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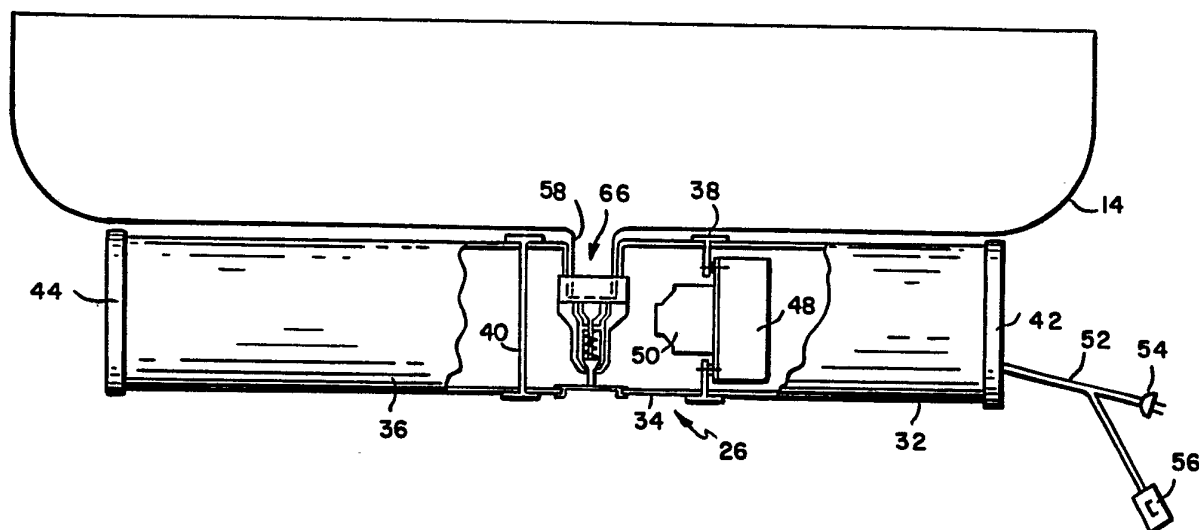
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(54) Title: COLLAPSIBLE AIR BED

**(57) Abstract**

A collapsible, portable, stowable air inflation bed (10) is disclosed. The bed (10) consists of an air mattress (14) supported at the head from a hollow cylinder (26). One end of the hollow cylinder (26) forms a support housing in the air conduit for an electric motor driven pump (48). The other end of the hollow cylinder (26) provides miscellaneous storage space. The surface of the cylinder (26) provides a roller assembly unto which the air bed (10) is rolled as it is being deflated. The mattress (14) is inflated and automatically unrolled by pumping air through a one way valve (66) into the interior of the mattress (14). When the user is lying on the mattress (14), firmness can be increased by energizing the pump motor (48) or the firmness can be decreased by manually releasing air through the one way valve (66). The mattress (14) is rapidly deflated by first opening a relatively large valve (24). A unique bedding system, a heating unit (100), and an automatic rewind unit (110) are also disclosed.

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-1-

COLLAPSIBLE AIR BED

This invention relates to a collapsible, portable, stowable, air inflatable bed intended to provide extra sleeping accommodations for small homes or apartments, mobile homes or motor coaches, and in other environments where space is at a premium, and comfort is a requirement. The bed consists of an air mattress supported at the head from a hollow cylinder. One end of the hollow cylinder forms the support housing and the air conduit for an electric motor driven air pump. The other end of the hollow cylinder provides miscellaneous storage space. The surface of the cylinder provides a roller assembly onto which the air bed is rolled as it is being deflated. The mattress is inflated and automatically unrolled by pumping air through a one-way valve into the interior of the mattress. When the user is lying on the mattress, the firmness can be increased by energizing the pump motor, or the firmness can be decreased by manually releasing air through the one-way valve.

The mattress is rapidly deflated by first opening a relatively large valve at the end of the mattress opposite the cylinder, and then hand

-2-

rolling the mattress on to the cylinder. Alternatively, the one-way valve and relatively large rapid deflation valve may be combined into a single valve.

The mattress may include a flexible heating element which rolls up as the mattress is rolled up. To assist in rolling up the mattress for storage an automatic rewind unit may be employed. A unique bedding system is also disclosed.

THE PRIOR ART

Many air mattresses are known in the prior art, however, none of the prior art mattresses disclose the combination of features which provide the comfort, portability and stowability of the air bed disclosed herein. The most simple and well known air mattress is the type used for camping and generally it includes an inlet valve through which air may be pumped or blown in by mouth. The same valve is used for exhausting the air when it is desired to deflate the mattress for storage.

U.S. Patent No. 918,391 issued to Taarud in 1909 is a variation of the simple air mattress in that it provides a manually operated piston pump to which a collapsible air pillow is attached. The pump cylinder provides a form on which the pillow is rolled for storage.

-3-

The Swenson et al. U.S. Patent No. 4,394,784 shows a mattress in which the air pressure within a mattress is varied by pumping air to the interior of the mattress bladder by means of a motor driven air pump through a solenoid actuated valve, and wherein air is exhausted by energizing the solenoid, but not the motor. Swenson et al. does not show a collapsible mattress. Neither Taarud or Swenson, alone or in combination, functions to provide the various combination of the features of the invention herein disclosed and claimed. The disclosed arrangement, unlike Swenson, provides a portable mattress which can be unrolled, and which can rapidly and easily be rolled up and stored. Moreover, unlike Taarud, the disclosed invention can be automatically unrolled, and the internal pressure of the mattress is adjustable.

SUMMARY OF THE INVENTION

In accordance with this invention, I provide a rigid roller assembly comprised of three cylinder modules which serve: (1) as the housing and the support for a motor driven rotary air pump; (2) as the air inlet and outlet to and from the interior of the mattress; (3) as a mandrel on to which the mattress is rolled for storage and to provides rapid deflation through a second outlet valve; and (4) as convenient storage space.

-4-

The inlet and outlet valve and the rapid deflation valve are combined as a single valve in one embodiment. A flexible heating element, which may be rolled up with the mattress, is provided, and an automatic rewind unit may be employed to reroll the mattress after use.

The invention provides for the automatic unrolling of the mattress as it inflates, and also includes a bedding system not shown in the prior art.

In summary, this invention provides an inflatable air bed which employs a rectangular air inflatable bladder in the shape of a bed mattress having a head, a foot and a sleeping surface. The head of the bladder is secured to the roller assembly, and is wound onto the roller assembly for storage. The roller assembly may comprise three detachably interconnected cylindrical modules, including a pump support module at one end, an intermediate valve support module adjacent said pump support module, and a storage module at the other end. A motor driven pump is mounted in the pump support module and a one-way pressure actuated valve is mounted in the valve support module. The flow path from said valve and pump support modules to the storage module is closed, and an airtight fluid conduit including the valve is provided from the bladder into the valve and pump support chambers.

-5-

The output from said air pump flows into the interior of the bladder through said pressure actuated one-way valve. Means are provided in the valve support module for manually opening said valve. Thus when the air pump supplies pressurized air to the bladder through the one-way valve, the bed unrolls and is inflated. The comfort level of the bed can be adjusted by releasing air from the bladder by the manipulation of the valve when the pump is not operating.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a three-dimensional view showing a collapsed mattress in its rolled up state, ready to be inserted into its storage bag;

Figure 2 is a three-dimensional view showing the mattress unrolling during inflation;

Figure 3 is a three-dimensional view showing the mattress in its fully unrolled state, and also showing the bedding system;

Figure 4 is a cross-sectional view of the inflated mattress taken through the line 4-4 in Figure 3;

Figure 5 is an end view of the mattress with the bedding removed;

Figure 6 is a plan view with a portion of the cylinder broken away;

-6-

Figures 7 and 8 show the pressure control valve used in accordance with this invention;

Figure 9 shows a second embodiment of the present invention further including a flexible heating element;

Figure 10 is cross-sectional view of the inflated mattress of the present invention in combination with an automatic rewind unit;

Figure 11 is a cross-sectional view of a combination control valve and rapid deflation valve according to the present invention;

Figure 12 is a cross-sectional view similar to Figure 11 with rapid deflation valve open;

Figure 13 is a top plan view of the combination valve shown in Figure 11;

Figure 14 is a top plan view of an alternate embodiment of the control valve used in accordance with the present invention; and

Figure 15 is a cross-sectional view of the control valve shown in Figure 13; and

Figure 16 is an exploded cross-section view of the control valve shown in Figure 14.

DESCRIPTION OF A PREFERRED EMBODIMENT

Figure 1 shows an air bed 10 in its collapsed, deflated condition ready to be inserted into storage bag 12.

-7-

Figure 2 shows the mattress 10 in a partially unrolled and partially inflated state. As will be pointed out hereinafter, the mattress automatically unrolls as it is inflated.

Figures 3 and 4 show a fully inflated mattress 10 including a preferred embodiment of the bedding system. The mattress includes an air impermeable mattress shaped bladder 14 (see figure 4) which is contained within a mattress cover or sack 16. A zipper 18 (see figure 3) closes the cover, but provides an opening to the chambers within roller assembly 26, hereinafter described. While the manner in which the mattress 10 is constructed forms no part of this invention, it basically is a closed mattress shaped sack formed of sheets of impervious plastic or rubber materials which are bonded together or otherwise sealed to provide an air tight enclosure.

