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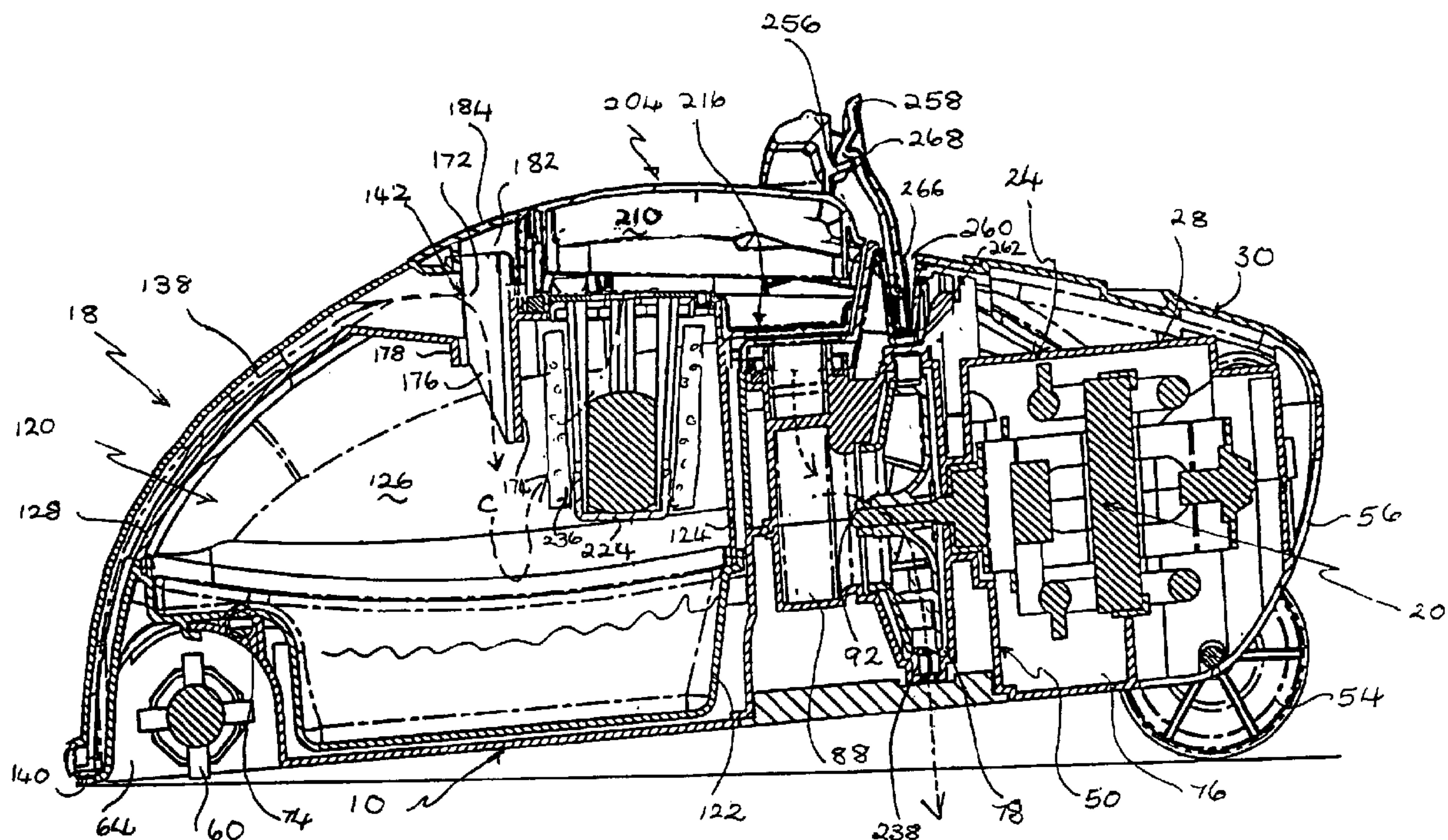
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(54) Title: CARPET EXTRACTOR HOUSING



(57) **Abrégé/Abstract:**

A carpet extractor includes a base assembly (A) with a two part base housing (10). Upper (22) and lower portions (24,528) of the base housing define a socket (100), for receiving a cleaning fluid recovery tank (120,552), and a chamber (50), rearward of the socket, for receiving a suction fan (82,540) and associated motor (80,542). The chamber includes front (78,544) and rear compartments (546,76) for receiving the suction fan and motor, respectively. The lower portion (22,528) of the base housing defines a first pocket or indentation (70,550) for receiving a motor (68,548) for driving a rotating brushroll (60) and a second pocket (532) for receiving a solution supply pump (520) which selectively supplies pressurized cleaning fluid to a spray bar (526) and a remote distributor (614). The pocket and indentation are positioned rearward of the socket, and generally beneath a forward end of the chamber. The location of the fan, fan motor, pump, and brushroll motor behind the recovery tank socket provides for the accommodation of a large capacity recovery tank, while maintaining a low-profile base assembly.

CARPET EXTRACTOR HOUSING**Abstract of the Disclosure**

A carpet extractor includes a base assembly (A) with a two part base housing (10). Upper (22) and lower portions (24,528) of the base housing define a socket (100), for receiving a cleaning fluid recovery tank (120,552), and a
5 chamber (50), rearward of the socket, for receiving a suction fan (82,540) and associated motor (80,542). The chamber includes front (78,544) and rear compartments (546,76) for receiving the suction fan and motor, respectively. The lower portion (22,528) of the base housing defines a first pocket or
10 indentation (70,550) for receiving a motor (68,548) for driving a rotating brushroll (60) and a second pocket (532) for receiving a solution supply pump (520) which selectively supplies pressurized cleaning fluid to a spray bar (526) and a remote distributor (614). The pocket and indentation are
15 positioned rearward of the socket, and generally beneath a forward end of the chamber. The location of the fan, fan motor, pump, and brushroll motor behind the recovery tank socket provides for the accommodation of a large capacity recovery tank, while maintaining a low-profile base assembly.

CARPET EXTRACTOR HOUSING

Background of the Invention

The present invention relates to the carpet extractor arts. It finds particular application in conjunction with the cleaning of floors and above-floor
5 surfaces, such as upholstery, stairs, and the like, using a liquid cleaning fluid.

Carpet extractors of the type which apply a cleaning solution to a floor surface and then recover dirty fluid from the surface are widely used for cleaning carpeted and wooden
10 floors in both industrial and household settings. Generally, a recovery tank is provided on the extractor for storing the recovered fluid. The recovery tank is often bulky in order to store a sufficient quantity of the recovered fluid before emptying. A vacuum source, such as a vacuum pump, is mounted
15 to a base frame of the extractor and applies a vacuum to a nozzle adjacent the floor surface. For ease of manipulating the extractor, the recovery tank may also be mounted to the base. The recovery tank and vacuum source are then generally vertically aligned. This provides a bulky base which tends to
20 impede access of the extractor to low, overhung spaces, such as beneath chairs, and the like. For cleaning such areas, a low-profile extractor base is desirable.

Accordingly, it has been considered desirable to develop a new and improved carpet extractor housing which
25 accommodates a large capacity recovery tank, suction fan and fan motor while providing access to hard to reach areas. The present invention provides a new and improved apparatus which overcomes the above-referenced problems and others, while

providing better and more advantageous results.

Summary of The Invention

In accordance with one aspect of the present
5 invention, an upright carpet extractor of the type which
applies a cleaning fluid to a floor surface and vacuums
dirty cleaning fluid, the carpet extractor comprising: a
recovery tank for collecting the dirty cleaning fluid;
and, a housing including: a socket for selectively
10 receiving said recovery tank, said socket comprising a
pair of opposed side walls and a rear wall, and a
chamber, located rearward of the socket for holding a
suction fan and motor assembly, said rear wall separating
said socket from said chamber, the chamber including a
15 forward compartment for receiving a suction fan portion
of the suction fan and motor assembly and a rearward
compartment for receiving a motor portion of the suction
fan and motor assembly. Optionally, the housing also
includes a first pocket, on one side of the chamber, for
20 receiving a pump for pressurizing the cleaning fluid and
a second pocket, on another side of the chamber, for
receiving a motor for rotating a brushroll, the two
pockets being positioned rearward of the socket and
defined in a bottom surface of the housing. The housing
25 may include a first locking member for engaging a second
locking member on the recovery tank to lock the recovery
tank to the housing.

In accordance with another aspect of the present
invention, an upright carpet extractor of the type which
30 applies a cleaning fluid to a floor surface and vacuums
dirty cleaning fluid, the carpet extractor comprising: a
recovery tank for collecting the dirty cleaning fluid;
and, a housing including: a socket for selectively
receiving said recovery tank, said socket comprising a

pair of opposed side walls and a rear wall, and a chamber, located rearward of the socket for holding a suction fan and motor assembly, said rear wall separating said socket from said chamber, the chamber being defined
5 in a top surface of the housing, a first pocket located on a first side of the chamber, forward of the fan and motor assembly and a second pocket located on a second side of the chamber forward of the fan and motor assembly, the first and second pockets being defined in a
10 bottom surface of the housing.

In accordance with another aspect of the present invention, a carpet extractor is provided. The extractor includes a reservoir for storing and providing a supply of cleaning solution and a base assembly. The base
15 assembly includes a distributor fluidly connected with the reservoir for selectively applying the cleaning solution to a floor surface to be cleaned, a nozzle for removing dirty cleaning solution from the floor surface, a recovery tank, fluidly connected with the nozzle for
20 collecting the dirty cleaning solution from the nozzle, a vacuum source fluidly connected with the recovery tank for drawing a vacuum on the recovery tank, and a housing for holding the nozzle, recovery tank, and vacuum source. The housing includes a socket for selectively receiving
25 the recovery tank and a chamber, located rearward of the socket, for holding the vacuum source.

In accordance with more limited aspects of this aspect of the present invention, the extractor further includes a pump connected between the reservoir and the
30 distributor, and the housing includes a pocket, positioned rearward of the socket and on one side of the chamber, which receives the pump. The extractor may further comprise a brushroll and motor therefore, the housing including an indentation, rearward of the socket,

and on another side of the chamber from the pocket, for the brushroll motor. The vacuum source may include a motor driven by a suction fan and the chamber may include a suction fan cavity and an air inlet cavity. The housing
5 is preferably formed from lower and upper sections, the lower section including a lower portion of the chamber. The upper section of the housing is secured on the lower section of the housing and defines upper portions of the suction fan-holding cavity and the motor-holding cavity.

10 In accordance with yet another aspect of the present invention, a carpet extractor is provided. The extractor includes a base assembly and a handle assembly pivotally mounted thereto. A recovery tank is selectively mounted on the base assembly. A brushroll is mounted on the base
15 assembly. The base assembly includes a housing having a socket defined by a front wall, a pair of opposed side walls, and a rear wall. The socket selectively holds the recovery tank. A first compartment, located rearwardly of the socket, holds a fan and a second compartment, located
20 rearwardly of the first compartment, holds a motor for driving the fan.

In accordance with more limited aspects of this aspect of the present invention, the first and second compartments are axially aligned. A cleaning solution
25 supply pump supplies pressurized cleaning fluid to a distributor and the housing includes a pocket, preferably located rearward of the socket, for holding the pump. The pocket is located on one side of first chamber and an indentation for a brushroll motor is located on another
30 side of first and second compartments. The extractor may include a third compartment, located forwardly of the first compartment, which serves as an air inlet chamber for the fan.

One advantage of the present invention is the provision of a base housing for a carpet extractor which defines a socket for receiving a recovery tank and a chamber, located rearward of the socket for holding a suction fan and motor assembly. The positioning of the socket and chamber permits the accommodation of a large-capacity recovery tank while maintaining a low-profile base.

Another advantage of the present invention is the provision of a low-profile carpet extractor which can be manoeuvred beneath chairs, beds, and the like for a more thorough cleaning.

Still another advantage of the present invention is the provision of a carpet extractor base having forward and rearward chamber sections for allowing the motor portion to be located rearward of the fan, along a horizontal axis, thus providing a low-profile base.

Yet another advantage of the present invention is the provision of a carpet extractor base having a first pocket for receiving a pump for pressurizing the cleaning fluid and a second pocket for receiving a brushroll motor, the positioning of the two pockets being such as to avoid limiting the capacity of the recovery tank.

A further advantage of the present invention is the provision of a carpet extractor base having a rear portion on an upper side of which is provided a chamber having a first section which serves as a fan inlet and a second section for receiving a fan assembly. On a lower side of the base rear portion are provided two spaced pockets for receiving a pump and a brushroll motor. Thus an efficient use is made of otherwise wasted space.

A still further advantage of the present invention is the provision of a carpet extractor base in which a fluid pump and a brushroll motor are positioned on

opposite sides of a centrally mounted motor and fan assembly and in which all three of these components are located rearwardly of a recovery tank. This construction allows the carpet extractor base to have a low profile.

5 A yet still further advantage of the present invention is the provision of a carpet extractor base which includes a locking member, in the form of an upstanding flange. The locking member cooperates with a carrying handle of a recovery tank selectively to lock
10 the handle to the base.

 A further advantage of the present invention is an upright carpet extractor of the type which applies a cleaning fluid to a floor surface and vacuums dirty cleaning fluid, the carpet extractor comprising: a
15 recovery tank for collecting the dirty cleaning fluid; and, a housing including: a socket for selectively receiving said recovery tank said socket comprising at least two side walls, and a chamber, located rearward of the socket which holds a suction fan and motor assembly;
20 and a nozzle, located adjacent a forward end of the socket, which vacuums the dirty cleaning fluid from the floor surface.

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A further advantage of the present invention is a carpet extractor comprising: a reservoir for storing and providing a supply of cleaning solution; a base assembly including: a distributor fluidly connected with the reservoir for
5 selectively applying the cleaning solution to a floor surface to be cleaned, a nozzle for removing dirty cleaning solution from the floor surface, a recovery tank, fluidly connected with the nozzle for collecting the dirty cleaning solution from the nozzle, a vacuum source fluidly connected with the
10 recovery tank for drawing a vacuum on the recovery tank, the extractor further includes a pump, fluidly connected between the reservoir and the distributor, and a housing for holding said nozzle, said recovery tank, and said vacuum source, said housing comprising: a first section for selectively receiving
15 the recovery tank, a second section, located adjacent the first section, for holding the vacuum source, and a pocket which receives the pump.

A further advantage of the present invention is a carpet extractor comprising: a reservoir for storing and providing a
20 supply of cleaning solution; a base assembly including: a distributor fluidly connected with the reservoir for selectively applying the cleaning solution to a floor surface to be cleaned, a nozzle for removing dirty cleaning solution from the floor surface, a recovery tank, fluidly connected
25 with the nozzle for collecting the dirty cleaning solution from the nozzle, a vacuum source fluidly connected with the recovery tank for drawing a vacuum on the recovery tank, and a housing for holding said nozzle, said recovery tank, and said vacuum source, said housing comprising: a first section

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for selectively receiving the recovery tank, and a second section, located adjacent the first section, for holding the vacuum source; and a motor drivingly connected to a brushroll mounted on the housing, the housing including
5 an indentation which receives the brushroll motor.

A further advantage of the present invention is a carpet extractor comprising: a reservoir for storing and providing a supply of cleaning solution; a base assembly including: a distributor fluidly connected with the
10 reservoir for selectively applying the cleaning solution to a floor surface to be cleaned, a nozzle for removing dirty cleaning solution from the floor surface, a recovery tank, fluidly connected with the nozzle for collecting the dirty cleaning solution from the nozzle, a
15 vacuum source fluidly connected with the recovery tank for drawing a vacuum on the recovery tank, and a housing for holding said nozzle, said recovery tank, and said vacuum source, said housing comprising: a first section for selectively receiving the recovery tank, a second
20 section, located adjacent the first section, for holding the vacuum source, a lower section and an upper section which are connected together to define the second section therebetween, the second section being partially defined in an upper surface of the housing lower section, a
25 pocket, which is defined in a lower surface of the housing lower section, and an indentation, which is defined in the lower surface of the housing lower section.

A further advantage of the present invention is a
30 carpet extractor comprising: a cleaning solution supply pump for supplying pressurized cleaning fluid to a distributor; a base assembly and a handle assembly pivotally mounted on the base assembly; a recovery tank selectively mounted on the base assembly; a brush mounted

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on the base assembly; the base assembly including a housing comprising: a front wall and a pair of opposed side walls, the housing selectively holding the recovery tank, and the housing including: a section for supporting
5 a motor for driving a fan, and a pocket for holding the pump.

Still other benefits and advantages of the present invention will become apparent to those skilled in the art upon a reading and understanding of the following
10 detailed specification.

Brief Description of the Drawings

The invention takes form in certain parts and arrangements of parts, preferred embodiments of which
15 will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

FIGURE 1 is a perspective view of an upright carpet extractor according to the present invention;

20 FIGURE 2 is a side elevational view of the carpet extractor of FIGURE 1, showing a directing handle assembly in an upright position and in a working position (in phantom);

FIGURE 3 is a side elevational view of a carpet
25 extractor accessory tool for above floor cleaning, according to the present invention;

FIGURE 4 is an enlarged side sectional view of the base assembly of the carpet extractor of FIGURE 1;

FIGURE 5 is a reduced exploded perspective view of
30 the base assembly of FIGURE 4 without a recovery tank and nozzle assembly thereof;

FIGURE 6 is an enlarged bottom plan view of the base assembly of FIGURE 4;

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FIGURE 7 is an enlarged perspective view of a rear portion of the base assembly of FIGURE 4 with certain portions

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removed for clarity;

FIGURE 8 is a reduced exploded perspective view of the recovery tank and nozzle assembly of the base assembly of FIGURE 4;

5 FIGURE 9 is a top plan view of the carpet extractor of FIGURE 1 with the directing handle assembly removed for clarity;

FIGURE 10 is a side sectional view of the recovery tank and nozzle assembly of FIGURE 8;

10 FIGURES 11A, 11B, and 11C are side elevational views of the base housing, recovery tank, and carrying handle of FIGURE 1, showing the handle in an unlocked position, a carrying position, and an emptying position, respectively;

FIGURE 12 is an enlarged side sectional view of the directing handle assembly of the extractor of FIGURE 1;

15 FIGURE 13 is an exploded perspective view of the directing handle assembly and cleaning solution reservoir of the extractor of FIGURE 1;

FIGURE 14 is an enlarged front elevational view of the directing handle assembly of FIGURE 13;

20 FIGURE 15 is a greatly enlarged front sectional view of the cleaning solution reservoir of FIGURE 13 showing a check valve thereof;

FIGURE 16 is a greatly enlarged side sectional view of a directional valve assembly of FIGURE 1 shown with a first discharge port open;

FIGURE 17 is a side sectional view of the valve assembly of FIGURE 16 shown with a second discharge port open;

FIGURE 18 is a schematic view of a fluid control circuit of the extractor of FIGURE 1 according to a first preferred embodiment of the present invention;

30 FIGURE 19 is a schematic view of a fluid control circuit of a carpet extractor according to a second preferred embodiment of the present invention;

FIGURE 20 is a side sectional view of a pump housing and solution supply pump for the embodiment of FIGURE 18;

FIGURE 21 is an exploded perspective view of the

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pump housing and pump of FIGURE 20;

FIGURE 22 is a side elevational view, in partial section, of an extractor and attachment tool according to the embodiment of FIGURE 19;

5 FIGURE 23 is an enlarged bottom plan view of the base assembly of FIGURE 22; and,

FIGURE 24 is an enlarged side sectional view of the reservoir and handle assembly of FIGURE 13, showing a reservoir latching mechanism.

10

Detailed Description of the Preferred Embodiments

Referring now to the drawings, wherein the showings are for purposes of illustrating preferred embodiments of the invention only and are not for purposes of limiting the same, 15 **FIGURES 1 and 2** show an upright carpet extractor. The extractor includes a base assembly **A** having a base housing **10**. A directing handle assembly **12** is pivotally connected to the base housing **10** for manipulating the base assembly over a floor surface to be cleaned. A cleaning solution supply tank 20 or reservoir **14** is removably supported on the handle assembly **12** for supplying cleaning solution to a floor surface or to an optional hand-held accessory tool **16** (**FIGURE 3**) for remote cleaning. A recovery tank and nozzle assembly **18** is removably supported on the base housing **10**. A vacuum source, such as a 25 motor and fan assembly **20** (**FIGURE 4**) is supported on the base housing **10** rearward of the recovery tank assembly for drawing a vacuum.

