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CA 2353068 C 2002/07/09

(11)(21) 2 353 068

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2001/07/30

(41) Mise à la disp. pub./Open to Public Insp.: 2001/12/31

(45) Date de délivrance/Issue Date: 2002/07/09

(51) Cl.Int.^{7}/Int.Cl.^{7} E21B 33/04, E21B 17/00

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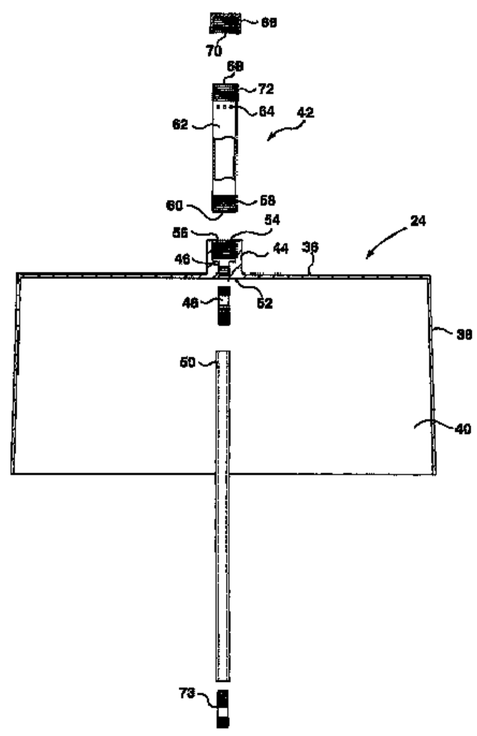
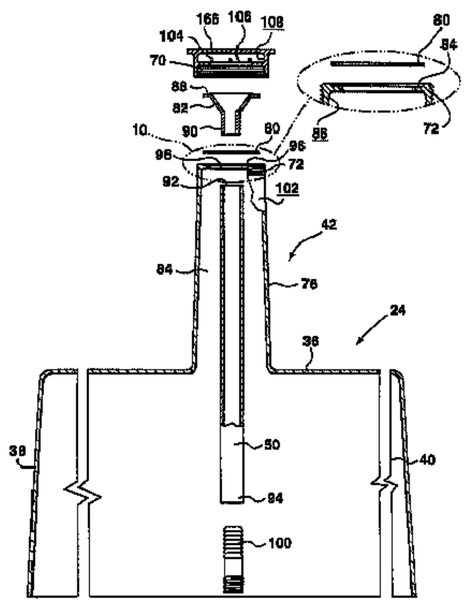
(54) Titre : CAPUCHON POUR TUBAGE DE PUITS ET METHODE POUR PLACER CE CAPUCHON SUR LEDIT TUBAGE

(54) Title: CAP FOR A WELL CASING, AND METHOD TO RETROFIT A WELL CASING WITH A CAP





(57) Abrégé/Abstract:
This invention is a cap for protecting wells from ground surface liquids getting into a well through the top. The cap encompasses the lid and the top portion of the well casing. The cap has a top, a sidewall and an access port. The top is coupled to a sidewall

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(57) Abrégé(suite)/Abstract(continued):
to define a space to accept a lid and well casing. In preferred embodiments of the invention, the access port has either a tube and boss or a neck and adaptor. The boss surrounds an opening in the top and receives a proximal end of the tube whereas the neck surrounds the opening in the top and the adaptor is received within the neck. The cover is disposed on the tube or neck at an open end distal to the top to cover the opening. In both embodiments, there is at least one hole in the access port. The cap prevents surface liquid from entering into the well though the top.

Abstract

This invention is a cap for protecting wells from ground surface liquids getting into a well through the top. The cap encompasses the lid and the top portion of the well casing.. The cap has a top, a sidewall and an access port. The top is coupled to a sidewall to define a space to accept a lid and well casing. In preferred embodiments of the invention, the access port has either a tube and boss or a neck and adaptor. The boss surrounds an opening in the top and receives a proximal end of the tube whereas the neck surrounds the opening in the top and the adaptor is received within the neck. The cover is disposed on the tube or neck at an open end distal to the top to cover the opening. In both embodiments, there is at least one hole in the access port. The cap prevents surface liquid from entering into the well though the top.

Cap for a Well Casing and Method to Retrofit a Well Casing With a Cap

Field of the invention:

[0001] This invention relates to a cap for a well casing, specifically a cap to fit over a water liquid and liquid-borne contaminants into well water from the top of the well casing.

Background of the invention:

Contamination of well water is a very significant problem. It is especially prevalent in farming areas, where the surface water can be contaminated with animal waste and

[0002] chemicals.

There are thousands of old wells in the country, many of which should be updated because there is a potential of surface water getting into them. The Department of the Environment recommends having the well casings at least 12 inches above the ground, and many of the wells are at ground level or even below ground level. Many people will

[0003] not follow the recommendations because it is too expensive. To extend a concrete well casing, a contractor would need to be hired as the casing weighs approximately 900 lbs. Even if the 6-inch steel well casing (see reference numeral 33 in the prior art drawing of Fig. 2) in a drilled well is extended instead, one section of the concrete casing will need to be removed.

[0004] There are two main types of wells: dug wells and drilled wells. Dug wells are simply holes that are dug in the ground. The pump is usually in the house. The well may be cased in concrete or steel. The open end of the casing is preferably covered with a lid. Thus, a dug well consists of a casing and a lid, which together define a space to contain well water.

[0005] More commonly, wells are drilled. In a drilled well there is a steel casing that goes down to the water source. The steel casing has a cap that accommodates either one or two pipes depending upon the pumping system. These pipes or pipe continue down the casing to the water source. There is also an air vent as described in U.S. 2,562,946. The air vent is

necessary to ensure that pressures are equalized. Without an air vent, the well and pump

[0006] could have back pressure or gas problems in some areas. There are two common pumps: a submersible pump which is submerged in the water in the steel well casing and requires one pipe and electrical wiring that goes from the pump to the house and a jet pump which requires two pipes (one large and one small) that go from the well to the pump located in the house.

[0007] The metal cap (32) on the steel well casing (33) illustrated in the prior art drawing of Fig. 2 is the same as the cap shown in U.S. 2,562,946. Most of the metal caps for drilled wells are below the frost line and are housed in a large concrete casing (12) with a concrete lid (14) on top. The concrete casing may terminate below ground or alternatively may extend a short distance above ground. This creates a working space around the well that can be

[0008] accessed by removing the lid (14).

Unfortunately, the casing and lid provide an access point for surface liquids. Older well assemblies tend to be more problematic than new well assemblies, as old well assemblies frequently do not extend far enough out of the ground to prevent seepage or flow of surface liquid into the well. In addition, the lid frequently has an access port or is a two-

[0009] part design. Both lid types are not watertight and allow surface liquid to enter into the well water.

According to statistics, upwards of 50% of well water in some areas of North America is classified as contaminated. The well assemblies must be retrofitted and sanitized in order to reduce the level of contamination to acceptable levels. The choices faced by the

[0010] well owners include closing the well and either drilling a new well or having water delivered. Both these alternatives are very costly. Another choice is to retrofit the well assembly. Ideally, the retrofit will disturb as little soil as possible, will not involve the use of heavy equipment and will be inexpensive.

