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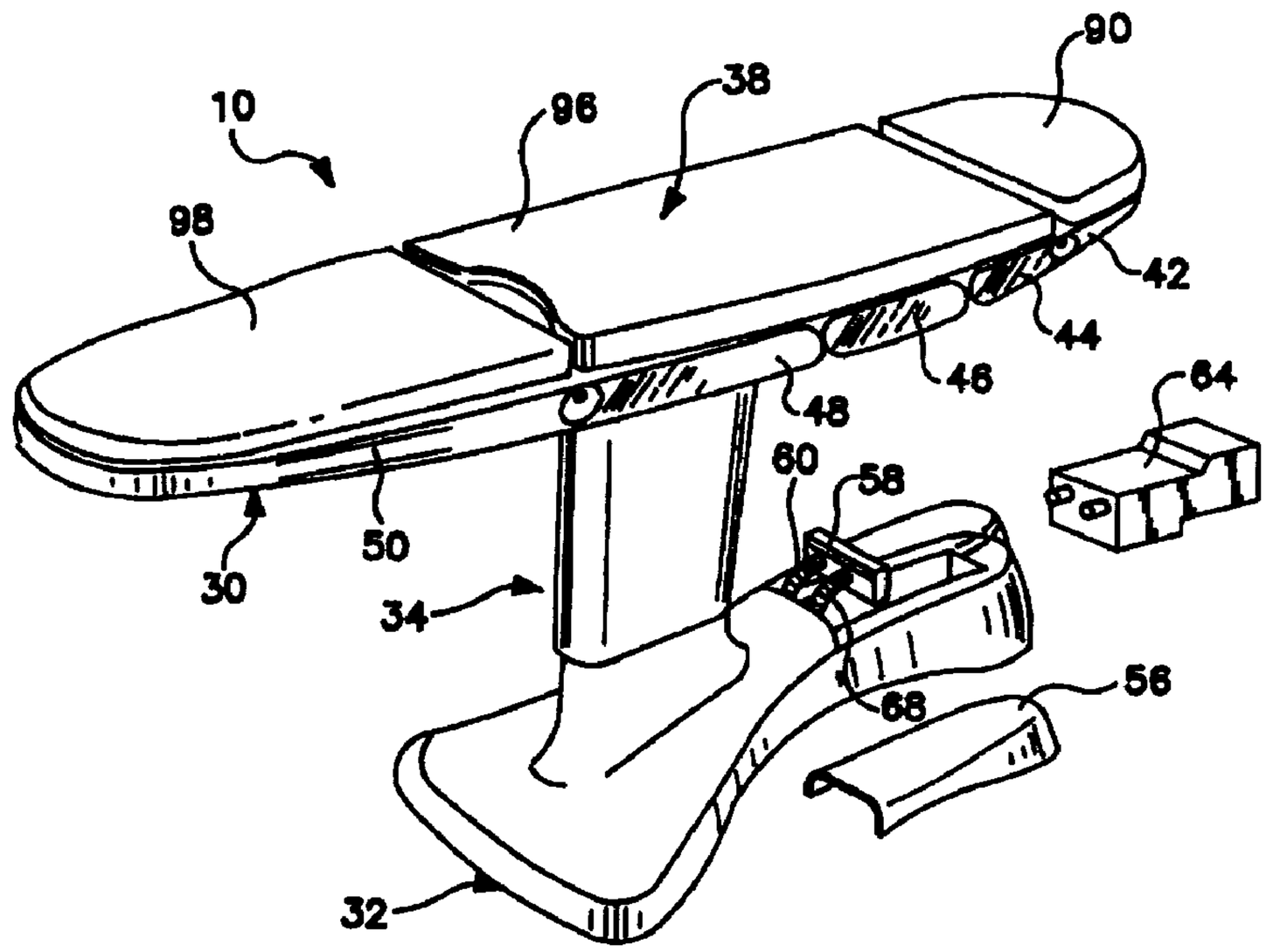
(54) **TABLE CHIRURGICALE**

(54) **SURGICAL TABLE**




(57) Table chirurgicale (10) qui possède une base (32), un élément de support vertical (34) qui s'étend verticalement vers le haut depuis la base (32), un châssis (30) qui s'étend vers l'extérieur depuis l'élément de support (34) et un matelas (38) porté par le châssis (30) et placé pour reposer sur ce dernier (30). Le matelas (38) est configuré pour soutenir un patient (24) et possède au moins une vessie (122) conçue pour recevoir un milieu. Ladite table chirurgicale (10) comporte également un groupe d'alimentation (64) placé à l'intérieur de la base (32) et conçu pour alimenter le matelas (38) en milieu de manière à modifier la forme dudit matelas (38).

(57) A surgical table (10) includes a base (32), a vertical support member (34) extending vertically upwardly from the base (32), a frame (30) extending outwardly from the support member (34), and a mattress (38) supported by the frame (30) and positioned to lie above the frame (30). The mattress (38) is configured to support a patient (24) and has at least one bladder (122) configured to receive a medium. The surgical table (10) also includes a power pack (64) positioned to lie within the base (32) and configured to supply the medium to the mattress (38) to change the shape of the mattress (38).

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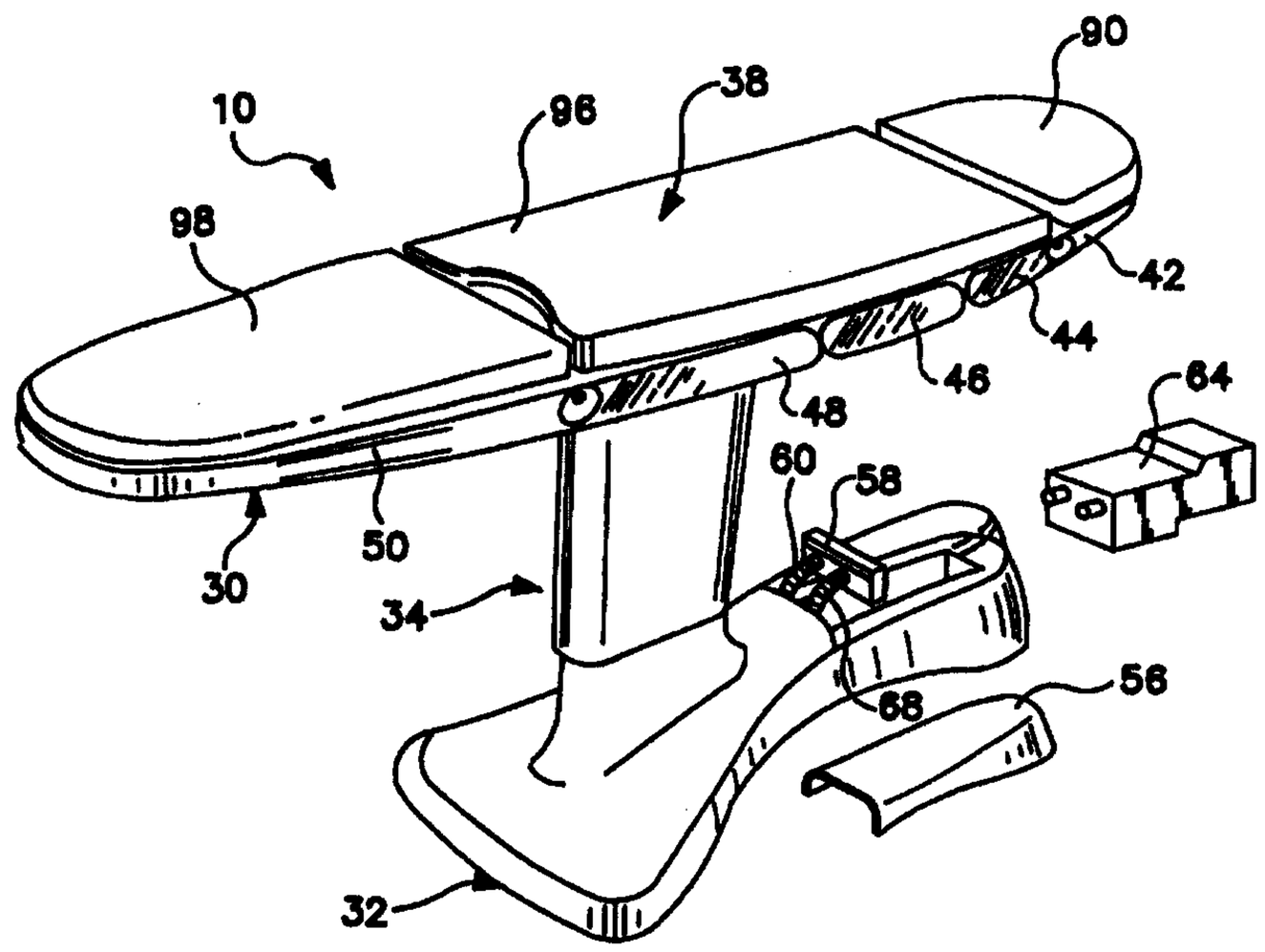
(54) Title: SURGICAL TABLE




(57) Abstract

A surgical table (10) includes a base (32), a vertical support member (34) extending vertically upwardly from the base (32), a frame (30) extending outwardly from the support member (34), and a mattress (38) supported by the frame (30) and positioned to lie above the frame (30). The mattress (38) is configured to support a patient (24) and has at least one bladder (122) configured to receive a medium. The surgical table (10) also includes a power pack (64) positioned to lie within the base (32) and configured to supply the medium to the mattress (38) to change the shape of the mattress (38).

# SURGICAL TABLE

## Background and Summary of the Invention

The present invention relates to an operating room or surgical table. More particularly, the present invention relates to a surgical table having a base for concealing a power pack and/or a mattress having a plurality of inflatable bladders for positioning a patient in a variety of predefined surgical positions.

Operating room tables are long known in the health care industry for supporting patients during surgical procedures. In recent years, surgical tables have been made even more useful and convenient for doctors and nurses by adding various features and options, such as powered articulation of head, torso, and leg sections of the surgical table, height adjustment, tilt adjustment, trend adjustment, etc. While these features and options give doctors great flexibility for supporting patients in a variety of positions that are best suited for a given surgical procedure, they also may become more difficult and frustrating to use. In addition, surgical tables having numerous control features often require separate power packs for supplying the necessary power for moving the table to different positions. Furthermore, mattress surface systems have likewise become more technically sophisticated which frequently makes them more cumbersome and frustrating to use.

According to one aspect of the present invention, a surgical table includes a base, a vertical support member extending vertically upwardly from the base, a frame extending outwardly from the support member, and a mattress supported by the frame and positioned to lie above the frame. The mattress is configured to support a patient and has at least one bladder configured to receive a medium. The surgical table also includes a power pack positioned to lie within the base and configured to supply the medium to the mattress to change the shape of the mattress.

In one illustrated embodiment, the medium supplied by the power pack to the mattress is air. In another illustrated embodiment, the medium supplied by the power pack to the mattress is a liquid. The power pack is further configured to supply heat to the mattress to change the temperature of the mattress. Illustratively, a flexible hose extends from the power pack to the mattress for delivery of the medium from the

power pack to the mattress. The hose is concealed within the base and the vertical support member of the frame.

According to another aspect of the present invention, a surgical table includes a base, a frame positioned in spaced-apart relation to the base, and a vertical support member interconnecting the frame and the base. The support member is configured to telescope vertically to position the frame at a variety of different heights relative to the base. The surgical table also includes a mattress positioned to lie above the frame and configured to support a patient. The mattress includes a cover having an upwardly-facing patient-support surface and defining an interior region of the mattress and a plurality of bladders received in the interior region of the cover and configured to be inflatable to position the patient in a predefined surgical position on the mattress. The surgical table further includes a blower positioned to lie within the base of the frame and configured to supply air to the bladders to inflate the bladders.

According to yet another aspect of the present invention, a surgical table includes a frame having a patient-support platform and a mattress positioned to lie on the patient-support platform. The mattress is configured to support a patient during a surgical procedure. The mattress includes a cover having an upwardly-facing patient-support surface and defining an interior region of the mattress and a plurality of bladder pairs received in the interior region of the cover and extending laterally across the mattress. The bladder pairs are positioned to lie adjacent to one another and each bladder pair has a bottom bladder and a top bladder positioned to lie above the bottom bladder. Each bladder within each bladder pair is individually inflatable to position the patient in a predefined surgical position on the mattress.

According to a further aspect of the present invention, a surgical table includes a mattress, a patient-support platform positioned below the mattress and configured to support the mattress, a base positioned in spaced-apart relation to the patient-support platform, and a vertical support member interconnecting the base and the patient-support platform. The support member is configured to support the patient-support platform at a variety of different heights relative to the base. The surgical table also includes a power pack positioned to lie within the base and configured to supply a medium to the mattress to change the shape of the mattress to position a patient in a predefined surgical position, and a hose interconnecting the

power pack and the mattress. The hose is configured to transfer the medium from the power pack to the mattress. The surgical table further includes a controller positioned in close proximity to the power pack. The controller is configured to control the distribution of the medium from the power pack to the mattress to control the shape of the mattress.