With reference to **FIGURES 4-7**, the base housing **10** includes a unitary molded lower housing portion **22** and an 30 upper housing portion **24** including a front hood **26**, a motor cover **28**, and a rear cosmetic cover **30**, which overlies a rearward portion of the motor cover. The motor cover and lower housing portion are joined together by bolts, screws, or other suitable fixing members to enclose the motor and fan 35 assembly **20**. Specifically, as shown in **FIGURES 5 and 7**, posts **34**, **35**, and **36**, are formed in the lower housing portion and posts **37** and **38** are formed on the cosmetic cover **30**. The

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posts 34, 35, and 37,38 are aligned and receive threaded screws for connecting the two parts together. The motor cover 28 is trapped between the lower housing portion 22 and the cosmetic cover 30. The front hood partially extends over the motor cover and the cosmetic cover and is positioned adjacent opposing vertical side walls 40 and 42 of the lower housing portion, which extend forwardly to provide part of a cosmetic housing shell for the base assembly. The front hood is attached to the lower housing portion and the motor cover by screws 44 or other suitable fixing means. As shown in FIGURE 5, two screws are received in laterally spaced holes 46 in the front hood which are positioned over the posts 36 and corresponding threaded bores 48 on the motor cover. Together, the lower housing portion 22 and the motor cover 28 define a chamber 50 for receiving the suction motor and fan assembly 20. The chamber is preferably located along an axial center line of the base housing 10.

Laterally displaced wheels 54 are journaled into a rearward end 56 of the lower housing portion 22. A rotatable brushroll 60, for agitating the floor surface to be cleaned, is mounted adjacent a forward end 62 of the lower housing portion 22 in a downwardly facing integral cavity 64 defined by a lower surface of the lower housing portion. The brushroll is rotated by a motor-driven belt 66. A motor 68 for the belt is supported by the lower housing portion 22 in an integral indentation or pocket 70 defined beneath the motor and fan assembly 20, shown most clearly in FIGURE 6. As shown in FIGURE 4, a cleaning solution distributor, such as a drool or spray bar 74, mounted to the lower housing portion 22 above the brushroll 60, directs cleaning solution onto the floor surface via the brushroll.

The chamber 50 for the motor and fan assembly is divided into interconnected compartments or cavities, namely a rearward motor housing compartment 76 and a forward fan housing compartment 78 which receive a motor portion 80 and suction fan portion 82 of the motor and fan assembly 20, respectively. Integrally molded into an upper surface of a

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rearward portion of the lower housing portion 22 are lower portions 84 and 86 of motor and fan housing compartments 76 and 78, respectively. The motor cover 28 defines top portions of the housing compartments 76 and 78 for the motor and fan portions 80 and 82, respectively.

A vertically extending inlet chamber 88 is molded into a forward portion of the lower housing portion 22, forward of the fan compartment and communicating with the fan compartment via a central opening 89. A forward portion of the motor cover defines an upper portion 90 of the inlet chamber through which working air is drawn into the fan portion. Air entering the inlet chamber passes into an eye 92 of the fan. The fan compartment is indented in an annular ring 94 adjacent the eye of the fan so that all air entering the inlet chamber passes through the eye of the fan. A louvered plate 96 (FIGURE 5) is removably affixed below the lower housing portion 22 adjacent the motor and fan assembly 20 and brushroll motor 68.

The front hood 26 is seated over the lower housing portion 22 and a forward end of the motor cover 28 to provide part of a cosmetic cover for the components of the base assembly A. Together, the front hood and the lower housing portion define a socket or well 100 for receiving the recovery tank and nozzle assembly 18. The socket includes opposing side walls 40 and 42, defined by the lower housing portion 22, a rear wall 106 defined between the socket and the inlet chamber 90 to the fan housing compartment 78, a front wall 108, defined between the socket and the brushroll cavity 64, and a base 110, extending from lower ends of the four walls 40, 42, 106, 108.

With continued reference to FIGURES 4 and 5, and reference also to FIGURES 8-11, the recovery tank and nozzle assembly 18 includes a recovery tank 120. The recovery tank includes a basin portion 122 and an upper portion 124 which are sealed together by glueing, sonic welding, or other conventional means, to define an internal chamber 126 for collecting recovered dirty cleaning solution.

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An exterior forward region of the upper portion 124 and basin portion 122, when joined, defines a depressed zone 128. When the recovery tank and nozzle assembly is positioned in the socket 100, the depressed zone extends forward of the lower housing portion 22 and the brushroll cavity 64, such that a perforated lip 130 at a lower end of the depressed zone is positioned adjacent the floor surface. A detachable nozzle cover 134 cooperates with the depressed zone to form a suction nozzle flowpath 138 having an elongated inlet slot or nozzle 140 extending laterally across the width of the nozzle cover and an outlet 142 at an upper end of the flowpath 138. Specifically, the nozzle cover is removably connected to the recovery tank 120 by screws, bolts or other suitable fasteners located adjacent upper and lower ends of the nozzle cover. Alternatively, the nozzle cover could be adhered to the recovery tank by glue or sonic welding.

As shown in FIGURE 8, two screws 146 attach the upper end of the nozzle cover to the upper portion 124 of the recovery tank, while four, similar screws 148 attach the lower end of the nozzle cover to the lower lip 130 of the basin portion 122. Peripheral edges 150 and 150' of the nozzle cover 134 sealingly engage adjacent peripheral edges 154 and 154' of the depressed zone. A pair of sealing members, such as gaskets 158 and 158', are disposed between each of the peripheral edges of the nozzle cover and the depression, and assist in providing an airtight seal. Alternatively, the peripheral edges of the nozzle cover are sealed to the corresponding peripheral edges of the depressed zone with an adhesive. The nozzle cover 134 and the depressed zone 128 are formed from a transparent material, such as a conventional thermoplastic, which allows an operator to check that the flowpath 138 is suctioning dirt and cleaning fluid effectively and to ensure that the brushroll 60 is rotating.

Dirt and cleaning solution from the floor surface to be cleaned are drawn through the nozzle inlet slot 140 into the suction flowpath 138. As shown in FIGURE 10, the flowpath widens into an exit chamber 160 adjacent the upper end of the

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nozzle cover 134. A recovery tank inlet slot 170, integrally formed with the recovery tank upper portion 124, extends vertically into the recovery tank interior chamber 126. An opening or inlet 172 is defined in an upper end of the inlet slot 170. The opening communicates directly with the nozzle exit chamber 160. The slot has a vertically extending planar rear wall 174, which is oriented perpendicularly to the adjacent exit chamber and outlet 142 of the nozzle flowpath, and a lower outlet 176.

10 The recovery tank inlet slot 170 acts as an air-fluid separator. The dirt, cleaning solution, and working air enter the recovery tank through the opening 172. The rear wall 174 of the inlet slot directs the recovered cleaning solution and working air through a roughly 90-degree angle, as
15 shown by arrow B in FIGURE 4, and downward into the recovery tank where the recovered solution and dirt are collected in the interior chamber 126. The contact of the recovered solution with the rear wall 174 assists in separating the cleaning solution from the working air. It also prevents
20 liquid from traveling directly toward an outlet of the chamber 126. A forward wall 178 of the inlet slot 170 extends generally parallel with the rear wall 174, but is shorter in length, allowing working air to enter the recovery tank without passing through the accumulated dirty cleaning
25 solution in the chamber 126. Since the air has to turn an additional 90 degrees, any remaining liquid in the air stream tends to precipitate out.

 An upper end 182 of the opening 172 is closed during floor cleaning by a removable inlet slot cover 184 so that all
30 the air and recovered solution entering the nozzle flowpath 138 is directed into the recovery tank chamber 126. The inlet slot cover includes a horizontal top portion 186 and a wall 188, shaped to fit through the opening upper end 182, which extends vertically from a lower surface of the top portion.
35 A sealing member 190, such as an annular gasket, is preferably received around the wall 188 to seal the inlet slot cover around the opening upper end. Optionally, a flexible tag (not

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shown) connects the inlet slot cover 184 with an exterior surface of the recovery tank 120 so that the cover is not misplaced during above the floor cleaning.

A discharge opening 200 is defined in the upper portion 124 of the recovery tank 120 for emptying the collected dirty cleaning solution and dirt from the interior chamber 126. As mentioned, the rear wall 174 of the inlet slot prevents direct flow of liquid to the discharge opening 200 of the recovery tank. During operation of the extractor, the discharge opening is sealed by a removable hollow lid 204. The lid 204 includes an upper wall 206, which forms an exterior of the lid, and a lower wall 208. The upper and lower walls are glued together to define an interior discharge chamber 210. A sealing member, such as a gasket 212, seals a lower surface of the lower wall 208 around the discharge opening 200. The lower wall has an inlet 214, which is disposed over the discharge opening 200 when the lid is in place, and an outlet 216, which is disposed over the vertically extending upper portion 90 of the inlet chamber, defined by the motor cover 28, through which the discharge chamber communicates with the fan 82. Working air is sucked upward from the recovery tank 120 by the motor and fan assembly 20, drawn through the discharge chamber inlet 214 into the discharge chamber 210, and is directed through an almost 180-degree turn by the lid upper wall 206. The working air travels downward through the discharge chamber outlet 216 into the motor cover upper portion 90 of the inlet chamber 88. When the lid 204 is seated on the recovery tank, the lower wall 208 partially covers an upper end of the front hood 26. As shown in FIGURE 5, the front hood provides an air access opening 220 to the motor cover upper portion 90 of the inlet chamber 88.

The positioning of the recovery tank 120, lid 204, and motor and fan assembly 20 provides a low profile extractor base assembly A, while maintaining a sizeable capacity for the recovery tank. This allows the base assembly to be wheeled under chairs, beds, and other household furniture or

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obstructions.

With continued reference to FIGURES 4, 8, and 10, fastened to the lid 204 is a float cage assembly 224. The float cage assembly 224 is removable from the recovery tank 5 120 along with the lid for ease of emptying the recovery tank and for cleaning of the float cage assembly. Specifically, the float cage assembly 224 includes a float cage 226. The cage is attached to the lower wall 208 of the lid by a number of tangs 228, which slot into corresponding openings 230 10 defined in the lower wall 208 around the lower wall inlet 214. A float 232 is received within the float cage. The float chokes off the flow of working air through the recovery tank chamber 126 when the reclaimed solution in the recovery tank reaches a predetermined level. A filter cup 236 is 15 optionally received around the float cage for filtering particles of dirt from the working air (See FIGURE 4). The filter cup is preferably formed from a porous material, such as plastic or foam, which is readily washable or replaceable to prevent the filter from becoming clogged with dirt. Prior 20 to entering the discharge chamber 210 from the recovery tank 120, therefore, the working air passes through the filter cup 236 and the float cage 226 as shown by arrow C.

With particular reference to FIGURE 4, the lower housing portion 22 defines an exhaust chamber 238 at the base 25 of the fan housing compartment 78. The working air leaves the fan housing compartment through the exhaust chamber in the direction of the floor surface through exit slots 240 defined in the plate 96, as shown in FIGURE 5.

Louvers 242 (shown in FIGURE 7), formed in a rear 30 end of the base housing 10 provide an air inlet for drawing in cooling air for cooling the fan motor 80. Preferably, a cooling fan 246, connected to a rear of the motor 80 is rotated by the motor to circulate air around the fan motor. Exhaust of air is through louvers 248.

35 With reference to FIGURES 4, 9, and 11, the recovery tank 120 includes a carrying handle 250 which is movable between a first functional position, or locking position

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(shown in FIGURES 9 and 11A), in which the recovery tank is lockable to the base housing 10, a second functional position, or carrying position (shown in FIGURE 11B), in which the recovery tank is removable from the base housing 10 and the lid 204 is locked to the recovery tank, and a third functional position, or emptying position (shown in FIGURE 11C), in which the lid is removable from the recovery tank for emptying the recovery tank. Specifically, the carrying handle 250 includes a central, U-shaped portion 252 defined between two laterally-spaced end portions or legs 254 and 254'. The legs 254 and 254' are pivotally connected to the upper portion 124 of the recovery tank.

In the locking position, the handle lies adjacent to the recovery tank and upper wall 206 of the lid to maintain the sleek, low profile of the base assembly A. In the locking position, the legs lie generally horizontally. The central portion 252 includes a rearwardly extending engagement tab 256, best shown in FIGURE 4. A latching member 258 is received in a vertically extending slot 260 in the rear cosmetic cover 30 so that it extends upwardly from the cosmetic cover 30, rearward of the lid. Specifically, the latching member is pivotally connected at a lower end to the base of the slot at two laterally spaced pivot points 262. A V-shaped biasing member 266, received in the slot 260 rearward of the latching member, biases the latching member to a forward position. The latching member defines a tang 268 which engages the tab 216 on the carrying handle 250, when the latching member is in the forward position, to lock the recovery tank 120 to the base housing 10. To release the tab from engagement, the latching member is pivoted rearwardly, allowing the recovery tank carrying handle 250 to be pivoted forwardly into the carrying position.

In the carrying position, the lid 204 is held in position on the recovery tank 120 to avoid spillage of recovered cleaning solution during transportation of the recovery tank. Specifically, hooks 270, one on each of the carrying handle end portions 254 engage corresponding

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projections 272 on the lid top wall 206 when the carrying handle is in the carrying position. The engagement of the hooks with the projections inhibits removal of the lid. To empty the recovery tank, the carrying handle 250 is pivoted 5 further forward to the emptying position, releasing the projections from engagement with the hooks. The lid can then be removed from the recovery tank.

One or more tangs 274 (see FIGURE 6), mounted on a forward end of the lower housing portion 22, engage the lip 10 130 of the nozzle inlet slot 140, causing the recovery tank and nozzle assembly 18 to pivot around the tangs during removal, as shown in FIGURES 11 A, B, and C. The recovery tank and nozzle assembly is moved forwardly during pivoting to disengage the assembly from the tangs.

15 With reference to FIGURES 12-14, the directing handle assembly 12 includes an upper handle portion 280, which defines a hand grip 282 at its upper end, and a lower handle portion or body shell 284. A cleaning solution reservoir support shelf 286 extends horizontally forwards from adjacent 20 a lower end of the body shell 284 for supporting the cleaning solution supply tank 14. The body shell is shaped to receive a rear portion of the cleaning solution supply tank. The directing handle assembly is completed by fixedly attaching the upper handle portion to the lower body shell by 25 telescopingly sliding the upper handle downward over an attachment post 288 defined by an upper end of the body shell 284. The upper handle is secured to the attachment post by a screw 290, pins, or other suitable fasteners.

The supply tank 14 includes a carrying handle 292 30 mounted to an upper end of the tank, shown in FIGURE 13 and in more detail in FIGURE 24. The handle includes a downward-facing slot 293 which receives the fingers of an operator's hand for transporting the reservoir. To latch the supply tank 14 in position on the directing handle assembly 12, a catch 35 294 on the supply tank carrying handle 292 is engaged with a resiliently flexible latch 296 disposed on an outwardly extending lower end 298 of the upper handle portion. A

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biasing member 299 biases the latch to an engaged position. To release the reservoir, the operator presses upwardly on the latch to move the latch to a disengaged position and withdraws the reservoir from the handle assembly.

5 Together, the body shell 284 and the base housing 10 thus comprise an extractor housing 300 which supports the main components of the extractor, including the recovery tank and nozzle assembly 18, supply tank 14, brushroll 60 and brushroll motor 68, motor and fan assembly 20, and the like.

10 As shown in FIGURE 2, the directing handle assembly 12 is pivotally connected to the base housing 10 for movement between an upright position and a working position (shown in phantom). Specifically, the rear of the base assembly has laterally spaced integrally molded trunnions 302 (FIGURE 5)
15 for rotatably receiving thereon spaced pivoting members 304 (FIGURE 14) on the lower handle portion. As is evident from FIGURE 1, the recovery tank and nozzle assembly 18 is removable from the base assembly A even in the upright position of the directing handle assembly 12, facilitating
20 emptying of the recovery tank 120. In other words, the recovery tank and nozzle assembly can be lifted vertically by its carrying handle 250 and clears the cleaning fluid tank 14 and the directing handle assembly 12.

 Near the top of the cleaning solution supply tank 14
25 is a fill opening 310 through which the tank may be conveniently filled with cleaning solution as shown in FIGURE 13. A cap 312 sealingly closes the fill opening. The cap includes an inverted cup portion 314 which serves as a convenient measuring cup for mixing an appropriate amount of
30 a concentrated cleaning fluid with water in the supply tank. The cleaning fluid is poured into the tank and the cap is then inverted to seal the fill opening 310.

 With reference also to FIGURE 15, at the base of the cleaning solution supply tank 14 is a cleaning solution outlet
35 316. A check valve 318 closes off the outlet during transport of the tank 14. A reservoir valve actuator 320 opens the check valve 318 when the tank is seated on the support shelf

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286. A grommet 322, formed from a resilient, flexible material, such as rubber, serves to seal the valve 318 to the cleaning solution tank outlet 316 and to seal around the valve actuator 320. Specifically, the grommet includes a
5 cylindrical portion 324 which is seated in the outlet 316 and a skirt portion 326, which extends downwardly and outwardly from the cylindrical portion, to form an annular sealing surface 328 which seals against a corresponding surface 330 of the valve actuator.

10 With reference now to FIGURES 14 and 16-17, the outlet 316 is fluidly connected to a valve assembly, or combination port valve 340. The valve assembly 340 directs the cleaning solution to the drool/spray bar 74 for floor cleaning, or to the accessory tool 16, for cleaning remote
15 surfaces, such as stairs and upholstery. The valve assembly is preferably supported by the body shell 284, beneath or adjacent to the cleaning solution supply tank 14, as shown in FIGURE 13, although other locations for the valve assembly, such as in the base assembly A, are also contemplated.

20 In a first embodiment, shown schematically in FIGURE 18, a hose 342 is connected between the cleaning solution supply tank and an inlet port 344 of the valve assembly 340. The cleaning solution flows under gravity from the supply tank 14 to the valve assembly 340. In a second embodiment, shown
25 schematically in FIGURE 19, and discussed in detail later, the cleaning solution is pumped under pressure to the valve assembly. In both embodiments, the valve assembly is structurally the same, it is only the components of the extractor that are coupled with the valve assembly that
30 differ.

With reference once more to FIGURES 16, 17, and 18, the valve assembly 340 includes a valve housing 346 with an interior chamber 348. The housing chamber includes a cylindrical body portion 350, into which the inlet port 344
35 opens. The valve assembly 340 includes first and second valve members or discharge valves 352 and 354, respectively, which selectively open to release cleaning solution to the

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drool/spray bar 74 or to the accessory tool 16, respectively. The first and second valve members are disposed on first and second ends 356 and 358, respectively, of the cylindrical body portion 350.

5 The first valve member 352 is fluidly connected with the drool/spray bar 74 and includes a cylindrically shaped first valve bore 360, defined by the valve housing 346 and extending axially from the first end 356 of the body portion, and a cylindrical first valve stem or poppet 362. The first
10 poppet is positioned within the housing chamber 348 for sealing the first valve member 352. Specifically, the first poppet is slidably received in the valve bore such that a first, open inner end 364 of the first poppet extends into the body portion 350 of the valve assembly and a second, outer
15 closed end 366 protrudes from a distal end 368 of the first valve bore 350, so that it extends beyond the valve housing 346. A first circumferential seal 372, such as an O-ring, is positioned in a circumferential groove 374, located in an outer surface of the first poppet adjacent the distal end 368
20 of the valve bore. The seal 372 seals the first poppet to the first valve bore to define an annular space 376 between the first poppet 362 and the first valve bore 360, which is sealed from the exterior. A first circumferential flange
25 poppet 362 into the body portion 350 of the valve assembly. The first valve bore 360 is narrower than the cylindrical body portion 350 such that an annular first valve seat 382 is defined by a stepped portion between the first end 356 of the body portion and the first bore 360. A compression spring
30 384, having first and second ends 386 and 388, respectively, is disposed axially in the body portion 350 of the chamber. The first end 386 of the spring engages the inner end 364 of the first poppet 362, biasing the first flange 380 toward the first valve seat 382. A second circumferential seal 390, such
35 as an O-ring, is positioned on the first poppet 362 between the first flange 380 and the first valve seat 382. In the normally closed position, the pressure of the spring

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compresses the second seal 390 between the first flange 380 and the first valve seat 382, sealing the body portion 350 of the valve assembly from the annular space 376 between the first valve bore 360 and the first poppet 362.

