

70029 U.S. PTO



07/28/97

Patterson & Keough, P.A.
1200 Rand Tower
527 Marquette Avenue South
Minneapolis, Minnesota 55402-1314
Telephone: (612) 349-5740
Facsimile: (612) 349-9266

\$

65703 U.S. PTO
08/901144
07/28/97

A

Attorney Docket No.: 1304.58-US-01

APPLICATION TRANSMITTAL

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of
INVENTOR(S): James Edwin Giff, Paul James Mahoney
FOR: IMPROVED VALVE ENCLOSURE ASSEMBLY

Enclosed are:

- Seven (7) sheets of drawings (Figs. 1-11).
- An assignment of the invention to Select Comfort Corporation.
- Certified copy(ies) of a _____ application.
- An Information Disclosure Statement.
- A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27.
- Declaration for United States Patent Application.

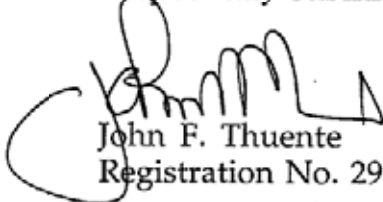
The filing fee has been calculated as shown below:

FOR:	NO. FILED	NO. EXTRA	RATE	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
				FEE	OR	RATE	FEE
BASIC FEE				\$385	OR		\$770
TOTAL CLAIMS	32-20 =	12	x 11 =		OR	x 22 =	\$264
INDEP CLAIMS	3-3 =	0	x 40 =		OR	x 80 =	
— Presence of Multiple Dependent Claim			+130 =		OR	+260	
			TOTAL		OR	TOTAL	\$1,034

* If the difference is less than zero, enter "0".

- A check in the amount of \$1,074.00 to cover the filing fee and Assignment recording fee is attached. The Commissioner is hereby authorized to grant any extensions of time and to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required during the entire pendency of this application to Deposit Account No. 16-0631.

Respectfully submitted,


John F. Thuente
Registration No. 29,595

CERTIFICATE OF EXPRESS MAIL

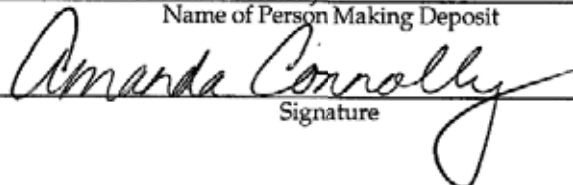
Express Mail Label No. EM443667971US

Date of Deposit July 28, 1997

I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Amanda Connolly

Name of Person Making Deposit


Signature

0890144-072897
68220-4410680

IMPROVED 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 Figure 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.

08901144-072897
68270-4470680

68270-1110680

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

68270 4470680

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

0890444-072897
68220-4470680

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;

68220: 44F0680

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

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

Figure 2 is an air inflatable mattress system having right and left inflatable bladders;

Figure 3 is a perspective view of the improved valve enclosure assembly of the present invention;

Figure 4 is an exploded perspective view of the improved valve enclosure assembly;

70689444-02268

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

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

Figure 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;

Figure 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;

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

Figure 10 is perspective view of the inner face of the rear cover of the improved valve enclosure; and

Figure 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 at 100 in the Figures. Referring to Figure 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

268240-441F0680

the housing of the pump 112. Pump 112 may be made substantially in accordance with the pump 12 of Figure 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 Figure 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 Figures 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 (Figure 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.

268220-4470680

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 Figure 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 Figures 3, 4, 6, and 11, the enclosure 130 that is the second of the two main structural components of the improved valve enclosure

68270-4470680

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 Figure 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 Figure 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 Figure 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 Figure 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

768220-4470680

268220-11110680

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 Figures 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. Figure 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 Figures 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 Figure 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 Figure 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

768260" HT 10680

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 Figure 7, the plunger 214 is stopped by the gasket hanger 160. At its left-most disposition, as depicted in Figure 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 Figure 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

68220 4470680

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 Figure 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 Figure 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 Figure 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 .25 and .4 pounds and the optimum force being approximately .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

768270-14110680

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 Figure 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 Figure 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 Figure 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.

68220-4470680

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; 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.

2. The improved valve enclosure assembly of claim 1 wherein the pressure monitor means continuously monitors the pressure in the at least one bladder during an inflate/deflate cycle.

3. The improved valve enclosure assembly of claim 1 wherein the pressure monitor means monitors the pressure in the at least one bladder by monitoring the pressure in the air chamber.

08901444 072897
468270 444 F0680

4. The improved valve enclosure assembly of claim 1 further including 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.

5. The improved valve enclosure assembly of claim 1 wherein a plurality of guides and stops are disposed within the enclosure for correctly positioning components within the enclosure.

6. The improved valve enclosure assembly of claim 5 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.

7. The improved valve enclosure assembly of claim 1 further including at least one valve disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure.

8. The improved valve enclosure assembly of claim 7 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.

46820-4470680

9. The improved valve enclosure assembly of claim 1 further including at least one valve disposed within the enclosure, the at least one valve having a valve member, the valve member being biased in sealed disposition by the compressed air in the bladder.

10. The improved valve enclosure assembly of claim 1 further including at least a second valve disposed within the enclosure, the at least a second valve for exhausting compressed air from the enclosure.

11. The improved valve enclosure assembly of claim 9 wherein the at least one valve is fluidly coupled to a first bladder of the inflatable mattress and further including at least a second valve disposed within the enclosure, the at least a second valve being fluidly coupled to a second bladder of the inflatable mattress.

12. The improved valve enclosure assembly of claim 11 further including at least a third valve disposed within the enclosure, the at least a third valve for exhausting compressed air from the enclosure.

13. The improved valve enclosure assembly of claim 1 wherein the enclosure is 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.

14. The improved valve enclosure assembly of claim 13 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.

15. The improved valve enclosure assembly of claim 14 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

16. 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;

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;

68904144-072297

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.

17. The method of claim 16, the mattress having a plurality of air bladders, further including the steps of:

providing a commanded desired pressure of a selected one of the plurality of bladders;

opening a valve fluid coupled to the selected one of the plurality of bladders.

18. The method of claim 16 wherein the existing pressure in the bladder is continuously monitored at a tap on a valve enclosure assembly.

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;

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.

20. The improved valve enclosure assembly of claim 19 wherein the at least one valve has a valve housing, pressure monitor means being formed integral with said valve housing.

21. The improved valve enclosure assembly of claim 19 further including 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.

22. The improved valve enclosure assembly of claim 19 wherein a plurality of guides and stops are disposed within the enclosure for correctly positioning components within the enclosure.

23. The improved valve enclosure assembly of claim 22 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.

24. The improved valve enclosure assembly of claim 19 further including at least one valve disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure.

25. The improved valve enclosure assembly of claim 24 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.

26. The improved valve enclosure assembly of claim 19 further including at least one valve disposed within the enclosure, the at least one valve having a valve member, the valve member being biased in sealed disposition by the compressed air in the bladder.

68270-4410680

27. The improved valve enclosure assembly of claim 19 further including at least a second valve disposed within the enclosure, the at least a second valve for exhausting compressed air from the enclosure.

28. The improved valve enclosure assembly of claim 26 wherein the at least one valve is fluidly coupled to a first bladder of the inflatable mattress and further including at least a second valve disposed within the enclosure, the at least a second valve being fluidly coupled to a second bladder of the inflatable mattress.

29. The improved valve enclosure assembly of claim 28 further including at least a third valve disposed within the enclosure, the at least a third valve for exhausting compressed air from the enclosure.

30. The improved valve enclosure assembly of claim 19 wherein the enclosure is 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.

31. The improved valve enclosure assembly of claim 30 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.

32. The improved valve enclosure assembly of claim 31 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

268220" 1111FO680

IMPROVED VALVE ENCLOSURE ASSEMBLY

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.

0890144-072897

PRIOR ART
Fig. 1

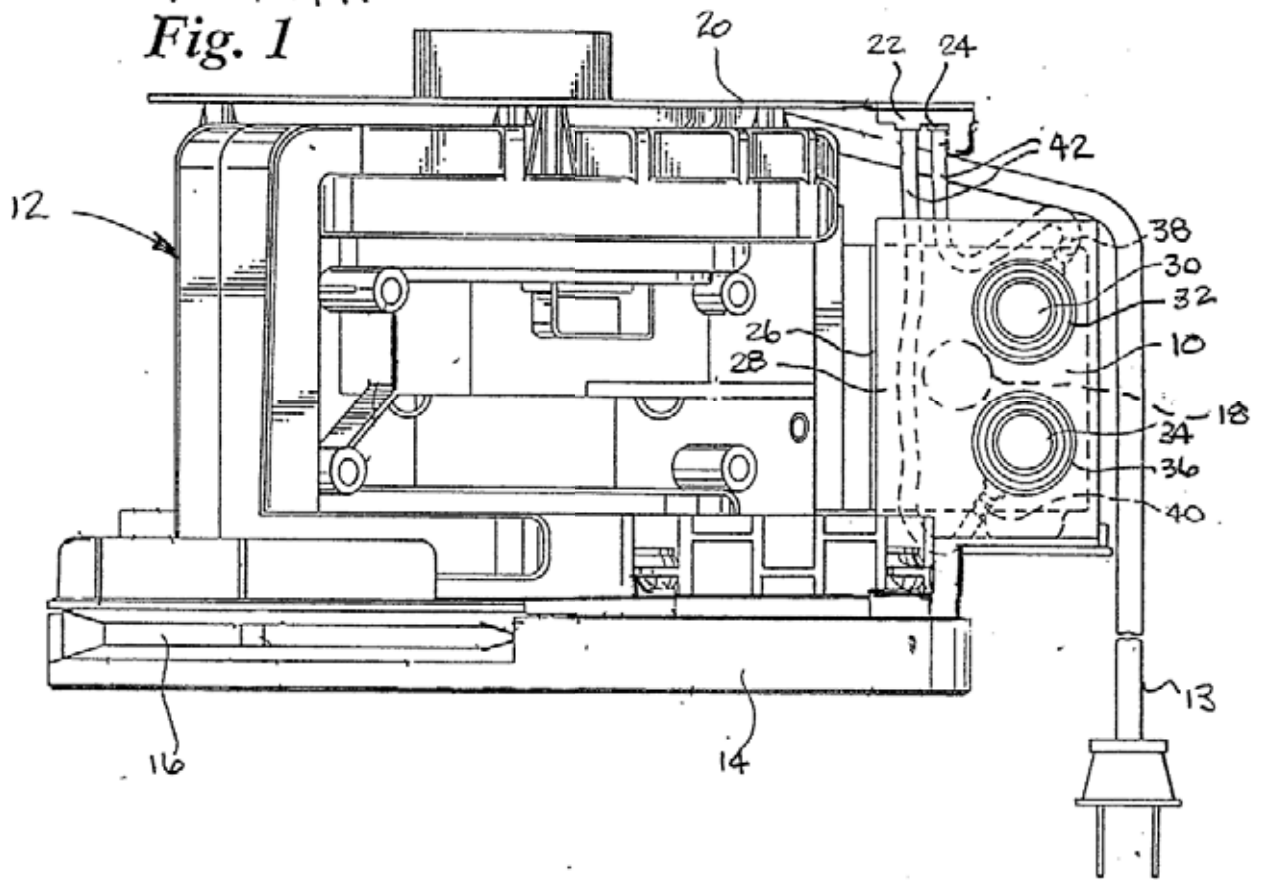
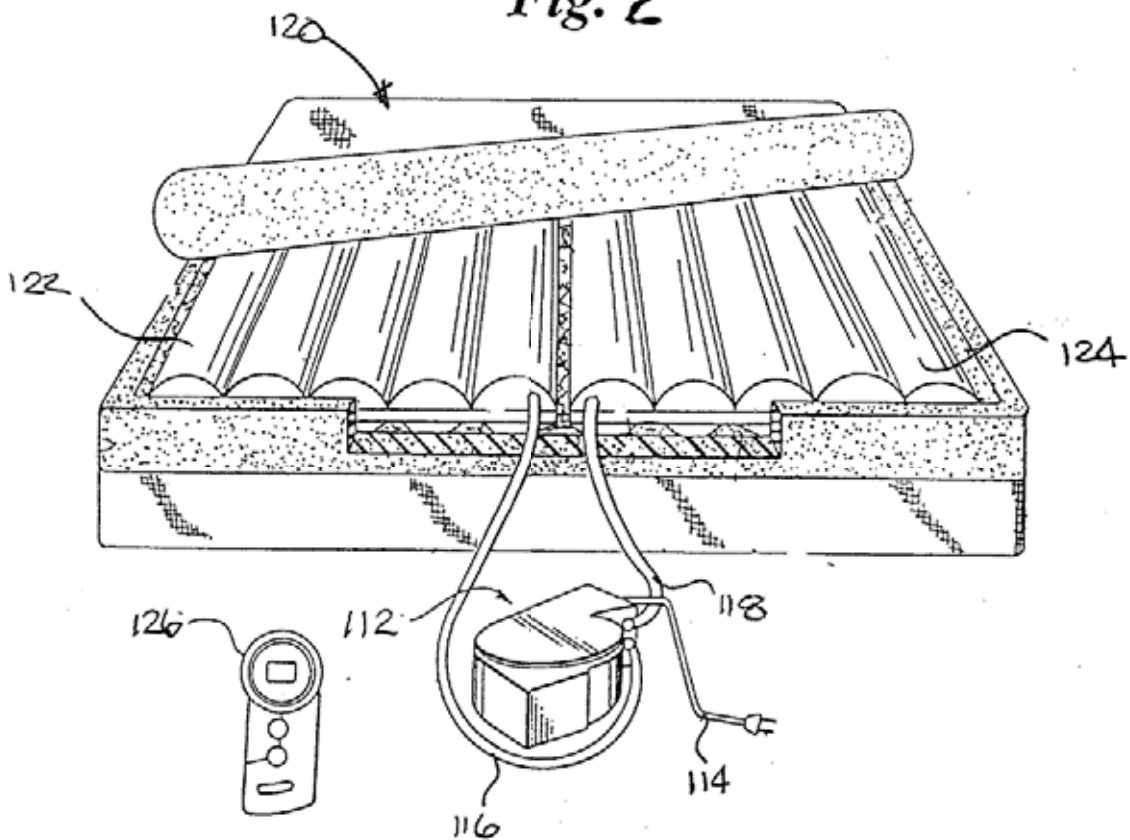
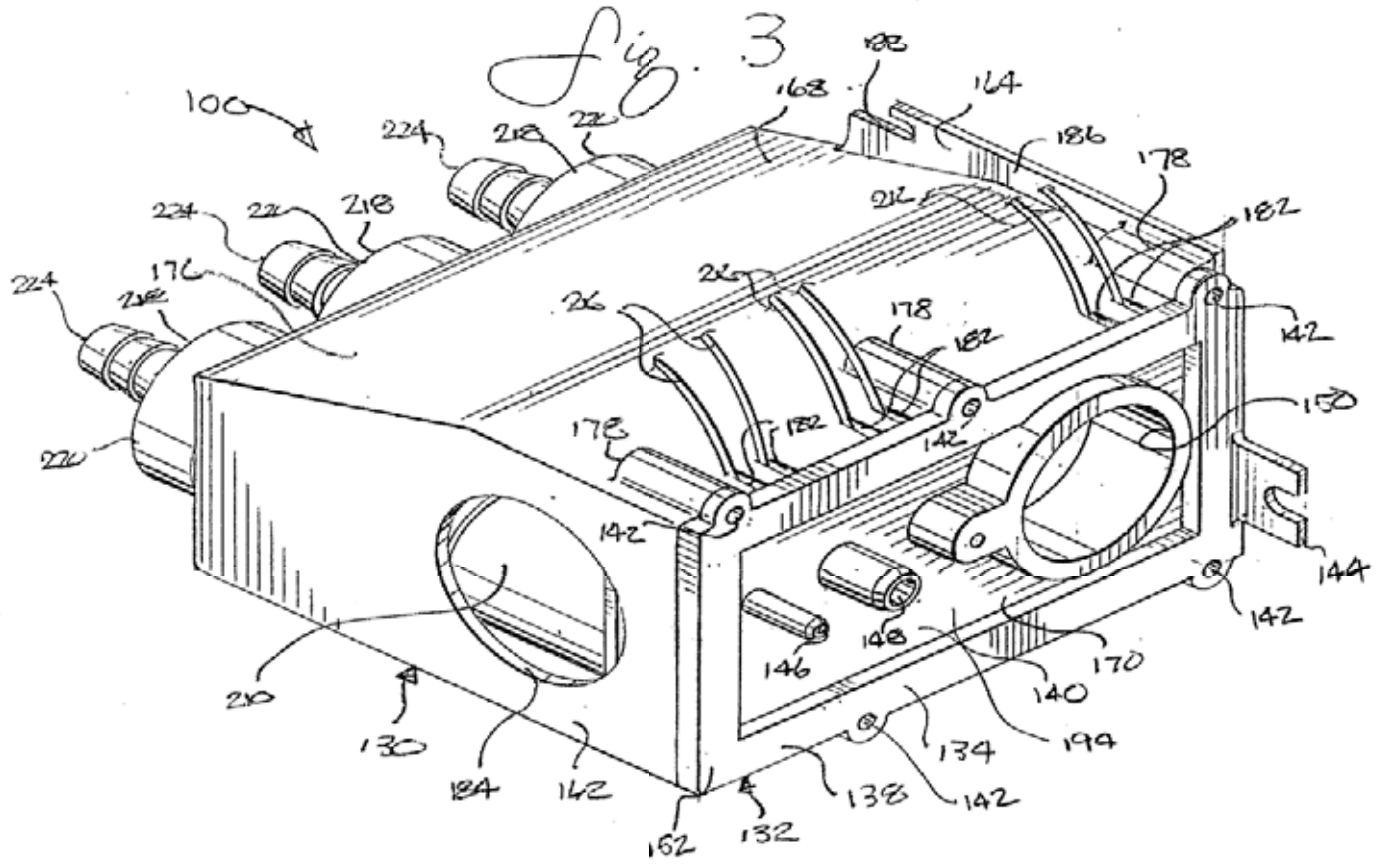


