, with solenoid valves 338,340 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, lines.34-59).

While Shafer et al. shows an enclosure, Shafer et al. does not teach guides and stops disposed within the enclosure. Stacy et al. teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46. It would have been obvious to use the guides and stops of Stacy et al. with the Shafer et al. system to correctly position components within the enclosure.

Further, while Shafer et al. shows a housing, Shafer et al. does not teach a flexible seal between the enclosure portion and the cover. Such a flexible gasket is taught in Kwok (10, col. 3, lines 32-46) and gaskets in general are discussed at Kwok col. 1, lines 14-46. Flexible seals such as gaskets were well known in the art at the time of the application for the ‘172 patent, and it would have been obvious to include a gasket between the enclosure and the cover of Shafer et al. in view of Kwok. in order to more fully seal the housing.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kalavitz et al. in view of Yavets-Chen and Walker.

As discussed in the Request (with modification):

Kalavitz et al. teaches air pressure selector 211 for selecting a desired air pressure, opening and closing valve 220 in response to pressure monitored by voltage transducer circuit 230 that monitors pressure, determining a difference between actual and desired air pressure (Abstract, Figure 1), and inflating/deflating (e.g., exhausting air when the differential indicates too high a pressure in the bladder, and energizing a pump to provide compressed air to the bladder when the differential indicates that the bladder pressure is lower than the desired air pressure) with valve 220 to place the desired air pressure in the bladder, and closing the valve when the desired pressure is reached. Air supply 102 is fluidly coupled to the bladder, and energized to supply compressed air to the bladder. It is noted that while the patent to Kalavitz et al. does not explicitly disclose a pump, the vehicle air supply disclosed is considered to include all types of compressed air supply including a pump, given a reasonable interpretation of Kalavitz et al.

While, Kalavitz et al. teaches inflating bladder type devices, Kalavitz et al. does not explicitly teach, show, or suggest that its pressure control system is usable for an air inflatable mattress. Walker discloses that it is known in the inflatable mattress art to employ a control system for an air mattress for the purpose of allowing the user of the mattress to adjust the pressure in the mattress for comfortableness. As Kalavitz et al. provides just such an pressure control system, and is relevant to bladder inflation, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the control system of Kalavitz et al. for an air mattress for the purpose of allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker.

Further, while Kalavitz et al. teaches pressure monitoring, Kalavitz et al. does not explicitly teach continuous monitoring of pressure in the bladder at a tap on a valve enclosure assembly. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74. It would have been obvious to use the sensor of Yavets-Chen to monitor pressure in the chamber of Kalavitz et al., to more accurately know the pressure at all times.

Note, the other supplied references are cumulative to the ones used in the above rejections.

Conclusion

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

Please mail any communications to:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered.

By Mail to: Attn: Mail Stop "Ex Parte Reexam"
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P. O. Box 1450
Alexandria VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By Hand: Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i)(C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Joseph A. Kaufman/
Joseph A. Kaufman
Primary Examiner
Art Unit 3993
(571) 272-4928

Conferees:
/RMF/

/EDL/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: VALVE ENCLOSURE ASSEMBLY

In re Ex Parte Reexamination of:

James Edwin Gifft et al.

Patent No.: 5,904,172

Issued: May 18, 1999

Confirmation No.: 5505

Reexam Control No. 90/012,456

Examiner: Joseph A. Kaufman

Group Art Unit: 3993

Docket No.: 3500.012USX

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

X Petition for an Extension of Time (3 pages).
X Certificate of Service (1 page).

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
Customer No.: 21186

By: /Adam Kiedrowski/
Adam P. Kiedrowski
Reg. No. 60,296

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: VALVE ENCLOSURE ASSEMBLY

In re Ex Parte Reexamination of:

James Edwin Gifft et al.

Patent No.: 5,904,172

Issued: May 18, 1999

Confirmation No.: 5505

Reexam Control No. 90/012,456

Examiner: Joseph A. Kaufman

Group Art Unit: 3993

Docket No.: 3500.012USX

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the Petition for an Extension of Time (3 pages) and the 1 page transmittal document as filed with the US Patent and Trademark Office on June 3, 2013 for Reexamination Control No. 90/012,456 was served on the following via U.S. Mail on June 3, 2013.

Daniel Polglaze
Leffert, Jay, & Polglaze, P.A.
PO Box 2230
Minneapolis, MN 55402-0230

/Amy Moriarty/

Amy Moriarty

Date of Deposit: June 3, 2013
This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to MS *Ex Parte* Reexam, Central Reexamination Unit, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Ex Parte Reexamination of:	Reexam Control No. 90/012,456
James Edwin Gifft et al.	Examiner: Joseph A. Kaufman
Patent No.: 5,904,172	Group Art Unit: 3993
Issued: May 18, 1999	Docket No.: 3500.012USX
Confirmation No.: 5505	
Title: VALVE ENCLOSURE ASSEMBLY	

PETITION PURSUANT TO 37 C.F.R. § 1.550(c) FOR EXTENSION OF TIME TO FILE RESPONSE TO OFFICE ACTION MAILED APRIL 24, 2013

Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Pursuant to 37 C.F.R. § 1.550(c), Select Comfort Corporation ("Patent Owner"), hereby petitions for a one-month extension of time to respond to the Office Action in the above-captioned *ex parte* reexamination ("the '172 reexamination"), which was mailed on **April 24, 2013**. The current deadline for the response is **June 24, 2013**. The requested deadline with a one-month extension of time is **July 24, 2013**. Please charge the Deposit Account No. 19-0743 to cover the required petition fee under 37 C.F.R. § 1.17(g).

Although Patent Owner, litigation counsel, and reexamination counsel have been diligent in their efforts to date, a modest extension of time of one month is required to generate a full and complete response to the Office Action.

APPLICABLE AUTHORITY

§1.550 Conduct of ex parte reexamination proceedings, paragraph (c) is as follows:

(c) The time for taking any action by a patent owner in an *ex parte* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified. Any request for such extension must be filed on or before the day on which action by the patent owner is due, but in no case will the mere filing of a request effect any extension. Any request for such extension must be accompanied by the petition fee set forth in § 1.17(g). See § 1.304(a) for extensions of time for filing a notice of appeal to the U.S. Court of Appeals for the Federal Circuit or for commencing a civil action.

EXPLANATION OF FACTS SURROUNDING THE NEED FOR THE REQUESTED EXTENSION

Upon receipt of the Office Action dated **April 24, 2013**, Patent Owner immediately began to study the rejections. Patent Owner began formulating a response to the detailed set of rejections. Patent Owner has reviewed the information and determined that it may be necessary to obtain an expert. Accordingly, Patent Owner is in the process of analyzing the need for an expert that may provide evidence that will support the arguments presented by the Patent Owner.

U.S. Patent 5,904,172 ("the '172 patent") is involved in a co-pending civil action pending in the District of Minnesota styled *Select Comfort Corporation v. The Sleep Better Store, LLC et al.*, filed May 11, 2012, Doc. No. 0:12cv1148. ("the pending litigation"). The pending litigation is currently stayed pending the outcome of this reexamination. The importance of the '172 patent to Patent Owner (as evidenced by the pending litigation), and the resulting significance of this reexamination, warrant that Patent Owner be given a full opportunity to develop a response strategy with reexamination counsel and litigation counsel and to prepare the submissions necessary to fully respond to the extensive and complex allegations of the Request adopted into the Office Action. Patent Owner respectfully submits that the requested one-month extension will allow that opportunity.

Therefore, Patent Owner respectfully requests a one-month extension of time to continue formulating our response strategy with reexamination and litigation counsel and to determine the need for an expert to assist in preparation of evidence for the response.

While the Patent Owner understands that an interview is not deemed sufficient reason to grant an extension of time, the Patent Owner also would like to attempt an interview to discuss the Office Action.

Patent Owner fully appreciates the statutory requirements for reexamination and the need to proceed with special dispatch. In this case, a reasonable one-month extension of time to respond is needed to allow Patent Owner to complete the above-noted actions and make a full and complete response to the Office Action. Based on the foregoing, Patent Owner respectfully submits that the current circumstances represent "sufficient cause" under 37 C.F.R. § 1.550(c) for the requested extension of time, and therefore respectfully requests that this Petition be granted and that the period for response be extended to **July 24, 2013**.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 349-9585

Date June 3, 2013 By /Adam Kiedrowski/
Adam P. Kiedrowski
Reg. No. 60,296

Date of Deposit: June 3, 2013
This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to MS *Ex Parte* Reexam, Central Reexamination Unit, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Electronic Acknowledgement Receipt

EFS ID:	15932737
Application Number:	90012456
International Application Number:	
Confirmation Number:	5505
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Customer Number:	21186
Filer:	Suneel Arora/Amy Moriarty
Filer Authorized By:	Suneel Arora
Attorney Docket Number:	292.001US1X
Receipt Date:	03-JUN-2013
Filing Date:	17-OCT-2012
Time Stamp:	15:41:52
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3500012usxSIGNEDeot.pdf	114073 f7cf3d6acaf790ce1df548695cd709cef9f7aacd	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Reexam Miscellaneous Incoming Letter	1	1
	Reexam Certificate of Service	2	2
	Reexam Request for Extension of Time	3	5

Warnings:

Information:

Total Files Size (in bytes):	114073

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456	10/17/2012	5904172	292.001US1X	5505

21186 7590 06/04/2013
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
06/04/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

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LEFFERT JAY & POLGLAZE, PA

P O BOX 2230

MINNEAPOLIS, MN 55402-0230

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/012,456.

PATENT NO. 5904172.

ART UNIT 3993.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Decision on Petition for Extension of Time in Reexamination	Control No.: **90/012,456**

1. THIS IS A DECISION ON THE PETITION FILED **June 3, 2013**.

2. THIS DECISION IS ISSUED PURSUANT TO:
   A. ☒ 37 CFR 1.550(c) – The time for taking any action by a patent owner in an *ex parte* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.
   B. ☐ 37 CFR 1.956 – The time for taking any action by a patent owner in an *inter partes* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.
   The petition is before the Central Reexamination Unit for consideration.

3. FORMAL MATTERS
   Patent owner requests that the period for responding to the Office action mailed on **April 24, 2013**, which sets a **two-month** period for filing a response thereto, be extended by **one month to July 24, 2013**.

   A. ☒ Petition fee per 37 CFR §1.17(g)):
      i. ☒ Petition includes authorization to debit a deposit account.
      ii. ☐ Petition includes authorization to charge a credit card account.
      iii. ☐ Other: ______________.
   B. ☒ Proper certificate of service was provided. (Not required in reexamination where patent owner is requester.)
   C. ☒ Petition was timely filed.
   D. ☒ Petition properly signed.

4. DECISION (See MPEP 2265 and 2665)
   A. ☒ Granted or ☐ Granted-in-part for **one month to July 24, 2013**, because petitioner provided a factual accounting that established sufficient cause. (See 37 CFR 1.550(c) and 37 CFR 1.956).
      ☐ Other/comment: ______________________________.
   B. ☐ Dismissed because:
      i. ☐ Formal matters (See unchecked box(es) (A, B, C and/or D) in section 4 above).
      ii. ☐ Petitioner failed to provide a factual accounting of reasonably diligent behavior by all those responsible for preparing a response to the outstanding Office action within the statutory time period.
      iii. ☐ Petitioner failed to explain why, in spite of the action taken thus far, the requested additional time is needed.
      iv. ☐ The statements provided fail to establish sufficient cause to warrant extension of the time for taking action (See attached).
      v. ☐ The petition is moot.
      vi. ☐ Other/comment: ______________________________.

5. CONCLUSION

   Telephone inquiries with regard to this decision should be directed to **Andres Kashnikow** at **571-272-4361**. In his/her absence, calls may be directed to __________, __________ in the Central Reexamination Unit.

Andres Kashnikow
[*Signature*]

SPRS, CRU 3993
(Title)

U.S. Patent and Trademark Office
PTO-2293 (Rev. 09-2010)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: VALVE ENCLOSURE ASSEMBLY

In re Ex Parte Reexamination of:

James Edwin Gifft et al.

Patent No.: 5,904,172

Issued: May 18, 1999

Confirmation No.: 5505

Reexam Control No. 90/012,456

Examiner: Joseph A. Kaufman

Group Art Unit: 3993

Docket No.: 3500.012USX

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

X Response to Office Action in Ex Parte Reexamination of April 24, 2013 (41 pages).
X Certificate of Service (1 page).

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
Customer No.: 21186

By: /Adam Kiedrowski/
Adam P. Kiedrowski
Reg. No. 60,296

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: VALVE ENCLOSURE ASSEMBLY

In re Ex Parte Reexamination of:

James Edwin Gifft et al.

Patent No.: 5,904,172

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Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the Response to Office Action in Ex Parte Reexamination of April 24, 2013 (41 pages) and the 1 page transmittal document as filed with the US Patent and Trademark Office on July 24, 2013 for Reexamination Control No. 90/012,456 was served on the following via U.S. Mail on July 24, 2013.

Daniel Polglaze
Leffert, Jay, & Polglaze, P.A.
PO Box 2230
Minneapolis, MN 55402-0230

/Amy Moriarty/

Amy Moriarty

Date of Deposit: July 24, 2013
This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to MS *Ex Parte* Reexam, Central Reexamination Unit, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Ex Parte Reexamination of:

James Edwin Gifft et al.

Patent No.: 5,904,172

Issued: May 18, 1999

Confirmation No.: 5505

Title: VALVE ENCLOSURE ASSEMBLY

Reexam Control No. 90/012,456

Examiner: Joseph A. Kaufman

Group Art Unit: 3993

Docket No.: 3500.012USX

RESPONSE TO OFFICE ACTION IN EX PARTE REEXAMINATION OF APRIL 24, 2013

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Office Action in Ex Parte Reexamination of April 24, 2013, Patent Owner submits the following:

TABLE OF CONTENTS

RESPONSE

I. CLAIMS

1. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and

at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.

2. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

3. (Original) The improved valve enclosure assembly of claim 1 further including at least one solenoid operated valve disposed within the enclosure, said plurality of guides and stops for disposing the solenoid with respect to the valve.

4. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

5. (Original) The improved valve enclosure assembly of claim 4 wherein the at least one valve has a circumferential ramped face, said ramped face for compressively engaging a circumferential beveled face of the aperture to effect the snap fit of the at least one valve.

6. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to

the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

7. (Original) The improved valve enclosure assembly of claim 1 wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure.

8. (Original) The improved valve enclosure assembly of claim 7 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

9. (Amended) A method of effecting a desired pressure in a bladder of an air inflatable mattress, comprising the steps of:

providing a commanded desired pressure of the bladder;

opening a valve fluidly coupled to the bladder, wherein the valve is one of a plurality of valves at least partially contained within, or formed integral to, a substantially fluidly sealed air chamber of a valve enclosure assembly;

continuously monitoring the existing pressure in the bladder at a tap on [a]the valve enclosure assembly, the tap defining an opening through the valve enclosure assembly and into an interior of the air chamber;

determining the differential between the existing pressure in the bladder and the desired pressure in the bladder;

exhausting air from the bladder through the valve when the differential indicates that the existing pressure in the bladder is greater than the desired pressure;

energizing a pump fluidly coupled to the valve for providing compressed air to the bladder when the differential indicates that the desired pressure in the bladder is greater than the existing pressure in the bladder to inflate the bladder; and

closing said valve when the existing pressure in the bladder substantially equals the desired pressure in the bladder.

[10. (Canceled) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve having a valve housing, pressure monitor means being formed integral with said valve housing; and pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.]

11. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

12. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

13. (Original) The improved valve enclosure assembly of claim 1 further including at least one solenoid operated valve disposed within the enclosure, said plurality of guides and stops for disposing the solenoid with respect to the valve.

14. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

15. (Original) The improved valve enclosure assembly of claim 14 wherein the at least one valve disposed therein has a circumferential ramped face, said ramped face for compressively engaging a circumferential beveled face of the aperture to effect the snap fit of the at least one valve.

16. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

17. (Original) The improved valve enclosure assembly of claim 16 wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure.

18. (Original) The improved valve enclosure assembly of claim 16 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

19. (New) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and

two or more valves being fluidly sealingly disposed in respective valve apertures defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.

20. (New) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween;

two or more valves being in fluid communication with both the exterior of the enclosure and with the air chamber; and

pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the pressure sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle.

21. (New) The improved valve enclosure assembly of claim 20 wherein the pressure monitoring port is disposed on the rear cover portion of the enclosure.

22. (New) The improved valve enclosure assembly of claim 2 further including at least one solenoid configured to operate a valve, wherein the at least one solenoid is at least partially received within the air chamber of the enclosure.

23. (New) The improved valve enclosure assembly of claim 2 further including at least one solenoid configured to operate a valve, wherein the at least one solenoid is positioned entirely within the air chamber of the enclosure.

24. (New) The improved valve enclosure assembly of claim 2 wherein the enclosure is formed of an enclosure portion and a rear cover portion.

25. (New) The improved valve enclosure assembly of claim 24 wherein a flexible seal is compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween.

26. (New) An improved valve enclosure assembly for use with an air inflatable mattress having a plurality of air bladders configured to be inflated by compressed air, a pump fluidly

coupled to the plurality of air bladders for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the plurality of air bladders for controlling the inflation of the plurality of air bladders, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

a plurality of valves operably coupled to the enclosure being in selective fluid communication with the air chamber, each valve being in fluid communication with a respective one of the plurality of air bladders for selectively fluidly coupling the air chamber thereto; and

at least one tap on the enclosure fluidly coupled to the air chamber of the enclosure and to a tube for conveying pressure to a pressure sensor so that the processor can control the inflation of each of the plurality of air bladders based on the pressure in the enclosure; and

wherein the improved valve enclosure assembly is capable of performing a method of effecting a desired pressure in a selected bladder of the air inflatable mattress, the method comprising the steps of:

providing a commanded desired pressure of the selected bladder;

opening a respective valve of the plurality of valves that is fluidly coupled to the selected bladder;

continuously monitoring the existing pressure in the selected bladder at the at least one tap on the valve enclosure assembly;

determining the differential between the existing pressure in the selected bladder and the desired pressure in the selected bladder;

exhausting air from the selected bladder through the valve when the differential indicates that the existing pressure in the selected bladder is greater than the desired pressure;

energizing the pump fluidly coupled to the valve for providing compressed air to the selected bladder when the differential indicates that the desired pressure in the selected bladder is greater than the existing pressure in the selected bladder to inflate the selected bladder; and

closing said valve when the existing pressure in the selected bladder substantially equals the desired pressure in the selected bladder.

II. INTRODUCTION

Claims 1, 2, 4-6, 9-12, and 14-18 of U.S. Patent No. 5,904,172 (the "'172 patent") were addressed by the non-final Ex Parte Reexamination Office Action dated April 24, 2013 ("Office Action"). Claims 3, 7, 8, and 13 are not subject to reexamination, and thus remain patentable. Claims 1, 2, 4-6, 9-12, and 14-18 stand rejected. With this Response, claim 9 is amended, claim 10 is canceled, and new claims 19-26 are added. Accordingly, claims 1, 2, 4-6, 9, 11, 12, and 14-26 are currently under consideration after this Response. Further reconsideration of the foregoing claims is requested. No new matter has been entered.

Patent Owner respectfully submits that these claims are in condition for allowance.

III. STATEMENT OF THE LAW

The Office must construe the claims giving them their broadest reasonable interpretation <u>in light of the supporting disclosure</u>. *See* MPEP § 2106 citing *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). The claims must be given their "plain meaning," <u>unless such meaning is inconsistent with the specification</u>. MPEP § 2111.01(I and II) citing *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); *see also*, *In re Weiss,* 989 F.2d 1202, 26 USPQ2d 1885 (Fed. Cir. 1993) (unpublished decision - cannot be cited as precedent) ("The claim related to an athletic shoe with cleats that 'break away at a preselected level of force' and thus prevent injury to the wearer. The examiner rejected the claims over prior art teaching athletic shoes with cleats not intended to break off and rationalized that the cleats would break away given a high enough force. The court reversed the rejection stating that 'when interpreting a claim term which is ambiguous, such as 'a <u>preselected</u> level of force', we must look to the specification for the meaning ascribed to that term by the inventor.' The specification had defined 'preselected level of force' as that level of force at which the breaking away will prevent injury to the wearer during athletic exertion.")

A patent owner may be his own lexicographer. Where an explicit definition is provided by the patent owner for a term, that definition will control interpretation of the term as used in the claim. MPEP § 2111.01(III) citing *Toro C. v. White Consolidated Industries, Inc.*, 199 F.3d 1295. "The specification should also be relied on for <u>more than just explicit lexicography or clear</u>

disavowal of claim scope to determine the meaning of a claim term when the applicant acts as his or her own lexicographer; the meaning of a particular claim term may be defined by implication, that is, according to the usage of the term in the context in the specification. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005) (*en banc*); and *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 1583, 39 USPQ2d 1573, 1577 (Fed. Cir. 1996)." *Id.* (emphasis added).

The legal conclusion that a claim is obvious under § 103(a) depends on at least four underlying factual issues set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). The underlying factual issues set forth in Graham are as follows: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) evaluation of any relevant secondary considerations.

The Office has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir.1988). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970); M.P.E.P. § 2143.03. To support an obviousness rejection under 35 U.S.C. § 103, the Examiner must clearly articulate the reason(s) why the claimed invention would have been obvious. M.P.E.P. § 2142. To facilitate review, this analysis should be made explicit. *See* KSR Int'l v. Teleflex Inc., et al., 127 S.Ct. 1727; 167 L.Ed 2d 705; 82 USPQ 2d 1385 (2007). Specifically, obviousness rejections "cannot be sustained with mere conclusory statements; instead, there must be some articulated reasons with some rational underpinning to support the legal conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ 2d 1329, 1336 (Fed. Cir. 2006).

IV. SUMMARY OF THE REJECTION OF CLAIMS UNDER 35 U.S.C. § 103

The Office Action sets forth the following grounds for rejection:

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer et al., U.S. Patent No. 5,509,154 ("Shafer") in view of Yavets-Chen, U.S. Patent No. 5,873,137 ("Yavets-Chen") and Rible, U.S. Patent No. 4,564,990 ("Rible").

Claims 2, 10, and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Stacy et al., U.S. Patent No. 5,586,346 ("Stacy").

Claims 4, 5, 11, 14, and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Madsen et al., U.S. Patent No. 5,560,057 ("Madsen") and Rible.

Claims 6 and 16-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Stacy and Kwok, U.S. Patent No. 3,729,205 ("Kwok").

Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kalavitz et al., U.S. Patent No. 4,583,566 ("Kalavitz") in view of Yavets-Chen and Walker, U.S. Patent No. 4,890,344 ("Walker").

V. THE REJECTION OF CLAIM 1 UNDER 35 U.S.C. § 103

Claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Yavets-Chen and Rible. According to the Office Action, Shafer discloses each of the limitations of claim 1 except for a snap-fit valve and continuously monitoring pressure during an inflate/deflate cycle. (Office Action at pages 4-5.) However, the Office Action further states that Rible "teaches a snap-fit valve 200 that is used to contain fluid," and it would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible. (Office Action at page 5.) With respect to continuously monitoring chamber pressure during an inflate/deflate cycle, the Office Action states that Yavets-Chen "discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74," and it would have been obvious to use the sensor of Yavets-Chen coupled to the processor of Shafer in order to monitor pressure in the chamber of Shafer to more accurately know the pressure at all times. (Id.)

A. INDEPENDENT CLAIM 1 AND DEPENDENT CLAIMS 3, 7, 8, AND 13

Patent Owner is maintaining original claim 1 in the reexamination while also presenting an amended version of claim 1 (claim 19) as discussed in Section V(B). Patent Owner intends to cancel original claim 1 after addressing an error in the original claims of the '172 patent, as set forth in detail below.

In the Office Action, claims 3, 7, 8, and 13 were indicated as not subject to reexamination, and therefore remain patentable. However, upon further inspection of these claims and the corresponding file history of the '172 patent, Patent Owner recognized that dependent claims 3, 7, 8, and 13 improperly depend from independent claim 1. To the best of

Patent Owner's knowledge, it appears that the numbering error resulted from a Patent Office mistake when formatting the published patent after payment of the issue fee. Particularly, dependent claim 3 should have depended from independent claim 2, dependent claim 7 should have depended from independent claim 6, with dependent claim 8 depending indirectly from claim 6 via claim 7, and dependent claim 13 should have depended from independent claim 12.

In view of the foregoing errors, Patent Owner plans to file a Certificate of Correction with the Patent Office to correct the dependencies, and then subsequently cancel independent claim 1 in favor of claim 19 and rewrite claims 3, 7, 8, and 13 in independent form once the dependency issue is resolved.

B. <u>NEW INDEPENDENT CLAIM 19 (AMENDED VERSION OF CLAIM 1)</u>

Independent claim 19 is an amended version of original independent claim 1 and includes structural limitations of a pressure monitoring port. Particularly, claim 19 is shown below as a marked-up version of claim 1 for the Examiner's convenience, and recites:

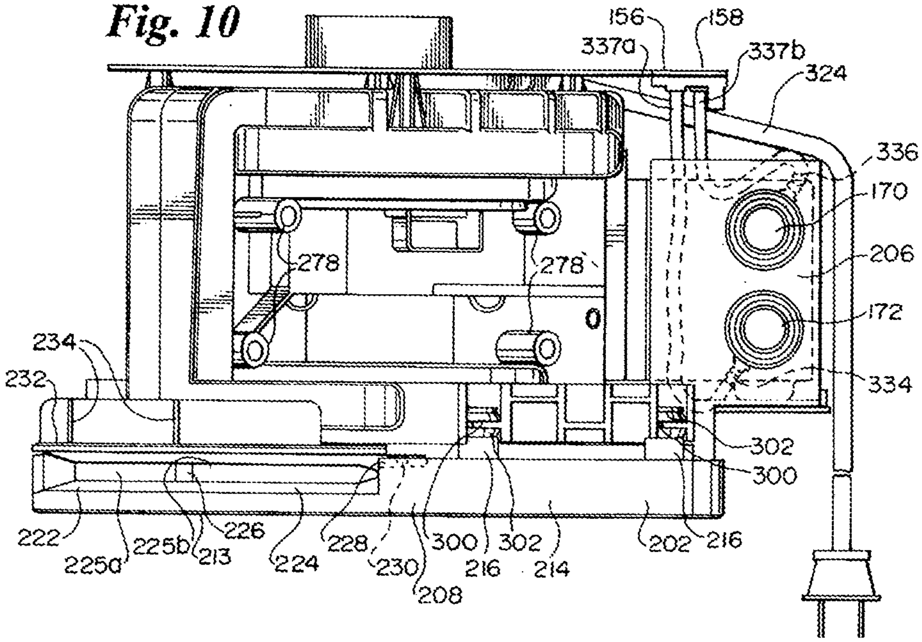
> 19. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:
>
> an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;
>
> pressure monitor means <u>including a sensor</u> being operably coupled to the processor and being in fluid communication with the at least one bladder <u>through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the sensor configured</u> for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and
>
> [at least one]<u>two or more</u> valve<u>s</u> being fluidly sealingly disposed in [a]<u>respective</u> valve aperture<u>s</u> defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.

Support for the amendments to claim 1, represented by new claim 19, can be found in the '172 patent in at least the following locations: col. 2, lines 48-50; col. 4, lines 30-36; col. 5, lines 24-27; col. 5, lines 45-50; col. 7, lines 50-58; col. 8, lines 3-6; and Figures 3, 4, and 6-8.

Claim 19 recites a valve enclosure assembly including "two or more valves being fluidly sealingly disposed in respective valve apertures defined in the enclosure" and "pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber." (Emphasis added.)