Additional features of the present invention will become apparent to those skilled in the art upon consideration of the following detailed description of the presently perceived best mode of carrying out the invention.

## Brief Description of the Drawings

The detailed description particularly refers to the accompanying figures in which:

Fig. 1 is a perspective view of a surgical table of the present invention being used in an operating room environment showing a patient lying on the surgical table, a pair of surgeons operating on the patient, a first nurse sitting at a central control station configured to control the lighting, the surgical table, and other operating room equipment, and a second nurse (shown in phantom) holding a remote controller;

Fig. 2 is a perspective view of the surgical table of Fig. 1 showing the surgical table including a base, a vertical support member (or pedestal) extending upwardly from the base, and an articulated frame extending outwardly from the support member and showing a mattress positioned to lie on the frame and configured to support a patient during a surgical procedure;

Fig. 3 is a perspective view of the surgical table of Fig. 1 showing the base being formed to include an opening for receiving a power pack;

Fig. 4 is a perspective view of the support surface of Fig. 3 with the base and the pedestal removed to show the power pack being plugged into a first connector, a power supply line, and a flexible air/fluid/power handling line (or hose) being coupled to the first connector, the handling line being coiled to extend upwardly through the vertical support member, and a second connector for connecting the second end of the handling line to the mattress;

Fig. 5 is a transparent side elevation view of the surgical table of Figs. 1-4 showing the power pack positioned in the base, the handling line extending through the vertical support member and coupled to the mattress, and a patient positioned atop the mattress;

Fig. 6 is a perspective view of a surgical table similar to the surgical tables of Figs. 1-5, showing the surgical table having a larger power pack external to the base and coupled to the base via an umbilical;

Fig. 7 is a perspective view of a surgical table similar to the surgical tables of Figs. 1-6, showing the base being formed to be larger to accommodate an even larger power pack;

Fig. 8 is a side elevation view of a surgical table similar to the surgical table of Figs. 1-7, showing an even larger power pack being located on a cart and coupled to the base via an umbilical, the cart including an IV prewarming system so that the patient support and warming needs for surgery are consolidated within the IV prewarming system;

Fig. 9 is a perspective view of a surgical table similar to the surgical tables of Figs. 1-8, showing the surgical table including a mattress being configured to be inflatable with a liquid or gaseous medium to alter the shape of the mattress so that the patient is positioned in a predefined surgical position;

Figs. 10-13 illustrate a variety of different surgical positions that can be achieved using the mattress and surgical table of Fig. 9;

Fig. 14 is a perspective view of the mattress of Figs. 9-13 showing the mattress including a leg section, a torso section, and a head section;

Fig. 15a is a side sectional view of the torso section of the mattress of Fig. 14 showing the mattress having a lower foam mattress structure, high amplitude air bladders positioned atop the foam mattress structure, a Styrofoam bead bag position stabilizer positioned atop the high amplitude air bladders, and a thermal pad positioned atop the Styrofoam bead bag position stabilizer;

Fig. 15b is an end sectional view of the torso section of the mattress of Fig. 14 showing the foam mattress structure being formed to include a pair of flow paths to allow a medium to be supplied from a bottom surface of the mattress through

the flow paths in the foam mattress structure so that the air bladders can be inflated and/or deflated:

Fig. 16 is a perspective view of the mattress of Fig. 14 showing each section of the mattress having a plurality of different zones that can be individually inflated or deflated;

Fig. 17 is a side elevation view of a patient being positioned atop the mattress of Figs. 9-16, showing the mattress being used to position the patient in a predefined surgical position;

Fig. 18 is a side view of the air bladders of Fig. 15 in a deflated state so that the mattress is substantially flat;

Fig. 19 illustrates the air bladders of Fig. 15 being inflated to change the position of a patient lying atop the mattress;

Fig. 20 is a side view of the mattress of Figs. 9-17, illustrating the mattress conforming to a predetermined shape based on the individual bladders being inflated to certain pressures;

Fig. 21 is a perspective view of the surgical table of Figs. 1-20, showing the articulated deck panel and mattress each being formed to include a separate leg section for each leg of the patient and showing the base having foot controls for vertically adjusting the deck panel of the surgical table and/or articulating various portions of the deck panel and/or inflating various portions of the bladders to position the patient in a surgical procedure position; and

Fig. 22 is a perspective view of leg sections similar to the leg sections of Fig. 21 showing each leg section having multiple zones.

Detailed Description of the Drawings

Referring now to the drawings, a surgical table 10 according to the present invention is shown in Fig. 1 as it would normally appear in an operating room 12. As shown in Fig. 1, operating room 12 includes surgical table 10, a surgical lighting system 14, a control station 16, an IV stand 18, and a medical device controller 19. As shown in Fig. 1, a surgeon 20 and one or more assistants 22 typically perform a procedure on a patient 24 while another care giver 26, such as an anesthesiologist or a nurse, controls and monitors operating room equipment,

including surgical table 10, from control station 16 or from a remote location using controller 19 (as shown in phantom).

As shown in Figs. 1-8, surgical table 10 enhances the environment of operating room 12 by preserving space in the operating room 12. As described in detail below, surgical table 10 preserves space by having a base 32 that allows a power pack 64 to be stored within the base 32. Thus, the power pack 64 need not be a separate piece of operating room equipment that takes up additional floor space in operating room 12. Instead, power pack 64 is contained within base 32 of surgical table 10.

As shown in Figs. 9-22, surgical table 10 also enhances the environment and efficiency of the surgeon 20 working in operating room 12 by having a mattress system 38 that allows the surgeon 20 to position the patient 24 in a predetermined surgical position that corresponds to a particular surgical procedure. Of course, surgical table 10 also includes an articulated frame 30, as discussed below, which also allows patient 24 to be positioned in a predetermined surgical position. However, the positioning of patient 24 by using mattress system 38 is supplemental to using articulated frame 30 which enables the surgeon 20 to fine-tune the positioning of patient 24 to obtain easier access to certain portions of patient 24 during the operation.

Details of another suitable frame for use with base 32 and/or mattress system 38 are disclosed in PCT Application Serial No. _____, entitled SURGICAL TABLE APPARATUS, filed November 6, 1998 (Attorney Docket 7175-62451 which is incorporated herein by reference. Similarly, details of a controller for mattress system 38 and/or power pack 64 are disclosed in PCT Application Serial No. _____, entitled MEDICAL EQUIPMENT CONTROLLER, filed November 6, 1998 (Attorney Docket No. 7175-62449) which is also incorporated herein by reference.

As shown in Figs. 1 and 2, table 10 includes articulated frame 30, base 32, a pedestal 34 interconnecting articulated frame 30 and base 32, and a mattress 38 positioned atop articulated frame 30. Articulated frame 30 includes a head section 42, an upper back section 44, a lower back section 46, a seat section 48, and at least one leg section 50, as shown in Fig. 2. Sections of frame 30 are coupled to longitudinally adjacent sections via pivots so that adjacent sections can be rotated with respect to

each other by motors (not shown). Thus, table 10 is configured to receive control signals from control station 16 and/or controller 19 to move sections of articulated frame 30 so that patient 24 can be positioned in a predetermined surgical position as shown in Fig. 1.

Pedestal (or vertical support column) 34 is similarly adjustable to position patient 24 in a predetermined position. Pedestal 34 includes a hi/low mechanism (not shown) for moving the telescoping pedestal 34 upwardly and downwardly to raise and lower the articulated frame 30 relative to the base 32 and the ground. Adjustment of vertical support pedestal 34 can also be controlled by control station 16 and/or controller 19 to position frame surgical table 10 at a predetermined height relative to the ground.

As shown in Fig. 3, base 32 includes a removable access cover 56 that, when removed, reveals an interior region 66 of base 32. The interior region 66 of base 32 is sized to allow a power pack 64 and a first connector 58 to fit comfortably within the interior region 66 of base 32. Power pack 64 is configured to be coupled to first connector 58 and then located within an interior region 66 of base 32 so that when access cover 56 is reinstalled onto base 32, power pack 64 and connector 58 are concealed within interior region 66 of base 32.

Power pack 64 is configured to provide power and/or a medium (not shown) to mattress 38 through a delivery line 60, as shown diagrammatically in Figs. 4 and 5. As shown in Figs. 4 and 5, a first end of delivery line 60 is coupled to first connector 58 and a second end of delivery line 60 is coupled to a second connector 62. The delivery line 60 extends longitudinally through base 32 and vertically upwardly through pedestal 34 towards mattress 38. The second connector 62 is configured to mate with a third connector 63 integrally coupled to mattress 38. The connectors 58, 62, 63 and delivery line 60 allow power pack 64 to deliver the power and/or medium to mattress 38 in a concealed manner through base 32 and pedestal 34. In other words, all hoses, wiring, pumps, and fluid supply units are completely concealed within the base 38 and telescoping pedestal 34. In addition, in the embodiment of Figs. 1-5, the power pack 64 is located within a footprint defined by the base 18 and the footprint of the base is sized to be narrower and shorter than a footprint of the frame 30.

Illustratively, power pack 64 includes a controller, a fluid pump, such as a blower, compressor, or liquid pump, and a heating unit for heating the air or fluid. Alternatively, mattress 38 may be supplied with a heating system powered by electricity from power pack 64. The power pack 64 may include battery power or it may be coupled to a wall outlet using a power cord 68, as shown in Fig. 4. Power pack 64 further includes control valves for controlling fluid flow to the various zones of mattress 38 and a processor for controlling operation of the device based on input signals from an operator 26 using control station 16 and/or remote controller 19.

Larger power packs may be required for certain types of mattress systems 38, as shown in Figs. 6-8. These power packs may be too large to fit into the interior region 66 of base 32 and are therefor positioned external to base 32. Fig. 6 illustrates one example of an external power pack 70 tethered to the base 32 by an umbilical connection 72. The umbilical connection 72 is made at the floor level into the base 32 of the table 10. All other lines and hoses are concealed within the table 10 as discussed above. Power pack 70 may sit on the floor adjacent the table 10. In addition, the power pack 70 may be mounted to an IV pole or stand, or integrated or contained in another piece of equipment such as an anesthesiology machine cart.

An even larger power pack 74 may be integrated with the base 32, as shown in Fig. 7. In this case, a base extension 76 is used to provide a larger footprint that covers a larger area than the original footprint of the base 32. The base extension 76 allows the larger power pack 74 to be coupled to the base 32 at the location where the access cover 56 was originally located.

If an even larger power pack 78 is required, the power pack 78 may be located on a cart 80, as shown in Fig. 8. Again, the power pack 78 is tethered to the base 32 by an umbilical connection 72. In this embodiment, IV lines 82 may be pre-warmed by the same cart 80 that contains the power pack 78. This consolidates the patient support and warming needs for surgery in one space-efficient package.

Mattress 38 for use with table 10 is shown in Figs. 9-22. Mattress 38 allows patient 24 to be positioned in a variety of predetermined surgical positions as shown in Figs. 9-13. Mattress 38 allows patient 24 to be positioned in a surgical position and/or moved from one surgical position without changing the positioning of articulated frame 30. Thus, mattress 38 acts as an independent patient-positioning

device so that various surgical positions can be achieved even for surgical tables having only a flat patient-support platform or for tables having very limited articulation capabilities, such as the patient-support platforms shown in Figs. 10-13. Mattress 38 also allows the positioning of patient 24 to be fine-tuned when, for example, articulated frame 30 is incapable of the precise positioning required for a particular surgical procedure. Thus, mattress 38 can be used for any surgical table to enhance the patient-positioning capabilities of the particular table.

As shown in Fig. 9, mattress 38 is configured to be coupled to a control apparatus 86 using a tube 88 so that control apparatus 86 can supply a medium (not shown) to mattress 38. The medium supplied by control apparatus 86 to mattress 38 allows mattress 38 to be inflated or deflated to position patient 24 in the desired surgical position. Control apparatus 86 may be controlled by using an input device 87 mounted on control apparatus 86 and/or control station 16 and/or controller 19.

A variety of different surgical positions can be achieved by inflating or deflating certain portions of mattress 38. For example, as shown in Fig. 9, portions of mattress 38 can be inflated so that mattress 38 pushes upwardly on the back of the knees and back of the neck of patient 24 with the remainder of patient 24 remaining substantially flat on mattress 38. Similarly, as shown in Fig. 10, a portion of mattress 38 can be deflated to allow the face of patient 24 to fit within an opening in mattress 38 created by the deflation of a portion of mattress 38 when patient 24 is lying face down on mattress 38. As shown in Fig. 11, the chest and legs of patient 24 can also be raised by inflating portions of mattress 38. As shown in Fig. 12, a portion of mattress 38 can also be inflated when a leg portion of a surgical table is raised so that the legs of patient 24 are fine-tuned into position while simultaneously inflating and another portion of mattress 24 to raise the posterior of patient 24. In addition, as shown in Fig. 13, a portion of mattress 24 can be inflated to raise the hips of patient 24. Although Figs. 9-13 illustrate a few examples of the capabilities of mattress 38 for positioning a patient in a predetermined surgical position, it is understood that, as described below, mattress 38 can be used to position a patient in virtually an infinite number of positions.