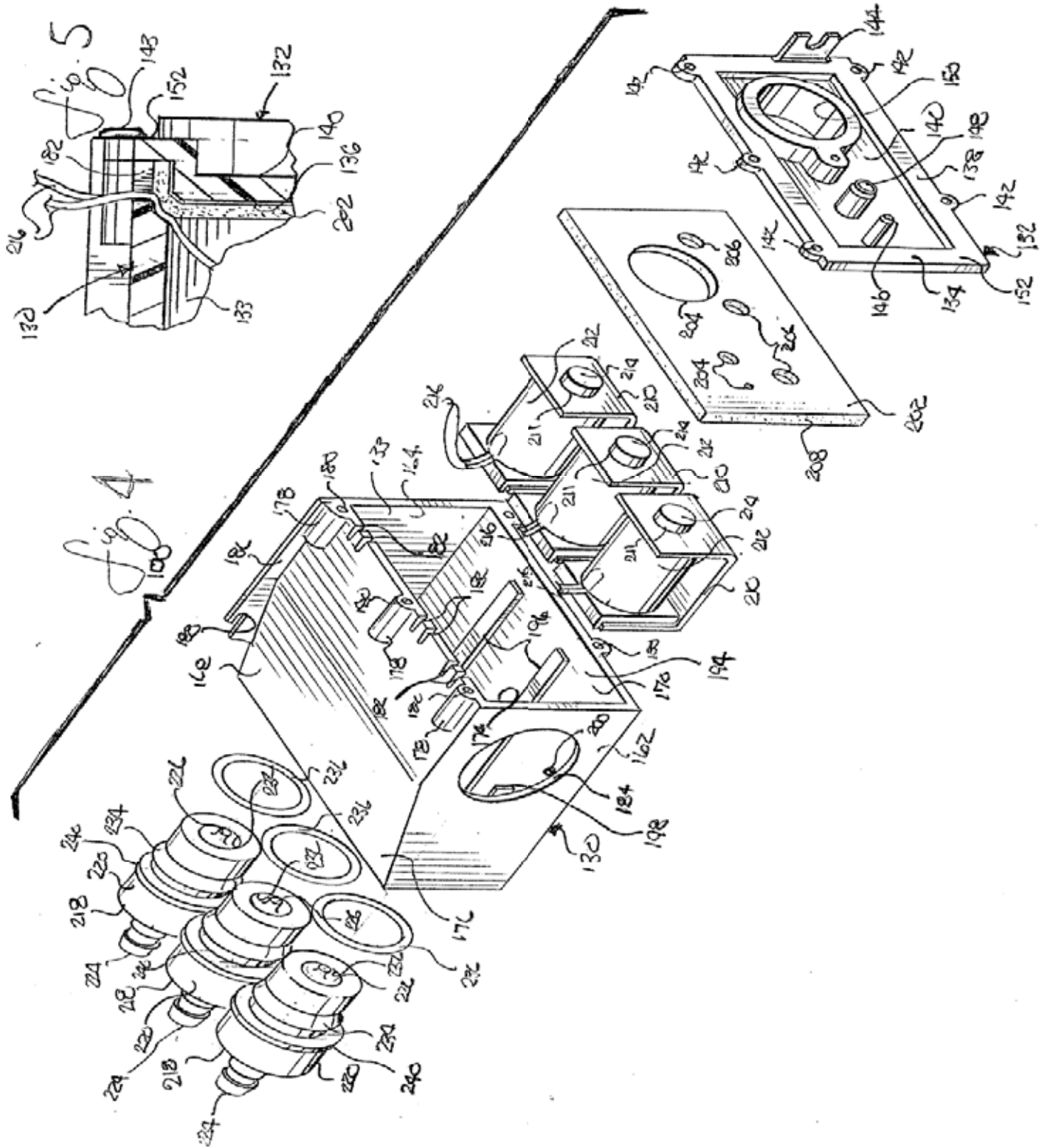
Fig. 2



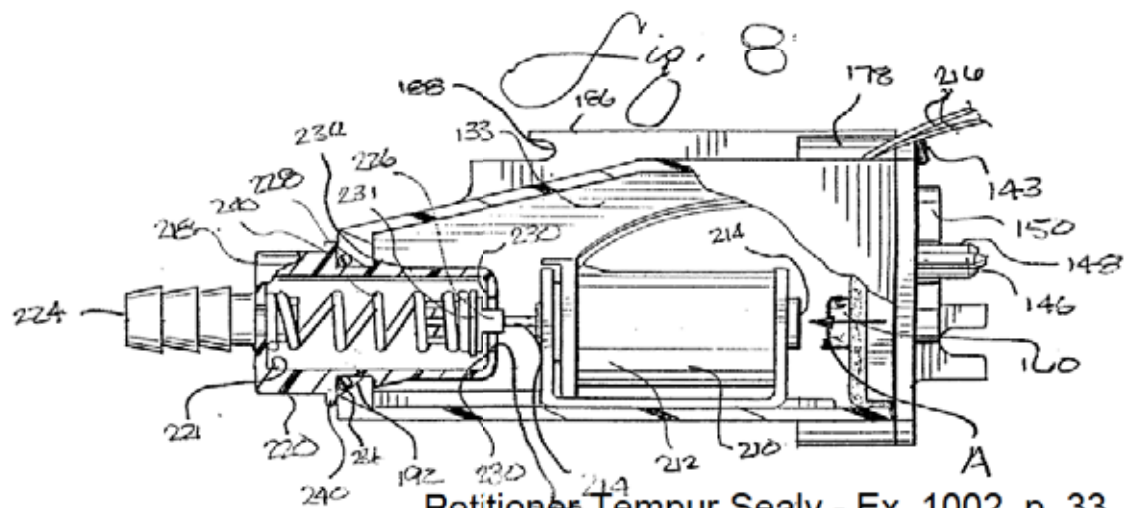
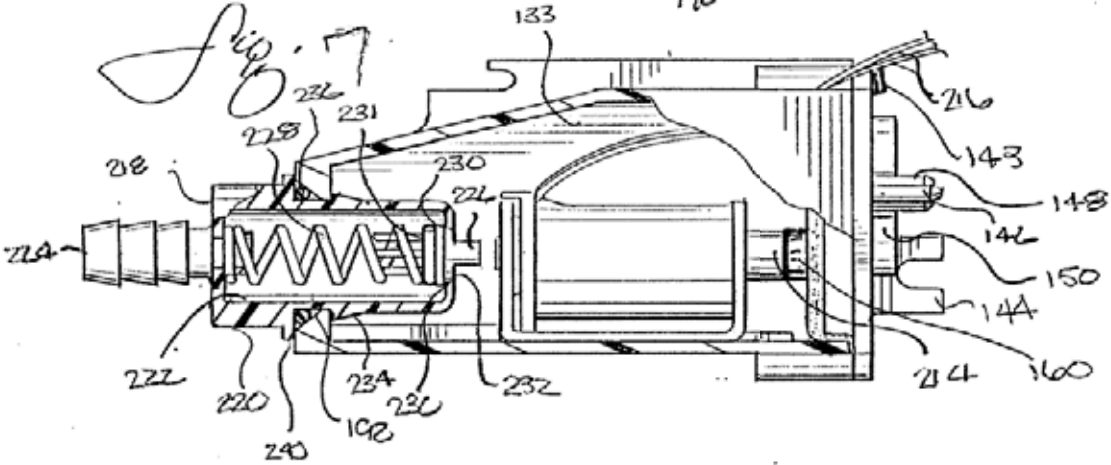
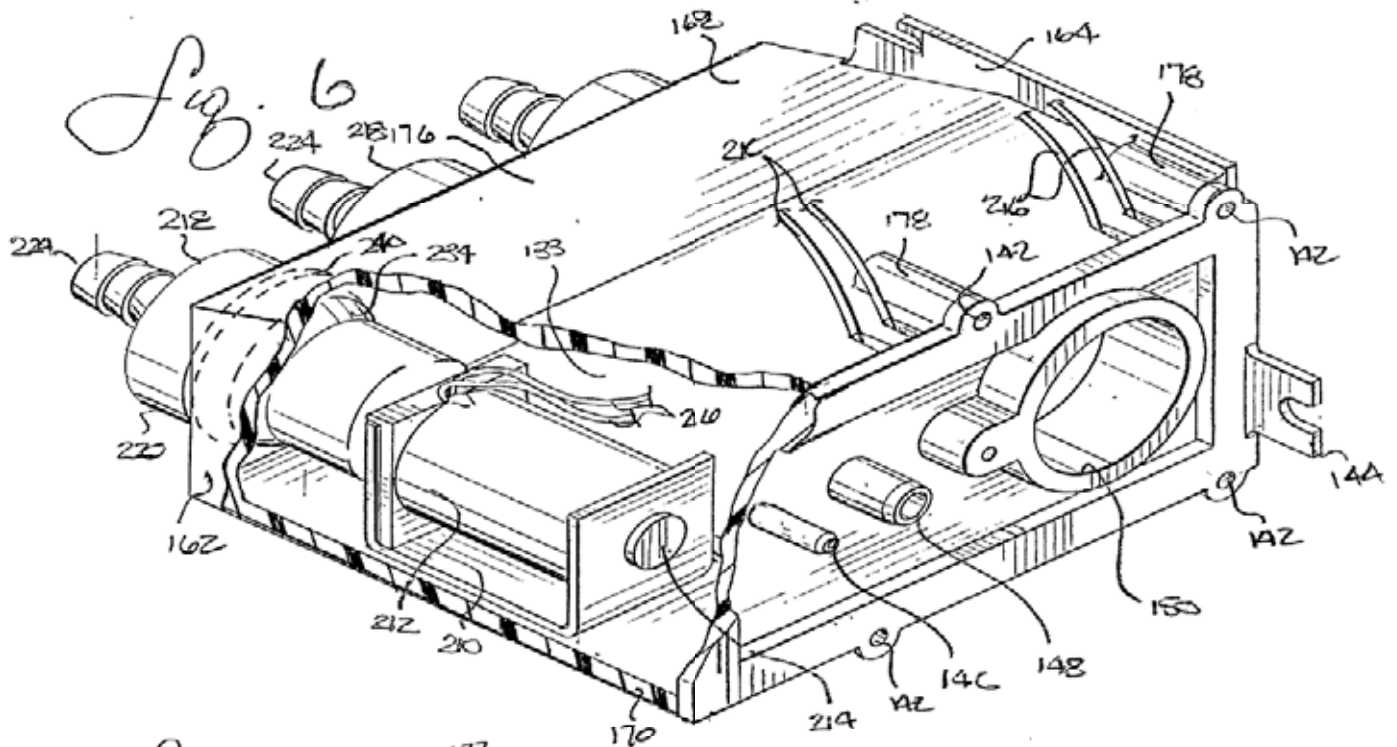
68270-4470680

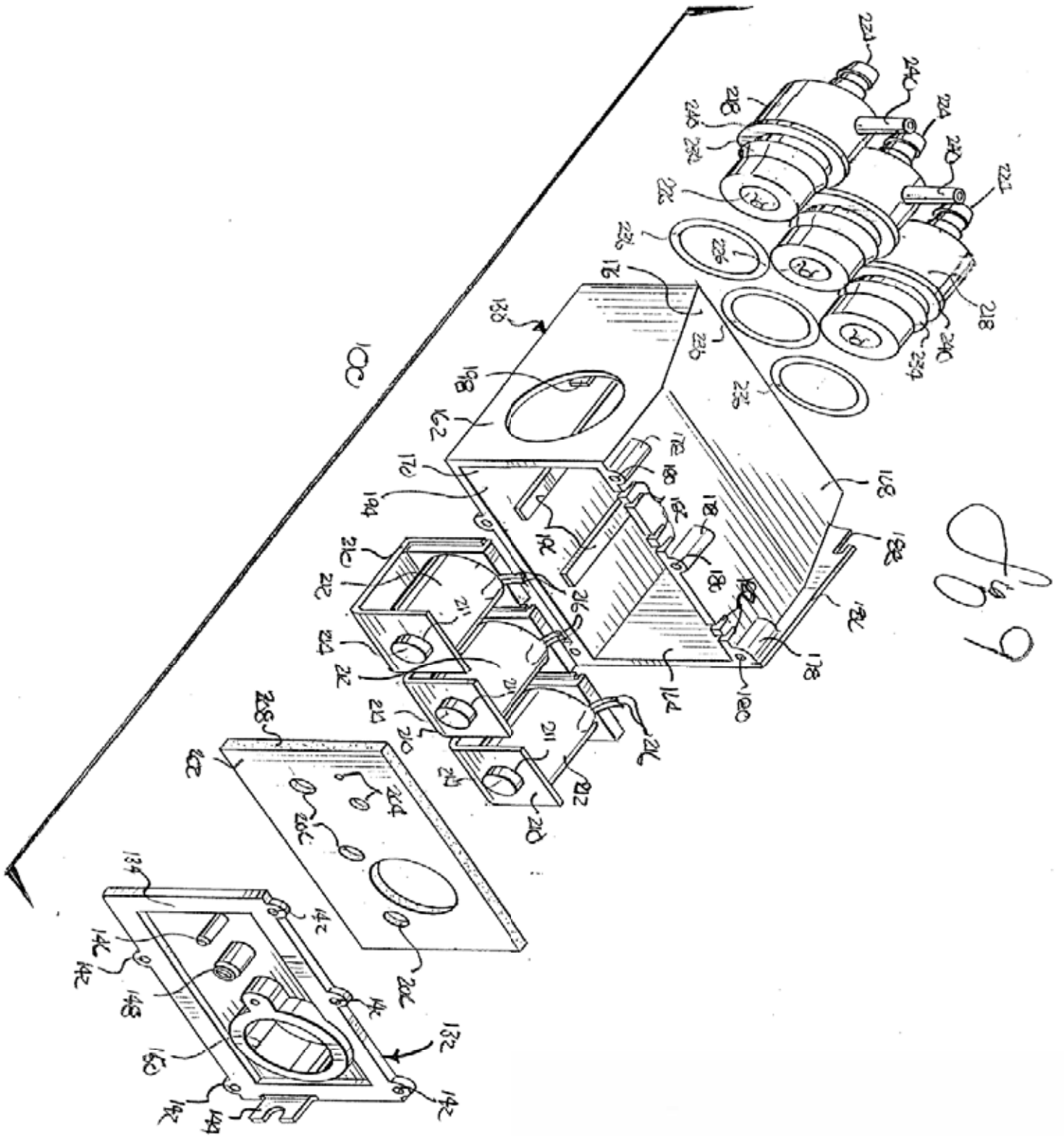
089901144-072897





08901144.072897





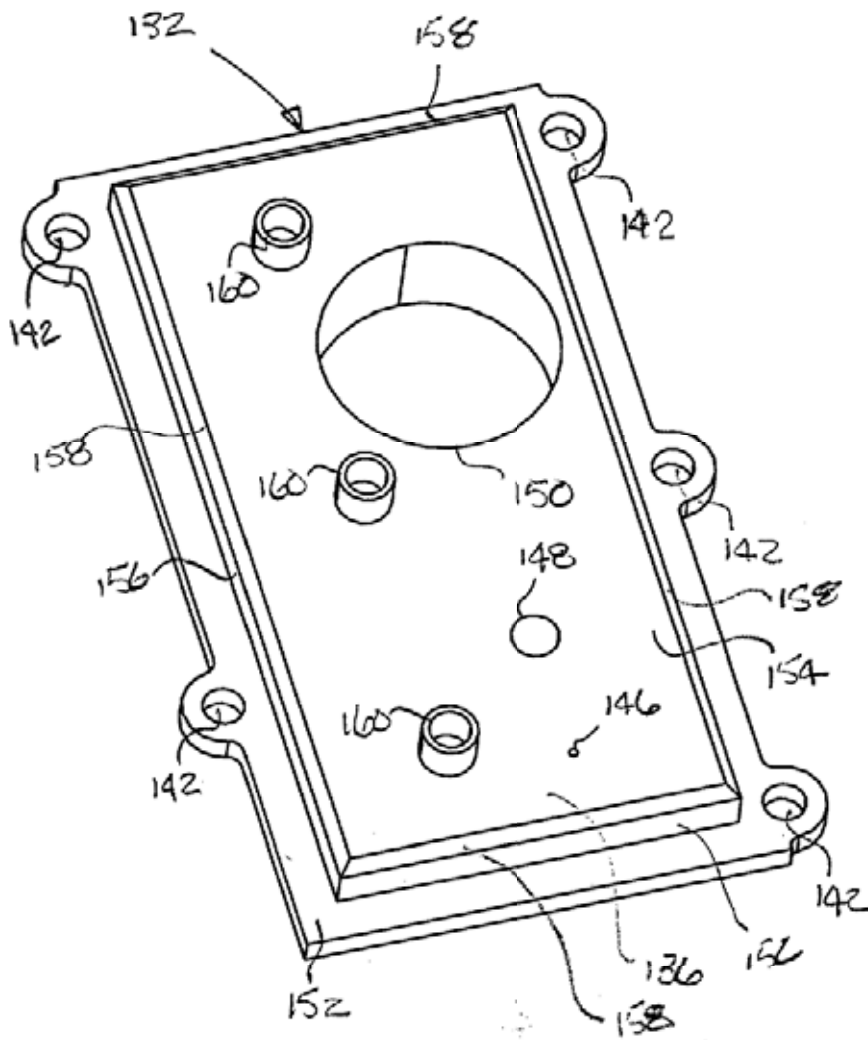
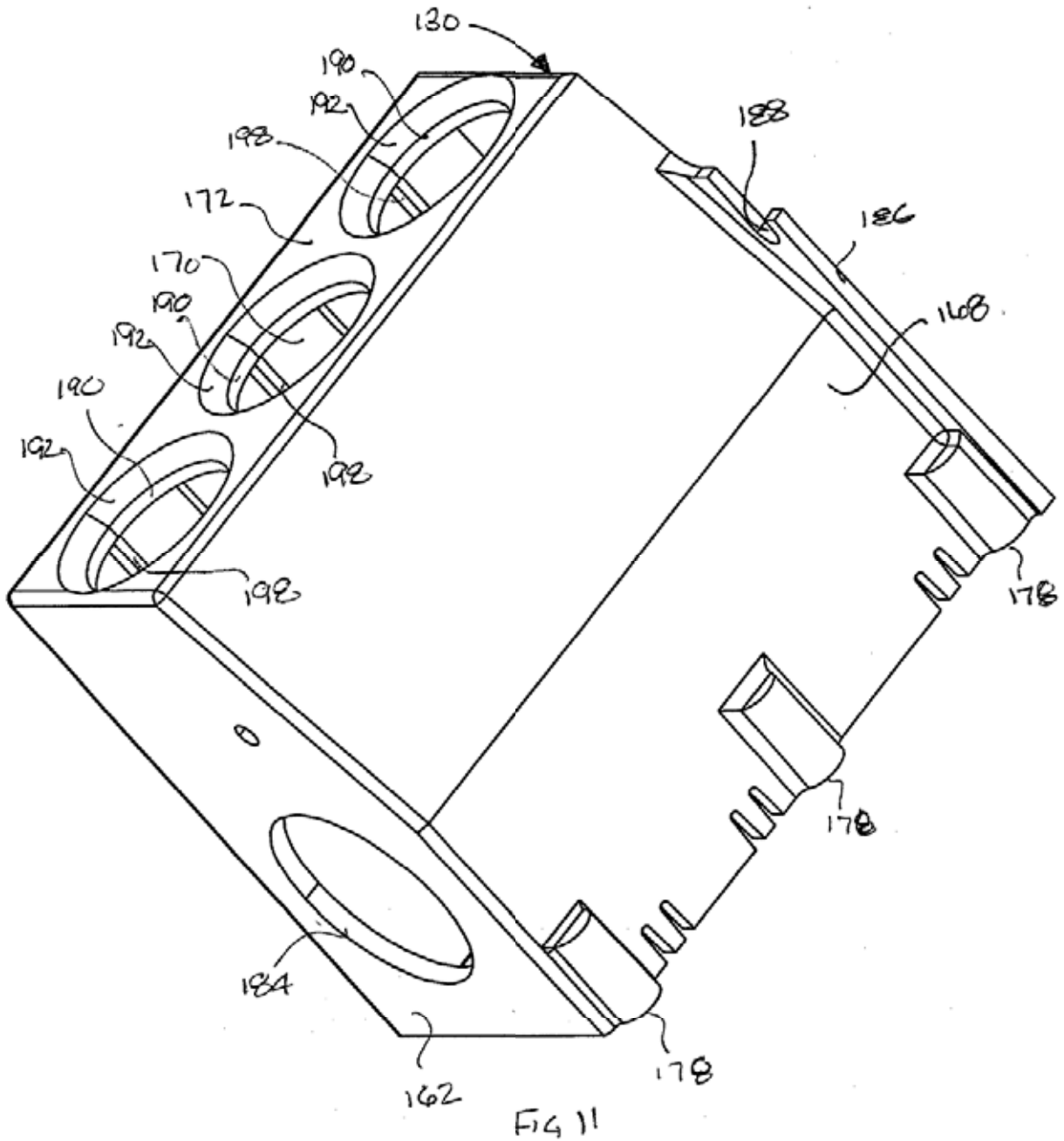


FIG 10

0890144-072897



DECLARATION FOR UNITED STATES PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled IMPROVED VALVE ENCLOSURE ASSEMBLY, the specification of which is attached hereto unless the following is checked:

The specification was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Claimed
(Number)	(Country)	(Day/Month/Year Filed)	(Yes/No)
(Number)	(Country)	(Day/Month/Year Filed)	(Yes/No)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application Number) (Filing Date)

(Application Number) (Filing Date)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

08901144-072897

(Application Number) (Filing Date) (Status - patented, pending, abandoned)

(Application Number) (Filing Date) (Status - patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

James H. Patterson (30,673), Steven J. Keough (33,190), John F. Thuente (29,595), William M. Hienz III (37,069), Paul W. Stanga (38,320), William L. Alexander (37,269), Girma Wolde-Michael (36,724), and Kimberly K. Baxter (P-40,504).

Address all telephone calls to: John F. Thuente at telephone number (612) 349-5747

Address all correspondence to: John F. Thuente
Patterson & Keough, P.A.
1200 Rand Tower, 527 Marquette Avenue South
Minneapolis, Minnesota 55402-1314

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

James Edwin Giff

Full name of sole or first inventor (given name, family name)

James Edwin Giff
Inventor's signature

7/26/97
Date

Maple Grove, Minnesota

Residence (City and either State or Foreign Country)

U.S.
Citizenship

c/o Select Comfort Corporation, 6105 Trenton Lane North, Minneapolis, Minnesota 55442
Post Office Address

Paul James Mahoney

Full name of second joint inventor, if any (given name, family name)

Paul James Mahoney
Second Inventor's signature

7-28-97
Date

Stillwater, Minnesota

Residence (City and either State or Foreign Country)

U.S.
Citizenship

c/o Select Comfort Corporation, 6105 Trenton Lane North, Minneapolis, Minnesota 55442
Post Office Address

[] Additional inventors are named on the attached sheets.

70029 U.S. PTO
 07/28/97

Patterson & Keough, P.A.
 1200 Rand Tower
 527 Marquette Avenue South
 Minneapolis, Minnesota 55402-1314
 Telephone: (612) 349-5740
 Facsimile: (612) 349-9266

\$

65703 U.S. PTO
 08/901144
 07/28/97

A

Attorney Docket No.: 1304.58-US-01

APPLICATION TRANSMITTAL

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of
 INVENTOR(S): James Edwin Giff, Paul James Mahoney
 FOR: IMPROVED VALVE ENCLOSURE ASSEMBLY

Enclosed are:

- Seven (7) sheets of drawings (Figs. 1-11).
- An assignment of the invention to Select Comfort Corporation.
- Certified copy(ies) of a _____ application.
- An Information Disclosure Statement.
- A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27.
- Declaration for United States Patent Application.

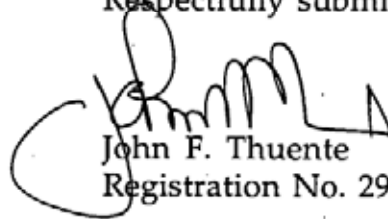
The filing fee has been calculated as shown below:

FOR:	NO. FILED	NO. EXTRA	RATE	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
				FEE	OR	RATE	FEE
BASIC FEE				\$385	OR		\$770
TOTAL CLAIMS	32-20 =	12	x 11 =		OR	x 22 =	\$264
INDEP CLAIMS	3-3 =	0	x 40 =		OR	x 80 =	
— Presence of Multiple Dependent Claim			+130 =		OR	+260	
			TOTAL		OR	TOTAL	\$1,034

* If the difference is less than zero, enter "0".

- [X] A check in the amount of \$1,074.00 to cover the filing fee and Assignment recording fee is attached. The Commissioner is hereby authorized to grant any extensions of time and to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required during the entire pendency of this application to Deposit Account No. 16-0631.