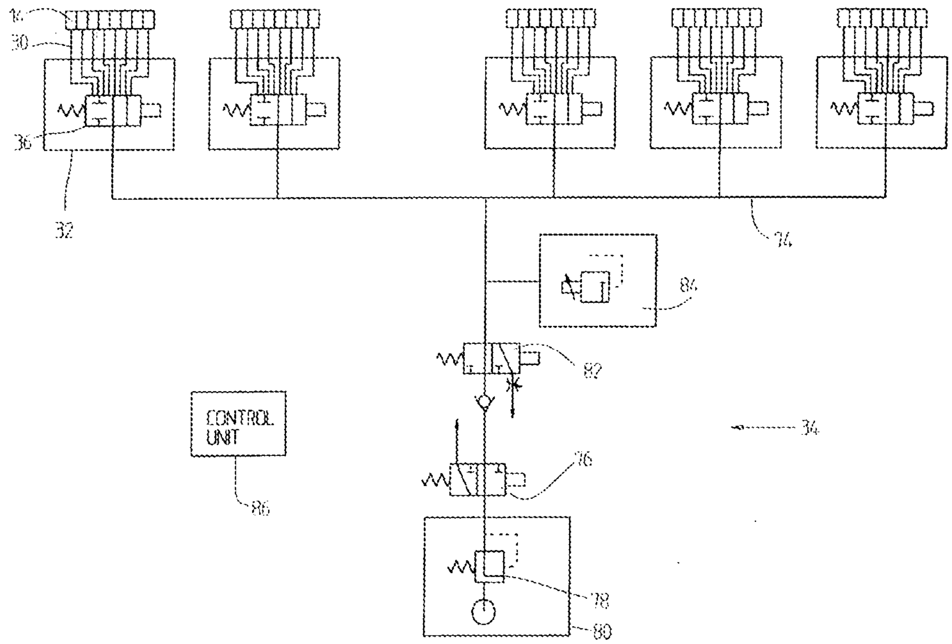
None of the references cited in the rejection of claim 1, including Shafer, Yavets-Chen, and Rible discloses, teaches, or suggests a system that includes two or more valves being fluidly sealingly disposed in an enclosure and a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber defined by the enclosure. For example, as illustrated in Figure 10 of Shafer reproduced below, the Shafer system includes a right pressurized air outlet (336) and a left pressurized air outlet (334) extending from a right inlet hose receptacle (170) and a left inlet hose receptacle (172), respectively. These pressurized air outlets (336, 334) do not extend through an enclosure housing the valves and into an interior of a fluidly sealed air chamber of the enclosure.

Fig. 10



With reference to Figure 10 reproduced below, Yavets-Chen discloses a pneumatic mattress system with a series of pneumatic cushions (14) each connected to a control system (32) having a multiple-valve solenoid controlled distributor (36). The pneumatic mattress system further includes a main pressure control system (34) operably coupled to the control systems (32) and pneumatic cushions (14) via a main supply conduit (74). Pressure in the pneumatic cushions (14) is measured using <u>a pressure sensor (84) coupled to the main supply conduit (74)</u>. (Col. 10, lines 25-28.) Thus, the pressure sensor (84) is not in fluid communication with a port defining <u>an opening through an enclosure housing the valves</u> and into an interior of a fluidly sealed air chamber of the enclosure. Rather, the valves are part of the distributor (36) in the control system (32), and the sensor (84) is in fluid communication with the main supply conduit (74) and located remote from the valves.

FIG. 10



In view of the foregoing, Patent Owner respectfully asserts that Shafer and Yavets-Chen do not disclose, teach, or suggest a system that includes two or more valves being fluidly sealingly disposed in an enclosure and a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber defined by the enclosure. Furthermore, Rible fails to provide the requisite teaching to maintain the obviousness rejection.

Because Shafer in combination with Yavets-Chen and Rible fails to disclose, teach, or suggest each and every limitation set forth in new claim 19, this combination of references cannot render claim 19 obvious.

VI. THE REJECTION OF CLAIM 2 UNDER 35 U.S.C. § 103

Claim 2, as originally issued, recites:

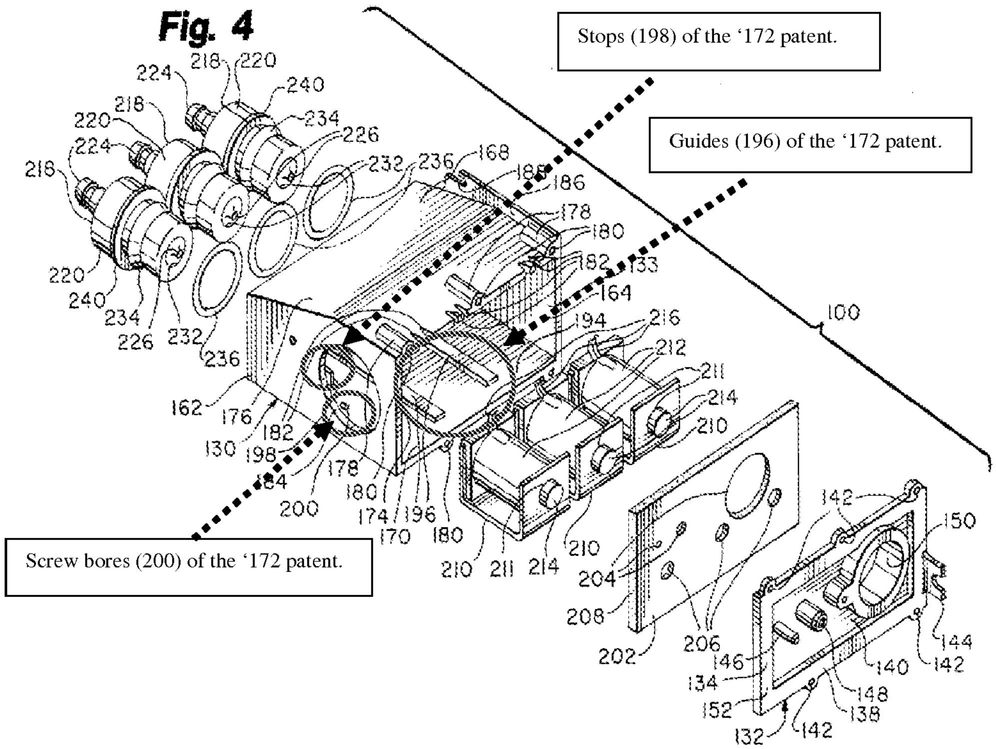
> 2. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

Claim 2 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Stacy. According to the Office Action, Shafer discloses each of the limitations of claim 2 except for guides and stops disposed within the enclosure. (Office Action at page 6.) However, the Office Action further states that Stacy "teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box," and it would have been obvious to use the guides and stops of Stacy with the Shafer system to correctly position components within the enclosure. (Id.)

According to the specification of the '172 patent, there was a need in the industry to provide for increased production efficiencies, such as reducing assembly time while maintaining the required level of accuracy. (Col. 2, lines 27-32.) As described in the '172 patent, a plurality of guides and stops can be disposed within a valve enclosure for correctly positioning components within the enclosure. In an example, with reference to Figure 4 reproduced below, the valve enclosure (130) can include a plurality of guides (196) and stops (198) disposed within the air chamber (133) for correctly positioning components within the valve enclosure assembly (100). (Col. 5, lines 34-40.) In an example, the guides (196) can be solenoid guides for laterally positioning solenoids within the valve enclosure (130), and the stops (198) can be solenoid stops for limiting the travel of a solenoid motor in relation to a front face (172) of the valve enclosure assembly (100). (Id. at lines 35-42) Additionally, as shown in Figure 4, a plurality of screw bores (200) can be formed in a bottom (170) of the valve enclosure (130) to affix a solenoid to the bottom. (Id. at lines 42-44.)



With further reference to Figure 4 above, in an example, during assembly a solenoid (210) can be paired with each valve (218) of the valve enclosure assembly (100), and each solenoid can be slidably positioned by a corresponding solenoid guide (196) and slid into the valve enclosure (130). (Col. 6, lines 39-41.) Travel of the solenoid (210) into the valve enclosure (130) can be limited by the solenoid coming into contact with a solenoid stop (198). (Id. at lines 41-43.) After being guided into the valve enclosure (130) via the solenoid guide (196) and the solenoid stop (198), the solenoid (210) can be held in position by a screw passing through one of the screw bores (200) into the underside of the solenoid. (Id. at lines 43-45.)

Stacy is directed to a hospital bed supporting an inflatable mattress having a lower inflatable layer configured for providing basic support for a patient and a second inflatable layer configured for establishing optimal patient interface pressure and patient comfort level. (Stacy at Abstract.) The second layer can also include independent inner chambers to facilitate the providing of specific therapies such as alternation of primary pressure contact areas, or percussion or vibration of the patient through inner cell inflation. (Id.) As set forth in the Office Action and illustrated in Figures 7 and 31 reproduced below, Stacy discloses an air box (46) operably coupled to a valve manifold (48). (Col. 5, lines 48-49.) Each of a plurality of valves (50) engages an outlet (52a-j) on the valve manifold (48) to selectively supply air to specific air channels throughout the inflatable mattress. (Id. at lines 49-53.) Stacy further discloses that the air box (46) includes a pair of solenoid valves (480, 481) which are in fluid communication with air from a blower, and the solenoid valves provide control of air to an air outlet (484). (Id. at lines 57-61.)

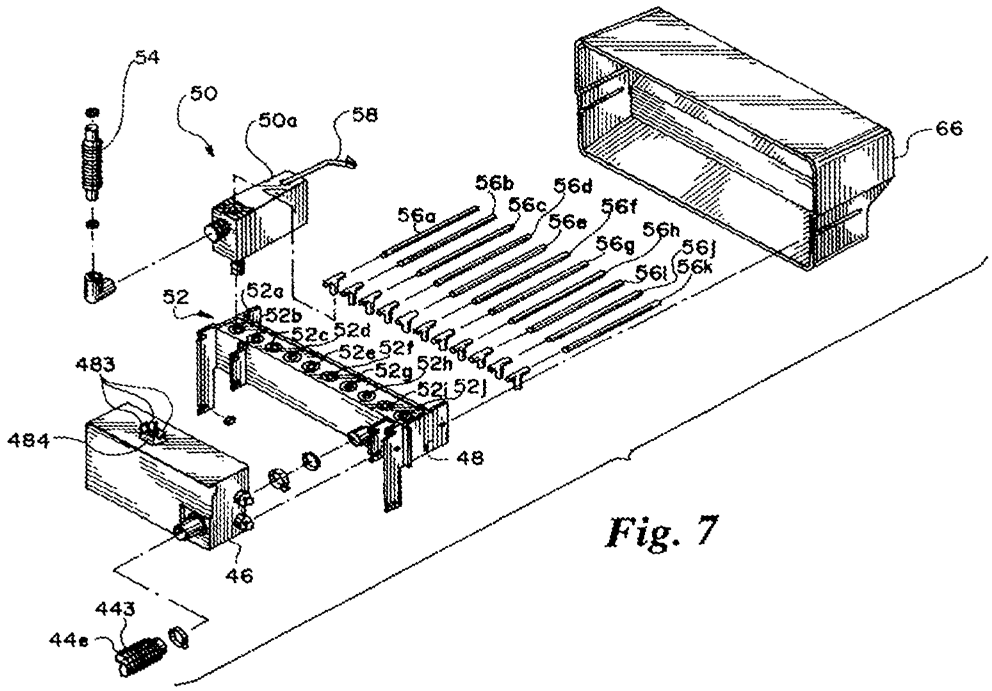
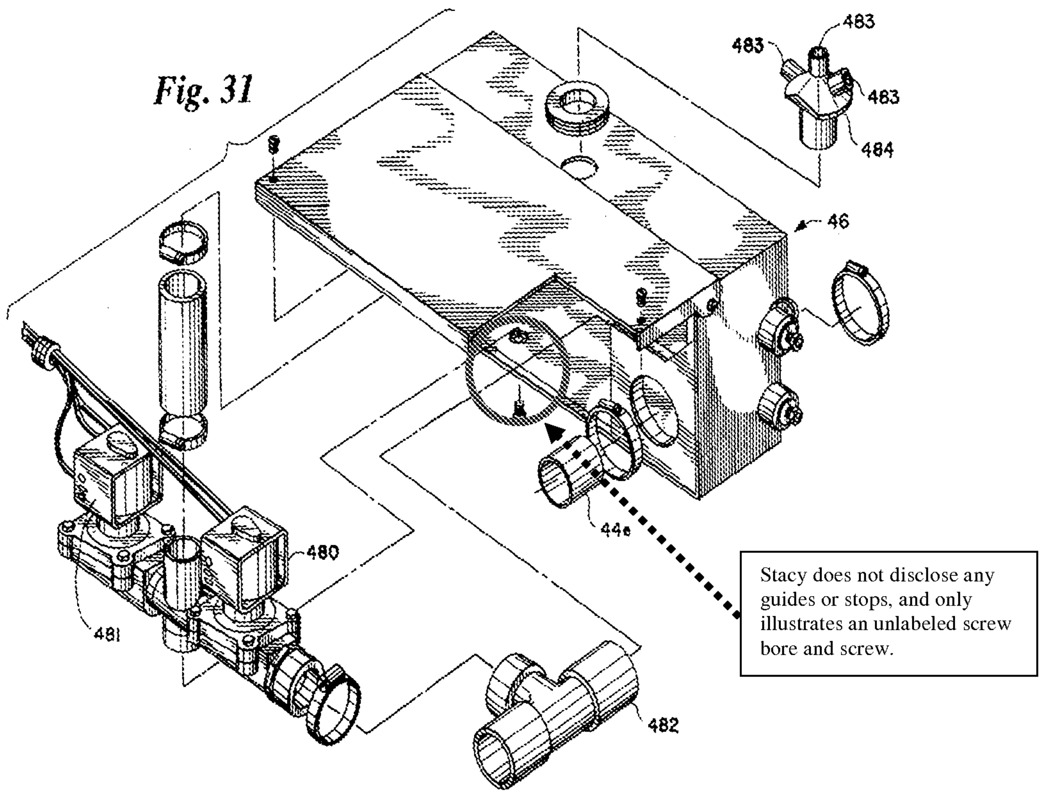


Fig. 7

Fig. 31



As stated above, the Office Action alleges that Stacy "teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box." (Office Action at page 6.) Patent Owner respectfully disagrees. Initially, the Office Action merely includes a general reference to the air box (46) shown in Figures 7 and 31 and does not indicate which features the Examiner considers the "plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure" as recited in claim 2. The only feature in Stacy's air box (46) that appears to help correctly position the solenoid valves (480, 481) within the air box enclosure is a screw bore and corresponding screw that is neither labeled in the figures nor discussed in the specification. Patent Owner respectfully asserts that screw bores and screws are not "guides and stops" as discussed above with reference to the figures and specification of the '172 patent. In fact, as discussed above, the '172 patent also discloses screw bores (200) configured for receiving screws to hold the solenoids (210) in place within the valve enclosure (130). However, the screw bores (200) and corresponding screws are described in the '172 patent as separate and distinct features from the plurality of guides (196) and stops (198) that are provided for properly positioning components (i.e., solenoids) within the valve enclosure (130) prior to fastening the components with screws inserted through the screw bores (200).