5 The housing 346 defines a first discharge port 400 which opens into the annular space 376, between the first and second seals 372 and 390. The first discharge port is fluidly connected to the drool/spray bar 74 by a hose 402, shown schematically in FIGURE 18. As shown in FIGURE 6, the hose is
10 supported by a channel 404 which runs along one side of the base housing 10. To separate the fluid lines of the extractor from the electrical components of the base A, a wall 406 of the rear cosmetic cover 30 is seated on the motor cover 28 (as shown in FIGURE 5), forming a barrier between the fluid lines,
15 such as hose 402, and the electrical wiring for the fan motor 80, brushroll motor 68, and other electrical components of the base assembly.

To open the first valve member 352, and allow cleaning solution to pass from the body portion 350 and out
20 through the first discharge port 400, the first poppet 362 is pushed inwardly, toward the body portion by a valve actuator. A preferred actuator is a generally vertically extending actuation rod or push rod 410, which is positioned with a tapered lower end 412 located adjacent the closed outer end
25 366 of the first poppet. The lower end 412 of the rod defines a camming surface 414. When the actuation rod 410 is pushed downwards, the camming surface 414 engages the outer end 366 of the poppet, pushing the first poppet inwards against the biasing force provided by the compression spring 384. The
30 flange 380 is thereby disengaged from the valve seat 382, providing a passageway between the chamber 348 and the first discharge port 400, through which the cleaning solution flows under gravity, as shown in FIGURE 16.

Although FIGURE 16 shows the first discharge port
35 400 as being located vertically opposite the inlet port 344, it should be appreciated that the inlet port and the first discharge port could equally extend from the valve housing in

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other directions. As shown in FIGURES 13 and 14, the inlet port and the first discharge port extend forwardly and parallel to each other.

With reference once more to FIGURES 12-14, the
5 actuation rod 410 comprises an upper portion 416 and a lower portion 418. The upper portion of the rod is received within the upper portion 280 of the directing handle assembly, and is pivotally connected at an upper end to a trigger 422. The trigger is pivotally connected to the handle grip 282 at a
10 pivot point 424. By squeezing the trigger 422 toward the handle grip, the upper portion 416 of the actuation rod is moved downwardly. The lower portion 418 of the actuation rod is received in a central channel 426 in the body shell, defined by two parallel spaced walls 428 and 430. A lower end
15 432 of the upper portion 416 of the actuation rod is positioned such that it pushes the lower portion 418 of the rod downwards when the trigger 422 is gripped. The lower portion of the actuation rod includes a compression spring 434 which biases the actuation rod upwardly when pressure on the
20 trigger is released.

With reference also to FIGURES 3, 17, and 18, the accessory tool 16 includes a solution supply hose 436 for delivering cleaning solution to a remote distributor 438. The second valve member 354 of the valve assembly is fluidly
25 connected with the accessory tool supply hose when the tool is to be used. The second valve member defines a cylindrical internal bore 440 which extends axially from the second end 358 of the body portion and defines a second discharge port 442 at an outer end. A second cylindrical valve stem or
30 poppet 444 is received in the housing 346 for selectively closing the second valve member. Specifically, the bore 440 slidably receives the second valve stem 444. An inner, closed end 446 of the second valve stem extends into the body portion 350 of the valve assembly. The valve stem 444 defines
35 a cylindrical internal passageway 448, best shown in FIGURE 17, which extends axially along the second valve stem from the closed inner end 446 to an open outer end 450 of the second

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valve stem, and at least one side opening 452. Preferably, two circular side openings are defined in opposite sides of the second valve stem. A second valve seat 454 is defined by a stepped portion between the body portion 350 and the valve
5 bore 440. A second annular flange 456 extends radially from the second valve stem 444 adjacent the inner end 446. A third compression seal 458, such as an O-ring, is positioned around the second valve stem between the flange 456 and the second valve seat 454. The second end 388 of the compression spring
10 384 biases the second valve stem 444 and the flange 456 to the normally closed position in which the flange compresses the seal 458 against the second valve seat 454, thereby sealing the valve bore 440 from the body portion 350.

A quick connect coupling assembly 460 releasably
15 connects the second valve member 354 to the accessory tool supply hose 436. Specifically, the accessory tool hose is fluidly connected to a male quick coupling connector 464. An exterior of the housing 346, adjacent the second valve member 354, defines a corresponding female connector 466 which
20 quickly couples with the male connector 464, as best shown in FIGURE 17. While one preferred embodiment of the male and female connectors 464, 466 is there shown, it should be appreciated that other suitable connectors are also contemplated. In the embodiment shown, the female connector
25 includes a circumferential groove 468 which receives a corresponding circumferential rim 470 of the male connector. An O-ring 472, provides a fluid-tight seal between the male and female connectors.

The male connector 464 includes a valve stem
30 actuator 474 which defines an internal bore 476 and a barb 478 at a distal end for coupling to a solution supply hose. To release cleaning solution from the second discharge port 442, the male coupling 464 is advanced on the female coupling 466. This causes the valve stem actuator 474 to enter the second
35 discharge port 442 and penetrate the second valve bore 440, forcing the closed end 446 of the valve stem 444 into the body portion 350. The opening 452 in the valve stem enters the

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body portion, providing a fluid path through the body portion, valve stem and valve stem actuator bore 476 to the accessory hose 436.

While the valve assembly 340 has been described with reference to a single compression spring 384 which biases both valve stems 362, 444 to the closed position, alternatively a pair of compression springs may be provided, one for each valve stem. The single compression spring 384 is resilient enough to allow both valve members to be opened contemporaneously, if desired, feeding cleaning solution to both a remote surface and a floor surface.

With reference to FIGURES 3, 18, 20, and 21, in the first embodiment described above, the hose 342 is directly connected between the valve actuator 320 for the cleaning solution tank 14 and the valve assembly inlet port 344 so that cleaning solution flows under gravity from the tank 14 to the valve assembly. A cleaning solution supply pump 480, such as an electric motor-driven peristaltic pump, is coupled between the valve assembly 340 and the accessory tool hose 436 for pumping the cleaning solution to the accessory distributor 438. Specifically, a pump hose 484 is connected at one end to the barb 478 of the male quick connect coupling connector 464. The other end of the pump hose 484 is received around a pump inlet fitting 486. The hose 484 may be firmly attached to the inlet fitting or be releasable, to allow for cleaning of the hose. An outlet fitting 488 of the pump is connected to the accessory tool hose 436 and may be similarly affixed or releasable.

With particular reference to FIGURES 20 and 21, the pump 480 is preferably enclosed in a two-part pump housing 490 which is removably mounted on top of the base assembly A when the accessory tool 16 is to be used. A lower portion 492 of the pump housing is shaped to be received on top of the recovery tank and nozzle assembly 18. The lower portion defines an L-shaped tube 494 having a vertically extending protrusion 496 which is received in the upper end 182 of the recovery tank inlet slot 170 via the opening 172. The

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protrusion 496 of the tube defines a forward wall 498 which closes off the nozzle outlet 142 when the protrusion 496 is inserted into the inlet slot 170. This prevents the motor and fan assembly 20 from drawing working air and cleaning solution through the nozzle flowpath 138. Extending perpendicularly from an upper end of the lower portion of the L-shaped tube is a cylindrical portion 500 which defines an opening for selectively receiving a tubular coupling 502 connected to one end of a vacuum hose 504 of the accessory tool 16. An electrical cable 506 is connected between the pump 480 and the base assembly A when the accessory tool is to be used, to supply power to the pump.

An upper portion 508 of the pump housing 490 defines two openings, namely a rearward opening 510 for providing access for the pump hose 484 to the fluid inlet fitting 486 of the pump and a forward opening 512 for providing access for the accessory tool hose 436 to the fluid outlet fitting 488 of the pump. The upper and lower portions of the pump housing are connected by snap connections, screws or other means which allow the pump housing to be opened, if necessary, for repair of the pump 480. Alternatively, two portions can be permanently secured together as with an adhesive, sonic welding, or the like.

In operation, the extractor is switched on by operating a pair of switches 512, 514 located on the directing handle assembly 12, as shown in FIGURE 1, or other convenient location. The first switch 512 energizes the motor 68 for the brushroll 60. If desired, the extractor may be operated without rotation of the brushroll, such as when the accessory tool is being used. The second switch energizes the fan motor 80. When energized, working air and cleaning solution are extracted from the floor surface to be cleaned and are carried through the nozzle flowpath 138 into the recovery tank 120. Cleaning solution is released under gravity from the spray/drool bar 74 when the handle trigger 422 is actuated. When the recovery tank 120 fills with recovered cleaning solution to a certain level, the float 232 blocks the inlet

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214 to the discharge chamber indicated in a change in the sound of the fan 82 or a lack of suction at the nozzle inlet slot 140. The operator then unlocks the recovery tank from the base housing 10 by releasing the latching member 5 258 from engagement with the recovery tank carrying handle tab 256 and moves the carrying handle 250 to the carrying position. The operator removes the recovery tank 120, together with the attached nozzle cover 134 and lid 204 and transports it to a sink, or other fluid disposal site. The 10 carrying handle is moved from the carrying position to the emptying position and the lid 204, as well as the attached float cage assembly 224, are detached from the recovery tank. The recovery tank 120 is then inverted to empty it while holding the carrying handle 250 out of the way. The recovered 15 dirt and cleaning solution are emptied from the recovery tank via the discharge opening 200. At the end of a floor cleaning process, or if excess dirt has built up on the filter cup 236 during the cleaning process, the foam cup may be rinsed to remove accumulated dirt. The nozzle flowpath 138, being 20 attached to the recovery tank, is also readily rinsed to remove trapped dirt, as desired. In cases where trapped dirt cannot be removed by rinsing, the nozzle cover 134 may be detached from the recovery tank for a more thorough cleaning.

When it is desired to convert the extractor from the 25 floor cleaning to a remote cleaning mode for cleaning upholstery, stairs, and the like, the brushroll motor 68 is deenergized by tripping the switch 512. The inlet slot cover 184 is removed from the opening 172 and the pump housing 490 is positioned on the base assembly A such that the protrusion 30 496 of the L-shaped pump housing tube extends into the recovery tank inlet slot 170. The electric cable 506 is electrically connected with the base assembly A to energize the solution supply pump 480. The male quick connect coupling 464 on the pump hose 484 is attached to the female connector 35 466 on the valve assembly 340, allowing cleaning solution to pass from the cleaning solution supply tank 14, through the valve assembly and pump hose to the pump 480 and thence, under

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pressure, to the accessory tool hose 436. A trigger 516, at the remote end of the tool hose, is actuated, as required, to allow the cleaning solution, under pressure, to be sprayed through the remote distributor 438 as shown in FIGURE 3. The vacuum hose of the accessory tool is coupled by the tubular coupling 502 to the cylindrical portion 500 of the L-shaped tube 494. Specifically, the vacuum hose is connected at its remote end to an accessory nozzle 518. The nozzle may have any desired shape for accessing corners of upholstery, stairs, and the like. Also, a brush (not shown) may be provided adjacent the nozzle, if desired. Dirt and cleaning solution are drawn through the accessory nozzle 518 by the suction fan 82 and thereafter drawn into the recovery tank 120 through the L-shaped tube 494.

15 In the second embodiment, shown in FIGURES 19, 22, and 23, the cleaning solution is pumped, rather than gravity fed, by a solution supply pump 520, such as an electrically driven pump of the type previously described, to a valve assembly 522 of the type described in the first embodiment. 20 This allows both an accessory tool 524 and a spray bar 526 to receive pressurized cleaning solution, as required. In this embodiment, the pump 520 is preferably located in a base assembly D, as shown in FIGURE 23. Specifically, a lower surface of a lower housing portion 528 of a base housing 530 defines a downward facing pocket or receptacle 532 for receiving the pump.

A vacuum source, such as a fan and motor assembly 534 is received in a chamber 536 defined in the base housing, as described for the first embodiment. As before, a fan portion 540 and motor portion 542 are axially aligned and received in fan and motor compartments 544, 546 of the chamber. A brushroll motor 544 is located as before in a downward facing indentation or pocket 550 formed in the lower surface of the lower housing portion 528.

35 The positioning and geometries of the fan 540, fan motor 542, brushroll motor 548 and solution supply pump 520, and their corresponding housing chambers, are designed to

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minimize the space occupied by these components and provide for a large capacity recovery tank 552. Preferably, the brushroll motor 548 and pump 520 are located in their corresponding pockets on opposite sides of the base housing 530, adjacent to, and generally beneath, an inlet chamber 554 to the fan housing compartment. The inlet chamber has a hemi-disc-shaped indentation in a base wall 556, and the positioning of the brushroll motor and pump on either side of the inlet chamber takes advantage of the open spaces on either side of the disc shape.

Louvers 560, formed in a rear end of the base housing 530 provide an air inlet for drawing in cooling air for cooling the fan motor 542. A cooling fan 562, connected to a rear of the motor 540 is rotated to circulate air around the fan 540 and the cleaning solution pump 520. The same source of air is used for both the pump and the fan motor to minimize the possibility of cleaning fluid being sucked into the base housing. The brushroll motor is cooled by the exhaust air from the fan chamber, i.e., the air being evacuated from the recovery tank 552. The cooling air, which has passed over the pump and fan motor, exits the base housing through a cooling air outlet 564 at the rear of the base housing.

The valve assembly may be mounted on a directing handle 566, as shown in FIGURE 22, or may be located in the base assembly, or other suitable location on the extractor. When mounted on the directing handle, a first hose 572 carries cleaning solution from a cleaning solution supply tank 574 to the pump 520 in the base assembly. A second hose 576 carries the cleaning fluid back up to the directing handle-mounted valve assembly 522. A third hose 578 connects the valve assembly and the spray bar 526. The relative positions of the hoses, pump, and valve assembly are shown most clearly in FIGURE 19.

In the floor cleaning mode, the spray bar 526 delivers the pressurized cleaning solution to a floor surface to be cleaned. The pump 520 is electrically connected to the motor and fan assembly 534, and runs continuously whenever the

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motor and fan assembly is energized. The motor and fan assembly draws a vacuum on a floor nozzle flowpath 588 and the associated recovery tank 552, as described for the first embodiment.

5 To convert the extractor to the remote cleaning mode, a vacuum hose outlet connector 592, which is connected to a vacuum hose 594 of the accessory tool 524, is inserted through an inlet opening 598 into an inlet slot 600 of the recovery tank 552. The outlet connector is shaped for sealing
10 the inlet slot opening 598 and a nozzle outlet 604, closing off the nozzle flowpath 588 from the recovery tank. As shown in FIGURE 22, the vacuum hose 594 carries a portion of a cleaning supply hose 606 for the attachment tool within it, facilitating manipulation of the accessory tool. The solution
15 supply hose 606 is coupled by a male coupling to a corresponding female coupling, similar to the male and female couplings 464 and 466 described for the first embodiment, on a second discharge port of the valve assembly to supply pressurized cleaning solution to a distributor 614 at a remote
20 end of the attachment tool. The motor and fan assembly 534 applies a vacuum to the recovery tank, drawing working air and reclaimed cleaning solution from the vacuum hose, through the inlet slot, and into the recovery tank.

In other respects not specifically mentioned above,
25 the extractor of the second embodiment operates as described for the first embodiment.

The invention has been described with reference to the preferred embodiments. Obviously, modifications and alterations will occur to others upon a reading and
30 understanding of this specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

Having thus described the preferred embodiments, the invention is now claimed to be:

1. An upright carpet extractor of the type
5 which applies a cleaning fluid to a floor surface and vacuums dirty cleaning fluid, the carpet extractor comprising:

a recovery tank for collecting the dirty
cleaning fluid; and,
10 a housing including:

a socket for selectively receiving said
recovery tank, said socket comprising a pair of
opposed side walls and a rear wall, and

a chamber, located rearward of the socket
15 for holding a suction fan and motor assembly, said rear wall separating said socket from said chamber, the chamber including a forward compartment for receiving a suction fan portion of the suction fan and motor assembly and a rearward compartment for
20 receiving a motor portion of the suction fan and motor assembly.

2. The carpet extractor of claim 1, wherein
the housing further comprises a first pocket for
25 receiving a pump for pressurizing the cleaning fluid.

3. The carpet extractor of claim 2, wherein
the first pocket is positioned rearward of the socket and
on one side of the chamber.

30 4. The carpet extractor of claim 2, wherein
the housing further comprises a second pocket for
receiving a motor for rotating a brushroll mounted in the
housing.

5. The carpet extractor of claim 4, wherein the second pocket is positioned rearward of the socket and is positioned on another side of the chamber.

5

6. The carpet extractor of claim 1, wherein the housing further comprises:

a first pocket located on a first side of the chamber, forward of the fan and motor assembly and a
10 second pocket located on a second side of the chamber forward of the fan and motor assembly.

7. An upright carpet extractor of the type which applies a cleaning fluid to a floor surface and
15 vacuums dirty cleaning fluid, the carpet extractor comprising:

a recovery tank for collecting the dirty cleaning fluid; and,

a housing including:

20 a socket for selectively receiving said recovery tank, said socket comprising a pair of opposed side walls and a rear wall, and

a chamber, located rearward of the socket for holding a suction fan and motor assembly, said
25 rear wall separating said socket from said chamber, the chamber being defined in a top surface of the housing,

a first pocket located on a first side of the chamber, forward of the fan and motor assembly
30 and a second pocket located on a second side of the chamber forward of the fan and motor assembly, the first and second pockets being defined in a bottom surface of the housing.

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8. The carpet extractor of claim 1, wherein the housing further comprises a first locking member for selectively engaging a second locking member on the recovery tank to lock the recovery tank to the housing.

5

9. A carpet extractor comprising:
a reservoir for storing and providing a supply of cleaning solution;

a base assembly including:

10 a distributor fluidly connected with the reservoir for selectively applying the cleaning solution to a floor surface to be cleaned,

a nozzle for removing dirty cleaning solution from the floor surface,

15 a recovery tank, fluidly connected with the nozzle for collecting the dirty cleaning solution from the nozzle,

a vacuum source fluidly connected with the recovery tank for drawing a vacuum on the recovery tank, and

20 a housing for holding said nozzle, said recovery tank, and said vacuum source, said housing comprising:

25 a socket for selectively receiving the recovery tank, and

a chamber, located rearward of the socket, for holding the vacuum source.

10. The carpet extractor of claim 9, wherein
30 the extractor further includes a pump, fluidly connected between the reservoir and the distributor, and the housing includes a pocket which receives the pump.

11. The carpet extractor of claim 10, wherein

the pocket is positioned rearward of the socket.

12. The carpet extractor of claim 11, wherein the pocket is positioned on one side of the chamber.

5

13. The carpet extractor of claim 9, further comprising:

a motor drivingly connected to a brushroll mounted on the housing and wherein the housing includes an indentation which receives the brushroll motor, the indentation being positioned rearward of the socket.

10

14. The carpet extractor of claim 13, wherein the indentation is positioned on another side of the chamber.

15

15. The carpet extractor of claim 9, wherein the housing includes a lower section and an upper section which are connected together to define the chamber therebetween.

20

16. The carpet extractor of claim 14, wherein the vacuum source includes a suction fan driven by a motor and the chamber has a suction fan-holding cavity and an air inlet cavity.

25

17. The carpet extractor of claim 15, wherein the chamber is partially defined in an upper surface of the housing lower section and further comprising:

30

a pocket, which is defined in a lower surface of the housing lower section; and,

an indentation, which is defined in the lower surface of the housing lower section.

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18. The carpet extractor of claim 17, wherein the chamber is located along an axial center line of the housing and wherein the pocket and the indentation are located on opposite sides of the axial center line.

5

19. A carpet extractor comprising:

a base assembly and a handle assembly pivotally mounted on the base assembly;

10 a recovery tank selectively mounted on the base assembly;

a brushroll mounted on the base assembly;
the base assembly including a housing comprising:

15 a socket defined by a front wall, a pair of opposed side walls and a rear wall, the socket selectively holding the recovery tank,

a first compartment located rearwardly of the socket for holding a fan, and

20 a second compartment located rearwardly of the first compartment for holding a motor for driving the fan.

