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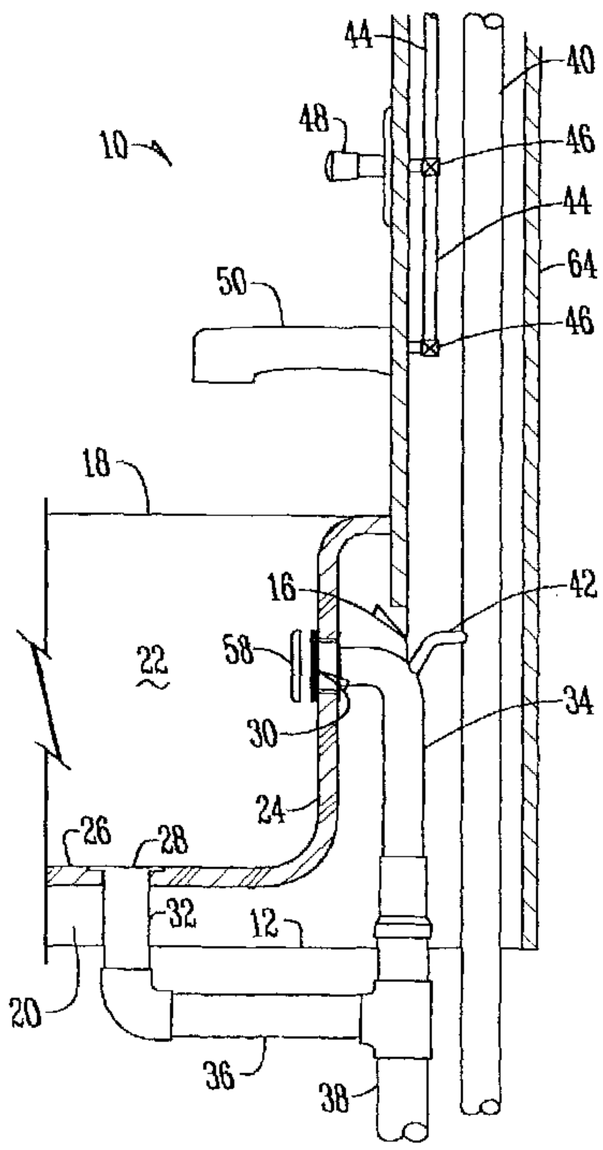
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(54) Title: METHOD AND APPARATUS FOR SEALING A BATHTUB OVERFLOW PORT FOR TESTING PURPOSES



(57) Abrégé/Abstract:
A temporary closure for a bathtub overflow port (30) is easily on the overflow port (30) for testing purposes. The temporary closure (52, 52A, 72) for the bathtub overflow port (30) comprises placing a solid cap (52, 52A, 72) on the outer end of a drain pipe (32) extending through the overflow port (30). The cap (52) is threaded on the outer end of the drain pipe (32), with or without a sealing element (66) on its inner surface (56). In one embodiment, the cap (52A) is provided with an outer face (54) having an aperture (68) therein covered by a sealing membrane (70). In another embodiment, the rap (72) is a solid plug (74) and is screwed into a threaded interior of the outer end of the drain pipe (32).

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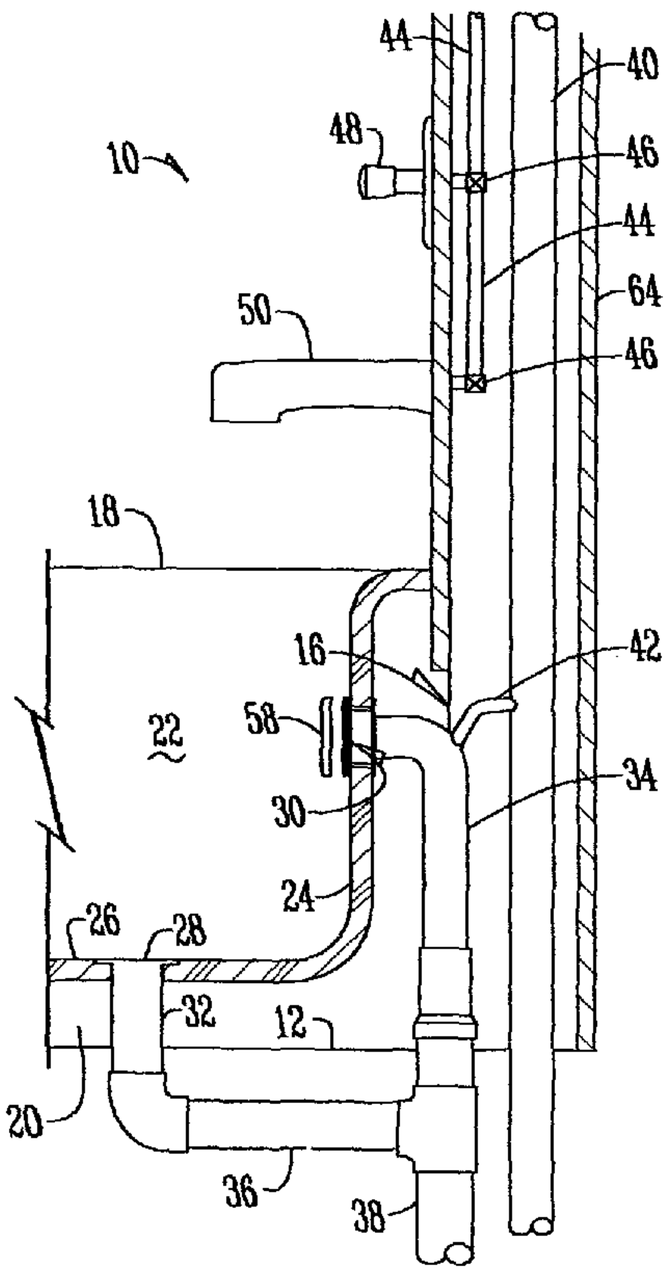
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(54) Title: METHOD AND APPARATUS FOR SEALING A BATHTUB OVERFLOW PORT FOR TESTING PURPOSES