In view of the foregoing, Patent Owner respectfully asserts that Stacy does not disclose, teach, or suggest a valve enclosure assembly including "a plurality of guides and stops being disposed within [an] enclosure for correctly positioning components within the enclosure" as recited in claim 2.

Because Shafer in combination with Stacy fails to disclose, teach, or suggest each and every limitation set forth in claim 2, this combination of references cannot render claim 2 obvious.

VII. THE REJECTION OF CLAIM 4 UNDER 35 U.S.C. § 103

Claim 4, as originally issued, recites:

> 4. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:
>
> an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;
>
> at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure; and
>
> pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Madsen and Rible. According to the Office Action, Shafer discloses each of the limitations of claim 4 except for snap-fit valves and chamber pressure monitoring means for monitoring chamber pressure during an inflate/deflate cycle. (Office Action at pages 7-8.) However, the Office Action further states that Rible "teaches a snap-fit valve 200 with ramped body 202 that is used to contain fluid," and it would have been obvious to engage the valves of Shafer with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible. (Id.) With respect to monitoring chamber pressure during an inflate/deflate cycle, the Office Action further states that Madsen "discloses at col. 6, lines 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48," and it would have been obvious to use the pressure feedback tube sensor of Madsen to monitor pressure in the chamber of Shafer to more accurately know the pressure at all times. (Id. at page 8)(emphasis added.)

After a detailed review of Madsen, Patent Owner cannot find the cited portions of Madsen in the specification. As evidenced by the cited portion of Madsen reproduced below, col. 6, lines 18-19 have nothing to do with monitoring pressure using a pressure feedback tube in a manifold:

6

of a patient's body and that the patient is properly positioned while being turned. This embodiment of the present invention preferably utilizes a total of six pressure zones which will be described below with the air cells **20** and **40**.

Each of the air cells **20** and **40** is preferably leak-tight, making them air and water impermeable. In a preferred construction of the air cells **20** and **40**, each of the cells **20** and **40** is made from vinyl, allowing the air cells **20** and **40** to be flexible while remaining air and fluid impermeable. Thus, the air cells **20** and **40** are unlikely to capture infectious material from one patient and pass it onto another patient. In addition, the surface of the air cells **20** and **40** can easily be washed or cleaned to help maintain a non-infectious environment.

As shown in FIGS. **1**, **2** and **3**A, the transverse cells **20** are located in the head and foot/leg regions of the bed. The head region preferably comprises two transverse cells **20**. The foot/leg region preferably comprises five transverse cells **20**, two cells **20** for the foot region and three cells for the leg region.

In col. 6, lines 18-19, Madsen discloses that "[t]he foot/leg region preferably comprises five transverse cells 20, two cells 20 for the foot region and three cells for the leg region." There is no mention of a "pressure feedback tube 56k" and a "manifold 48." Furthermore, after searching through the entire specification, there is no recitation of an element "56k" or an element "48." Madsen does recite an element "56," but the element is related to "two opposing end walls 56" of a turning cell (40) in an air turning mattress (1). (Col. 8, lines 22-27) Madsen also recites elements "48A" and "48B," but the elements are related to "right and left border cells 48A and 48B" of the turning cells (40). (Col. 7, line 18.)

Patent owner cannot find any relevant disclosure in Madsen of monitoring pressure during an inflate/deflate cycle. The turning air mattress system of Madsen includes a valve box (210) including a high pressure plenum (222), an exhaust plenum (226), and a series of normally closed on/off inlet and exhaust valves (230, 231), respectively. (Col. 15, lines 37-39 and 49-51.) The turning air mattress system of Madsen further includes air cells (20, 40) each defining Zones I-VI, and "[t]he actual pressure in each Zone I-VI is determined by using the pressure sensors 206 to preferably take twenty-five data samples at ten millisecond intervals and average them." (Col. 16, lines 19-21 and col. 18, lines 46-48.) Madsen further discloses that "<u>[t]he pressure sampling begins</u> approximately three hundred milliseconds <u>after all valves 230 and 231 are closed</u> to diminish the effects of "fluid hammer" on the pressure sensor 206 readings." (Col. 18, lines 49-52)(emphasis added.) Patent Owner respectfully asserts that because Madsen teaches sampling pressure <u>after all valves are closed</u>, the Madsen system does not monitor pressure during an inflate/deflate cycle because at least one valve would have to be open during an inflate/deflate cycle.

Furthermore, Rible fails to provide the requisite teaching to maintain the obviousness rejection.

Because Shafer in combination with Madsen and Rible fails to disclose, teach, or suggest each and every limitation set forth in claim 4, this combination of references cannot render claim 4 obvious.

VIII. DEPENDENT CLAIM 5 IS ALLOWABLE

Dependent claim 5 is allowable at least by virtue of its dependence from allowable claim 4, in addition to the elements recited in the claim.

IX. THE REJECTION OF CLAIM 6 UNDER 35 U.S.C. § 103

Claim 6, as originally issued, recites:

> 6. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a

processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

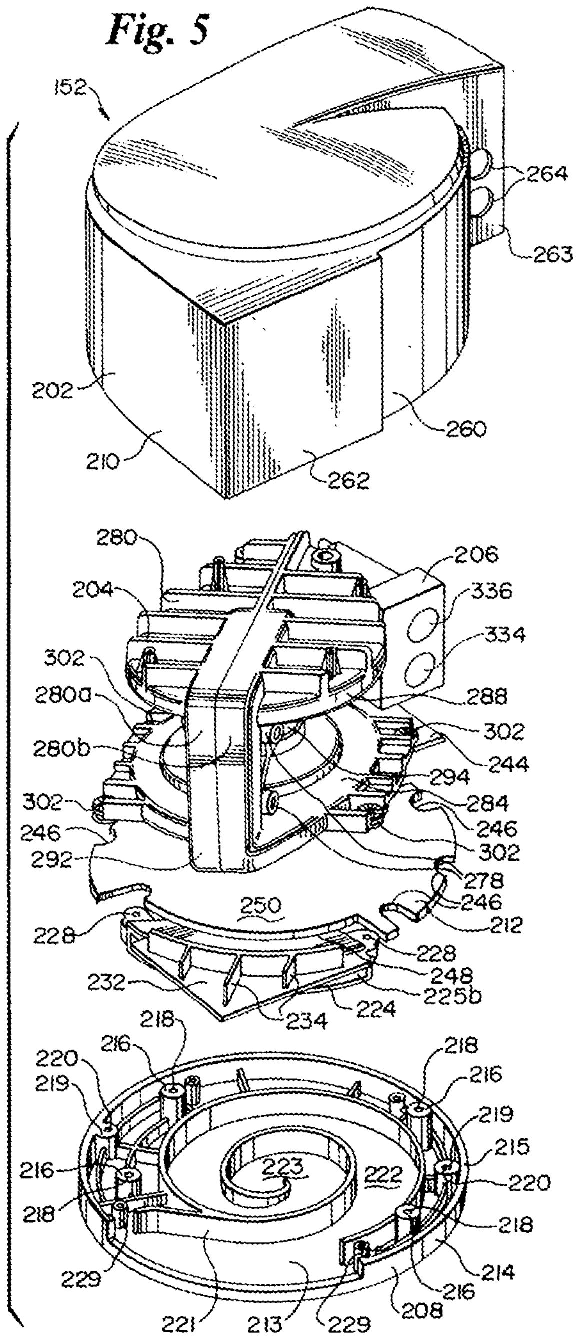
Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Stacy and Kwok. Initially, Patent Owner believes the recitation of Stacy in combination with Shafer and Kwok in the rejection of claim 6 was an error. Particularly, on page 9 of the Office Action, the Examiner relies on Stacy for teaching “guides and stops” that are missing from the Shafer reference. However, claim 6 does not recite “guides and stops” as a limitation, and the inclusion of Stacy in the cited combination appears to be an error.

Setting aside the Stacy reference, according to the Office Action, Shafer discloses each of the limitations of claim 6 except for “a flexible seal between the enclosure portion and the cover.” (Office Action at page 9.) However, the Office Action further states that “such a gasket is taught in Kwok (10, col. 3, lines 32-46) and gaskets in general are discussed at Kwok col. 2, lines 14-46.” (Id.) The Office Action concludes that it would have been obvious to include a gasket <u>between the enclosure and the cover</u> of Shafer in view of Kwok in order to more fully seal the housing. (Id.)

Claim 6 recites a valve enclosure assembly including “<u>an enclosure defining a substantially fluidly sealed air chamber</u> and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of <u>an enclosure portion and a rear cover portion</u>, <u>a flexible seal</u> being compressively interposed between the enclosure portion and a rear cover portion <u>to effect a substantially fluid tight seal therebetween</u>.” (Emphasis added.)

On page 8 of the Office Action, the Examiner generally alleges that the claimed “enclosure defining a substantially fluidly sealed air chamber” is met by the base unit enclosure (44) of Shafer, and further that the claimed “enclosure portion” and “rear cover portion” are met by the top cover and back cover portion of the base unit multi-part enclosure depicted in the exploded view of Figure 5. Figure 5 of Shafer is reproduced below for purposes of discussion and explanation.

Fig. 5



With reference to Figure 5 of Shafer, the top cover portion referred to in the Office Action appears to refer to the upper outer housing portion (210) and the back cover portion appears to refer to the lower outer housing portion (208), which together form a multi-part enclosure for the base unit (44). As stated above, the Office Action alleges that it would have been obvious to include a gasket between these separate portions in order to more fully seal the housing unit.

The components referred to in the Office Action as meeting the limitations of claim 6 are components of the pump housing (202) in Shafer, which does not define "a substantially fluidly sealed air chamber" as claimed. For example, a helical wall (221) on an upper surface of the lower housing portion (208) forms an air intake passageway (222) of the base unit (44). Thus, by design, the base unit (44) does not define a fluidly sealed air chamber but instead has an intake opening that is in fluid communication with the surrounding atmosphere. It follows that one of ordinary skill in the art would not be motivated to provide the flexible gasket of Kwok between the housing portions (208, 210) of Shafer in order to more fully seal the housing unit, as alleged on page 9 of the Office Action, because the base/housing unit is intended to be open to the surrounding atmosphere and not fluidly sealed. Furthermore, due to the presence of the air intake passageway (222), positioning a gasket between the enclosure and cover portions as suggested by the Office Action would not produce a fluidly sealed chamber.

Because Shafer in combination with Stacy and Kwok fails to disclose, teach, or suggest each and every limitation set forth in claim 6, this combination of references cannot render claim 6 obvious.

X. THE REJECTION OF CLAIM 9 UNDER 35 U.S.C. § 103

With this Response, claim 9 has been amended as follows:

9. A method of effecting a desired pressure in a bladder of an air inflatable mattress, comprising the steps of:

providing a commanded desired pressure of the bladder;

opening a valve fluidly coupled to the bladder<u>, wherein the valve is one of a plurality of valves at least partially contained within, or formed integral to, a substantially fluidly sealed air chamber of a valve enclosure assembly</u>;

continuously monitoring the existing pressure in the bladder at a tap on [a]the valve enclosure assembly, the tap defining an opening through the valve enclosure assembly and into an interior of the air chamber;

determining the differential between the existing pressure in the bladder and the desired pressure in the bladder;

exhausting air from the bladder through the valve when the differential indicates that the existing pressure in the bladder is greater than the desired pressure;

energizing a pump fluidly coupled to the valve for providing compressed air to the bladder when the differential indicates that the desired pressure in the bladder is greater than the existing pressure in the bladder to inflate the bladder; and

closing said valve when the existing pressure in the bladder substantially equals the desired pressure in the bladder.

Support for the amendments to claim 9 can be found in the ‘172 patent in at least the following locations: col. 2, lines 48-50; col. 4, lines 30-36; col. 5, lines 24-27; col. 5, lines 45-50; col. 7, lines 50-58; col. 8, lines 3-6; and Figures 3, 4, and 6-8.

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kalavitz in view of Yavets-Chen and Walker. According to the Office Action, Shafer discloses each of the limitations of claim 9 except for a pressure control system that is usable for an air inflatable mattress and continuously monitoring pressure in a bladder at a tap on a valve enclosure assembly. (Office Action at page 10.) However, the Office Action further states that “it is known in the inflatable mattress art to employ a control system for an air mattress for the purpose of allowing the user of the mattress to adjust the pressure for comfortableness,” and it would have been obvious to a person having ordinary skill in the art to use the control system of Kalavitz for an air mattress for the purpose of allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker. (Id.) With respect to continuously monitoring bladder pressure at a tap on a valve enclosure assembly, the Office Action states that Yavets-Chen “discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74,” and it would have been obvious to use the sensor of Yavets-Chen to monitor the pressure in the chamber of Kalavitz to more accurately know the pressure at all times. (Id. at pages 10-11.)