20. The carpet extractor of claim 19, wherein the first and second compartments are axially aligned.

25 21. The carpet extractor of claim 19, further comprising:

a cleaning solution supply pump for supplying pressurized cleaning fluid to a distributor and the housing includes a pocket for holding the pump.

30

22. The carpet extractor of claim 21, wherein the pocket is located rearward of the socket.

23. The carpet extractor of claim 21, wherein

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the pocket is located on one side of the first and second compartments.

24. The carpet extractor of claim 22, further
5 comprising:

a brushroll motor for driving the brushroll,
and wherein the housing includes an indentation for
holding the brushroll motor.

10 25. The carpet extractor of claim 24, wherein
the indentation is located on another side of the first
and second compartments.

26. The carpet extractor of claim 24, wherein
15 the pocket and indentation are located forwardly of the
fan.

27. The carpet extractor of claim 19, further
comprising a third compartment located forwardly of the
20 first compartment, said third compartment serving as an
air inlet chamber for said fan located in said first
compartment.

28. An upright carpet extractor of the type
25 which applies a cleaning fluid to a floor surface and
vacuums dirty cleaning fluid, the carpet extractor
comprising:

a recovery tank for collecting the dirty
cleaning fluid;and,

30 a housing including:

a socket for selectively receiving said
recovery tank said socket comprising at least two
side walls, and

a chamber, located rearward of the socket

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which holds a suction fan and motor assembly; and
a nozzle, located adjacent a forward end
of the socket, which vacuums the dirty cleaning fluid
from the floor surface.

5

29. The carpet extractor of claim 28, wherein
the housing further comprises a first pocket for receiving a
pump for pressurizing the cleaning fluid.

10

30. The carpet extractor of claim 29, wherein
the first pocket is positioned rearward of the socket and on
one side of the chamber.

15

31. The carpet extractor of claim 29, wherein
the housing further comprises a second pocket for receiving a
motor for rotating a brushroll mounted in the housing.

20

32. The carpet extractor of claim 28, wherein
the housing further comprises:
a first pocket located on a first side of the
chamber, forward of the fan and motor assembly and a second
pocket located on a second side of the chamber forward of the
fan and motor assembly.

25

33. A carpet extractor comprising:
a reservoir for storing and providing a supply
of cleaning solution;

a base assembly including:

30

a distributor fluidly connected with the
reservoir for selectively applying the cleaning solution
to a floor surface to be cleaned,

a nozzle for removing dirty cleaning
solution from the floor surface,

a recovery tank, fluidly connected with

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the nozzle for collecting the dirty cleaning solution from the nozzle,

a vacuum source fluidly connected with the recovery tank for drawing a vacuum on the recovery tank,

5 the extractor further includes a pump, fluidly connected between the reservoir and the distributor, and

a housing for holding said nozzle, said recovery tank, and said vacuum source, said housing comprising:

a first section for selectively receiving the recovery tank,

a second section, located adjacent the first section, for holding the vacuum source, and

15 a pocket which receives the pump.

34. The carpet extractor of claim 33, wherein the pocket is positioned rearward of the first section.

20 35. The carpet extractor of claim 33, wherein the pocket is positioned on one side of the chamber.

36. A carpet extractor comprising:

25 a reservoir for storing and providing a supply of cleaning solution;

a base assembly including:

a distributor fluidly connected with the reservoir for selectively applying the cleaning solution to a floor surface to be cleaned,

30 a nozzle for removing dirty cleaning solution from the floor surface,

a recovery tank, fluidly connected with the nozzle for collecting the dirty cleaning solution from the nozzle,

35 a vacuum source fluidly connected with the

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recovery tank for drawing a vacuum on the recovery tank, and
a housing for holding said nozzle, said
recovery tank, and said vacuum source, said housing
comprising:

5 a first section for selectively receiving
the recovery tank, and
a second section, located adjacent the
first section, for holding the vacuum source; and
a motor drivingly connected to a brushroll
10 mounted on the housing, the housing including an
indentation which receives the brushroll motor.

37. The carpet extractor of claim 36, wherein
the indentation is positioned on another side of the second
15 section.

38. The carpet extractor of claim 37, wherein
the vacuum source includes a suction fan driven by a motor and
the second section has a suction fan-holding cavity and an air
20 inlet cavity.

39. The carpet extractor of claim 36, wherein
the housing includes a lower section and an upper section
which are connected together to define the second section
25 therebetween.

40. A carpet extractor comprising:
a reservoir for storing and providing a supply
of cleaning solution;
30 a base assembly including:
a distributor fluidly connected with the
reservoir for selectively applying the cleaning solution
to a floor surface to be cleaned,
a nozzle for removing dirty cleaning
35 solution from the floor surface,

- 38 -

a recovery tank, fluidly connected with the nozzle for collecting the dirty cleaning solution from the nozzle,

5 a vacuum source fluidly connected with the recovery tank for drawing a vacuum on the recovery tank, and

a housing for holding said nozzle, said recovery tank, and said vacuum source, said housing comprising:

10 a first section for selectively receiving the recovery tank,

a second section, located adjacent the first section, for holding the vacuum source,

15 a lower section and an upper section which are connected together to define the second section therebetween, the second section being partially defined in an upper surface of the housing lower section,

a pocket, which is defined in a lower surface of the housing lower section, and

20 an indentation, which is defined in the lower surface of the housing lower section.

41. The carpet extractor of claim 40, wherein the chamber is located along an axial center line of the housing and wherein the pocket and the indentation are located on opposite sides of the axial center line.

42. A carpet extractor comprising:

30 a cleaning solution supply pump for supplying pressurized cleaning fluid to a distributor;

a base assembly and a handle assembly pivotally mounted on the base assembly;

a recovery tank selectively mounted on the base assembly;

35 a brush mounted on the base assembly;

- 39 -

the base assembly including a housing comprising:

a front wall and a pair of opposed side walls,
the housing selectively holding the recovery tank, and

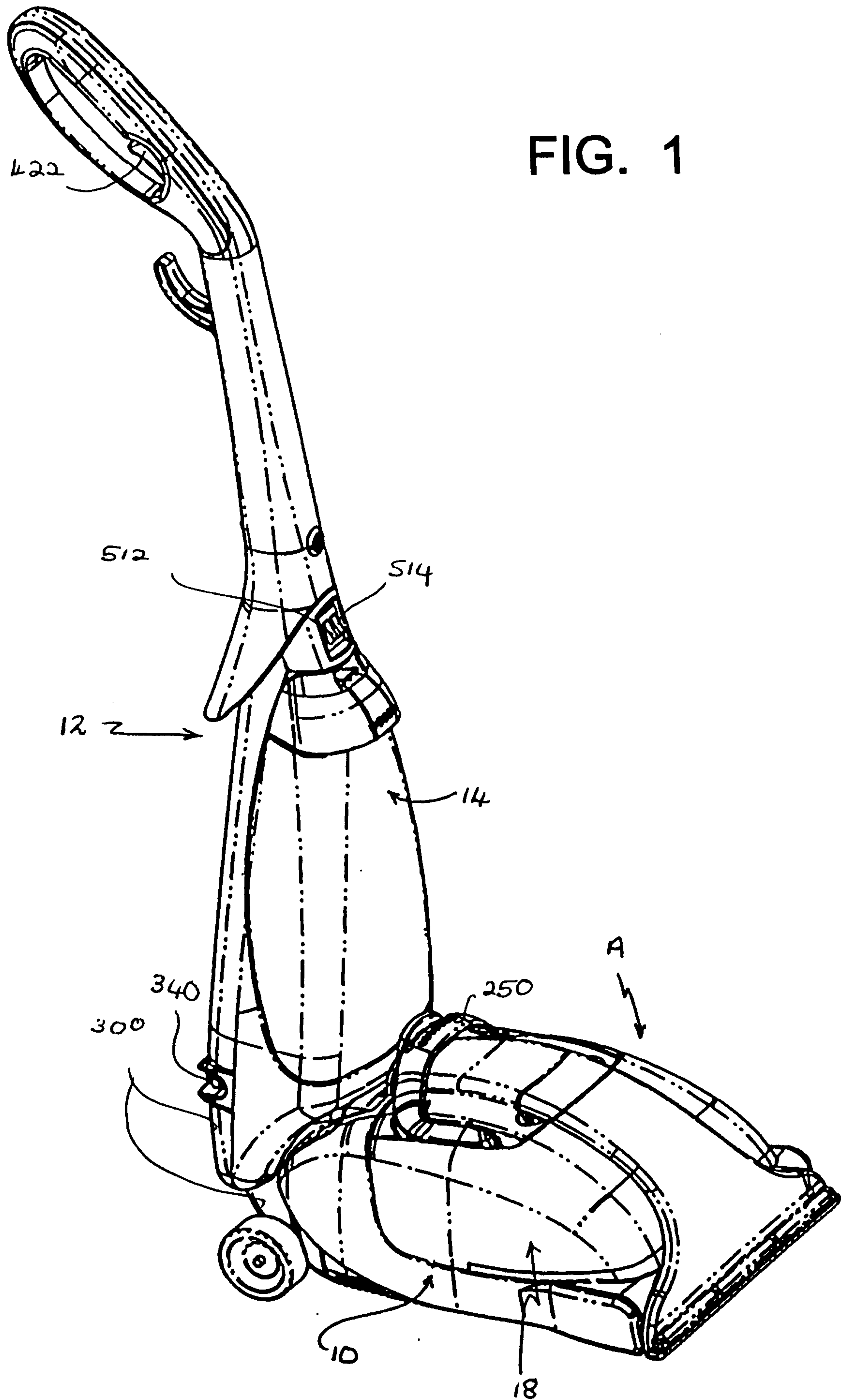
the housing including:

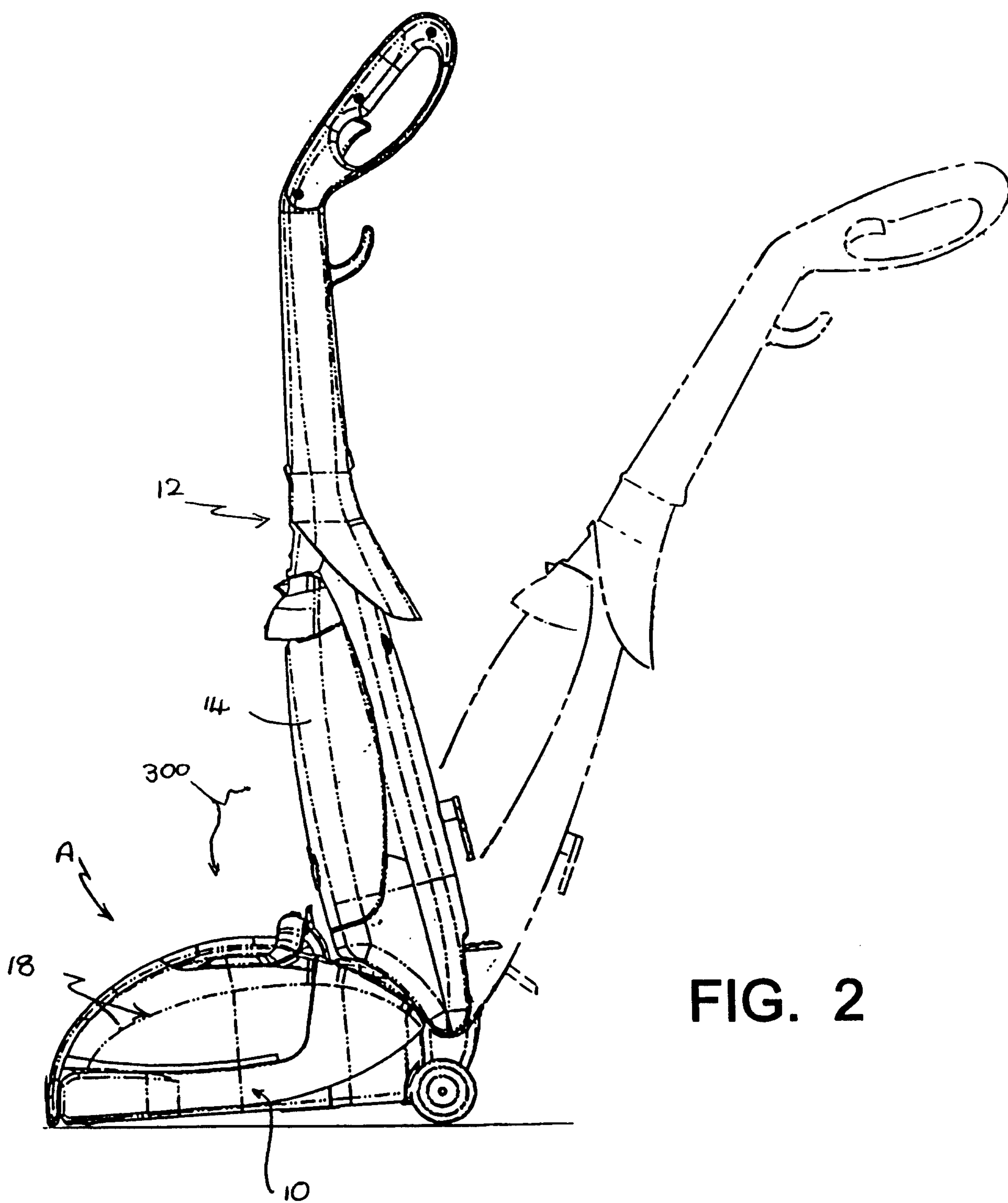
5 a section for supporting a motor for
driving a fan, and
a pocket for holding the pump.

43. The carpet extractor of claim 42, wherein
10 the brush is rotatably mounted.

44. The carpet extractor of claim 42, further
comprising a motor for driving the brush, and wherein the
housing includes an indentation for holding the brush motor.