(57) Abstract: A temporary closure for a bathtub overflow port (30) is easily on the overflow port (30) for testing purposes. The temporary closure (52, 52A, 72) for the bathtub overflow port (30) comprises placing a solid cap (52, 52A, 72) on the outer end of a drain pipe (32) extending through the overflow port (30). The cap (52) is threaded on the outer end of the drain pipe (32), with or without a sealing element (66) on its inner surface (56). In one embodiment, the cap (52A) is provided with an outer face (54) having an aperture (68) therein covered by a sealing membrane (70). In another embodiment, the rap (72) is a solid plug (74) and is screwed into a threaded interior of the outer end of the drain pipe (32).

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TITLE: METHOD AND APPARATUS FOR SEALING A BATHTUB OVERFLOW PORT FOR TESTING PURPOSES

BACKGROUND OF THE INVENTION

In new building construction, the plumbers prefer not to put the finished closure valves in the bottom of tubs, or the finished decorative plate over the overflow outlet at the end of the tub until the project is finished because these elements will be often damaged as the construction project is brought to a close. Further, the piping for both of the outlets needs to be checked for leaks before the inspection process is completed. The test involves running water down the vent for the drain until it reaches a level above the tub and the tester then determines whether any of the piping leaks. Thus, when the testing operation arrives, a plug is put in the bottom drain of the tub and some sort of a seal plate is placed at the end of the tub on the overflow outlet.

Existing overflow plates have a center opening therein. There are either two or four small screw holes in the plate adjacent the center opening wherein two of the holes are used to hold the plate to the plumbing fixture. In some cases there is a fitting so that the screw hole is located directly in the middle of the access hole. In that case, that hole is in the way when the testing procedure is implemented. In any event, the testing procedure usually involves stuffing a balloon through the large center opening into the pipe in the wall and the pipe is sealed when the balloon is inflated. Further, existing seal plates normally have to be removed when the decorative plate is put on. The decorative plate is typically held by two screws which either use the screw openings of the plate or two additional openings in the case that four holes are provided.

Some efforts have been made to seal the overflow ports of bathtubs with a diaphragm, and then cut the diaphragm when the test is completed. (See U.S. Patent No. 5,890,241). However, the system for including the diaphragm sometimes involves screws and tools, and is not always convenient to install or to remove after testing.

It is therefore a principal object of this invention to provide a seal for a bathtub overflow port that is very easy to install for testing purposes, and is easily made operable for overflow purposes when the testing is finished.

A further object of the invention is to provide a seal for a bathtub overflow port that is very economical to manufacture.

These and other objects will be apparent to those skilled in the art.

SUMMARY OF THE INVENTION

A temporary closure means for a bathtub overflow port, comprising placing on the outer end of a drain pipe extending through the overflow port a solid cap threaded on the outer end, with or without a sealing element on its inner surface; a cap with an outer face with an aperture thereon covered by a sealing diaphragm, or a solid plug screwed into a threaded interior of the outer end of the drain pipe.

Also present is a temporary closure means for a bathtub overflow port, comprising extending through the overflow port an expandable non-threaded plug which can be expanded to seal the overflow port during the testing of the water system, and which can be moved to a non-expandable condition for easy removal from the port after the testing has been completed.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Fig. 1 is a partial perspective view of a conventional bathtub environment utilizing the invention of this application;

Fig. 1A is an enlarged scale sectional view taken on line 1A-1A of Fig. 1;

Fig. 2 is a front perspective view of a first embodiment of the invention;

Fig. 3 is a rear perspective view of a first embodiment of the invention;

Fig. 4 is a sectional view taken on line 4-4 of Fig. 2;

Fig. 5 is an exploded view of a second embodiment of the invention;

Fig. 6 is a sectional view of the assembled components of Fig. 5;

Fig. 7 is an exploded view of a third embodiment of the invention;

Fig. 8 is a sectional view of the assembled components of Fig. 7;

Fig. 9 is a perspective view of a fourth embodiment of the invention;

Fig. 10 is a sectional view of the fourth embodiment of the invention in an assembled operating position;

Fig. 11 is an exploded large scale view of a fifth embodiment of this invention;

Fig. 12 is an exploded large scale sectional view of an open overflow port about to receive the assembled plug of Fig. 11; and

Fig. 13 is a large scale sectional view similar to that of Fig. 12 showing the plug of Fig. 11 installed in a sealing condition in the overflow port of a bathtub.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

With reference to Figs. 1 and 1A, a conventional bathroom structure 10 has a floor 12, and a hollow wall 14 with a wall opening 16 therein. A conventional bathtub ("tub") 18 has a base 20 which rests upon floor 12. Sidewalls 22 extend upwardly from base 20 as does an end wall 24. A bottom 26 dwells in spaced relation to the floor 12.