One method that is currently available for retrofitting involves removing one section of

[0011] the concrete well casing and extending the casing at least 12 inches out of the ground. The problem with replacing the casing is that it is expensive. It also disrupts the soil around the well. This disruption is known to lead to well water contamination.

To date, the prior art has not addressed the problems outlined above.

It is an objective of the invention to overcome the deficiencies in the prior art and to
[0012] provide means for preventing surface liquid from entering into the well from the top.

Summary of the invention:

According to the invention, a cap for a well casing is provided as an inexpensive means of eliminating surface liquid seeping or flowing into well water.

Two embodiments are disclosed; both are comprised of a top, a sidewall and an access port. In the first embodiment, the access port has a tubular structure in the form of a tube,
[0013] a cover and a boss. The boss surrounds an opening in the top and receives a proximal end of the tube. In the second embodiment, the access port has a tubular structure in the form of an integral neck, a cover, a gasket and an adaptor. The gasket is received on a lip in the neck, or alternatively, is seated on a lip on the open end of the neck, distal to the top. An air hole is provided in the access port to permit airflow between ambient surroundings
[0014] and the well by means of a hose attached at an upper end to the adaptor or the boss and at a lower end to the well.

The invention also provides a method of assembling a cap having an access port with a boss on a drilled well and a method of assembling a cap having an access port with an adaptor on a drilled well.

[0015] From the above description it is clear that the invention provides an inexpensive means of eliminating surface liquid seeping or flowing into a water well through a well lid, while at the same time providing an access for air exchange and for addition of chemicals to the well, as needed. Further, it enhances the appearance of the well casing and lid, especially if the lid is old and pitted.

Description of the Figures:

[0016] Embodiments of the invention will now be described by way of example with reference to the drawings wherein:

Fig. 1 is an exploded cross sectional view of a dug well in accordance with the prior art;

Fig. 2 is a partial cross sectional view of a drilled well in accordance with the prior art;

Fig. 3 is a partial cross sectional view of a dug well assembly showing a dug well with

[0017] water in it, a well casing, a lid and a cap for a well casing in accordance with the invention;

Fig. 4 is a partial cross sectional view of the well cap in Fig. 3;

Fig. 5 is a partial cross sectional view of a drilled well assembly showing a drilled well, a well casing, a lid, and a cap for a well casing in accordance with the invention;

[0018] Fig. 6 is a detail view (drawn to a larger scale) of circled area 6 drawn adjacent Fig5

Fig. 7 is a partial cross sectional view of a second embodiment of a cap for a drilled well assembly as shown in Fig 2;

Fig. 8 is a detail view (drawn to a larger scale) of circled area 8 drawn adjacent Fig7;

Fig. 9 is a partial cross sectional view of the well cap in Fig. 8;

[0019] Fig. 10 is a detail view (drawn to a larger scale) of circled area 10 drawn adjacent Fig. 9.

Detailed Description of the Preferred Embodiment:

As shown in Fig.1,a dug well generally indicated by numeral 10 has a concrete well casing (12) and a concrete lid (14). The well casing (12) defines a space (16),for containing well water (18) and for servicing the well (10). These wells are especially prone to contamination, as there is no barrier to entry of contaminants except for the lid (14) and

[0020] the well casing (12). The well casing (12) has an open end (20) projecting away from the well water (18). The lid (14) is disposed on the open end ((12) and lid (14) may extend a short distance above the soil line (not shown) or may 20) of the well casing (14) to cover the open end (20) of the well casing (12). The well casing be at or below the soil line.

[0021] A large number of wells are drilled wells. Such a drilled well is generally indicated by numeral 26 in Fig. 2. The drilled well (26) differs from a dug well (10) in that there is no direct access to open water. As shown in Fig. 2, there are generally two pipes, one which is an outlet (28) and the other which is an inlet (30). These protrude through a metal cap

(32) and are connected to a pump (not shown) at one end and with a water source at the other end. When water is pumped from the source, it must be replaced with air. Thus, there is an air vent (34) for gas exchange.

[0022]

The dug well assembly shown in Fig. 3 and generally indicated by number 22 is comprised of a dug well (10), a concrete well casing (12), a lid (14) and a cap (24) made in accordance with one embodiment of the invention. The cap (24), which is preferably made of plastic or a related polymer, but which could be made of metal, has a top (36) and a sidewall (38) spaced from the concrete well casing (12) to define an air pocket (40). The air pocket (40) accepts the well casing (12) and the lid (14) to provide a water resistant method and to exclude surface liquid from entering the well (10).through the top. Depending upon how far the well casing (12) extends above the soil line, the sidewall (38) may or may not be embedded in the ground (as drawn). If the well casing (12) extends a significant distance above the ground, the cap (24) may need to be anchored to the concrete well casing (12) with fasteners.

[0023]

[0024]

The cap (24) is further defined as having an access port (42). As shown in Fig. 4, the access port (42) has a boss (44) integrally formed with the top (36) of the cap (24). The boss (44) has an internal thread (46) which accepts a coupling (48) that couples a hose (50) on a bottom side (52). The coupling (48) is barbed at one end and threaded at the other end. A similar coupling (48) is shown in more detail in the assembly drawn in Fig. 6. A top side (54) of the boss (44) has an internal thread (56) which accepts a threaded proximal end (60) of a detachable tubular structure defined by a tube (62). Small air holes (64) are formed in the distal end of the tube (62) and a cover (66) is disposed on an open end (68) of the tube(62) to close the tube by means of threads (70), (72) on the cover (66) and the tube (62), respectively. Once assembled, the cap (24) is resistant against surface liquids and liquid-borne contaminants entering directly into the well water through the top.

[0025]

[0026]

In Fig. 3, the hose (50) extends into the space (16) below the level of the cap (24). In order to ensure that the hose (50) remains extended, a weight is disposed at a free end thereof. Conveniently, the weight is in the form of a second coupling (73) which, as described below, may be used to couple the assembly to the drilled well (26).

[0027]

The cap (24) of the invention will now be described in association with a drilled well (26) with reference being made to Fig. 5 and 6. During operation of a drilled well (26), there

[0028] may be a need to access a working space (74) inside the concrete well casing (12). This requires that the drilled well assembly, generally indicated by numeral 76 be disassembled by removing the cap (24) from the well casing (12). Removal of the cap (24) can be readily facilitated by undoing the hose (50). Once the hose (50) is detached, the cap (24) can be extracted from the ground, as needed.

[0029] There may also be a need to add chemicals to the drilled well (26) from time to time. This can be accomplished by removing the cover (66) of the access port (42) and pouring the chemicals into the tube (62). From there, the chemicals will flow through the hose (50) which is coupled to the well (26) with the second coupling (73) inserted into an aperture formed in the metal cap (32). In order for the chemicals to flow into the drilled well (26),

[0030] the hose (50) must be relatively straight. This in turn requires that there is not a great excess length of hose (50), but it can be slack as long as a trap is not created in the hose (50).