15





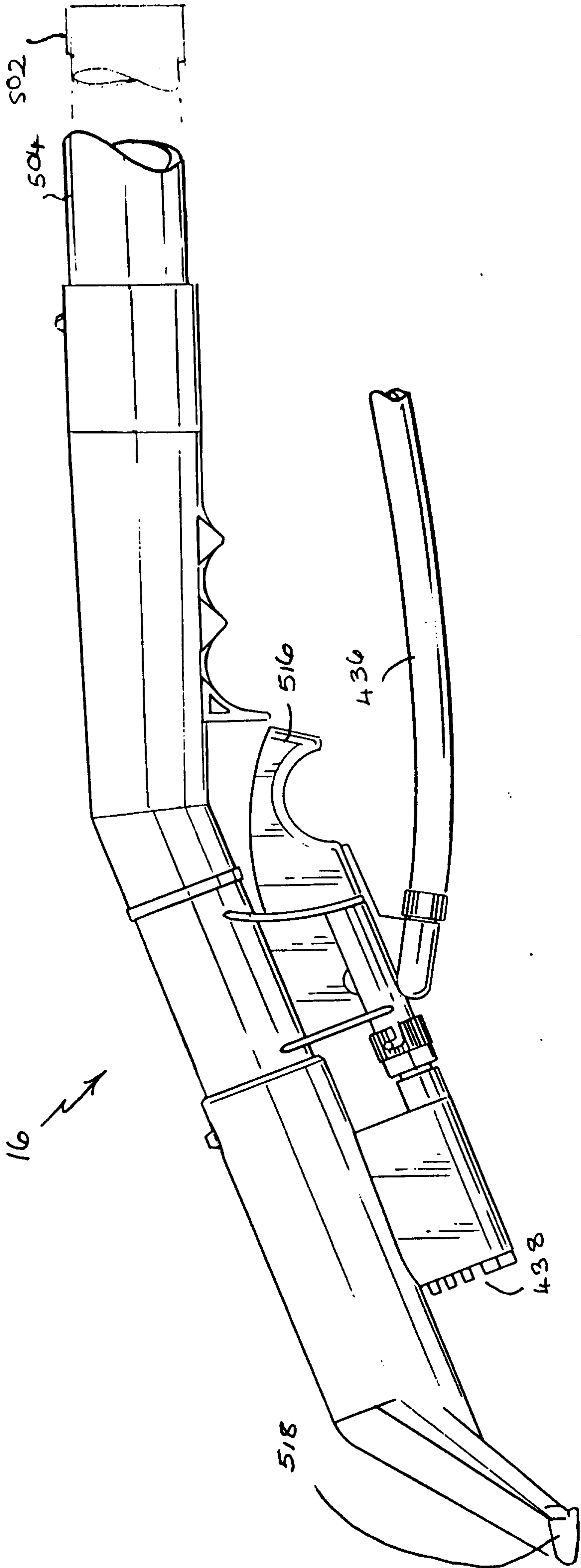


FIG. 3

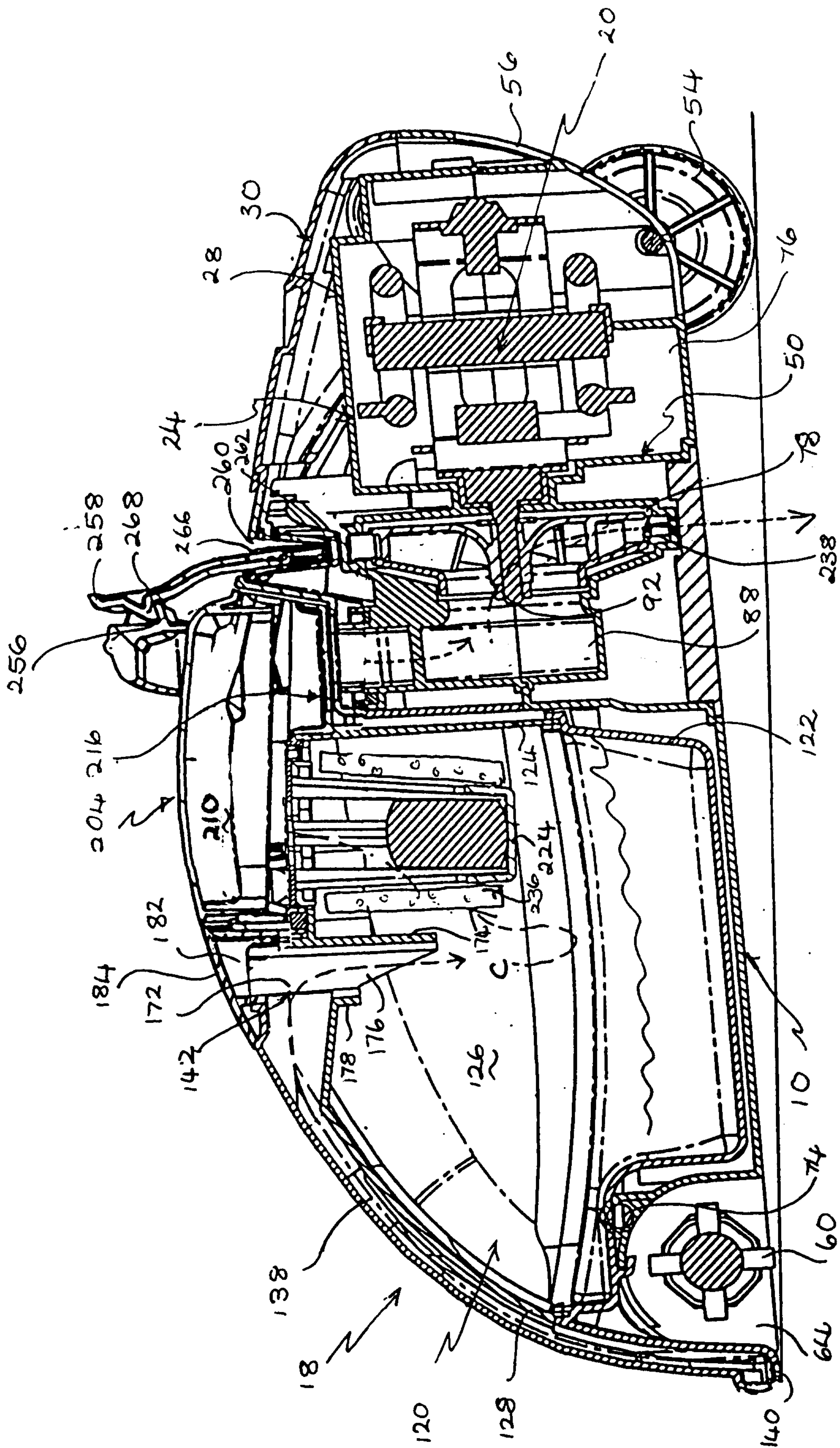


FIG. 4

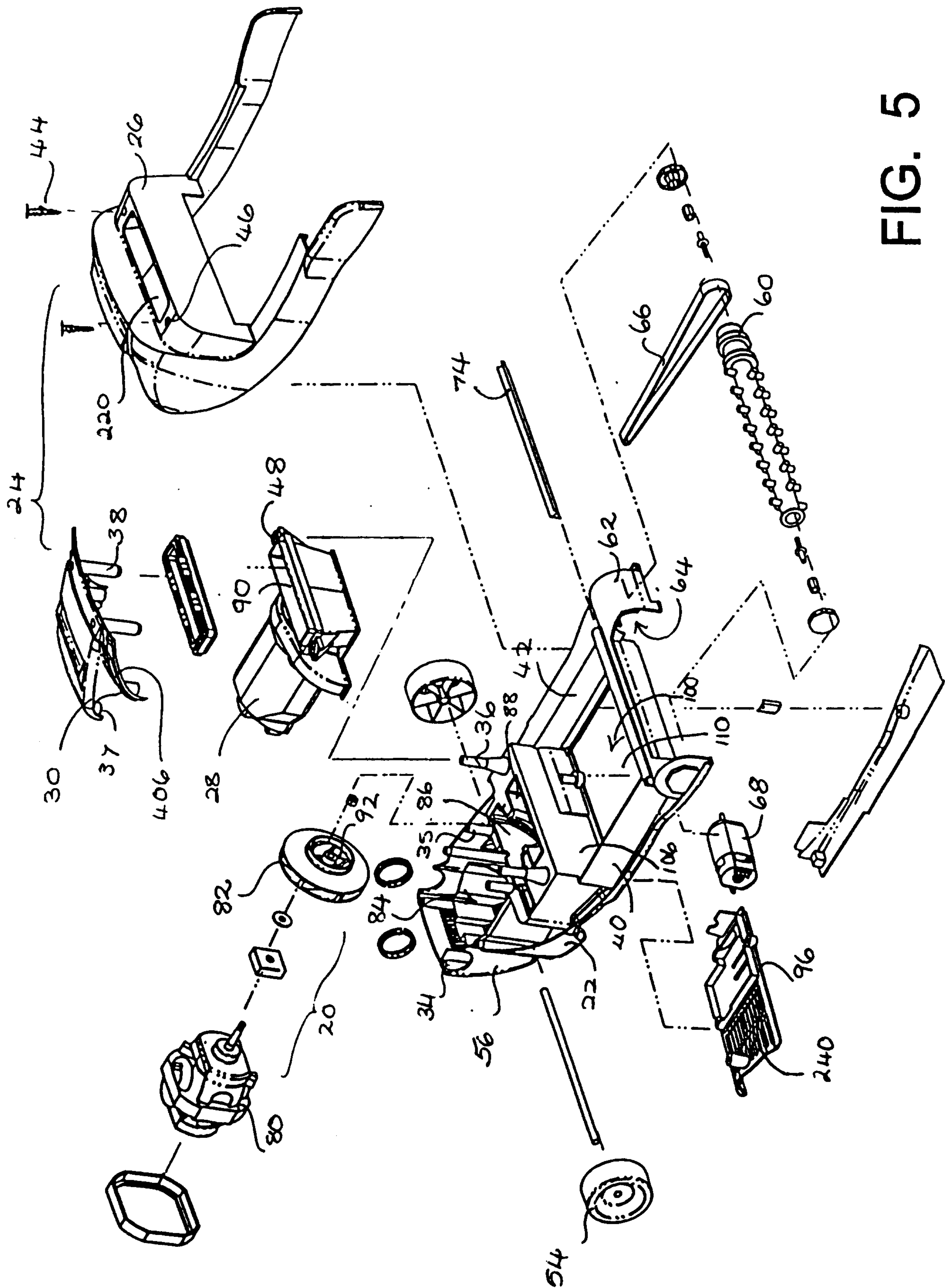


FIG. 5

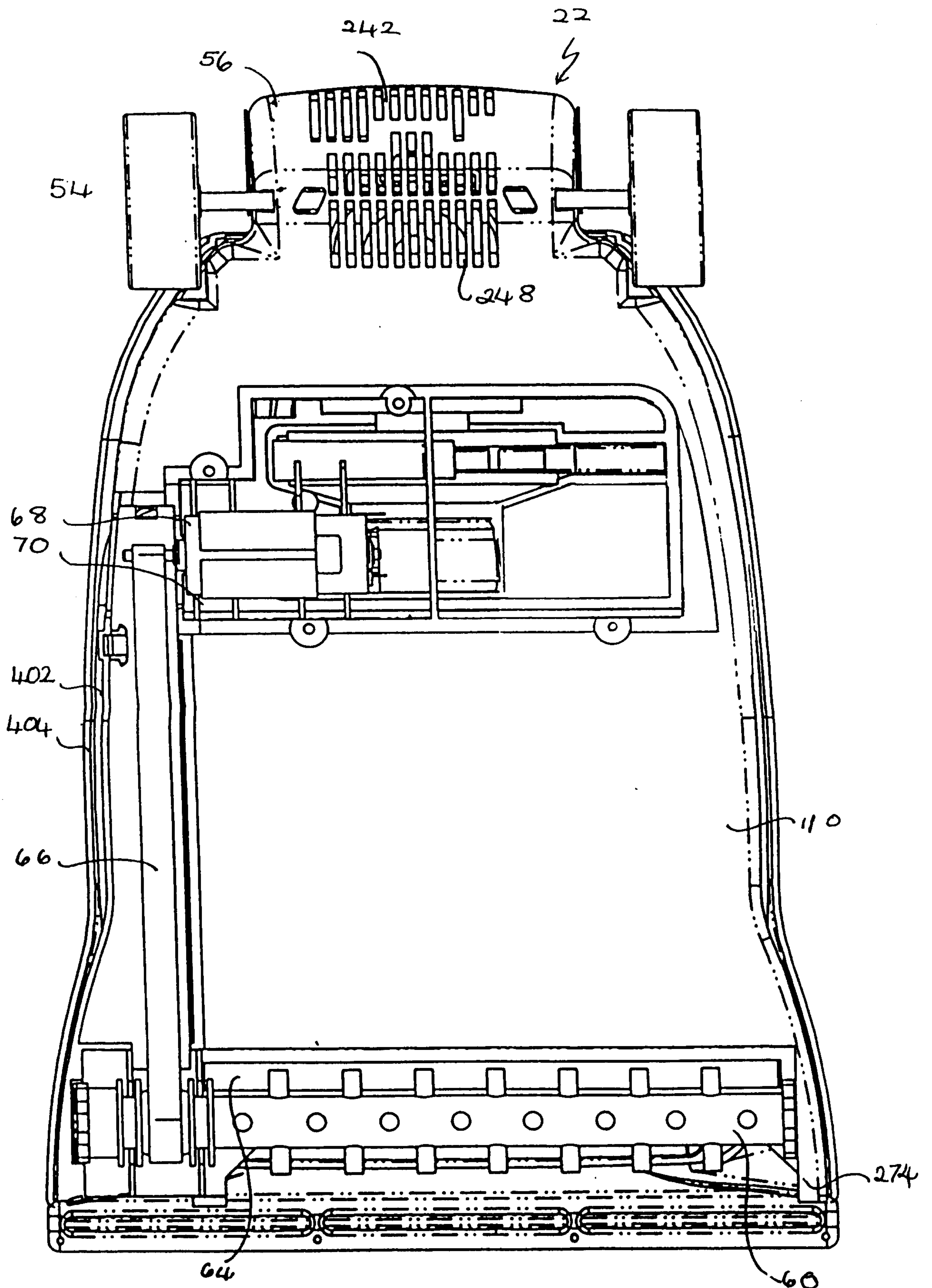


FIG. 6

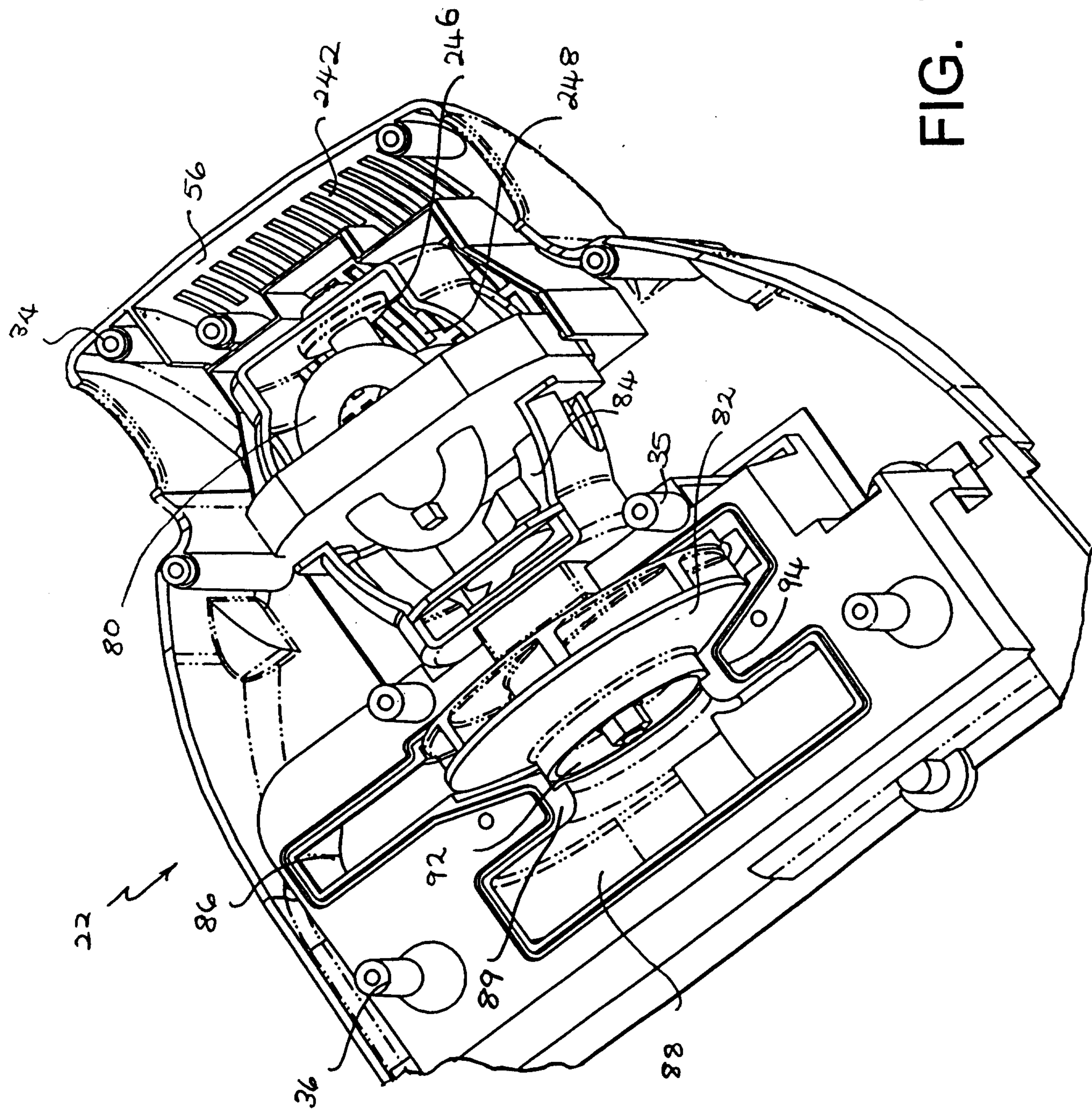


FIG. 7

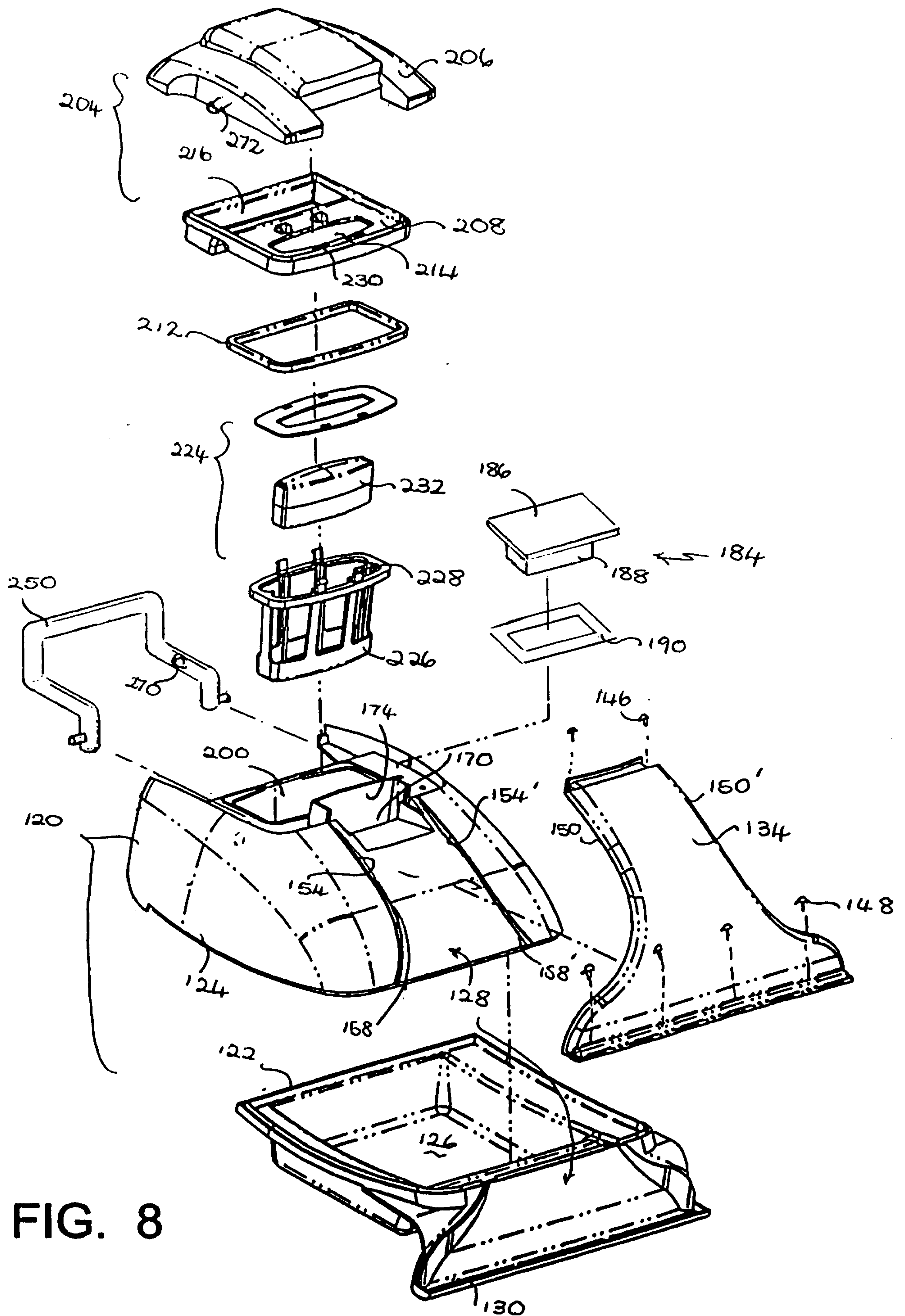


FIG. 8

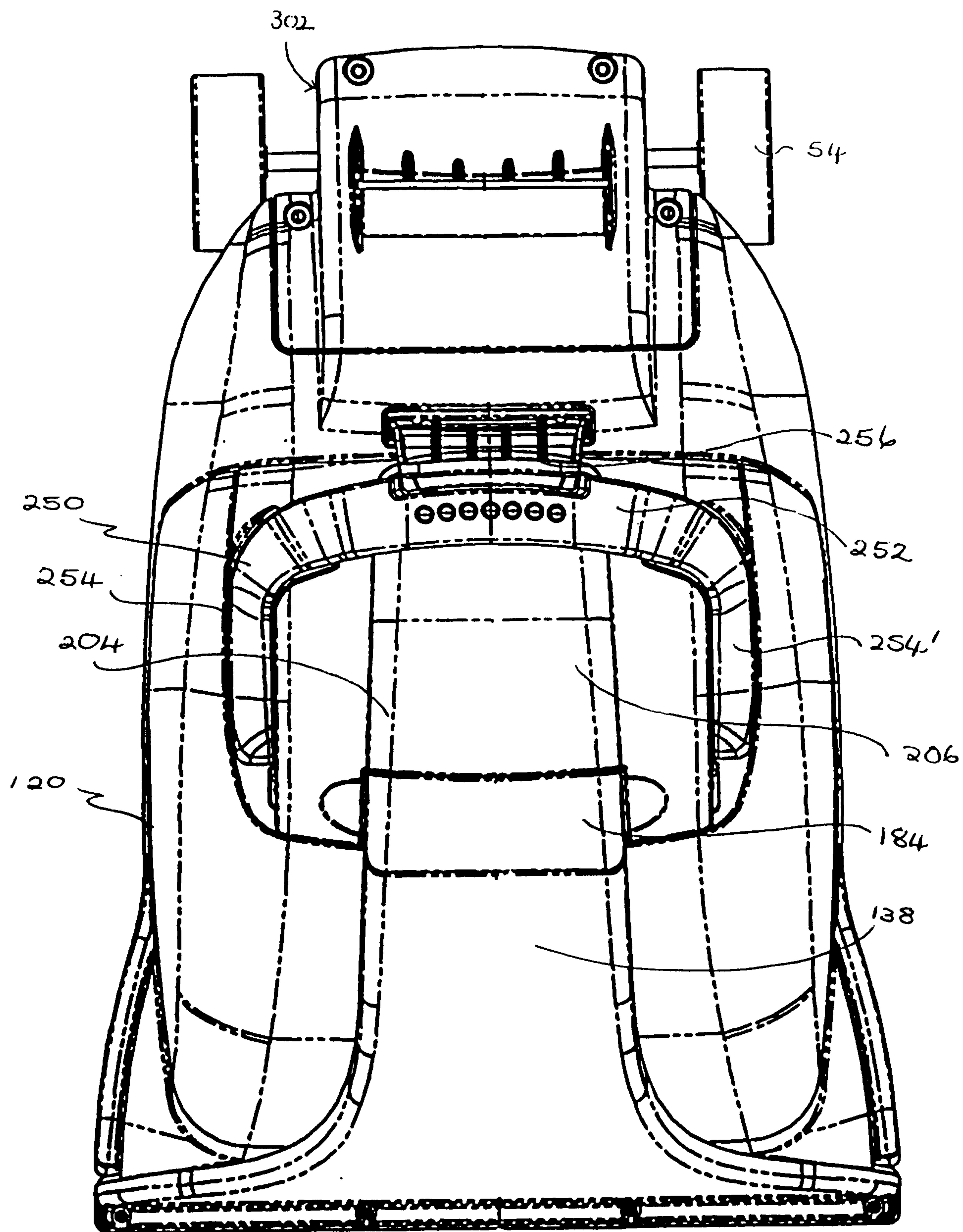
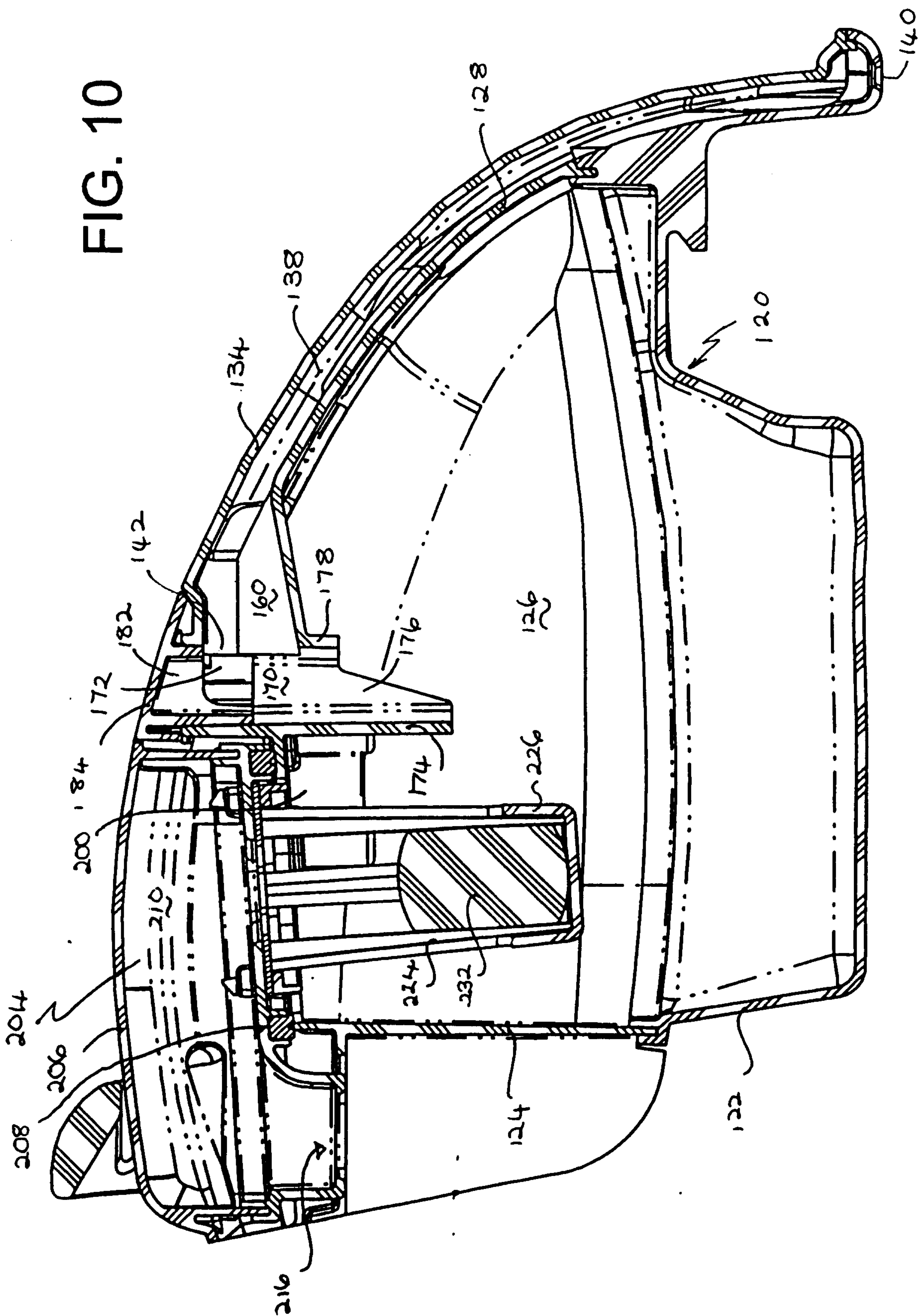


