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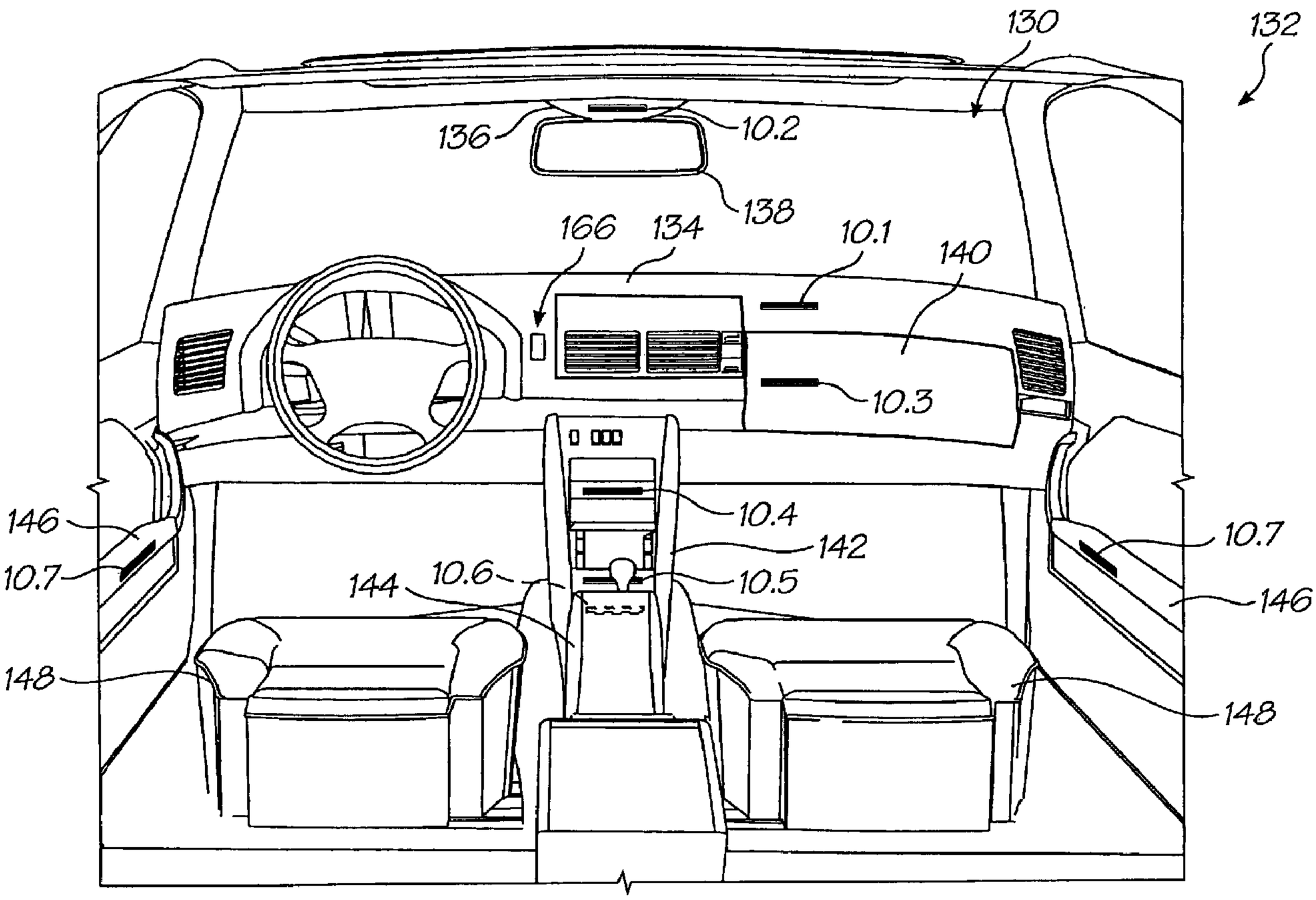
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An accessory for a conveyance includes an audio device that is connectable to a wiring circuit of the conveyance. A printer unit is included in the device.

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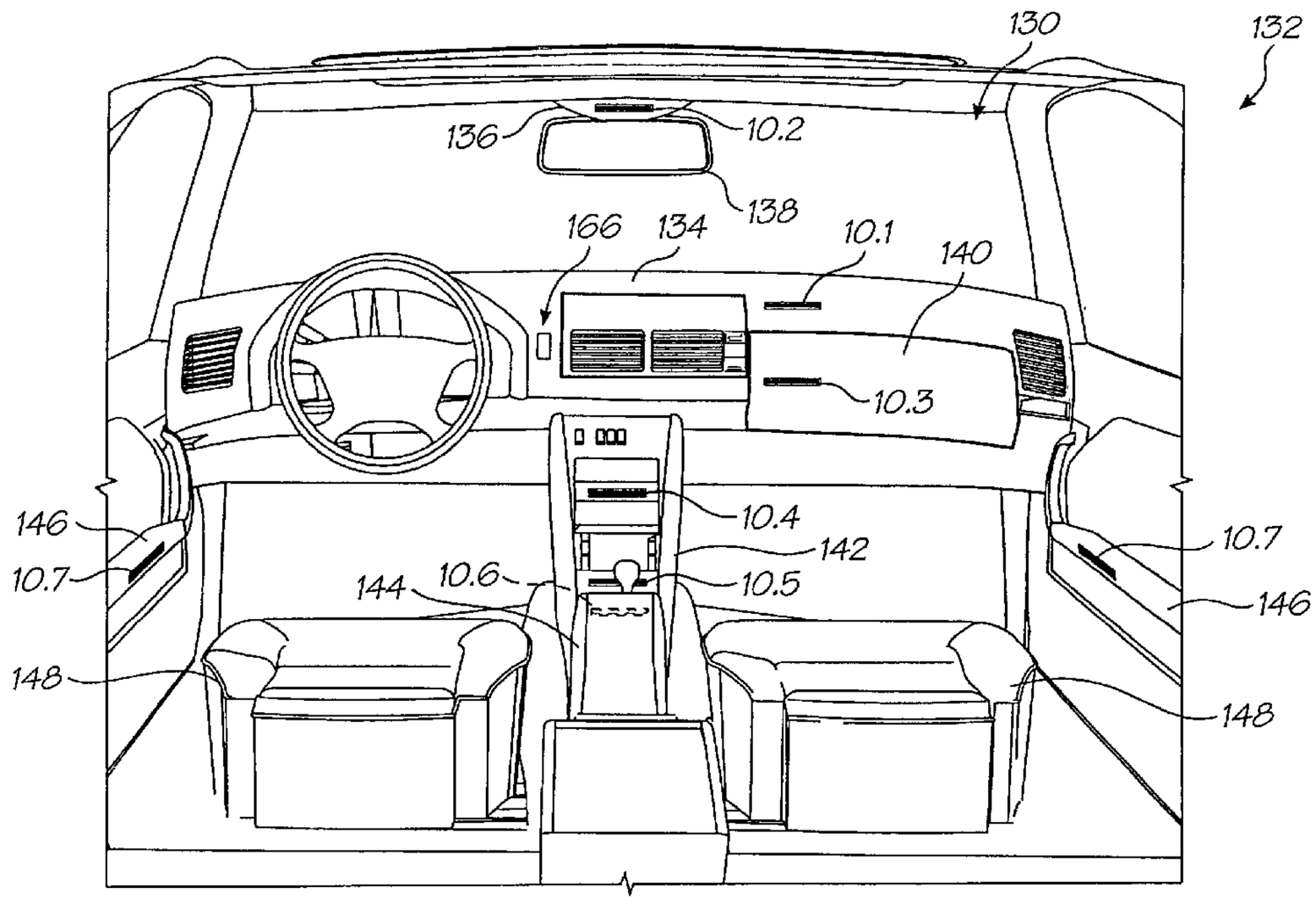
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(54) Title: AN ACCESSORY FOR A CONVEYANCE



(57) Abstract: An accessory for a conveyance includes an audio device that is connectable to a wiring circuit of the conveyance. A printer unit is included in the device.

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AN ACCESSORY FOR A CONVEYANCE

FIELD OF INVENTION

This invention relates to a printer for a conveyance and to a conveyance including such printer.

In this specification, unless the context clearly indicates otherwise, the term "conveyance" is to be understood in a broad sense as any form of device which conveys persons and/or goods and includes, but is not necessarily limited to, road vehicles, rail vehicles, aircraft, spacecraft and waterborne craft.

BACKGROUND TO THE INVENTION

These days, more and more information is provided to people. The information is made available in various forms, including audible forms and visual forms. Often, the information is made available to persons in a conveyance.

There are situations where it is desirable to have a record of such information. To date, making a record of such information means that the person needs some means to record the information, for example, on a magnetic recording medium by way of a dictation machine or by making written notes on paper. Often such recording devices are not readily to hand and vital information can be lost.

SUMMARY OF THE INVENTION

According to the invention there is provided an accessory for a conveyance having a wiring circuit, the accessory comprising:

a chassis;

an audio device within the chassis, the audio device being connectable to the wiring circuit and configured for receiving data and generating an audio signal output, the audio device having controls for user control of the audio signal output; and

a printer unit within the chassis for receiving print data from the audio device and generating printed material; wherein,

the controls of the audio device are further adapted for user control of the printer unit.

The audio device may include a radio and at least one of a tape player and a CD player. It will be appreciated that, these days, most audio devices incorporate both a tape player and a CD player, in addition to the radio.

The audio device may include a display. Further, the audio device may include satellite navigation equipment, a television receiver, or both.

The controls may include means so that data to be printed is able to be previewed on the display.

The printer may be a full color printer. More particularly, the printer may be a photo quality color printer.

The printer is preferably an inkjet printer and may comprise a pagewidth inkjet printhead. The printhead preferably comprises an inkjet nozzle array, the array being fabricated by microelectromechanical techniques.

BRIEF DESCRIPTION OF DRAWINGS

The invention is now described by way of example with reference to the accompanying drawings in which:-

Figure 1 shows a three dimensional, front view of a printer, in accordance with the invention, for a conveyance;

Figure 2 shows a three dimensional, rear view of the printer;

Figure 3 shows a three dimensional, front view of the printer illustrating cartridge insertion or removal;

Figure 4 shows a three dimensional view of the printer with a top cover removed;

Figure 5 shows a three dimensional, exploded view of the printer;

Figure 6 shows a plan view of the printer;

Figure 7 shows a sectional, side view of the printer taken along line VII-VII in Figure 6;

Figure 8 shows a sectional, end view of the printer taken along line VIII-VIII in Figure 6;

Figure 9 shows a first drive arrangement of the printer;

Figure 10 shows a second drive arrangement of the printer;

Figure 11 shows a three dimensional, top view of an ink cartridge for the printer;

Figure 12 shows a three dimensional, bottom view of the cartridge;

Figure 13 shows a three dimensional, exploded view of the cartridge;

Figure 14 shows a plan view of the cartridge;

Figure 15 shows a sectional, end view taken along line XV-XV in Figure 14;

Figure 16 shows a sectional, side view of the cartridge taken along line XVI-XVI in Figure 14;

Figure 17 shows a schematic, plan view of one embodiment of the cartridge;

Figure 18 shows a schematic, plan view of another embodiment of the cartridge;

Figure 19 shows a schematic, plan view of a further embodiment of the cartridge;

Figure 20 shows a schematic, plan view of yet a further embodiment of the cartridge;

Figure 21 shows a schematic representation of an interior compartment of a vehicle indicating various locations for the printer of Figures 1 to 10;

Figure 22 shows a three dimensional view of a vehicle audio unit incorporating a printer, in accordance with the invention;

Figure 23 shows a three dimensional view of a further vehicle audio unit incorporating a printer and other devices;

Figure 24 shows a three dimensional view of yet a further vehicle audio unit incorporating the printer; and

Figure 25 shows a three-dimensional view of still a further vehicle audio unit incorporating a printer and other devices.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, reference numeral 10 generally designates a printer, in accordance with the invention, for a conveyance, as defined. The printer 10 is intended for use in any suitable type of conveyance of the type described. However, for ease of reference, the printer 10 will be described with reference to its application in a motor vehicle.

The printer 10 includes a chassis 12 (Figure 4) that is covered by a top cover 16 having an access opening 18 closed off by a flap 20. The flap 20 is spring biased so that, when a cartridge 22 has been removed from the printer 10, the flap is urged to the position shown in Figure 1 of the drawings.

It is important to note that the printer 10 does not have any of its own controls and, effectively, is a dumb unit. The unit is therefore actuated from a device from which it is desired to print material.

The device that sends commands to the printer 10 can either be hard wired to the printer 10, for example, via a wiring loom of the motor vehicle or, instead, the device may send commands to the printer 10 in a wireless manner. For this purpose, the printer 10 includes a port 24 able to detect wireless communications of some form.

Various forms of wireless communications can be employed such as an infra red communication system, a personal area network (PAN) system referred to as Bluetooth, a radio local area network (LAN) or a digital cordless telephone system.

Further, the device which communicates with the printer 10 can be of various forms such as, for example, a palm computer, a laptop computer, a mobile telephone, a digital camera, a scanner, a diagnostics system for the motor vehicle, a navigation system, a vehicle entertainment system, or the like. This is not intended to be an exhaustive list and those skilled in the art will readily conceive of other devices that can communicate with the printer 10.

The port 24 is mounted on a front face 26 of the printer 10. As shown in greater detail in Figure 2 of the drawings, a rear face 28 of the printer 10 accommodates a data socket 30 and a power socket 32. It will be appreciated that, when the printer 10 communicates exclusively in a wireless manner, the data socket 30 may be omitted.

The printer 10 incorporates a printhead 34 (Figure 4). The printhead 34 is a pagewidth inkjet printhead. More particularly, the printhead 34 is a four color printhead, or three color plus infra red ink, printhead that prints photo quality prints on print media stored in the cartridge 22. The printhead 34 comprises an array of nozzles to provide printing at 1600 dpi. The nozzles of the printhead 34 are manufactured using the applicant's Memjet technology.

The printhead 34 receives commands from a printed circuit board (PCB) 36 secured to the chassis 12.

Drive motors 38 and 40 are mounted on a sidewall 42 of the chassis 12. The drive motor 38, which is in the form of a stepper motor, drives a first drive arrangement in the form of a first gear train 44. The first gear train 44 is mounted on a side molding 46 of the chassis 12.

The drive motor 40, which is also in the form of a stepper motor, drives a drive roller 48 via a second drive arrangement. The second drive arrangement comprises a second gear train 50.

The printhead 34 receives ink from ink hoses 52 that communicate with an ink supply reservoir 54 (Figures 13 and 15) of the cartridge 22 via an ink supply manifold 56, as will be described in greater detail below.

Referring to Figure 5 of the drawings, an exploded view of the printer 10 is illustrated. It is to be noted that the printhead 34 communicates with the PCB 36 via a TAB film 54.

A slot 58 is defined in the side molding 46. The slot 58 receives a corresponding formation of the cartridge 22 in it. Further, a roller set 60 is mounted on a base 62 of the printer 10. The roller set 60 comprises a rotatable axle 62. A cog 64 is mounted proximate each end of the axle 62. Each cog 64 engages a rack 100, 102 (Figure 12) on the cartridge 22 for inhibiting skewing of the cartridge 22 as it is inserted into, or withdrawn from, the interior of the printer 10.