It will be noted that the sidewall (38) of the cap (24) tapers outwardly from the top (36) for ease of stacking during storage, transport and sale of the cap (24). The shape of the

[0031] cap (24) can be altered if desired to give the well a decorative, pleasing appearance. The cap (24) provides a water resistant cover for the existing well lid (14)

The cap (24) can be used to retrofit existing wells. Alternatively, the cap (24) can be used in new well construction. Installation of the cap (24) when retrofitting a drilled well (26) requires that a trench (not shown) be dug around the well casing (12). In addition, the

[0032] existing well lid (14) may need to be drilled to provide an aperture (15) for the hose (50). The hose (50) is first attached to the well (26) with the second coupling (73) and subsequently passed through the aperture (15) in the existing well lid (14). It may be necessary to modify the metal cap (32) of the drilled well (26) to accept the hose (50). The hose(50) is then attached to the boss (44) by means of the coupling (48).

[0033] An alternative embodiment of the invention will now be described with reference to Figs. 7 to 10 in which like numerals are used to identify like parts to the embodiment shown in

Figs. 3 to 6. As shown in Fig. 9, the access port (42) has a tubular structure in the form of a neck (78) which is integrally formed with the top (36) of the cap (24) so that the inside of the neck is in communication with the air pocket (40). An adaptor (82) to accept

[0034] the flexible hose (50) from the well (26) and a gasket (80) complete the assembly. The neck (78) of the access port (42) is tapered outwardly from a modified cover (166). An annular lip (84) (Fig. 10) is formed on an inner surface (86) of the neck (78) to receive the gasket (80) and the adaptor (82). The adaptor (82) is funnel-shaped and is seated at a wider end (88) on the gasket (80), which in turn is seated on the annular lip (84). A

[0035] narrower end (90) of the adaptor (82) is housed in the neck (78). The narrower end (90) accepts an upper end (92) of the hose (50). The attachment of a lower end (94) of the hose (50) to the drilled well (26), by means of a barbed and threaded coupling (100) and the upper end (92) of the hose (50) to the narrower end (90) of the adaptor (82) is shown in Figs. 7 and 8.

[0036] As in the preferred embodiment, the cover (166) is removably attached to the neck (78) by means of threads (70) (omitted for simplicity in the drawing of Fig. 8) that thread onto corresponding threads (72) on an outer surface (102) of the neck (78). The cover (166) has at least one air hole (104) and has an annular ring (106) on an inner surface (108) to locate and seat the adaptor (82) and gasket (80) against the neck (78).

[0037] It will be understood that the air holes (104) are sufficiently small to restrict small insects from penetrating the neck (78). Alternatively, a single air hole may be formed as a larger opening and screened. The cover (166) also has a flanged top so that any precipitation falling on the cover will be directed outwardly away from the neck (78) thereby minimizing the likelihood of such precipitation contaminating the well water through the

[0038] air holes (104).

When retrofitting a well with the second embodiment, the cap (24) is placed over the existing well lid (14) and the length of the hose (50) is adjusted and attached to the narrower end (90) of the adaptor (82). The gasket (80) is seated on the lip (84) of the neck (78), the adaptor (82) is seated on the gasket (80) and the cover (166) is positioned over

[0039] the open end (96) of the neck (78).

Advantages of this invention will now be readily apparent to a person skilled in the art from the foregoing description of a preferred embodiment and its uses. Other embodiments and uses of this cap will now be readily apparent.

The embodiments of the invention in which an exclusive property or privilege is claimed as are defined as follows:

1. A cap for a well casing forming part of a dug well assembly; having a dug well, a well casing, a lid and a cap for the well casing, said well casing surrounding the well to define a space to contain well water and having an open end projecting away from the well, said lid being disposed on the open end of the well casing to cover the open end of the well casing, and said cap having a top, a sidewall and an access port, said top being coupled to the sidewall to define an air pocket to accept the lid and well casing, said access port surrounding an opening in the top whereby an inside of the well casing is in communication with the access port, said access port having a removable cover disposed at an open end thereof distal to the top to cover the open end.

2. A cap for a well casing forming part of a drilled well assembly, the drilled well assembly having a drilled well, a well casing and a hose, said well casing surrounding the well to define a working space around the drilled well and having an open end projecting away from the drilled well, said hose being attached at a lower end to the drilled well and being attached at an upper end to the cap, said cap having a top, a sidewall and an access port, said top being coupled to the sidewall to define an air pocket to accept the well casing, said access port comprising a tubular structure having at least one air hole, a removable cover and an adapter, said tubular structure surrounding an opening in the top of the cap such that an inside of the tubular structure is in communication with the air pocket, said cover being disposed on the tubular structure at an open distal end to the top to cover the open end, and said adapter providing communication between said at least one air hole and said hose.

3. A cap for a well casing as claimed in claim 2, in which the adaptor is removably attached to the tubular structure.

4. A cap for a well casing as claimed in claim 2 or 3, in which the adaptor is funnel shaped to accept the hose from the drilled well at a narrower end and to seat on the open end of the tubular structure on a wider end.

5. A cap for a well casing as claimed in any one of claims 2, 3 or 4 having a gasket and in which the tubular structure has an annular lip on an inner surface to receive the gasket, said gasket being shaped to accept a wider end of the adaptor.

6. A cap for a well casing forming part of a drilled well assembly, the drilled well assembly having a drilled well, a well casing and a hose, said well casing surrounding the well to define a working space around the drilled well and having an open end projecting away from the drilled well, said hose being attached at a lower end to the drilled well and being attached at an upper end to the cap, said cap having a top, a sidewall and an access port, said top being coupled to the sidewall to define an air pocket to accept the well casing, said access port comprising a tubular structure having at least one air hole, a removable cover and an adapter, said tubular structure surrounding an opening in the top of the cap, said cover being disposed on the tubular structure at an open distal end to the top to cover the open end, and said adapter providing communication between said at least one air hole and said hose.

7. A cap according to claim 6 in which said tubular structure comprises a boss having a threaded upper end and a threaded lower end and a tube having a threaded lower end for coupling to said threaded upper end of the boss, the adapter comprising a threaded coupling for coupling to said threaded lower end of the boss.

8. A method of assembling the cap for a well casing as claimed in claim 7 on a drilled well assembly, said method comprising the steps of attaching the lower end of the hose to the well, attaching the coupling to the bottom side of the boss, attaching the upper end of the hose to the coupling, attaching the tubular structure to the top side of the boss, placing the cap over the well casing and attaching the cover to the tubular structure.

9. A method of assembling the cap for a well casing as claimed in claim 3 for a drilled well assembly, said method comprising the steps of attaching the lower end of the hose to the well, passing the hose through the access port, placing the cap over the lid well casing, adjusting the length of the hose, attaching the upper end of the hose to the adaptor, seating the adaptor on the open end of the tubular structure, and attaching the cover to the tubular structure.