A conventional drain port 28 is located in bottom 26. A conventional overflow port 30 is located in the end wall 24 (Fig. 2). A vertical drain pipe 32 extends downwardly from drain port 28, and overflow drain pipe 34 extends downwardly from overflow port 30. A horizontal pipe 36 connects pipes 32 and 34. A drain pipe 38 extends downwardly from the junction between pipes 34 and 36.

A conventional vertical vent pipe 40 is located within the hollow wall 14. Pipe 42 interconnects vent pipe 40 and the upper end of overflow drain pipe 34 (Fig. 1A). Conventional water pipes 44 extend through hollow wall 40 and are connected to valve 46 which is interconnected to conventional control member 48 and faucet 50.

With reference to Figs. 2-4, a cap 52 has an outer face 54 which has an inner surface 56 (Fig. 4) and an outer surface 58. The cap 52 has a cylindrical body 60 which has interior threads 62 which are adapted to mate with the threads 31 of port 30 (Fig. 7). The cap also has an annular flange 64 that extends

radially outwardly from the open end of the cylindrical body 60. A thin sealing membrane 66 is affixed to the inner surface 56 (Fig. 3) of cap 52 so as to seal the cap when it is screwed on the threads 31 so that the cap can be effectively sealed against the port 30.

With reference to Figs. 5 and 6, a structure is shown very similar to that of Figs. 2-4 except that the cap 52A has a center aperture 68 therein which is covered by a thin sealing membrane 70 in lieu of the sealing membrane 66 revealed in Figs. 2-4.

With reference to Figs. 7 and 8, a cap 72 is shown and is essentially like the cap 52 in Figs. 2-4 except that the seal 66 in cap 52 is not present in the cap 72. Rather, the slightly malleable characteristics of the material of cap 72 (PDC or the like) are sufficient to seal the port 30 when the cap 72 is securely threaded to the port 30 in the same manner that the cap 52 is threaded to the port 30.

With reference to Figs. 9 and 10, the numeral 74 designates a solid plug of plastic or metal material which is comprised of an outer plate 76 which has a hollow stub tube 77 extending outwardly therefrom and having a center bore 78. The stub tube 77 has external threads 80 which are adapted to match internal threads 82 of overflow drain pipe 34 (Fig. 10). An O-ring seal or the like (not shown) can be used to extend around the exterior of stub tube 77 to seal the outer portion of the plate 76 to the port 30.

In operation, the device in Figs. 2-4 is effected by merely screwing the cap 52 tightly onto the external threads 31 of port 30. When the water test is completed, the cap is removed, and the conventional overflow apparatus of conventional tubs is placed on the port 30.

In the case of the device of Figs. 5 and 6, the cap 52 can either be removed from the port 30, or the thin sealing membrane 66 can be cut away so as to permit the attachment of the conventional overflow mechanisms.

In regard to the device shown in Figs. 7 and 8, the cap 72 is merely removed from the port 30 to be discarded when the test is completed, so that a conventional overflow apparatus can be placed on the threads 31.

In regard to the plug 74 of Figs. 9 and 10, it is tightly inserted within the port 30 by means of the internal threads 82 in member 34A. When the water test is completed, the plug is removed and discarded (or kept for further use) and the conventional overflow mechanism is inserted on the port.

In a fifth alternative embodiment, (Figs. 11-13), cap 52 may be interchanged with a conventional expandable plug 86. With reference to Figs. 11-13, a conventional expandable plug 86 is shown which does not of itself comprise this invention. However, its use and application in conjunction with this invention is deemed to be novel.

The plug 86 is comprised of bolt 88 which includes head 90 and a threaded shank 92. A cup shaped washer 94 has tapered side walls 94A, a bottom 94B and a square center aperture 94C.

Similarly, a cup shaped washer 96 has tapered side walls 96A, a bottom 96B, a square center aperture 96C, and a flat perimeter flange 96D.

A resilient expandable washer 98 has a circular center aperture 98A, tapered side walls 98B, and an outer perimeter surface 100.

Sealing washers 102 with center openings 104 are located adjacent the bottoms 94B and 66B of cup-shaped washers 94 and 96, respectively.

As shown in Fig. 13, a washer 102 is positioned against bolt head 90, and the cup shaped washers 94 and 96 are placed on bolt shank 92 with resilient washer 98 therebetween. A second sealing washer 102 is then placed on bolt shank 92 to be located between wing nut 100 and cup shaped washer 96.