As seen in figure 4, conventional padding 19 is positioned between the bladder 14 and the cover 16 to pad and insulate the sleeping surface of the bladder 12. Sheeting in the form of a rectangular sack 20 is secured to the mattress cover 16 by means of a plurality of pairs of Velcro loop pads 22 or other attaching devices, such as interlocking clips, distributed on the opposing faces of the periphery of the sack and the cover.

-8-

A large manually operated exhaust valve 24 located in the bladder 12 extends through appropriate apertures in the cover and pad at the foot of the bed.

As shown in figures 4, 5 and 6, the roller assembly 26, comprised of hollow cylindrical modules, is secured to the head end of the bladder by means of a pair of spaced straps 28 and 30. As will be hereinafter explained, the cylindrical housing of the roller assembly 26 serves (1) as a mandrel on which the air bed 10 is wound, (2) as a support and air conduit for the pump used to inflate the mattress 14, (3) as a support for the manual valve operator used to exhaust air to reduce the pressure within the bladder, and (4) for storage of bedding and miscellaneous items.

As best seen in figures 5 and 6, the cylindrical housing of the roller assembly 26 is comprised of three cylindrical modules, the air supply module 32, the pressure control module 34 and the storage module 36. The three modules are threaded together at flanged discs 38 and 40. Structural rings 42 and 44 reinforce the ends of the modules 32 and 36, respectively. A flanged disc 40 closes and seals the inner end of cylinder storage module 36, while the flanged disc 38 has a central opening through which air can freely flow.

-9-

The cylinder 26, the discs 38 and 40, and the rings 42 and 44 are constructed of a rigid plastic capable of supporting the various elements which are mounted therein. The flanged disc 38 supports an air pump or fan 48 and a pump driving A.C. motor 50. The motor 50 is connected by means of wiring 52 and a conventional plug 54 to a source of 60 cycle house power, not shown, and its operation is controlled by means of a conventional on/off switch 56. As shown, switch 56 and the wiring 52 to the electric motor 50 extend through the module 32, and are stored therein when not in use. When so removed the switch 56 can be held by a person lying on an inflated bed 10, or it may be mounted on the cover at the head of the bed by means of velcro style hook and loop pads 55 and 57.

When the electric motor 50 is energized, air is driven from the air supply module 32 into the pressure control module 34 which provides the air conduit to the interior of the bladder 14, and which supports a pressure control valve 66 which is selectively actuated either manually or by air pressure.

The bladder 14 has a cylindrical neck 58 which extends into an inwardly projecting cylindrical neck 60 in the center module 34. The neck 60 has threads 62 onto which the housing 64 of the control valve 66 is threaded, with the bladder neck 58 clamped

-10-

therebetween.

The control valve 66 (see figures 7 and 8) comprises a rubber membrane or diaphragm 68 which is attached to the center of a support spider 70 by means of pin 72. Air pressure within the bladder 14 maintains the membrane 68 in a flat condition on the spider 70 and closes the opening to the bladder 58, and thus maintains the air pressure within the bladder. A plunger 74 having a stem 76 and tines 78 is normally biased by means of spring 79 into the position shown in figure 7. A rubber diaphragm mounted in an aperture 82 in the wall of module 34 is positioned adjacent the plunger tip 84.

The diaphragm 68 is deflected to unseal the neck 58 of bladder 14 in one of two ways. First, turning on the motor 50 to operate the fan 48 increases the pressure in module 34 to cause the deflection of the membrane 68 to admit air to the bladder 14 to increase the firmness of the mattress. Any small increase in pressure is sufficient to deflect the membrane. Second, with the motor 50 deenergized, the membrane 68 can be manually unsealed by depressing the diaphragm 80 to push in the plunger 74 and thereby drive the tines 78 through the spider 70 to deflect the membrane 68, as shown in figure 8, thereby permitting the escape of air from the bladder, and hence, reduce the firmness of the mattress.

-11-

In the use of the system, the bed 10 is first removed from its storage bag 10 and the plug 54 and switch 56 are removed from the module 32. After plugging into a conventional home outlet, and pressing the switch to its on position, the motor 50 is energized to drive the fan 48 so as to pump ambient air past the deflected rubber diaphragm 68 of the valve 66. The air that is pumped into the bladder 14 forces the rolled up bed automatically to unwind in the direction of the arrow 15 (figure 2).

When the bed is fully unwound as depicted in figure 3, the user is able to adjust the person comfort level of the bed by further increasing the pressure of the air in the bladder if the bed is too soft, or to decrease the pressure by pushing the diaphragm 80 to depress the plunger 74 to mechanically deflect the diaphragm 68, and permit the escape of air within mattress until the firmness of the mattress meets the personal taste of the user.

When the bed is to be stored, the exhaust valve 24 at the foot of the bed is manually opened, and the bed, with all the bedding in place, is wound on the roller assembly cylinder 26, compressing the air in the bladder and quickly forcing the air out of the exhaust valve.

The bedding system is also unique in that it includes the insulation padding 20 held in place by the zippered cover 16, which is made of a heavy, soft fabric that provides warmth and comfort to the

-12-

user. In addition the sheet 22 is held in place by appropriately located velcro style hook and loop so that the bed is not only comfortable, but is convenient for use, and the sheet is quickly and easily changed as required.

Figure 9 shows another embodiment in which a flexible heat strip 100 is attached to the bottom of the mattress 10. The flexible heat strip 100 extends in the lengthwise direction of the mattress 10. The heating strip 100 is powered by a battery (not shown) or a wall plug for drawing electric power from an outlet. Since the heat strip 100 is flexible, it does not interfere with the rolling and unrolling of the mattress 10.

The inflatable air bed of the present invention is designed so that it can be used with an automatic rewind unit. When use of the mattress 10 is no longer desired, the rapid deflation valve 24 is opened to release the air. In order to store the bed, the mattress 10 must be rewound. The embodiment shown in Figure 10 includes an automatic rewind unit 110 which attaches to the roller assembly 26 and rotates it so that the mattress 10 is wound around the roller assembly 26. The automatic rewind unit includes a rewind motor 112, a pair of mandrels 114 and 116 and an outer casing 118. The motor 112 is attached to the outer casing

-13-

118. In the illustrated embodiment the motor 112 is attached to one end of the casing 118. Mandrel 114 extends from the motor 118 inwardly along axis of the cylindrical casing 118. The second mandrel 116 extends along the axis of the casing from the opposite end thereof. The pair of mandrels 114 and 116 connect to the opposing ends of the roller assembly 26 and engage it so that rotation of the mandrels imparts a corresponding rotation to the roller assembly. Thus, when the rewind motor 112 is engaged, the mandrel 114 imparts rotation to the roller assembly 26 to draw the mattress 10 about the roller assembly. The second mandrel 116 extending from the opposite end of the cylindrical casing 118 stabilizes the roller assembly during the rewinding procedure. The automatic rewind unit 110 thus provides a means for easily rewinding the mattress 10 quickly and efficiently. The mandrels 114 and 116 may be designed to interfit with the ends of the roller assembly 26 in any one of numerous known ways.

In another embodiment of the invention, shown in Figures 11-13, the exhaust valve 24 and roller assembly 26 are eliminated, and a combination valve 120 replaces the control valve 66. The embodiment illustrated in FIGS. 11-13 need not be inflated by an electric pump. The combination valve 120 incorporates a diaphragm 134 and stem 136 similar to

-14-

the control valve 66 shown in Figures 7 and 8. The entire control valve portion 130 of the combination valve 120 is mounted inside of a cylinder 140. The cylinder 140 has multiple flanges 135 around the lower edge to provide openings for air flow during inflation. These openings prevent damage to an inflation device if the cylinder 140 became obstructed. The cylinder 140 fits inside of a second larger cylinder 150 attached directly to the surface of the mattress 10. The first and second cylinders 140 and 150 are attached to one another by a hinge unit 152. As a result, the first cylinder 140 may be pivoted so that the control valve portion 130 of the combination valve 120 is positioned concentrically within the second cylinder 150. The first cylinder 140 is maintained in this concentric position by a locking unit 154 extending from the first cylinder 140 on the side opposite the hinge 152. The locking unit 154 includes an arm 156 which pivots about a projection 157 on the first cylinder 140 and interlocks with a flange 158 extending from the upper edge 159 of the second cylinder 150 to lock the control valve portion 130 in position.

As shown in Figure 12, the hinge 152 and locking unit 154 cooperate so that the control valve portion 130 may be pivoted out of and away from the second cylinder 150 thus providing a large opening

-15-

to the bladder 14 of the mattress 10. In this manner, the hinge 152 and locking unit 154 perform the function of the exhaust valve 24 of the first embodiment for rapid deflation of the mattress 10. The hinge 152, the locking 154 and the first and second cylinders 140 and 150 thus may be operated manually as a "flip-top" gasket seal to ensure speedy, efficient air exhaust.

