

- [54] AIR BED WITH FIRMNESS CONTROL
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- [52] U.S. Cl. **5/453; 5/455;**
5/464; 5/474; 415/121 R; 417/423 R
- [58] Field of Search 5/449, 450, 453-456,
5/474, 464; 297/DIG. 3; 417/423 R; 415/121 R

4,306,322 12/1981 Young et al. 5/449

FOREIGN PATENT DOCUMENTS

1529538 3/1970 Fed. Rep. of Germany 5/455

Primary Examiner—Alexander Grosz
Attorney, Agent, or Firm—Stephenson and Boller

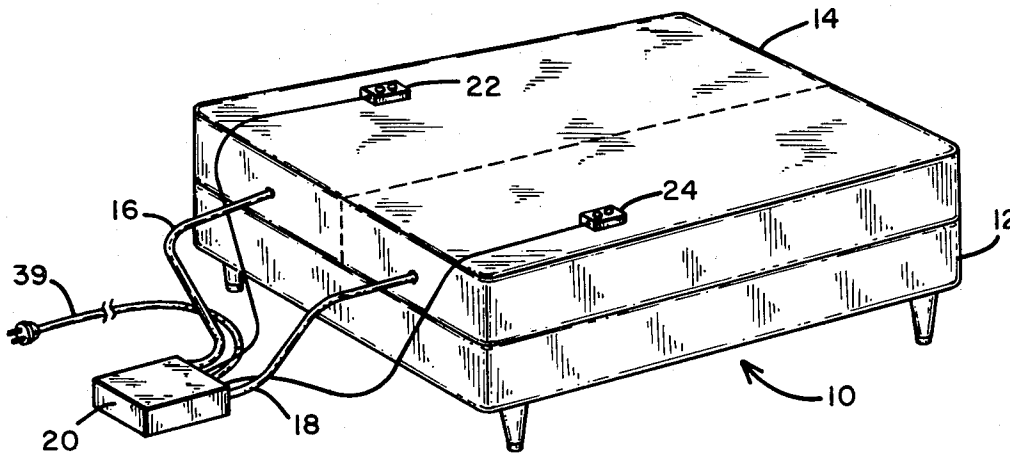
[57] **ABSTRACT**

A bed or mattress structure having at least one pneumatic bladder confined within an outer perimeter of resilient but relatively firm edging material, with top and bottom covers, wherein air flow tubes are coupled into the pneumatic bladder and are connected to an electrically driven blower assembly which intakes and pressurizes ambient air at a moderately elevated pressure to the air bladder; the blower and air flow paths being controllable by at least one hand held control unit.

[56] **References Cited**
U.S. PATENT DOCUMENTS

- 3,303,518 2/1967 Ingram 5/456
- 4,078,842 3/1978 Zur 297/DIG. 3
- 4,224,706 9/1980 Young et al. 5/449