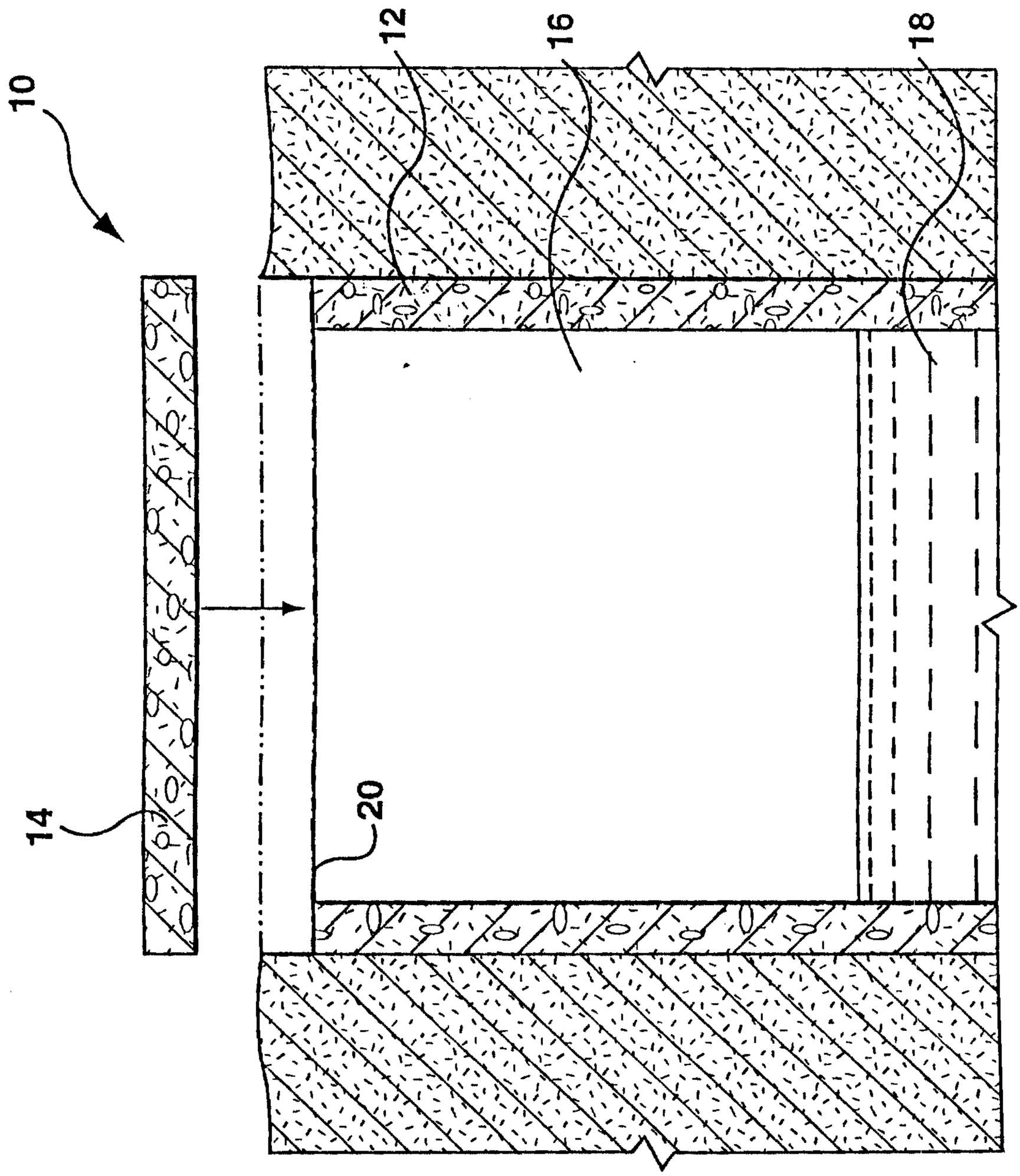

FIG. 1 (PRIOR ART)

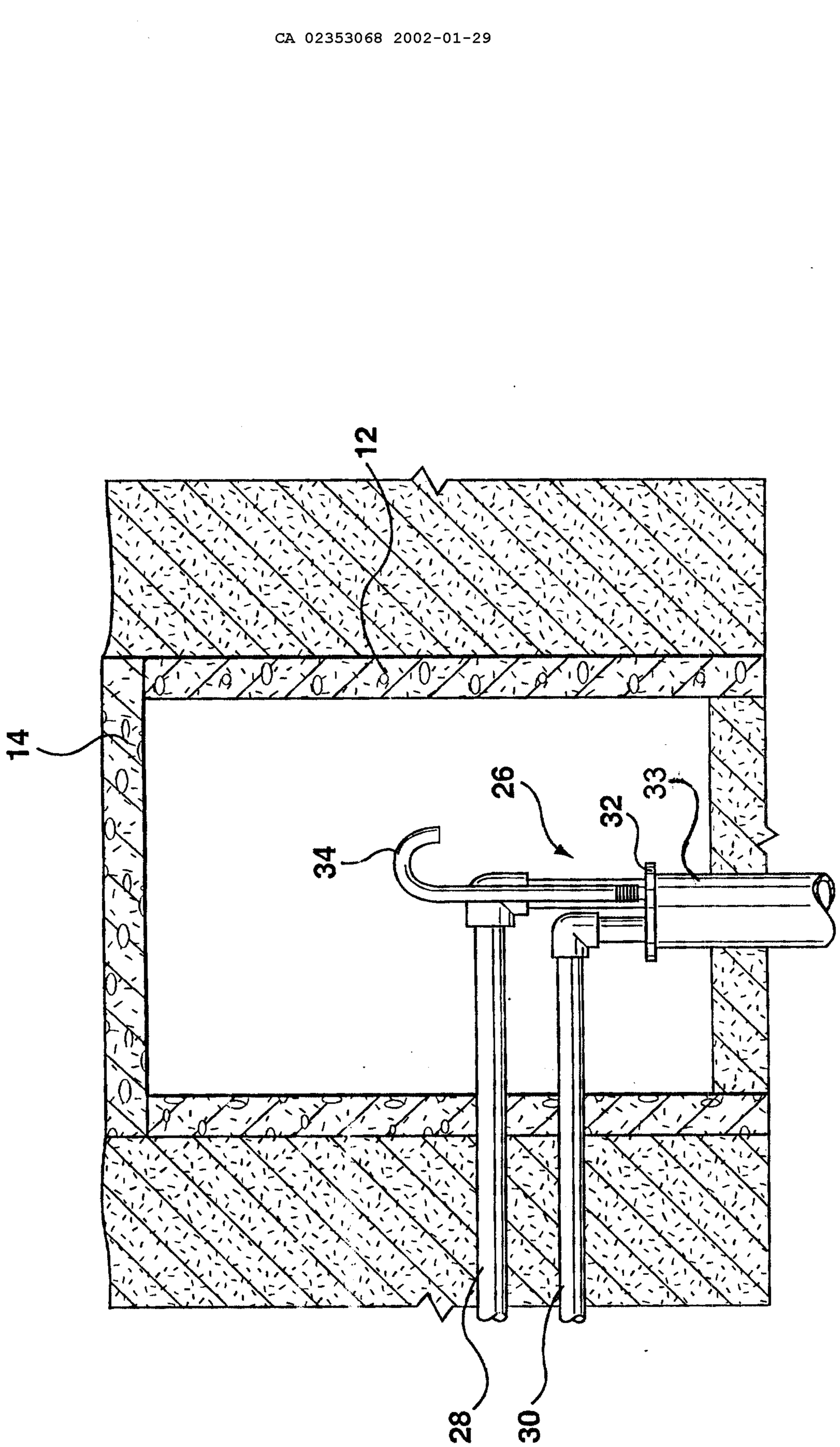

FIG. 2 (PRIOR ART)