Figures 14-16 show another embodiment of the control valve 66. The control valve 200 of this embodiment includes valve stem 202 having a diaphragm 204 extending transversely from one end. The valve stem 202 moves within a cylindrical valve housing 206 which is engaged, for example by means of screw threads, to a cylindrical cup 208 projecting outwardly from the mattress 10. The valve housing 206 has a projection 210 extending inwardly and angled upwards as shown in Figure 15 towards the valve stem 202, to engage the diaphragm 204 at the end of the valve stem 202. The valve housing 206 further has a series of circumferentially spaced flanges 212 located around its bottom edge 214. When the valve stem 202 is depressed, air flows through the valve housing 206 and through the spaces between the flanges 212 into the mattress 10. The bottom edge 214 of the valve housing 206 extends toward the mattress 10 for a

-16-

distance greater than the length of the range of movement of the valve stem 202. Thus, diaphragm 204 does not extend below the bottom edge 214 of the valve housing 206 when avoiding any damage to the mattress 10.

The control valve 200 is further provided with a lower valve support 216 which fits inside of the valve housing 206 and rests on an upwardly projecting shoulder 222. The lower valve support 216 has a downwardly extending frustoconical section 218 having an opening 220 for supporting the valve stem 202. The support 216 is designed so that the frustoconical section 218 and opening 220 are centered in the valve housing 206.

An upper valve support 224 is provided to further support the valve stem 202. The upper valve support 224 has a frustoconical shape similar to the frustoconical section 218. As shown in Figure 15, the upper valve support 224 has a greater height than the frustoconical section 218. The upper and lower valve supports 224 and 216 fit together so that an opening 226 at the top of the upper valve support 224 aligns with the opening 220, thus permitting unobstructed movement of the valve stem 202.

The lower valve support 216 has a recess 228 formed in the base of frustoconical section 218.

-17-

The upper valve support 224 has a downwardly projecting flange 230 which fits within the recess 228 in the lower valve support 216. The outer diameter of the flange 230 may be slightly less than the outer diameter of the base of the frustoconical section 218 of the upper valve support 224 as shown in Figure 16. Thus an optional filter 232 may be placed on top of the lower valve support 216, and the upper valve support 224 may be inserted through an opening 234 in the filter 232 to engage the lower valve support 216. The larger diameter base of the frustoconical portion of the upper valve support 224 will thus hold the filter 232 in place.

As shown in Figure 13, the lower valve support 216 has an outer ring 236 and inwardly extending radial ribs 238. The ribs 238 connect to the frustoconical section 218 and support the filter 232. In this manner air can pass freely through openings 240 between the ribs 238 and through the filter 232.

While the foregoing specification describes a preferred embodiment of this invention, it will be understood that various modifications and adaptations will be available to persons skilled in the art. It is intended therefore that this invention be limited only by the following claims as interpreted in the light of the prior art.

What is claimed is:

-18-

Claims

1. An inflatable air bed, the combination comprising:

a rectangular air inflatable bladder in the shape of a bed mattress having a head, a foot and a sleeping surface;

a roller assembly, the head of said bladder being secured to said roller assembly, and being wound onto said roller for storage, said roller assembly comprising a rigid hollow cylinder open at one end, and closed intermediate its ends to provide first and second chambers;

an airtight fluid conduit from said bladder into said first chamber, said conduit including a one-way pressure actuated valve for admitting air to said bladder;

a motor driven air pump supported within said first chamber, the output from said air pump flowing into the interior of said bladder through said pressure actuated one-way valves; and

means mounted in said first chamber for manually opening said valve,

whereby said air pump supplies pressurized air to said bladder through said one-way valve to unroll said bladder from said roller assembly, and whereby air can be released from said bladder by the manual

-19-

operation of said valve when said pump is not operating.

2. The invention as defined in claim 1, and a large manually operated pressure release valve at the foot of said bladder for the rapid deflation of said bladder.
3. The invention as defined in claim 1, wherein said second chamber is a storage chamber.
4. The invention as defined in claim 1 wherein said roller assembly comprises first, second and third axially aligned, detachably interconnected cylinders, said pump and motor being supported within said first cylinder, said valve being supported within said second cylinder, an air flow path from said pump to said third cylinder, said path being closed, whereby air flowing from said pump is directed through said valve to pressurize said bladder, and whereby said third cylinder provides a storage chamber within said roller assembly.
5. The invention as defined in claim 4, wherein said means mounted in said first chamber for manually opening said valve, is a plunger supported

-20-

in said second cylinder for mechanically opening said one-way valve, and said plunger being accessible through an air tight flexible diaphragm in the wall of said second cylinder.

6. The invention as defined in claim 1 wherein said roller assembly is comprised of three cylindrical modules, including a pump support module at one end, an intermediate valve support module adjacent said pump support module, and a storage module at the other end, a flow path from said valve and pump support modules to said storage module, said path being closed, said modules being detachably interconnected.

7. The invention as defined in claim 6, and an insulating pad on the sleeping surface of said bladder, and wherein the bladder, the pad and the attached roller assembly are enclosed in a fitted cover, an end of said cover being open to enable access to said modules.

8. The invention as defined in claim 7, and a sheet detachably secured to the sleeping surface of said cover.

9. In an inflatable air bed, the combination comprising:

-21-

an air inflatable bladder in the shape of a bed mattress having a head and a foot;

a rigid hollow support cylinder secured to an end wall of said bladder at said head, said cylinder being closed intermediate its ends by an intermediate wall, and being open at both ends;

first and second diametrically opposed holes in the surface of said cylinder on one side of said intermediate wall;

an airtight fluid conduit from said bladder into said cylinder through said first hole, said conduit including a pressure activated one-way valve in said conduit, said one-way valve permitting the flow of pressurized air into said bladder but preventing the flow of air from said bladder, said valve including manual means for opening said valve to permit air flow from said bladder;

a flexible diaphragm sealing said second hole, said manual means being mechanically operable when said diaphragm is depressed;

a motor driven air pump supported within said one side of said cylinder, the output from said air pump being connected to said the interior of said bladder through said one-way valve, whereby operation of said air pump supplies pressurized air to said bladder through said one-way valve, and whereby air can be released from said bladder by the

-22-

manual operation of said valve when said pump is not operating.

10. The invention as defined in claim 9, and a large manually opened valve at the foot of said bladder for quickly releasing air from said bladder as said bladder is rolled onto said cylinder.

11. An inflatable air bed, the combination comprising:

- a rectangular air inflatable bladder in the shape of a bed mattress having a head, a foot and a sleeping surface;

- a roller assembly, the head of said bladder being secured to said roller assembly, and being wound onto said roller for storage said roller assembly comprising a rigid hollow cylinder;

- an airtight fluid conduit from said bladder into said hollow cylinder, said conduit including a one-way pressure actuated valve for admitting air to said bladder;

- a motor drive air pump supported within said hollow cylinder, the output from said air pump flowing into the interior of said bladder through said pressure actuated one-way valve; and

- means mounted in the hollow cylinder for manually opening said valve,

-23-

whereby said air pump supplies pressurized air to said bladder through said one-way valve to unroll said bladder from said roller assembly, and whereby air can be released from said bladder by the manual operation of said valve when said pump is not operating.

12. An inflatable bed comprising:

an inflatable bladder having first and second sides;

a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage;

means including a one way valve connected to said bladder through which gas is infused to inflate said bladder; and

a motor driven pump connected to said means for inflating said bladder through said valve and unrolling said bladder from said roller assembly.

13. An inflatable bed as recited in Claim 12, further comprising a means for manually opening said valve to release gas from said bladder when said pump is not operating.

14. An inflatable bed as recited in Claim 12, wherein an occupant of said bed can reduce the gas

-24-

pressure in said bladder by manually activating said valve while reclining on said bed.

15. An inflatable bed as recited in Claim 12, wherein said pump is mounted in said roller assembly.

16. An inflatable bed as recited in Claim 12, wherein said roller assembly extends the entire length of said one of said first and second sides.

17. An inflatable bed as recited in Claim 12, further comprising a large manually operated pressure release valve at the other of said first and second sides to rapidly deflate said bladder.

18. An inflatable bed as recited in Claim 12, further comprising an insulating pad disposed on said bladder, and a fitted cover and enclosing said bladder, pad and roller assembly, said cover having an opening for access to said roller assembly.

19. An inflatable bed as recited in Claim 12, wherein said roller assembly is a rigid hollow support cylinder.

20. An inflatable bed as recited in Claim 12, wherein said one way valve is manually operable to

-25-

release gas from said bladder after inflation by said pump, when said pump is no longer operating.

21. In combination,

a motor driven pump and inflatable bed;

an inflatable bladder comprising a mattress for the bed and having first and second sides;

a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage; and

a one way valve to which said pump is attached for inflating said bladder, said bladder unrolling from said roller assembly upon inflation by said motor driven pump.

22. An inflatable bed comprising:

an inflatable bladder having first and second sides;

a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage;

means including a one way valve connected to said bladder through which said gas is infused to inflate said bladder; and

means for heating said gas in said bladder.

-26-

23. An inflatable bed as recited in Claim 22, wherein said heating means further comprises a flexible heat strip which is capable of being rolled up with said mattress for storage.

24. In combination, an inflatable bed comprising:
an inflatable bladder having first and second sides;

a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage;

means including a one way valve connected to said bladder through which said gas is infused to inflate said bladder; and

a motor driven pump connected to said means for inflating said bladder through said valve and unrolling said bladder from said roller assembly, and

means for automatically rewinding said bladder on said roller assembly upon deflation of said bladder.