The first gear train 44 engages a pick up roller 68 of the printer 10. The pick up roller 68 picks up print media in the form of a sheet of paper from a stack 70 of paper (Figure 13) in the cartridge 22 for feeding to the printhead 34 of the printer 10 when printing is to be effected.

As shown in greater detail in Figure 9 of the drawings, the first gear train 44 is powered by the stepper motor 38 via an axle 72 extending across the printer 10 to convey power from the stepper motor 38 to the first gear train 44. A gear 74 is mounted against the molding 46 at one end of the axle 72. The gear 74 drives a reduction gear set 76. Further, the reduction gear set 76 communicates with a reversing mechanism 78. Accordingly, the gear train 44 performs two functions. When the reversing mechanism 78 is not selected, the gear train 44 engages an upper rack 80 on the cartridge 22 for feeding the cartridge 22 into the printer 10 or ejecting the cartridge 22 from the printer 10. Instead, when the reversing mechanism is in the position shown in Figure 9 of the drawings, it engages the pick up roller 68 or, more particularly, a gear 82 mounted at an end of the pick up roller 68. The gear train 44 then serves to feed the paper to the drive roller 48 for conveying to the printhead 34.

Referring now to Figures 11 to 20 of the drawings, the cartridge 22 is described in greater detail.

The cartridge 22 comprises a base molding 90. A metal cover 92 closes off the base molding 90. The cover 92 has a pair of transversely spaced openings 94 defined in a front edge thereof. These openings 94 permit the pick up roller 68 of the printer 10 to engage a topmost sheet of the stack 70 of paper within the cartridge 22.

A toothed rack 96 is provided on one side of the cartridge 22. The toothed rack 96 defines the upper rack 80, which is engaged by a gear of the first gear train 44 for insertion of the cartridge 22 into, or its ejection from, the printer 10. A rib 98 extends longitudinally along the side of the toothed rack 96. The rib 98 is received in the slot 58 in the side molding 46 of the printer 10. A lower surface of the toothed rack 96 also has the rack 100 (Figure 12) for engagement with one of the cogs 64. An opposed side of the base molding 90 of the cartridge 22 carries the other rack 102, which engages the other, cog 64 for inhibiting skewing of the cartridge 22 when it is inserted into, or ejected from, the printer 10.

A feed slot 104 is defined at a front edge of the metal cover through which a sheet of paper to be printed is passed in use. The feed slot 104 is partially defined by a plastics strip 106 that inhibits more than one sheet of paper being fed to the printhead 34 at any one time.

A transversely extending trough 108 is defined outwardly of the strip 106. The trough 108 accommodates a sprung roller 110 therein. The roller 110 is supported in the trough 108 via a plurality of clips 112.

The roller 110 is biased upwardly relative to a base of the trough 108 via a plurality of leaf springs 114. The leaf springs 114 are formed integrally with an L-shaped metal bracket 116 that partially forms the trough 108. The roller 110 is a snap-fit in the clips 112.

A platen 118 is accommodated in the base molding 90. The platen 118 is spring biased via a plurality of leaf springs 120 which engage a floor 122 of the base molding 90 for urging the stack 70 of paper against the cover 92.

The ink supply reservoir 54 includes an ink supply molding 124 formed integrally with the base molding 90. The ink supply molding 124 defines a plurality of ink supply channels 126. Each ink supply

channel 126 contains a particular color of ink. In this context, the term "color" is to be understood as including inks which are invisible in the visible spectrum such as, for example, infra red inks.

The channels 126 are closed off by a flexible bladder-like membrane 128 that is heat-sealed to the molding 124. It will be appreciated that, as ink is withdrawn from each channel 126, the associated membrane 128 collapses into the channel 126 thereby inhibiting the ingress of air into that channel 126.

Each channel 126 communicates with an ink outlet 130. Each ink outlet 130 is in the form of a rupturable seal.

As shown in greater detail in Figure 5 of the drawings, the ink supply manifold 56 of the printer 10 includes pins 132. These pins 132 communicate with the ink supply hoses 52. When the cartridge 22 is inserted into the printer 10, and the cartridge 22 is driven home by the gear train 44, the pins 132 pierce the seals 130 to place the hoses 52 in communication with their associated ink supply channels 126.

The cartridge 22 includes a quality assurance chip 134. This chip 134 ensures correct communications between the cartridge 22 and the printer 10 and that the cartridge 22 is of the required quality. The chip 134 communicates with the printer 10 via chip contacts 136 mounted on the ink supply manifold 56 of the printer 10. Thus, when the cartridge 22 is driven home by the gear train 44, the chip 134 engages the contacts 136 for enabling communications to be established between the chip 134 and the circuit board 36 of the printer 10.

Figure 17 shows a first embodiment of the cartridge 22 with the ink supply reservoir 54 arranged on a left side of the cartridge 22 and the stack 70 arranged on the right side of the cartridge 22.

Figure 18 shows another embodiment of the cartridge 22 with the stack 70 arranged on the left side of the cartridge 22 and the ink supply reservoir 54 being arranged on the right side of the cartridge 22.

Figure 19 shows yet a further embodiment with the stack 70 arranged at a front of the cartridge 22 with the ink supply reservoir 54 being arranged at a rear of the cartridge 22.

Figure 20 shows yet a further embodiment with the stack 70 arranged on the platen 118 with the ink supply reservoir 54 being arranged below the platen 118. It will be appreciated also, with reference to this embodiment that the ink supply reservoir 54 could be arranged above the stack of paper 70 although this will increase the height of the cartridge 22 and, accordingly, the height of the printer 10.

The cartridge 22 is a disposable unit so that, once its ink supply and paper supply have been depleted, the cartridge is disposed of. Instead, the cartridge 22 may be re-useable. In the latter case, once the supply of ink and paper in the cartridge 22 have been depleted and the cartridge 22 is ejected from the printer 10, the used, empty cartridge 22 can be taken by a user to a supplier for a refund. It is to be noted that the cartridge 22 is automatically ejected from the printer 10 once its supply of paper and/or ink has been depleted.

As described above, the printer 10 is intended particularly for use in a motor vehicle. The printer 10 is dimensioned to fit in numerous positions in a passenger compartment 130 (Figure 21) of a motor vehicle 132. The printer 10 is, desirably, mounted where it is readily accessible within the passenger compartment 130 of the vehicle 132.

Various desirable locations within the passenger compartment 130 are now described. Firstly, a printer, designated by the reference numeral 10.1, can be mounted in a dashboard 134 of the vehicle 132.

This provides a good location at least for front occupants of the passenger compartment 130 and, usually, this part of the dashboard 134 of the vehicle 132 is unoccupied by other equipment.

A second desirable location is in an overhead fitting 136 arranged above a rear view mirror 138 of the passenger compartment 130. Thus, a printer 10.2 can be mounted in this fitting 136. Once again, this provides good access, at least for front occupants of the passenger compartment.

Another location in the passenger compartment for a printer 10.3 is a glovebox 140. This is a convenient location in that the printer 10.3 can be built into the lid 140 of the glovebox. This renders the printer 10.3 readily accessible for servicing purposes.

Yet a further location is in an upper region of a console 142 as illustrated by printer 10.4. Another suitable location for a printer 10.5 is in a lower region of the console 142 where, for example, coin trays or the like are sometimes mounted. A further suitable location is in a central armrest 144 of the passenger compartment 130 in which a printer 10.6 could be installed. Still further, if there is sufficient space, printers 10.7 could be built into door arm rests 146 of the passenger compartment. Only the person adjacent such a door armrest will have easy access to the printer 10.7 but this need not necessarily be a major inconvenience.

It will also be appreciated that more than one printer could be provided in the passenger compartment. Although not shown, printers could also be provided in back rests of the front seats of the passenger compartment 130.

Those skilled in the art will appreciate that the exemplified locations as described above are not the only locations in which printers 10 could be installed and it is conceivable that printers could be stored in less convenient location such as in footwells of the passenger compartment 130, under the front seats, in an arm rest of a rear seat of the passenger compartment 130, or the like.

Also, it is envisaged that receiving sockets for printers could be molded into relevant fittings in the passenger compartment 130 during manufacture of the vehicle 132. The receiving sockets could include wiring for the printer 10. Blanking plates could then close off the receiving sockets, the relevant blanking plate being removed to facilitate installation of the printer 10.

In another embodiment of the invention, the printers 10 are built into and form part of car audio devices, which are also referred to as in car entertainment (ICE) units.

Accordingly, as shown in Figure 22 of the drawings, an ICE unit 150 is illustrated. The ICE unit 150 incorporates a radio having an LCD display 152, a CD player having a slot 154 in a front panel of the unit 150 and various controls 158.

The ICE unit 150 includes a printer 10 as described above including the cartridge 22. The ICE unit 150 includes controls 160 for controlling printing from the printer 10. The controls 160 are used for instructing the printer 10 to print required information. Depending on the material to be printed, the LCD 152 can be used for previewing material to be printed.

It is envisaged that this embodiment of the invention will be used for printing information from radio broadcasts, CD's played in the CD player 150, or the like.

Referring now Figure 23 of the drawings a variation of the ICE unit 150 illustrated in Figure 22 is illustrated. With reference to Figure 22, like reference numerals refer to like parts, unless otherwise specified.

In this embodiment of the invention, the ICE unit 150 includes a slot 162 in which a digital camera 164 is received. The digital camera 164 and the slot 162 have corresponding electrical contacts so that information can be downloaded from the camera 164 to be printed via the printer 10. Accordingly, it is an advantage of this embodiment of the invention that information from a digital camera can be downloaded as soon as a user of the camera has used the camera and/or has returned to the vehicle 132. Thus, the user need not, unlike at present, await the user's return to a venue where the camera can communicate with a computer for downloading information captured by the camera 164.

It is also contemplated that a suitable slot 162 could be incorporated in, for example, the dashboard 134 of the vehicle 132 as illustrated at 166 so that a camera can be incorporated in the vehicle 132 for printing on any one of the printers 10.1 to 10.7. In other words, the slot 166 need not form part of an ICE unit but may be provided as a separate feature in the vehicle 132 in association with one of the printers 10.1 to 10.7.

Referring now to Figures 24 and 25 of the drawings, a further ICE unit 170 is provided. In this embodiment, the ICE unit 170, in addition to a CD player 172 and a radio having controls 174, includes a full color LCD 176. The ICE unit 170 further functions as a satellite navigation unit and may also be used for receiving television signals. The unit 170 incorporates a printer 10 of the type described above. The unit 170 includes controls 178. These controls 178 are GPS controls and are used for satellite navigation purposes. In addition, a further bank of controls 180 is provided for controlling the printer 10.

With this unit 170, a map, or the like, can be downloaded and printed via the printer 10 or images from the LCD 176 when it is used as a television receiver can be printed via the printer 10.

The unit 170 shown in Figure 25 of the drawings, once again, incorporates a slot 182 for receiving a digital camera 184. The slot 182 and the digital camera 184 therefore have corresponding electrical contacts for enabling data to be downloaded from the digital camera 184 to be printed on the printer 10.

Accordingly, it is an advantage of the invention that an in-vehicle printer 10 is provided for enabling suitable materials to be downloaded and printed rapidly. Further, the fact that the printhead 34 of the printer 10 uses a pagewidth, full color printhead means that high quality images can be printed using the printer 10. It will also be appreciated that, due to the fact that the printhead 34 is a pagewidth printhead and does not traverse the media on which an image is being printed, it is less susceptible to jolting, bumping or other such disturbances. In other words, it is less likely to produce a poor quality image even if printing is taking place while the vehicle is moving.

Although the invention has been described with reference to a number of preferred embodiments, it will be appreciated by those skilled in the art that the invention can be embodied in many other forms without departing from the spirit and intended scope of the invention.

CLAIMS:

1. An accessory for a conveyance having a wiring circuit, the accessory comprising:

a chassis, the chassis provided with a frontal slot accessible from within the conveyance;

an audio device within the chassis, the audio device being connectable to the wiring circuit and configured for receiving data and generating an audio signal output, the audio device having controls for user control of the audio signal output;

satellite navigation equipment; and,

a printer unit within the chassis for generating printed material, the printer unit adapted to receive a cartridge storing print media and ink via the frontal slot,

wherein the printer is configured to print data based on navigation information generated by the satellite navigation equipment and wherein the controls of the audio device are further adapted for user control of the printer unit.

2. The accessory of claim 1 in which the audio device includes a radio and at least one of a tape player and a CD player.

3. The accessory of claim 1, further including a display wherein the controls are further adapted to control images shown on the display.

4. The accessory of claim 3, wherein the printer is configured to print data based on an image shown on the display.

5. The accessory of claim 3, further including a television receiver for outputting received television pictures to the display, wherein the printer is configured to print data based on the displayed television pictures.

6. The accessory of claim 1 further including an interface for connection with and external device for generating data to be printed by the printer unit.

7. The accessory of claim 1, wherein the printer unit is a full color printer.

8. The accessory of claim 6, wherein the printer is a photo quality color printer.

9. The accessory of claim 1, wherein the printer is an inkjet printer.

10. The accessory of claim 8, wherein the printer comprises a pagewidth inkjet printhead.

11. The accessory of claim 9, wherein the printhead comprises an inkjet nozzle array, the array being fabricated by microelectromechanical techniques.

12. The accessory of claim 1, further comprising a gear train, the gear train operable to engage with a toothed rack of the cartridge to inhibit a skewing of the cartridge at a time of insertion or ejection of the cartridge.