In its non-expanded condition of Fig. 12, resilient washer 98 is in a non-compressed condition, and the diameter of the washer 98 is equal to or less than the interior diameter of the overflow port 30 as shown in Fig. 12, thus permitting the plug 86 to be slidably moved into the interior of port 30 in the position shown in Fig. 13. While in that position, the wing nut 106 is rotated inwardly on threaded shank 92 to compress all the components of the plug 86 on shank 92 together so as to compress resilient washer 98 tightly between the cup-shaped washers 94 and 96, thus expanding the perimeter 100 of washer 98 tightly

against the interior surface of port 30 (Fig. 13). The deformation of the perimeter 100 against the interior of port 30 is shown in Fig. 13.

With the port 30 so sealed, the water testing procedure can be completed. When it is finished, the wing nut 106 is rotated outwardly on bolt shank 92 to decompress resilient washer 98. The plug 86 can then be slidably removed from port 30 to permit a conventional cover to be placed on the port.

This invention eliminates the need for threads in port 30 to affix a seal plug therein, thus saving some costs in manufacturing. Further, the plug 86 is easily inserted into and removed from port 30, which expedites the water testing procedure. This invention therefore achieves its stated objectives.

AMENDED CLAIMS

[Received by the International Bureau on 10 November 2003
original claims 1 – 11 replaced by amended claims 1 – 10 (4 page)]

1. An overflow system for a bathtub which has a bottom, and adjacent side and endwalls, a drain port in the bottom, and overflow port in an endwall, with said overflow port being in communication with a vent pipe, comprising,
a drain pipe adapted to be in communication with said drain port and said overflow port, said drain pipe having an inverted L-shape, including a horizontal leg extending into and through the overflow port of the bathtub, and a vertical leg extending downwardly for connection to a fluid drain system, threads on the horizontal leg extending through the overflow port, and a cap of one-piece construction threadably mounted on an end of the horizontal leg extending through the overflow port, the cap being of a material capable of sealing and closing the end of the horizontal leg when threaded against the end thereof.

2. The device of claim 1 wherein the cap has a circular planar end with a perimeter terminating in a threaded annular flange for interconnection with the threads on the horizontal leg.

3. An overflow system for a bathtub which has a bottom, and adjacent side and endwalls, a drain port in the bottom, and overflow port in an endwall, with said overflow port being in communication with a vent pipe, comprising,
a drain pipe adapted to be in communication with said drain port and said overflow port, said drain pipe having an inverted L-shape, including a horizontal leg extending into and through the overflow part of the bathtub, and a vertical leg extending downwardly for connection to a fluid drain system, threads on the horizontal leg extending through the overflow port, and a cap threadably mounted on an end of the horizontal leg extending through the overflow port,
the cap has a circular planar end with a perimeter terminating in a threaded annular flange for interconnection with the threads on the horizontal leg;
a circular sealing element on a face of the circular planar end of the cap being adjacent the end of the horizontal leg to seal the cap to the end of the horizontal leg.

AMENDED SHEET (ARTICLE 19)

4. An overflow system for a bathtub which has a bottom, and adjacent side and endwalls, a drain port in the bottom, and overflow port in an endwall, with said overflow port being in communication with a vent pipe, comprising, a drain pipe adapted to be in communication with said drain port and said overflow port, said drain pipe having an inverted L-shape, including a horizontal leg extending into and through the overflow part of the bathtub, and a vertical leg extending downwardly for connection to a fluid drain system, and a solid plug of one-piece construction threaded into interior threads of the horizontal leg extending through the overflow port to close the end of the horizontal leg.

5. An overflow system for a bathtub which has a bottom, and adjacent side and endwalls, a drain port in the bottom, and overflow port in an endwall, with said overflow port being in communication with a vent pipe, comprising, a drain pipe adapted to be in communication with said drain port and said overflow port, said drain pipe having an inverted L-shape, including a horizontal leg extending into and through the overflow part of the bathtub, and a vertical leg extending downwardly for connection to a fluid drain system, threads on the horizontal leg extending through the overflow port, and a cap threadably mounted on an end of the horizontal leg extending through the overflow port, the cap having an opening in its circular planar end, with a thin sealing membrane secured to the cap and extending over the opening in the circular planar end.

6. An overflow system for a bathtub which has a bottom, and adjacent side and endwalls, a drain port in the bottom, and overflow port in an endwall, with said overflow port being in communication with a vent pipe, comprising, a drain pipe adapted to be in communication with said drain port and said overflow port, said drain pipe having an inverted L-shape, including a horizontal leg extending into and through the overflow port of the bathtub and terminating with a flat perimeter edge, and a vertical leg extending downwardly for connection to a fluid drain system, and an expandable plug removably positioned in the interior of the

horizontal leg and expanded to seal the horizontal leg-against fluid flow, the expandable plug comprising a bolt which has a head in one end and a threaded shank in the other end, a first cup-shaped washer adjacent the head and a second cup-shaped washer on the shank and having a flat perimeter flange, the first cup-shaped washer having a diameter less than an inner diameter of the horizontal leg, the flat perimeter flange of the second cup-shaped washer having a diameter greater than the inner diameter of the horizontal leg so as to be able to engage the flat perimeter edge, a resilient washer on the shank between the first and second cup-shaped washers, a nut threadably mounted on the shank inwardly from the second cup-shaped washer and tightened against the second cup-shaped washer when the flat perimeter flange on the second cup-shaped washer is engaged with the flat perimeter edge to compress the resilient washer between the first and second cup-shaped washers and frictionally force a perimeter surface of the resilient washer into engagement with the inner diameter of the horizontal leg to seal the overflow port against fluid flow.