Claim 9 has been amended to recite a method of effecting a desired pressure in a bladder of an inflatable mattress including “opening a valve fluidly coupled to the bladder, wherein the valve is one of a plurality of valves at least partially contained within, or formed integral to, a substantially fluidly sealed air chamber of a valve enclosure assembly" and "continuously monitoring the existing pressure in the bladder at a tap on the valve enclosure assembly, the tap defining an opening through the valve enclosure assembly and into an interior of the air chamber." (Emphasis added.)

None of the cited references, including Kalavitz, Yavets-Chen, and Walker discloses, teaches, or suggests a method that includes continuously monitoring the existing pressure in a bladder at a tap on a valve enclosure assembly containing a plurality of valves in a substantially fluidly sealed air chamber, wherein the tap defines an opening through the valve enclosure assembly and into an interior of the air chamber. For example, as discussed above in Section V(B) in response to the rejection of claim 1, Yavets-Chen discloses a pneumatic mattress system with a series of pneumatic cushions (14) each connected to a control system (32) having a multiple-valve solenoid controlled distributor (36). (See Figure 10.) The pneumatic mattress system further includes a main pressure control system (34) operably coupled to the control systems (32) and pneumatic cushions (14) via a main supply conduit (74). Pressure in the pneumatic cushions (14) is measured using a pressure sensor (84) coupled to the main supply conduit (74). (Col. 10, lines 25-28.) Thus, the pressure sensor (84) is not in fluid communication with a tap defining an opening through an enclosure housing a plurality of valves and into an interior of a fluidly sealed air chamber of the enclosure. Rather, the valves are part of the distributor (36) in the control system (32), and the sensor (84) is in fluid communication with the main supply conduit (74) and located remote from the valves. In view of the foregoing, Yavets-Chen fails to disclose a tap on an enclosure that includes a common fluidly sealed air chamber that houses a plurality of valves such that a pressure of an air bladder can be determined by sampling pressure within the valve enclosure via the tap.

Furthermore, neither Kalavitz nor Walker provides the requisite teaching to maintain the obviousness rejection.

Because Kalavitz in combination with Yavets-Chen and Walker fails to disclose, teach, or suggest each and every limitation set forth in claim 9, this combination of references cannot render claim 9 obvious.

XI. THE REJECTION OF CLAIM 10 UNDER 35 U.S.C. § 103

With this Response, independent claim 10 has been canceled, thus rendering the rejection moot.

XII. THE REJECTION OF CLAIM 11 UNDER 35 U.S.C. § 103

Claim 11, as originally issued, recites:

> 11. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:
>
> an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;
>
> at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber; and
>
> pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Madsen and Rible in a manner identical to claim 4. Particularly, the Office Action relies on Madsen as disclosing "at col. 6, lines 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48," and states that it would have been obvious to use the pressure feedback tube sensor of Madsen to monitor pressure in the chamber of Shafer to more accurately know the pressure at all times. (Office Action at page 8)(emphasis added.) For at least the reasons set forth above in Section VII (claim 4), Patent Owner respectfully asserts that the combination of Shafer, Madsen, and Rible does not disclose, teach, or suggest each and every limitation set forth in claim 11. Therefore, this combination of references cannot render claim 11 obvious.

XIII. THE REJECTION OF CLAIM 12 UNDER 35 U.S.C. § 103

Claim 12, as originally issued, recites:

12. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Stacy in a manner identical to claim 2. For at least the reasons set forth above in Section VI (claim 2), Patent Owner respectfully asserts that Stacy does not disclose, teach, or suggest a valve enclosure assembly including "a plurality of guides and stops being disposed within [an] enclosure for correctly positioning components within the enclosure" as recited in claim 12.

Because Shafer in combination with Stacy fails to disclose, teach, or suggest each and every limitation set forth in claim 12, this combination of references cannot render claim 12 obvious.

XIV. THE REJECTION OF CLAIM 14 UNDER 35 U.S.C. § 103

Claim 14, as originally issued, recites:

14. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly

coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Madsen and Rible in a manner identical to claims 4 and 11. Particularly, the Office Action relies on Madsen as disclosing "at col. 6, lines 18-19 monitoring pressure with pressure feedback tube 56k in manifold 48," and states that it would have been obvious to use the pressure feedback tube sensor of Madsen to monitor pressure in the chamber of Shafer to more accurately know the pressure at all times. (Office Action at page 8)(emphasis added.) For at least the reasons set forth above in Section VII (claim 4), Patent Owner respectfully asserts that the combination of Shafer, Madsen, and Rible does not disclose, teach, or suggest each and every limitation set forth in claim 14. Therefore, this combination of references cannot render claim 14 obvious.

XV. DEPENDENT CLAIM 15 IS ALLOWABLE

Dependent claim 15 is allowable at least by virtue of its dependence from allowable claim 14, in addition to the elements recited in the claim.

XVI. THE REJECTION OF CLAIM 16 UNDER 35 U.S.C. § 103

Claim 16, as originally issued, recites:

> 16. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:
>
> an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween;
>
> at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and
>
> pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

Claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Stacy and Kwok in a manner identical to claim 6. Similar to claim 6, claim 16 recites a valve enclosure assembly including "<u>an enclosure defining a substantially fluidly sealed air chamber</u> and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of <u>an enclosure portion and a rear cover portion</u>, <u>a flexible seal</u> being compressively interposed between the enclosure portion and a rear cover portion <u>to effect a substantially fluid tight seal therebetween</u>." (Emphasis added.) For at least the reasons set forth above in Section IX (claim 6), Patent Owner respectfully asserts that the combination of Shafer, Stacy, and Kwok does not disclose, teach, or suggest each and every limitation set forth in claim 16. Therefore, this combination of references cannot render claim 16 obvious.

XVII. DEPENDENT CLAIMS 17 AND 18 ARE ALLOWABLE

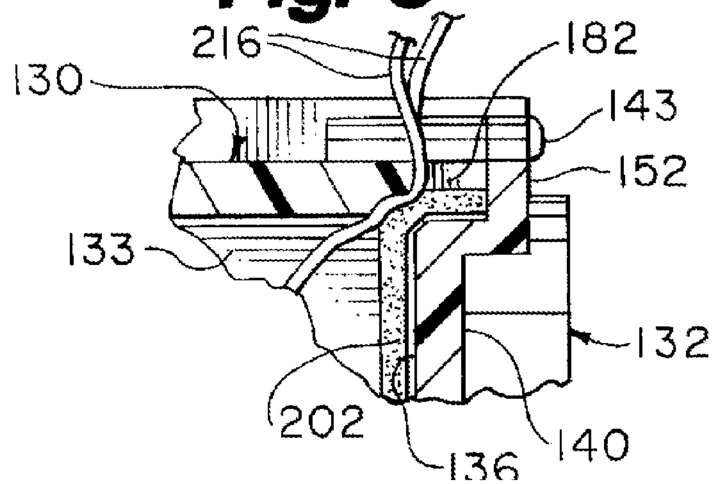
Claims 17 and 18 are allowable at least by virtue of their dependence from allowable claim 16, in addition to the elements recited in the claims.

Claim 17 recites a valve enclosure assembly according to claim 16 "wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure." (Emphasis added.) Claim 18 recites that the "flexible seal fluidly seals the lead wires disposed in the lead grooves." Similar limitations can be found in claims 7 and 8, which were not asserted as invalid in view of the prior art and are therefore not a part of the present reexamination.

Patent Owner respectfully asserts that on pages 8-9 of the Office Action it is unclear which of the cited references provides the basis for rejecting claims 17 and 18. Particularly, the cited Shafer, Stacy, and Kwok references do not appear to be relevant to the claimed features, which include an enclosure having a plurality of lead grooves for passing electrical leads into the enclosure, and a flexible seal that fluidly seals the electrical leads passing through the lead grooves. It is possible that the Office Action relies on Stacy to allegedly disclose the foregoing features. Page 9 of the Office Action states that Stacy "teaches an air box 46 (Figures 7, 31) with alignment guides and stops within the air box 46," and concludes that it would have been obvious to use the guides and stops of Stacy with the Shafer system to correctly position components within the enclosure. However, the "guides and stops" allegedly disclosed by Stacy have no relevance to the "lead grooves" for passing electrical leads into the claimed enclosure. The same citation of Stacy was applied in the Office Action to reject independent claims 2 and 12 as discussed, for example, in Section VI above. Unlike claims 17 and 18, claims 2 and 12 actually recite limitations to "guides and stops."

In an example, with reference to Figure 5 of the '172 patent currently under reexamination, the specification states that "[t]he leads 216 of the solenoid 210 are passed out of the enclosure 130 through the lead grooves 182." (Col. 6, lines 45-47.) The specification of the '172 patent further describes that "[t]he compression of the deformable gasket [202] therein fluidly seals the rear cover 132 and the enclosure 130, including sealing around the solenoid leads 216 that are passed out of the enclosure 130 through the lead grooves 182." (Id. at lines 63-67.) Stacy fails to disclose any features that could be considered "lead grooves" defined in an enclosure portion for passing electrical leads into the enclosure to be fluidly sealed by a flexible seal as generally illustrated in Figure 5 of the '172 patent and recited in claims 17 and 18.

Fig. 5



For at least the foregoing reasons, Shafer in combination with Stacy and Kwok fails to disclose, teach, or suggest each and every limitation set forth in claims 17 and 18, and the combination of references cannot render these claims obvious.

XVIII. CLAIMS 3, 7, 8, AND 13 ARE NOT SUBJECT TO REEXAMINATION

In the Office Action, claims 3, 7, 8, and 13 were indicated as not subject to reexamination, and therefore remain patentable.

XIX. NEW CLAIMS 19-26

With this Response, new claims 19-26 have been added. No new matter has been added.

Support for new claim 19 can be found in the ‘172 patent in at least the following locations: col. 2, lines 48-50; col. 4, lines 30-36; col. 5, lines 24-27; col. 5, lines 45-50; col. 7, lines 50-58; col. 8, lines 3-6; and Figures 3, 4, and 6-8.

Support for new claim 20 can be found in the ‘172 patent in at least the following locations: col. 2, lines 48-50; col. 4, lines 30-36; col. 5, lines 24-27; col. 5, lines 45-50; col. 7, lines 50-58; col. 8, lines 3-6; and Figures 3, 4, and 6-8.

Support for new claim 21 can be found in the ‘172 patent in at least the following locations: col. 8, lines 3-6; and Figures 3, 4, and 6-8.

Support for new claim 22 can be found in the ‘172 patent in at least the following locations: col. 5, lines 34-44; col. 5, lines 59-60; col. 6, lines 39-43; and Figures 3, 4, and 6-8.

Support for new claim 23 can be found in the '172 patent in at least the following locations: col. 5, lines 34-44; col. 5, lines 59-60; col. 6, lines 39-43; and Figures 3, 4, and 6-8.

Support for new claim 24 can be found in the '172 patent in at least the following locations: col. 4, lines 17-20; and Figures 3 and 4.

Support for new claim 25 can be found in the '172 patent in at least the following locations: col. 5, lines 45-58; col. 6, lines 53-67; and Figures 4 and 5.

Support for new claim 26 can be found in the '172 patent in at least the following locations: col. 2, lines 48-50; col. 4, lines 30-36; col. 5, lines 24-27; col. 5, lines 45-50; col. 7, lines 50-58; col. 8, lines 3-6; and Figures 3, 4, and 6-8.

A. NEW INDEPENDENT CLAIM 19 IS ALLOWABLE

As discussed above in Section V(B), Patent Owner respectfully asserts that new independent claim 19 is patentable over the prior art.

B. NEW INDEPENDENT CLAIM 20 IS ALLOWABLE

Independent claim 20 represents original independent claim 6 rewritten to include structural limitations of a pressure monitoring port. Particularly, claim 20 recites:

> 20. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:
>
> an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween;
>
> two or more valves being in fluid communication with both the exterior of the enclosure and with the air chamber; and
>
> pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through

a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the pressure sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle.

As discussed above in Section V(B) (claim 19) and Section X (claim 9), none of the cited prior art references disclose "a pressure monitoring port defining an opening through [an] enclosure and into an interior of [an] air chamber," including Shafer, Yavets-Chen, Rible, Kalabitz, and Walker. Therefore, Applicant respectfully asserts that new independent claim 20 is patentable over the prior art.

C. NEW DEPENDENT CLAIMS 21-25 ARE ALLOWABLE

Claim 21 is dependent on claim 20, which is allowable for at least the reasons set forth above in Section XIX(B). Claims 22-25 are dependent on claim 2, which is allowable for at least the reasons set forth above in Section VI. Thus, dependent claims 21-25 are allowable at least by virtue of their dependence from allowable independent claims, in addition to the elements recited in such claims.

D. NEW INDEPENDENT CLAIM 26 IS ALLOWABLE

Independent claim 26 generally represents independent method claim 9 incorporated into an "assembly" claim. Particularly, claim 26 recites:

26. An improved valve enclosure assembly for use with an air inflatable mattress having a plurality of air bladders configured to be inflated by compressed air, a pump fluidly coupled to the plurality of air bladders for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the plurality of air bladders for controlling the inflation of the plurality of air bladders, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

a plurality of valves operably coupled to the enclosure being in selective fluid communication with the air chamber, each valve being in fluid communication with a respective one of the plurality of air bladders for selectively fluidly coupling the air chamber thereto; and

at least one tap on the enclosure fluidly coupled to the air chamber of the enclosure and to a tube for conveying pressure to a pressure sensor so that the processor can control the inflation of each of the plurality of air bladders based on the pressure in the enclosure; and

wherein the improved valve enclosure assembly is capable of performing a method of effecting a desired pressure in a selected bladder of the air inflatable mattress, the method comprising the steps of:

providing a commanded desired pressure of the selected bladder;

opening a respective valve of the plurality of valves that is fluidly coupled to the selected bladder;

continuously monitoring the existing pressure in the selected bladder at the at least one tap on the valve enclosure assembly;

determining the differential between the existing pressure in the selected bladder and the desired pressure in the selected bladder;

exhausting air from the selected bladder through the valve when the differential indicates that the existing pressure in the selected bladder is greater than the desired pressure;

energizing the pump fluidly coupled to the valve for providing compressed air to the selected bladder when the differential indicates that the desired pressure in the selected bladder is greater than the existing pressure in the selected bladder to inflate the selected bladder; and

closing said valve when the existing pressure in the selected bladder substantially equals the desired pressure in the selected bladder.