Respectfully submitted,


John F. Thuent
Registration No. 29,595

CERTIFICATE OF EXPRESS MAIL


Express Mail Label No. EM443667971US

Date of Deposit July 28, 1997

I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Amanda Connolly

Name of Person Making Deposit


Signature

68220-4410680

PRIOR ART
Fig. 1

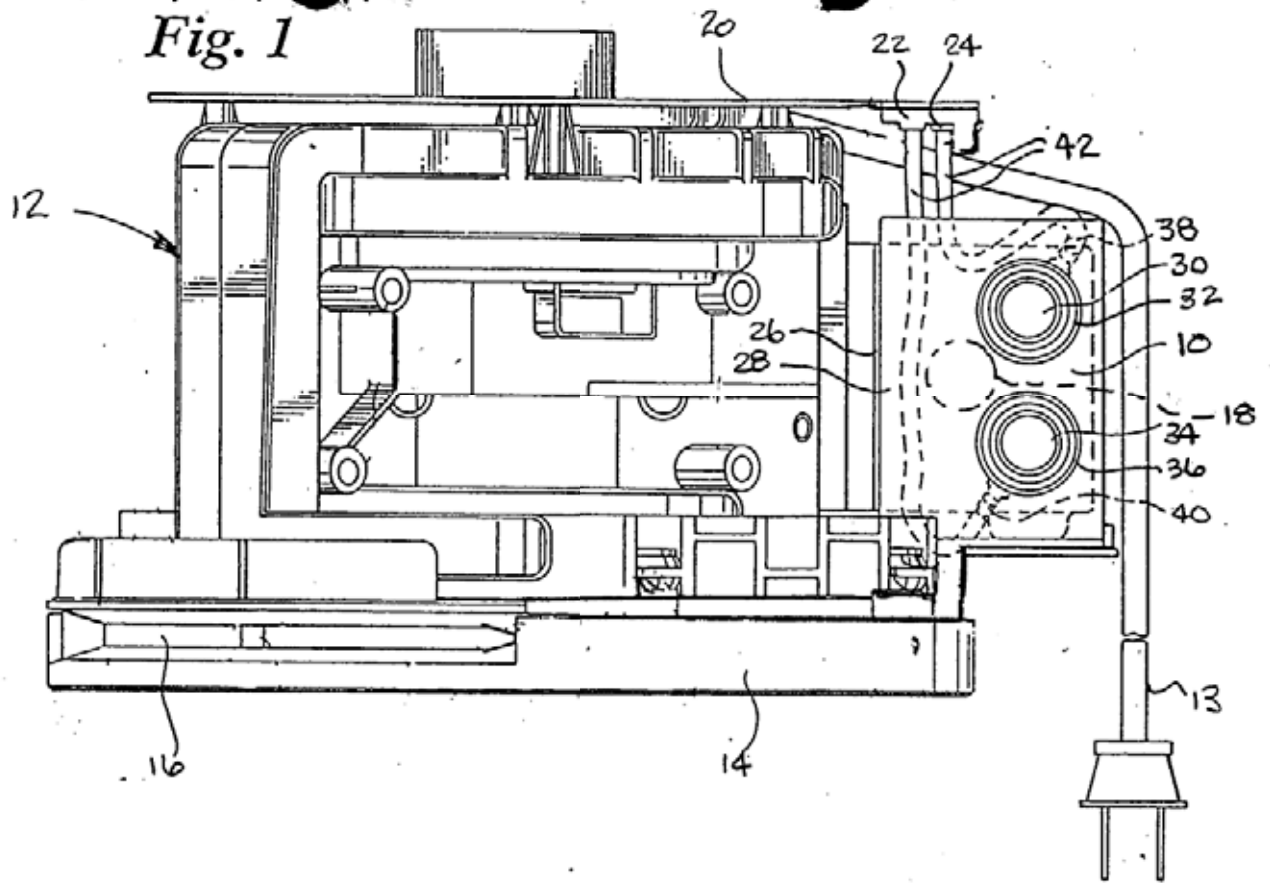
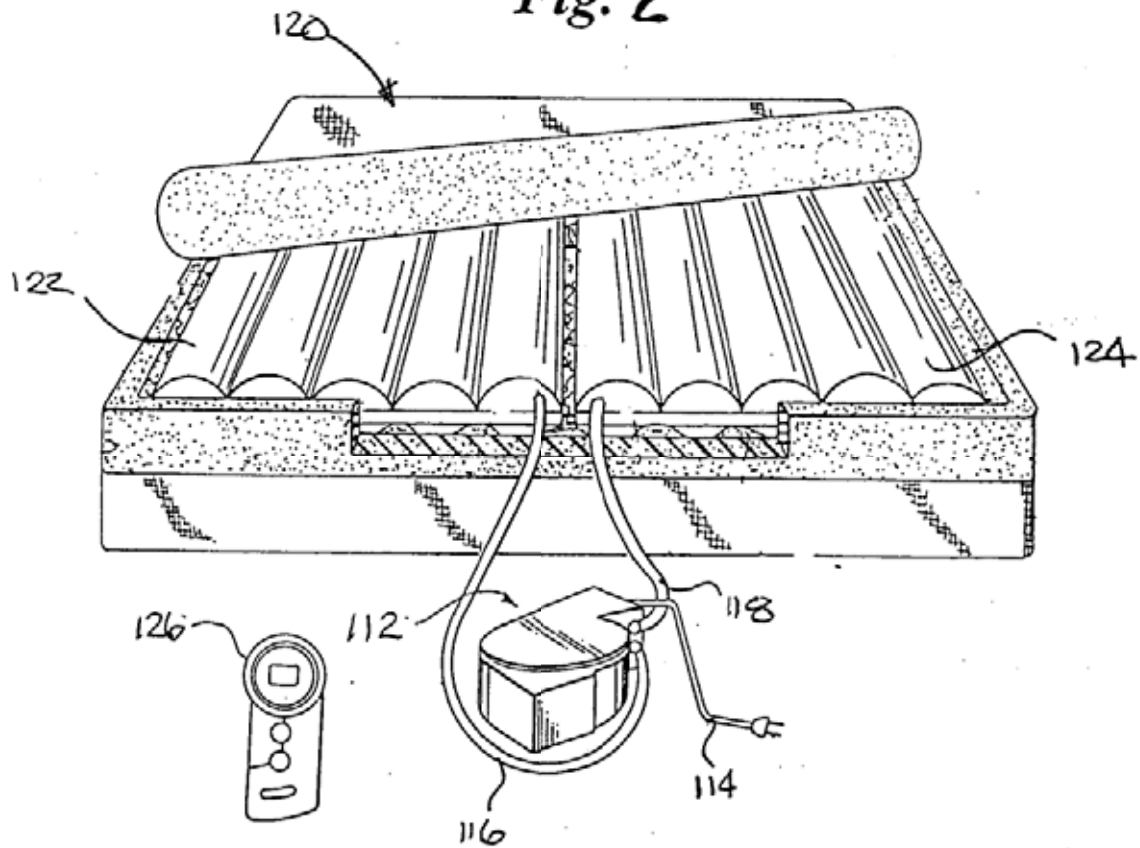
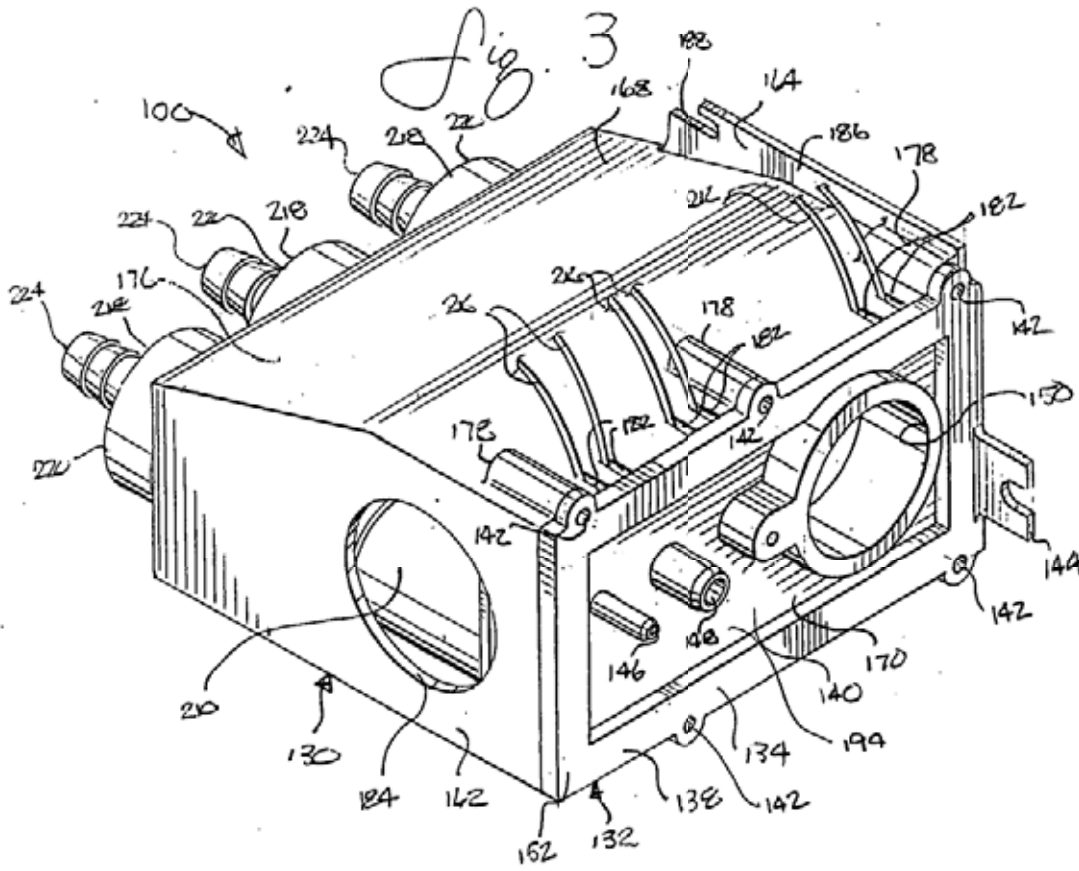


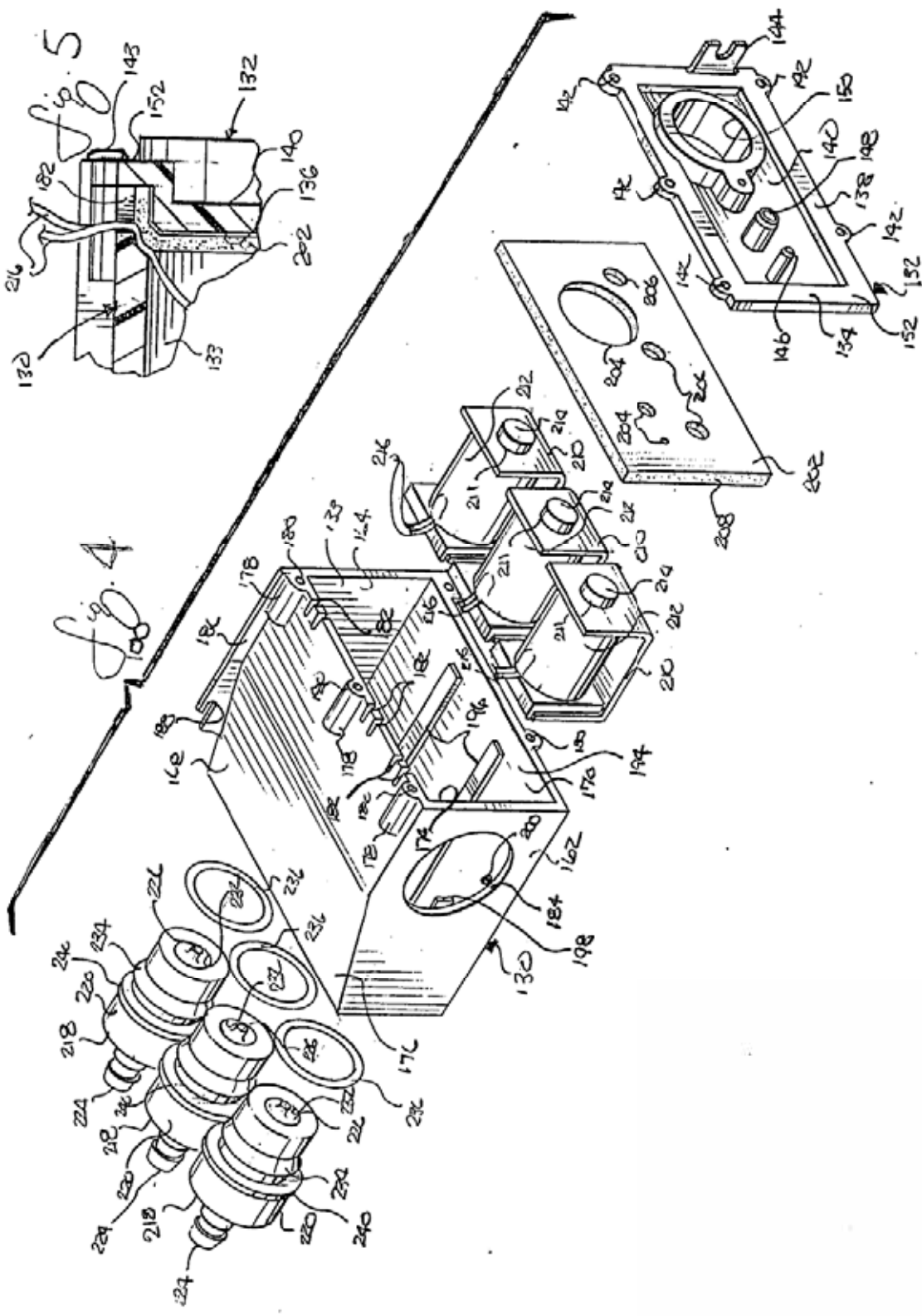
Fig. 2



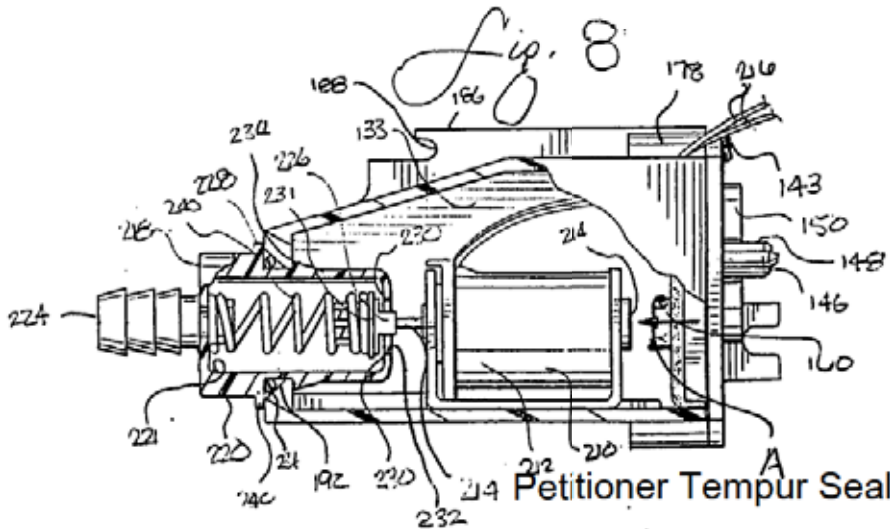
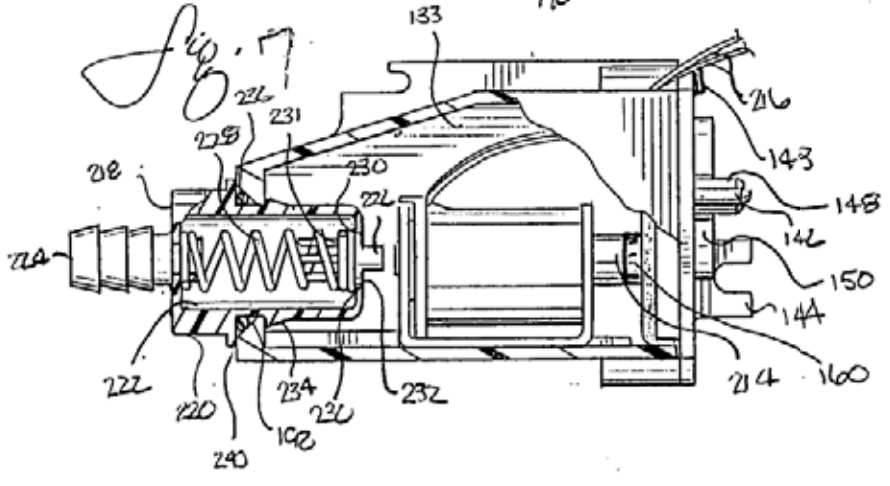
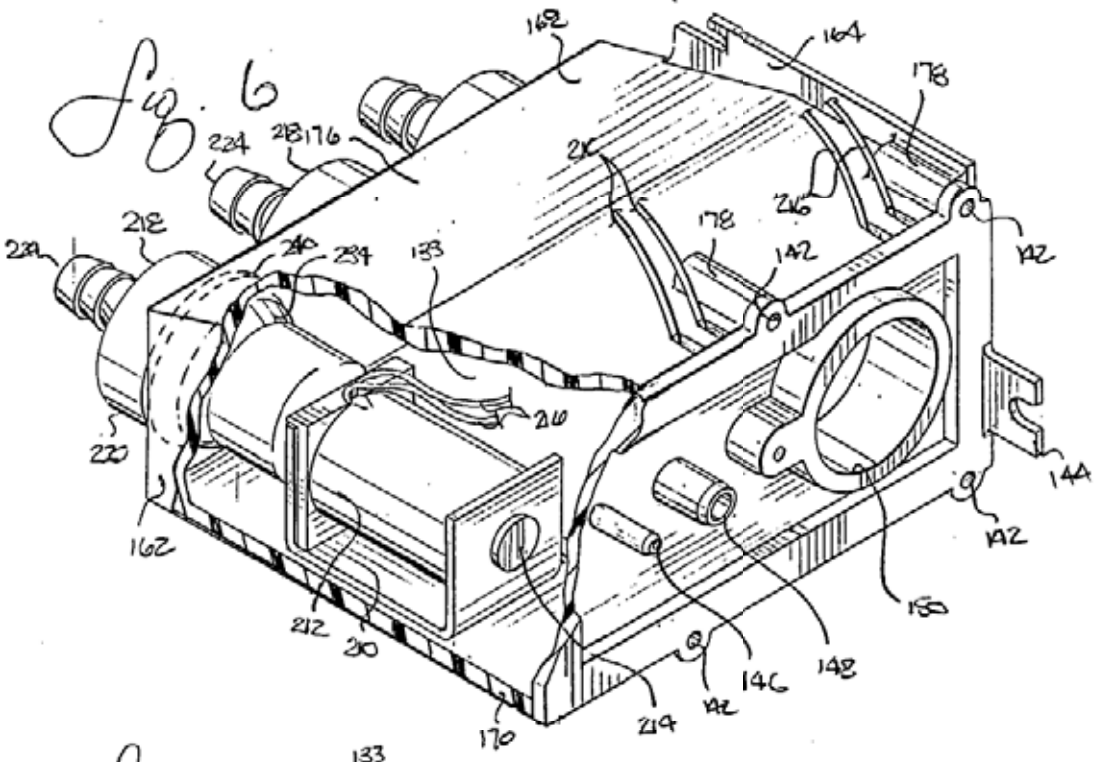
08901144-072897