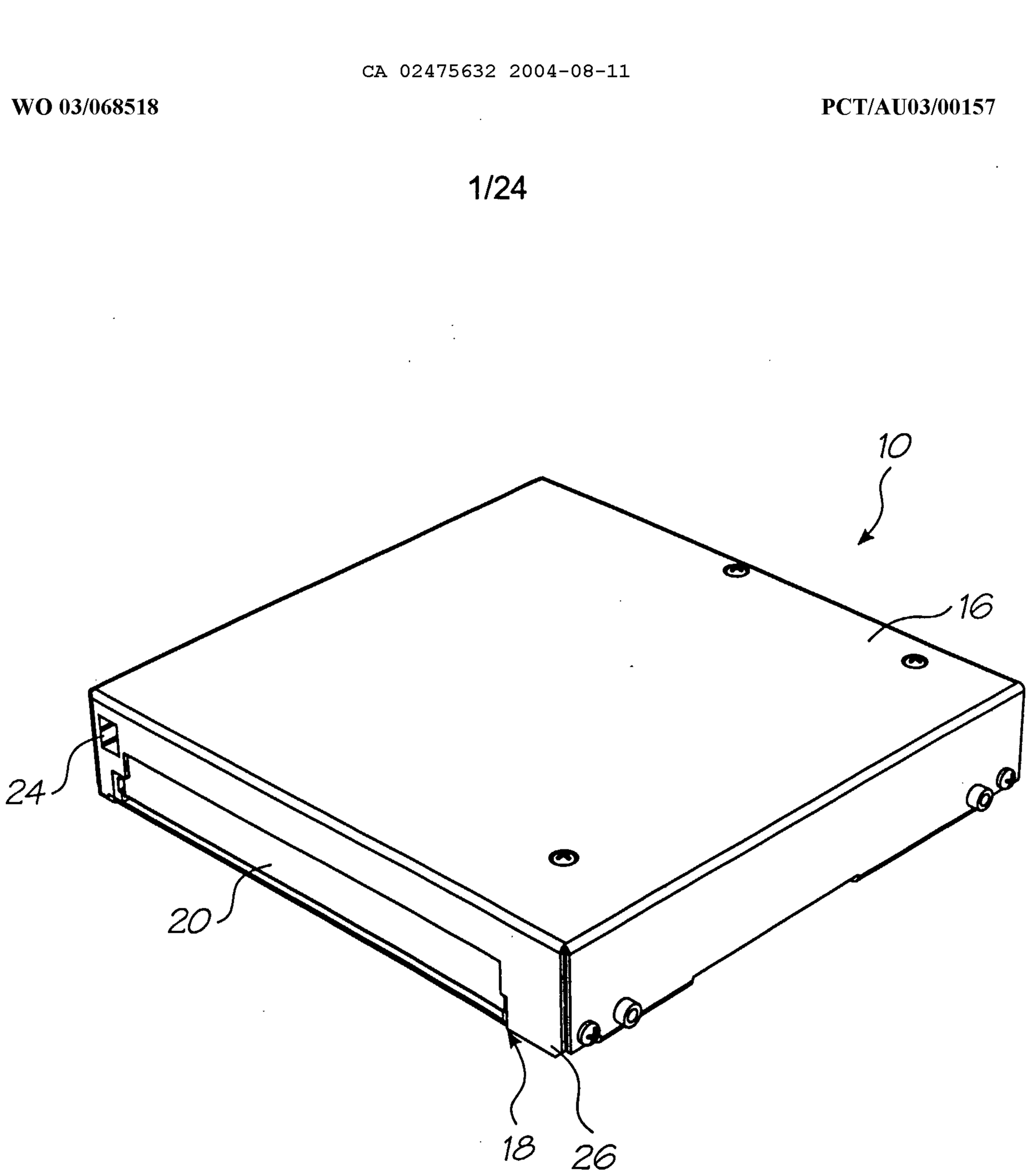


FIG. 1

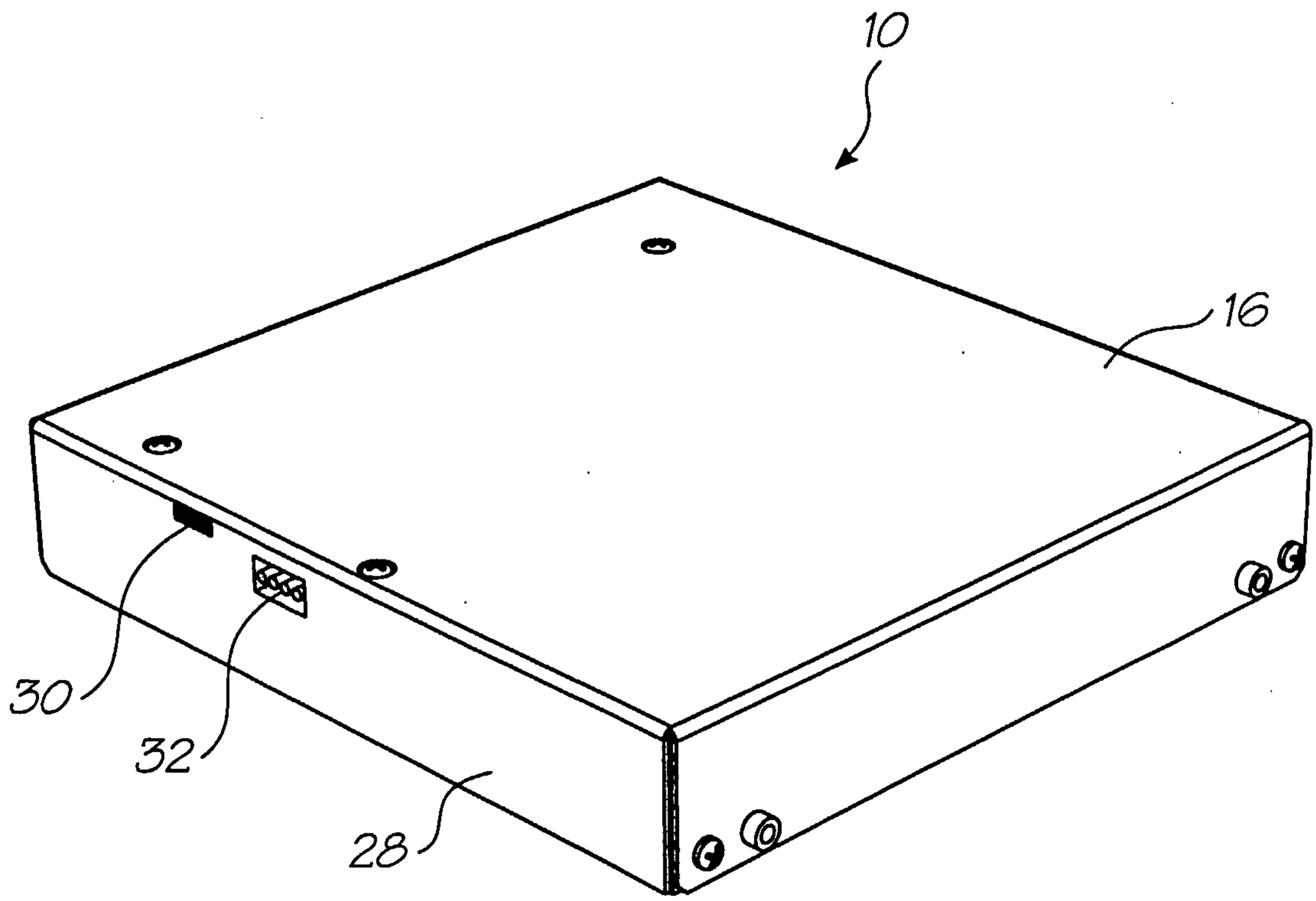


FIG. 2

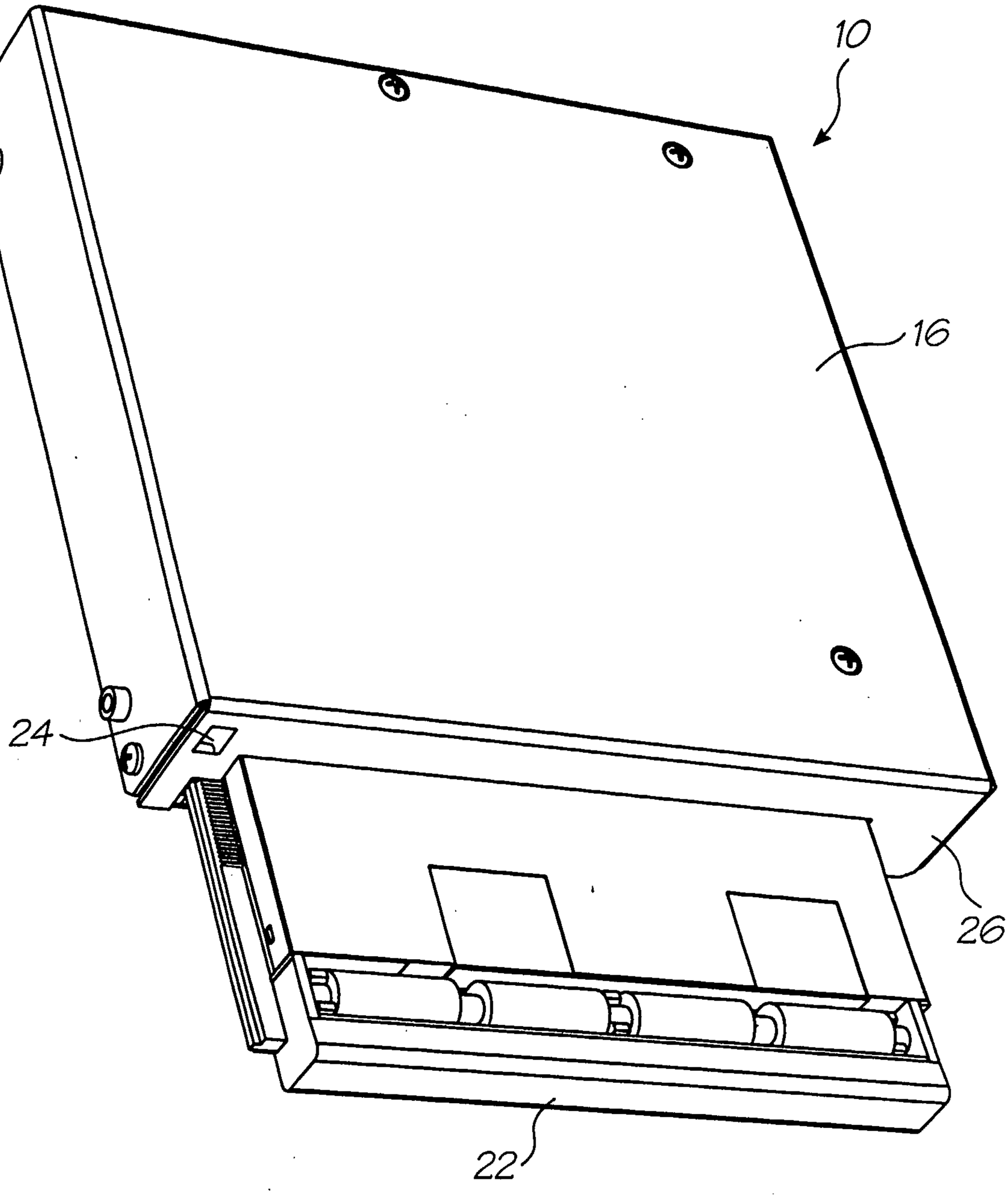


FIG. 3

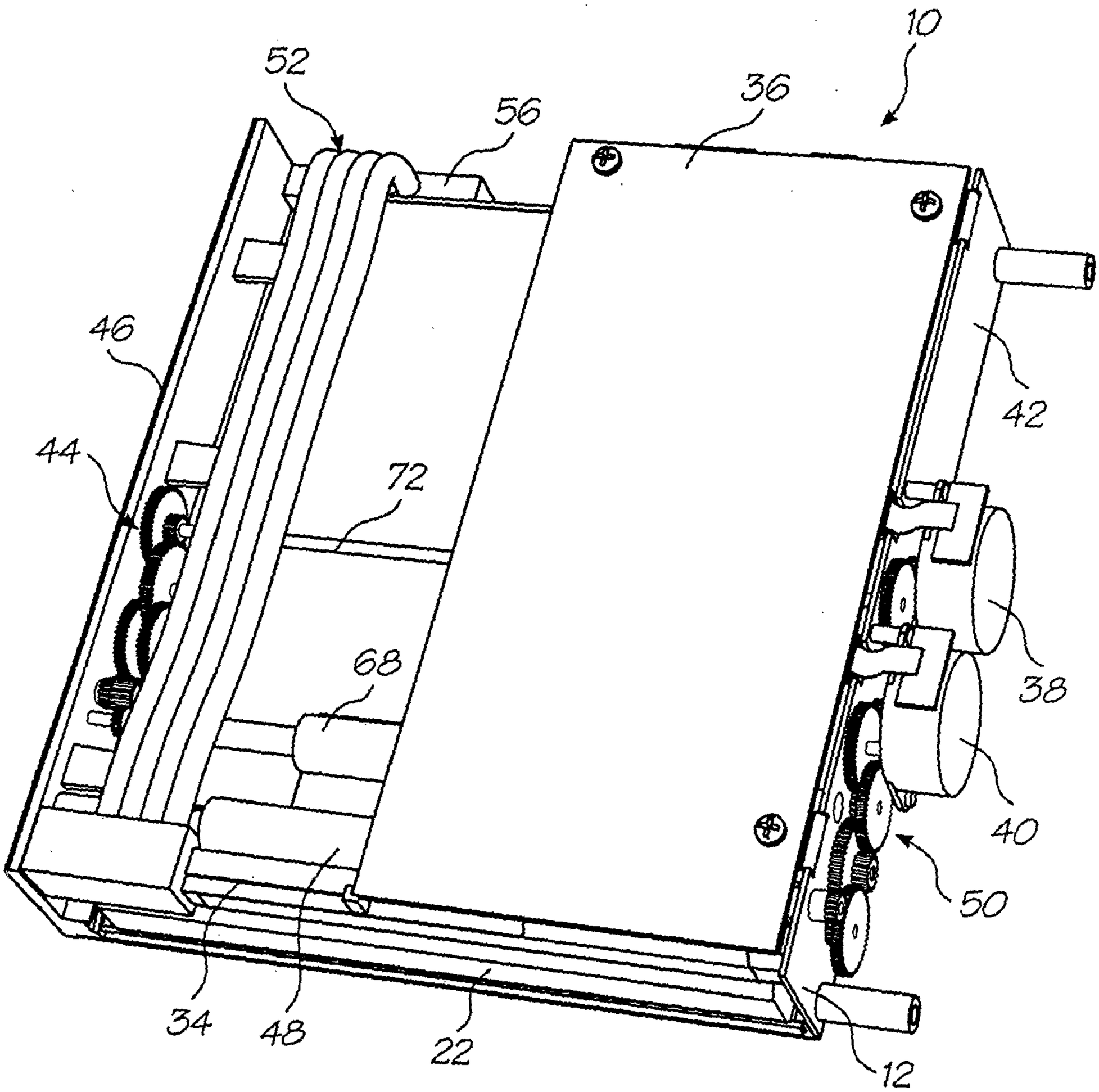


FIG. 4

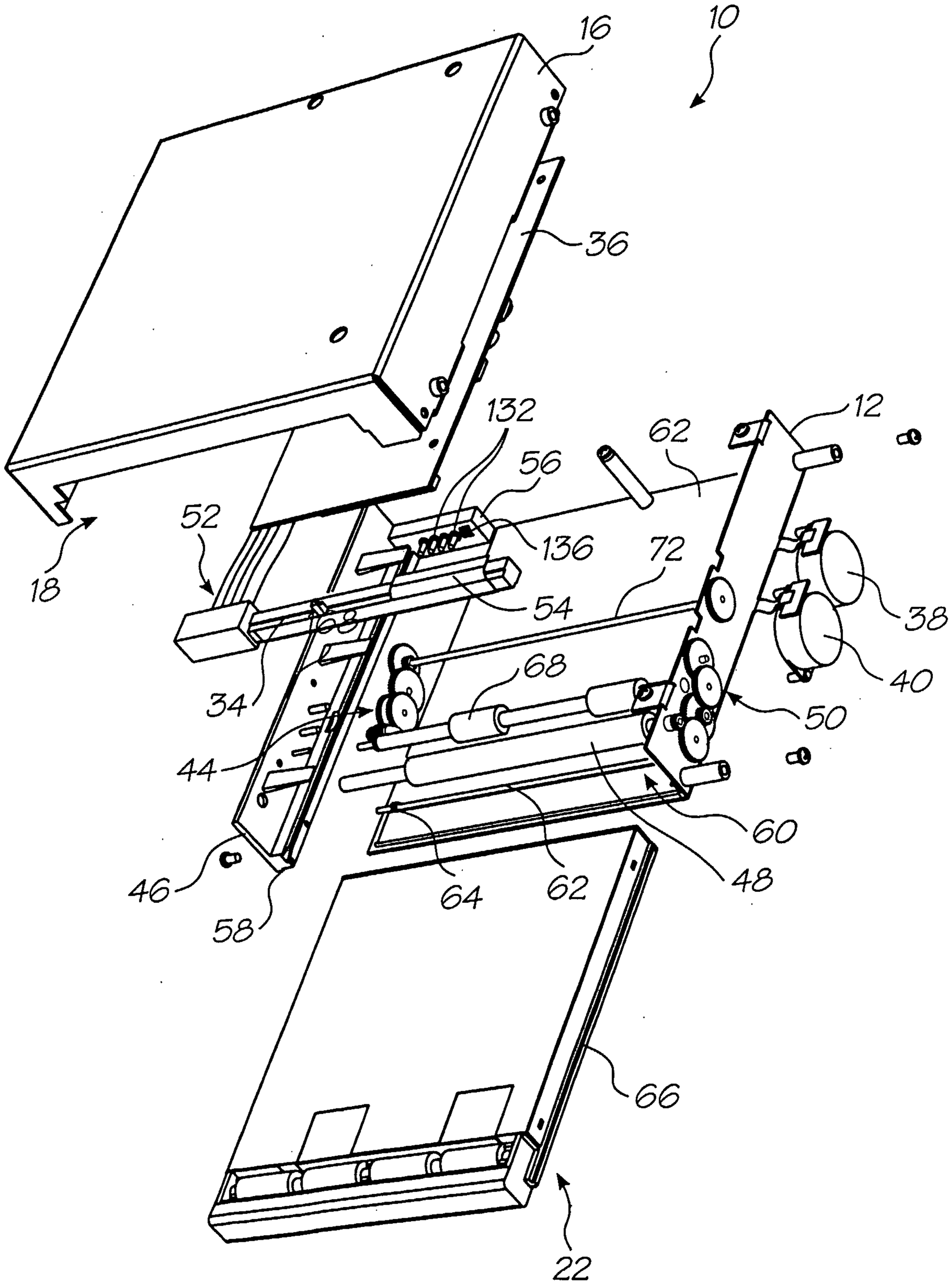

16
10
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62
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64
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66
22