Mattress 38 is shown in more detail in Fig. 14. As shown in Fig. 14, mattress 38 includes a head section 90, a torso section 96, and a leg section 98.

Although not shown in Figs. 1-13, the head section 90 of mattress 38 may also include an outer head section 92 and an inner head section 94, as shown in Fig. 14. Each section is coupled to its adjacent section using a connector 100, as shown in Figs. 4 and 14, to allow the medium supplied by control apparatus 86 to be transmitted to the appropriate section of mattress 38.

As shown in Figs. 14 and 15, each section of mattress 38 includes an outer cover 110 defining an interior region 112 of the respective section. The outer cover 110 of each section of mattress 38 includes a top surface 114, a bottom surface 116, and a perimeter surface 118 interconnecting the top and bottom surfaces 114, 116. The top surface 114 of outer cover 110 is configured to provide a patient-support platform for receiving patient 24. The bottom surface 116 of outer cover 110 is configured to lie on frame 30.

Each portion of mattress 38 also includes a foam mattress structure 120, a plurality of air bladders 122, a bead bag position stabilizer 124, and a thermal pad 126 configured to lie within the interior region 112 of the respective section of mattress 38, as shown in Fig. 15. Foam mattress structure 120 is positioned adjacent to the bottom surface 116 of outer cover 110 so that air bladders 122 can be positioned above foam mattress structure 120 within interior region 112 of outer cover 110. As shown in Fig. 15b, foam mattress structure 120 is formed to include a pair of flow paths 130 to allow the medium supplied by control apparatus 86 to pass through foam mattress structure 120 to air bladders 122. Illustratively, foam mattress structure 120 is made from a Styrofoam material, although a wide variety of different materials may also be used.

Air bladders 122 are illustratively positioned on top of foam mattress structure 120 and extend transversely across mattress 38, as shown in Figs. 14 and 15. As described below, air bladders 122 are configured to be inflated and/or deflated by the medium supplied by control apparatus 86 to position patient 24 in a desired surgical position.

Bead bag position stabilizer 124 is positioned above air bladders 122 and is configured to freeze the air bladders 122 in the desired surgical position. Details of a suitable bead bag position stabilizer and suitable air bladders for use with mattress

system 38 are disclosed in U.S. Application Serial No. 08/691,573 which is incorporated herein by reference.

Thermal pad 126 is positioned above air bladders 122 so that thermal pad 126 is positioned adjacent to top surface 114 of outer cover 110. Thermal pad 126 is configured to provide heat to patient 24 lying on top of mattress 38. Thermal pad 126 can be any type of heating device that provides heat to patient 24. Illustratively, thermal pad 126 is made from a conductive thermal material (such as Gorix™) which provides uniform heat across the material when low-voltage electricity is supplied to the material.

As shown in Figs. 16 and 17, each section of mattress 38 can be formed to include a plurality of zones to provide better patient-positioning control for mattress 38. Illustratively, as shown in Fig. 16, leg section 98 of mattress 38 may be formed to include a foot zone 140, a calf zone 142, a knee zone 144, and a thigh zone 146. Torso section 96 of mattress 38 may be formed to include a seat zone 150, a lower lumbar zone 152, an upper lumbar zone 154, a lower back zone 156, and an upper back zone 158. In addition head section 90, torso section 96, and leg section 98 may each be formed to include a plurality of lateral zones 160. As shown in Fig. 17, by using various zones to position patient 24 on surgical table 10, patient 24 can be positioned in a variety of positions to allow greater flexibility to surgeons to fine-tune the positioning of the patient 24.

Air bladders 122 are shown in more detail in Figs. 18-20. As shown in Figs. 18-20, air bladders 122 are preferably positioned in pairs so that, in the bladder pair, one air bladder is positioned to lie below the other bladder. Each bladder pair is positioned next to another bladder pair within the interior region 112 of outer cover 110 so that each bladder pair abuts another bladder pair within outer cover 110 and the bladder pairs on the ends of the respective section of mattress 38 abut the perimeter surface 188 of outer cover 110. Bladders 122 are preferably configured to extend transversely across mattress 38 so that patient 24 can be positioned as shown in Fig. 17. However, bladders 122 can be configured to extend longitudinally across mattress 38 or in a variety of other positions relative to mattress 38.

As shown in Fig. 19, the shape of bladders 122 change as medium from control apparatus 86 is supplied to the bladders 122. For example, the bladders 122

shown in Fig. 18 and on the left side of Fig. 19 are bladders that have not been supplied with a medium (such as air or liquid) so that these bladders 122 are flat and uninflated. However, moving from left to right in Fig. 19 shows bladders 122 that are progressively more inflated with the medium. Thus, bladders 122 on the far right side of Fig. 19 are fully inflated, while bladders in the middle of Fig. 19 are only partially inflated. As shown in Fig. 19, both air bladders 122 in a given bladder pair are inflated at the same time using the same air-supply line. This allows both bladders 122 within the bladder pair to be similarly sized and shaped before, during, and after the inflating/deflating process.

As shown in Fig. 20, bladders 122 in each section of mattress 38 can be used to adjust the shape of mattress 38 even if the section of mattress 38 does not include separate zones. Although bladders 122 are described herein as air bladders, it is understood that any bladder configured to receive a medium (liquid, solid, or gas) to change the shape of the mattress can be used. In addition, although bladders 122 are shown to be circular in shape, it is understood that any shape bladder, including oval, rectangular, square, triangle, etc., may be used.

As shown in Figs. 21 and 22, leg section 50 of frame 30 of surgical table 10 may include a first leg section 240 and a second leg section 242. First and second leg sections 240, 242 allow each leg of patient 24 to be individually positioned. When this type of configuration is used, leg section 98 of mattress 38 is also formed to include a first leg section 250 and a second leg section 252. Each leg section 250, 252 illustratively includes a foot zone 260, an calf zone 262, a knee zone 264, a thigh zone 266, and a plurality of lateral zones 268, as shown in Fig. 22. These zones are configured to operate identically to the zones described above to allow a greater range of positioning of patient 24.

In addition, as shown in Fig. 21, table 10 may include a foot controller 219 mounted to base 32 of table 10. Foot controller 219 is configured to perform the same functions as control station 16 and/or controller 19, except that foot controller 219 is mounted to the base 32 of surgical table 10 so that a surgeon 20 can control the positioning of table 10 and mattress 38 using foot controller 219.

In operation, surgical positioning surface (or mattress) 38 is used as follows. First, the frame 30 and/or pedestal 34 of surgical table 10 is adjusted using

control station 16, controller 19, and/or foot controller 219 to place patient 24 in the best possible position. Controller 16, 19, and/or 219 are then used to adjust mattress 38 to fine-tune the positioning of patient 24 on mattress 38. Illustratively, controllers 16, 19, 219 are configured to allow mattress 38 to be automatically adjusted so that air bladders 122 are filled with the medium to fill in the natural gaps between patient 24 and outer cover 110 of mattress 38. Controllers 16, 19, 219 are also configured to allow mattress 38 to be manually adjusted so that each individual bladder pair can be inflated or deflated to enhance the position of patient 24 to improve surgical exposure or access to a particular portion of patient 24.

The air bladders 122 are then stabilized by evacuating the air from air bladders 122 and using the bead bag position stabalizer 124 to stiffen (or "freeze") the mattress 38 in the desired position. Finally, the temperature of mattress 38 can be adjusted using controller 16, 19, and/or 219 so that control apparatus 86 supplies the necessary signal to thermal pad 126 to change the temperature of thermal pad 126. For example, when thermal pad 126 is a conductive material (such as Gorix™), control apparatus 86 supplies a voltage signal to thermal pad 126 to change the temperature of thermal pad 126.

WHAT IS CLAIMED IS:

1. A surgical table comprising

a base,

a vertical support member extending vertically upwardly from the base,

a frame extending outwardly from the support member,

a mattress supported by the frame and positioned to lie above the frame, the mattress being configured to support a patient and having at least one bladder configured to receive a medium, and

a power pack positioned to lie within the base and configured to supply the medium to the mattress to change the shape of the mattress.

2. The surgical table of claim 1, wherein the frame is articulated.

3. The surgical table of claim 2, wherein the vertical support member telescopes vertically to position the frame at a variety of different heights.

4. The surgical table of claim 2, wherein the medium supplied by the power pack to the mattress is air.

5. The surgical table of claim 1, wherein the frame is configured to assume a variety of predefined surgical positions.

6. The surgical table of claim 5, wherein one of the predefined surgical positions includes raising a leg of the patient.

7. The surgical table of claim 5, wherein one of the predefined surgical positions includes raising a chest portion of the patient.

8. The surgical table of claim 1, wherein the mattress is configured to assume a variety of predefined surgical positions as the medium is supplied by the power pack to the mattress.

9. The surgical table of claim 8, wherein the medium supplied by the power pack to the mattress is air.

10. The surgical table of claim 8, wherein the medium supplied by the power pack to the mattress is a liquid.

11. The surgical table of claim 1, wherein the power pack is further configured to supply heat to the mattress to change the temperature of the mattress.

12. The surgical table of claim 1, further comprising a flexible hose extending from the power pack to the mattress for delivery of the medium from the power pack to the mattress.

13. The surgical table of claim 12, wherein the hose is concealed within the base and the vertical support member of the frame.

14. The surgical table of claim 12, wherein the vertical support member telescopes vertically to position the frame at a variety of different heights.

15. A surgical table comprising

a base,

a frame positioned in spaced-apart relation to the base,

a vertical support member interconnecting the frame and the base, the support member being configured to telescope vertically to position the frame at a variety of different heights relative to the base,

a mattress positioned to lie above the frame and configured to support a patient, the mattress including a cover having an upwardly-facing patient-support surface and defining an interior region of the mattress and a plurality of bladders received in the interior region of the cover and configured to be inflatable to position the patient in a predefined surgical position on the mattress, and

a blower positioned to lie within the base of the frame and configured to supply air to the bladders to inflate the bladders.

16. The surgical table of claim 15, further comprising a hose extending between the blower and the mattress to transfer the air from the blower to the mattress.

17. The surgical table of claim 16, wherein the hose is concealed within the base and the vertical support member of the frame.

18. The surgical table of claim 16, wherein the hose is coiled to accommodate the telescoping support member.

19. The surgical table of claim 15, wherein the bladders extend transversly across the mattress.

20. The surgical table of claim 16, wherein the bladders are positioned in pairs so that one bladder lies atop another bladder and each bladder pair is adjacent another bladder pair.

21. The surgical table of claim 15, wherein the mattress includes a head section, a torso section adjacent to the head section, and a leg section adjacent to the torso section, each section having a plurality of zones having at least two bladders, each bladder pair being configured to be individually inflated.

22. The surgical table of claim 15, wherein the frame is articulated to allow the frame to position the patient in a predefined surgical position.

23. The surgical table of claim 22, wherein the blower is configured to supply warm air to the mattress to control the temperature of the mattress.

24. The surgical table of claim 15, further comprising a controller configured to control the inflating of the bladders.

25. The surgical table of claim 24, wherein the controller is hand-held.

26. The surgical table of claim 25, wherein the controller is wireless.

27. The surgical table of claim 24, wherein the controller is mounted to the base to allow a surgeon to operate the controller using the surgeon's foot.

28. A surgical table comprising

a frame having a patient-support platform and

a mattress positioned to lie on the patient-support platform, the mattress being configured to support a patient during a surgical procedure, the mattress including a cover having an upwardly-facing patient-support surface and defining an interior region of the mattress and a plurality of bladder pairs received in the interior region of the cover and extending laterally across the mattress, the bladder pairs being positioned to lie adjacent to one another and each bladder pair having a bottom bladder and a top bladder positioned to lie above the bottom bladder, each bladder within each bladder pair being individually inflatable to position the patient in a predefined surgical position on the mattress.

29. The surgical table of claim 28, wherein the mattress further includes a foam mattress structure positioned to lie below the bladder pairs within the interior region of the cover, the mattress structure being configured to support the bladder pairs on the patient-support platform.

30. The surgical table of claim 29, wherein the mattress further includes a bead bag position stabilizer positioned to lie atop the bladder pairs within the interior region of the cover, the stabilizer being configured to freeze the bladder pairs in the predefined surgical position.

31. The surgical table of claim 30, wherein the mattress further includes a thermal pad positioned to lie atop the bead bag position stabilizer within the interior region of the cover, the pad being configured to regulate the temperature of the mattress.

32. The surgical table of claim 28, further comprising a base and a vertical support member extending upwardly from the base, the vertical support member being positioned to lie between the base and the frame.

33. The surgical table of claim 32, wherein the vertical support member telescopes vertically to position the frame at a variety of different heights relative to the base.

34. The surgical table of claim 32, wherein the patient-support platform is articulated to allow the patient-support platform to position the patient in a predefined surgical position.

35. The surgical table of claim 32, further comprising a power pack positioned within the base, the power pack being configured to supply a medium to the bladder pairs to inflate the bladder pairs to position the patient in the predefined surgical position.