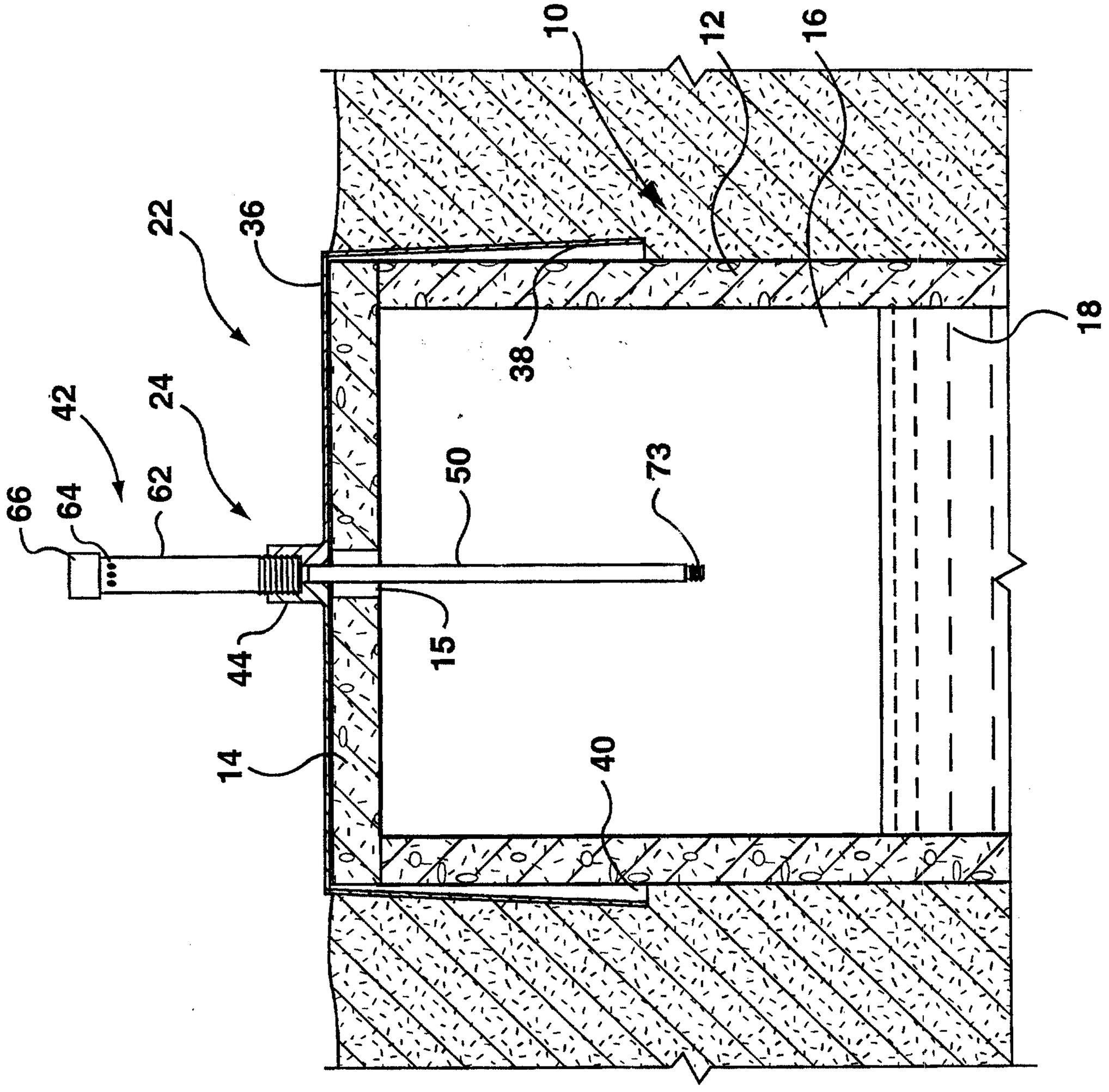

FIG. 3

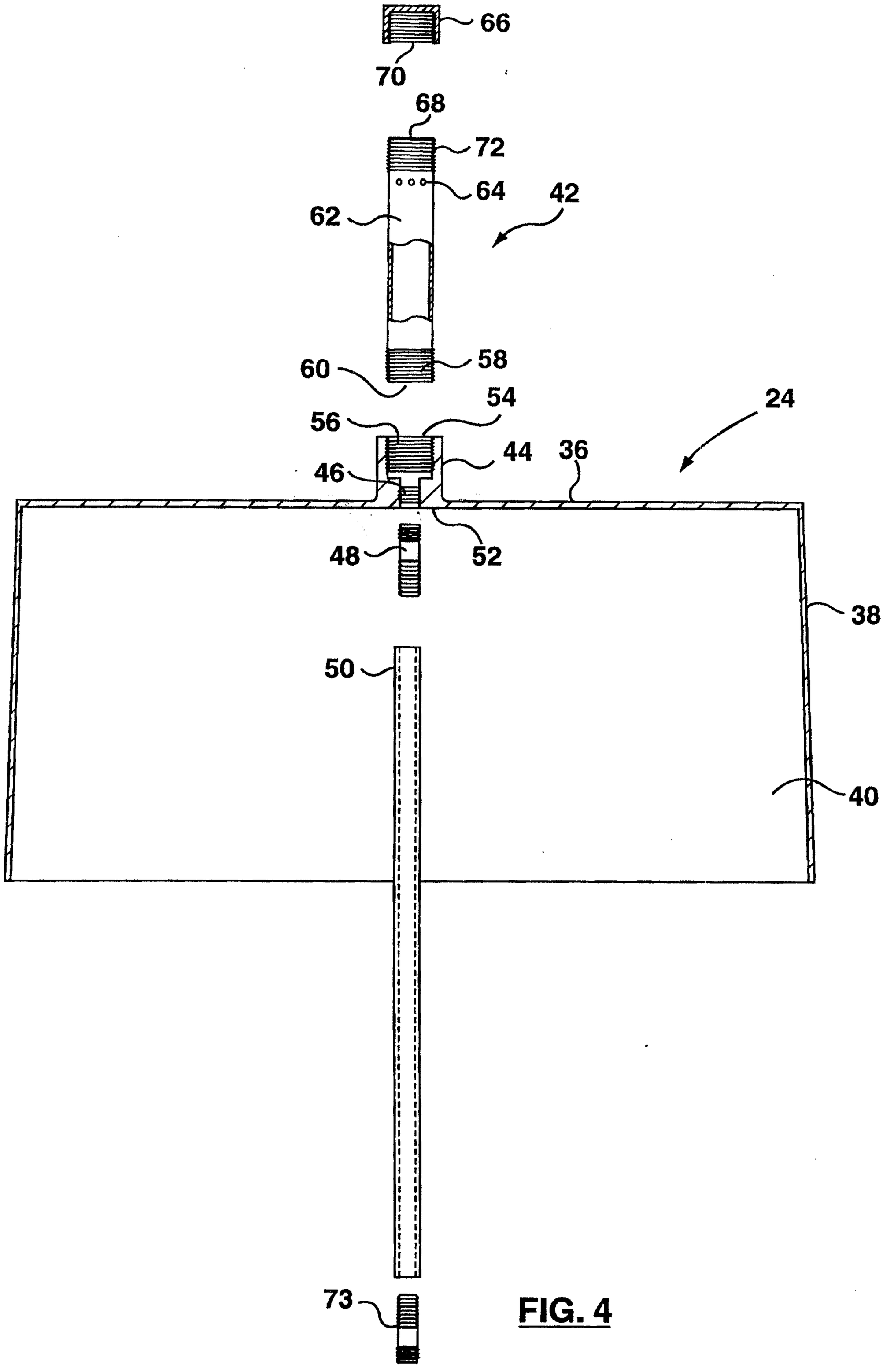

FIG. 4

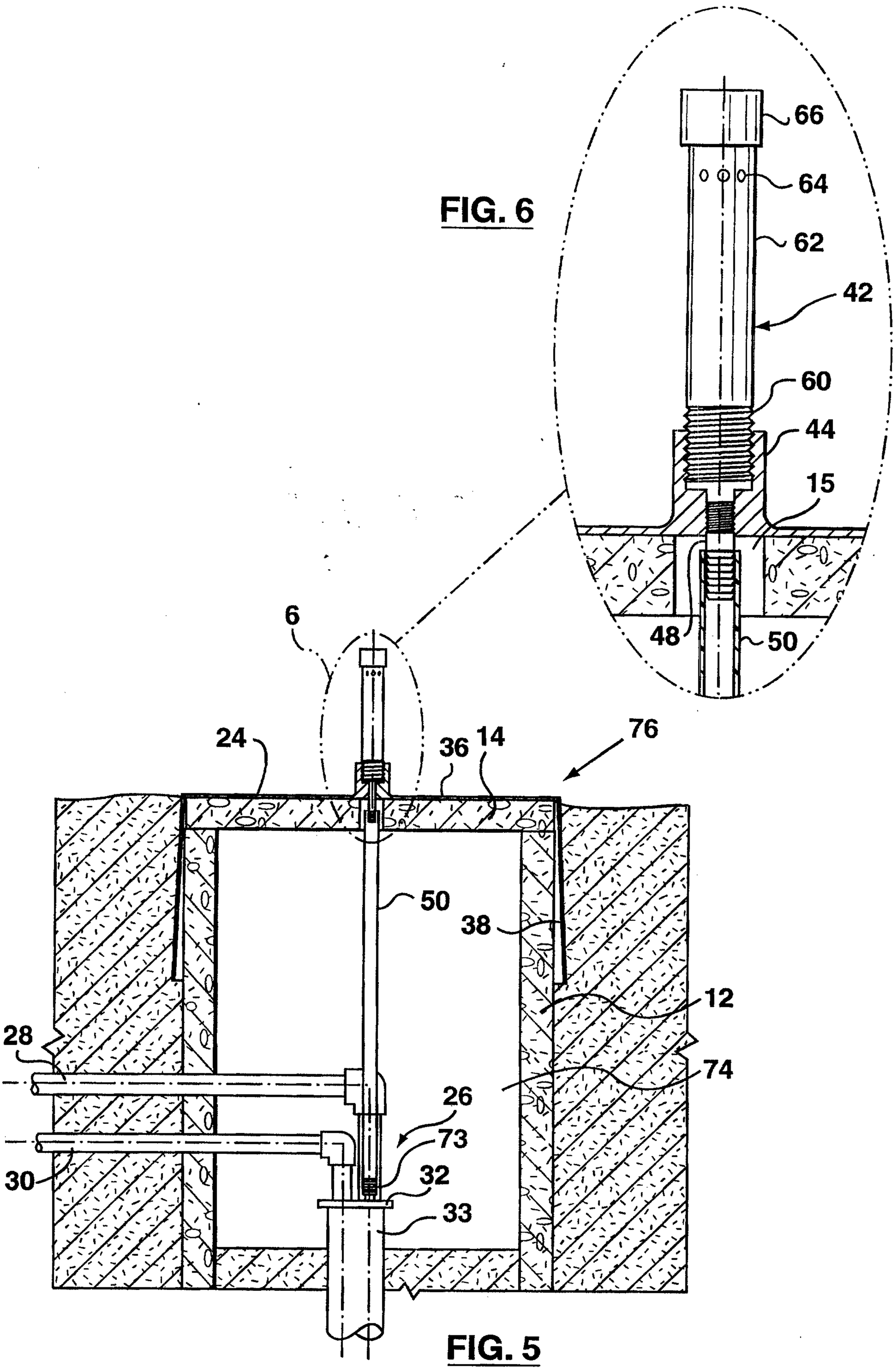