25. The combination as recited in Claim 24, wherein said rewinding means attaches to and rotates said roller assembly.

26. The combination recited in Claim 25, wherein said rewind means comprises:

-27-

an outer casing;
a pair of mandrels aligned substantially coaxial with one another and attaching to opposite sides of said roller assembly; and
a motor attached to said housing for rotating said mandrels.

27. An inflatable bed comprising:
an inflatable bladder having first and second sides;
means including a combination valve connected to said bladder through which gas is infused to inflate said bladder, and means for rapidly deflating said gas from said bladder.

28. An inflatable bed as recited in Claim 27, wherein said combination valve further comprises a one way valve mounted in a first housing, a second housing into which said first housing is pivotably connected, and means for locking said first housing in said second housing.

29. An inflatable bed comprising:
an inflatable bladder having first and second sides;
a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage;

-28-

means including a one way valve connected to said bladder through which said gas is infused to inflate said bladder; and

a motor driven pump connected to said means for inflating said bladder through said valve an unrolling said bladder from said roller assembly;

wherein said one way valve comprises a valve stem, a diaphragm extending transversely from one end of said valve stem, a valve housing having an inwardly projecting flange which engages said diaphragm, a lower valve support fitting inside of said valve housing to support said valve stem, and an upper valve support extending from said lower valve support to further support said valve stem.

30. An inflatable mattress as recited in Claim 29, wherein said valve housing further comprises a stepped portion for supporting said lower valve support.

31. An inflatable bed as recited in Claim 29, wherein said lower valve support further comprises a flustoconical section having an opening for supporting and guiding said valve stem.

32. An inflatable bed as recited in Claim 29, further comprising a filter supported by said lower valve support.

-29-

33. An inflatable bed as recited in Claim 29, wherein said valve housing further comprises a series of cut away portions disposed around a bottom edge of said valve housing to permit the influx of gas while preventing damage to the mattress when said valve stem is depressed.

34. An inflatable bed comprising:

an inflatable bladder having first and second sides;

a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage;

means including a one way valve connected to said bladder through which said gas is infused to inflate said bladder;

a motor driven pump connected to said means for inflating said bladder through said valve and unrolling said bladder from said roller assembly; and

bedding material having means for holding said bedding material in place on said bladder, wherein said bedding material may be rolled up with said bladder for storage therewith.

35. An inflatable bed as recited in claim 28, wherein said first having further comprises a series of cut away portions disposed around a bottom edge of said first housing to permit the influx of gas.