FIG. 5

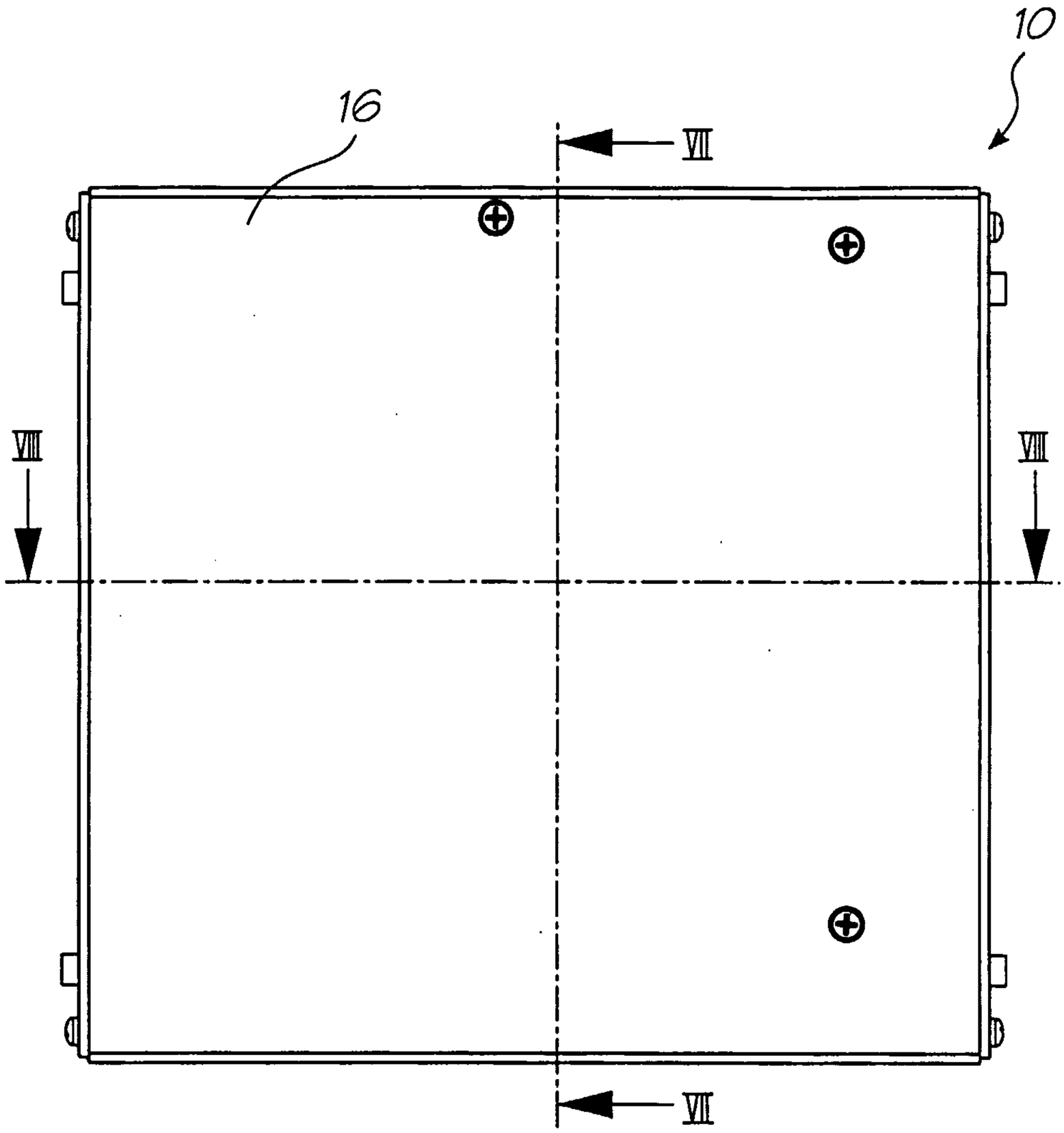


FIG. 6

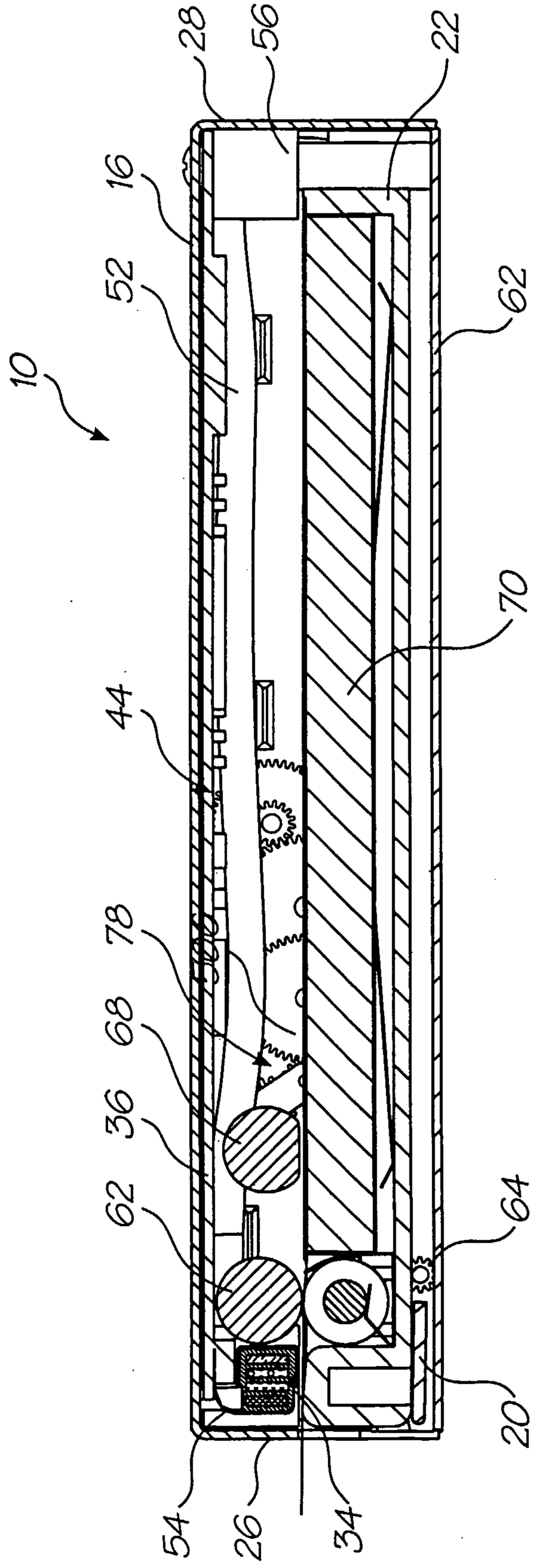


FIG. 7

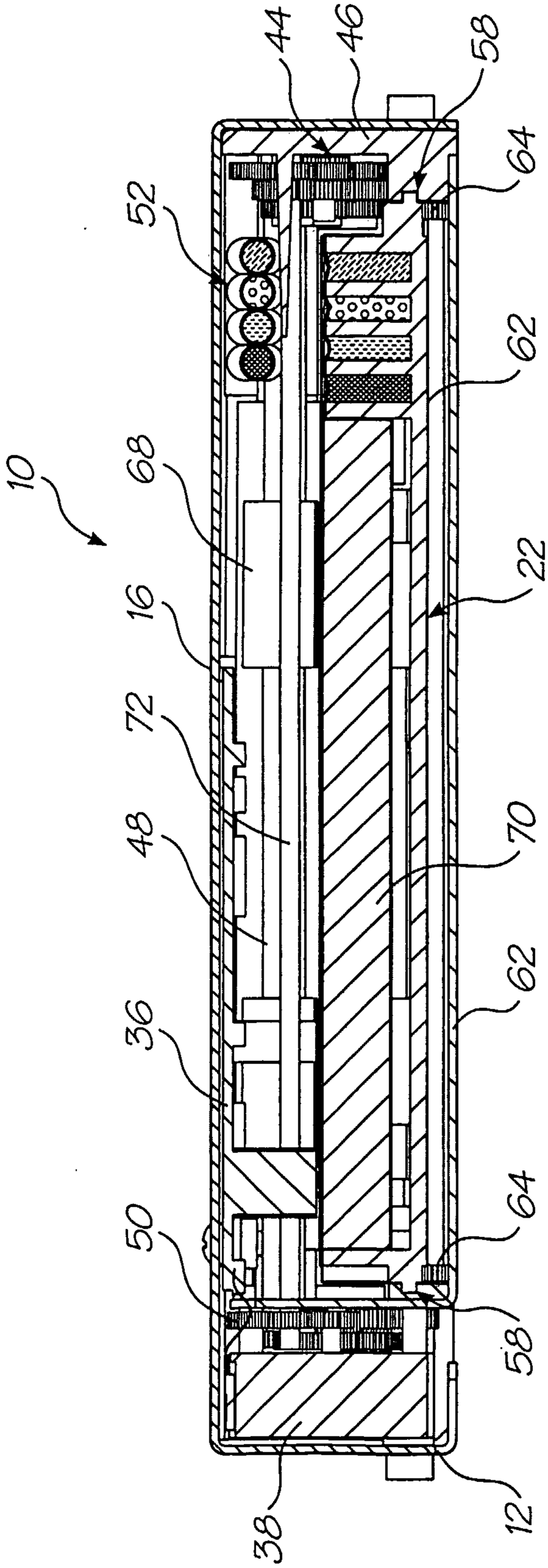


FIG. 8

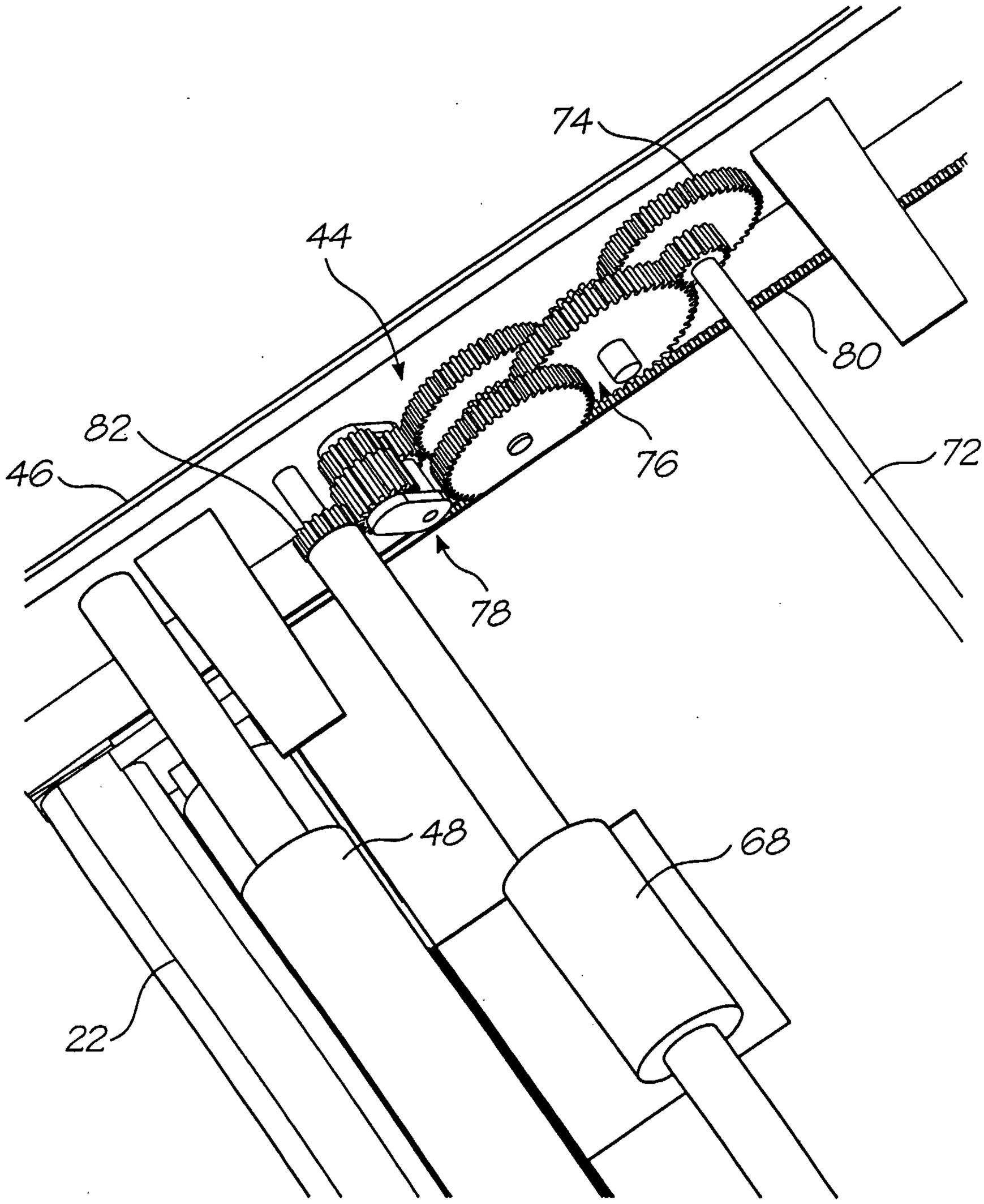


FIG. 9

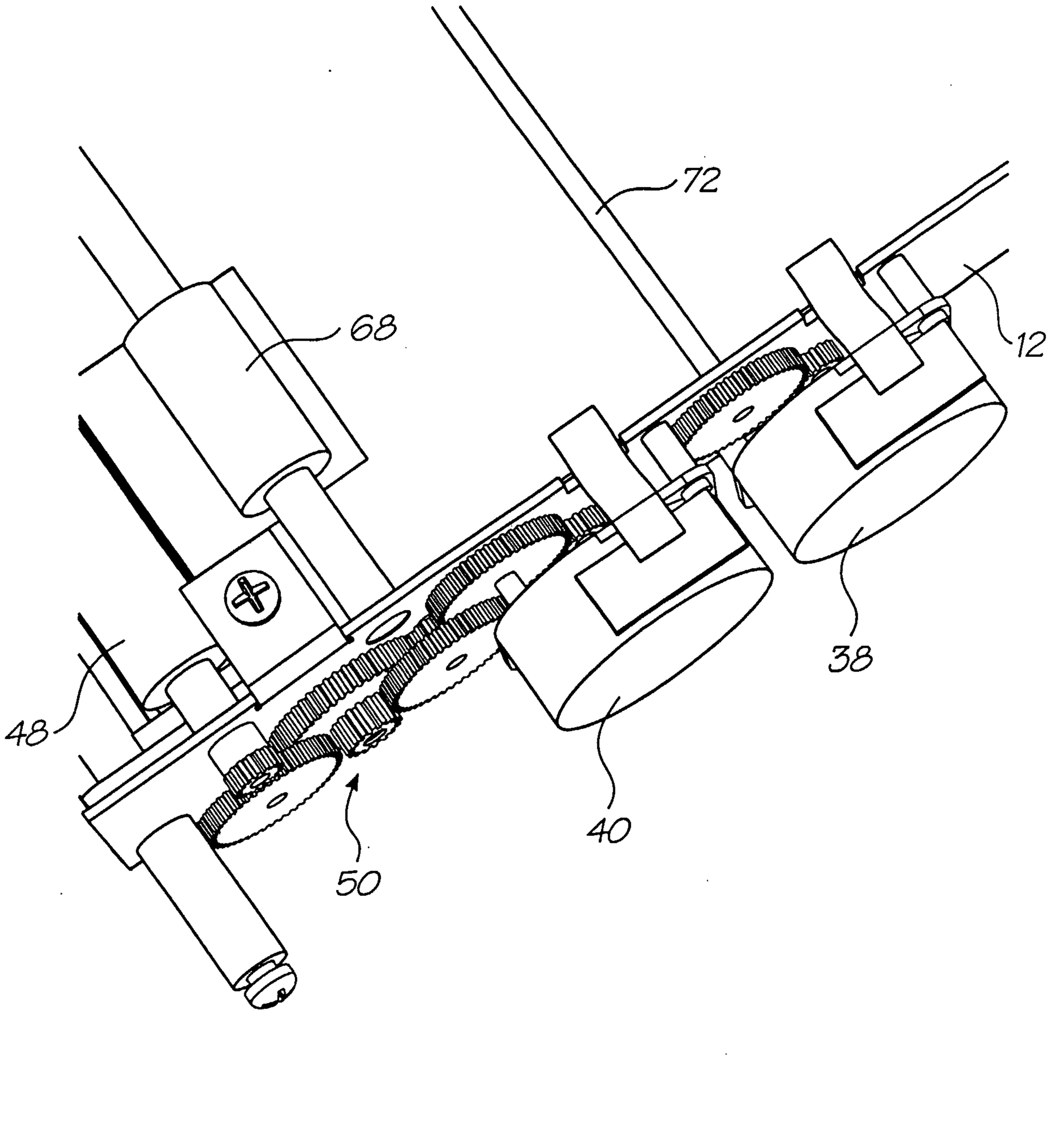


FIG. 10