7. A method of sealing an overflow fluid port of a bathtub against fluid flow for testing for leaks in the water system which includes the overflow fluid port, comprising, providing an expandable plug comprising a bolt which has a head in one end and a threaded shank in the other end, a first cup-shaped washer adjacent the head and a second cup-shaped washer on the shank and having a flat perimeter flange, the first cup-shaped washer having a diameter less than an inner diameter of the horizontal leg, the flat perimeter flange of the second cup-shaped washer having a diameter greater than the inner diameter of the horizontal leg so as to be able to engage the flat perimeter edge, a resilient washer on the shank between the first and second cup-shaped washers, a nut threadably mounted on the shank inwardly from the second cup-shaped washer and tightened against the second cup-shaped washer when the flat perimeter flange on the second cup-shaped washer is engaged with the flat perimeter edge to compress the resilient washer between the first and second cup-shaped washers and frictionally force a perimeter surface of the resilient washer into

engagement with the inner diameter of the horizontal leg to seal the overflow port against fluid flow, inserting into the overflow fluid port the expandable plug, mechanically expanding the expandable plug to engage an interior surface of the port to seal the port against fluid flow, thence conducting the water system for leaks, thence mechanically moving the expandable plug to a non-expanded condition, and removing the expandable plug from the port.

8. The device of claim 1 wherein the cap has a circular planar end with a perimeter terminating in an internally threaded annular flange for interconnection with external threads on the horizontal leg.

9. The device of claim 1 wherein the cap has a circular planar end with a perimeter terminating in an externally threaded annular flange for interconnection with internal threads on the horizontal leg.

10. The device of claim 5 wherein the cap has a circular planar end with a perimeter terminating in an externally threaded annular flange for interconnection with internal threads on the horizontal leg.