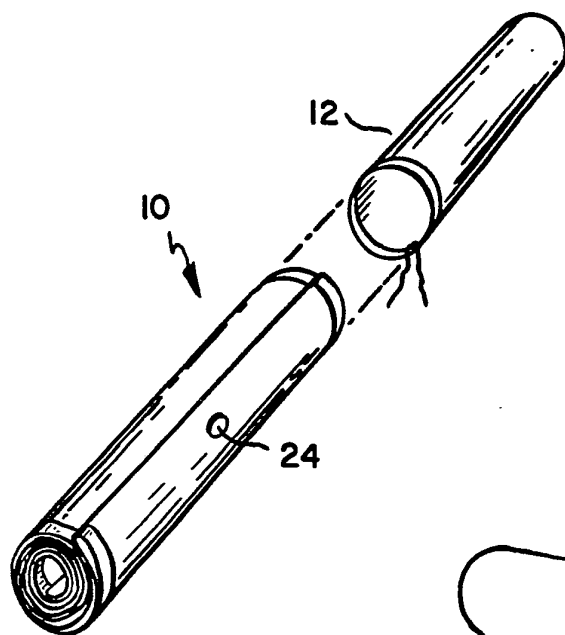


FIG. 1

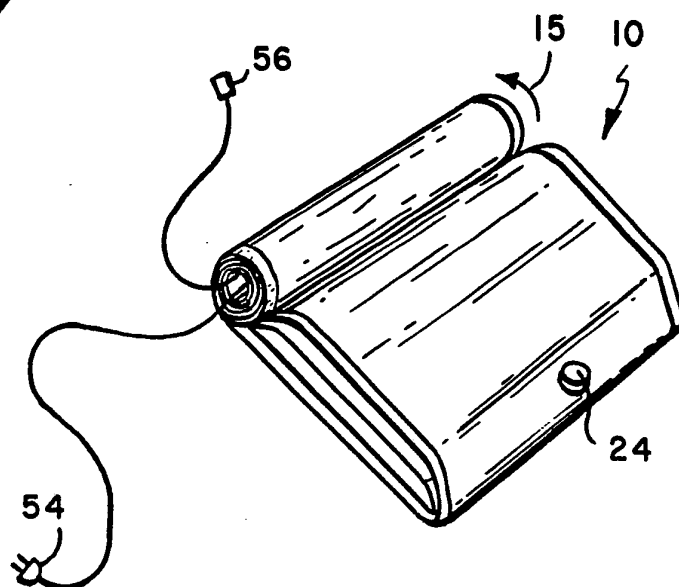


FIG. 2

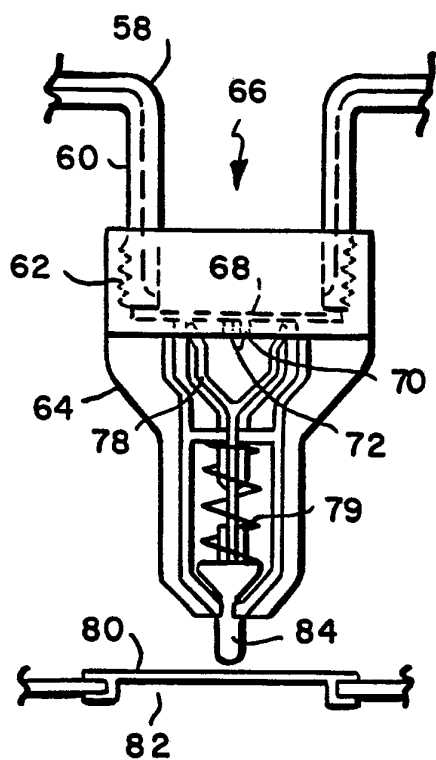


FIG. 7

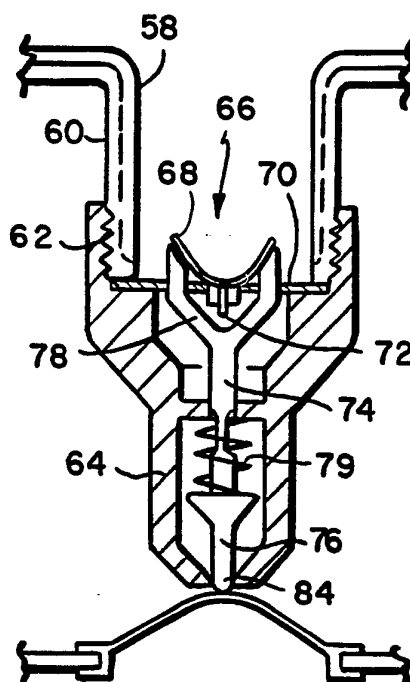