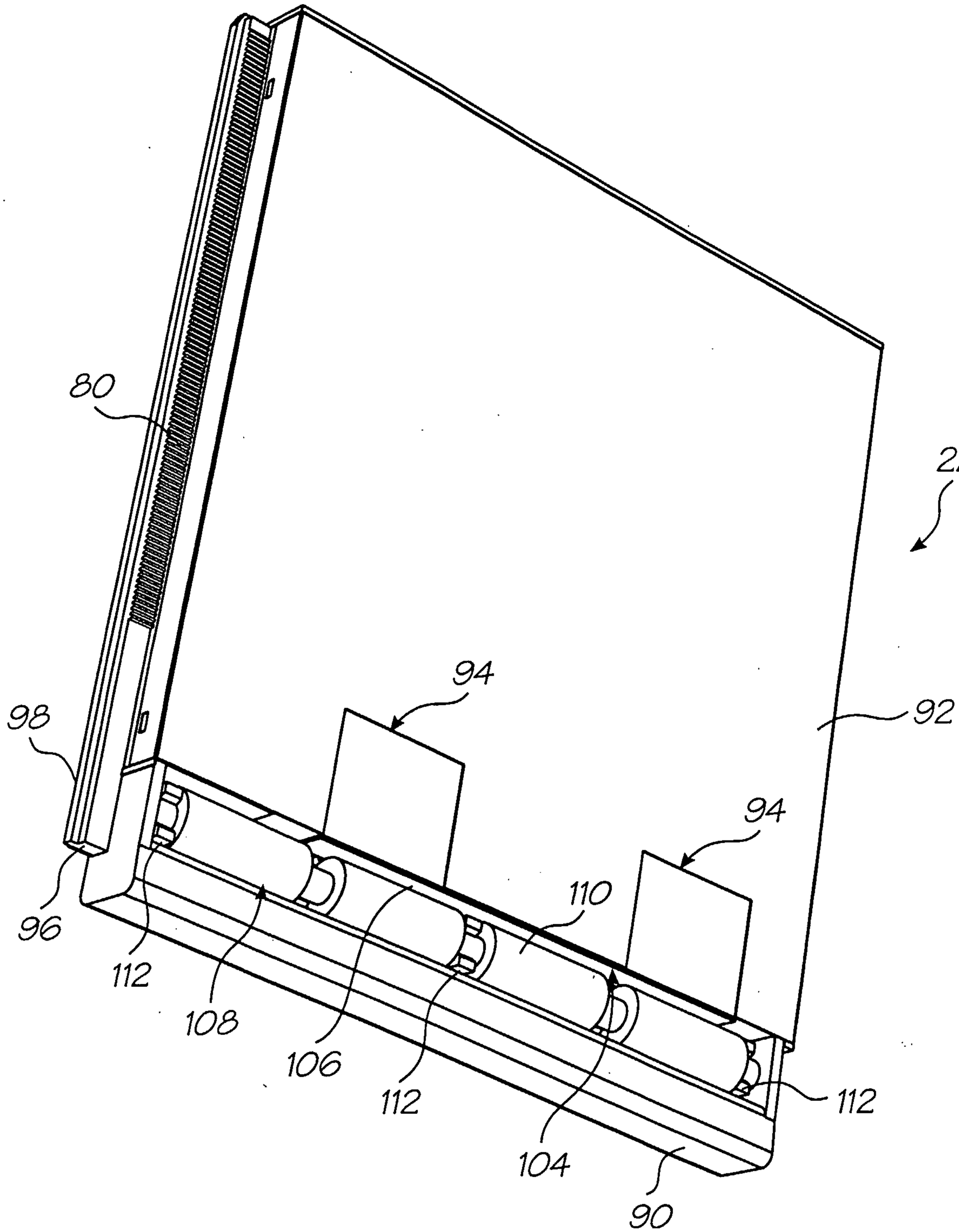


FIG. 11

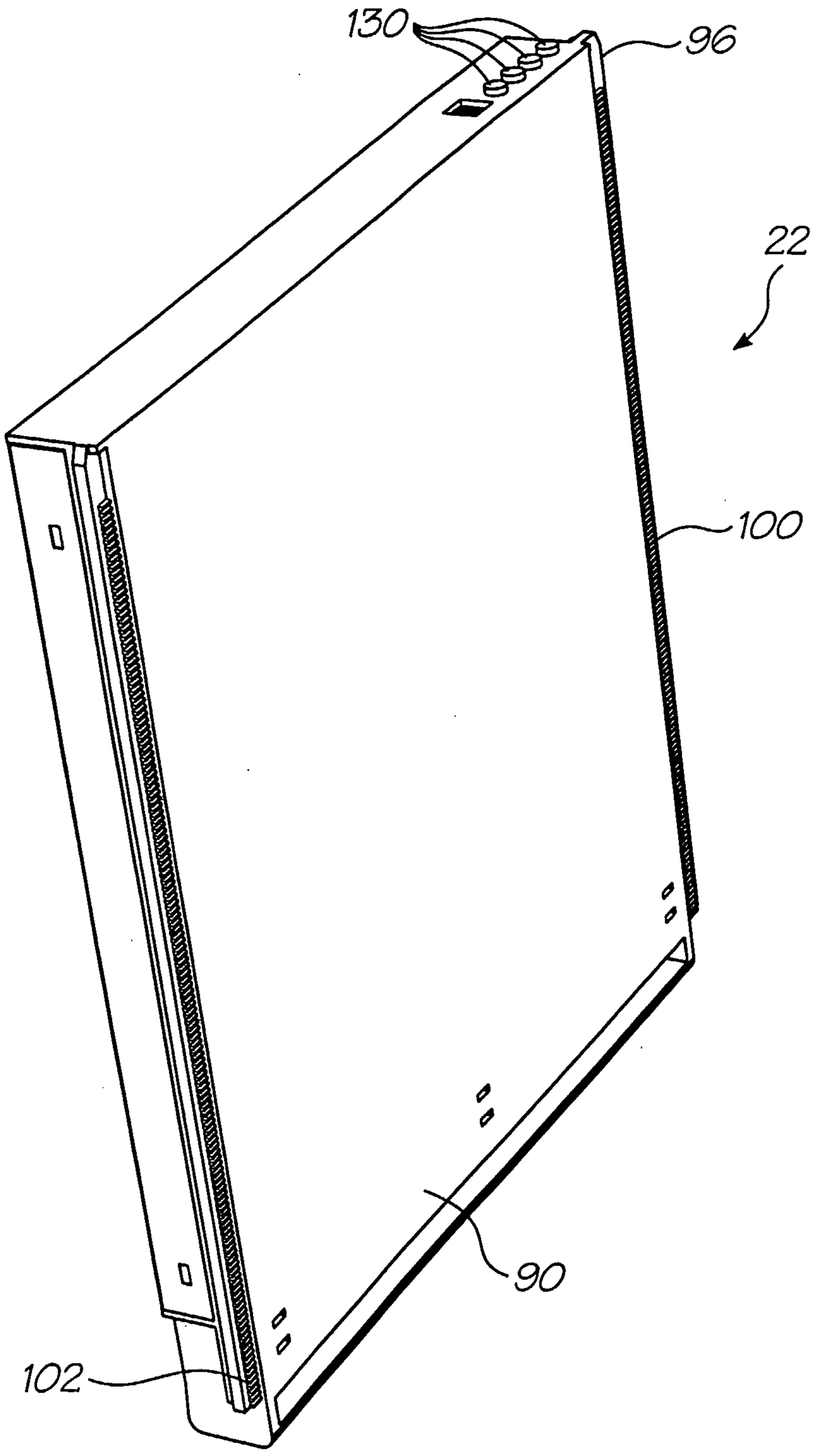


FIG. 12

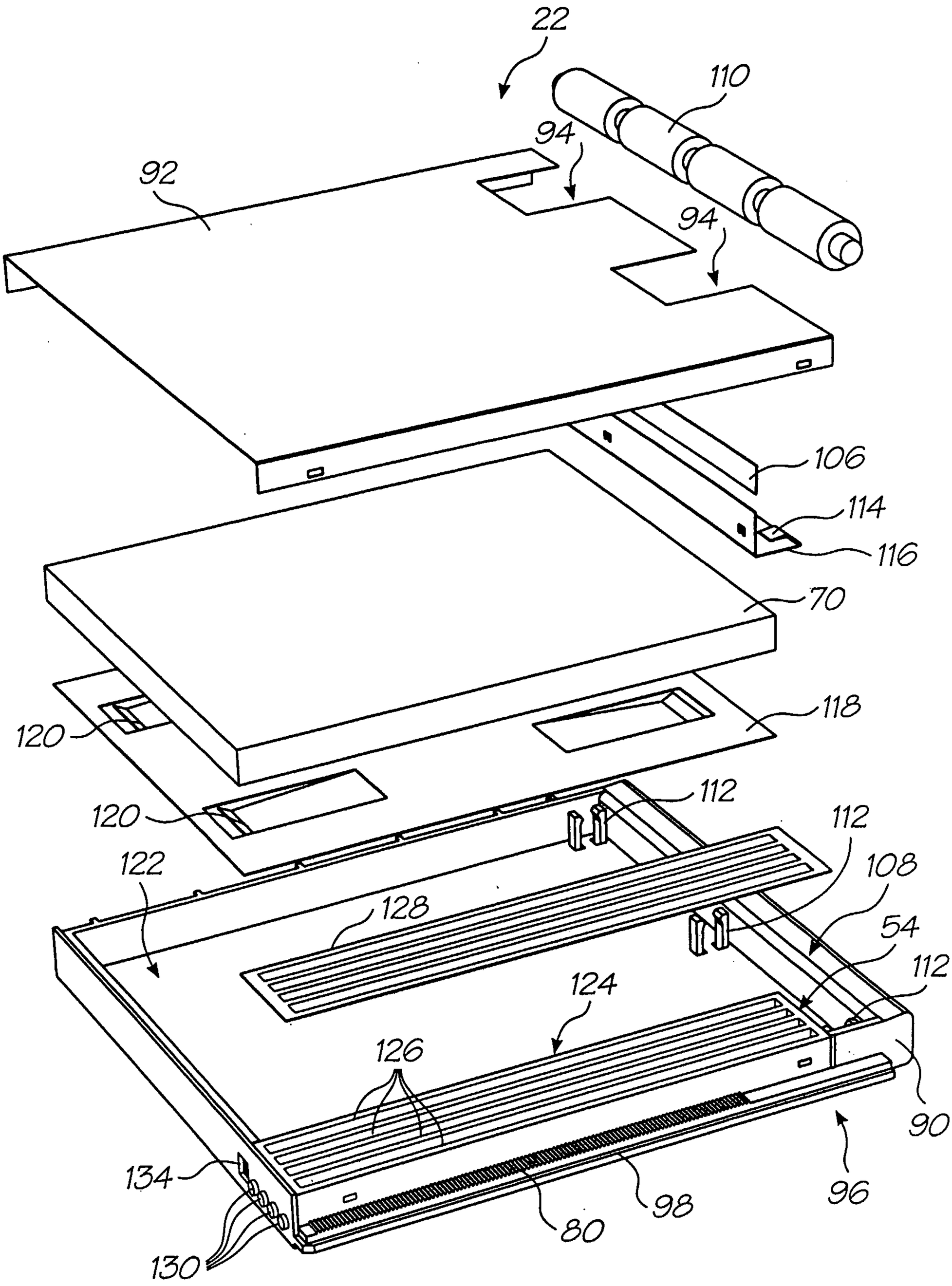

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FIG. 13

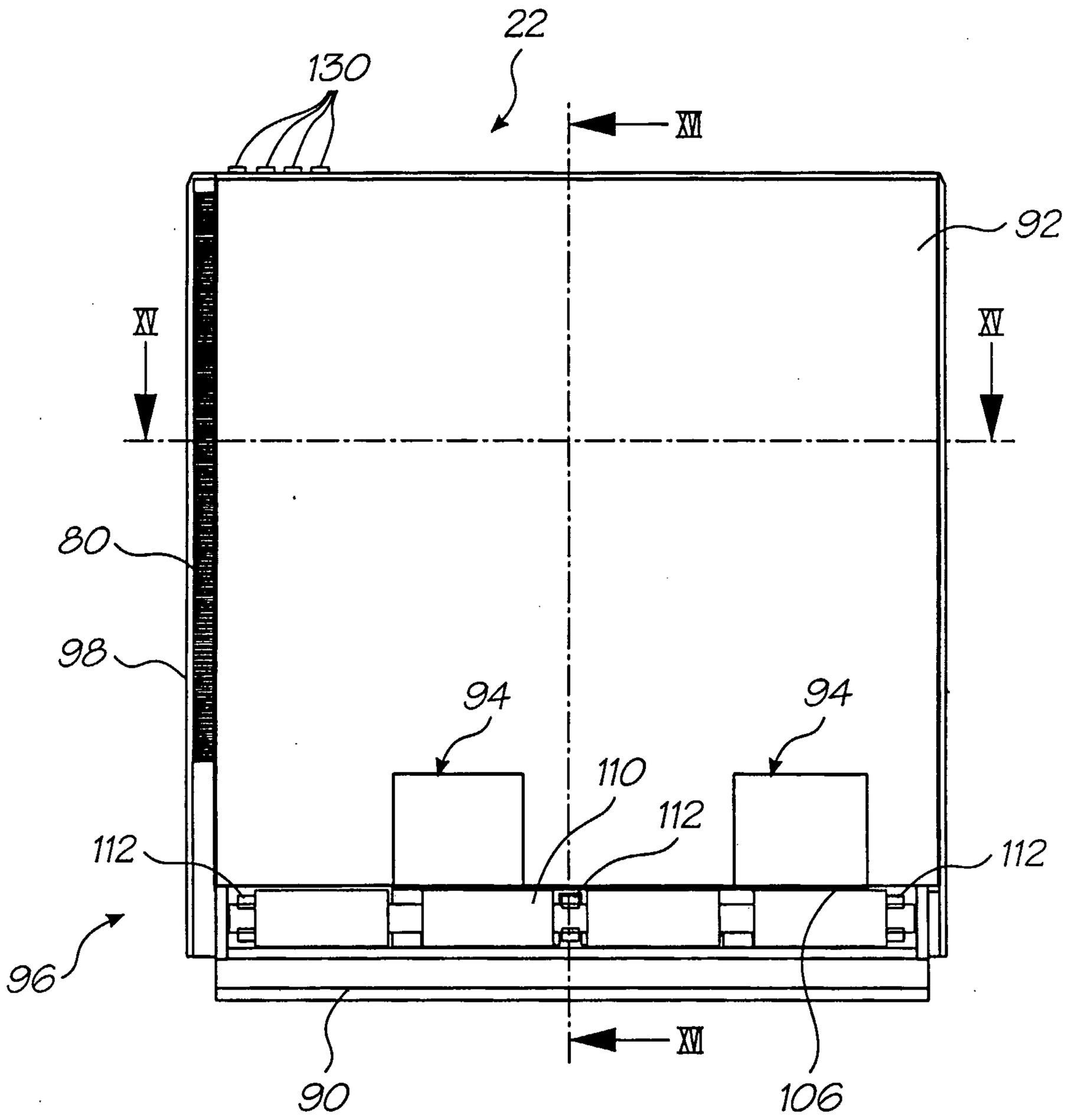


FIG. 14