As discussed above in Section V(B) (claim 19) and Section X (claim 9), none of the cited prior art references (including Shafer, Yavets-Chen, Rible, Kalabitz, and Walker) disclose limitations such as "a plurality of valves operably coupled to the enclosure being in selective fluid communication with the air chamber, each valve being in fluid communication with a respective one of the plurality of air bladders for selectively fluidly coupling the air chamber thereto" and "at least one tap on the enclosure fluidly coupled to the air chamber of the enclosure and to a tube for conveying pressure to a pressure sensor so that the processor can control the inflation of each of the plurality of air bladders based on the pressure in the enclosure." (Emphasis added.) Therefore, Applicant respectfully asserts that new independent claim 26 is patentable over the prior art.

XX. CONCLUSION

Patent Owner respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested.

Respectfully submitted,

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/Adam Kiedrowski/

Date July 24 , 2013 By ______________________

Adam P. Kiedrowski
Reg. No. 60,296

Electronic Patent Application Fee Transmittal

Application Number:	90012456
Filing Date:	17-Oct-2012
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Filer:	Suneel Arora/Amy Moriarty
Attorney Docket Number:	292.001US1X

Filed as Large Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Reexamination Independent Claims	1821	2	420	840
Reexamination claims in excess of 20	1822	5	80	400
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1240**

Electronic Acknowledgement Receipt

EFS ID:	16407205
Application Number:	90012456
International Application Number:	
Confirmation Number:	5505
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Customer Number:	21186
Filer:	Suneel Arora/Amy Moriarty
Filer Authorized By:	Suneel Arora
Attorney Docket Number:	292.001US1X
Receipt Date:	24-JUL-2013
Filing Date:	17-OCT-2012
Time Stamp:	17:28:27
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1240
RAM confirmation Number	4758
Deposit Account	190743
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		350012usxSIGNEDoaresponse.pdf	1904545 afa1863e62dbab850cb0371f7bef9e95bc429501	yes	43

Multipart Description/PDF files in .zip description

Document Description	Start	End
Trans Letter filing of a response in a reexam	1	1
Reexam Certificate of Service	2	2
Response after non-final action-owner timely	3	43

Warnings:

Information:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
2	Fee Worksheet (SB06)	fee-info.pdf	31425 414f3d935c96bfc88e1bbfef1c24441d8b535b2b	no	2

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Total Files Size (in bytes): 1935970

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456	10/17/2012	5904172	292.001US1X	5505

21186 7590 10/02/2013
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EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
10/02/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/012,456.

PATENT NO. 5904172.

ART UNIT 3993.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c).

Submissions

In order to insure full consideration of any amendments, affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and by 37 CFR 41.33 after appeal, which will be strictly enforced.

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No 5,904,172 throughout the course of this reexamination proceeding. Likewise, if present, the third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Scope of Reexamination

As a reminder, claims 3, 7, 8 and 13 will not be reexamined in this *ex parte* reexamination proceeding.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Yavets-Chen and Rible.

As discussed in the Request (with modification):

Shafer et al. discloses an air control system base unit enclosure 44 which contains a pump 152, pressure monitor means 156, 158, (see also Figure 10), and valve members coupled to the enclosure, the pump 152 being in fluid communication with the air bladders of the mattress 30, 32 via tubes 166, 168. The air control system (base unit 44, Figure 5) has a base unit processing board 160 (see also Figure 11) having a processor 162 for providing system commands to the system and the pressure monitor means. The base unit further has a multi-part enclosure clearly seen in the exploded view of Figure 5, with a top cover and a back cover portion. Shafer et al.

further teaches air inlets (apertures) 170, 172 in air distribution unit 206 of the pump 152, with solenoid valves 338,340 fluidly connected to the apertures 170, 172 (see Figures 10, 17, 18, and specification col. 9, lines.34-59).

While Shafer et al. teaches pressure monitoring, Shafer et al. does not explicitly teach monitoring chamber pressure during an inflate/deflate cycle. Yavets-Chen discloses sensor 84 (Fig. 10) continuously monitoring pressure in a chamber 74, and control unit 86 in electrical communication with and operably coupled to the valves and sensors of Yavets-Chen. It would have been obvious to use the sensor of Yavets-Chen coupled to the processor of Shafer et al., in order to monitor pressure in the chamber of Shafer et al. to more accurately know the pressure at all times.

While Shafer et al. teaches the use of valves, Shafer et al. does not teach a snap-fit valve. However, the benefits of snap-fitting one component to another were well known at the time of filing the application for the ' 172 patent. Rible teaches a snap-fit valve 200 that is used to contain fluid. It would have been obvious to engage the valves of Shafer et al. with an aperture in the valve enclosure via a snap-fit engagement as shown in Rible to make assembly easier and faster, and to provide a fluid-tight and fast and easy connection of a valve.

Rejections Withdrawn

Claims 2, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Stacey et al.

Claims 4, 5, 11, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Madsen et al. and Rible.

Claims 6 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Stacey et al. and Kwok

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kalavitz et al. in view of Yavets-Chen and Walker.

New Rejections Resulting from the Amendment Filed 24 July 2013

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 26 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter because it is both an apparatus and method claim. Claims must be directed to one statutory category only.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 26 is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

The claim is indefinite as it contains both apparatus and method categories of subject matter. Therefore, the metes and bounds of the claim cannot be reasonably determined.

Response to Arguments

Patent Owner: Patent Owner states that claim 1 will be canceled following a Certificate of Correction to fix dependency issues and will be replaced by claim 19.

Examiner: The Examiner maintains the rejection of claim 1 until such time it is canceled.

Patent Owner: Patent Owner contends that new claim 19 is patentable over the art cited in the Reexamination as the new features are not shown. Specifically, the “two or more valves being fluidly and sealingly disposed in an enclosure and a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber defined by the enclosure" is allegedly not found in the prior art of record.

Examiner: The Examiner, upon further review of the references, agrees with Patent Owner's position.

Patent Owner: Patent Owner alleges that the combination of references cited against claim 2 do not show the "plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure".

Examiner: Upon further review, the Examiner agrees with Patent Owner's position.

Patent Owner: Regarding claim 4 and its dependent claim 5, Patent Owner contends that the prior art cited does not show the pressure monitoring means. Specifically, the Madsen reference does not show the feedback tube in a manifold as alleged and provides passages to illustrate this point.

Examiner: The Examiner agrees with Patent Owner's position.

Patent Owner: Regarding claim 6, Patent Owner contends that the prior art does not show a fluidly sealed air chamber as required by the claim and provides a detailed explanation as to why.

Examiner: After considering Patent Owner's arguments and reviewing the prior art, the Examiner concurs with Patent Owner's position.

Patent Owner: Patent Owner contends that amended claim 9 is patentable over the art cited in the Reexamination as the new features are not shown. Specifically, the “continuously monitoring the existing pressure in a bladder at a tap on a valve enclosure assembly containing a plurality of valves in a substantially fluidly sealed air chamber, wherein the tap defines an opening through the valve enclosure assembly and into an interior of the air chamber" is allegedly not found in the prior art of record.

Examiner: The Examiner, upon consideration of the arguments and further review of the references, agrees with Patent Owner’s position.

Patent Owner: Regarding claim 11, Patent Owner contends that the prior art cited does not show the pressure monitoring means. Specifically, the Madsen reference does not show the feedback tube in a manifold as alleged and provides passages to illustrate this point.

Examiner: The Examiner agrees with Patent Owner's position.

Patent Owner: Patent Owner alleges that the combination of references cited against claim 12 do not show the "plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure".

Examiner: Upon further review, the Examiner agrees with Patent Owner's position.

Patent Owner: Regarding claim 14 and its dependent claim 15, Patent Owner contends that the prior art cited does not show the pressure monitoring means. Specifically, the Madsen reference does not show the feedback tube in a manifold as alleged and provides passages to illustrate this point.

Examiner: The Examiner agrees with Patent Owner's position.

Patent Owner: Regarding claim 16 and its dependent claims 17, 18; Patent Owner contends that the prior art does not show a fluidly sealed air chamber as required by the claim and provides a detailed explanation as to why.

Examiner: After considering Patent Owner’s arguments and reviewing the prior art, the Examiner concurs with Patent Owner’s position.

New claims 20-25 are patentable either for their dependence on a previously indicated confirmed/patentable claim or in light of Patent Owner's arguments noted above with regard to claim 6.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding: for the reasons noted above in the Response to Arguments section, claims 2, 4-6, 9, 11, 12 and 14-25 are confirmed/patentable over the prior art cited for use in rejections in the Request.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

Conclusion

Patent owner's amendment filed 24 July 2013 necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

A shortened statutory period for response to this action is set to expire 2 months from the mailing date of this action.

Extensions of time under 37 CFR 1.136(a) do not apply in reexamination proceedings. The provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Further, in 35 U.S.C. 305 and in 37 CFR 1.550(a), it is required that reexamination proceedings "will be conducted with special dispatch within the Office."

Extensions of time in reexamination proceedings are provided for in 37 CFR 1.550(c). A request for extension of time must be filed on or before the day on which a response to this action is due, and it must be accompanied by the petition fee set forth in 37 CFR 1.17(g). The mere filing of a request will not effect any extension of time. An extension of time will be granted only for sufficient cause, and for a reasonable time specified.

The filing of a timely first response to this final rejection will be construed as including a request to extend the shortened statutory period for an additional month, which will be granted even if previous extensions have been granted. In no event, however, will the statutory period for response expire later than SIX MONTHS from the mailing date of the final action. See MPEP § 2265.

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

Please mail any communications to:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered.

By Mail to: Attn: Mail Stop "Ex Parte Reexam"
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P. O. Box 1450
Alexandria VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By Hand: Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i)(C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Joseph A. Kaufman/
Joseph A. Kaufman
Primary Examiner
Art Unit 3993
(571) 272-4928

Conferees:
/RMF/

/EDL/

Office Action in Ex Parte Reexamination	Control No. 90/012,456	Patent Under Reexamination 5904172	
	Examiner JOSEPH KAUFMAN	Art Unit 3993	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☒ Responsive to the communication(s) filed on *24 July 2013* .
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ______.

b. ☒ This action is made FINAL.

c. ☒ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *2* month(s) from the mailing date of this letter.
Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**
If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ ______.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1,2,4-6,9-12 and 14-26* are subject to reexamination.

1b. ☒ Claims *3,7,8 and 13* are not subject to reexamination.

2. ☐ Claims *10* have been canceled in the present reexamination proceeding.

3. ☒ Claims *2, 4-6, 9, 11, 12 and 14-25 are* are patentable and/or confirmed.

4. ☒ Claims *1 and 26* are rejected.

5. ☐ Claims ______ are objected to.

6. ☐ The drawings, filed on ______ are acceptable.

7. ☐ The proposed drawing correction, filed on ______ has been (7a) ☐ approved (7b) ☐ disapproved.

8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have

1 ☐ been received.

2 ☐ not been received.

3 ☐ been filed in Application No. ______ .

4 ☐ been filed in reexamination Control No. ______.

5 ☐ been received by the International Bureau in PCT application No. ______.

* See the attached detailed Office action for a list of the certified copies not received.

9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.

10. ☐ Other: ______

cc: Requester (if third party requester)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Ex Parte Reexamination of: Reexam Control No. 90/012,456

James Edwin Gifft et al. Examiner: Joseph Kaufman

Patent No.: 5,904,172 Group Art Unit: 3993

Docket No.: 3500.012USX

Title: VALVE ENCLOSURE ASSEMBLY

RESPONSE TO FINAL OFFICE ACTION IN EX PARTE REEXAMINATION OF OCTOBER 2, 2013

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Final Office Action of October 2, 2013 in the captioned *Ex Parte* Reexamination, Patent Owner submits the following:

TABLE OF CONTENTS

RESPONSE

I. CLAIMS

[1. (Canceled) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and

at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.]

2. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

3. (Original) The improved valve enclosure assembly of claim 1 further including at least one solenoid operated valve disposed within the enclosure, said plurality of guides and stops for disposing the solenoid with respect to the valve.

4. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

5. (Original) The improved valve enclosure assembly of claim 4 wherein the at least one valve has a circumferential ramped face, said ramped face for compressively engaging a circumferential beveled face of the aperture to effect the snap fit of the at least one valve.

6. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least

one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder.

7. (Original) The improved valve enclosure assembly of claim 1 wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure.

8. (Original) The improved valve enclosure assembly of claim 7 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

9. (Amended) A method of effecting a desired pressure in a bladder of an air inflatable mattress, comprising the steps of:

providing a commanded desired pressure of the bladder;

opening a valve fluidly coupled to the bladder<u>, wherein the valve is one of a plurality of valves at least partially contained within, or formed integral to, a substantially fluidly sealed air chamber of a valve enclosure assembly</u>;

continuously monitoring the existing pressure in the bladder at a tap on [a]the valve enclosure assembly, the tap defining an opening through the valve enclosure assembly and into an interior of the air chamber;

determining the differential between the existing pressure in the bladder and the desired pressure in the bladder;

exhausting air from the bladder through the valve when the differential indicates that the existing pressure in the bladder is greater than the desired pressure;

energizing a pump fluidly coupled to the valve for providing compressed air to the bladder when the differential indicates that the desired pressure in the bladder is greater than the existing pressure in the bladder to inflate the bladder; and

closing said valve when the existing pressure in the bladder substantially equals the desired pressure in the bladder.