27 Claims, 8 Drawing Figures



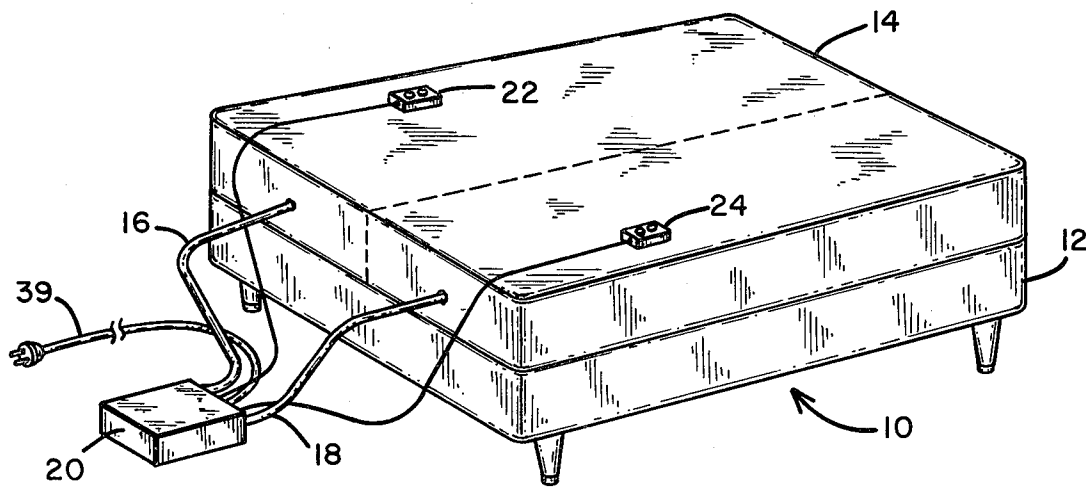


Fig. 1

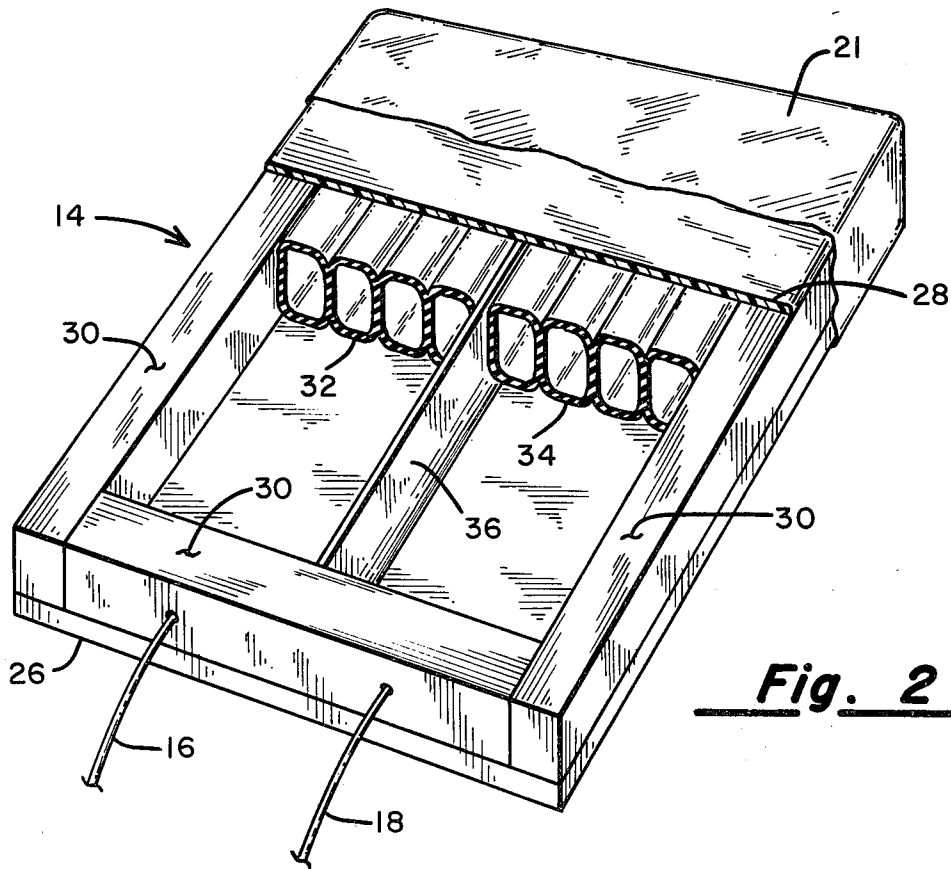


Fig. 2

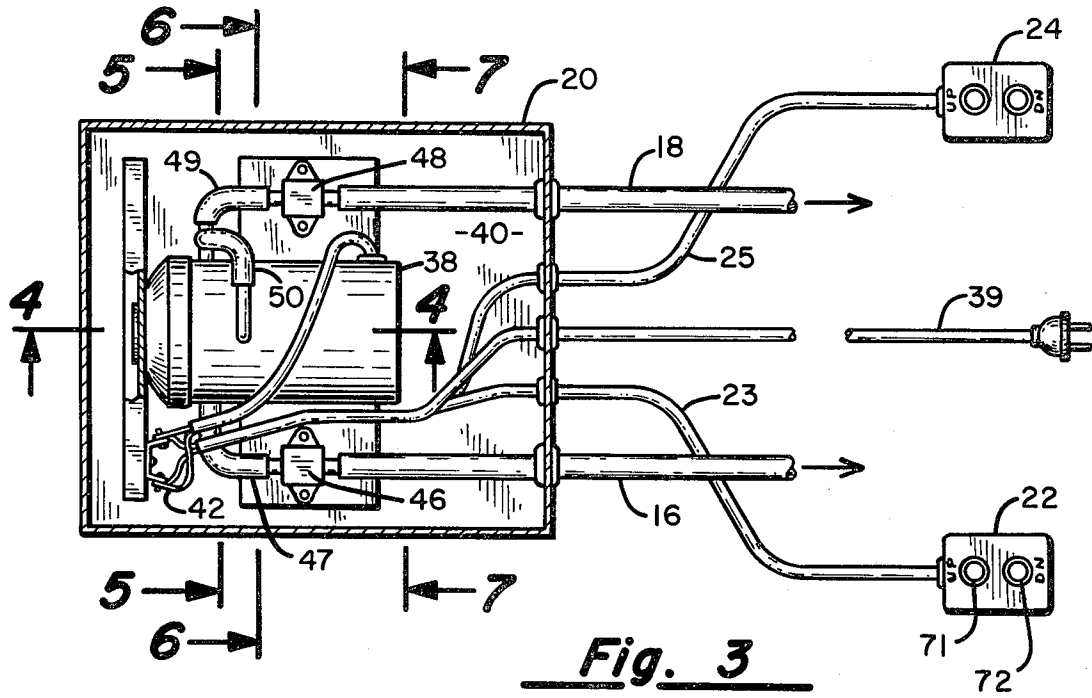


Fig. 3

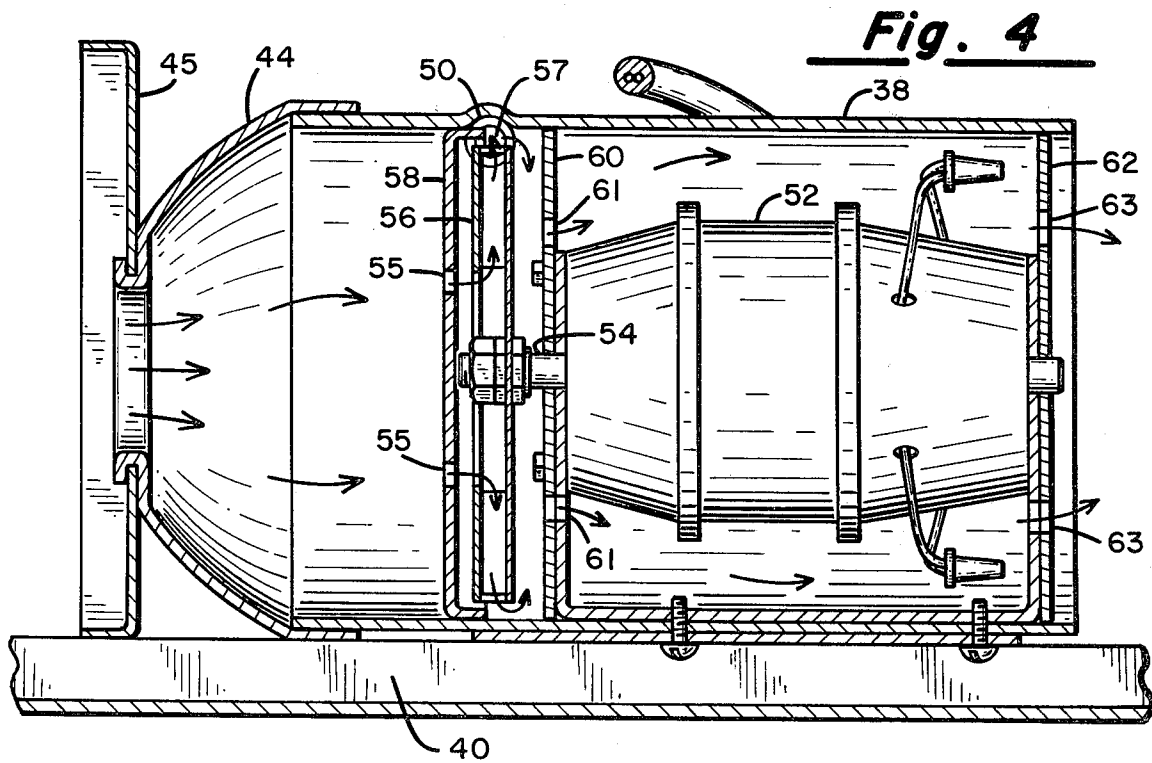


Fig. 4

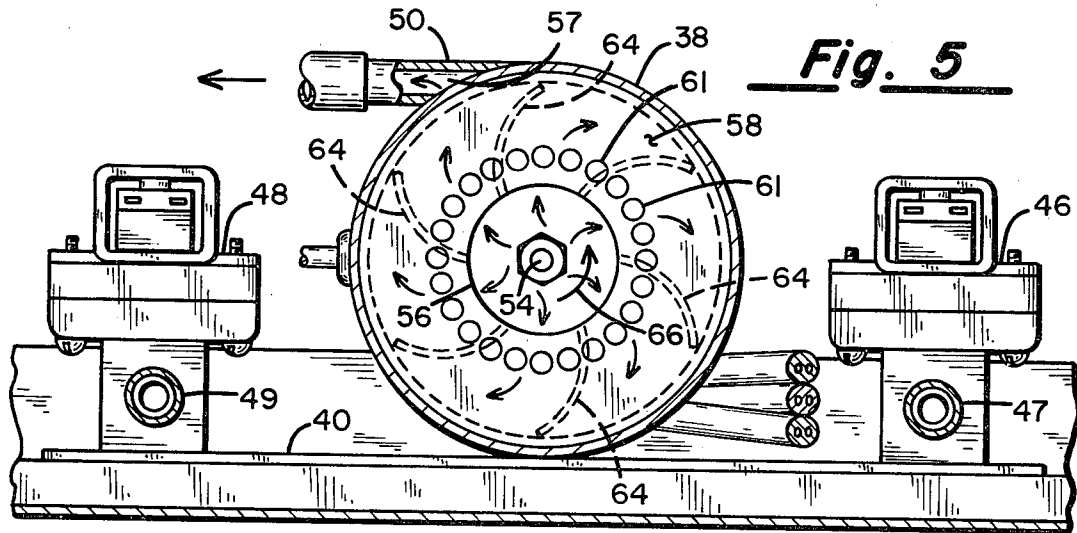