36. A surgical table comprising

a mattress,

a patient-support platform positioned below the mattress and configured to support the mattress,

a base positioned in spaced-apart relation to the patient-support platform,

a vertical support member interconnecting the base and the patient-support platform, the support member being configured to support the patient-support platform at a variety of different heights relative to the base,

a power pack positioned to lie within the base and configured to supply a medium to the mattress to change the shape of the mattress to position a patient in a predefined surgical position,

a hose interconnecting the power pack and the mattress, the hose being configured to transfer the medium from the power pack to the mattress, and

a controller positioned in close proximity to the power pack, the controller being configured to control the distribution of the medium from the power pack to the mattress to control the shape of the mattress.

37. The surgical table of claim 36, wherein the controller is further configured to control the positioning of the patient-support platform at the variety of different heights.

38. The surgical table of claim 37, wherein the controller is mounted to the base and operable by a foot of a surgeon.

39. The surgical table of claim 37, wherein the controller is a hand-held, wireless controller.

40. The surgical table of claim 36, wherein the patient-support platform is articulated to allow the patient-support platform to position the patient in a variety of surgical positions.

41. The surgical table of claim 40, wherein the controller further controls the articulation of the patient-support platform.

42. The surgical table of claim 40, wherein the patient-support platform positions the patient in a rough surgical position and the mattress fine-tunes the positioning of the patient in the surgical position.

43. The surgical table of claim 36, wherein the mattress includes a cover having an upwardly-facing patient-support surface and defining an interior region of the mattress, and a plurality of bladder pairs received in the interior region of the cover and extending laterally across the mattress, the bladder pairs being positioned to lie adjacent to one another and each bladder pair having a bottom bladder and a top bladder positioned to lie on top of the bottom bladder, each bladder within each bladder pair being inflatable to position the patient in a predefined surgical position on the mattress.

44. The surgical table of claim 43, wherein the mattress further includes a thermal pad positioned to lie above the bladder pairs within the interior region of the cover and configured to regulate the temperature of the mattress.

5

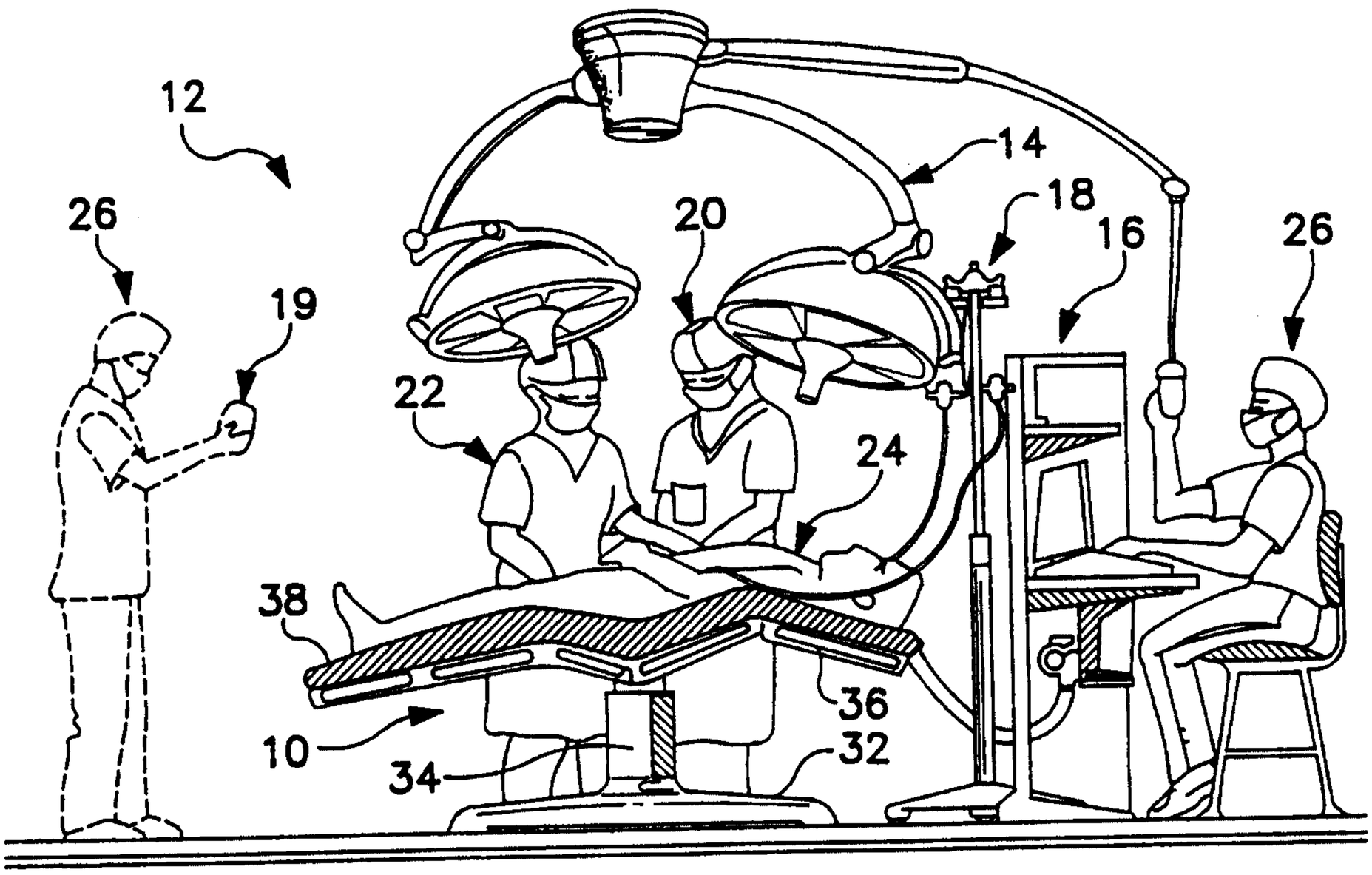

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FIG. 1

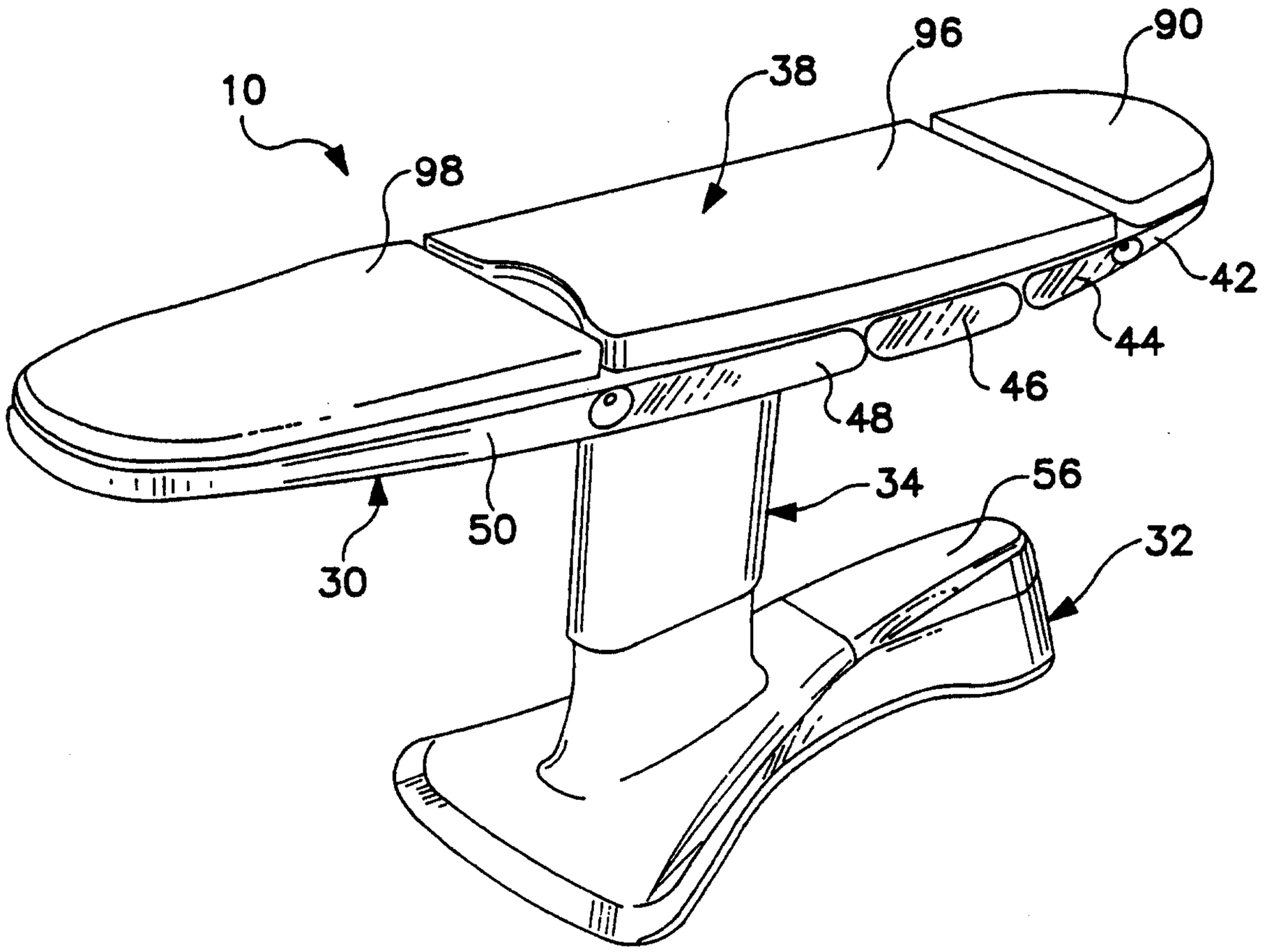
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FIG. 2

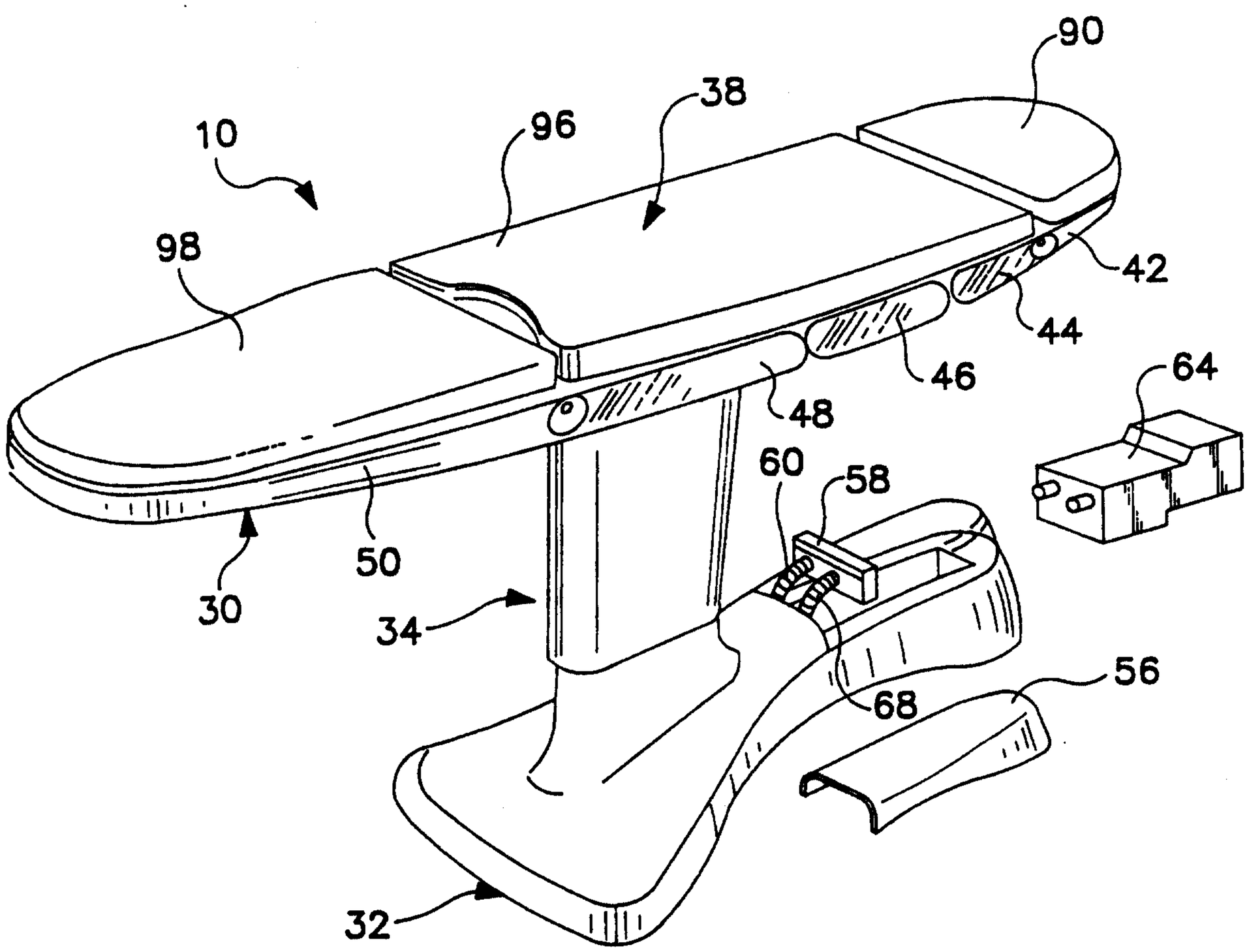
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FIG. 3