08901144.072897





08901144.072897



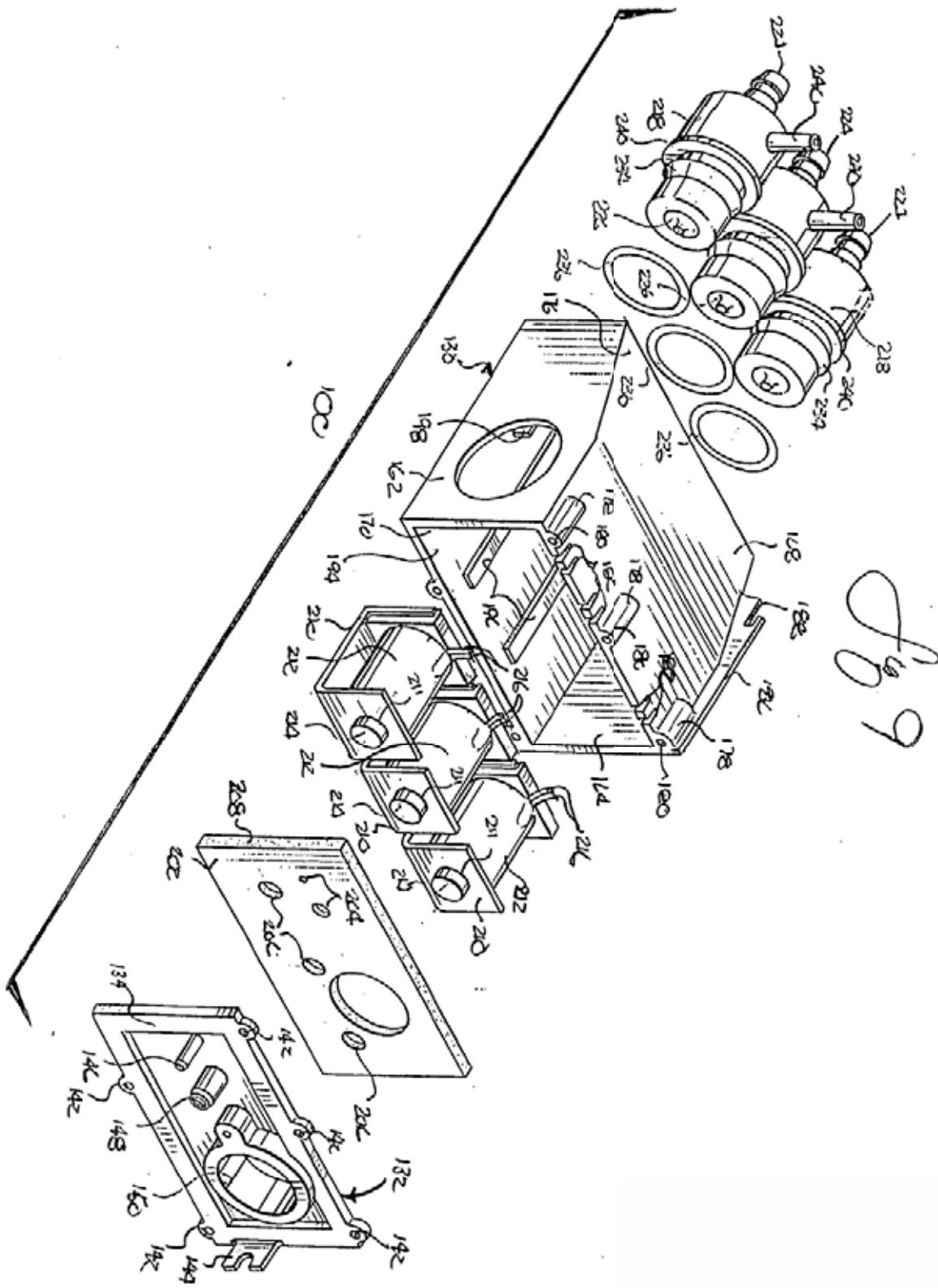


Fig 9

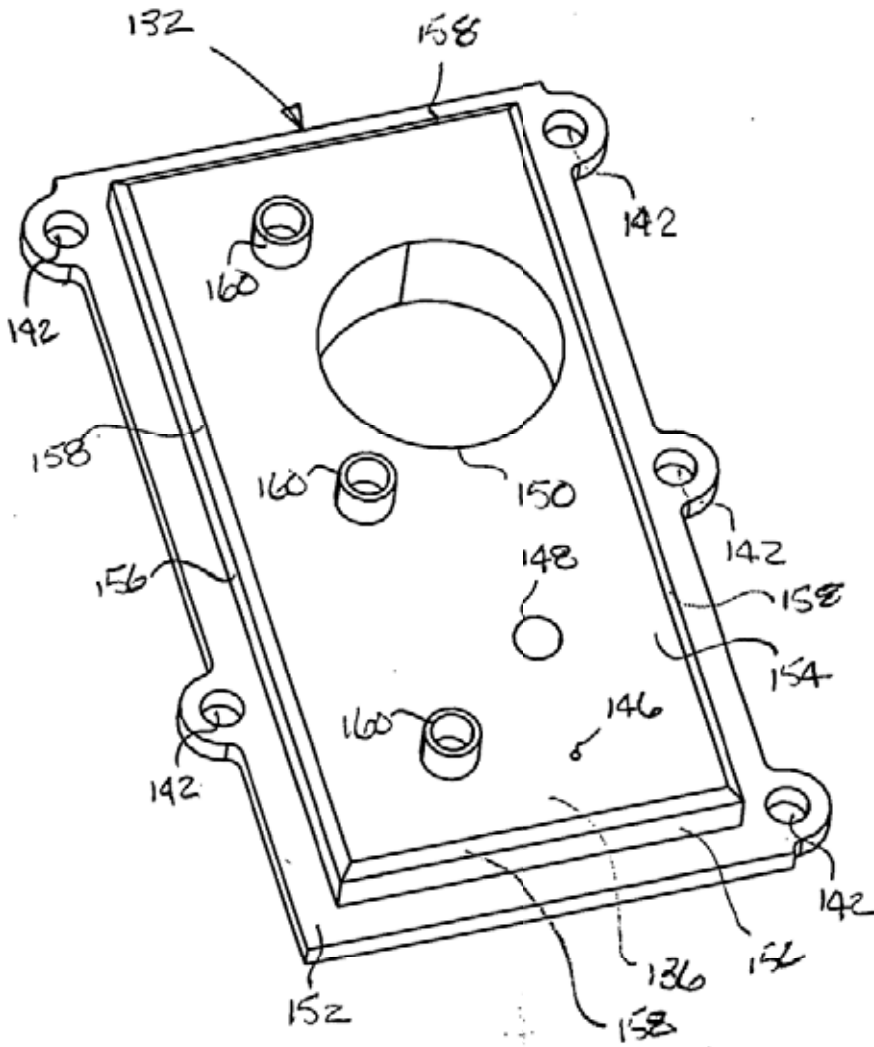
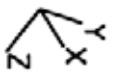
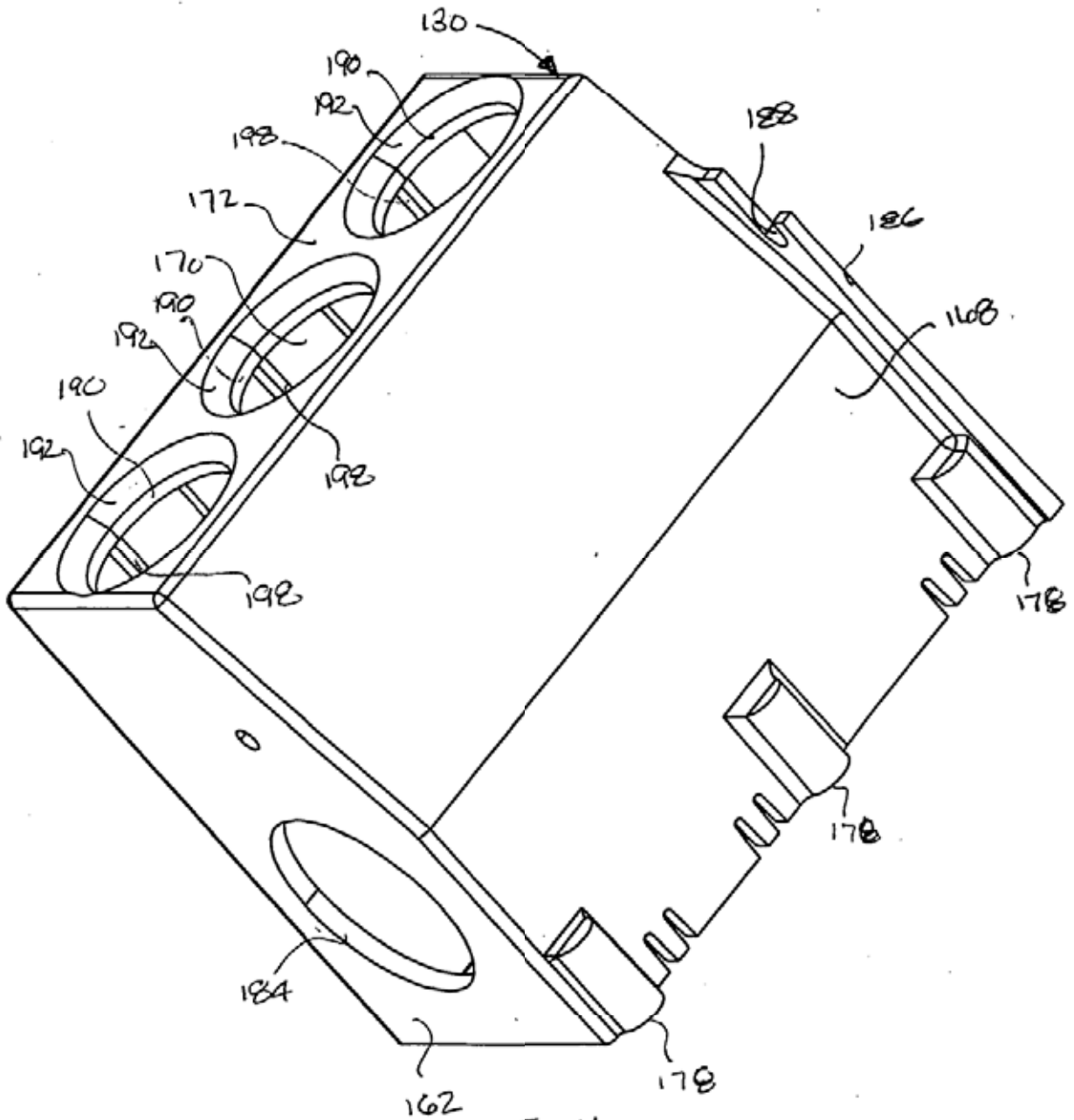


FIG 10

08901144-072897



08/201,144

IMPROVED 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 Figure 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.

08901144-072897

2

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

08901144.072897

3

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.

468240*44T10680

4

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

08901144-072897

S

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;

468240*HHFD680

6

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

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

Figure 2 is an air inflatable mattress system having right and left inflatable bladders;

Figure 3 is a perspective view of the improved valve enclosure assembly of the present invention;

Figure 4 is an exploded perspective view of the improved valve enclosure assembly;

68240 hht10680

7

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

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

Figure 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;

Figure 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;

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

Figure 10 is perspective view of the inner face of the rear cover of the improved valve enclosure; and

Figure 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} at 100 in the Figures. Referring to Figure 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

08901144-072897

8

the housing of the pump 112. Pump 112 may be made substantially in accordance with the pump 12 of Figure 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 Figure 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 Figures 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 (Figure 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.

0890144-02897
268220-1410680

9

08901144-072897
468240" 44TT0880

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 Figure 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 Figures 3, 4, 6, and 11, the enclosure 130 that is the second of the two main structural components of the improved valve enclosure

10

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 Figure 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

08901144-072897

11

112 by means of a screw inserted therein and threaded into a bore defined in the housing of the fan 112.

Referring to Figure 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 Figure 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 Figure 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

12

68240"44T0680

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 Figures 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. Figure 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 Figures 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 Figure 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

13

2025 RELEASE UNDER E.O. 14176

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 Figure 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

14

08901144-072897

468270-4470680

solonoid stops 198. The solonoid 210 is then held in position by screws passing through the screw bores 200 into the underside of the solonoid 210. The leads 216 of the solonoid 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 Figure 7, the plunger 214 is stopped by the gasket hanger 160. At its left-most disposition, as depicted in Figure 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 Figure 5. The compression of the deformable gasket therein fluidly seals the rear cover 132 and the enclosure 130, including sealing around the solonoid 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 solonoid 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 Figure 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 Figure 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 Figure 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 .25 and .4 pounds and the optimum force being approximately .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

16

468240 440680

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 Figure 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 Figure 2, a desired inflation of either the left bladder 122 or the right bladder 124 may be commanded.

17

08901144-072897

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 Figure 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.

08901144.072897

18

What is claimed is:

917
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; 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.

2. The improved valve enclosure assembly of claim 1 wherein the pressure monitor means continuously monitors the pressure in the at least one bladder during an inflate/deflate cycle.

3. The improved valve enclosure assembly of claim 1 wherein the pressure monitor means monitors the pressure in the at least one bladder by monitoring the pressure in the air chamber.

468220" h h T F 0680

4. The improved valve enclosure assembly of claim 1 further including 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.

5. The improved valve enclosure assembly of claim 1 wherein a plurality of guides and stops are disposed within the enclosure for correctly positioning components within the enclosure.

6. 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.

7. The improved valve enclosure assembly of claim 1 further including at least one valve disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure.

8. The improved valve enclosure assembly of claim 1 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.

468240-11110680

20

Q2

3

Q3

5

4

468270" 44T10680

9. The improved valve enclosure assembly of claim 1 further including at least one valve disposed within the enclosure, the at least one valve having a valve member, the valve member being biased in sealed disposition by the compressed air in the bladder.

10. The improved valve enclosure assembly of claim 1 further including at least a second valve disposed within the enclosure, the at least a second valve for exhausting compressed air from the enclosure.

11. The improved valve enclosure assembly of claim 9 wherein the at least one valve is fluidly coupled to a first bladder of the inflatable mattress and further including at least a second valve disposed within the enclosure, the at least a second valve being fluidly coupled to a second bladder of the inflatable mattress.

12. The improved valve enclosure assembly of claim 11 further including at least a third valve disposed within the enclosure, the at least a third valve for exhausting compressed air from the enclosure.

ay 13. The improved valve enclosure assembly of claim 1 wherein the enclosure is formed of an enclosure portion and a rear cover portion, a flexible seal

247

being compressively interposed between the enclosure portion and a rear cover portion to effect a substantially fluid tight seal therebetween.

7

The improved valve enclosure assembly of claim 13 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 14 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

16. 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;
- 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;

08901144-072897

21

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.

17. The method of claim 16, the mattress having a plurality of air bladders, further including the steps of:

providing a commanded desired pressure of a selected one of the plurality of bladders;

opening a valve fluid coupled to the selected one of the plurality of bladders.

18. The method of claim 16 wherein the existing pressure in the bladder is continuously monitored at a tap on a valve enclosure assembly.

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

468270-1110880

057

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; 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.

20. The improved valve enclosure assembly of claim 19 wherein the at least one valve has a valve housing, pressure monitor means being formed integral with said valve housing.

21. The improved valve enclosure assembly of claim 19 further including 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.

08901144-072897

af

22. The improved valve enclosure assembly of claim 19 wherein a plurality of guides and stops are disposed within the enclosure for correctly positioning components within the enclosure.

13. ~~23.~~ The improved valve enclosure assembly of claim ~~22~~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.

24. The improved valve enclosure assembly of claim 19 further including at least one valve disposed within the enclosure, the at least one valve being snap fit in an aperture defined in a wall of the enclosure.

25. The improved valve enclosure assembly of claim 24 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.

26. The improved valve enclosure assembly of claim 19 further including at least one valve disposed within the enclosure, the at least one valve having a valve member, the valve member being biased in sealed disposition by the compressed air in the bladder.

af

13

68220-44110680

a77

22

27. The improved valve enclosure assembly of claim 19 further including at least a second valve disposed within the enclosure, the at least a second valve for exhausting compressed air from the enclosure.

28. The improved valve enclosure assembly of claim 26 wherein the at least one valve is fluidly coupled to a first bladder of the inflatable mattress and further including at least a second valve disposed within the enclosure, the at least a second valve being fluidly coupled to a second bladder of the inflatable mattress.

29. The improved valve enclosure assembly of claim 28 further including at least a third valve disposed within the enclosure, the at least a third valve for exhausting compressed air from the enclosure.

30. The improved valve enclosure assembly of claim 19 wherein the enclosure is 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.

31. The improved valve enclosure assembly of claim 30 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.

08901144-072897

as

17

16

23

18 32. The improved valve enclosure assembly of claim 31 wherein the flexible seal fluidly seals the lead wires disposed in the lead grooves.

16

08901144-072897

24

IMPROVED VALVE ENCLOSURE ASSEMBLY

08/901144

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.

08901144-072897

DECLARATION FOR UNITED STATES PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled IMPROVED VALVE ENCLOSURE ASSEMBLY, the specification of which is attached hereto unless the following is checked:

The specification was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Claimed
(Number)	(Country)	(Day/Month/Year Filed)	(Yes/No)
(Number)	(Country)	(Day/Month/Year Filed)	(Yes/No)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application Number) (Filing Date)

(Application Number) (Filing Date)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Number) (Filing Date) (Status - patented, pending, abandoned)

(Application Number) (Filing Date) (Status - patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

James H. Patterson (30,673), Steven J. Keough (33,190), John F. Thuente (29,595), William M. Hienz III (37,069), Paul W. Stanga (38,320), William L. Alexander (37,269), Girma Wolde-Michael (36,724), and Kimberly K. Baxter (P-40,504).

Address all telephone calls to: John F. Thuente at telephone number (612) 349-5747

Address all correspondence to: John F. Thuente
Patterson & Keough, P.A.
1200 Rand Tower, 527 Marquette Avenue South
Minneapolis, Minnesota 55402-1314

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

James Edwin Giff
Full name of sole or first inventor (given name, family name)

James Edwin Giff
Inventor's signature

7/28/97
Date

Maple Grove, Minnesota
Residence (City and either State or Foreign Country)

U.S.
Citizenship

c/o Select Comfort Corporation, 6105 Trenton Lane North, Minneapolis, Minnesota 55442
Post Office Address

Paul James Mahoney
Full name of second joint inventor, if any (given name, family name)

Paul James Mahoney
Second Inventor's signature

7-28-97
Date

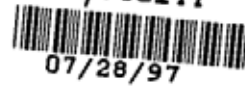
Stillwater, Minnesota
Residence (City and either State or Foreign Country)

U.S.
Citizenship

c/o Select Comfort Corporation, 6105 Trenton Lane North, Minneapolis, Minnesota 55442
Post Office Address

[] Additional inventors are named on the attached sheets.

65703 U.S. PTO
08/901144



PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

08/29/1997 SCHAPMAN 00000049 08901144
01 FC:101 770.00 OP
02 FC:103 264.00 OP

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 1996

Application or Docket Number

901144

CLAIMS AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA
BASIC FEE		
TOTAL CLAIMS	32 minus 20 =	* 12
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		

SMALL ENTITY OR

RATE	FEE
	385.00
x\$11=	
x40=	
+130=	
TOTAL	

OTHER THAN SMALL ENTITY

RATE	FEE
	770.00
x\$22=	214
x80=	
+260=	
TOTAL	1034

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1)	(Column 2)	(Column 3)	(Column 4)
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
Total	* 18	Minus * 20	=	-
Independent	* 10	Minus *** 3	=	7
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY OR

RATE	ADDITIONAL FEE
x\$11=	
x40=	
+130=	
TOTAL ADDIT. FEE	

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
x\$22=	
x80=	574.00
+260=	
TOTAL ADDIT. FEE	574.00

AMENDMENT B	(Column 1)	(Column 2)	(Column 3)	(Column 4)
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
Total	*	Minus **	=	
Independent	*	Minus ***	=	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY OR

RATE	ADDITIONAL FEE
x\$11=	
x40=	
+130=	
TOTAL ADDIT. FEE	

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
x\$22=	
x80=	
+260=	
TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1)	(Column 2)	(Column 3)	(Column 4)
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
Total	*	Minus **	=	
Independent	*	Minus ***	=	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY OR

RATE	ADDITIONAL FEE
x\$11=	
x40=	
+130=	
TOTAL ADDIT. FEE	

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
x\$22=	
x80=	
+260=	
TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 3.

08/90/144
 CLASSIFIED
 SUBCLASSIFIED
 SCANNED 2

5904172
 5904172

SERIAL NUMBER 08/901 144	FILED DATE 07/28/97	CLASS 137	SUBCLASS 224	GROUP ART UNIT 3403 3407 B7
-----------------------------	------------------------	--------------	-----------------	-----------------------------------

APPROVED BY JAMES EDWIN GIFFT, MAPLE GROVE, MN; PAUL JAMES MAHONEY, STILLWATER, MN.

CONTINUING DATA
 VERIFIED
AMS none

FOREIGN/PCT APPLICATIONS
 VERIFIED
AMS none

FOREIGN FILING LICENSE GRANTED 12/04/97

Foreign priority claimed 35 USC 119 conditions met	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no	AS FILED MM	STATE OR COUNTRY MM	SHEETS OR DWGS.	TOTAL CLAIMS 22	INDEX CLAIMS 2	FILING FEE RECEIVED \$1,034.00	ATTORNEY'S DOCKET NO. 204,52-UC-0
---	---	----------------	------------------------	-----------------	--------------------	-------------------	-----------------------------------	--------------------------------------

ADDRESS: JOHN F. THUENTE
 Patterson & Leough
 1400 103 Center
 150 South 8th Street
 Minneapolis, MN 55402-0100

TITLE: VALVE ENCLOSURE ASSEMBLY
 U.S. DEPT. OF COMM./PAT. & TM—PTO-436L (Rev.12-94)

PARTS OF APPLICATION FILED SEPARATELY		Judy C. Schenck Appellate Examiner	
NOTICE OF ALLOWANCE MAILED 10-28-97		Meredith H. Schenck Assistant Examiner	
ISSUE FEE Amount Due: 15.00 Date Paid: 10/09	CLAIMS ALLOWED Total Claims: 18 Final Claim: P		DRAWING Sheet Draw: 31 Fig. Draw: 11 Print Fee: A
Label Area	Judy C. Schenck Primary Examiner		ISSUE BATCH NUMBER K167
PREPARED FOR ISSUE			
WARNING: The information disclosed herein may be disclosed, transmitted, or otherwise made available to the public by the United States Code Title 35, Sections 122, 167, and 261. Restrictions outside the U.S. Patent & Trademark Office in respect to disclosure and use apply and control only.			

SGM
 OTC

STAPLE AREA

U.S. GOVERNMENT PRINTING OFFICE 1897-422-216

PATENT NUMBER		ORIGINAL CLASSIFICATION	
		CLASS	SUBCLASS
		137	224
CROSS REFERENCES			
APPLICATION SERIAL NUMBER	CLASS	SUBCLASS	(ONE SUBCLASS PER BLOCK)
08901144	137	271	59616
APPLICANT'S NAME (PLEASE PRINT)	5	710	5910-2
Giffit, et al.			
IF REISSUE, ORIGINAL PATENT NUMBER			
INTERNATIONAL CLASSIFICATION			
B			
A	47C	27	08
GROUP ART UNIT	ASSISTANT EXAMINER (PLEASE STAMP OR PRINT FULL NAME)		
3753	Meredith H. Schoentfeld		
	PRIMARY EXAMINER (PLEASE STAMP OR PRINT FULL NAME)		
	JOHN H. WELLS		
	PRIMARY EXAMINER		

SEARCHED

Class	Sub	Date	Exmr
37	223 224 5962 59616	6/1/98	MLG
5	710 713	6/1/98	MLG
37	884 871	6/5/98 6/5/98	MLG
37	884 871	6/5/98 6/5/98	MLG
37	884 871	6/5/98 6/5/98	MLG

SEARCH NOTES

	Date	Exmr
Alexander Gross Class 3	6/1/98	MLG

INTERFERENCE SEARCHED

Class	Sub	Date	Exmr
37	224 5961 5962	10/30/98	MLG
5	710 713		

(RIGHT OUTSIDE)

Staple Issue Slip Here

POSITION	ID NO.	DATE
CLASSIFIER		
EXAMINER	10303	10/21/97
TYPIST		
VERIFIER		
CORPS CORR.		
SPEC. HAND		
FILE MAINT.		
DRAFTING		

INDEX OF CLAIMS

Claim	Date
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	
50	

Claim	Date
51	
52	
53	
54	
55	
56	
57	
58	
59	
60	
61	
62	
63	
64	
65	
66	
67	
68	
69	
70	
71	
72	
73	
74	
75	
76	
77	
78	
79	
80	
81	
82	
83	
84	
85	
86	
87	
88	
89	
90	
91	
92	
93	
94	
95	
96	
97	
98	
99	
100	

SYMBOLS
 (through numbers) Reflected
 * Adverse
 * Restricted
 * Non-vested
 * Annuity
 * Discharged

(LEFT INSIDE)



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	J	1304 ATTORNEY DOCKET NO.
08/901,144	07/28/97	GIFFT		

QM61/0616

JOHN F THUENTE
PATTERSON & KEOUGH
1200 RAND TOWER
527 MARQUETTE AVE SOUTH
MINNEAPOLIS MN 55402-1314

SCHOENFELD EXAMINER	
ART UNIT	PAPER NUMBER
3753	06/16/98 2Wf


DATE MAILED:

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents

Office Action Summary

Application No. 08/901,144	Applicant(s) Gifft
Examiner Meredith Schoenfeld	Group Art Unit 3753



Responsive to communication(s) filed on Jul 28, 1997

This action is **FINAL**.

Since this application is in condition for allowance 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.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

Claim(s) 1-32 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

Claim(s) 1-3, 9-12, 16, 17, 19, and 26-29 is/are rejected.

Claim(s) 4-8, 13-15, 18, 20-25, and 30-32 is/are objected to.

Claims _____ are subject to restriction or election requirement.

Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) _____

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 3753

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3,9,19 and 26 are rejected under 35 U.S.C. 102 (b) as being anticipated by Shafer et. al. Shafer discloses an air control system having an enclosure which is coupled to the 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).

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 negated 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(f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 3753

Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kalavitz et. al. in view of Walker. The patent to Kalavitz et. al. discloses all the claimed features with the exception of being used with an air inflatable mattress. 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 a 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 allowing the user to adjust the pressure in the mattress for comfortableness as recognized by Walker.

Claims 10, 11, 12, 17, 27, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalavitz et. al., in view of Walker, as applied to claim 16 above, and in further view of Sember. The patent to Kalavitz et. al. as modified by Walker discloses all the claimed features with the exception of having a plurality of independent air bladders having independent valves, which can communicate fluidly. The patent to Sember discloses that it is known in the art to employ multiple independent air bladders having independent valves for communicating fluidly for the purpose of allowing the bladders to be adjusted separately. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Kalavitz et. al. a plurality of independent air bladders having independent valves for communicating fluidly for the

Art Unit: 3753

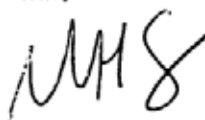
purpose of allowing the bladders to be adjusted separately as recognized by Sember. It is noted that Sember discloses "at least" two bladders/valves therefore it can be read as having either 2 or 3 bladders/valves.

Claims 4-8, 13, 14, 15, 18, 20-25, and 30-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meredith H. Schoenfeld whose telephone number is (703) 308-3146.

mhs



June 9, 1998



JOHN RIVELL
PRIMARY EXAMINER
ART UNIT 347

Notice of References Cited

Application No. 08/901,144	Applicant(s) Giff	
Examiner Meredith Schoenfeld	Group Art Unit 3753	Page 1 of 1

U.S. PATENT DOCUMENTS

	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A	4,915,124	4/1990	Sember	137	223
B	4,583,566	4/1986	Kalavitz Et. Al.	137	224 X
C	4,890,344	1/1990	Walker	5	713
D	5,509,154	4/1996	Shafer Et. Al.	5	713
E	2,885,906	8/1954	Willimas	137	224 x
F	5,095,568	3/1992	Thomas Et. Al.	5	713
G	5,542,136	8/1996	Tappel	5	710
H	4,745,647	5/1988	Goodwin	5	713
I	4,797,962	1/1989	Goode	5	713
J	4,427,022	1/1984	Forney	137	224
K	3,513,876	5/1970	Tarbox	137	884 X
L				----	----
M					

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						

NON-PATENT DOCUMENTS

	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
U		
V		
W		
X		

NOTICE OF DRAFTSPERSON'S PATENT DRAWING REVIEW

PTO Draftpersons review all originally filed drawings regardless of whether they are designated as formal or informal. Additionally, patent Examiners will review the drawings for compliance with the regulations. Direct telephone inquiries concerning this review to the Drawing Review Branch, 703-305-8404.

The drawings filed (insert date) 7/28/97, are
A. not objected to by the Draftsperson under 37 CFR 1.84 or 1.152.
B. objected to by the Draftsperson under 37 CFR 1.84 or 1.152 as indicated below. The Examiner will require submission of new, corrected drawings when necessary. Corrected drawings must be submitted according to the instructions on the back of this Notice.