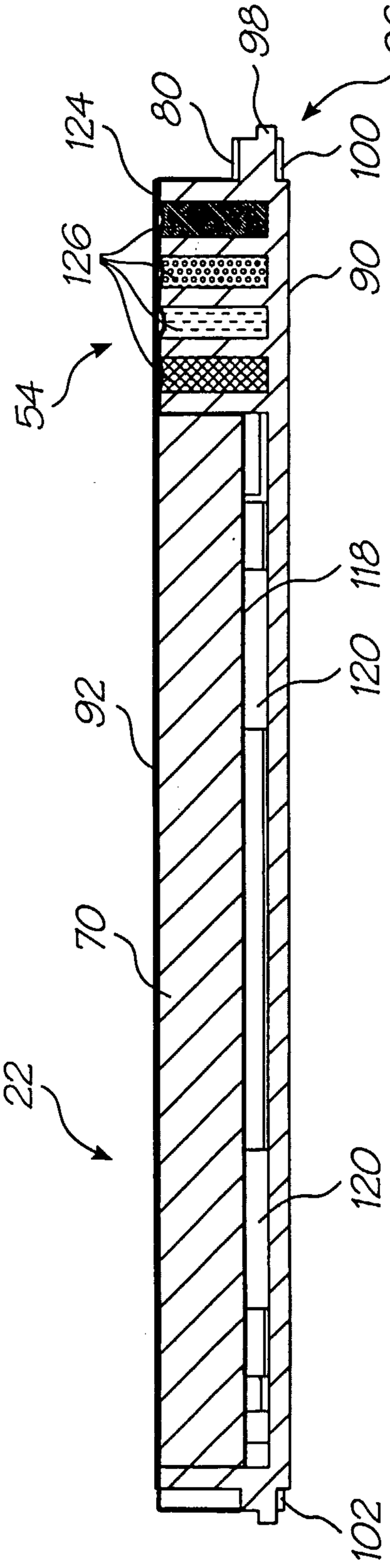

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FIG. 15

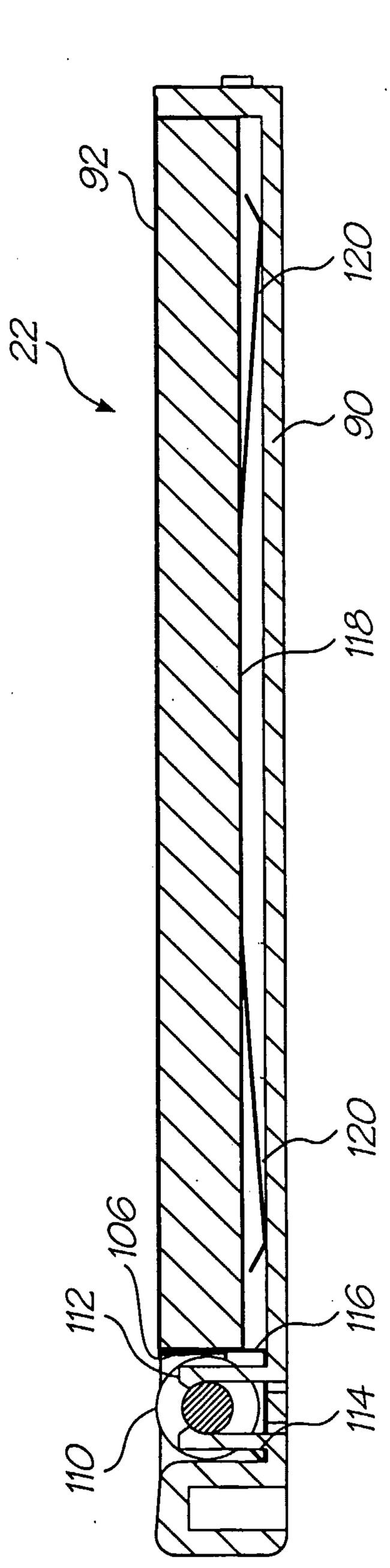

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FIG. 16

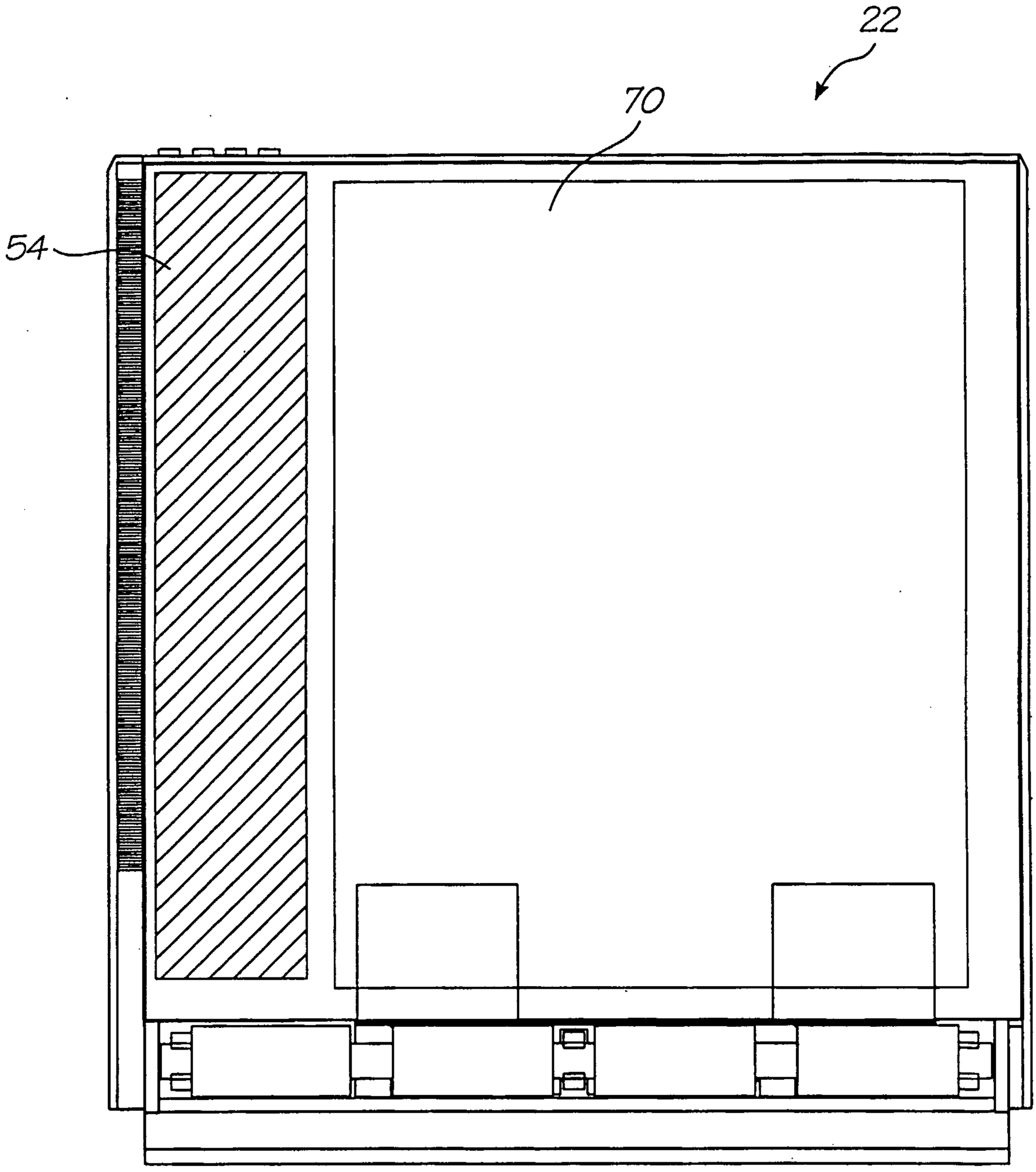


FIG. 17

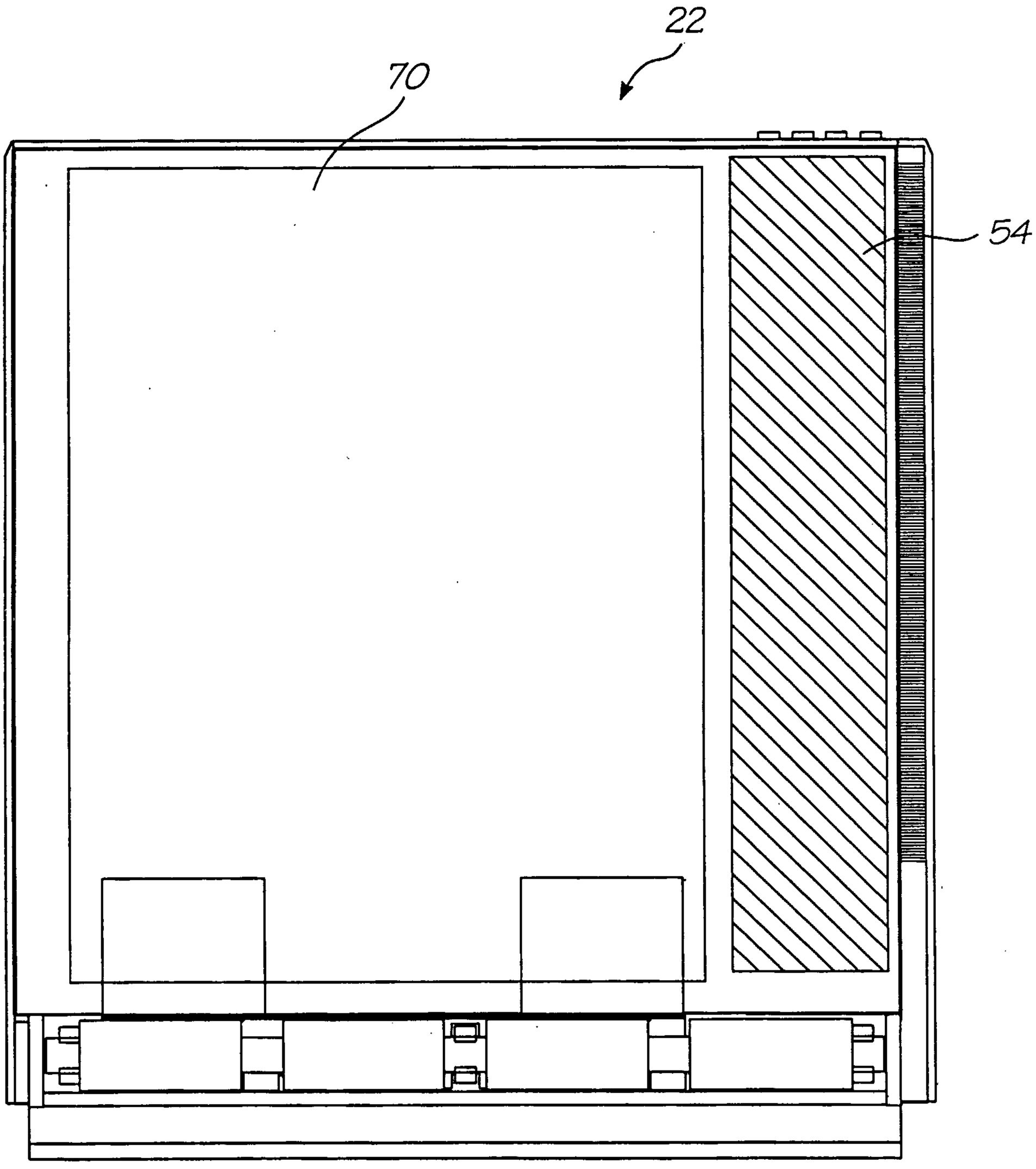