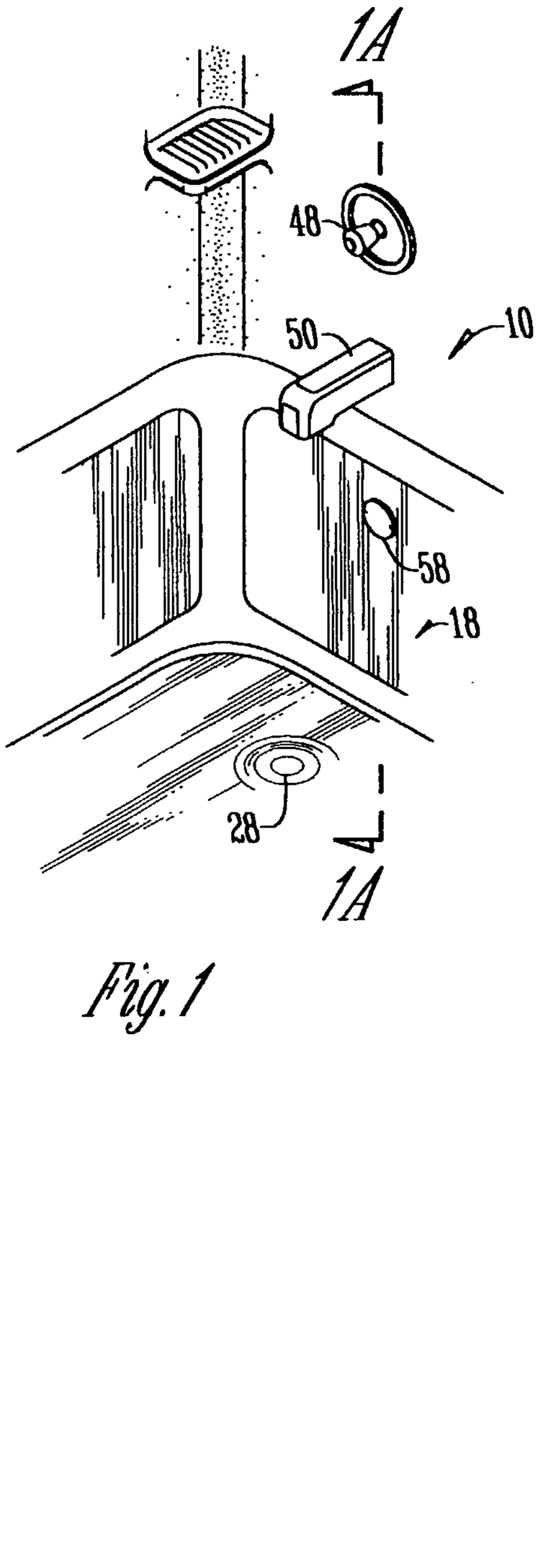

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Fig. 1

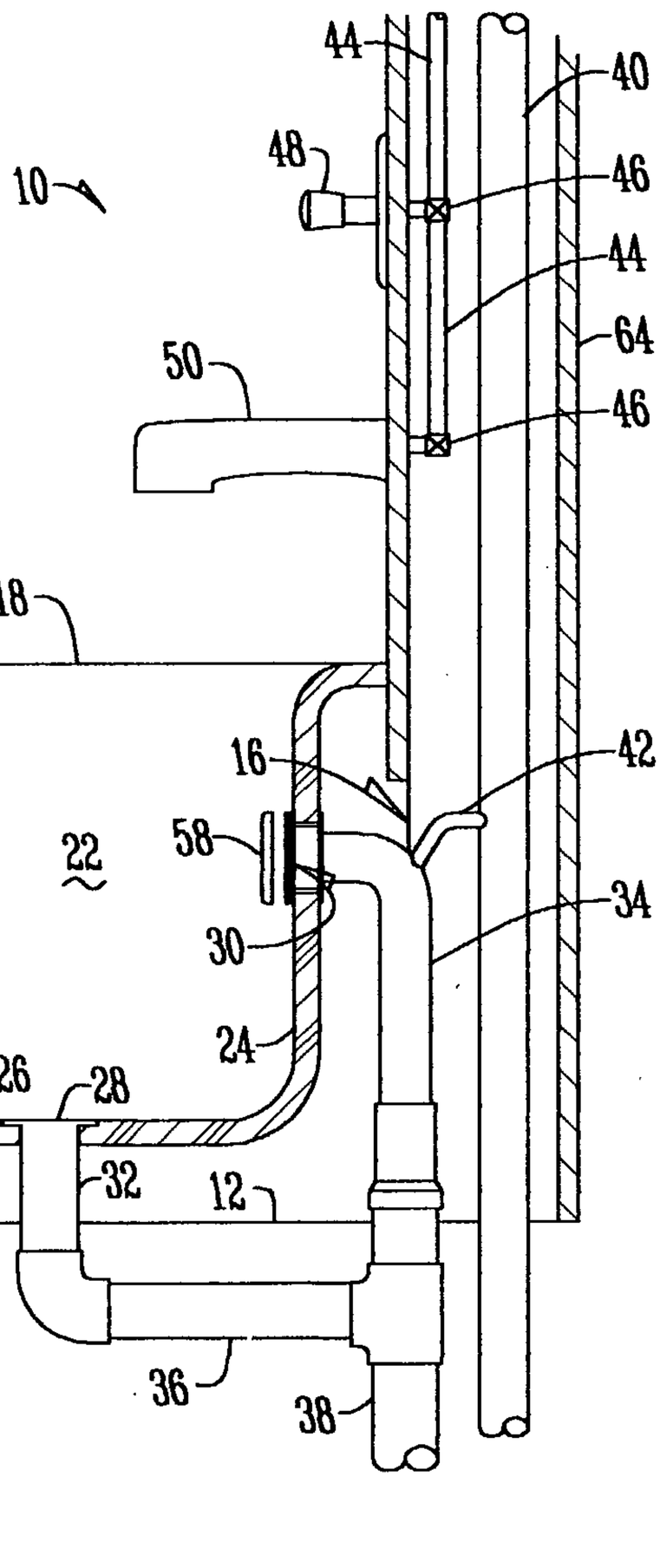