[10. (Canceled) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve having a valve housing, pressure monitor means being formed integral with said valve housing; and pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.]

11. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder, the at least one valve being fluidly sealingly disposed in a valve aperture defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

12. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, a plurality of guides and stops being disposed within the enclosure for correctly positioning components within the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

13. (Original) The improved valve enclosure assembly of claim 1 further including at least one solenoid operated valve disposed within the enclosure, said plurality of guides and stops for disposing the solenoid with respect to the valve.

14. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, at least one valve being disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

15. (Original) The improved valve enclosure assembly of claim 14 wherein the at least one valve disposed therein has a circumferential ramped face, said ramped face for compressively engaging a circumferential beveled face of the aperture to effect the snap fit of the at least one valve.

16. (Original) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween;

at least one valve operably coupled to the enclosure being in selective fluid communication with the air chamber and being in fluid communication with the at least one air bladder for selectively fluidly coupling the air chamber to at least one air bladder; and

pressure monitor means being operably coupled to the processor and being in fluid communication with the at least one valve for monitoring the pressure in the at least one bladder.

17. (Original) The improved valve enclosure assembly of claim 16 wherein the enclosure further includes a plurality of lead grooves defined in the enclosure portion proximate the rear cover portion, said lead grooves for passing electrical leads into the enclosure.

18. (Original) The improved valve enclosure assembly of claim 16 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

19. (New) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and

two or more valves being fluidly sealingly disposed in respective valve apertures defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.

20. (New) An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween;

two or more valves being in fluid communication with both the exterior of the enclosure and with the air chamber; and

pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the pressure sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle.

21. (New) The improved valve enclosure assembly of claim 20 wherein the pressure monitoring port is disposed on the rear cover portion of the enclosure.

22. (New) The improved valve enclosure assembly of claim 2 further including at least one solenoid configured to operate a valve, wherein the at least one solenoid is at least partially received within the air chamber of the enclosure.

23. (New) The improved valve enclosure assembly of claim 2 further including at least one solenoid configured to operate a valve, wherein the at least one solenoid is positioned entirely within the air chamber of the enclosure.

24. (New) The improved valve enclosure assembly of claim 2 wherein the enclosure is formed of an enclosure portion and a rear cover portion.

25. (New) The improved valve enclosure assembly of claim 24 wherein a flexible seal is compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween.

[26. (Canceled) An improved valve enclosure assembly for use with an air inflatable mattress having a plurality of air bladders configured to be inflated by compressed air, a pump fluidly coupled to the plurality of air bladders for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the plurality of air bladders for controlling the inflation of the plurality of air bladders, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

a plurality of valves operably coupled to the enclosure being in selective fluid communication with the air chamber, each valve being in fluid communication with a respective one of the plurality of air bladders for selectively fluidly coupling the air chamber thereto; and

at least one tap on the enclosure fluidly coupled to the air chamber of the enclosure and to a tube for conveying pressure to a pressure sensor so that the processor can control the inflation of each of the plurality of air bladders based on the pressure in the enclosure; and

wherein the improved valve enclosure assembly is capable of performing a method of effecting a desired pressure in a selected bladder of the air inflatable mattress, the method comprising the steps of:

providing a commanded desired pressure of the selected bladder;

opening a respective valve of the plurality of valves that is fluidly coupled to the selected bladder;

continuously monitoring the existing pressure in the selected bladder at the at least one tap on the valve enclosure assembly;

determining the differential between the existing pressure in the selected bladder and the desired pressure in the selected bladder;

exhausting air from the selected bladder through the valve when the differential indicates that the existing pressure in the selected bladder is greater than the desired pressure;

energizing the pump fluidly coupled to the valve for providing compressed air to the selected bladder when the differential indicates that the desired pressure in the selected bladder is greater than the existing pressure in the selected bladder to inflate the selected bladder; and

closing said valve when the existing pressure in the selected bladder substantially equals the desired pressure in the selected bladder.]

II. INTRODUCTION

Claims 1, 2, 4-6, 9-12, and 14-18 of U.S. Patent No. 5,904,172 (the "'172 patent"), along with new claims 19-26, were addressed by the final Ex Parte Reexamination Office Action dated October 2, 2013 ("Office Action"). Claims 3, 7, 8, and 13 are not subject to reexamination, and thus remain patentable. Claims 1 and 26 stand rejected. Furthermore, claims 2, 4-6, 9, 11, 12, and 14-25 were found patentable over the cited prior art. With this Response, claims 1 and 26 are canceled without prejudice or disclaimer. Accordingly, claims 2, 4-6, 9, 11, 12, and 14-25, which were found patentable, are the only claims currently under consideration after this Response.

III. NOTIFICATION OF CONCURRENT PROCEEDINGS

As previously discussed in the Petition for Extension of Time filed on June 3, 2013, the '172 patent was involved in a co-pending civil action pending in the District of Minnesota styled *Select Comfort Corporation v. The Sleep Better Store, LLC et al.*, filed May 11, 2012, Doc. No. 0:12cv1148. Pursuant to the request on page 3 of the Office Action to apprise the Office of litigation activity throughout the course of this reexamination proceeding, Patent Owner respectfully reports that the litigation matter has been settled between the parties and the action has been dismissed.

IV. STATEMENT OF THE LAW

The Office must construe the claims giving them their broadest reasonable interpretation <u>in light of the supporting disclosure</u>. *See* MPEP § 2106 citing *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). The claims must be given their "plain meaning," <u>unless such meaning is inconsistent with the specification</u>. MPEP § 2111.01(I and II) citing *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); *see also*, *In re Weiss,* 989 F.2d 1202, 26 USPQ2d 1885 (Fed. Cir. 1993) (unpublished decision - cannot be cited as precedent) ("The claim related to an athletic shoe with cleats that 'break away at a preselected level of force' and thus prevent injury to the wearer. The examiner rejected the claims over prior art teaching athletic shoes with cleats not intended to break off and rationalized that the cleats would break away given a high enough force. The court reversed the rejection stating that 'when interpreting a claim term which is ambiguous, such as 'a preselected level of force', we must look to the specification for the meaning ascribed to that term by the inventor.' The specification had defined 'preselected level of force' as that level of force at which the breaking away will prevent injury to the wearer during athletic exertion.")

A patent owner may be his own lexicographer. Where an explicit definition is provided by the patent owner for a term, that definition will control interpretation of the term as used in the claim. MPEP § 2111.01(III) citing *Toro C. v. White Consolidated Industries, Inc.*, 199 F.3d 1295. "The specification should also be relied on for more than just explicit lexicography or clear disavowal of claim scope to determine the meaning of a claim term when the applicant acts as his or her own lexicographer; the meaning of a particular claim term may be defined by implication, that is, according to the usage of the term in the context in the specification. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005) (*en banc*); and *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 1583, 39 USPQ2d 1573, 1577 (Fed. Cir. 1996)." *Id.* (emphasis added).

The legal conclusion that a claim is obvious under § 103(a) depends on at least four underlying factual issues set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). The underlying factual issues set forth in Graham are as follows: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) evaluation of any relevant secondary considerations.

The Office has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir.1988). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970); M.P.E.P. § 2143.03. To support an obviousness rejection under 35 U.S.C. § 103, the Examiner must clearly articulate the reason(s) why the claimed invention would have been obvious. M.P.E.P. § 2142. To facilitate review, this analysis should be made explicit. *See* KSR Int'l v. Teleflex Inc., et al., 127 S.Ct. 1727; 167 L.Ed 2d 705; 82 USPQ 2d 1385 (2007). Specifically, obviousness rejections "cannot be sustained with mere conclusory statements; instead, there must be some articulated reasons with some rational underpinning to support the legal conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ 2d 1329, 1336 (Fed. Cir. 2006).

V. SUMMARY OF THE REJECTION OF CLAIMS

The Office Action sets forth the following grounds for rejection:

Claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer et al., U.S. Patent No. 5,509,154 ("Shafer") in view of Yavets-Chen, U.S. Patent No. 5,873,137 ("Yavets-Chen") and Rible, U.S. Patent No. 4,564,990 ("Rible").

Claim 26 was rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claim 26 was rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA) second paragraph as being indefinite.

VI. THE REJECTION OF CLAIM 1 UNDER 35 U.S.C. § 103

As set forth on page 4 of the Office Action, claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Shafer in view of Yavets-Chen and Rible.

Without conceding to the merits of the rejection, and solely for the purpose of advancing prosecution, claim 1 has been canceled without prejudice or disclaimer. Therefore, Patent Owner respectfully requests withdrawal of the rejection under 35 U.S.C. § 103.

VII. THE REJECTION OF CLAIM 26 UNDER 35 U.S.C. § 101

As set forth on page 6 of the Office Action, claim 26 was rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Particularly, the Office Action states that claim 26 is directed to both an apparatus and a method, and "[c]laims must be directed to one statutory category only."

Without conceding to the merits of the rejection, and solely for the purpose of advancing prosecution, claim 26 has been canceled without prejudice or disclaimer. Therefore, Patent Owner respectfully requests withdrawal of the rejection under 35 U.S.C. § 101.

VIII. THE REJECTION OF CLAIM 26 UNDER 35 U.S.C. § 112

As set forth on page 7 of the Office Action, claim 26 was rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA) second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant, regards as the invention. Particularly, the Office Action states that claim 26 is indefinite because it contains both apparatus and method categories of subject matter. Therefore, according to the Office Action, "the metes and bounds of the claim cannot be reasonably determined."

Without conceding to the merits of the rejection, and solely for the purpose of advancing prosecution, claim 26 has been canceled without prejudice or disclaimer. Therefore, Patent Owner respectfully requests withdrawal of the rejection under 35 U.S.C. § 112.

IX. REJECTIONS WITHDRAWN AND CLAIMS CONFIRMED AS PATENTABLE

As set forth on pages 5-6 of the Office Action, the rejections of claims 2, 4-6, 9, 11, 12, and 14-18 were withdrawn in view of Patent Owner's prior response to the non-final Office Action. Therefore, claims 2, 4-6, 9, 11, 12, and 14-18 were found patentable over the cited prior art. (See Office Action at page 10.) Additionally, new claims 19-25 were also found patentable over the cited prior art. (Id.)

Patent Owner respectfully thanks the Examiner for the indication/confirmation of patentable claims as set forth above.

X. CONCLUSION

Patent Owner respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested.

Respectfully submitted,

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(612) 349-9585

Date December 2, 2013 By /Adam Kiedrowski/

Adam P. Kiedrowski
Reg. No. 60,296

Electronic Acknowledgement Receipt

EFS ID:	17540959
Application Number:	90012456
International Application Number:	
Confirmation Number:	5505
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	5904172
Customer Number:	21186
Filer:	Suneel Arora/Amy Moriarty
Filer Authorized By:	Suneel Arora
Attorney Docket Number:	292.001US1X
Receipt Date:	02-DEC-2013
Filing Date:	17-OCT-2012
Time Stamp:	16:08:23
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3500012usxSIGNEDFOAresp.pdf	177342 4244998bcb605b11e8018ef6fab0ba9c32ca0e05	yes	20

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Trans Letter filing of a response in a reexam	1	1
	Reexam Certificate of Service	2	2
	Reexam Response to Final Rejection	3	20

Warnings:

Information:

Total Files Size (in bytes):	177342

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: VALVE ENCLOSURE ASSEMBLY

In re Ex Parte Reexamination of:	Reexam Control No. 90/012,456
James Edwin Gifft et al.	Examiner: Joseph A. Kaufman
Patent No.: 5,904,172	Group Art Unit: 3993
Issued: May 18, 1999	Docket No.: 3500.012USX
Confirmation No.: 5505	

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

X Response to Final Office Action in Ex Parte Reexamination of October 2, 2013 (18 pages).
X Certificate of Service (1 page).

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
Customer No.: 21186

By: /Adam Kiedrowski/
Adam P. Kiedrowski
Reg. No. 60,296

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: VALVE ENCLOSURE ASSEMBLY

In re Ex Parte Reexamination of:

James Edwin Gifft et al.

Patent No.: 5,904,172

Issued: May 18, 1999

Confirmation No.: 5505

Reexam Control No. 90/012,456

Examiner: Joseph A. Kaufman

Group Art Unit: 3993

Docket No.: 3500.012USX

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the Response to Final Office Action in Ex Parte Reexamination of October 2, 2013 (18 pages) and the 1 page transmittal document as filed with the US Patent and Trademark Office on December 2, 2013, for Reexamination Control No. 90/012,456 was served on the following via U.S. Mail on December 2, 2013.

Daniel Polglaze
Leffert, Jay, & Polglaze, P.A.
PO Box 2230
Minneapolis, MN 55402-0230

/Amy Moriarty/

Amy Moriarty

Date of Deposit: December 2, 2013
This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to MS *Ex Parte* Reexam, Central Reexamination Unit, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,456	10/17/2012	5904172	292.001US1X	5505

21186 7590 12/13/2013

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
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MINNEAPOLIS, MN 55402

EXAMINER	
KAUFMAN, JOSEPH A	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
12/13/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

LEFFERT JAY & POLGLAZE, PA

P O BOX 2230

MINNEAPOLIS, MN 55402-0230

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,456*.

PATENT NO. *5904172*.