Fig. 5

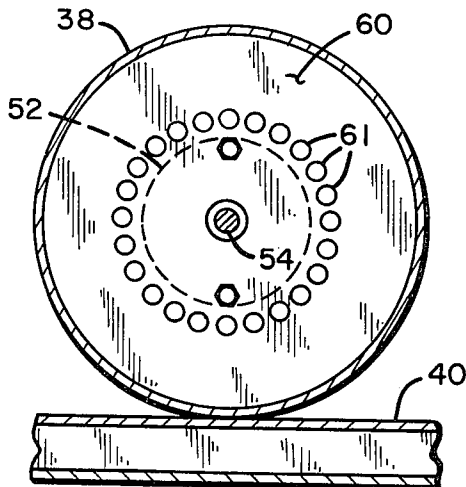


Fig. 6

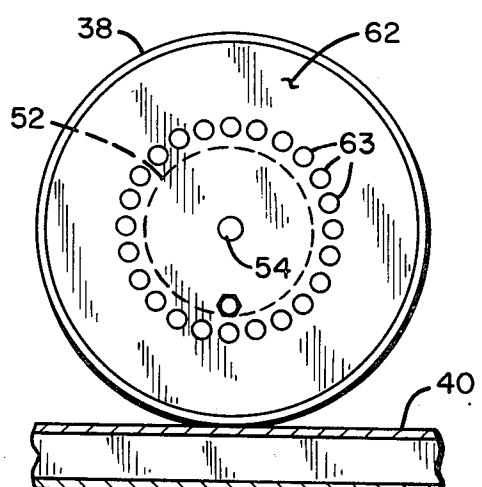


Fig. 7

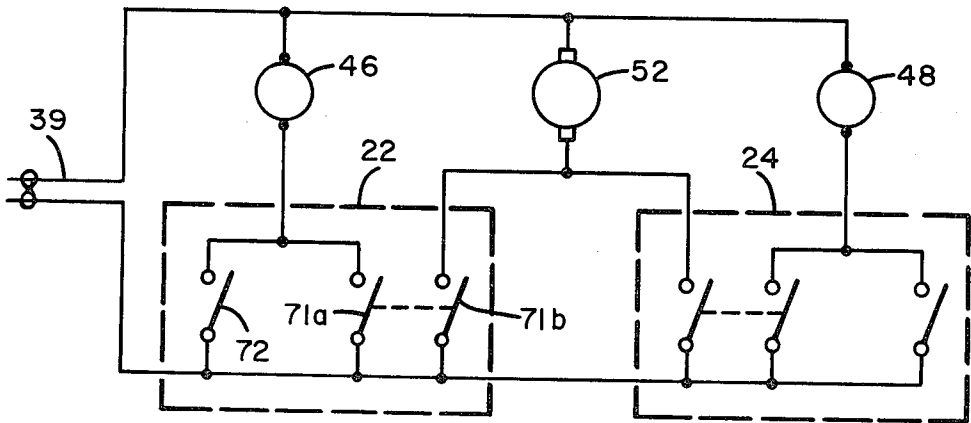


Fig. 8

AIR BED WITH FIRMNESS CONTROL

BACKGROUND OF THE INVENTION

The present invention relates to bedding and mattresses, and more particularly to mattresses of a type including pneumatic bladders as an important support element in the construction of the mattress. The invention specifically relates to an apparatus for providing variable firmness control to beds having air mattresses as a structural feature.