FIG. 8

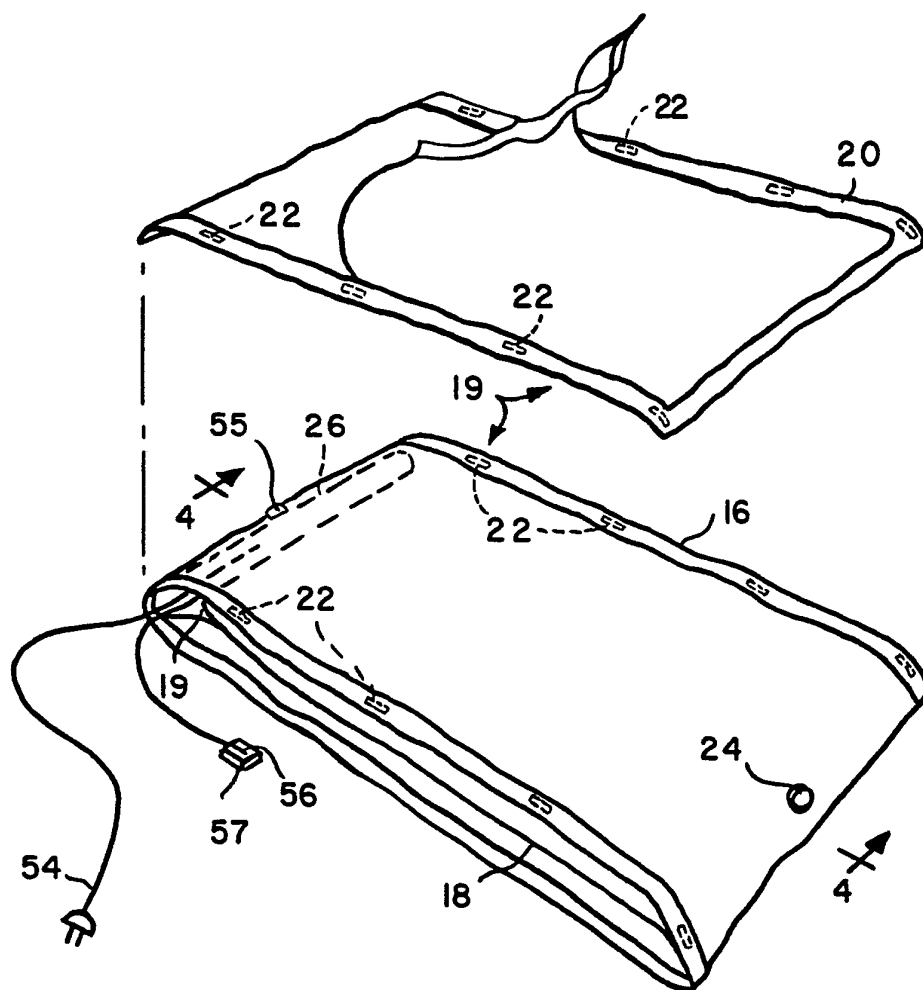


FIG. 3

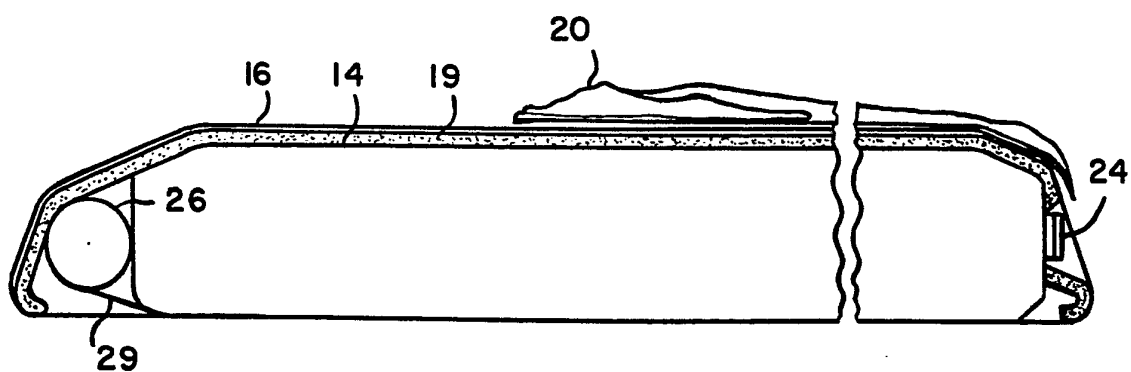


FIG. 4

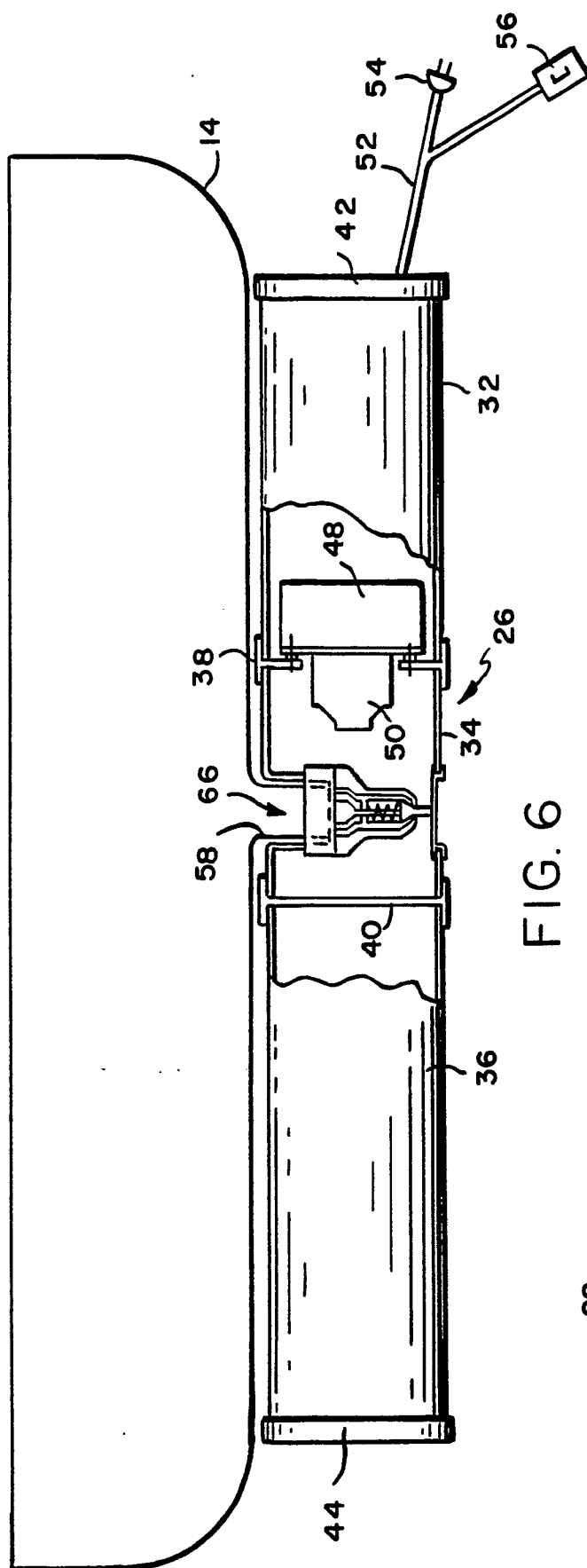


FIG. 6