- 1. DRAWINGS. 37 CFR 1.84(a): Acceptable categories of drawings:
Black ink. Color.
 Not black solid lines. Fig(s) _____
 Color drawings are not acceptable until petition is granted. Fig(s) _____
- 2. PHOTOGRAPHS. 37 CFR 1.84(b)
 Photographs are not acceptable until petition is granted. Fig(s) _____
 Photographs not properly mounted (must use bristol board or photographic double-weight paper). Fig(s) _____
 Poor quality (half-tone). Fig(s) _____
- 3. GRAPHIC FORMS. 37 CFR 1.84 (d)
 Chemical or mathematical formula not labeled as separate figure. Fig(s) _____
 Group of waveforms not presented as a single figure, using common vertical axis with time extending along horizontal axis. Fig(s) _____
 Individuals waveform not identified with a separate letter designation adjacent to the vertical axis. Fig(s) _____
- 4. TYPE OF PAPER. 37 CFR 1.84(e)
 Paper not flexible, strong, white, smooth, nonshiny, and durable. Sheet(s) _____
 Erasures, alterations, overwritings, interlineations, cracks, creases, and folds copy machine marks not accepted. Fig(s) _____
 Mylar, velum paper is not acceptable (too thin). Fig(s) _____
- 5. SIZE OF PAPER. 37 CFR 1.84(f): Acceptable sizes:
21.6 cm. by 35.6 cm. (8 1/2 by 14 inches)
21.6 cm. by 33.1 cm. (8 1/2 by 13 inches)
21.6 cm. by 27.9 cm. (8 1/2 by 11 inches)
21.0 cm. by 29.7 cm. (DIN size A4)
 All drawing sheets not the same size. Sheet(s) 1-7
 Drawing sheet not an acceptable size. Sheet(s) 1-7
- 6. MARGINS. 37 CFR 1.84(g): Acceptable margins:

Paper size			
21.6 cm. X 35.6 cm. (8 1/2 X 14 inches)	21.6 cm. X 33.1 cm. (8 1/2 X 13 inches)	21.6 cm. X 27.9 cm. (8 1/2 X 11 inches)	21.0 cm. X 29.7 cm. (DIN Size A4)
T 5.1 cm (2")	2.5 cm (1")	2.5 cm (1")	2.5 cm (1")
L .64 cm (1/4")	.64 cm (1/4")	.64 cm (1/4")	.64 cm (1/4")
R .64 cm (1/4")	.64 cm (1/4")	.64 cm (1/4")	.64 cm (1/4")
B .64 cm (1/4")	.64 cm (1/4")	.64 cm (1/4")	.64 cm (1/4")

- Margins do not conform to chart above.
Sheet(s) _____
 Top (T) Left (L) Right (R) Bottom (B)
- 7. VIEWS. 37 CFR 1.84(h)
REMINDER: Specification may require revision to correspond to drawing changes.
 All views not grouped together. Fig(s) _____
 Views connected by projection lines or lead lines. Fig(s) _____
Partial views. 37 CFR 1.84(h) 2

- View and enlarged view not labeled separately or properly. Fig(s) _____
- Sectional views. 37 CFR 1.84 (b) 3
 Hatching not indicated for sectional portions of an object. Fig(s) _____
- Cross section not drawn same as view with parts in cross section with regularly spaced parallel oblique strokes. Fig(s) _____
- 8. ARRANGEMENT OF VIEWS. 37 CFR 1.84(i)
 Words do not appear on a horizontal, left-to-right fashion when page is either upright or turned so that the top becomes the right side, except for graphs. Fig(s) _____
- 9. SCALE. 37 CFR 1.84(k)
 Scale not large enough to show mechanism with crowding when drawing is reduced in size to two-thirds in reproduction. Fig(s) _____
 Indication such as "actual size" or scale 1/2" not permitted. Fig(s) _____
- 10. CHARACTER OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(j)
 Lines, numbers & letters not uniformly thick and well defined, clean, durable and black (except for color drawings). Fig(s) 1-11
- 11. SHADING. 37 CFR 1.84(m)
 Solid black shading areas not permitted. Fig(s) _____
 Shade lines, pale, rough and blurred. Fig(s) _____
- 12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR 1.84(p)
 Numbers and reference characters not plain and legible. 37 CFR 1.84(p)(1) Fig(s) 1-11
 Numbers and reference characters not oriented in same direction as the view. 37 CFR 1.84(p)(1) Fig(s) _____
 English alphabet not used. 37 CFR 1.84(p)(2) Fig(s) _____
 Numbers, letters, and reference characters do not measure at least .32 cm. (1/8 inch) in height. 37 CFR(p)(3) Fig(s) _____
- 13. LEAD LINES. 37 CFR 1.84(q)
 Lead lines cross each other. Fig(s) _____
 Lead lines missing. Fig(s) _____
- 14. NUMBERING OF SHEETS OF DRAWINGS. 37 CFR 1.84(t)
 Sheets not numbered consecutively, and in Arabic numerals, beginning with number 1. Sheet(s) _____
- 15. NUMBER OF VIEWS. 37 CFR 1.84(u)
 Views not numbered consecutively, and in Arabic numerals, beginning with number 1. Fig(s) _____
 View numbers not preceded by the abbreviation Fig. Fig(s) _____
- 16. CORRECTIONS. 37 CFR 1.84(w)
 Corrections not made from prior PTO-948. Fig(s) _____
- 17. DESIGN DRAWING. 37 CFR 1.152
 Surface shading shown not appropriate. Fig(s) _____
 Solid black shading not used for color contrast. Fig(s) _____

COMMENTS:

ATTACHMENT TO PAPER NO. 2 REVIEWER JOL DATE 12/9/97



GAU 3753W
7-4-98
#3

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of

Gifft et al.

Attorney Docket No.: 1304.58US01

Application No.: 08/901,144

Filed: July 28, 1997

For: VALVE ENCLOSURE ASSEMBLY

RECEIVED

JUN 26 1998

CHANGE OF ADDRESS LETTER

GROUP 3200

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please record the change of address of applicants' attorneys in the above-identified case from 1200 Rand Tower, 527 Marquette Avenue South, Minneapolis, Minnesota 55402, to:

4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100

This change of address is effective June 26, 1998 and is merely a change in mailing address, but not a change in the name or telephone number of the attorney previously designated to receive the correspondence in this case.

Respectfully submitted,

Kimberly K. Baxter
Registration No. 40,504

Patterson & Keough, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5740

CERTIFICATE OF MAILING

I hereby certify that this document is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231

JUN 17 1998

Date of Deposit



PATENT APPLICATION

10/17/98
5/a

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Giff et al.

Attorney Docket No.: 1304.58US01

Application No.: 08/901,144

Examiner: Schoenfeld

Filed: July 28, 1997

Group Art Unit: 3753

For: VALVE ENCLOSURE ASSEMBLY

RECEIVED
OCT 17 1998
3753

AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action of June 16, 1998, and in accordance with the automatic extension of time for response provided by 37 C.F.R. § 1.136(a), amendment to the above-identified patent application is requested.

In the Claims

Cancel claims 2-4, 9-12, 16-17, 19, and 26-29. Amend the claims as follows:

- 1. (Amended) 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

91

10/06/1998 ZABDALLA 00000057 08901144
02 FC:115 110.00 OP
Not good

25

575-00-80
Clerk

0007-08901144
01-11-98

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; [and]

91 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 A 2 ¶. (Amended) [The improved valve enclosure assembly of claim 1 wherein] 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:

92 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 [are] 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.

4 4. (Amended) [The improved valve enclosure assembly of claim 1 further including] 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;

93 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.

94 b ~~8~~. (Amended) [The improved valve enclosure assembly of claim ⁵ wherein] 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 [is] 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

94

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.

9 18. (Amended) [The method of claim 16 wherein the existing pressure in the bladder is continuously monitored] 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

29

95 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.

24 10 20. (Amended) [The improved valve enclosure assembly of claim 19 wherein]
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

30

valve [has] 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 21. (Amended) [The improved valve enclosure assembly of claim ⁹ ~~18~~ further including] 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

31

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 22. (Amended) [The improved valve enclosure assembly of claim 11 wherein]

26 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 [are] being disposed within the enclosure for correctly positioning components within the enclosure;

24
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.

14 24. (Amended) [The improved valve enclosure assembly of claim ¹³ further including] 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:

97
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.

97

¹⁵ 25. (Amended) The improved valve enclosure assembly of claim ¹⁴ 24 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 30. (Amended) [The improved valve enclosure assembly of claim ¹⁵ 29 wherein] 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:

28

34

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 [is] 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;

28 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.

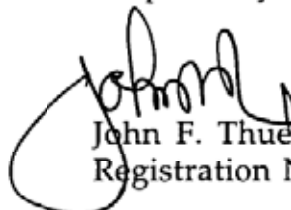
Remarks

Claims 4-8, 13-15, 18, 20-25, and 30-32 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim. Responsive thereto, claim 1 has been amended to include the limitations of claim 4. Claims 5, 7, 13, 18, 20, 21, 22, 24, and 30 have been rewritten in independent form. Claim 6 depends from claim 5, claim 8 depends from claim 7,

claims 14-15 depend from claim 13, claim 23 depends from claim 22, claim 25 depends from claim 24, and claims 31 and 32 depend from claim 30.

Claims 2-4, 9-12, 16-17, 19, and 26-29. have been canceled. It is believed that claims 1, 5-8, 13-15, 18, 20-25, and 30-32 are in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested. The Examiner is invited to telephone the undersigned if any action other than a Notice of Allowability is to be forthcoming and if the Examiner believes that a telephone conversation would be useful to advance prosecution.

Respectfully submitted,


John F. Thuente
Registration No. 29,595

Patterson & Keough, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5747

Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 16-0631.

CERTIFICATE OF MAILING

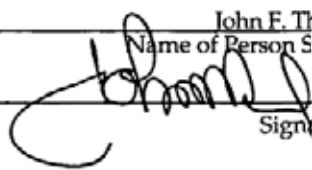
I hereby certify that this document is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

25 SEPTEMBER 1998

Date of Deposit

John F. Thuente

Name of Person Signing Certificate


Signature

37534

GD
10/17/98
y#



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Gift et al.

Attorney Docket No.: 1304.58US01

Application No.: 08/901,144

Examiner: Schoenfeld

Filed: July 28, 1997

Group Art Unit: 3753

For: VALVE ENCLOSURE ASSEMBLY

PETITION FOR EXTENSION OF PERIOD FOR RESPONSE
UNDER 37 C.F.R. § 1.136(a)

RECEIVED

OCT - 8 1998

TECHNOLOGY CENTER 3700

RECEIVED
GROUP 340

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Pursuant to 37 C.F.R. § 1.136(a), an extension of time of one (1) month (from September 16, 1998 to October 16, 1998) within which to respond to the Office Action dated June 16, 1998 is requested. A check in the amount of \$110.00 is enclosed herewith to cover the extension fee. The Commissioner is authorized to charge to Deposit Account No. 16-0631 any underpayments, overpayments or additionally required fees.

Respectfully submitted,

John F. Thuent
Registration No. 29,595

Patterson & Keough, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5747

CERTIFICATE OF MAILING

I hereby certify that this document is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

25 September 1998
Date of Deposit

John F. Thuent
Name of Person Signing Certificate

Signature

10/06/1998 ZABDALLA 00000057 08901144

02 FC:115

110.00 OP

Patterson & Keough, P.A.
 4800 IDS Center
 80 South 8th Street
 Minneapolis, Minnesota 55402-2100
 Telephone: (612) 349-5740
 Facsimile: (612) 349-9266



Attorney Docket No.: 1304.58US01

AMENDMENT TRANSMITTAL

In re the application of:

Gifft et al.

Application No.: 08/901,144

Examiner: Schoenfeld

Filed: July 28, 1997

Group Art Unit: 3753

For: VALVE ENCLOSURE ASSEMBLY

Assistant Commissioner for Patents
 Washington, D.C. 20231

RECEIVED
 GROUP 3753

Sir:

Transmitted herewith is an Amendment in the above-identified application.

- A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.
- Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted.

The filing fee has been calculated as shown below:

					Small Entity		Other Than Small Entity		
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra (Equals)	Rate	Add'l Fee	OR	Rate	Add'l Fee
Total	18*	—	**30	0	x 11	\$		x 22	\$
Indep.	10*	—	***3	7	x 41	\$		x 82	\$574
MDC					+ 135	\$		+ 270	\$
					TOTAL	\$	OR	TOTAL	\$574

First Presentation of Multiple Dependent Claim [MDC]

* If the entry in Column 1 is less than the entry in Column 2, write "0" in Column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space.
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found from the equivalent box in Column 1 of a prior Amendment or the number of claims originally filed.

- [X] A check in the amount of \$574.00 is attached. The Commissioner is hereby authorized to charge payment of any fees under 37 C.F.R. § 1.16 for presentation of extra claims or credit any overpayment to Deposit Account No. 16-0631. Two duplicate copies of this sheet are attached.

Respectfully submitted,



John F. Thunte
Registration No. 29,595

Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 16-0631.

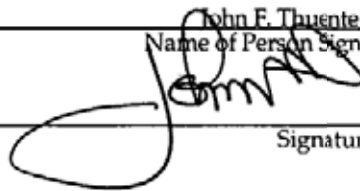
CERTIFICATE OF MAILING

I hereby certify that this document is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

25 SEPTEMBER 1998

Date of Deposit

John F. Thunte
Name of Person Signing Certificate



Signature



NOTICE OF ALLOWANCE AND ISSUE FEE DUE

QM61/1022

JOHN F THUENTE
PATTERSON & KEOUGH
4800 IDS CENTER
80 SOUTH 8TH STREET
MINNEAPOLIS MN 55402-2100

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/901,144	07/28/97	018	SCHOENFELD, M 3753	10/22/98
First Named Applicant GIFFT.		35 USC 154(b) term ext. =		6 Days.

TITLE OF INVENTION LIVE ENCLOSURE ASSEMBLY

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
3	1304.58-US-0	137-224.000	K67 UTILITY	NO	\$1329.00	01/22/99

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED.

THE ISSUE FEE MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED.

HOW TO RESPOND TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is changed, pay twice the amount of the FEE DUE shown above and notify the Patent and Trademark Office of the change in status, or
- B. If the status is the same, pay the FEE DUE shown above.

If the SMALL ENTITY is shown as NO:

- A. Pay FEE DUE shown above, or
- B. File verified statement of Small Entity Status before, or with, payment of 1/2 the FEE DUE shown above.

II. Part B-Issue Fee Transmittal should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B Issue Fee Transmittal should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "4b" of Part B-Issue Fee Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give application number and batch number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PATENT AND TRADEMARK OFFICE COPY



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/901,144	07/28/97	GIFFT	J 1304.58-US-0

QM61/1022

JOHN F THUENTE
PATTERSON & KEOUGH
4800 IDS CENTER
80 SOUTH 8TH STREET
MINNEAPOLIS MN 55402-2100

EXAMINER

SCHOENFELD, M

ART UNIT	PAPER NUMBER
3753	6 H


DATE MAILED: 10/22/98

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

Commissioner of Patents and Trademarks

Notice of Allowability

Application No. DB/901,144	Applicant(s) Giff
Examiner Meredith Schoenfeld	Group Art Unit 3753



All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance and Issue Fee Due or other appropriate communication will be mailed in due course.

This communication is responsive to 10/2/98

The allowed claim(s) is/are 1, 5-8, 13-15, 18, 20-25, and 30-32

The drawings filed on _____ are acceptable.

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) _____

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE THREE MONTHS FROM THE "DATE MAILED" of this Office action. Failure to timely comply will result in ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.

Applicant MUST submit NEW FORMAL DRAWINGS

because the originally filed drawings were declared by applicant to be informal.

including changes required by the Notice of Draftsperson's Patent Drawing Review, PTO-948, attached hereto or to Paper No. 2

including changes required by the proposed drawing correction filed on _____, which has been approved by the examiner.

including changes required by the attached Examiner's Amendment/Comment.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the reverse side of the drawings. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Any response to this letter should include, in the upper right hand corner, the APPLICATION NUMBER (SERIES CODE/SERIAL NUMBER). If applicant has received a Notice of Allowance and Issue Fee Due, the ISSUE BATCH NUMBER and DATE of the NOTICE OF ALLOWANCE should also be included.

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s) _____

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

Interview Summary, PTO-413

Examiner's Amendment/Comment

Examiner's Comment Regarding Requirement for Deposit of Biological Material

Examiner's Statement of Reasons for Allowance

In the specification, on page 7, line 18 "at" has been replaced with --as--

John Rivell
JOHN RIVELL
PRIMARY EXAMINER
ART UNIT 347

4400

GAY 3753



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Giff et al.

Attorney Docket No.: 1304.58US01

Application No.: 08/901,144

Examiner: Schoenfeld

Filed: July 28, 1997

Group Art Unit: 3753

For: VALVE ENCLOSURE ASSEMBLY

LETTER

Assistant Commissioner for Patents
Attention: Official Draftsman
Washington, D.C. 20231

RECEIVED
OCT 30 1998
Group 3700

Sir:

Informal drawings were submitted for filing with the above-identified patent application. Enclosed for filing are seven (7) sheets of formal drawings.

Respectfully submitted,

John F. Thuent
Registration No. 29,595

Patterson & Keough, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5747

Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 16-0631.

CERTIFICATE OF MAILING

I hereby certify that this document is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

23 OCT 1998

Date of Deposit

John F. Thuent
Name of Person Signing Certificate

Signature

APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 1
PRIOR ART

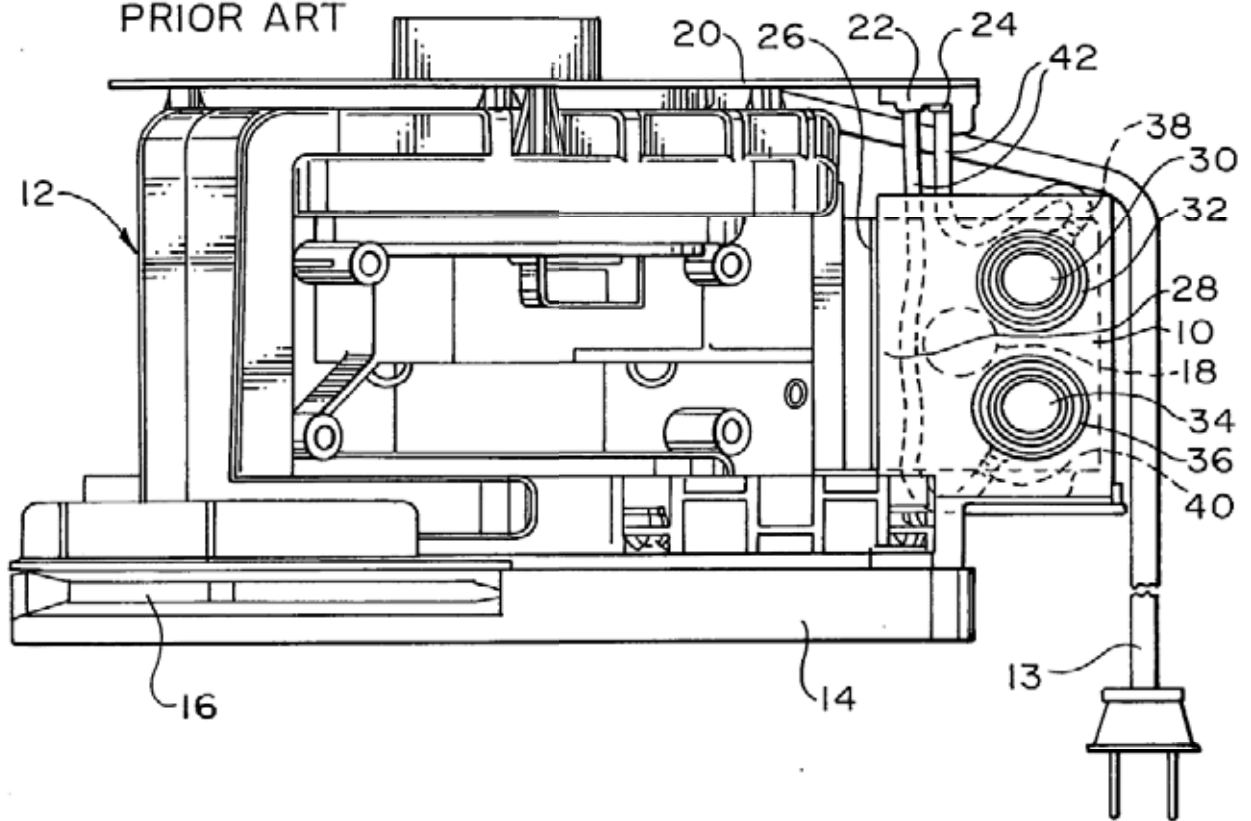
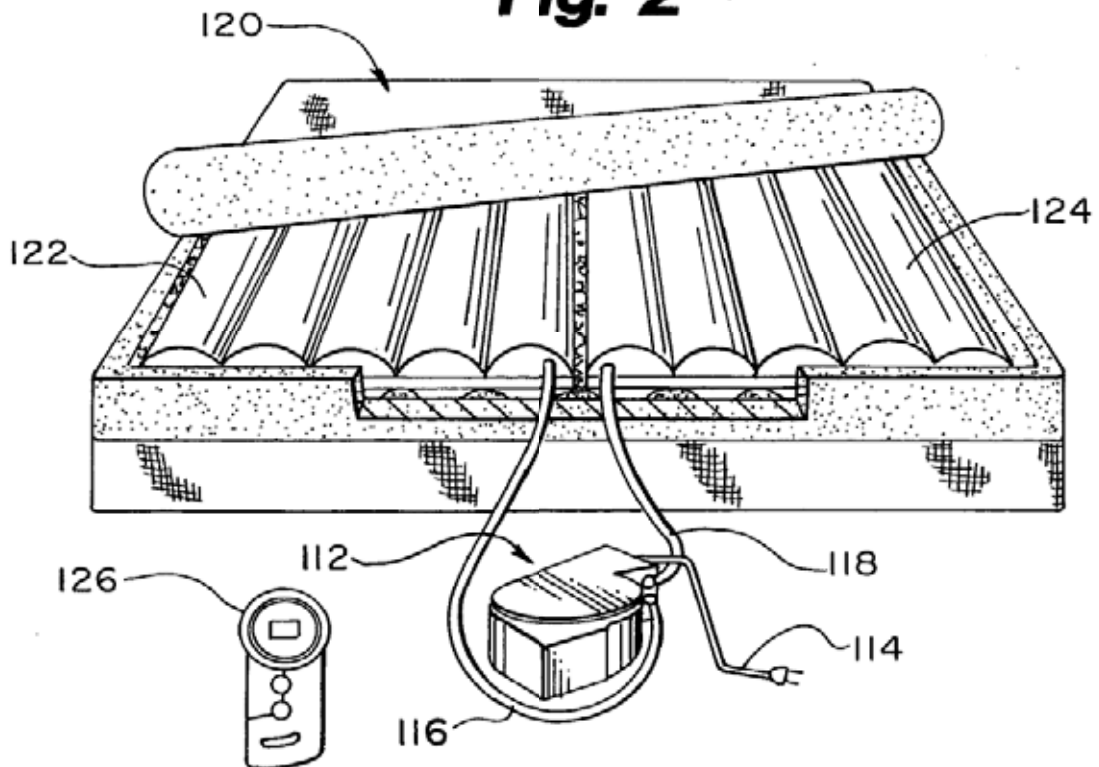