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FIG. 6

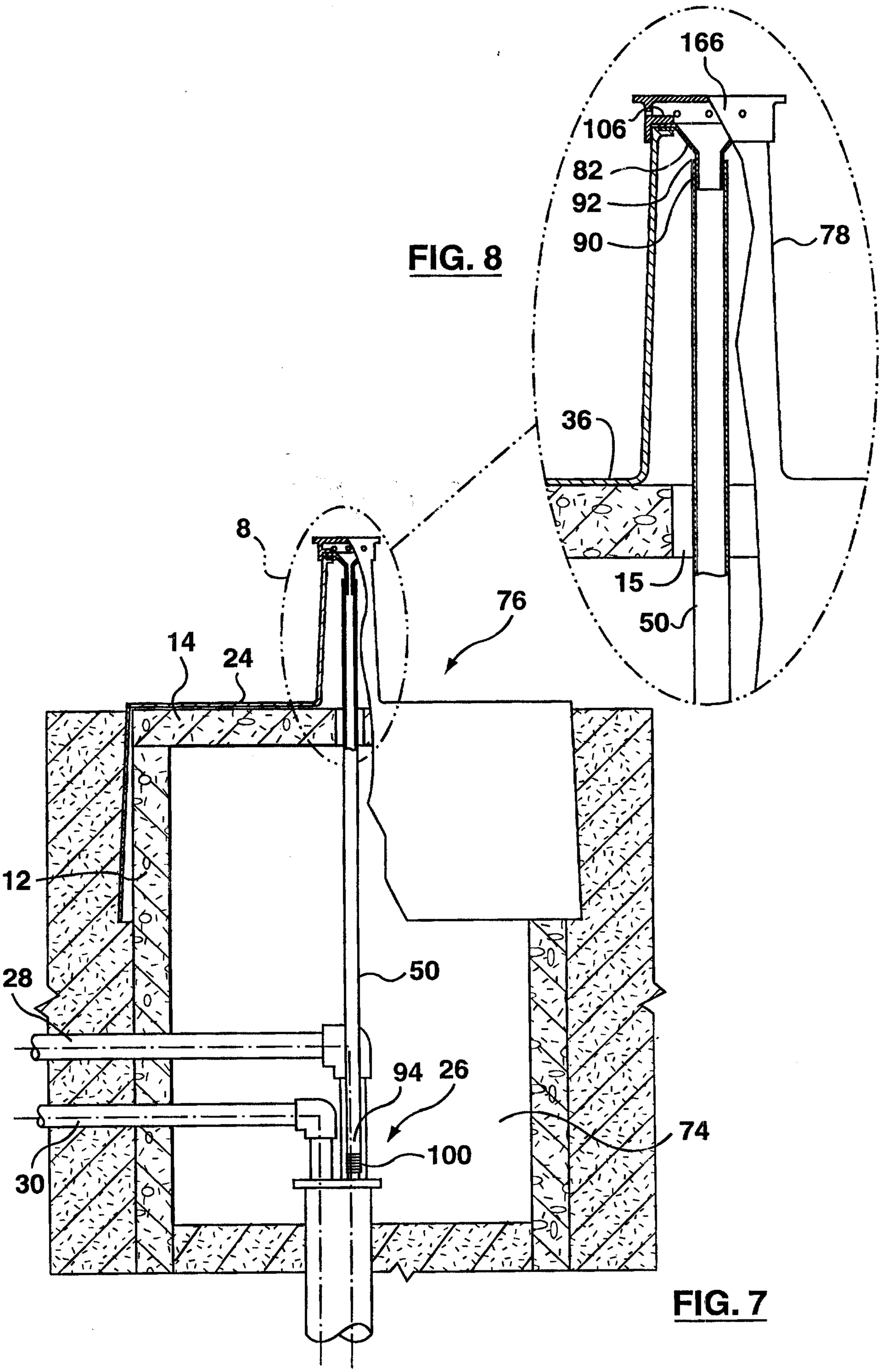

FIG. 7

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