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Notice of Intent to Issue Ex Parte Reexamination Certificate	**Control No.** 90/012,456	**Patent Under Reexamination** 5904172	
	Examiner JOSEPH KAUFMAN	**Art Unit** 3993	**AIA (First Inventor to File) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☒ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of
   (a) ☒ Patent owner's communication(s) filed: *02 December 2013*.
   (b) ☐ Patent owner's failure to file an appropriate timely response to the Office action mailed: ____.
   (c) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
   (d) ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated ____
   (e) ☐ Other: ____.
2. The Reexamination Certificate will indicate the following:
   (a) Change in the Specification: ☐ Yes ☒ No
   (b) Change in the Drawing(s): ☐ Yes ☒ No
   (c) Status of the Claim(s):
      (1) Patent claim(s) confirmed: *2,4-6,11,12 and 14-18*.
      (2) Patent claim(s) amended (including dependent on amended claim(s)): *9*
      (3) Patent claim(s) canceled: *1 and 10*.
      (4) Newly presented claim(s) patentable: 19-25.
      (5) Newly presented canceled claims: 26.
      (6) Patent claim(s) ☐ previously ☐ currently disclaimed: ____
      (7) Patent claim(s) not subject to reexamination: 3,7,8 and 13.
3. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
4. ☒ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
5. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).
6. ☐ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).
7. ☐ The drawing correction request filed on ____ is: ☐ approved ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All b)☐ Some* c)☐ None of the certified copies have
      ☐ been received.
      ☐ not been received.
      ☐ been filed in Application No. ____.
      ☐ been filed in reexamination Control No. ____.
      ☐ been received by the International Bureau in PCT Application No. ____.

   * Certified copies not received: ____.
9. ☐ Note attached Examiner's Amendment.
10. ☐ Note attached Interview Summary (PTO-474).
11. ☐ Other: ____.

All correspondence relating to this reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

Joseph A. Kaufman
Primary Examiner
Art Unit: 3993

cc: Requester (if third party requester)

Reexamination

Status of Amendment After-Final

The after final amendment filed 2 December 2013 has been entered.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding: Patent Owner has canceled the remaining rejected claims. Please see the Final Office Action mailed 2 October 2013 for a detailed explanation of the confirmed/patentable features.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

Conclusion

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

Please mail any communications to:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered.

By Mail to: Attn: Mail Stop “Ex Parte Reexam”
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P. O. Box 1450

Alexandria VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By Hand: Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i)(C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Joseph A. Kaufman/
Joseph A. Kaufman
Primary Examiner
Art Unit 3993
(571) 272-4928

Conferees:
/EDL/

/AK/

Reexamination	Application/Control No. 90/012,456	Applicant(s)/Patent Under Reexamination 5904172
	Certificate Date	**Certificate Number** C1

Requester Correspondence Address: ☐ Patent Owner ☒ Third Party

LEFFERT JAY & POLGLAZE, PA
P O BOX 2230
MINNEAPOLIS, MN 55402-0230

LITIGATION REVIEW ☒	**JAK** (examiner initials)	**5 December 2013** (date)

Case Name	Director Initials
Select Comfort Corporation v. The Sleep Better Store, LLC et al.; 0:12cv1148 US Dist. Ct, Minnesota; closed.	
Select Comfort Corp. v. Halcyon Waterspring; 0:03cv3325, US Dist, Ct. Minnesota;closed.	

COPENDING OFFICE PROCEEDINGS

TYPE OF PROCEEDING	NUMBER
1. none	
2.	
3.	
4.	

Search Notes

	Application/Control No. 90/012,456	**Applicant(s)/Patent under Reexamination** 5904172
	Examiner JOSEPH KAUFMAN	**Art Unit** 3993

SEARCHED

Class	Subclass	Date	Examiner
none			

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	DATE	EXMR
reviewed patented file's prosecution history	12/5/2013	JAK

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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BIB DATA SHEET

CONFIRMATION NO. 5505

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/012,456	10/17/2012 RULE	137	3993	292.001US1X

APPLICANTS

INVENTORS

5904172, Residence Not Provided;
SELECT COMFORT CORPORATION, MINNEAPOLIS, MN;
LEFFERT JAY & POLGLAZE, PA (3RD PTY REQ.), MINNEAPOLIS, MN;
LEFFERT JAY & POLGLAZE, PA, MINNEAPOLIS, MN

** **CONTINUING DATA** *************************

This application is a REX of 08/901,144 07/28/1997 PAT 5904172

** **FOREIGN APPLICATIONS** *************************

** **IF REQUIRED, FOREIGN FILING LICENSE GRANTED** **

		STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /JOSEPH A KAUFMAN/ Examiner's Signature	☐ Met after Allowance Initials			18	10

ADDRESS

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402
UNITED STATES

TITLE

VALVE ENCLOSURE ASSEMBLY

FILING FEE RECEIVED		
17750	FEES: Authority has been given in Paper No.____________ to charge/credit DEPOSIT ACCOUNT No.____________ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other ________________ ☐ Credit

BIB (Rev. 05/07).

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination
	90/012,456	5904172
	Examiner	**Art Unit**
	JOSEPH KAUFMAN	3993

ISSUE CLASSIFICATION

ORIGINAL		INTERNATIONAL CLASSIFICATION								
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED			
137	224	A	47	C	27	/08				/
						/				/

CROSS REFERENCES					INTERNATIONAL CLASSIFICATION (CLAIMED)				NON-CLAIMED			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											
137	271	596.16	596.2					/				/
5	710	713						/				/
								/				/
								/				/
								/				/

(Assistant Examiner) (Date)	Joseph A. Kaufman Primary Examiner Art Unit 3993	**Total Claims Allowed: 23**
(Legal Instruments Examiner) (Date)	(Primary Examiner) (Date)	O.G. Print Claim(s): 2 — O.G. Print Fig.: 4

☐ **Claims renumbered in the same order as presented by applicant** ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		31		61		91		121		151		181
2	2		32		62		92		122		152		182
3	3		33		63		93		123		153		183
4	4		34		64		94		124		154		184
5	5		35		65		95		125		155		185
6	6		36		66		96		126		156		186
7	7		37		67		97		127		157		187
8	8		38		68		98		128		158		188
9	9		39		69		99		129		159		189
10	10		40		70		100		130		160		190
11	11		41		71		101		131		161		191
12	12		42		72		102		132		162		192
13	13		43		73		103		133		163		193
14	14		44		74		104		134		164		194
15	15		45		75		105		135		165		195
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	27		57		87		117		147		177		207
	28		58		88		118		148		178		208
	29		59		89		119		149		179		209
	30		60		90		120		150		180		210

US005904172C1

(12) **EX PARTE REEXAMINATION CERTIFICATE** (9998th)

United States Patent

Gifft et al.

(10) **Number: US 5,904,172 C1**

(45) **Certificate Issued: Jan. 3, 2014**

(54) **VALVE ENCLOSURE ASSEMBLY**

(75) Inventors: **James Edwin Gifft**, Maple Grove, MN (US); **Paul James Mahoney**, Stillwater, MN (US)

(73) Assignee: **Select Comfort Corporation**, Plymouth, MN (US)

Reexamination Request:
No. 90/012,456, Oct. 17, 2012

Reexamination Certificate for:

Patent No.:	**5,904,172**
Issued:	**May 18, 1999**
Appl. No.:	**08/901,144**
Filed:	**Jul. 28, 1997**

(51) **Int. Cl.**
A47C 27/08 (2006.01)

(52) **U.S. Cl.**
USPC ... **137/224**; 137/271; 137/596.16; 137/596.2; 5/710; 5/713

(58) **Field of Classification Search**
None
See application file for complete search history.

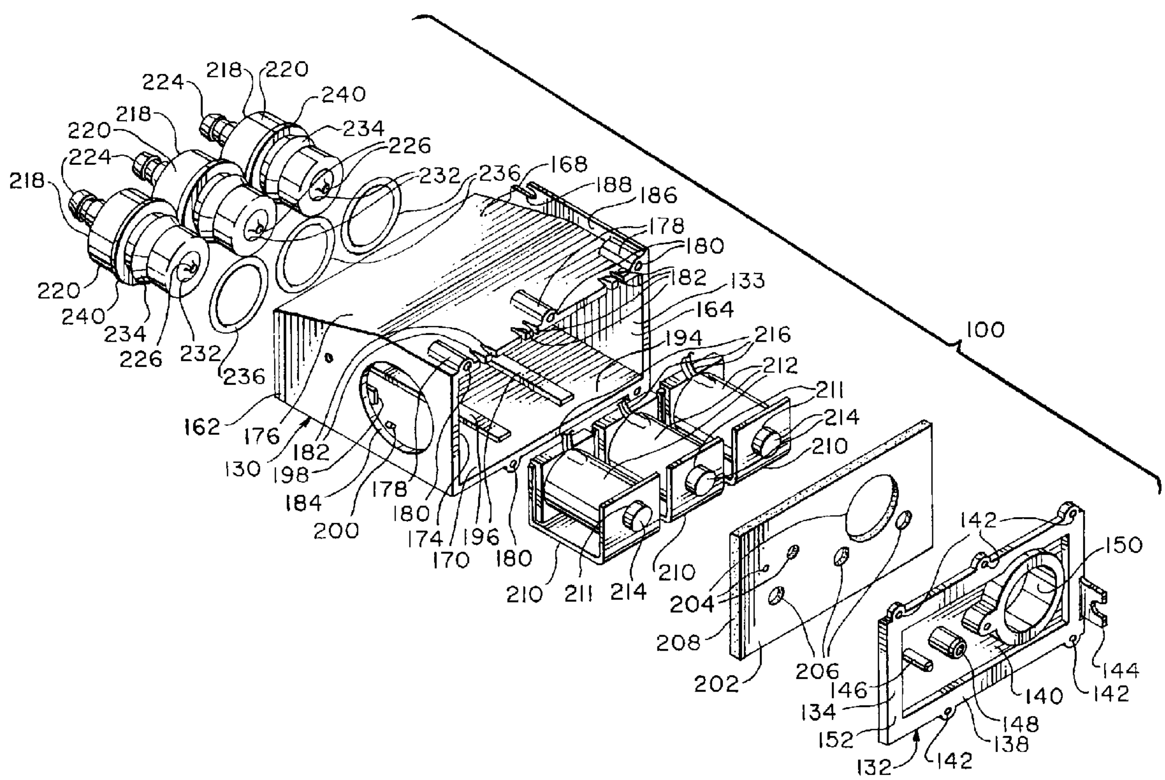
(56) **References Cited**

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/012,456, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

Primary Examiner — Joseph A. Kaufman

(57) **ABSTRACT**

An improved valve enclosure assembly for use with an air inflatable mattress includes at least one air bladder, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle. The improved valve enclosure assembly is fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder. An enclosure defines a substantially fluidly sealed air chamber and has at least one air inlet to the air chamber being fluidly coupled to the pump. A pressure monitor is operably coupled to the processor and is in fluid communication with the at least one bladder for continuously monitoring the pressure in the at least one bladder. A method of effecting a desired pressure in a bladder of an air inflatable mattress is also disclosed.



EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **2**, **4-6**, **11**, **12** and **14-18** is confirmed.

Claims **1** and **10** are cancelled.

Claim **9** is determined to be patentable as amended.

New claims **19-25** are added and determined to be patentable.

Claims **3**, **7**, **8** and **13** were not reexamined.

9. A method of effecting a desired pressure in a bladder of an air inflatable mattress, comprising the steps of:

providing a commanded desired pressure of the bladder;

opening a valve **[**fluid**]** *fluidly* coupled to the bladder*, wherein the valve is one of a plurality of valves at least partially contained within, or formed integral to, a substantially fluidly sealed air chamber of a valve enclosure assembly*;

continuously monitoring the existing pressure in the bladder at a tap on **[**a**]** *the* valve enclosure assembly*, the tap defining an opening through the valve enclosure assembly and into an interior of the air chamber*;

determining the differential between the existing pressure in the bladder and the desired pressure in the bladder;

exhausting air from the bladder through the valve when the differential indicates that the existing pressure in the bladder is greater than the desired pressure;

energizing a pump fluidly coupled to the valve for providing compressed air to the bladder when the differential indicates that the desired pressure in the bladder is greater than the existing pressure in the bladder to inflate the bladder; and

closing said valve when the existing pressure in the bladder substantially equals the desired pressure in the bladder.

19. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump;

pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening the enclosure and into an interior of the air chamber, the sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle by monitoring the pressure in the air chamber, and

two or more valves being fluidly sealingly disposed in respective valve apertures defined in the enclosure by a snap-fit engagement therewith and being in fluid communication with both the exterior of the enclosure and with the air chamber.

20. An improved valve enclosure assembly for use with an air inflatable mattress having at least one air bladder inflated by compressed air, a pump fluidly coupled to the at least one air bladder for providing compressed air thereto, and a processor for providing commands to the improved valve enclosure assembly during an inflate/deflate cycle, the improved valve enclosure assembly being fluidly coupled intermediate the pump and the at least one air bladder for controlling the inflation of the at least one air bladder, comprising:

an enclosure defining a substantially fluidly sealed air chamber and having at least one air inlet to the air chamber being fluidly coupled to the pump, the enclosure being formed of an enclosure portion and a rear cover portion, a flexible seal being compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween;

two or more valves being in fluid communication with both the exterior of the enclosure and with the air chamber; and

pressure monitor means including a sensor being operably coupled to the processor and being in fluid communication with the at least one bladder through a pressure monitoring port defining an opening through the enclosure and into an interior of the air chamber, the pressure sensor configured for continuously monitoring the pressure in the at least one bladder during an inflate/deflate cycle.

21. The improved valve enclosure assembly of claim 20 wherein the pressure monitoring port is disposed on the rear cover portion of the enclosure.

22. The improved valve enclosure assembly of claim 2 further including at least one solenoid configured to operate a valve, wherein the at least one solenoid is at least partially received within the air chamber of the enclosure.

23. The improved valve enclosure assembly of claim 2 further including at least one solenoid configured to operate a valve, wherein the at least one solenoid is positioned entirely within the air chamber of the enclosure.

24. The improved valve enclosure assembly of claim 2 wherein the enclosure is formed of an enclosure portion and a rear cover portion.

25. The improved valve enclosure assembly of claim 24 wherein a flexible seal is compressively interposed between the enclosure portion and the rear cover portion to effect a substantially fluid tight seal therebetween.

* * * * *