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Fig. 1A

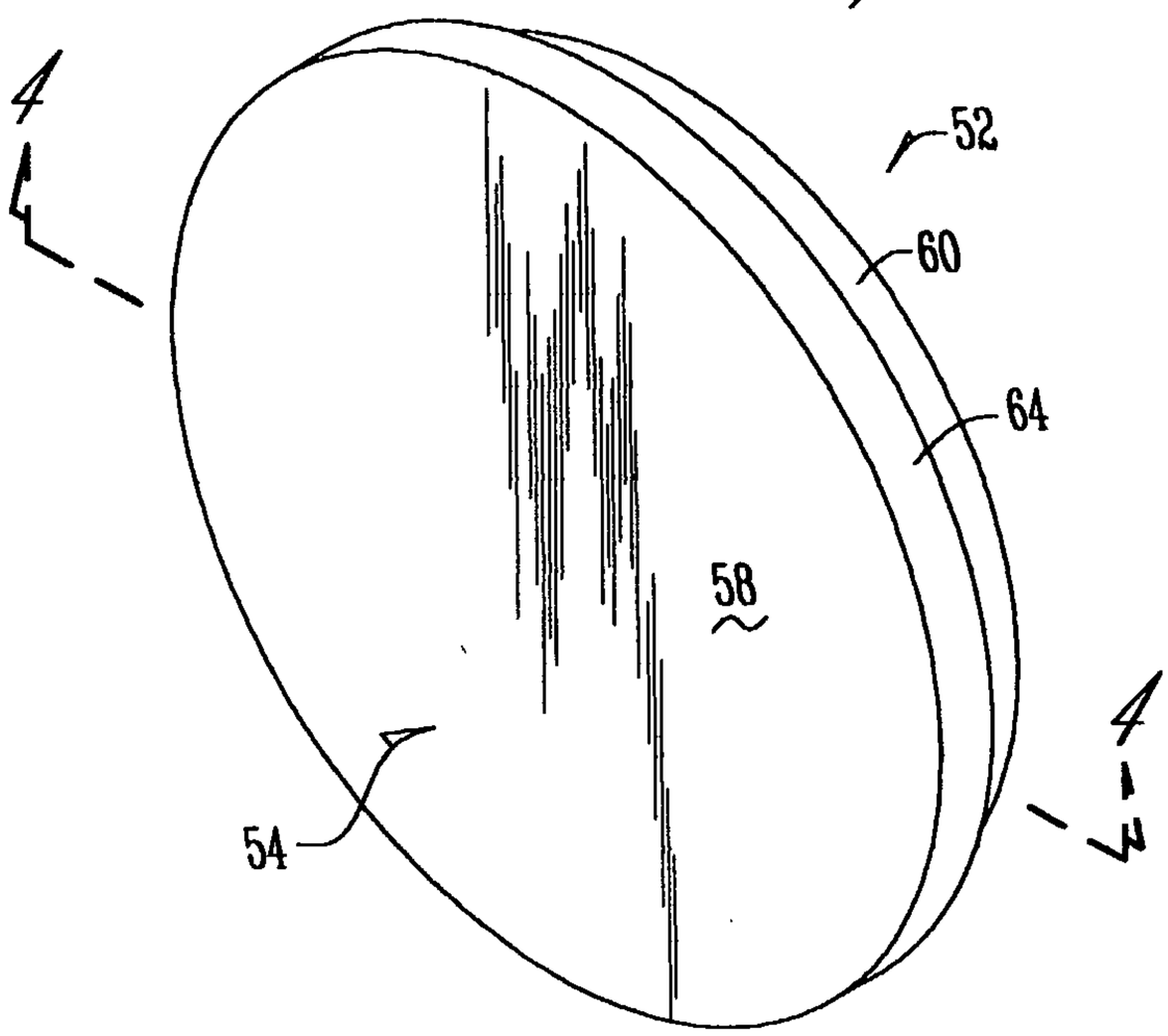


Fig2