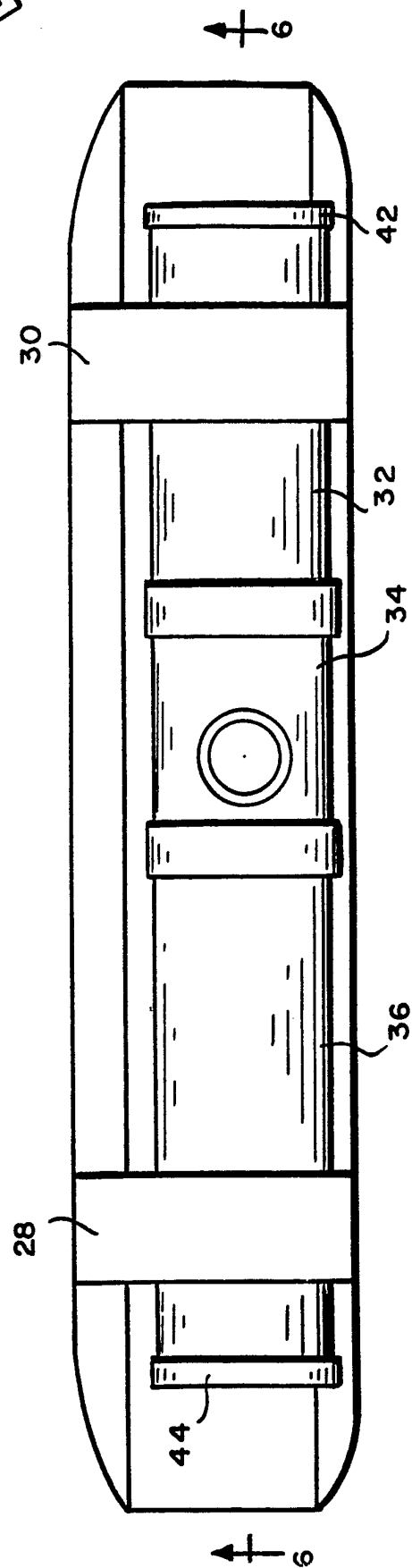
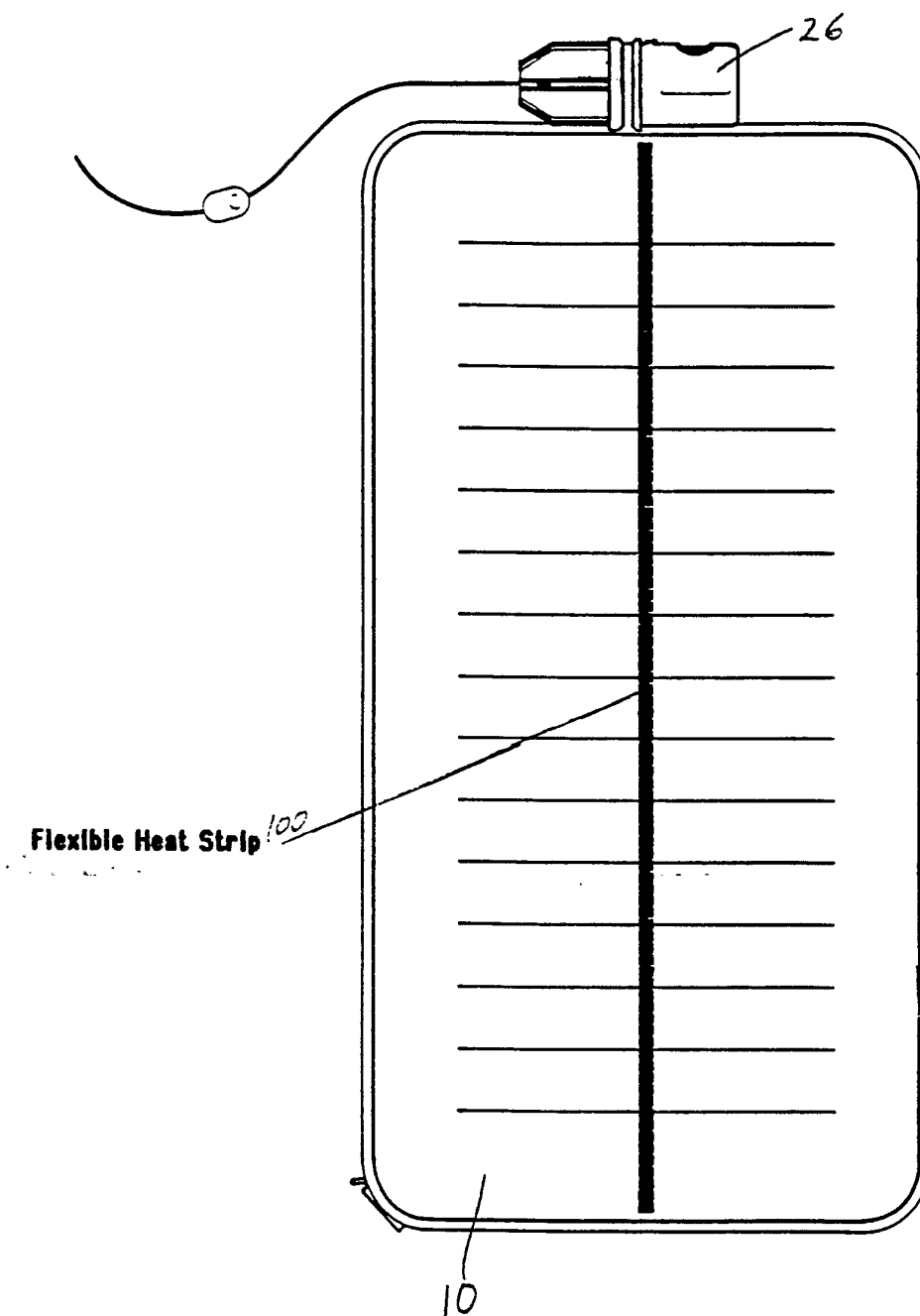
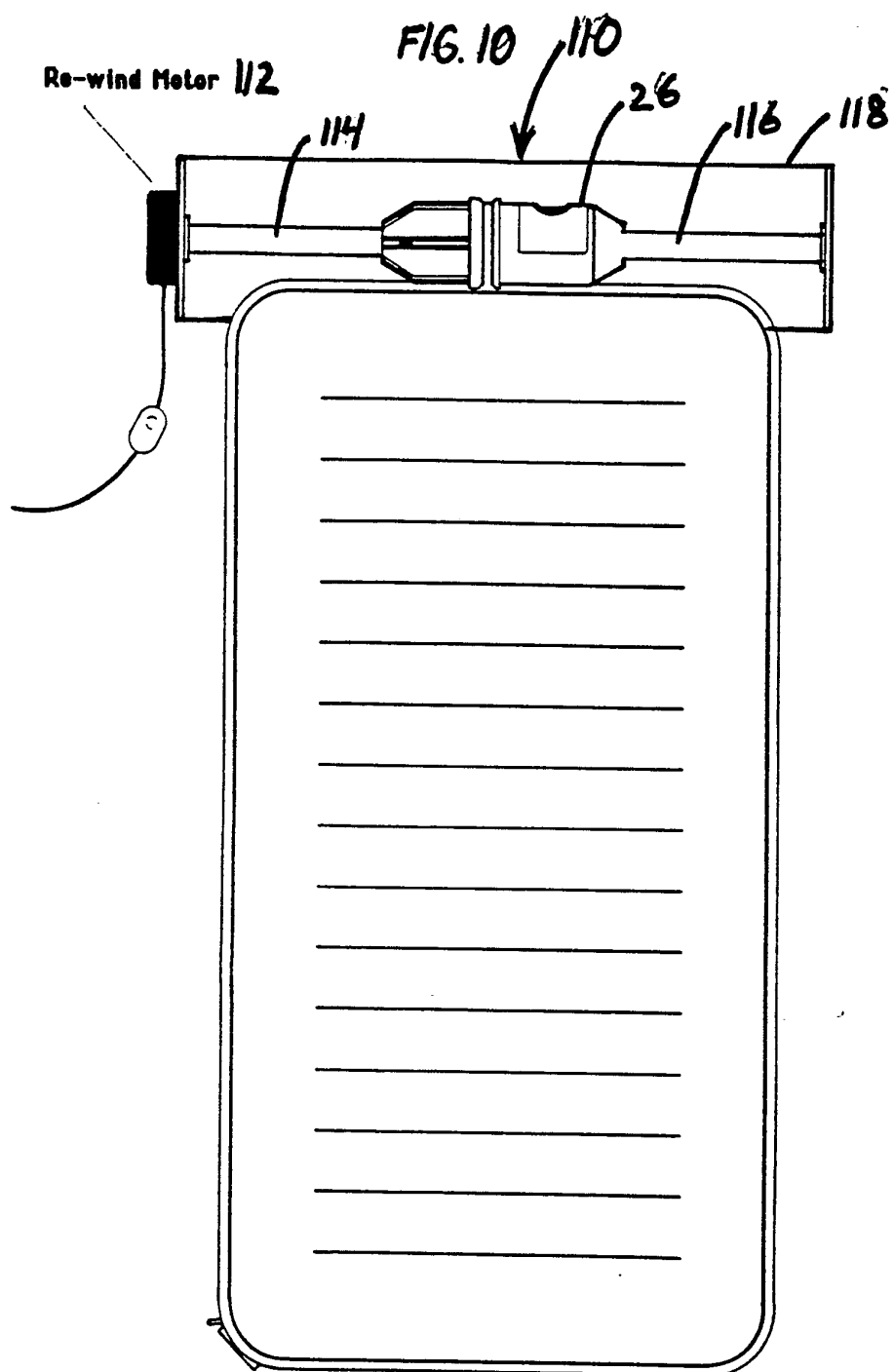
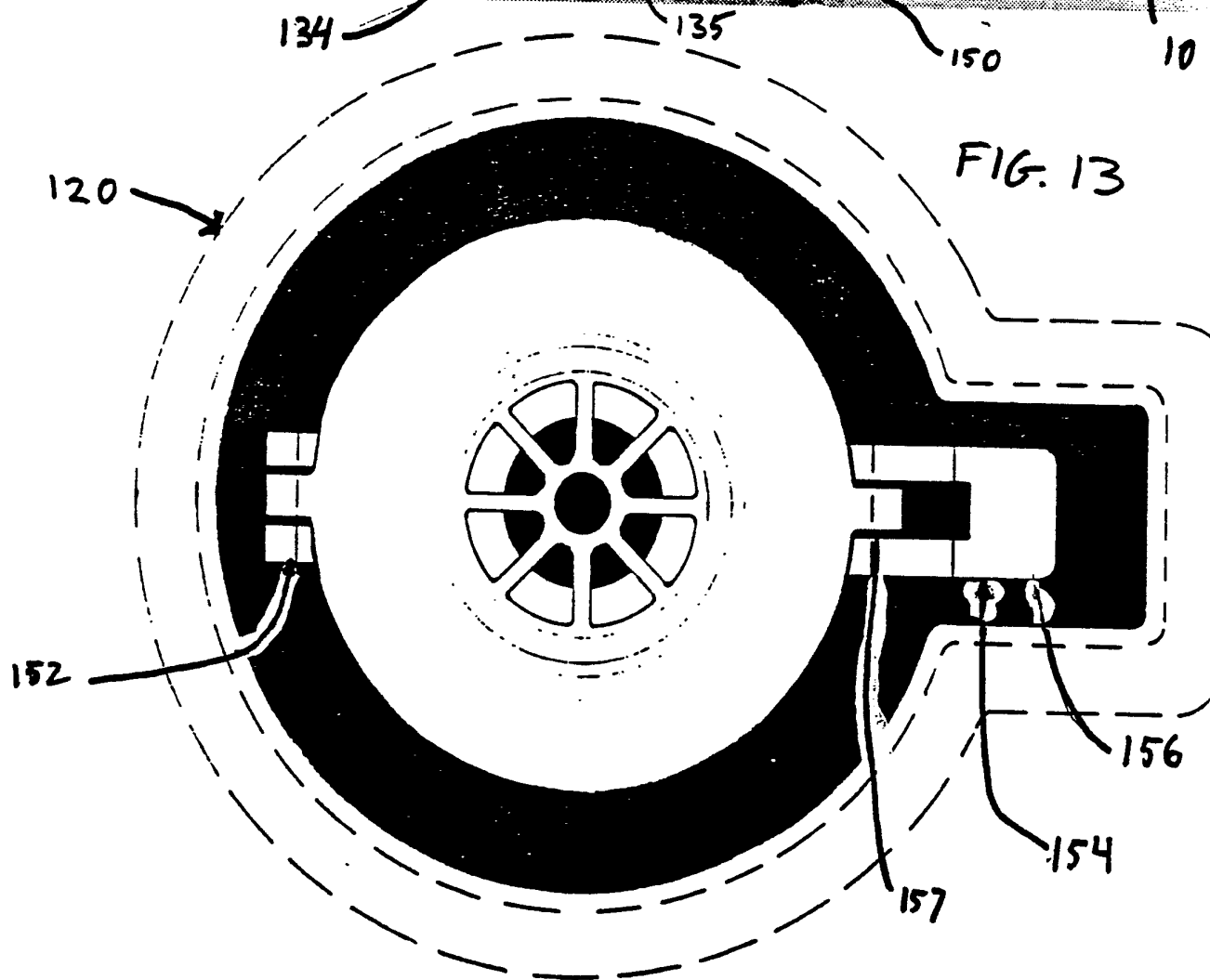
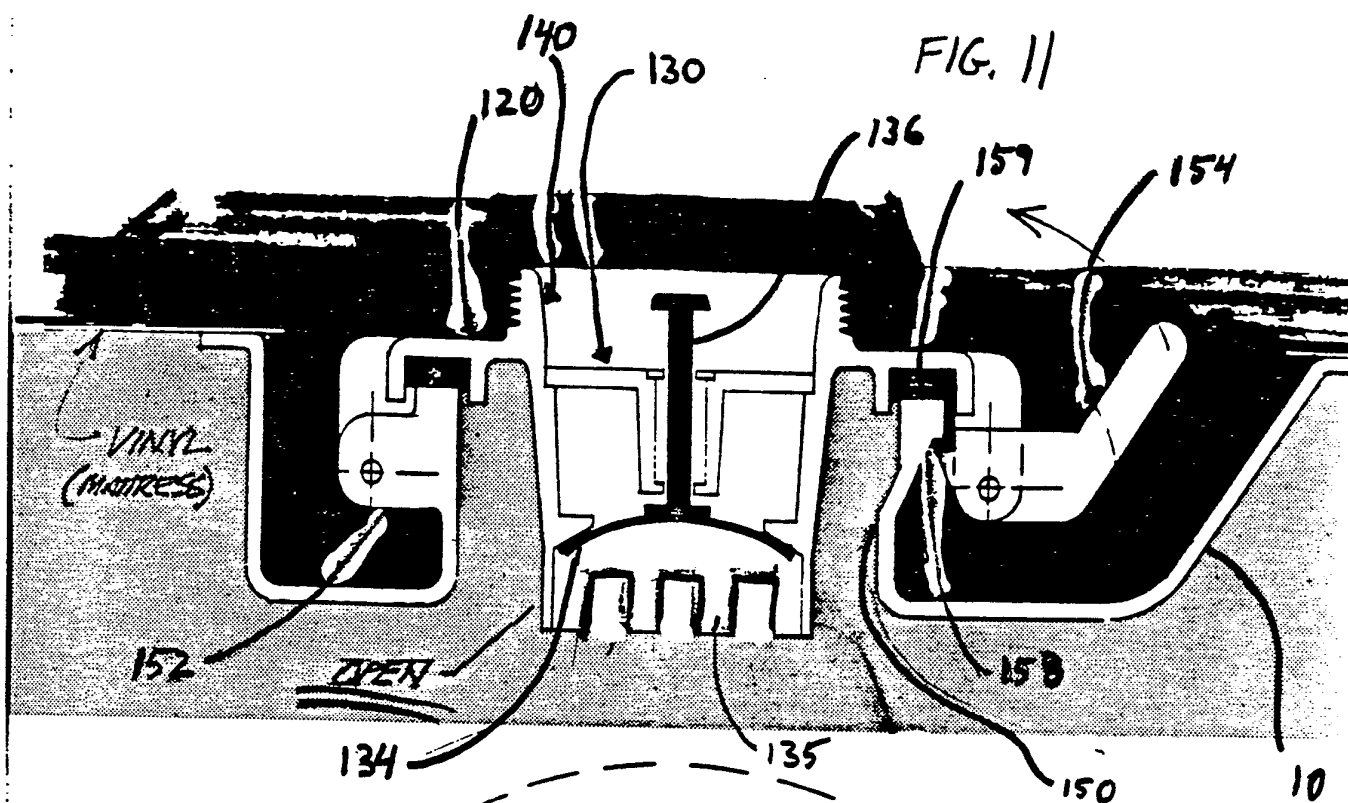