FIG. 18

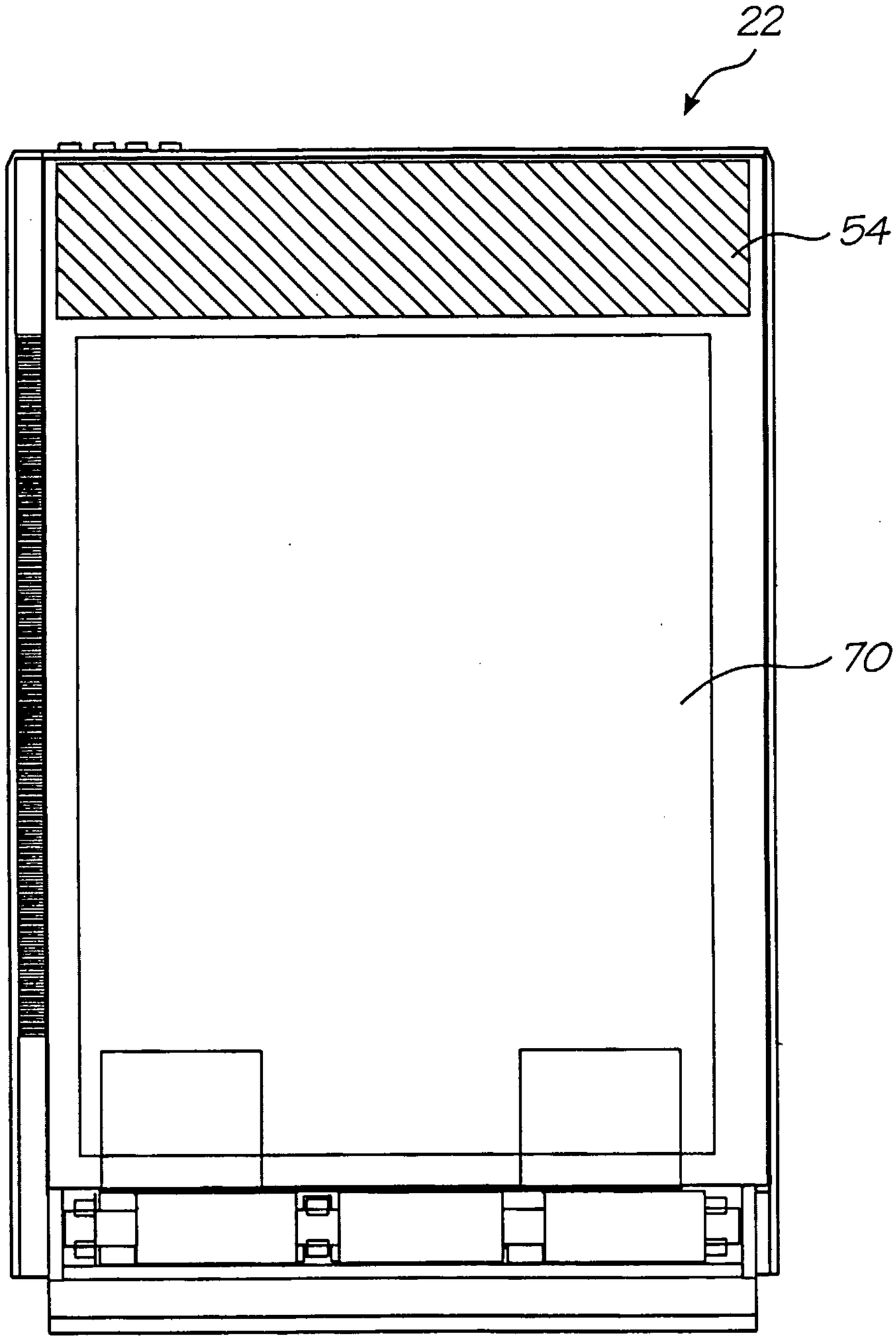


FIG. 19

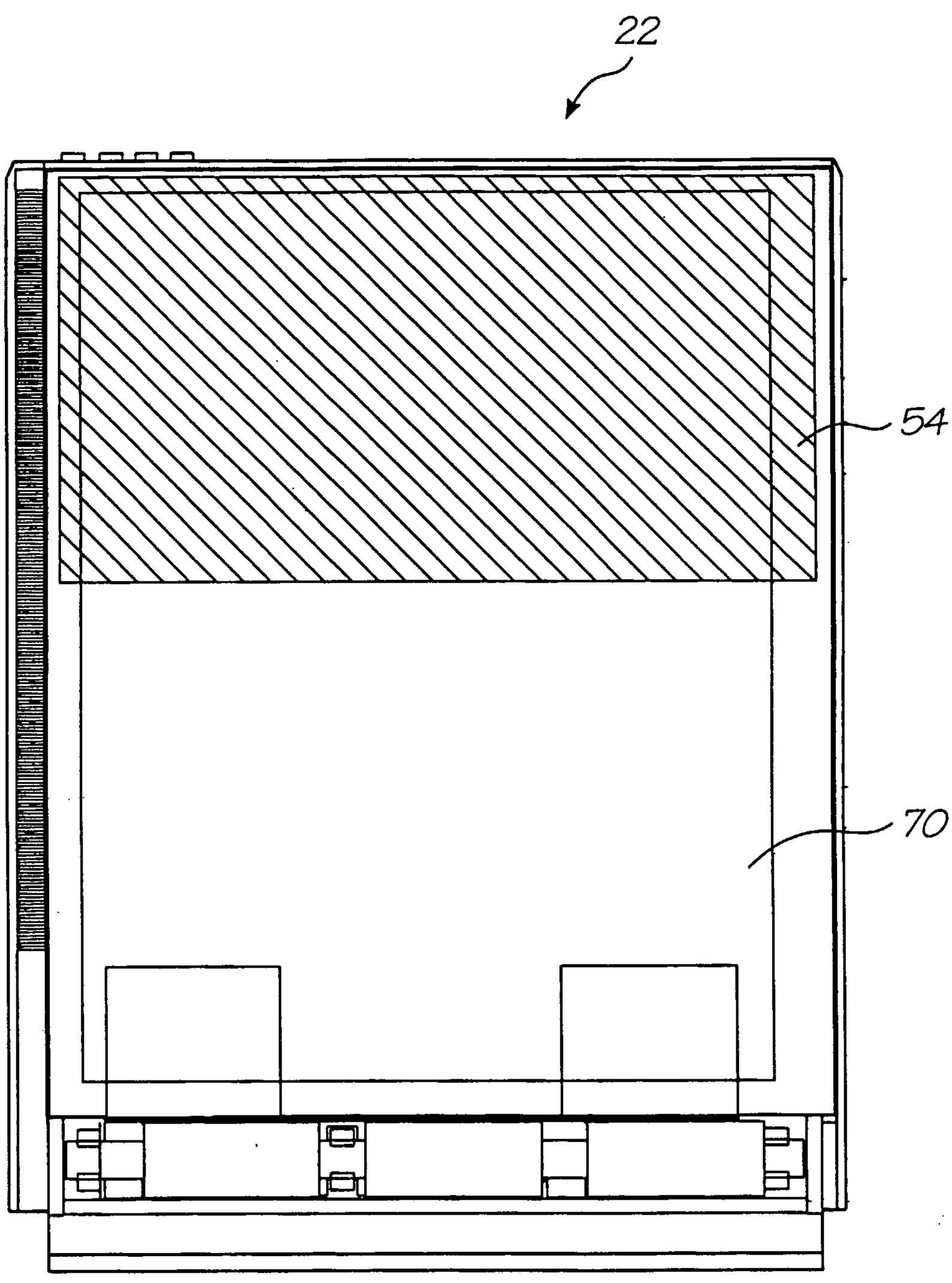


FIG. 20

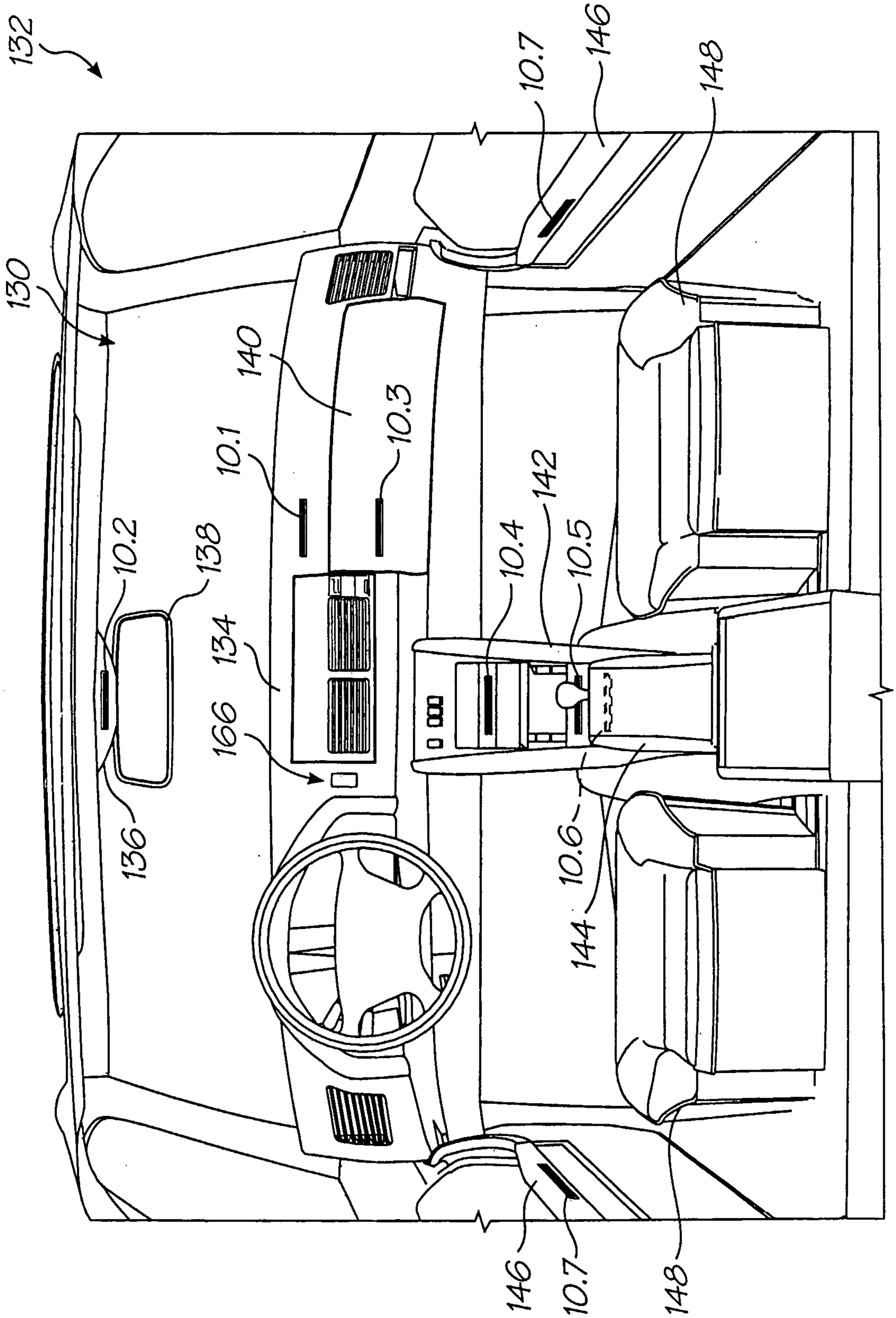

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FIG. 21

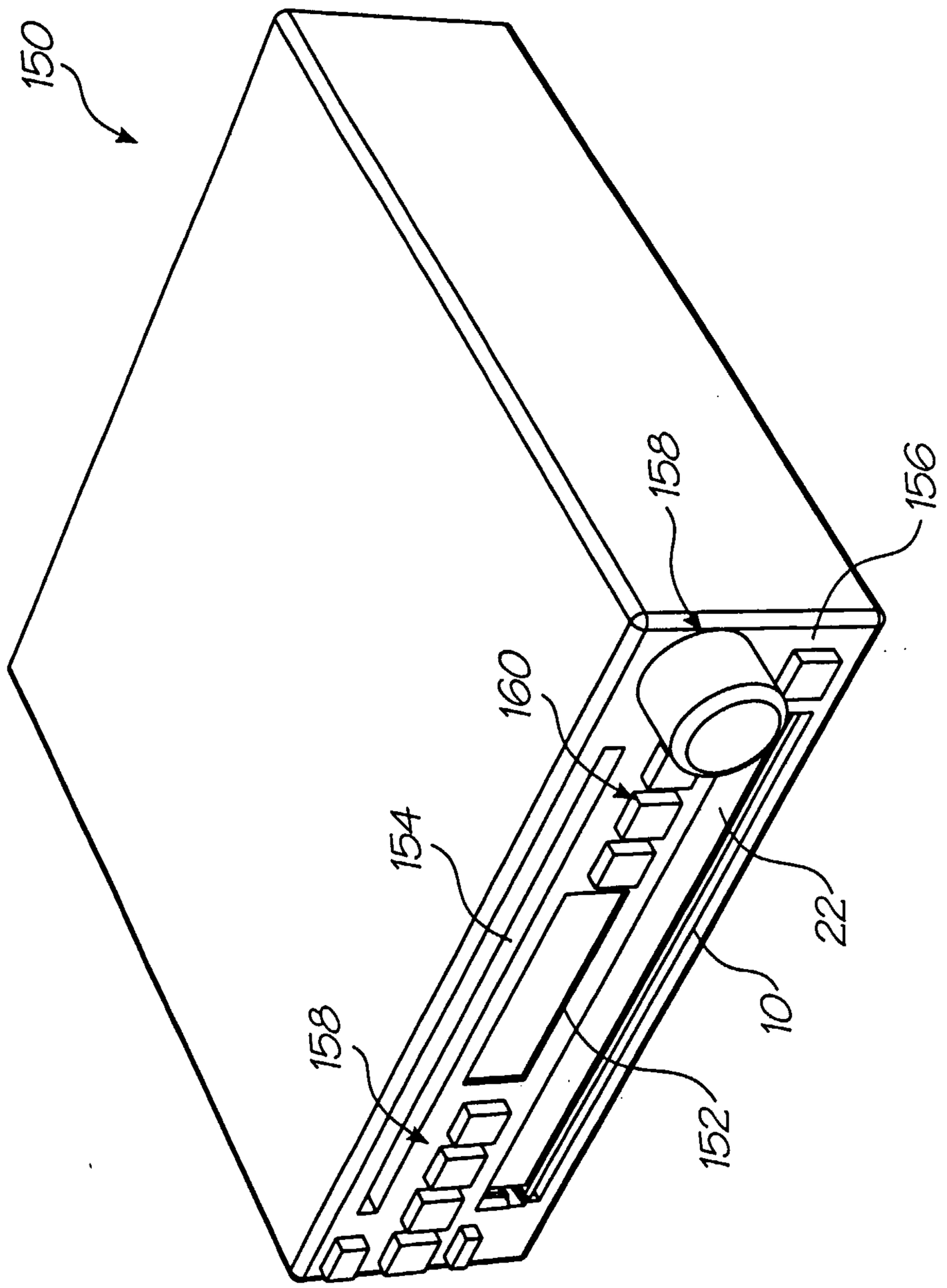