FIG. 9



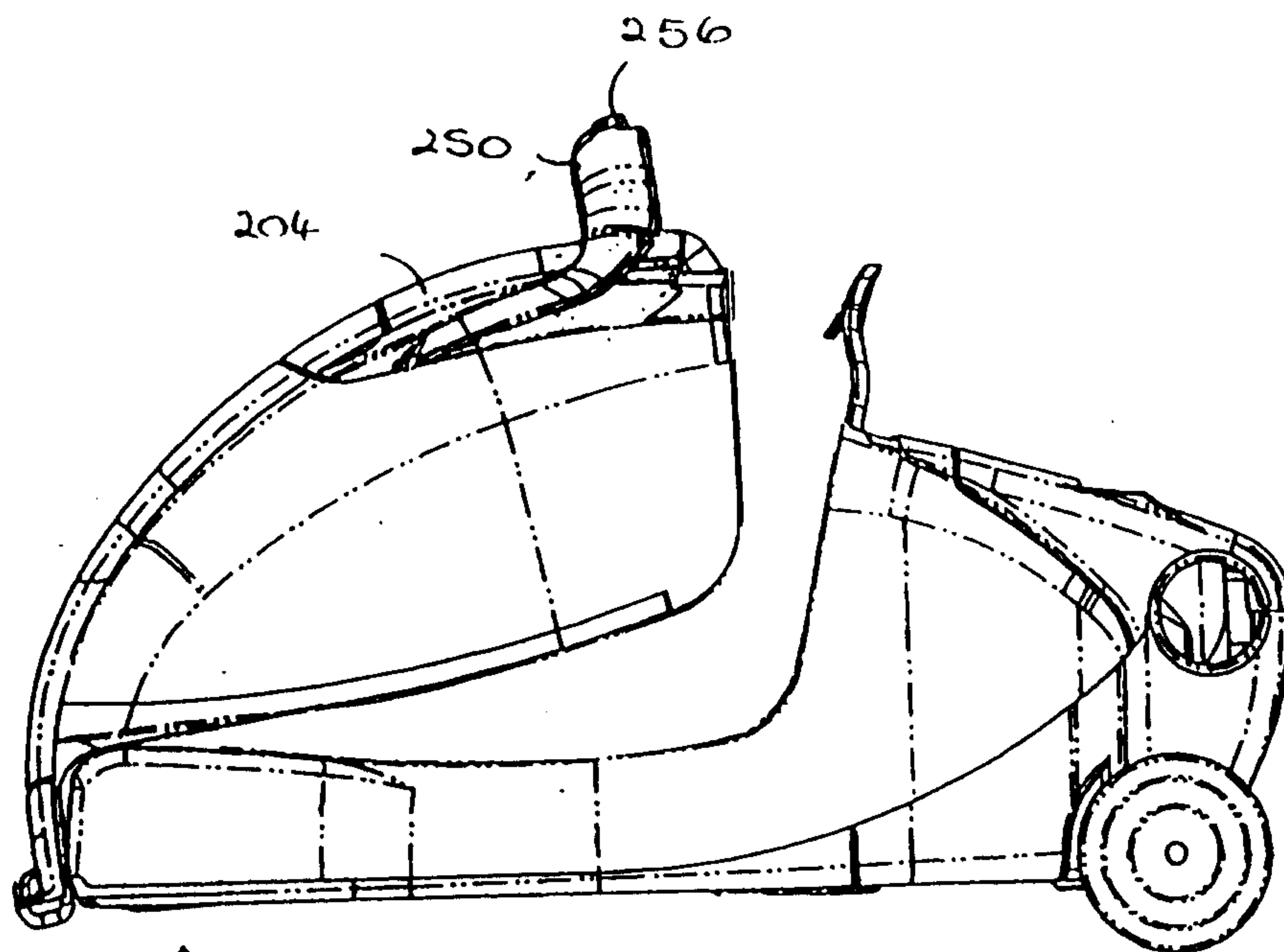


FIG. 11A.

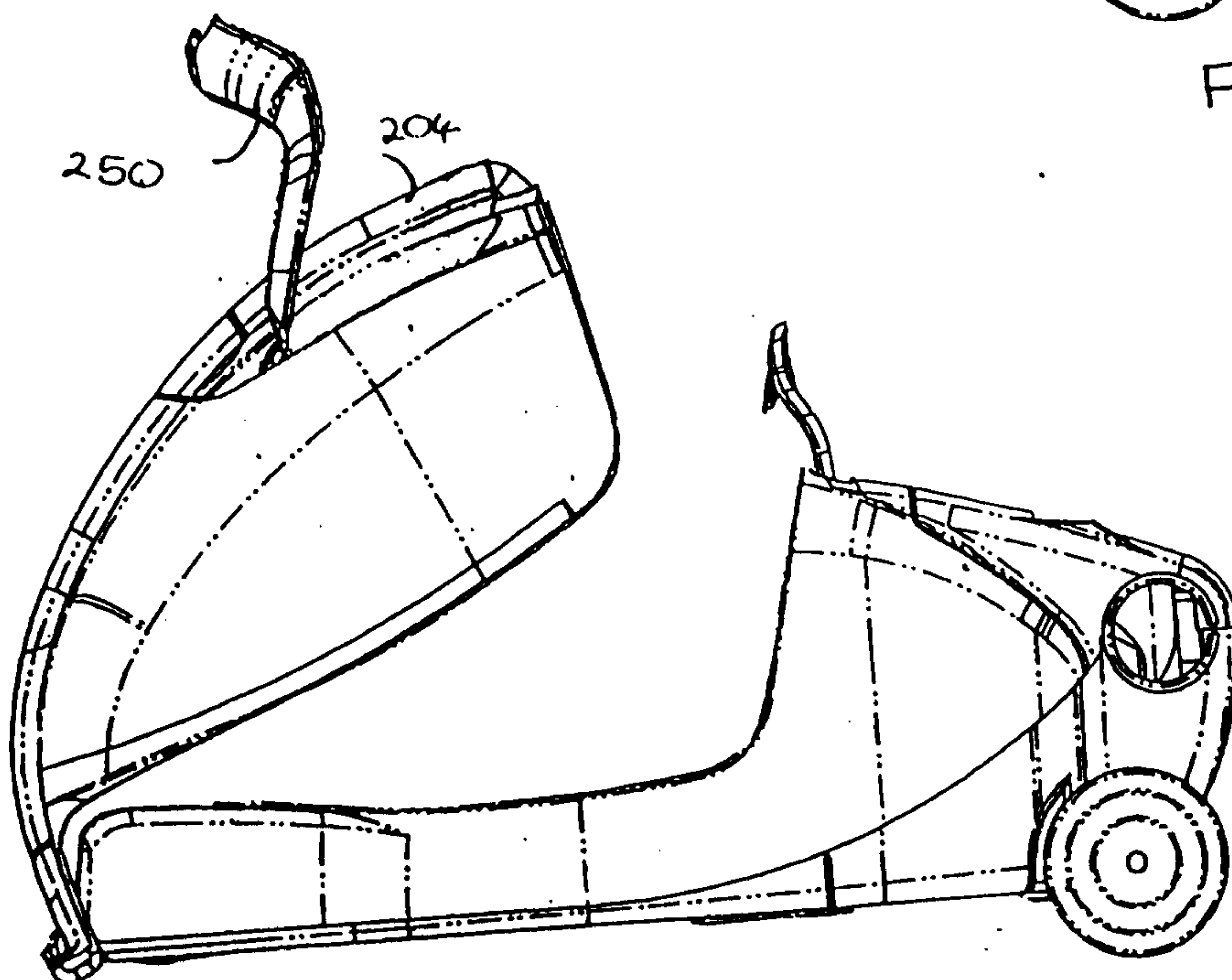


FIG. 11B.

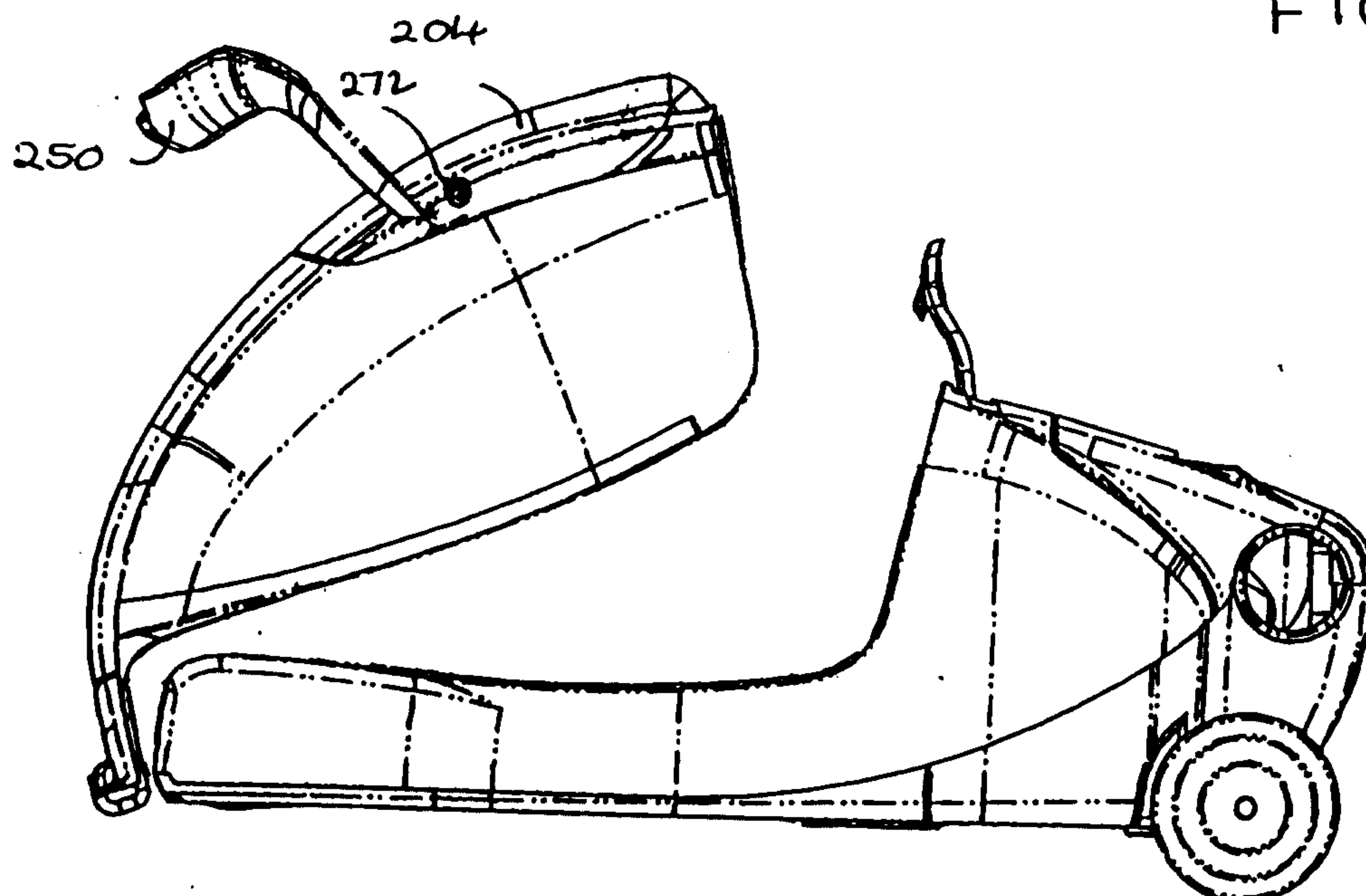


FIG. 11C

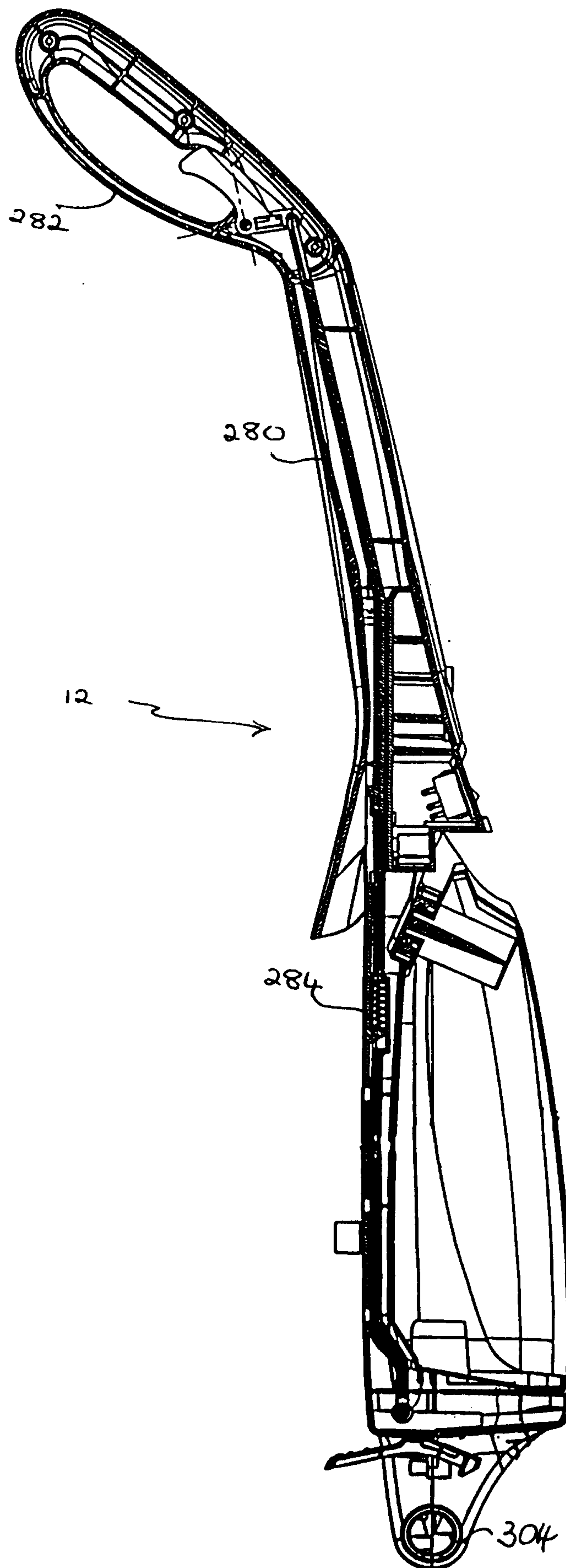


FIG. 12

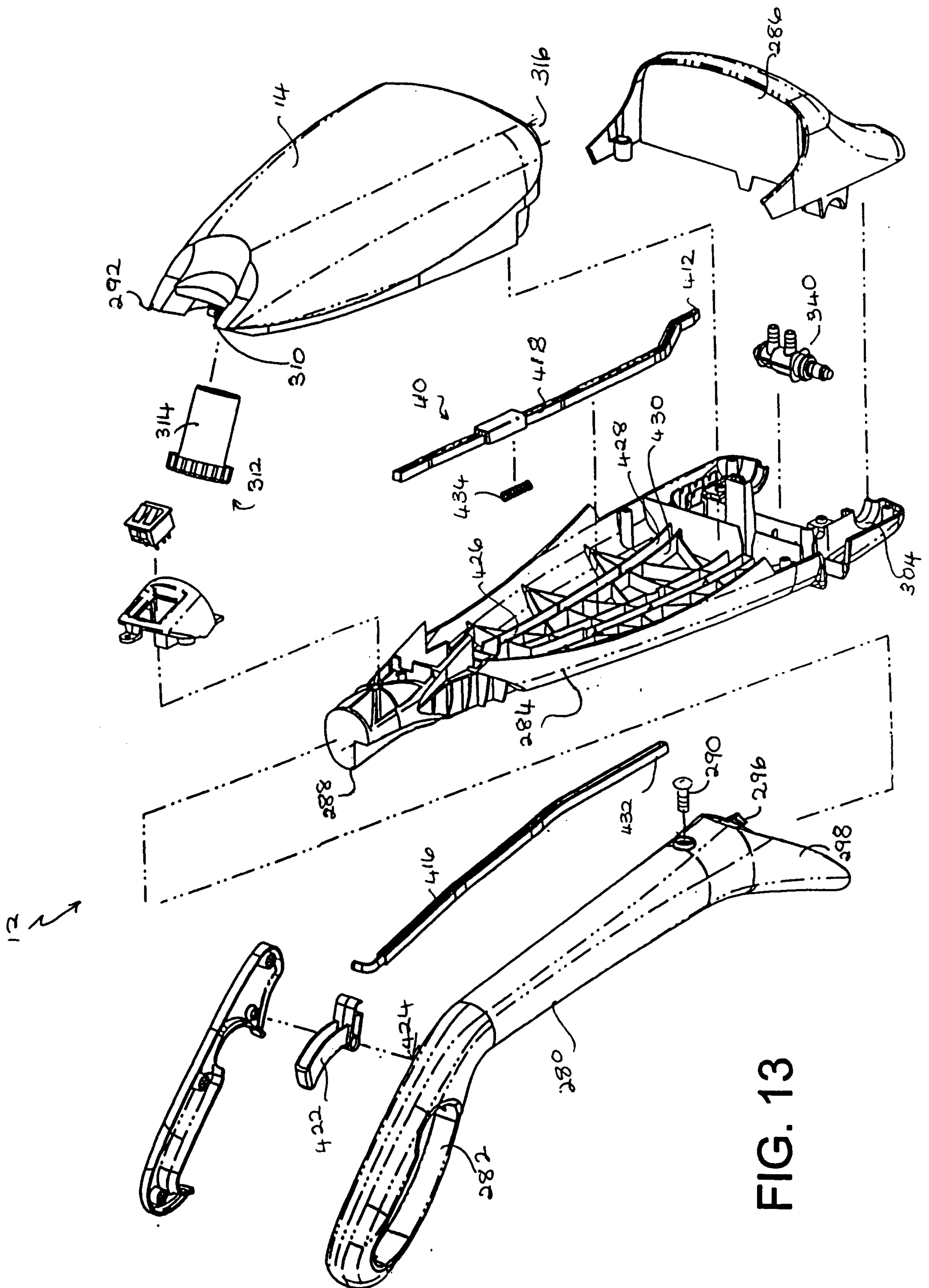
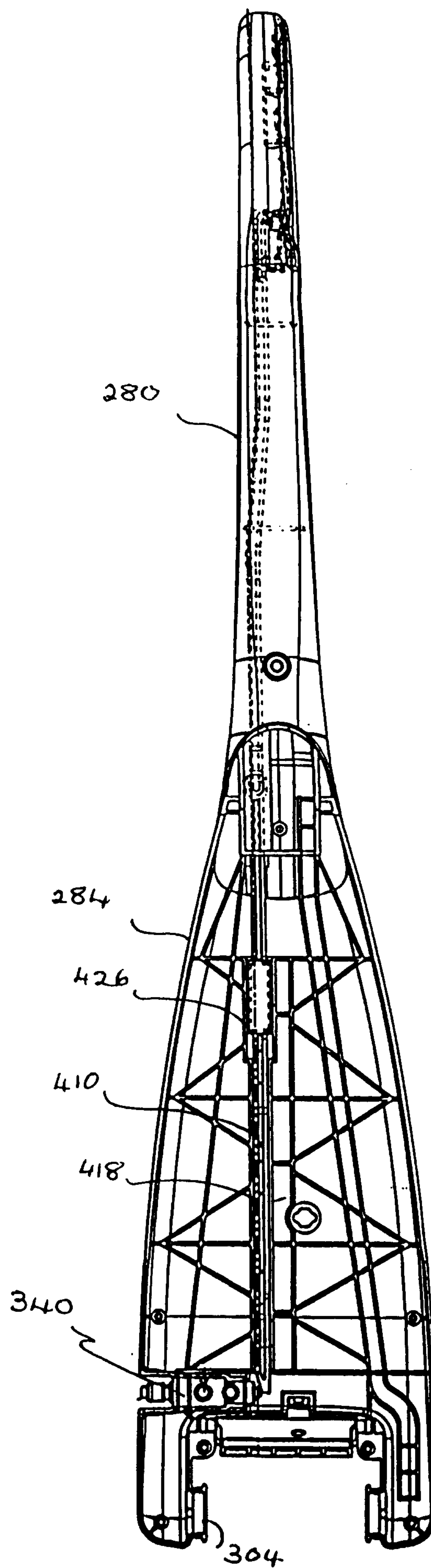