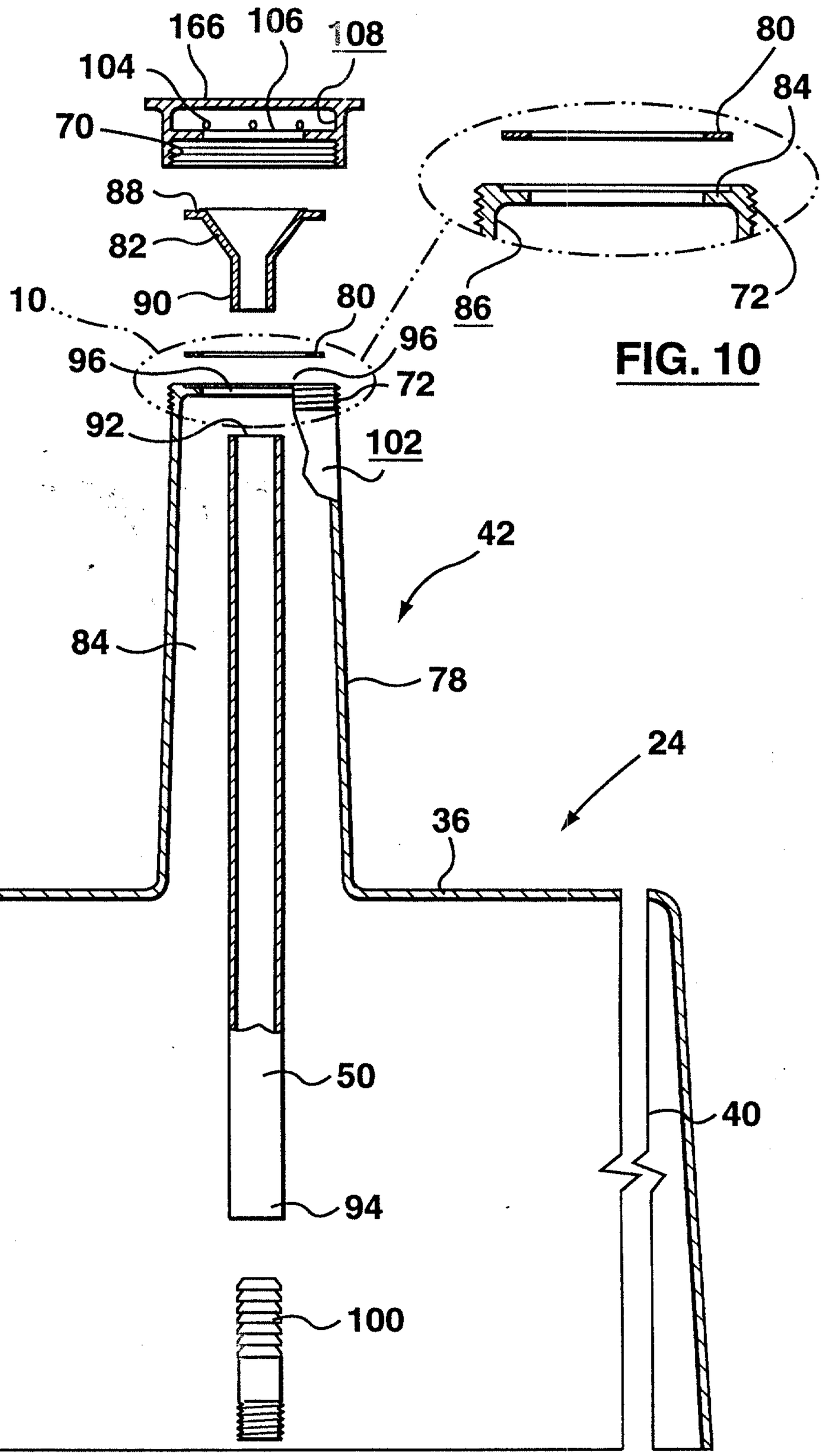
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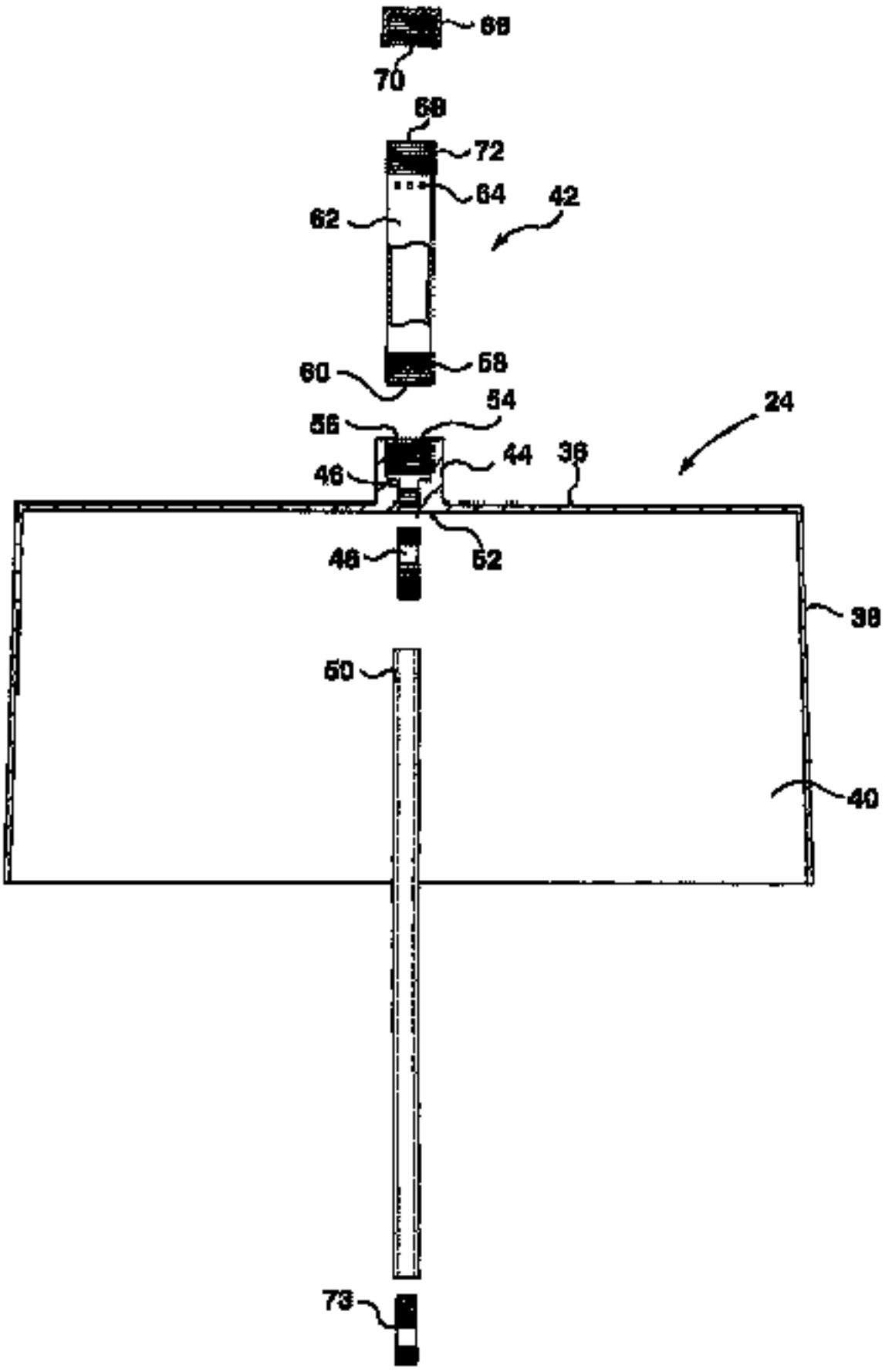
FIG. 10