FIG. 22

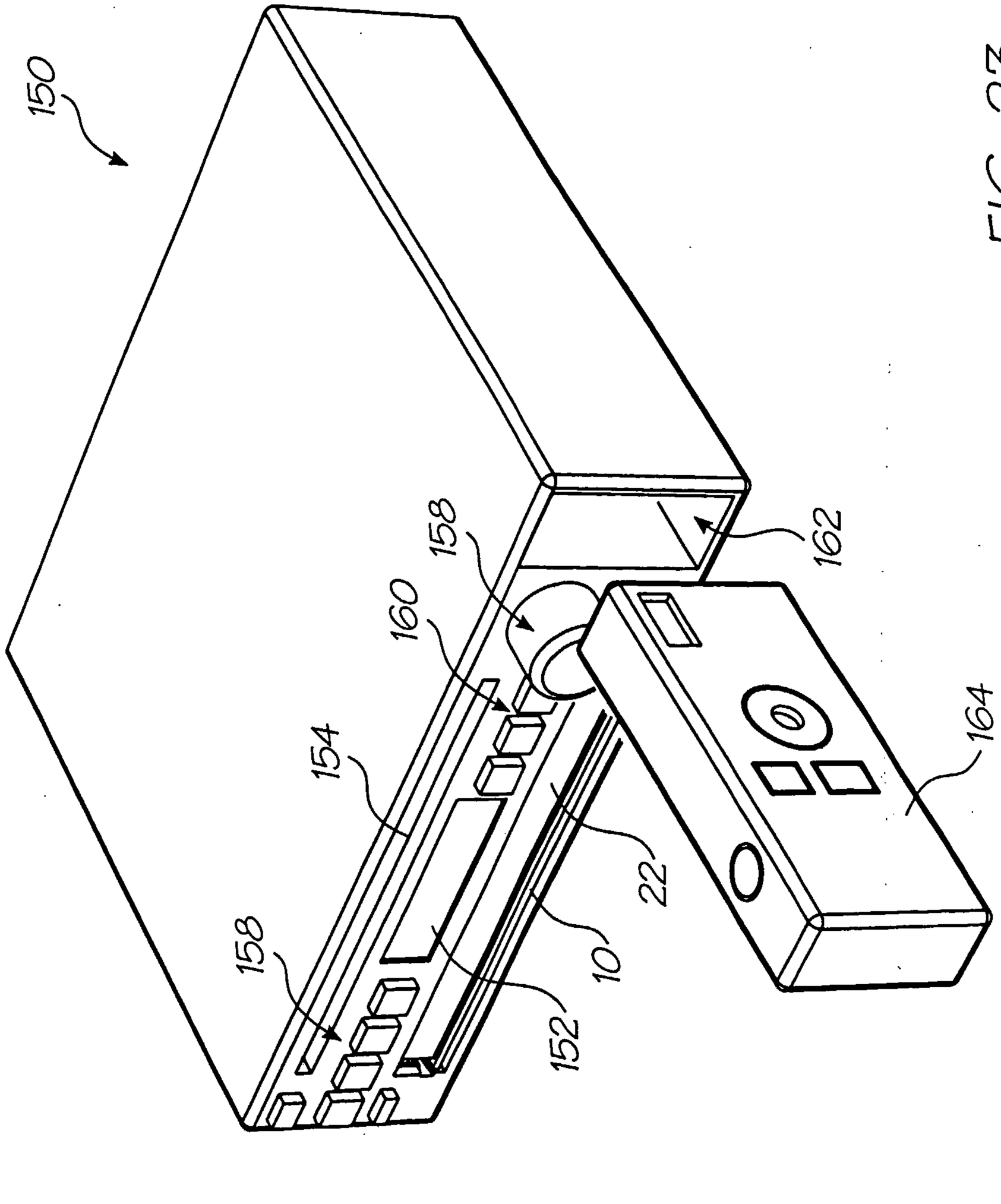


FIG. 23

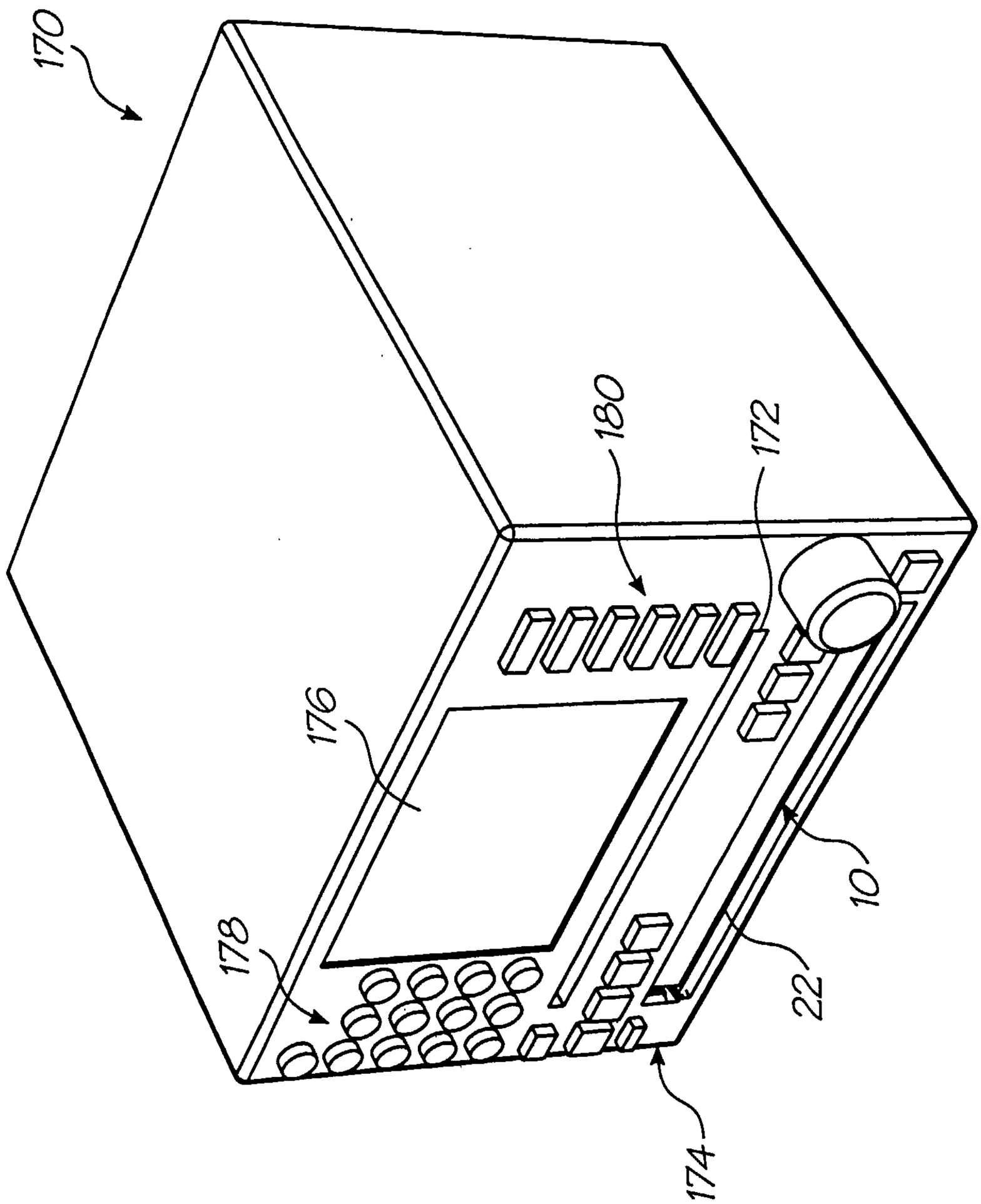


FIG. 24

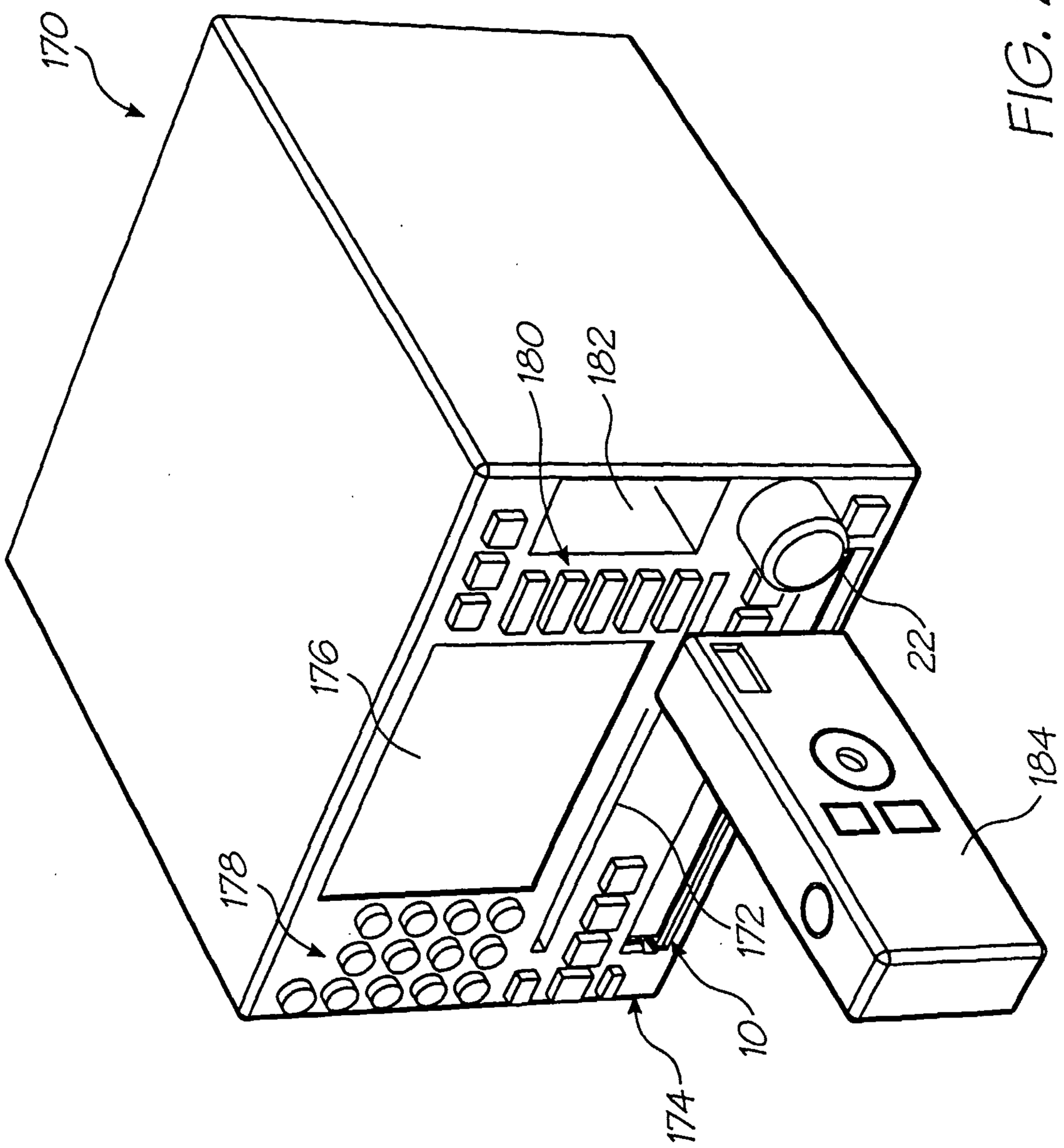
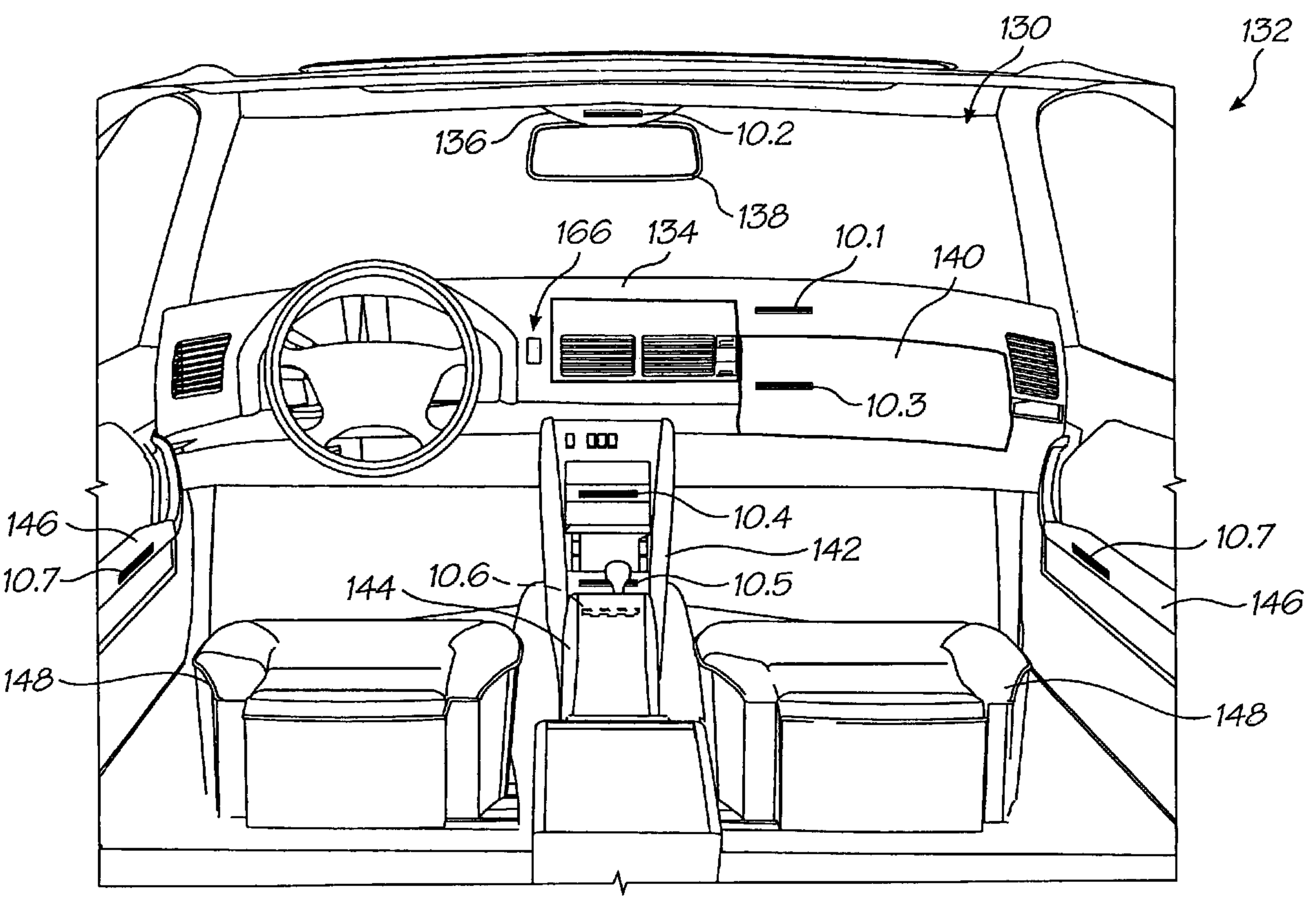


FIG. 25


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