Fig. 2



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 3

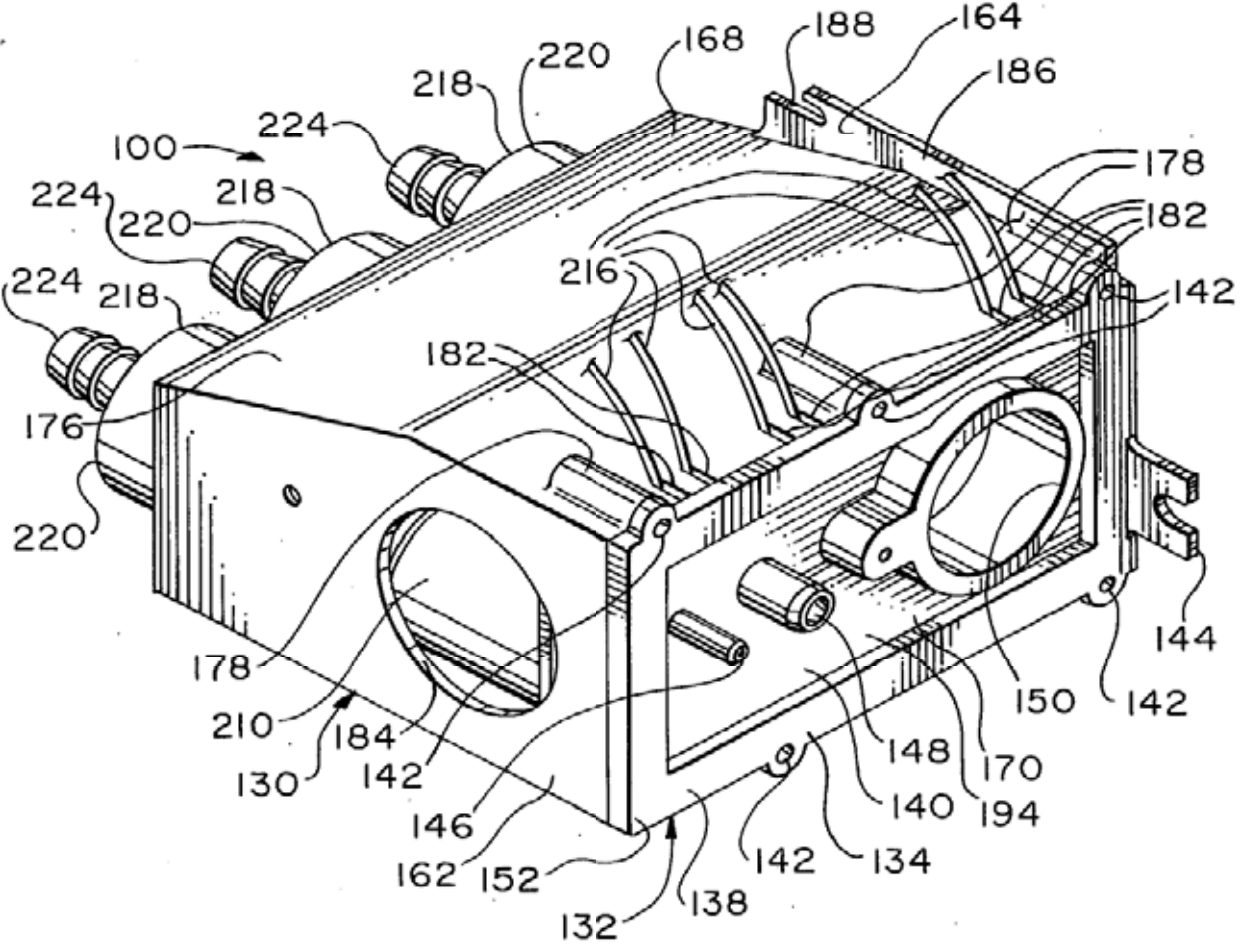


Fig. 5

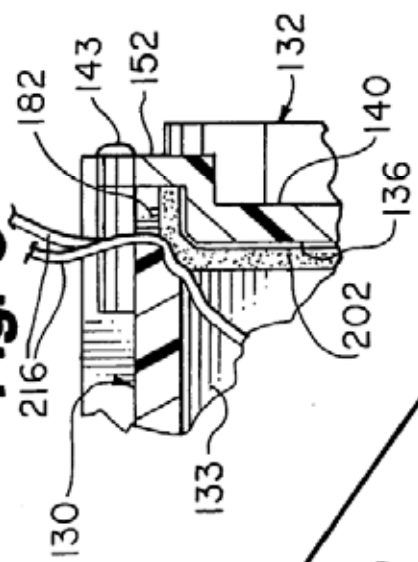
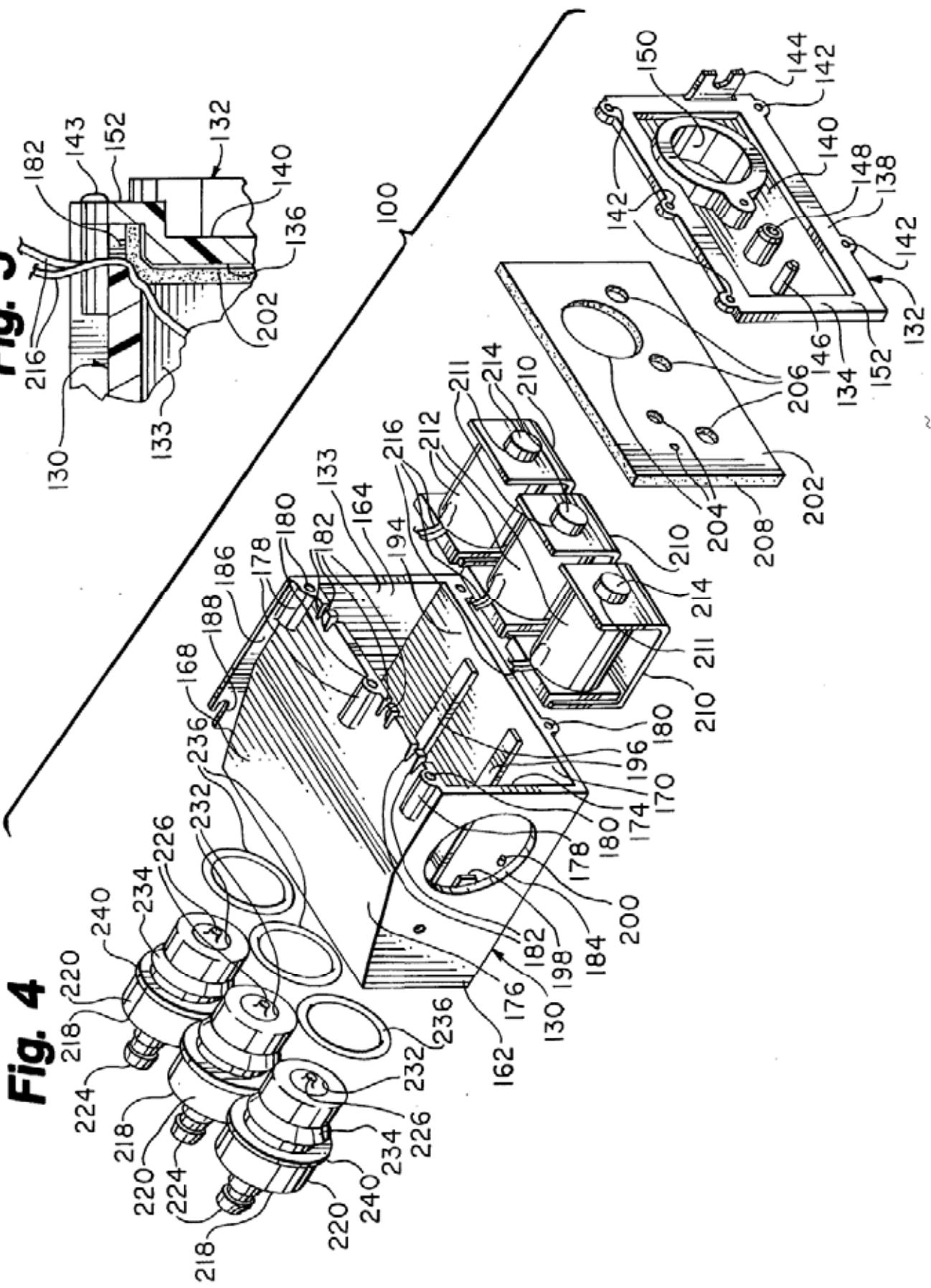


Fig. 4



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 6

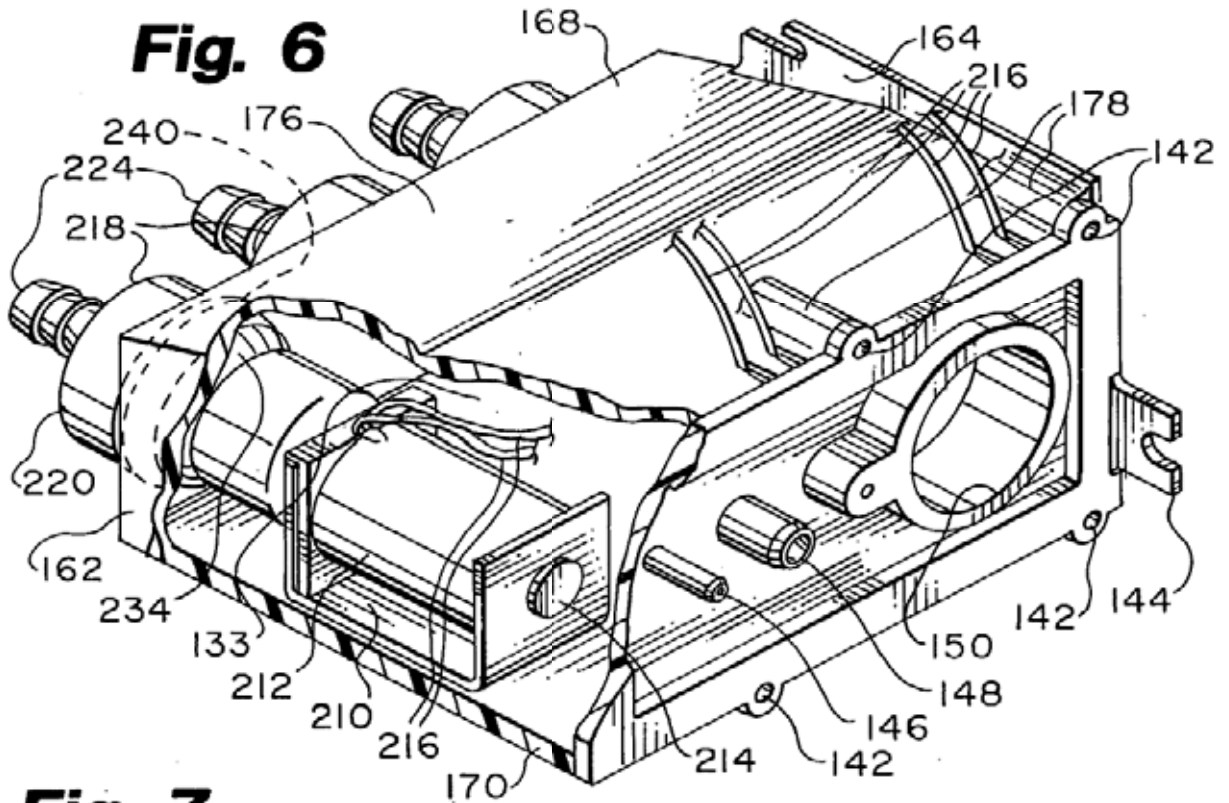


Fig. 7

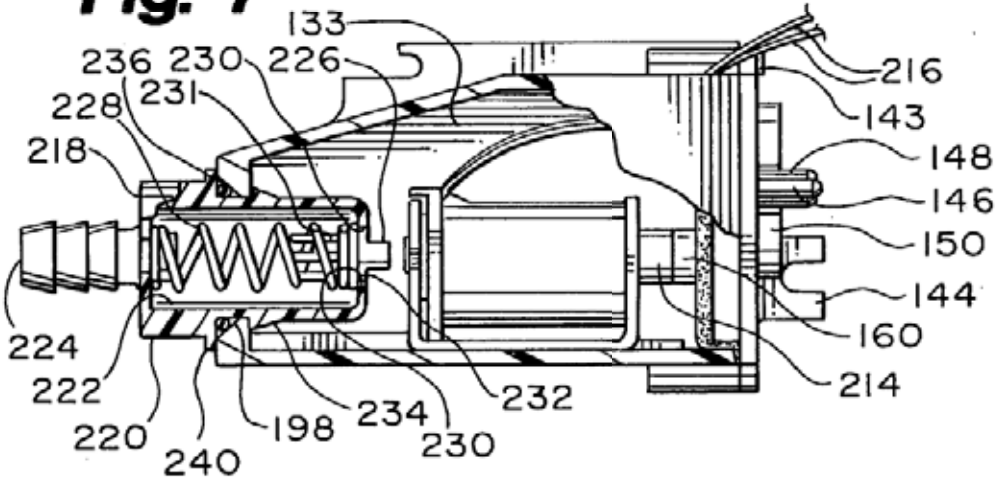
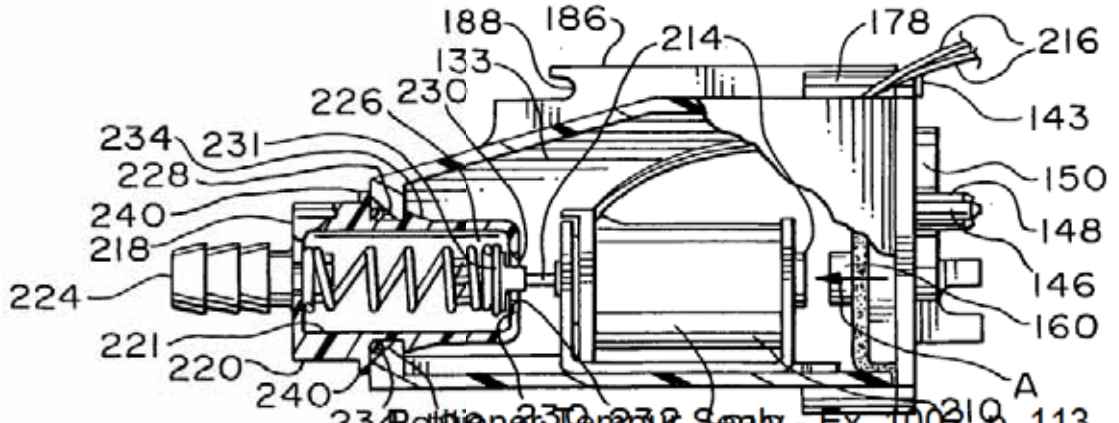
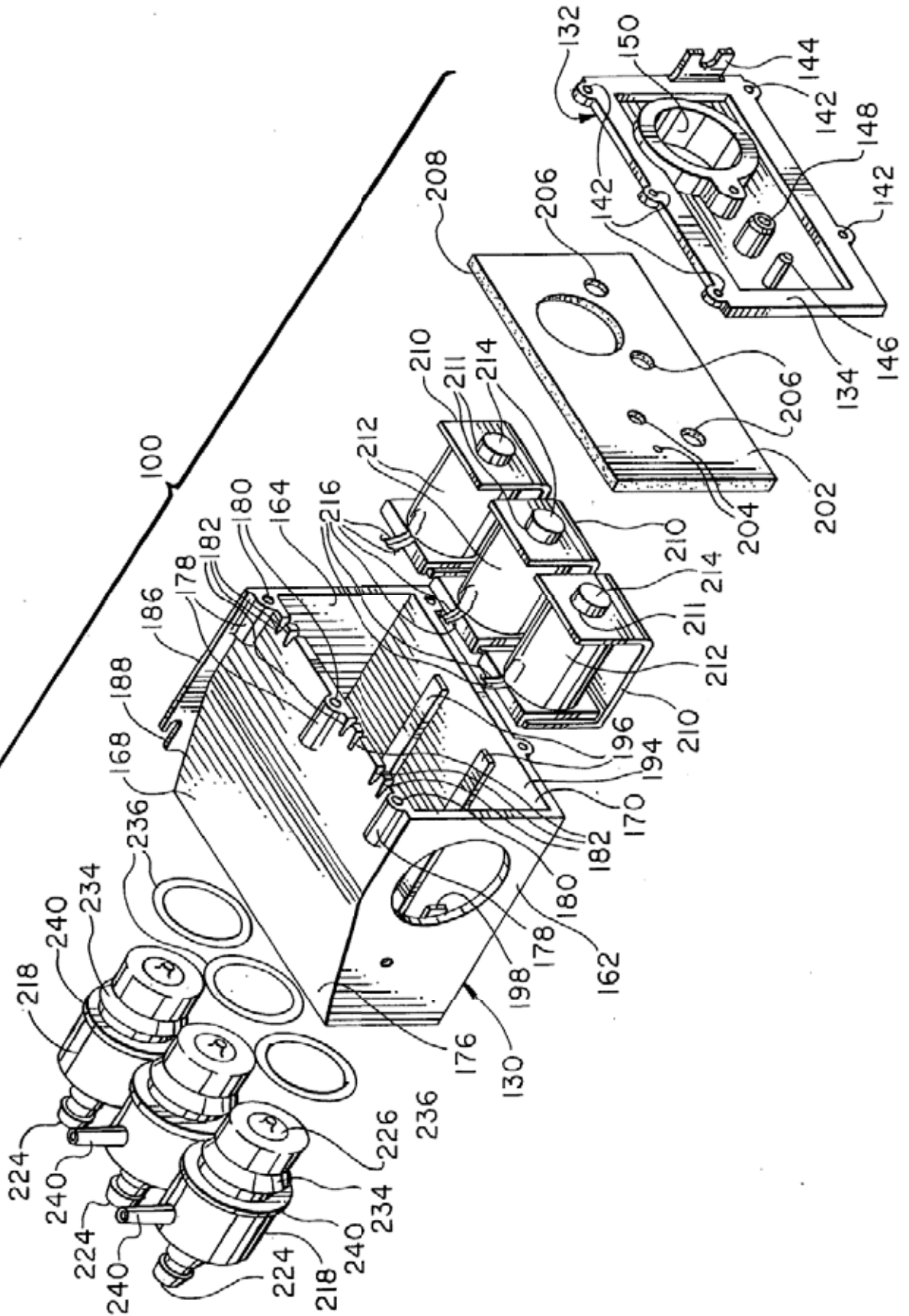


Fig. 8



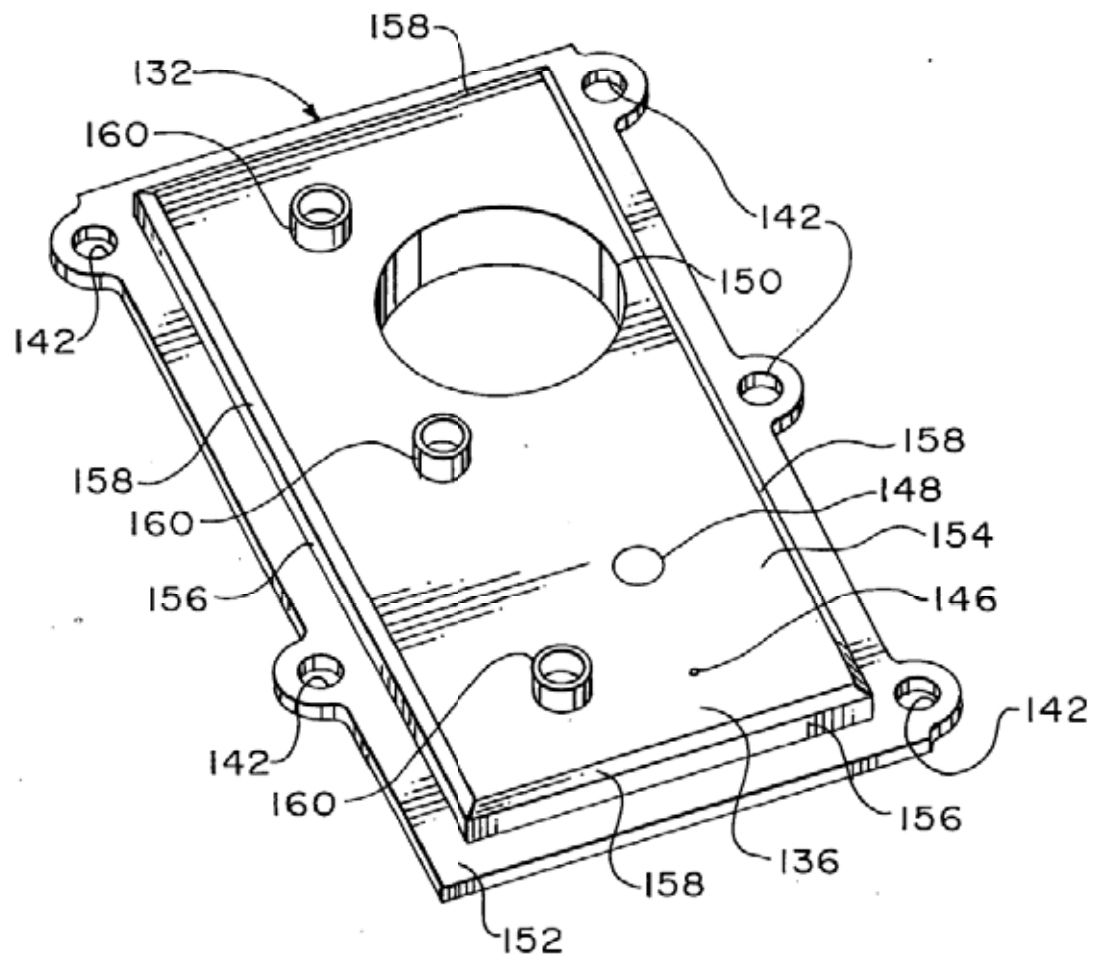
APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 9



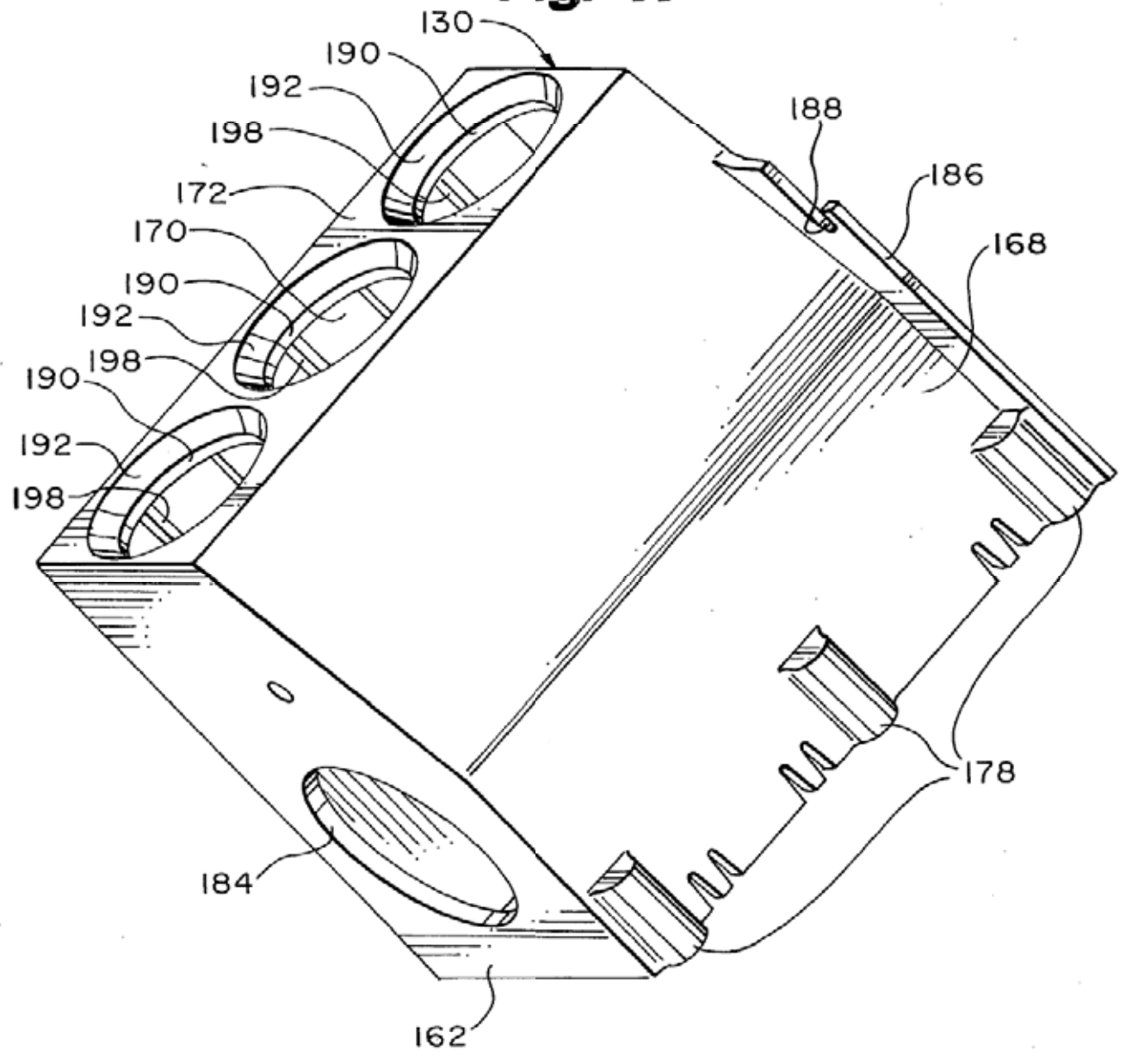
APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 10



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 11





km @

7500

SHAR

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Gifft et al.