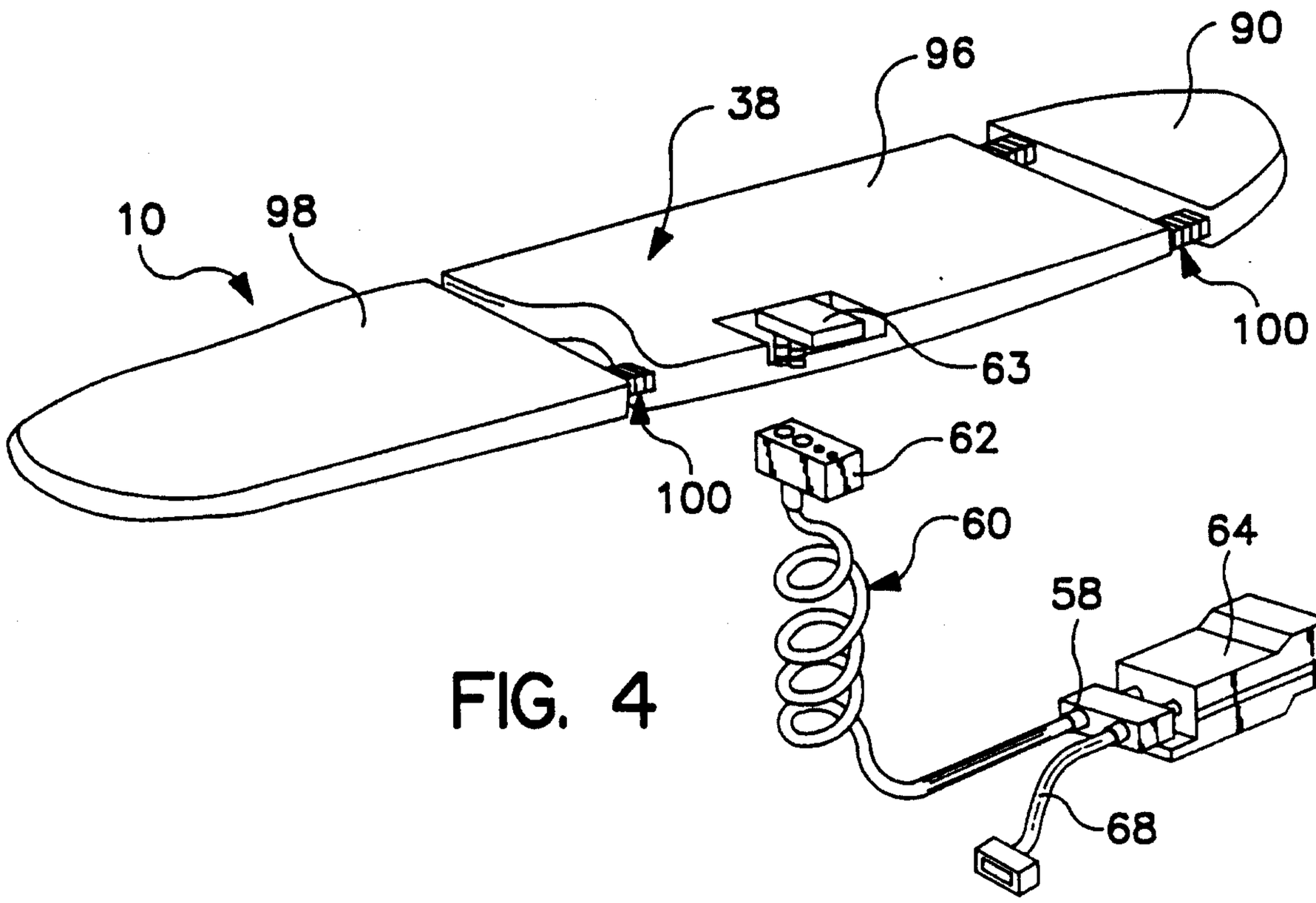
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FIG. 4

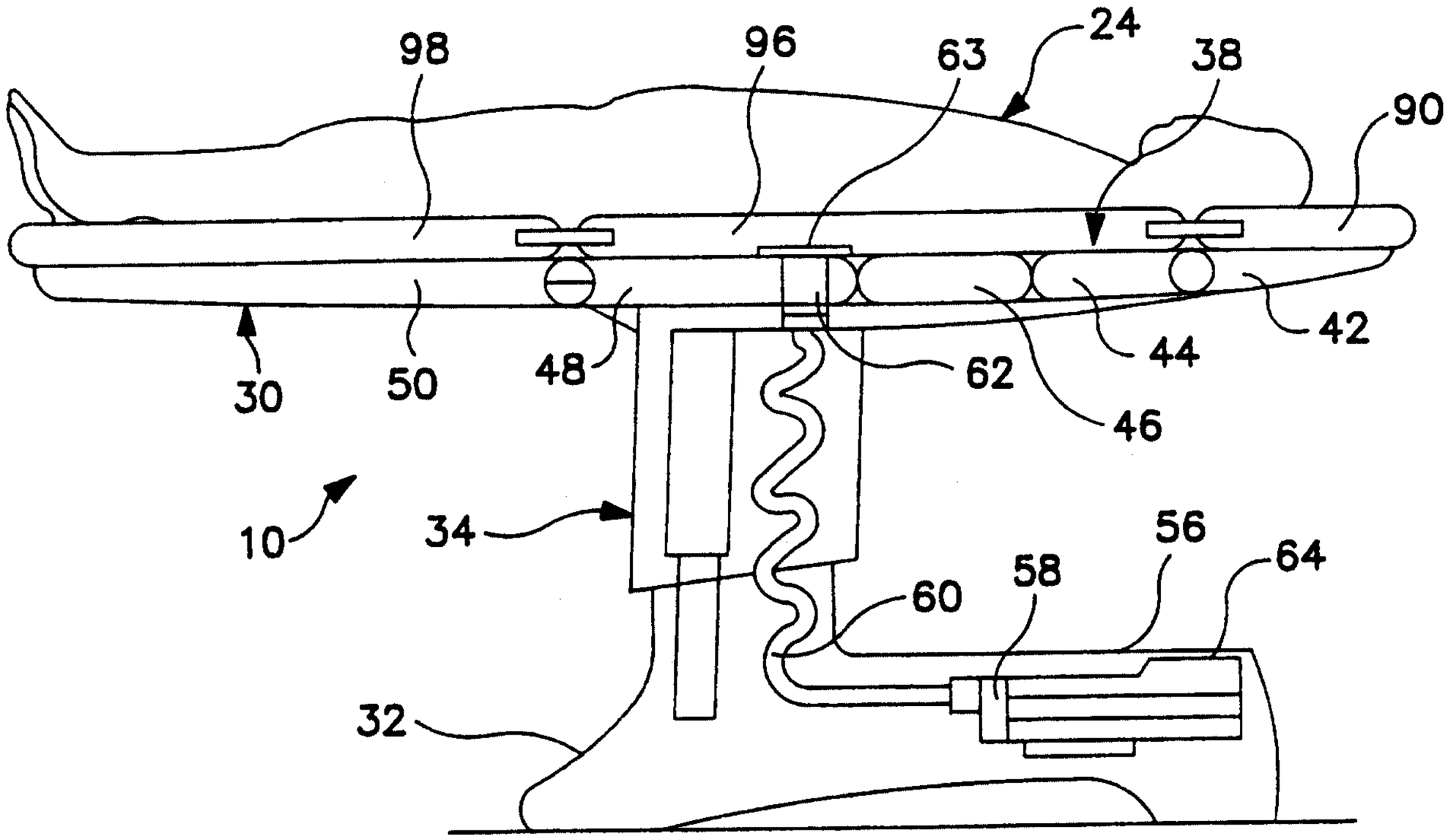
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FIG. 5

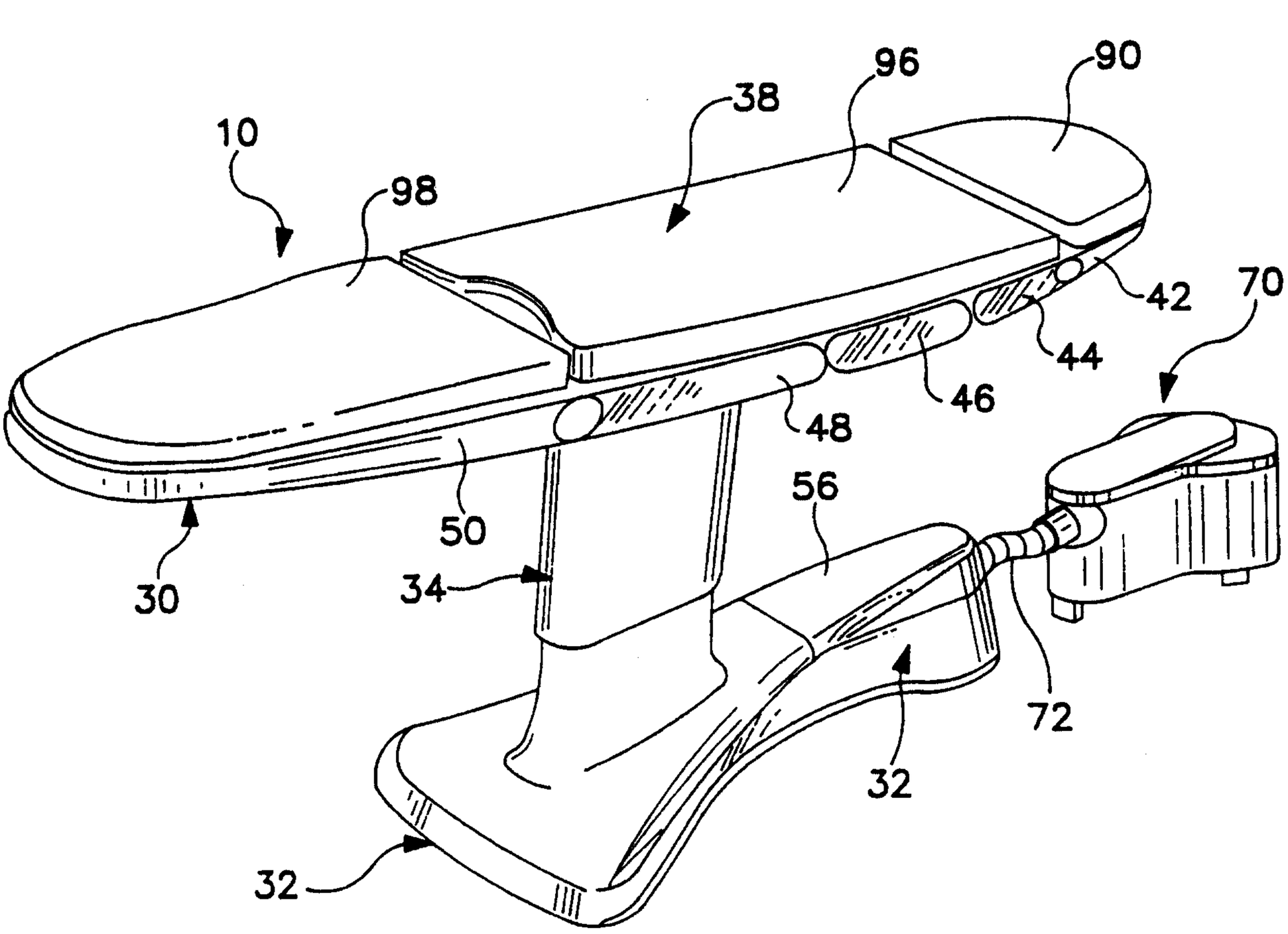
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FIG. 6