FIG. 14



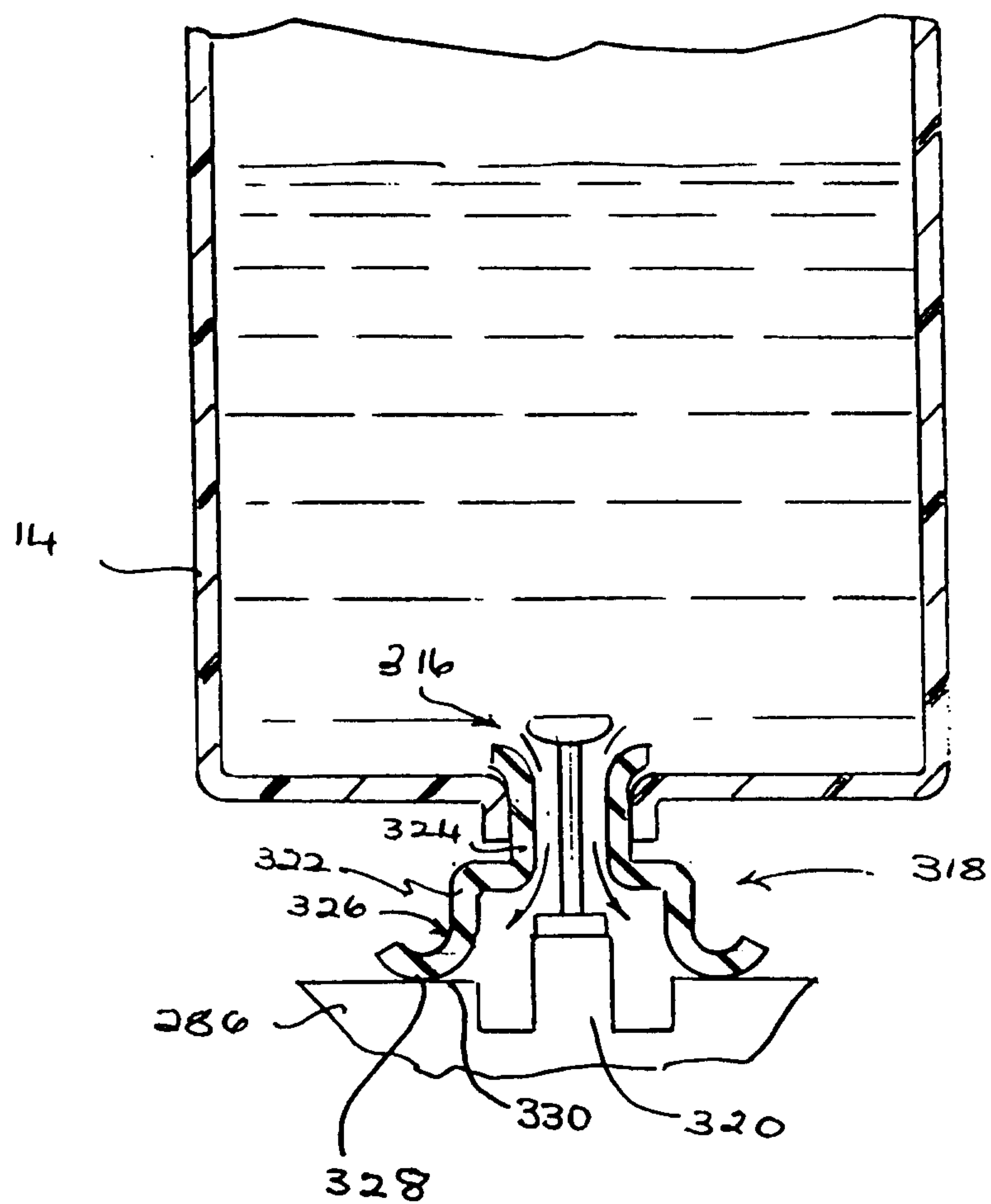


FIG. 15

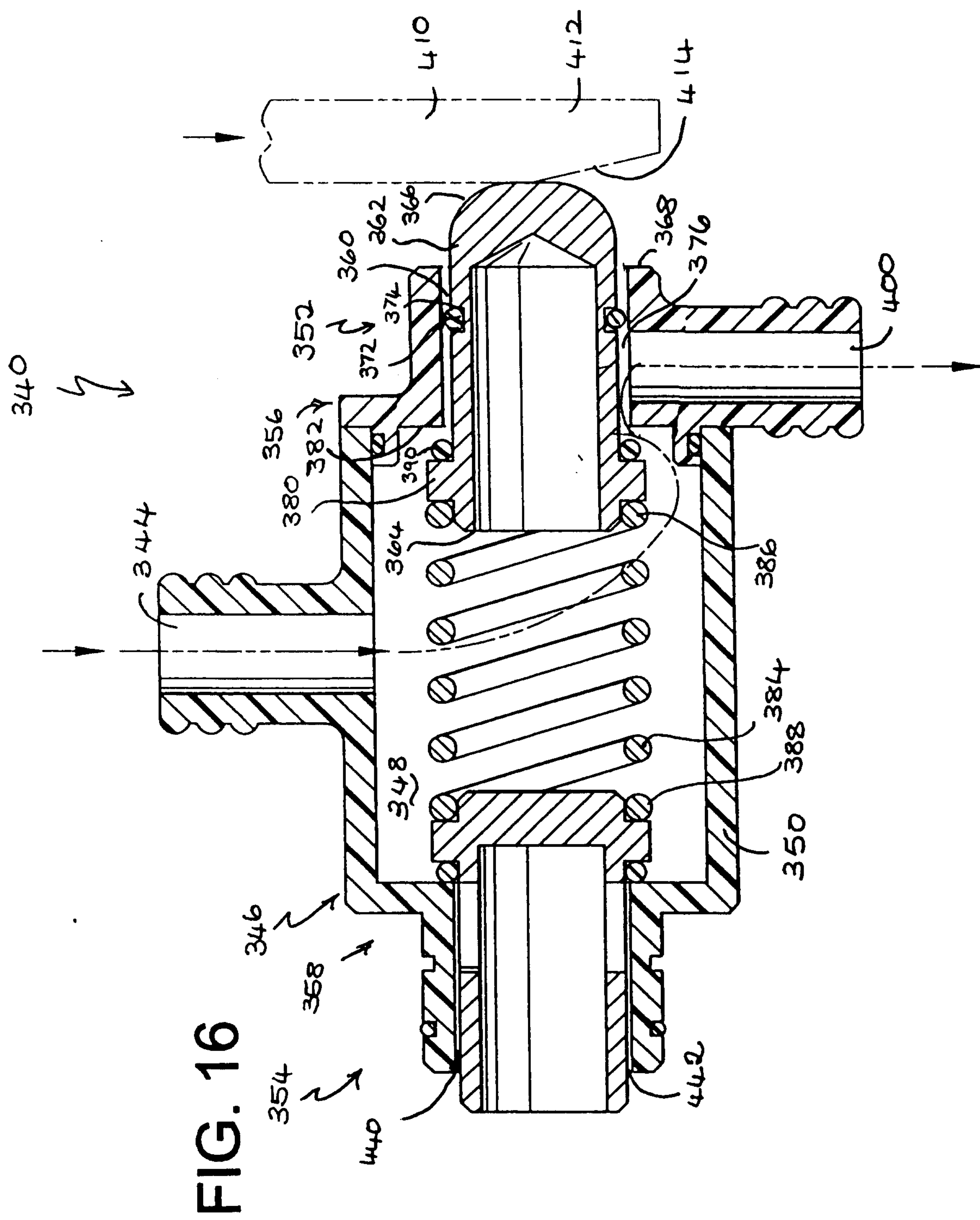
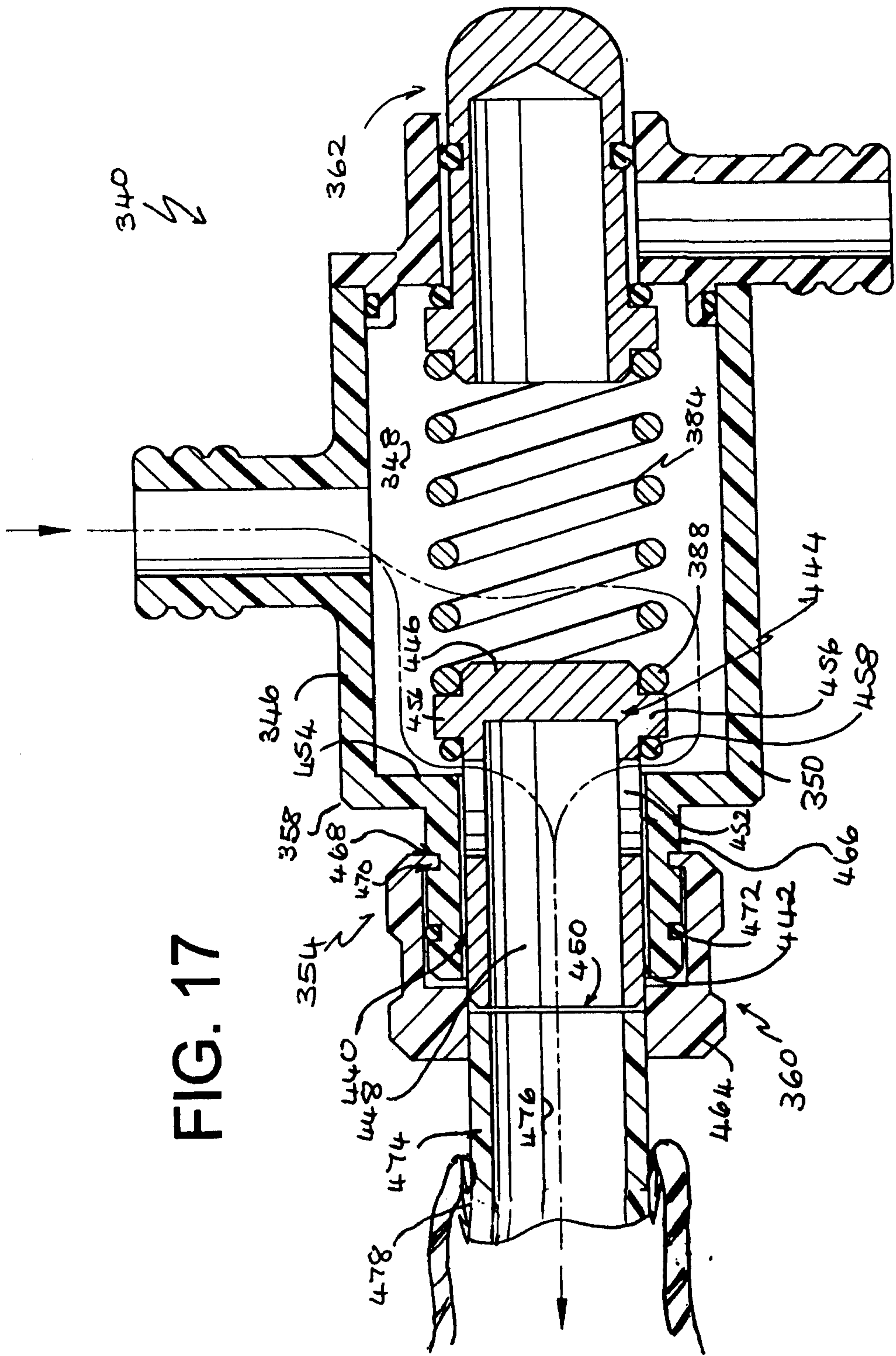