Attorney Docket No.: 1304.58US01

Application No.: 08/901,144

Examiner: Schoenfeld

Filed: July 28, 1997

Group Art Unit: 3753

For: VALVE ENCLOSURE ASSEMBLY

LETTER

Assistant Commissioner for Patents
Attention: Official Draftsperson
Washington, D.C. 20231

Sir:

In response to the Notice of Allowability mailed October 22, 1998 which requires formal drawings, enclosed are seven (7) sheets (Figs. 1-11) of formal drawings.

Respectfully submitted,

John F. Thunte
Registration No. 29,595

Patterson & Keough, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5747

Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 16-0631.

CERTIFICATE OF MAILING

I hereby certify that this document is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

11 JANUARY 1999
Date of Deposit

John F. Thunte
Name of Person Signing Certificate

Signature

5904172

Fig. 1
PRIOR ART

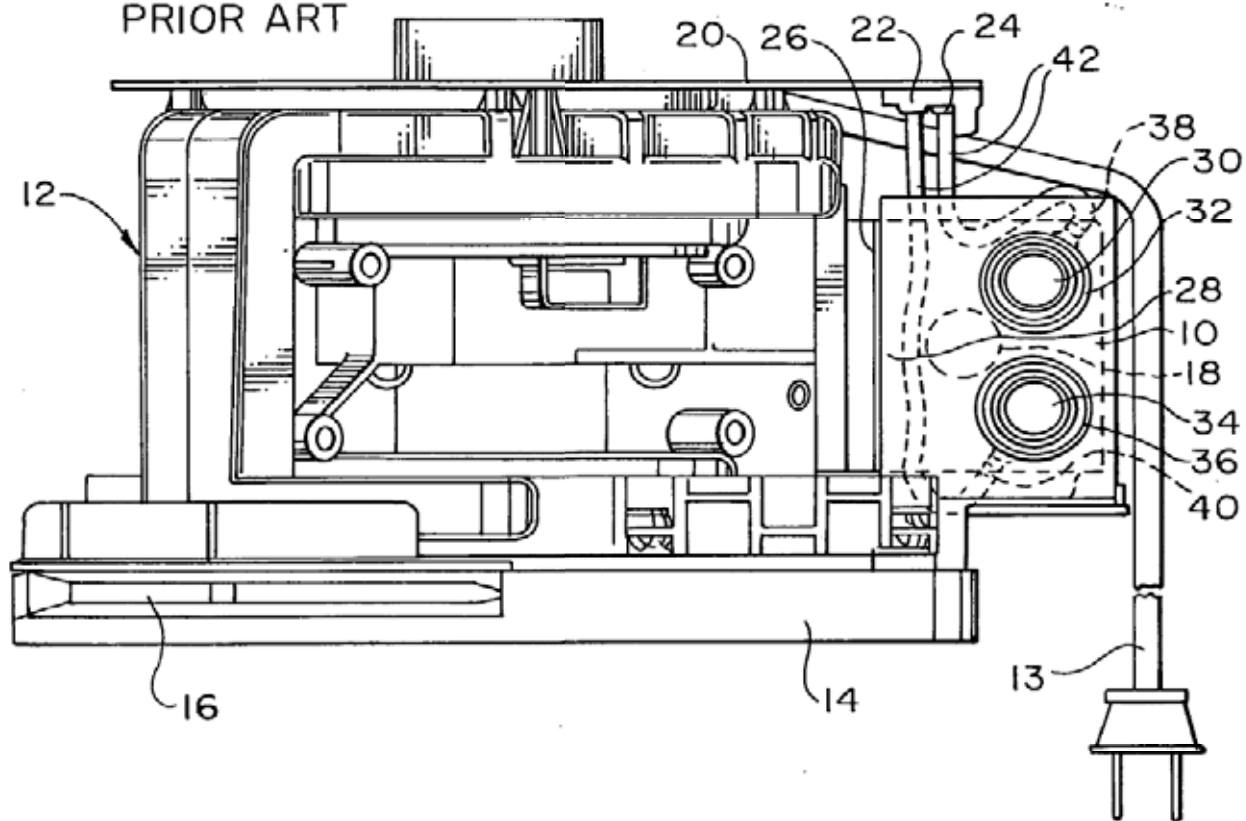
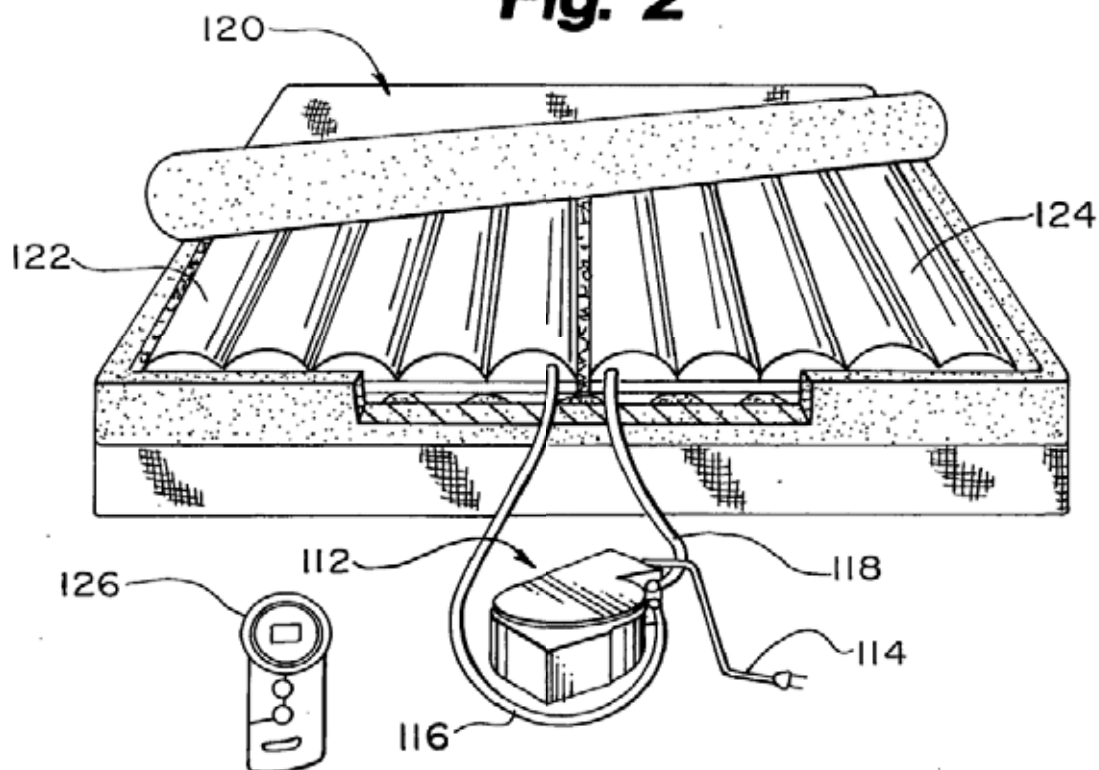
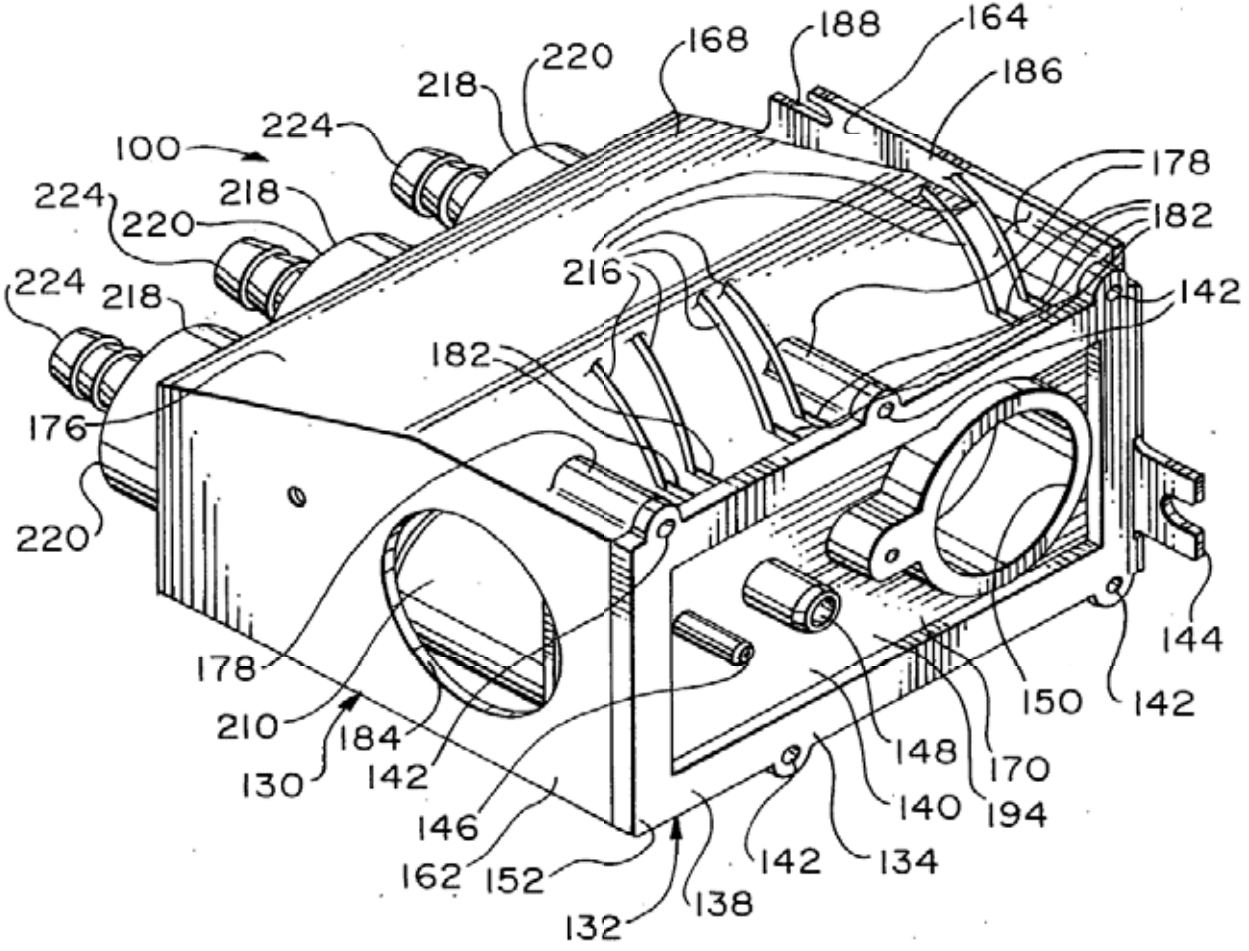


Fig. 2



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 3



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 5

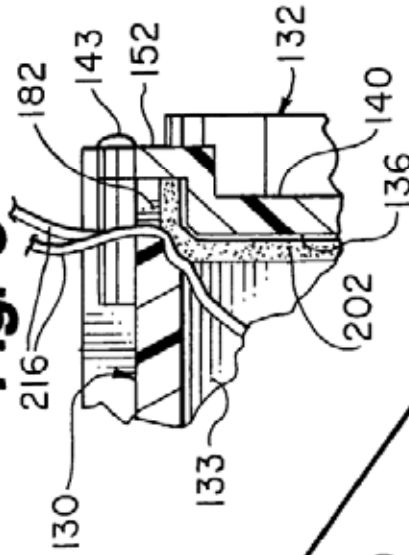
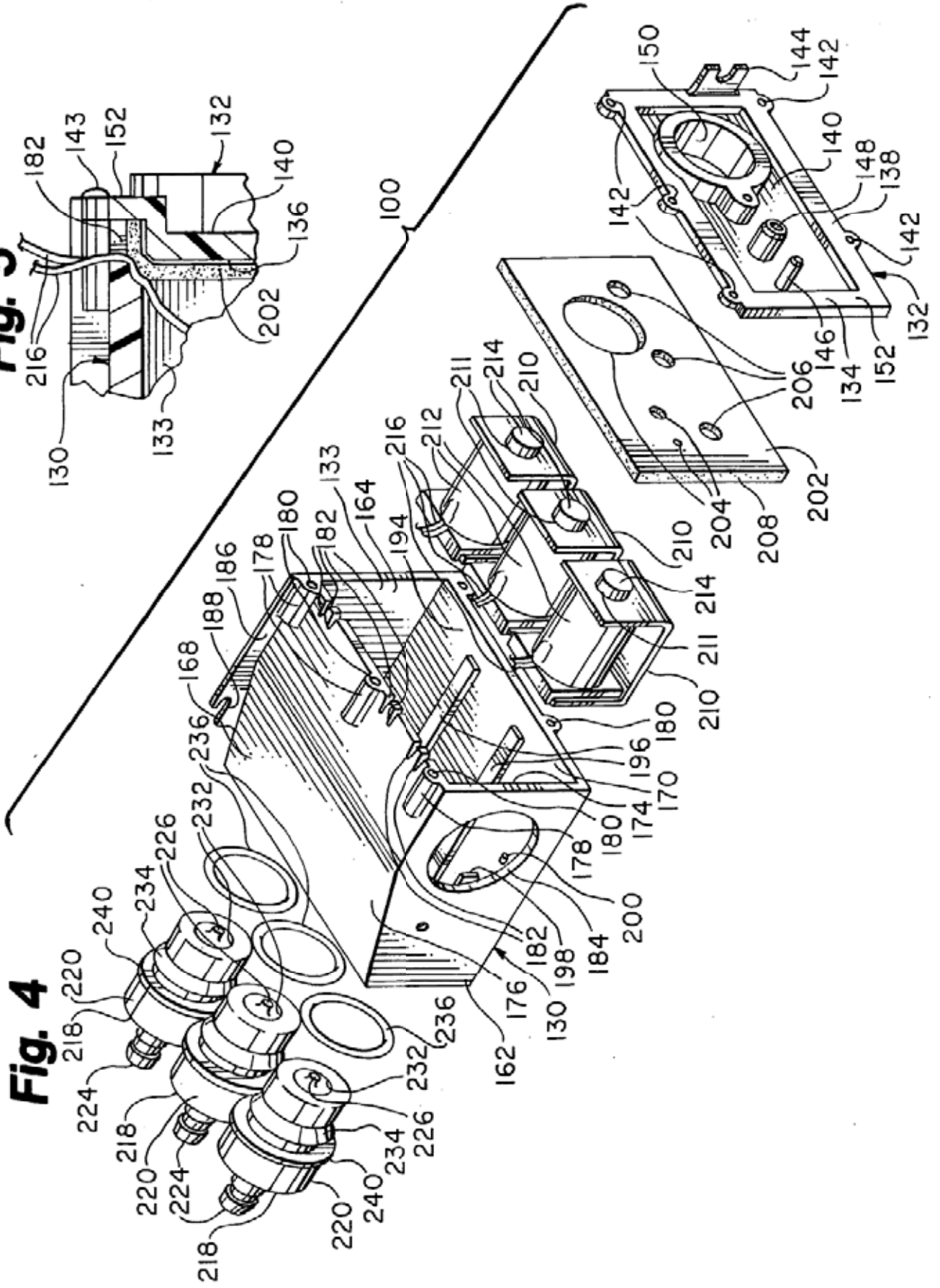


Fig. 4



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 6

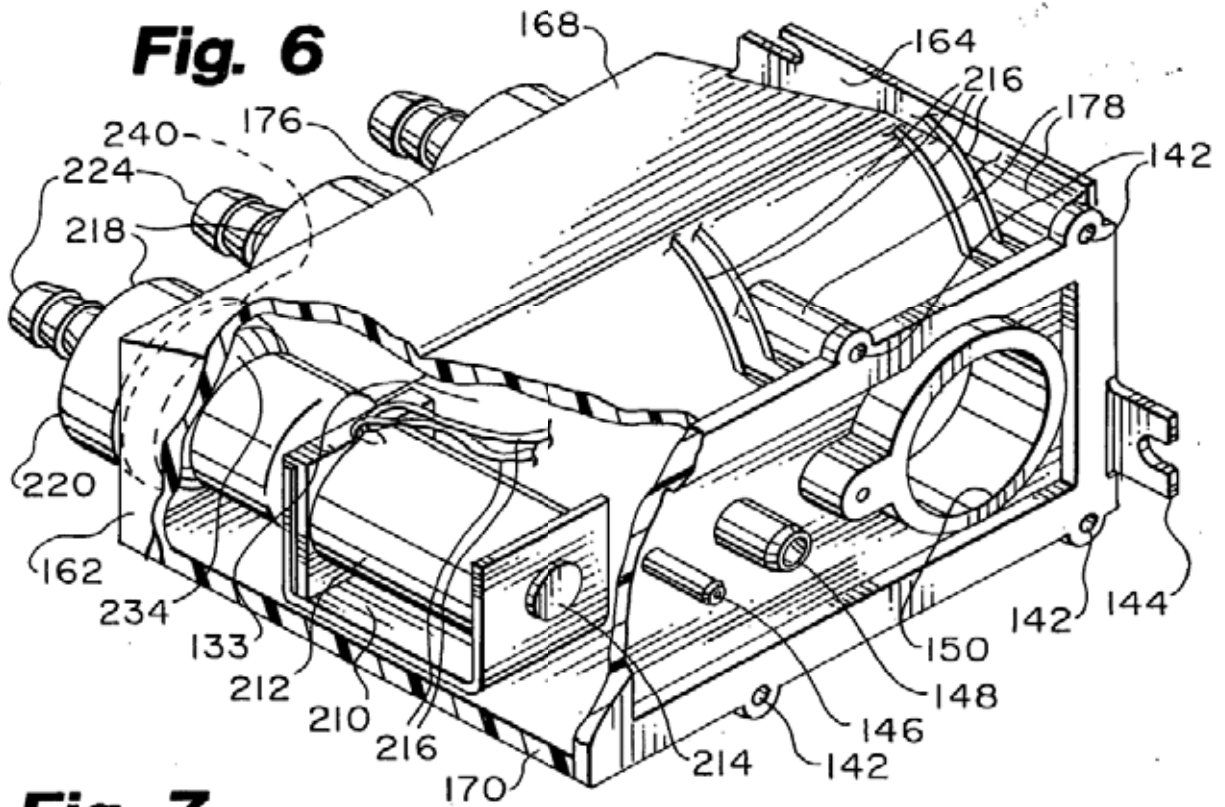


Fig. 7

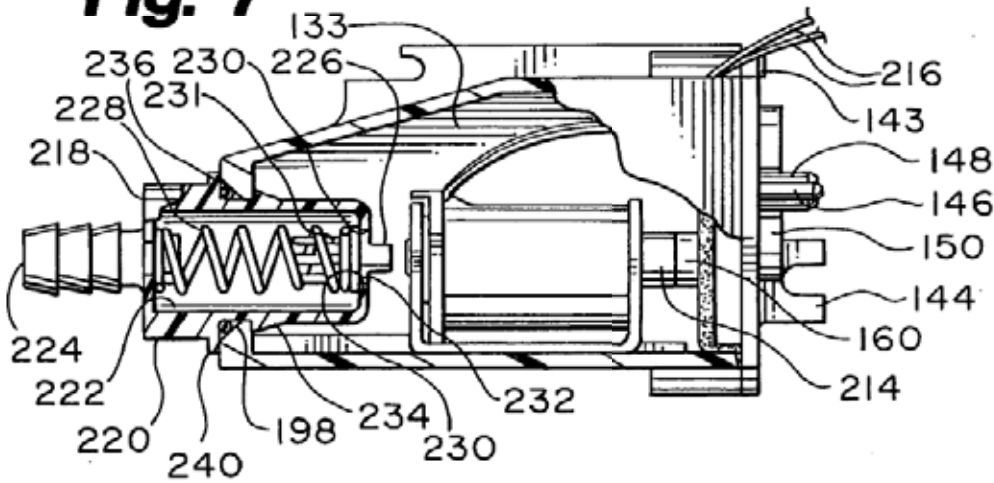
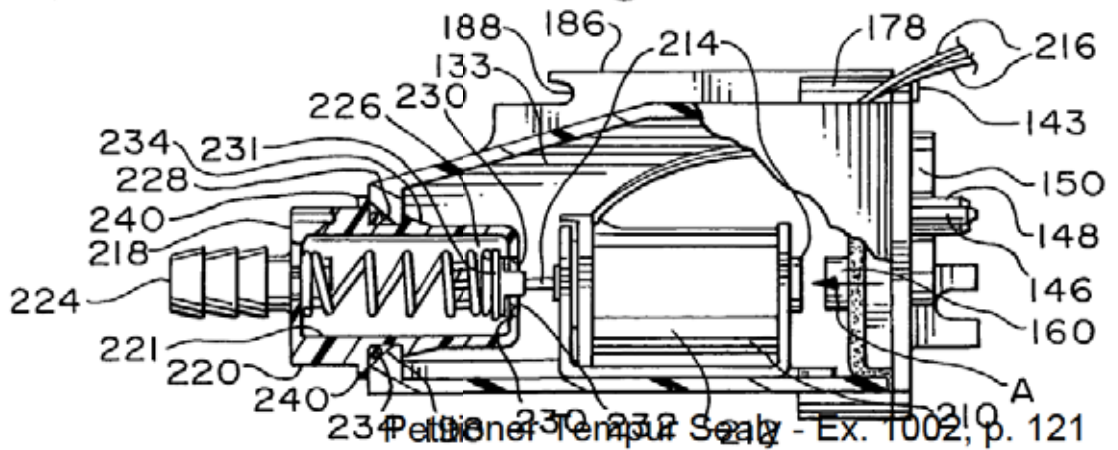