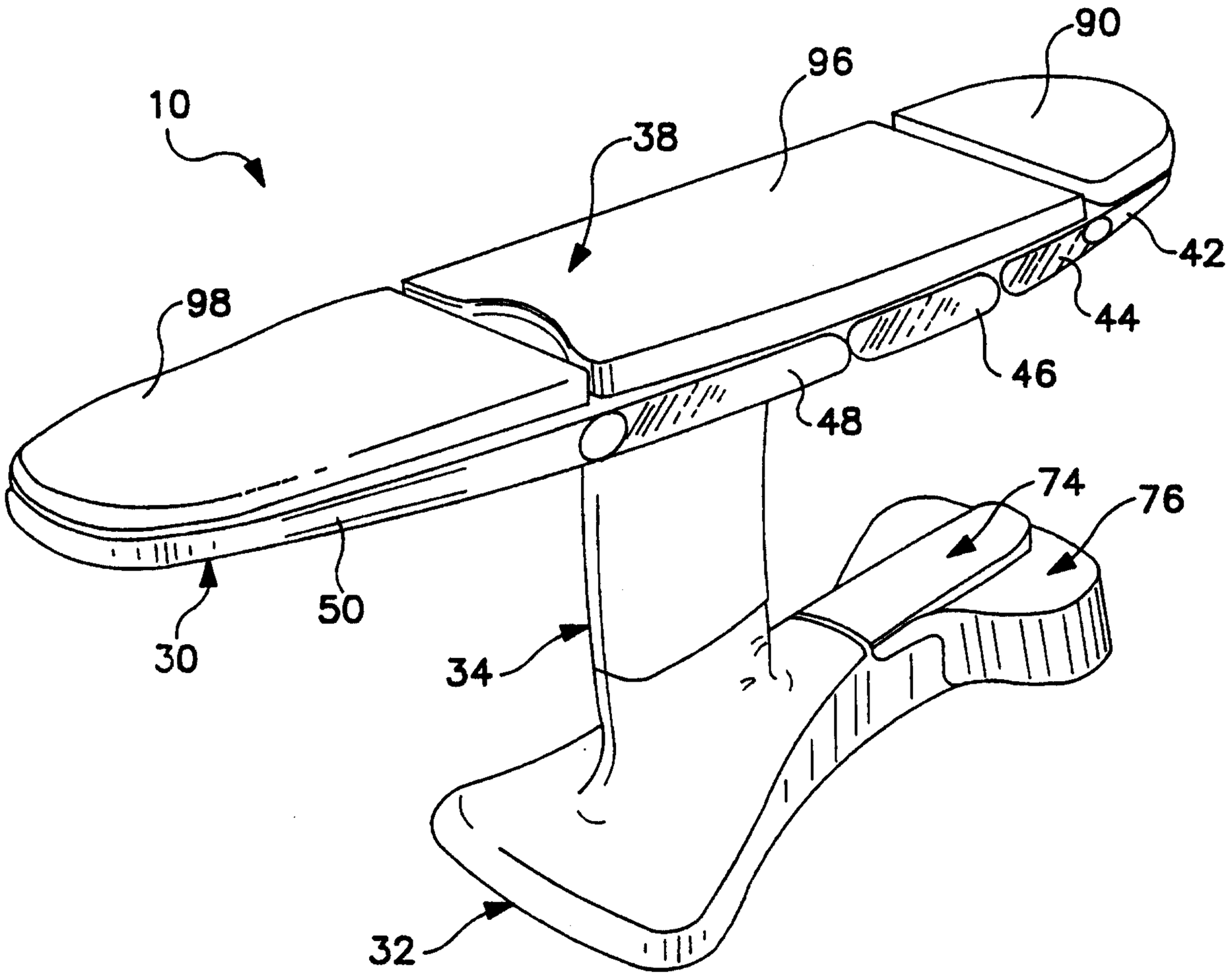
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FIG. 7

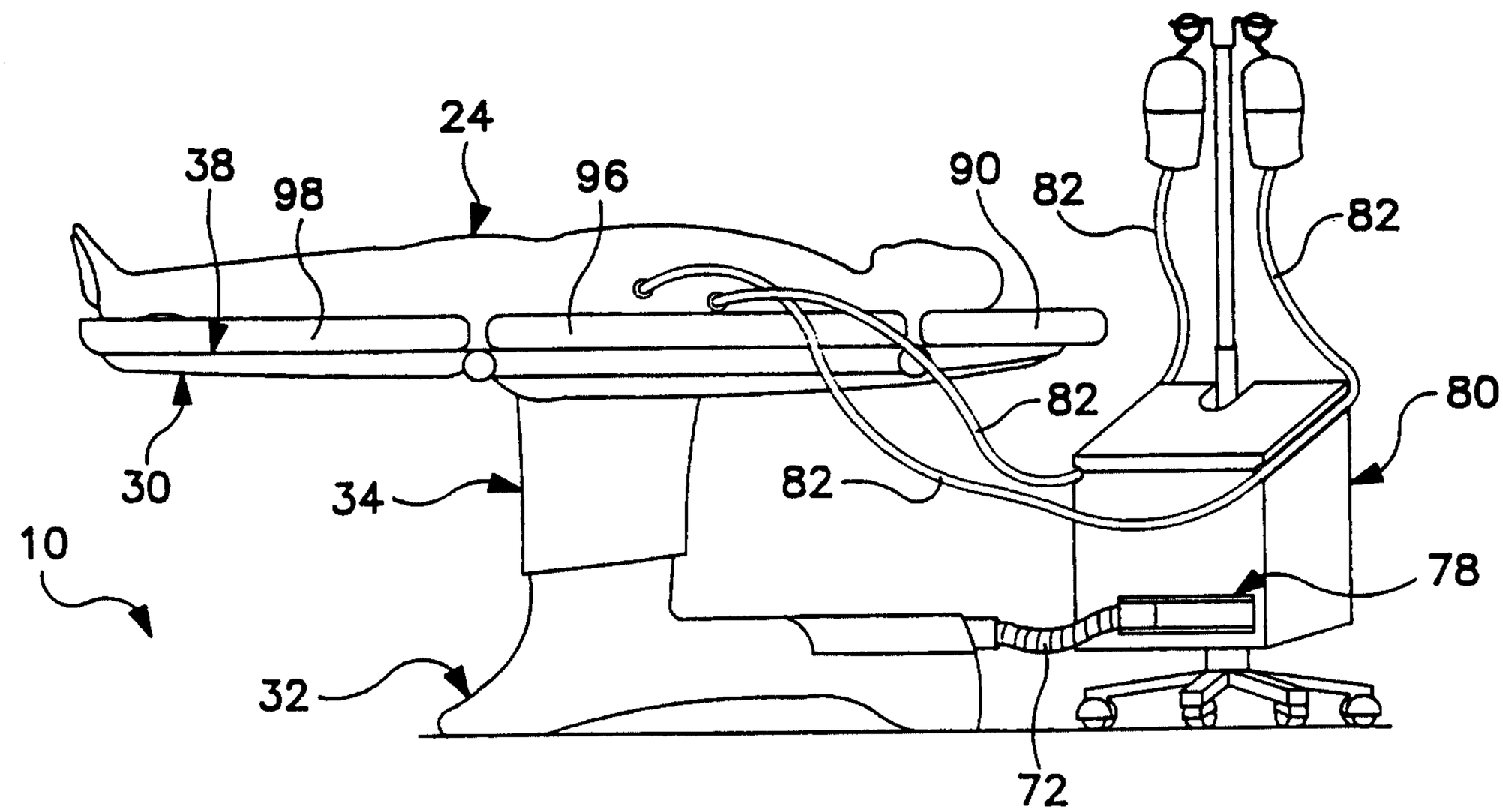
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FIG. 8