FIG. 9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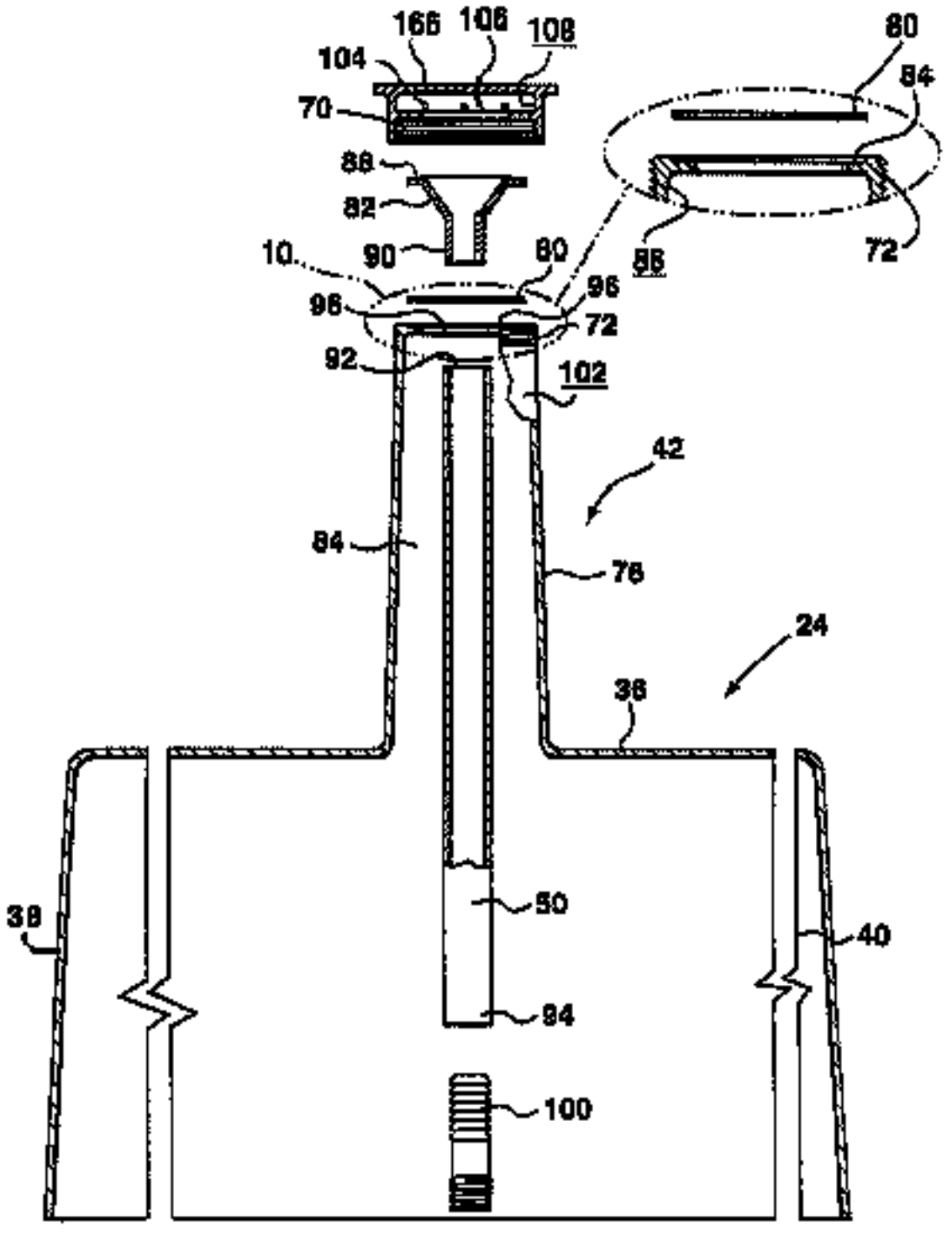
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