Beds utilizing air mattresses as an important and functional component thereof are known in the art. The best and most recent example of such a bed may be found in U.S. Pat. No. 4,224,706, issued Sept. 30, 1980, and U.S. patent application No. 094,347, filed Nov. 14, 1979 now U.S. Pat. No. 4,306,322, both of which are owned by the assignee of the present invention. These beds relate specifically to air beds having a "closed" air system, whereas the present invention relates to an air bed having an "open" air system. By contrast, a "closed" air system in a pneumatic bed assembly incorporates an air mattress of some structure which is coupled through appropriate tubes to an air bladder, wherein a predetermined volume of air is sealably confined by the two air elements. Relative firmness of such a pneumatic bed assembly is achieved by controllably transferring some of the air volume between the mattress and the air bladder, and vice versa, and the patents above referred to achieve this result through a mechanism for controlling the total volume of the air bladder. Such a mechanism requires the confinement of the air bladder in a closed but variable volume, and includes means for increasing and decreasing the confinement volume so as to either permit air to flow from the mattress into the air bladder or to force air from the air bladder into the mattress. When air is released from the air mattress into the bladder the "feel" of the bed becomes softer, and when air is forced from the bladder into the mattress, the "feel" of the bed becomes more firm.

SUMMARY OF THE INVENTION

The present invention utilizes an air mattress assembly of a particular and preferred construction, in combination with an externally energized and powered air pressure source. In a preferred embodiment of the invention the air mattress is constructed in two independent sections, each section having an air tube coupled to a source of air pressure. The source of air pressure is selectively controllable by means of independently operable control mechanisms, which preferably may be hand held, and which permit either an increase in air pressure to a section of air mattress or the release thereof, thereby providing independent adjustment and control of relative firmness of each air mattress section.

It is therefore a principal object of the present invention to provide an air mattress having adjustable control of firmness by means of a control unit which may be operated while lying on the mattress.

It is another object of the present invention to provide variable firmness control for two mattress sections in the same bed.

It is a further object of the present invention to provide firmness control for air mattresses by means of an open air system which derives ambient air and elevates its pressure sufficient to control the system.

BRIEF DESCRIPTION OF THE DRAWINGS

An understanding of the operation and advantages of the invention will become apparent from the following specification, and with reference to the appended drawings, in which:

FIG. 1 is a perspective view of a preferred embodiment of the invention;

FIG. 2 is a perspective view, partially broken away, illustrating the air mattress of the invention;

FIG. 3 is a top view of the power source;

FIG. 4 is a cross-sectional view taken along the lines 4-4 of FIG. 3;

FIG. 5 is a cross-sectional view taken along the lines 5-5 of FIG. 3;

FIG. 6 is a cross-sectional view taken along the lines 6-6 of FIG. 3;

FIG. 7 is a cross-sectional view taken along the lines 7-7 of FIG. 3; and

FIG. 8 is a schematic diagram of the control portion of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, the preferred embodiment of the invention is shown in perspective view. A bed 10 has a box spring 12 and a mattress 14. Box spring 12 is constructed according to well-known techniques, and mattress 14 is constructed according to the teachings hereinafter recited. A pair of air lines 16 and 18 respectively are coupled to mattress 14, and terminate at power source 20. A pair of control units 22 and 24 are electrically connected to power source 20 and will be hereinafter described. The dotted line shown on FIG. 1, which divides mattress 14 into two halves, is indicative of the construction of the preferred embodiment of mattress 14, wherein each of the mattress halves are independently adjustable relative to firmness.

FIG. 2 shows a perspective view of mattress 14 in partial breakaway. Mattress 14 has a bottom cover 26 and a top cover 28, one or both of which may be made from soft, padded material. Top cover 28 in particular, may be made in conformance with practices and procedures relating to conventional mattresses, and may be attached to an outer cover 21 over the mattress by means of zippers or other fasteners. An edging material 30 forms an outer perimeter around mattress 14. Edging material 30 is constructed from relatively firm, yet resilient, material such as foam or coil springs confined within a rectangular cover. Edging material 30 may also be constructed from other types of springs or other semiresilient material, with the objective of having resiliency characteristics such that a person sitting on the edge of the mattress will not unduly deform the edging material. It is also important that edging material 30 be sufficiently rigid to confine within its perimeter the air bladder or air bladders which form a part of mattress 14. If edging material 30 is constructed in sections as shown in FIG. 2, it is important that the abutting ends of the respective sections are locked together. This can be accomplished by constructing interlocking mechanisms at the respective section edges, or preferably by enclosing the entire perimeter in a cloth or plastic, tightly fitting cover 21. The edging material 30 is typically approximately four inches in width and five-six inches in height.

At least one air bladder 32 or 34 is contained within the volume defined by edging material 30 and the top

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