FIG. 17



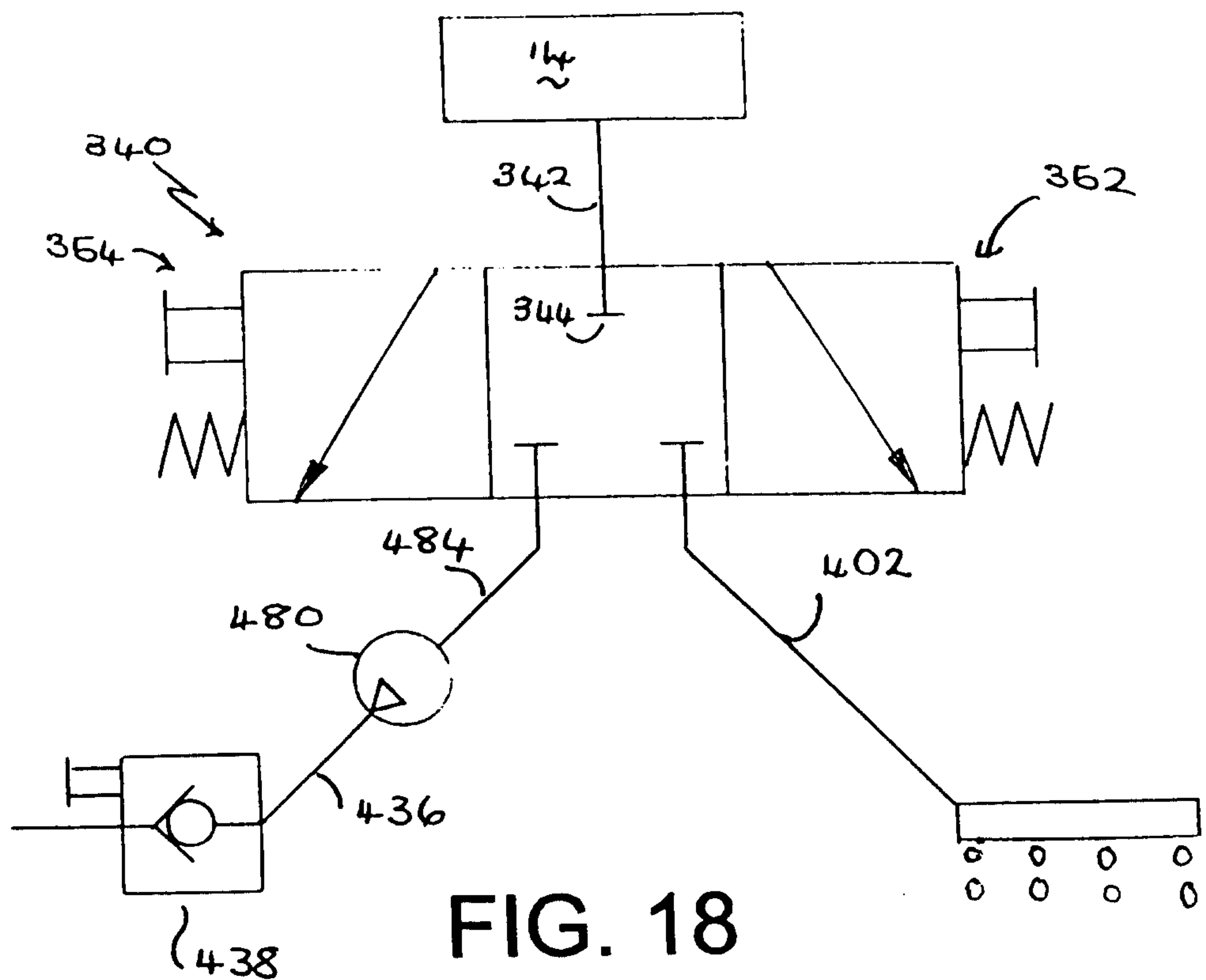


FIG. 18

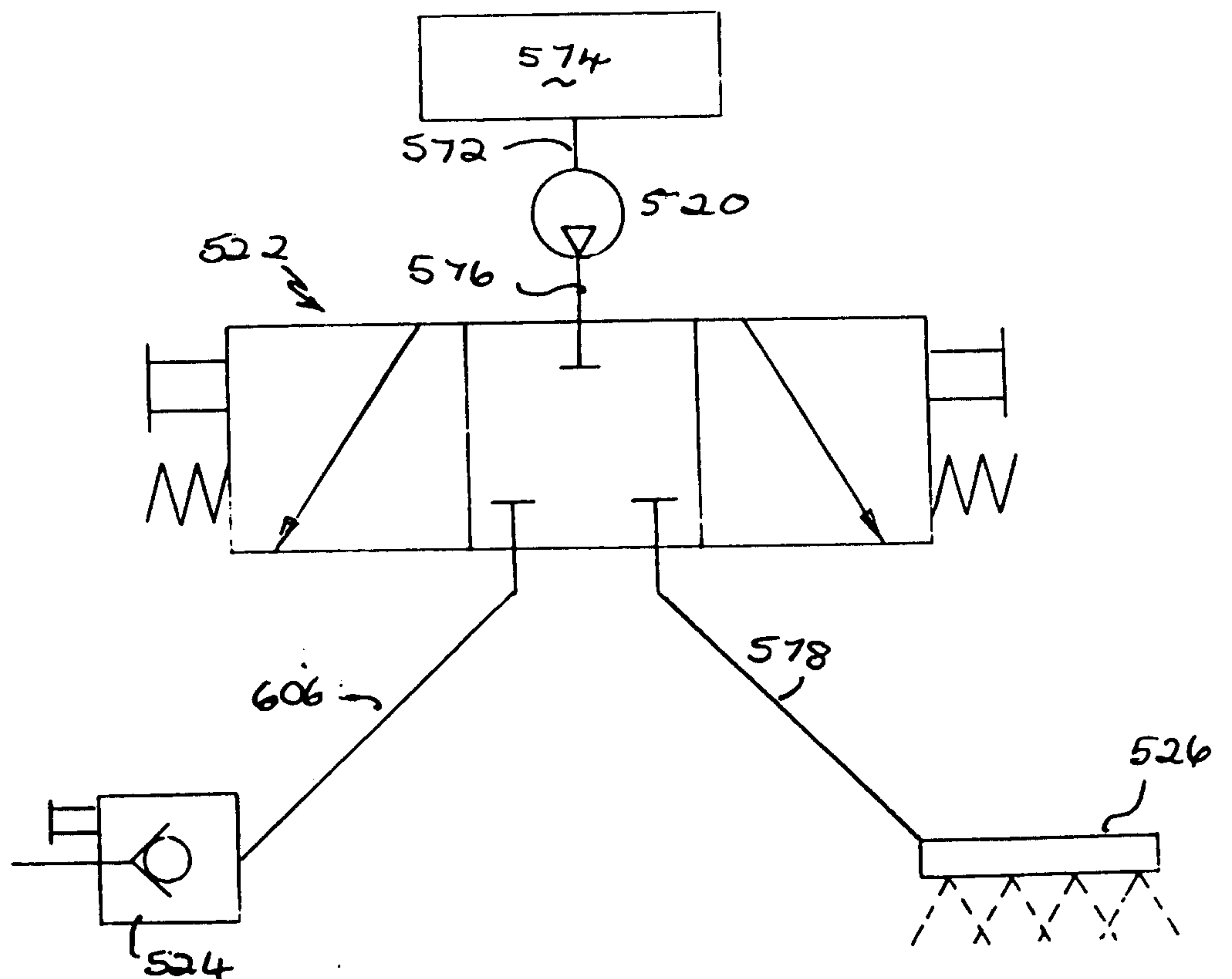


FIG. 19

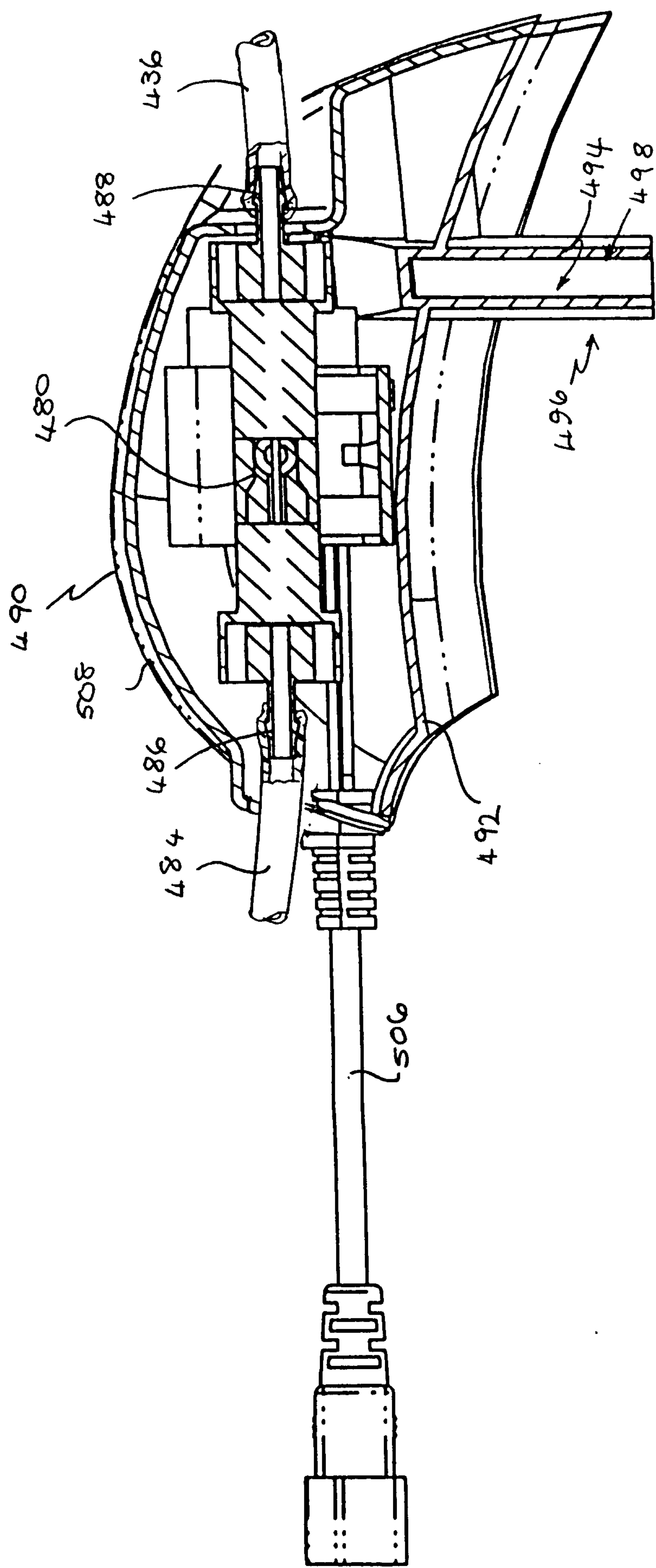


FIG.20

FIG. 21

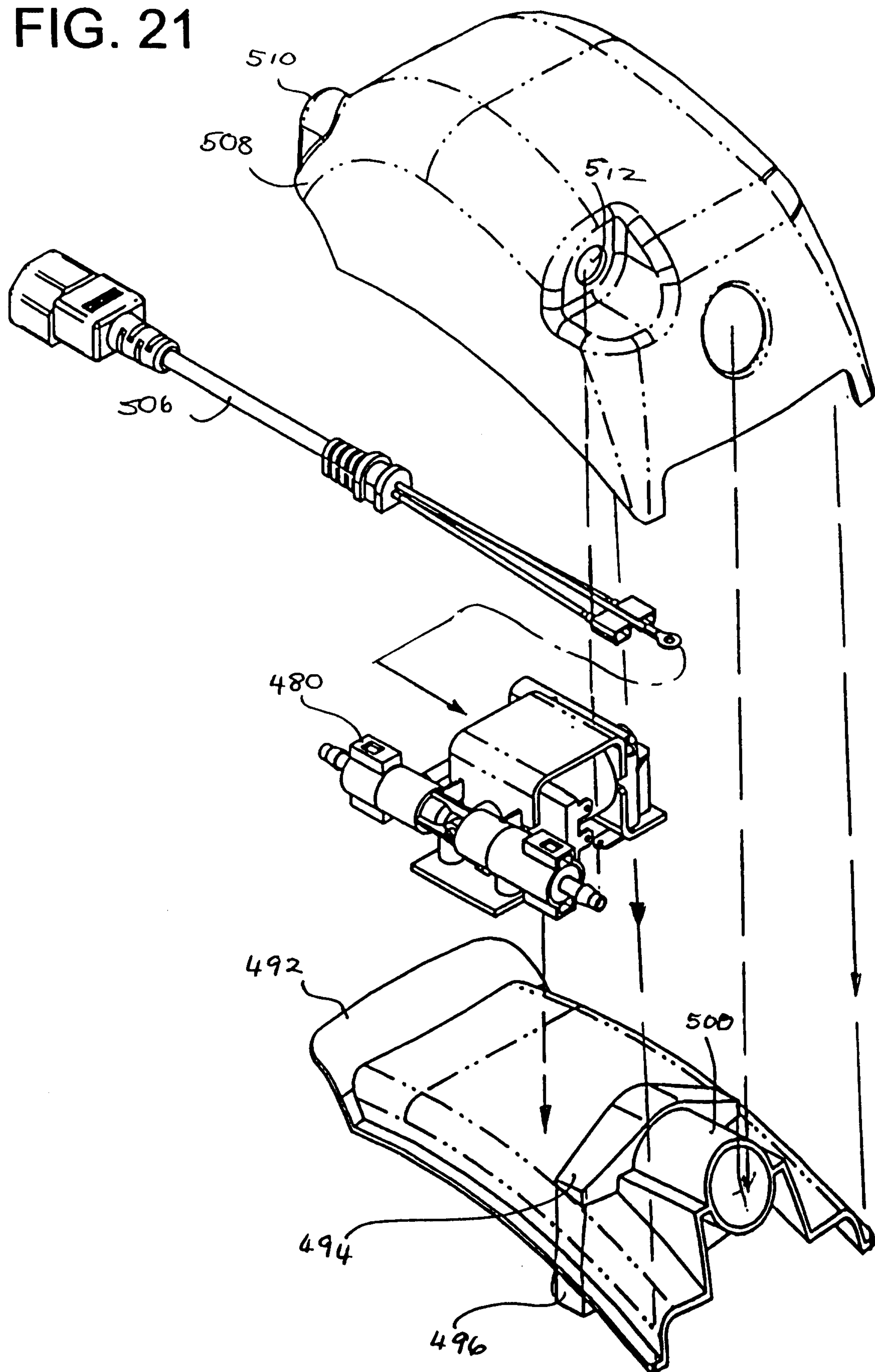
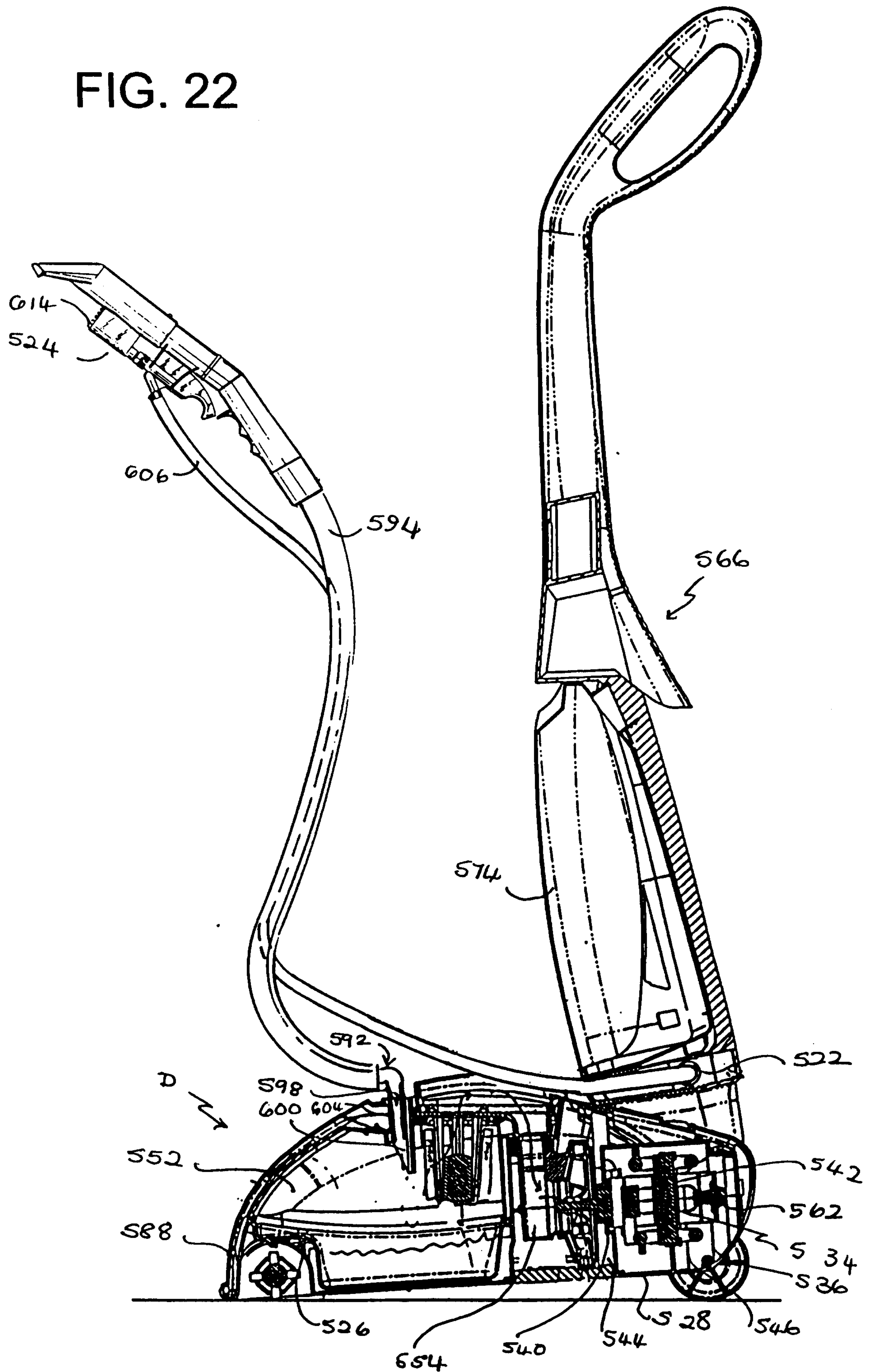


FIG. 22



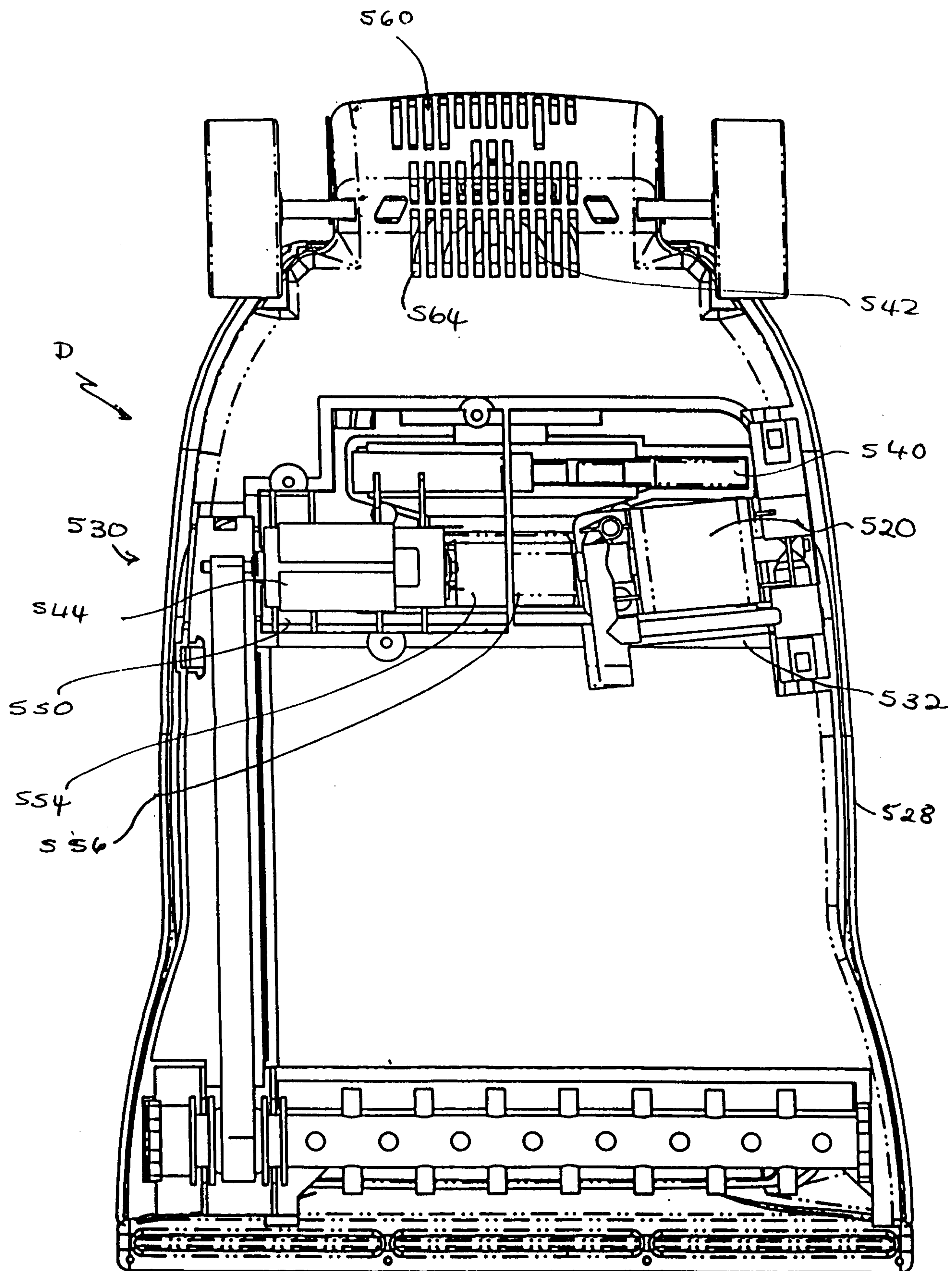


FIG. 23

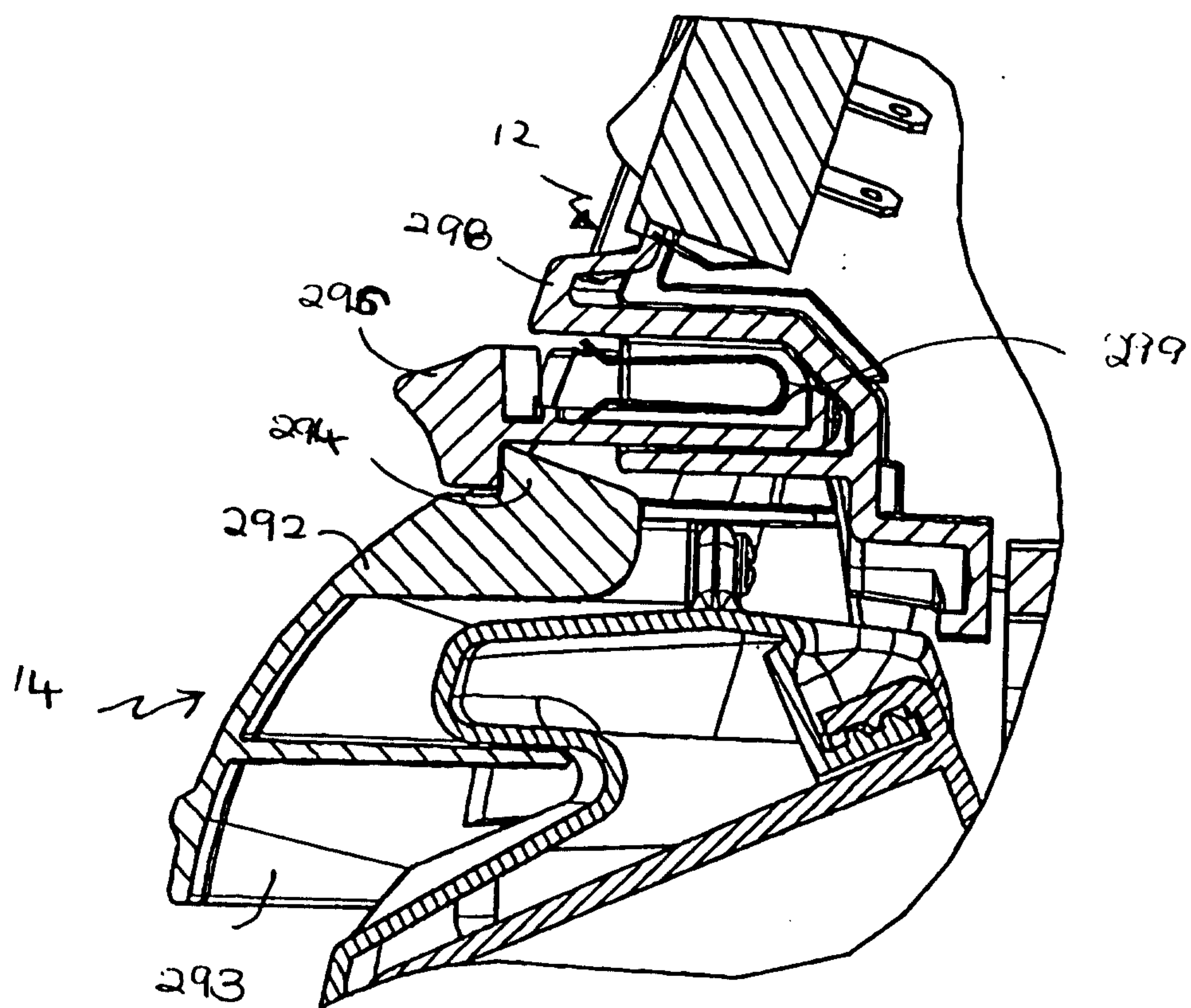


FIG. 24