FIG. 5

FIG. 9







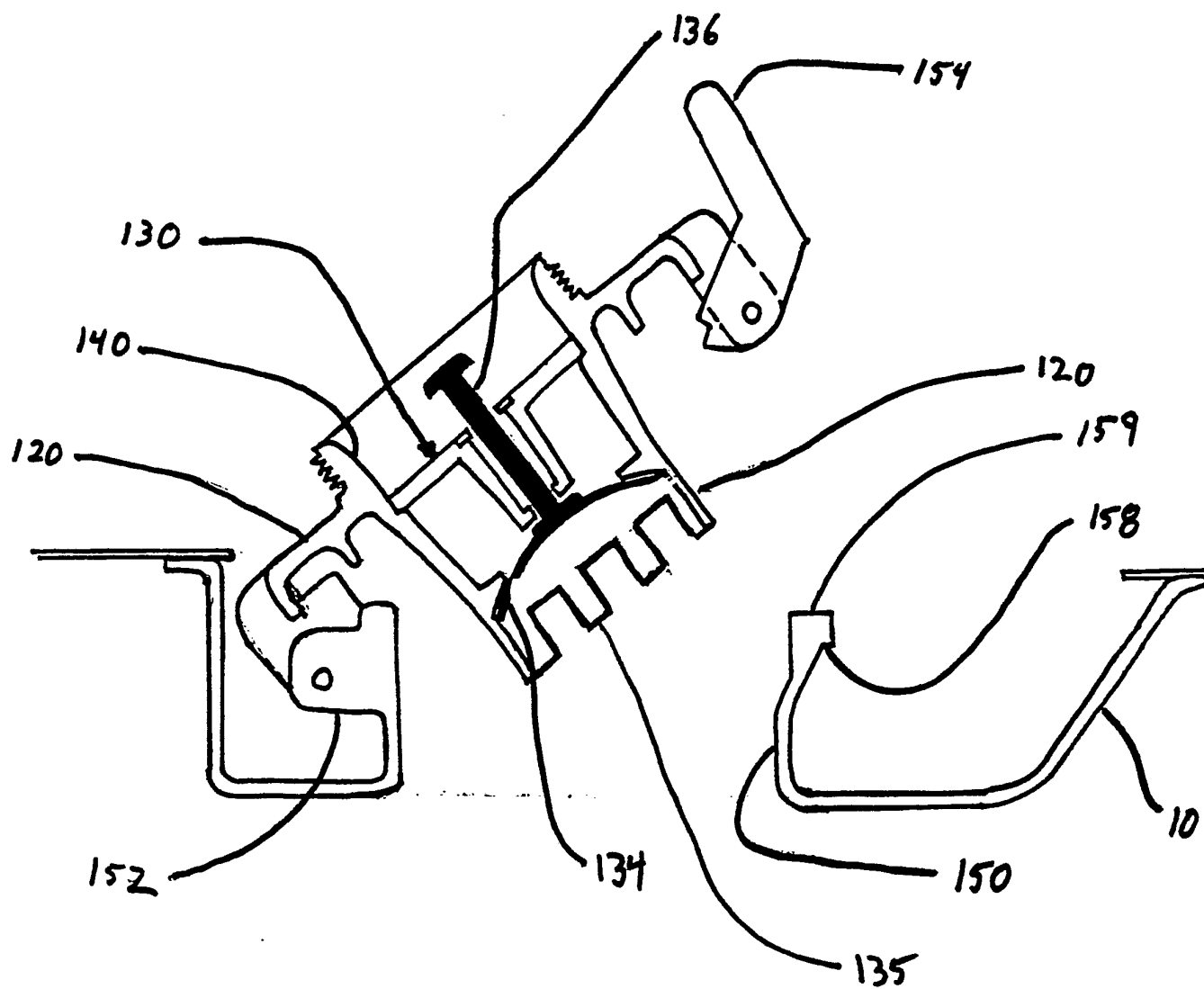
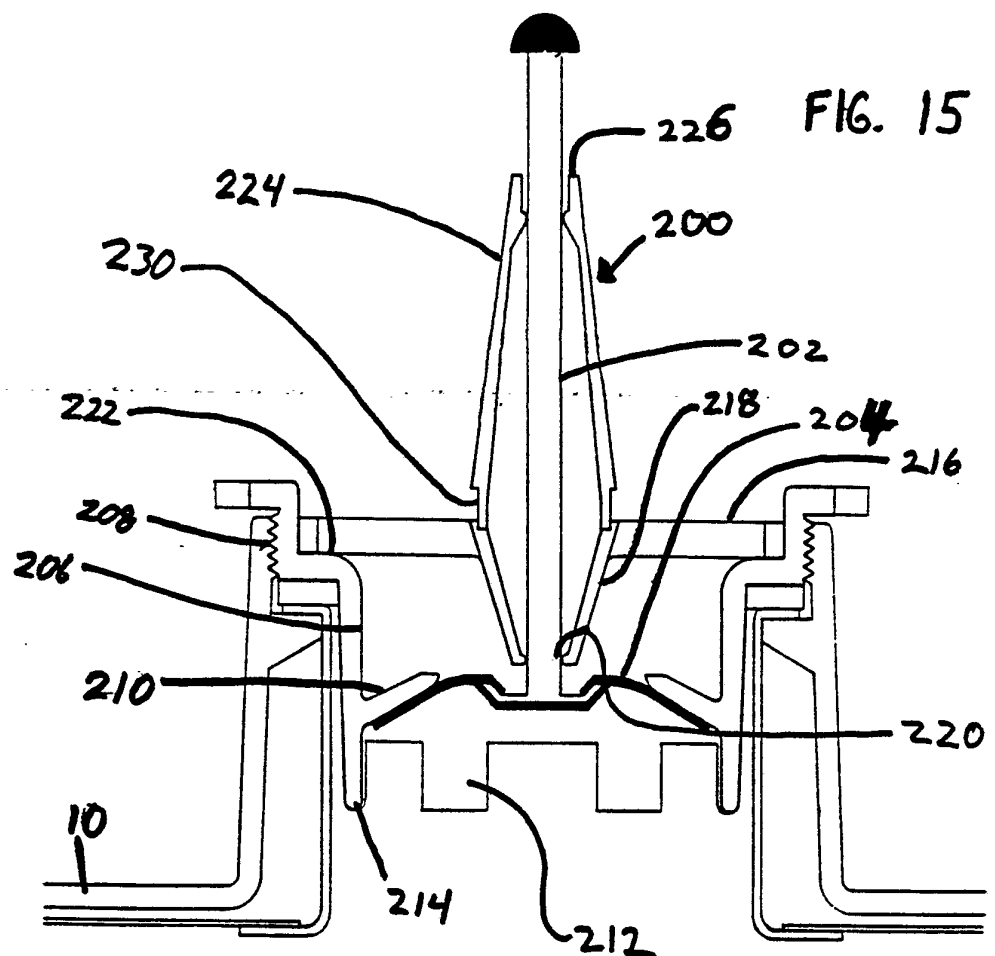
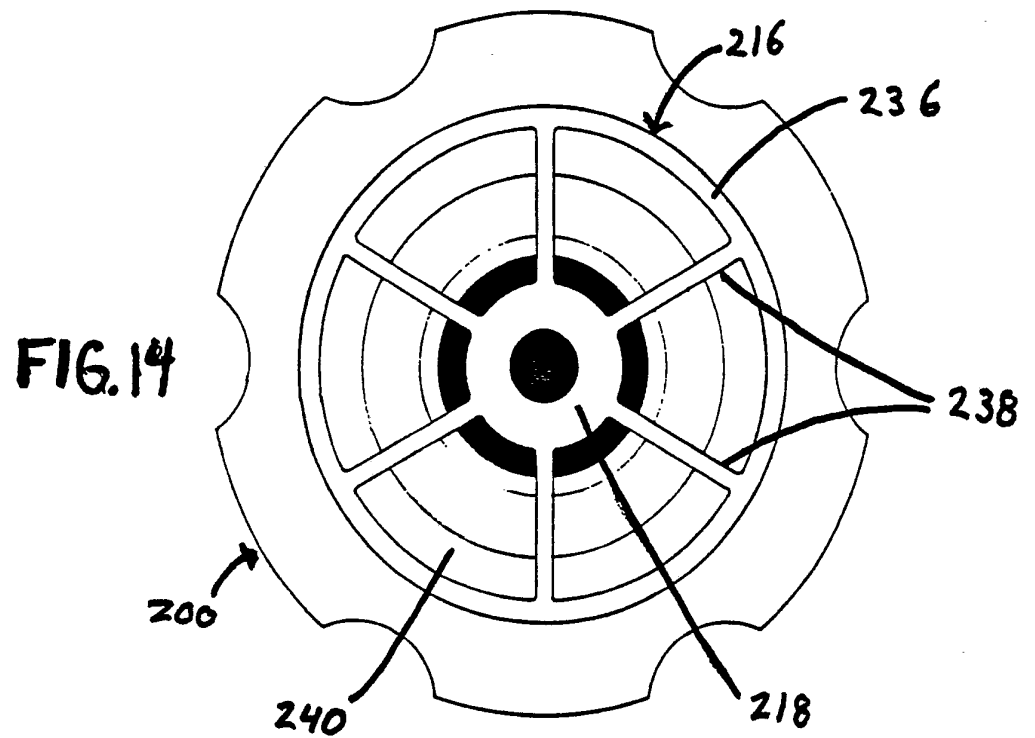
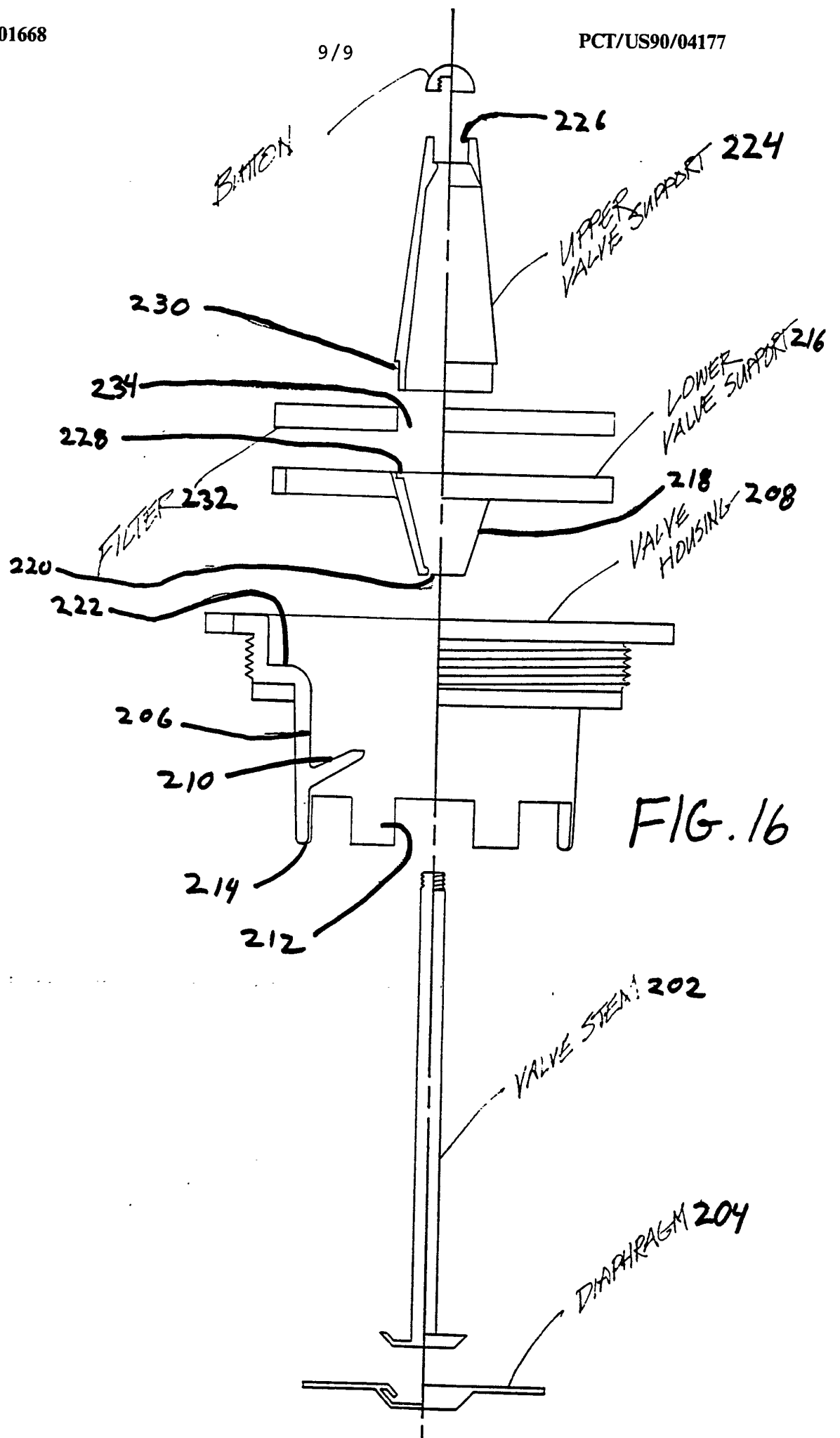


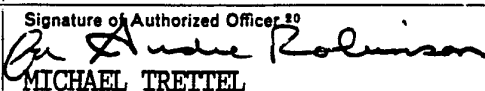
FIG. 12





INTERNATIONAL SEARCH REPORT

International Application No PCT/US90/04177

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC (5): A47C 27/08 U.S. CL: 5/453		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
U.S. 5/284,421,449,450,453,454		
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category ⁶	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
Y	GB, A, 2,050,844 GOBBETT 14 January 1981 see the entire document.	12,16,21,34
<u>X</u> <u>Y</u>	US, A, 3,042,941 MARCUS 10 July 1962 note inlet valve 11 and exit port 19	27 17
<u>X</u> <u>Y</u>	US, A, 4,766,628 WALKER 30 August 1988 note combined inlet/outlet valve 36	27 12-14,20,34,35
Y	US, A, 3,877,092 Ganser 15 April 1975 note cover 12 which can be wrapped about mandrel 3.	18,34
A,P	US, A, 918,391 TAARUD 13 April 1990	
A,P	US, A, 4,862,533 ADAMS, III 05 September 1989	
A	US, A, 2,701,579 HASSELQUIST 08 February 1955	
A	US, A, 3,785,395 ADREASSON 15 January 1974	
¹⁵ * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ¹	Date of Mailing of this International Search Report ²	
20 November 1990	10 JAN 1991	
International Searching Authority ¹	Signature of Authorized Officer ²⁰	
ISA/US	 MICHAEL TRETTEL	