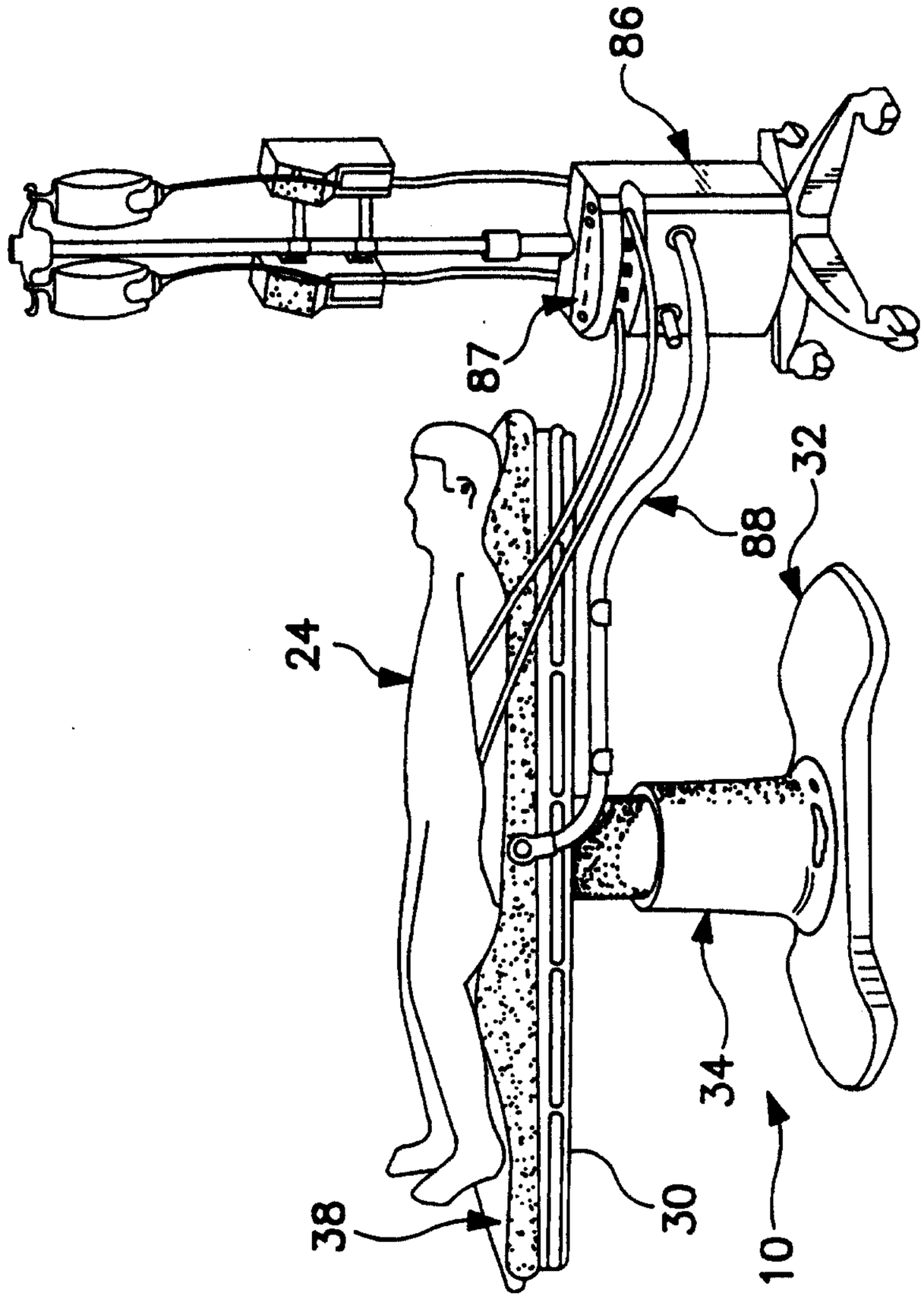


FIG. 9

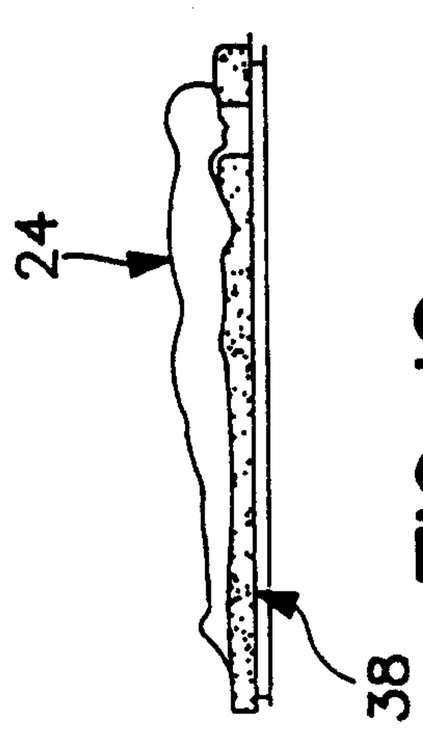


FIG. 10

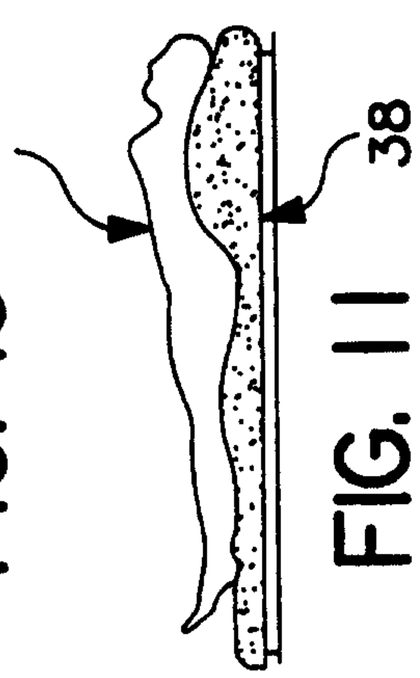


FIG. 11

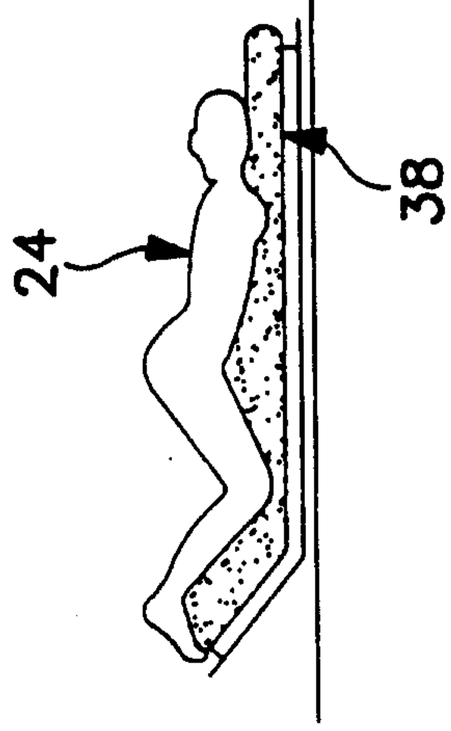


FIG. 12

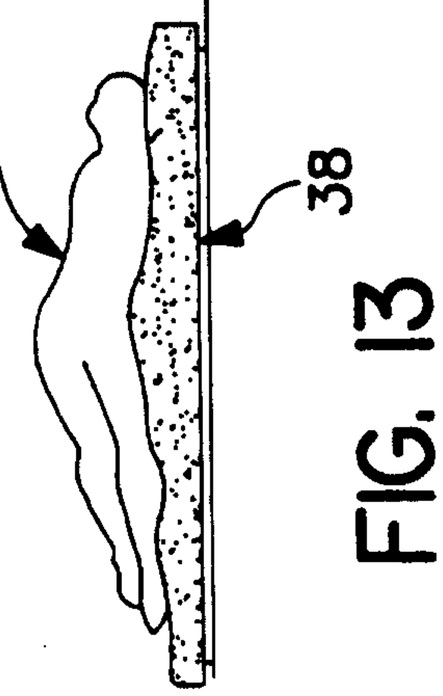


FIG. 13

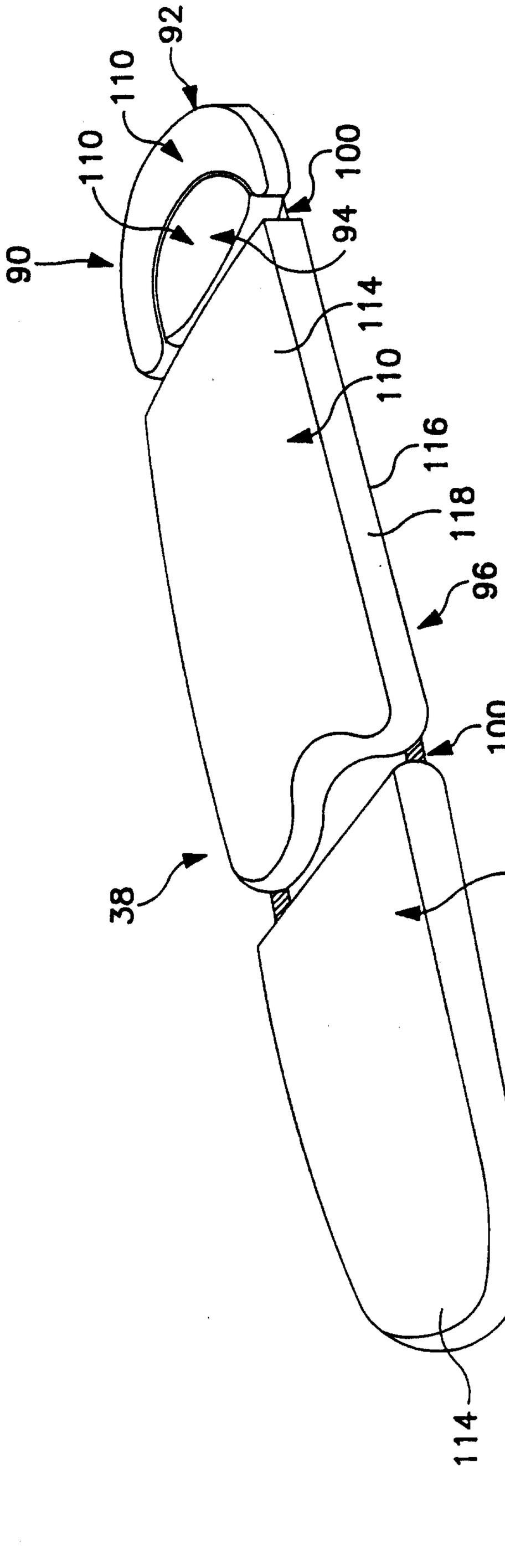


FIG. 14

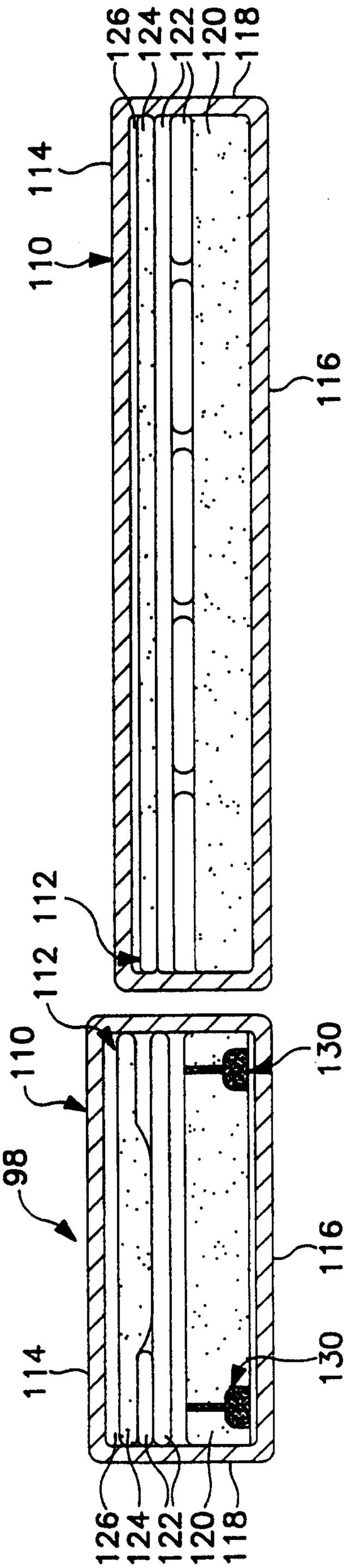


FIG. 15A

FIG. 15B

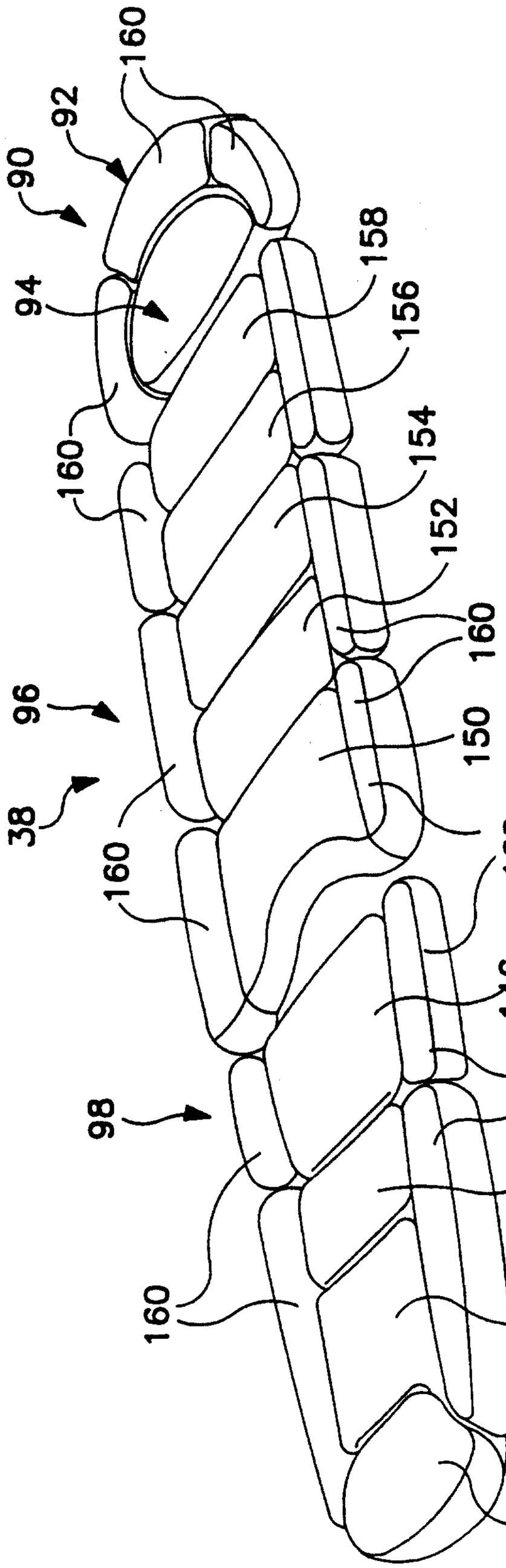
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FIG. 16

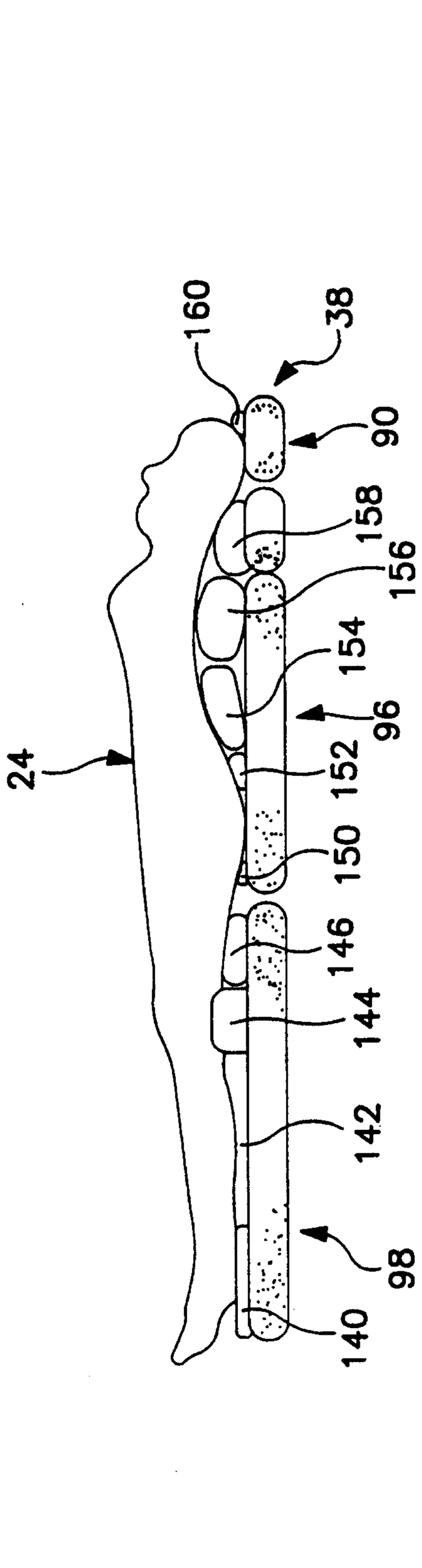
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FIG. 17