Fig. 8



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

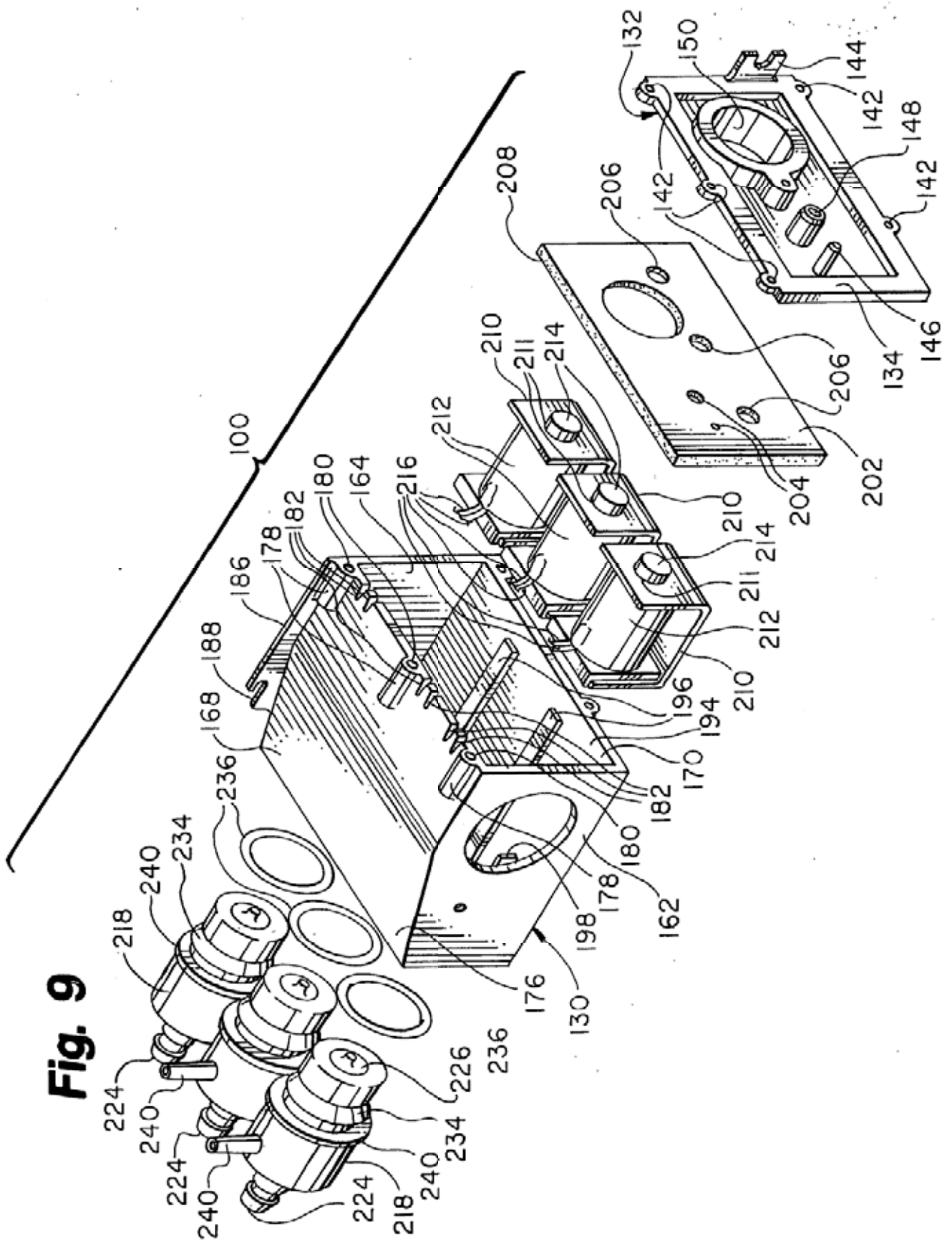
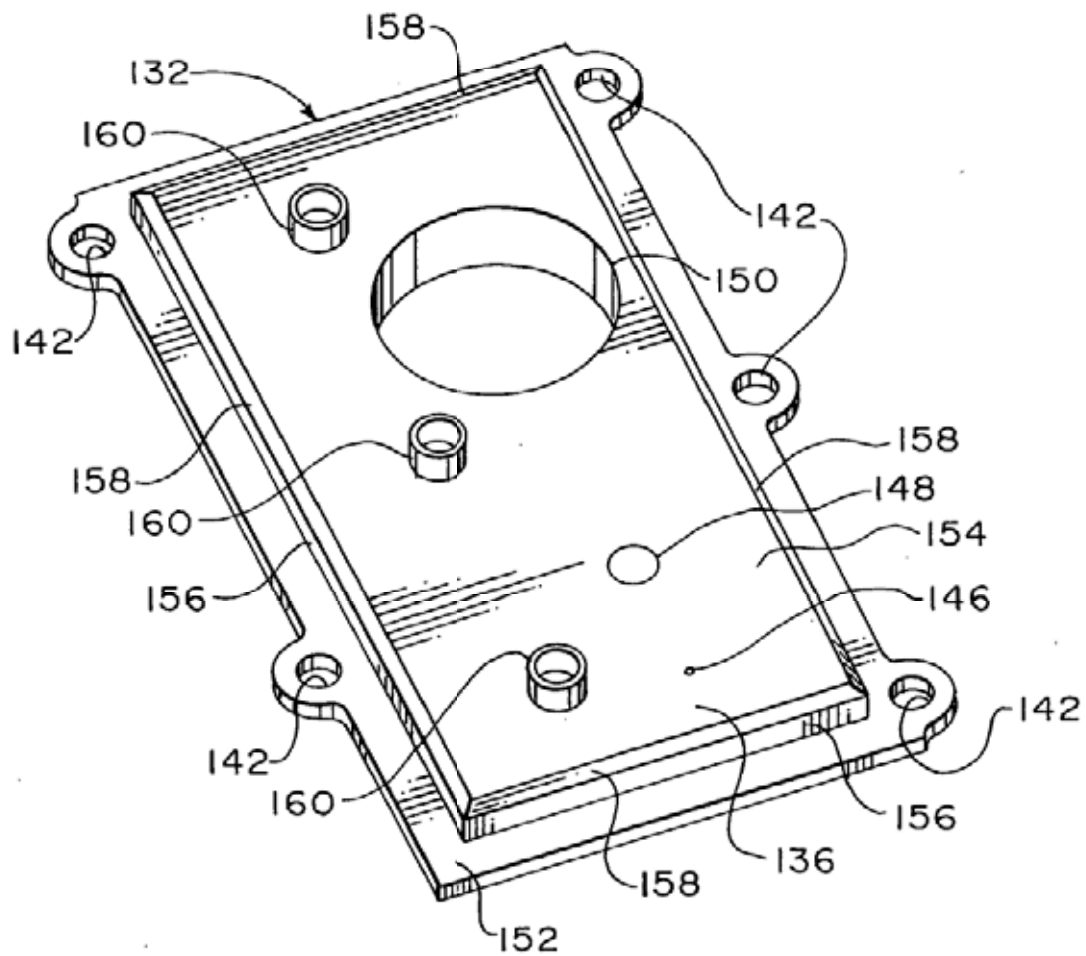


Fig. 9

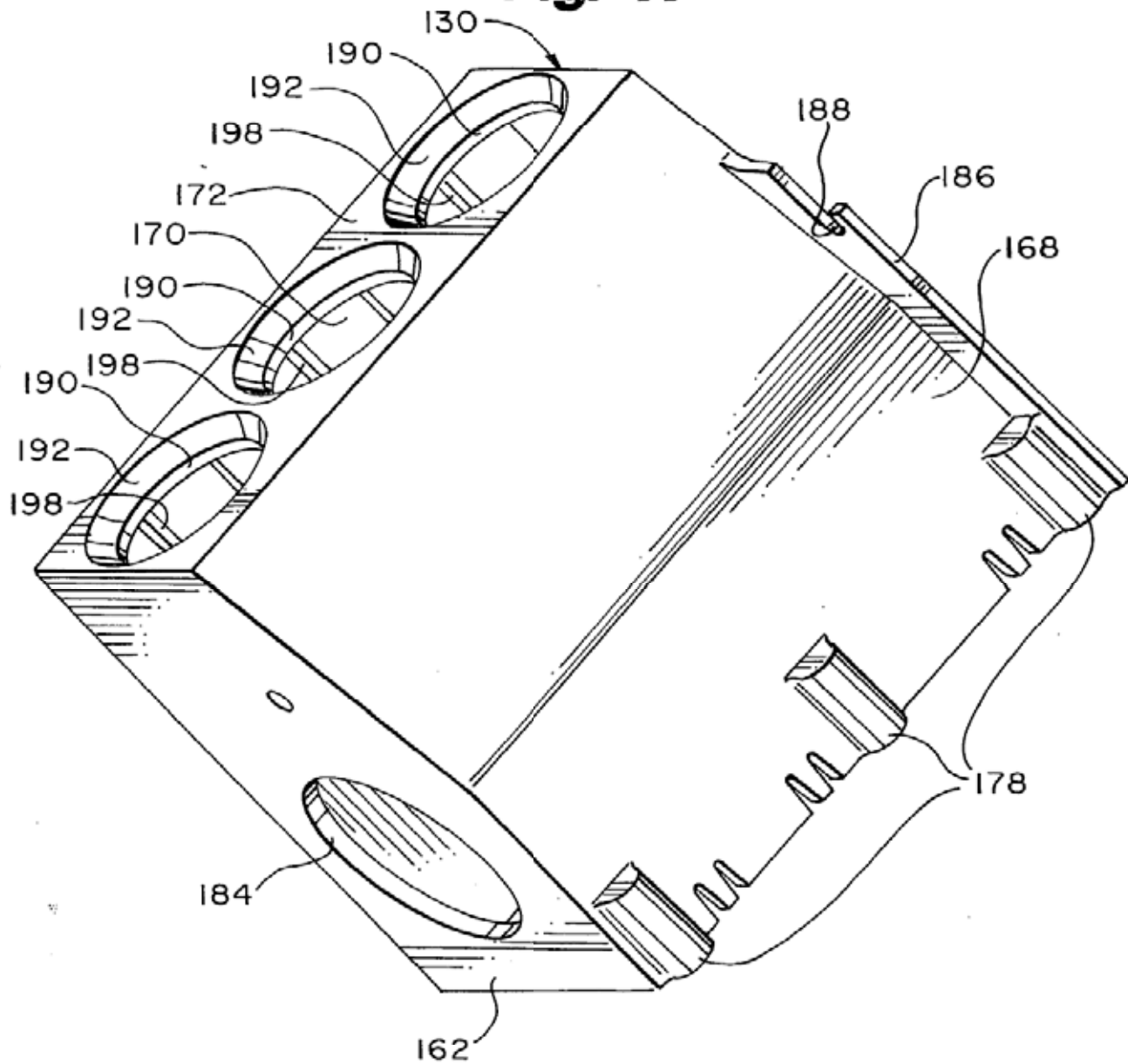
APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 10



APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Fig. 11



Complete and mail this form, together with appropriate fees, to: **Box ISSUE FEE**
Assistant Commissioner for Patents
Washington, D.C. 20231

Handwritten: 12/10
 01/30

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

JOHN F THUENTE
 PATTERSON & KEOUGH
 4800 IDS CENTER
 80 SOUTH 8TH STREET
 MINNEAPOLIS MN 55402-2100

RECEIVED
 Publishing Division
 JAN 19 1999
 11

JOHN F. THUENTE (Depositor's name)
 [Signature] (Signature)
 17 JANUARY 1999 (Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/901,144	07/28/97	018	SCHOENFELD, M	10/22/98
First Named Applicant: GIFFT.		35 USC 154(b) term ext. = 0 Days.		

TITLE OF INVENTION: **VALVE ENCLOSURE ASSEMBLY**

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
3	1304.58-US-0	137-224.000	K67	UTILITY	NO \$1210.00 \$1320.00	01/22/99

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.383). Use of PTO form(s) and Customer Number are recommended, but not required.
- Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1. Patterson & Keough, P.A.
2. _____
3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE
 Select Comfort Corporation

(B) RESIDENCE: (CITY & STATE OR COUNTRY)
 Minneapolis, Minnesota

Please check the appropriate assignee category indicated below (will not be printed on the patent)

individual corporation or other private group entity government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

Issue Fee
 Advance Order - # of Copies 10

4b. The following ~~fees~~ deficiency in these fees should be charged to:

DEPOSIT ACCOUNT NUMBER 16-0631
 (ENCLOSE AN EXTRA COPY OF THIS FORM)

Issue Fee
 Advance Order - # of Copies _____

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature) [Signature] (Date) 11 JANUARY 1999

01/26/1999 RTSEGAY1 00000061 08901144

01 FC:142 1210.00 OP
 02 FC:561 30.00 OP

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE

Petitioner Tempur Sealy - Ex. 1002 p. 125

5/18/99

PTO UTILITY GRANT
Paper Number 9

**The Commissioner of Patents
and Trademarks**

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to an statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.

Bruce Lehman
Commissioner of Patents and Trademarks

Attest

The
United
States
of
America



Form PTO-1504 (Rev. 2007)

(RIGHT INSIDE)

PH-101

MAR 08 2012

MODIFIED PTO/SB/96 (1/1/08) Approved for use through 11/30/2011. OMB 0491-0035 U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

Practitioner associated with the Customer Number: **21186**

OR
 Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used)

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

The address associated with Customer Number: **21186**

OR

Firm or Individual Name

Address

City State Zip

Country

Telephone Email

Assignee Name and Address:
Select Comfort Corporation
9800 59th Avenue North
Minneapolis, MN 55442
United States of America

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature: <i>Heather Somers</i>	Date: <i>2/25/2011</i>
Name: Heather Somers	Telephone: N/A
Title: VP and Associate General Counsel	

Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22315-1450. DO NOT SEND FEE'S OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22315-1450.

MAR 08 2012

MODIFIED PTO/SB/98 (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 C.F.R. 3.73(b)

Applicant/Patent Owner: James Edwin Giff et al. Attorney Docket No. 3500.012US1
Application No./Patent No.: 08/901,144 Filed/Issue Date: July 28, 1997
Titled: VALVE ENCLOSURE ASSEMBLY

Select Comfort Corporation, a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

States that it is:

- 1. the assignee of the entire right, title, and interest in;
- 2. an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
- 3. the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 008658, Frame 0309 - 0312, or for which a copy therefore is attached.

OR

B. A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

- 1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- 2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- 3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

Additional documents in the chain of title are listed on a supplemental sheet(s).

As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.
[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Adam Kiedrowski
Signature

March 8, 2012
Date

Adam P. Kiedrowski
Printed or Typed Name

USPTO Reg. No. 60,296
Title

Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

MAR 08 2012



SCHWEGMAN • LUNDBERG • WOESSNER
PATENT PROTECTION FOR HIGH TECHNOLOGY

P.O. Box 2938
Minneapolis, MN 55402
Telephone (612) 373-6900 Facsimile (612) 339-3061

Date: 03/08/2012

Time: 12:36 PM
(Minneapolis, Minn.)

TO: Commissioner for Patents
Attn: Meredith Schoenfeld
Patent Examining Corps
Facsimile Center
P.O. Box 1450
Alexandria, VA 22313-1450
FAX NUMBER 571-273-8300

FROM: Adam P. Kiedrowski

OUR REF: 3500.012US1

21186

* Please deliver to Examiner Meredith Schoenfeld in Art Unit 3753. *

Document(s) Transmitted: **Power of Attorney to Prosecute Applications before the USPTO (PTO/SB/80) (1 pg.), Statement Under 37 C.F.R. 3.73(b) (PTO/SB/96) (1 pg.)**

Total pages of this transmission, including cover letter: 3

If you do NOT receive all of the pages described above, please telephone us at 612-373-6900 or fax us at 612-339-3061.

In re. Patent Application of: James Edwin Giff et al.

Examiner: Meredith Schoenfeld

Serial No.: 08/901,144

Group Art Unit: 3753

Filed: July 28, 1997

Docket No.: 3500.012US1

Title: VALVE ENCLOSURE ASSEMBLY

Please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

By: *Adam Kiedrowski*
Name: Adam P. Kiedrowski
USPTO Reg. No. 60,296

I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on the date shown below.

Mandy Brown
Mandy Brown

March 08, 2012
Date of Transmission



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
08/901,144	07/28/1997	JAMES EDWIN GIFFT	1304.58-US-0

CONFIRMATION NO. 8861

POWER OF ATTORNEY NOTICE



JOHN F THUENTE
PATTERSON & KEOUGH
4800 IDS CENTER
80 SOUTH 8TH STREET
MINNEAPOLIS, MN 554022100

Date Mailed: 03/16/2012

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/08/2012.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervned as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/dolipscomb/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
08/901,144	07/28/1997	JAMES EDWIN GIFFT	1304.58-US-0

CONFIRMATION NO. 8861

POA ACCEPTANCE LETTER

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



Date Mailed: 03/16/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/08/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/dolipscomb/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER SECRETARY OF COMMERCE FOR
INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT
AND TRADEMARK OFFICE
Alexandria, Virginia 22313

Patent No. 5904172

Paper No. _____

NOTICE OF *EX PARTE* REEXAMINATION

Notice is hereby given that a request for *ex parte* reexamination of U.S. Patent No. 5904172 was filed on 8-29-12 under 35 U.S.C. 302 and 37 CFR 1.510(a).

The reexamination proceeding has been assigned Control No. 90/012456.

This Notice incorporates by reference into the patent file, all papers entered into the reexamination file.

Note: This Notice should be entered into the patent file and given a paper number.

Patent 5,904,172

PATENT

IN UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 5,904,172

Docket No: 3500.012US1

Issue Date: May 18, 1999

Patentee: Giff et al.

Customer No.: 21186

Confirmation No.: 8861

Title VALVE ENCLOSURE ASSEMBLY

REQUEST FOR CERTIFICATE OF CORRECTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
ATTN: CERTIFICATE OF CORRECTION BRANCH

It is requested that a Certificate of Correction be issued correcting printing errors appearing in the above-identified United States patent. A copy of the text of the Certificate in the suggested form is enclosed.

Issuance of the Certificate of Correction would neither expand nor contract the scope of the claims as properly allowed, and re-examination is not required.


As the error is that of the Patent Office, it is believed that no fee is due.

The Examiner is authorized to charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully Submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A
P.O. Box 2938
Minneapolis, MN 55402
(612) 349-9585

Date : December 2, 2013

By: 
Adam P. Kiedrowski
Reg No: 60,296

CERTIFICATE UNDER 37 CFR § 1.8: The undersigned hereby certifies that this correspondence is filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450, on this 2 day of December 2013

Sallie Knudsen
Name

/Sallie Knudsen/
Signature

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. (Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 5,904,172

Page (1) of 1

DATED : May 18, 1999

INVENTOR(S) : Giffit et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 8, line 66, in Claim 3, delete "claim 1" and insert --claim 2--, therefor

In column 9, line 50, in Claim 7, delete "claim 1" and insert --claim 6--, therefor

In column 11, line 19, in Claim 13, delete "claim 1" and insert --claim 12--, therefor

MAILING ADDRESS OF SENDER:

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

Atty Docket No: 3500.012US1

PATENT NO. 5,904,172

No. of additional copies



Electronic Acknowledgement Receipt

EFS ID:	17541651
Application Number:	08901144
International Application Number:	
Confirmation Number:	8861
Title of Invention:	VALVE ENCLOSURE ASSEMBLY
First Named Inventor/Applicant Name:	JAMES EDWIN GIFFT
Customer Number:	21186
Filer:	Nicholas Peter Lanzatella/Sallie Knudsen
Filer Authorized By:	Nicholas Peter Lanzatella
Attorney Docket Number:	1304.58-US-0
Receipt Date:	02-DEC-2013
Filing Date:	28-JUL-1997
Time Stamp:	16:30:52
Application Type:	Utility under 35 USC 111(a)

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		3500012US1COCKIEDROWSKI.pdf	140238 d74414789a1c5642c0a01bc489e675603b15b9f	yes	3

Multipart Description/PDF files in .zip description			
	Document Description	Start	End
	Miscellaneous Incoming Letter	1	1
	Request for Certificate of Correction	2	3

Warnings:

Information:

Total Files Size (in bytes):	140238
-------------------------------------	--------

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

Applicant: Giffit et al.

Examiner: Meredith H. Schoenfeld

Patent No.: 5,904,172

Group Art Unit: 3753

Issue Date: May 18, 1999

Docket No: 3500.012US1

Title: VALVE ENCLOSURE ASSEMBLY


Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
ATTN: CERTIFICATE OF CORRECTION BRANCH

We are transmitting herewith the attached:

- Request for Certificate of Correction. (1 pg.)
- Certificate of Correction Form - PTO-1050 (1 pg.)

Please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
Customer No: 21186

By: 
Adam P. Kiedrowski
Reg. No: 60,296

CERTIFICATE UNDER 37 CFR § 1.8: The undersigned hereby certifies that this correspondence is filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450, on this 02 day of December 2013.

Sallie Knudsen
Name

/Sallie Knudsen/
Signature