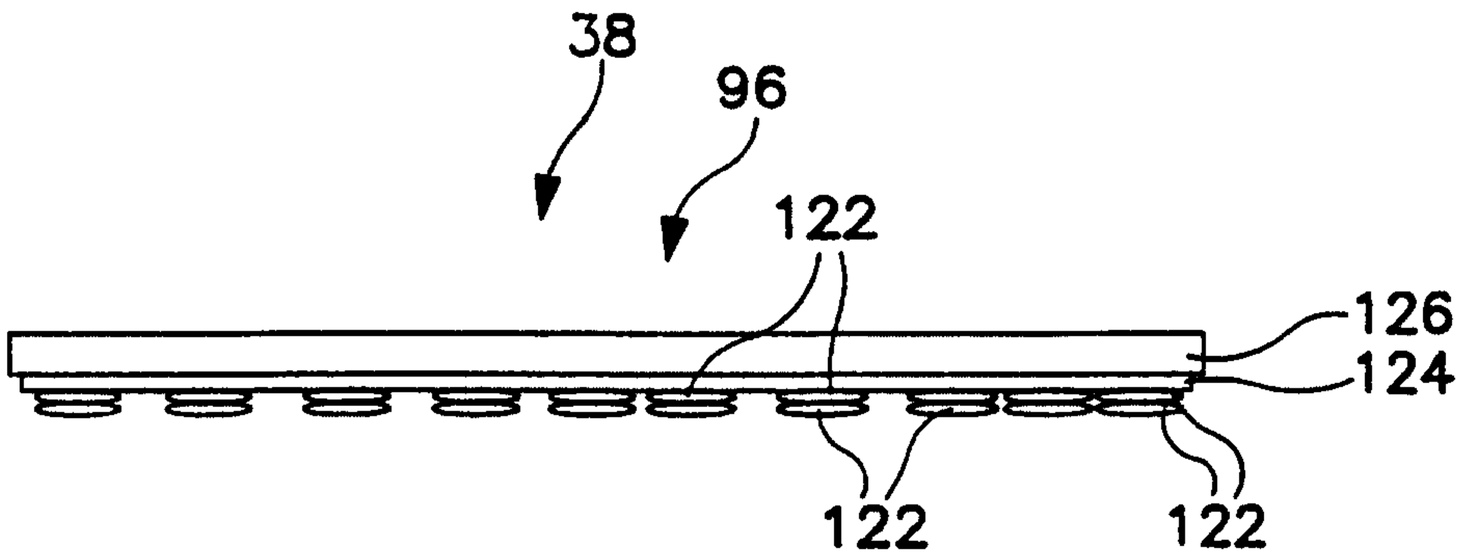


FIG. 18

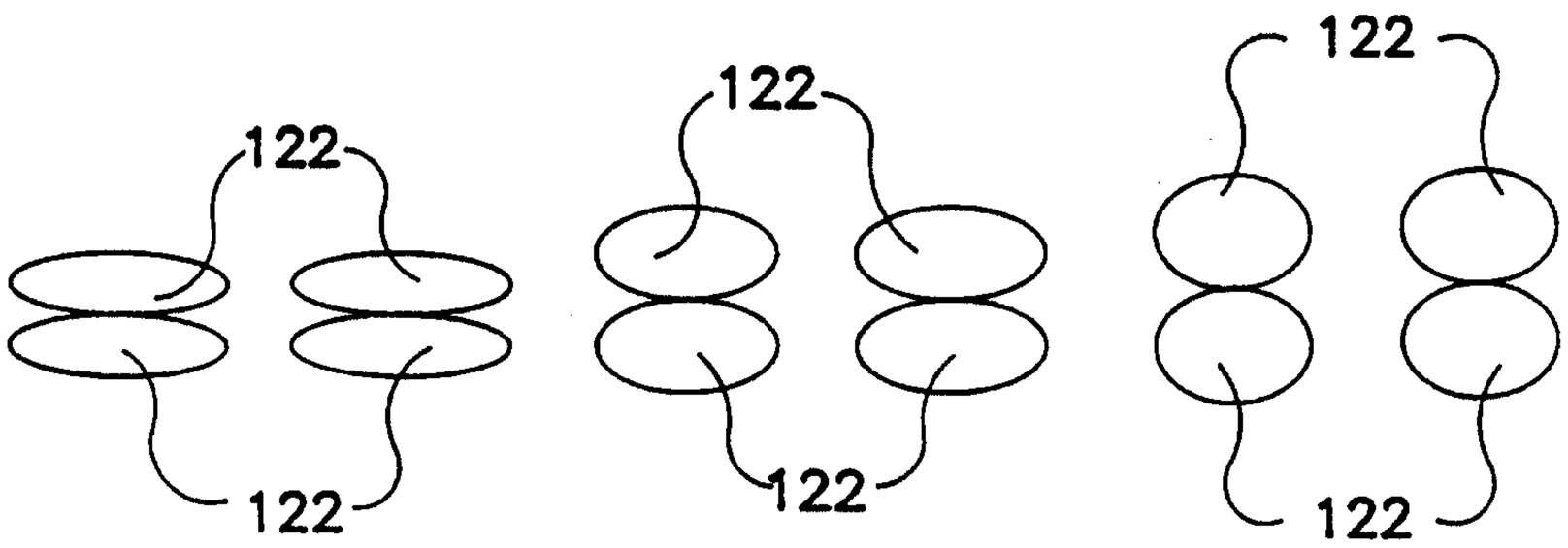


FIG. 19

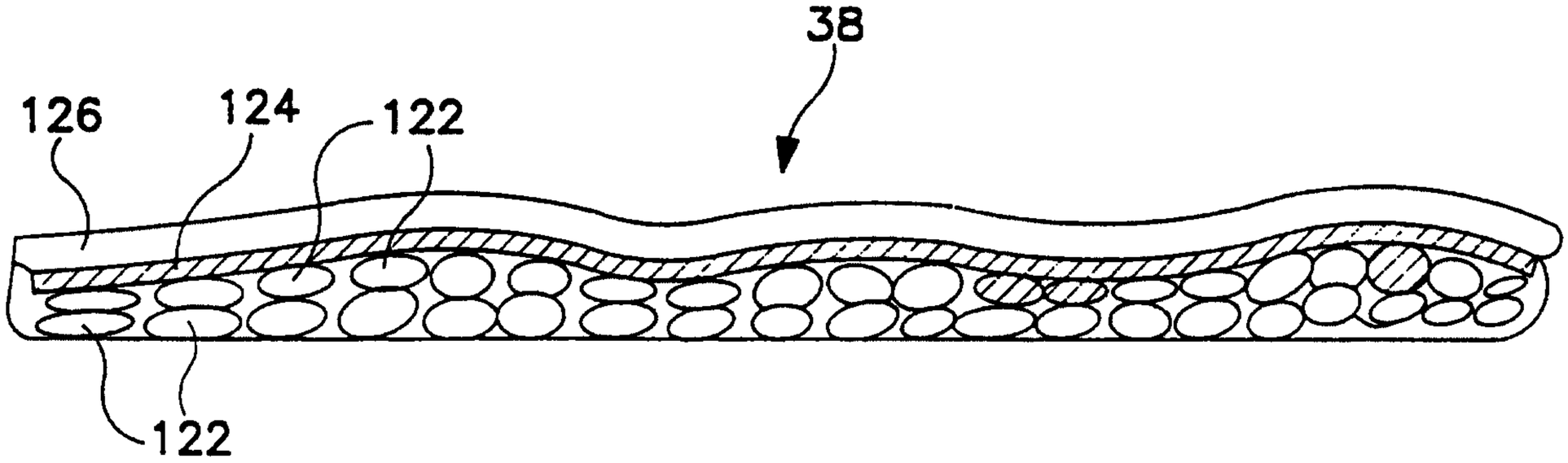


FIG. 20

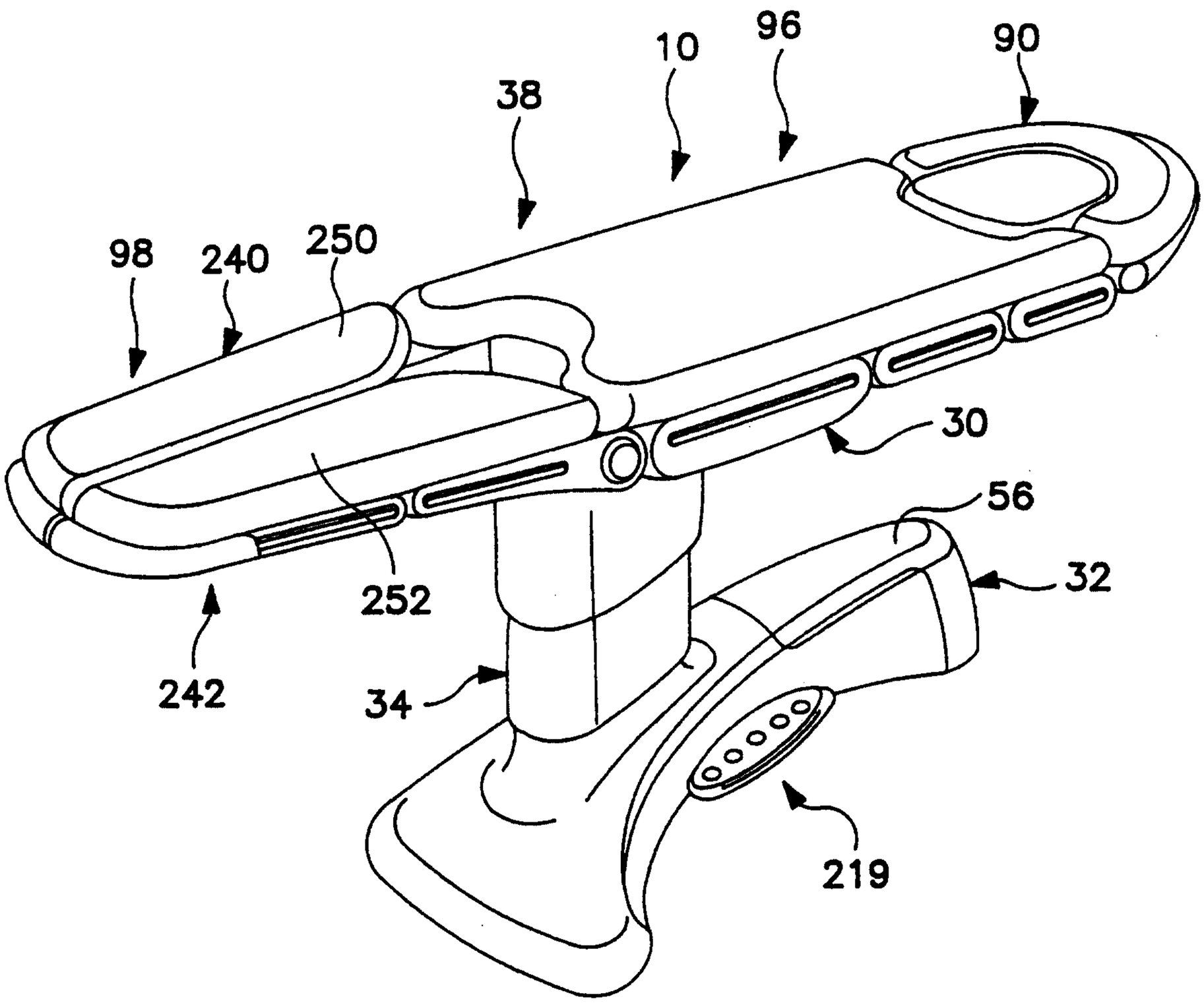
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FIG. 21

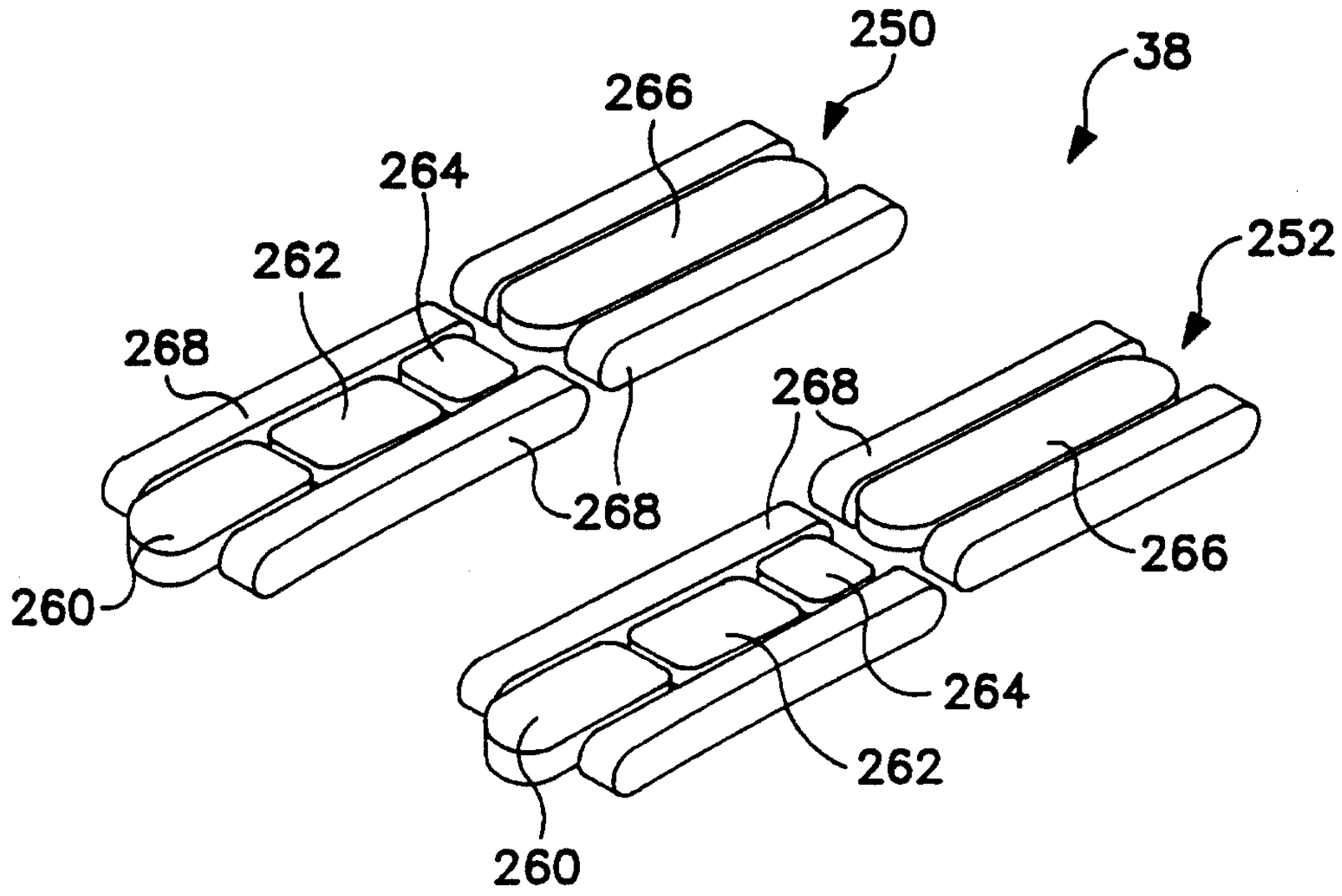
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FIG. 22