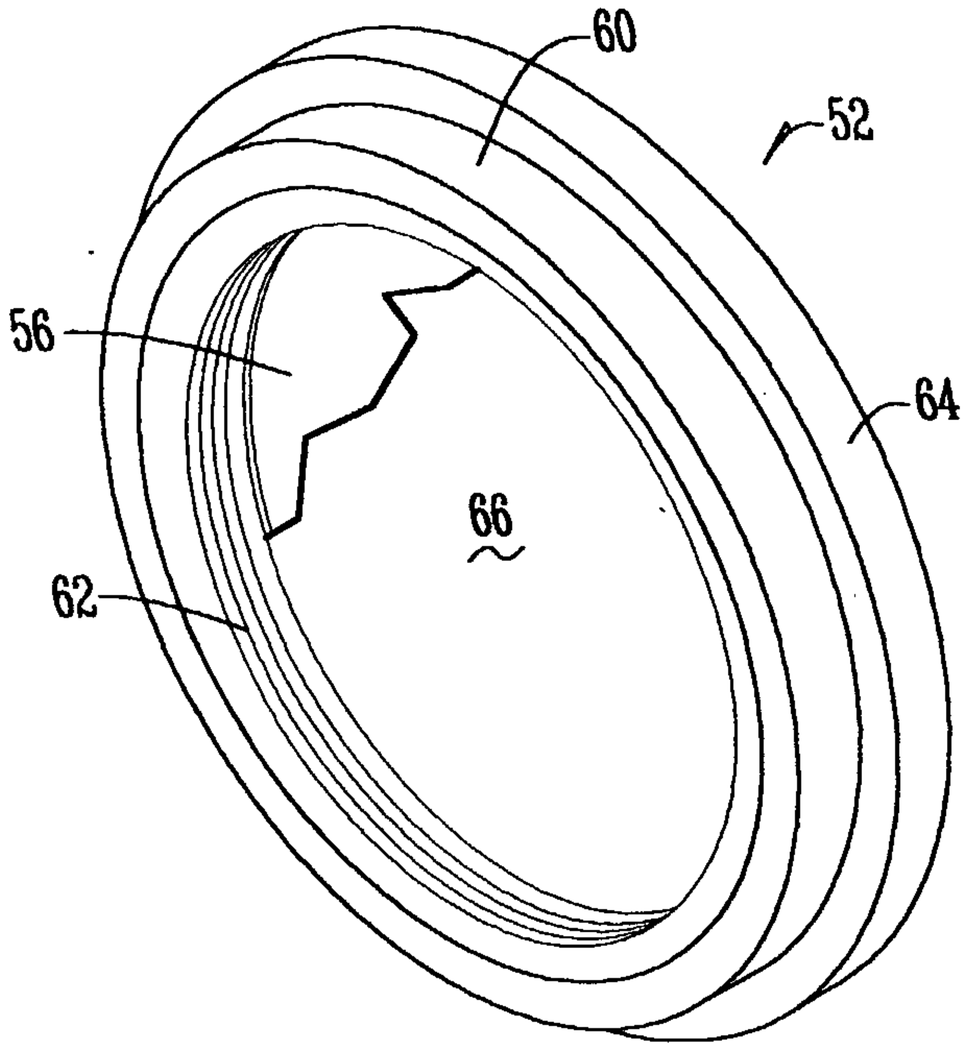


Fig3

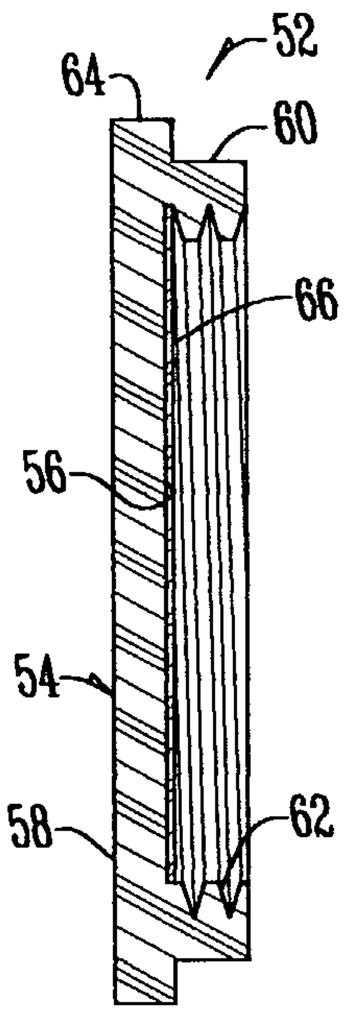


Fig4

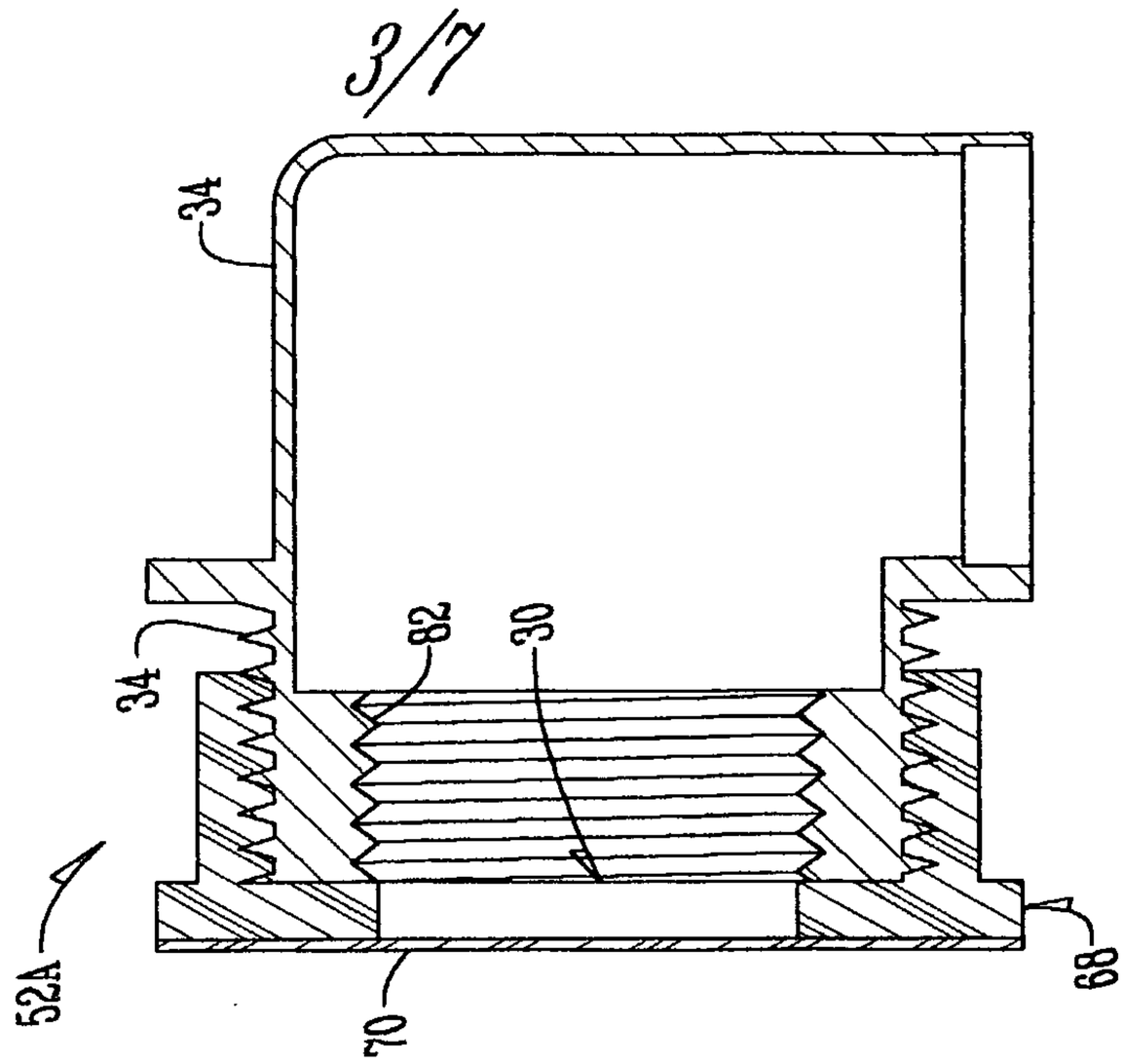


Fig6

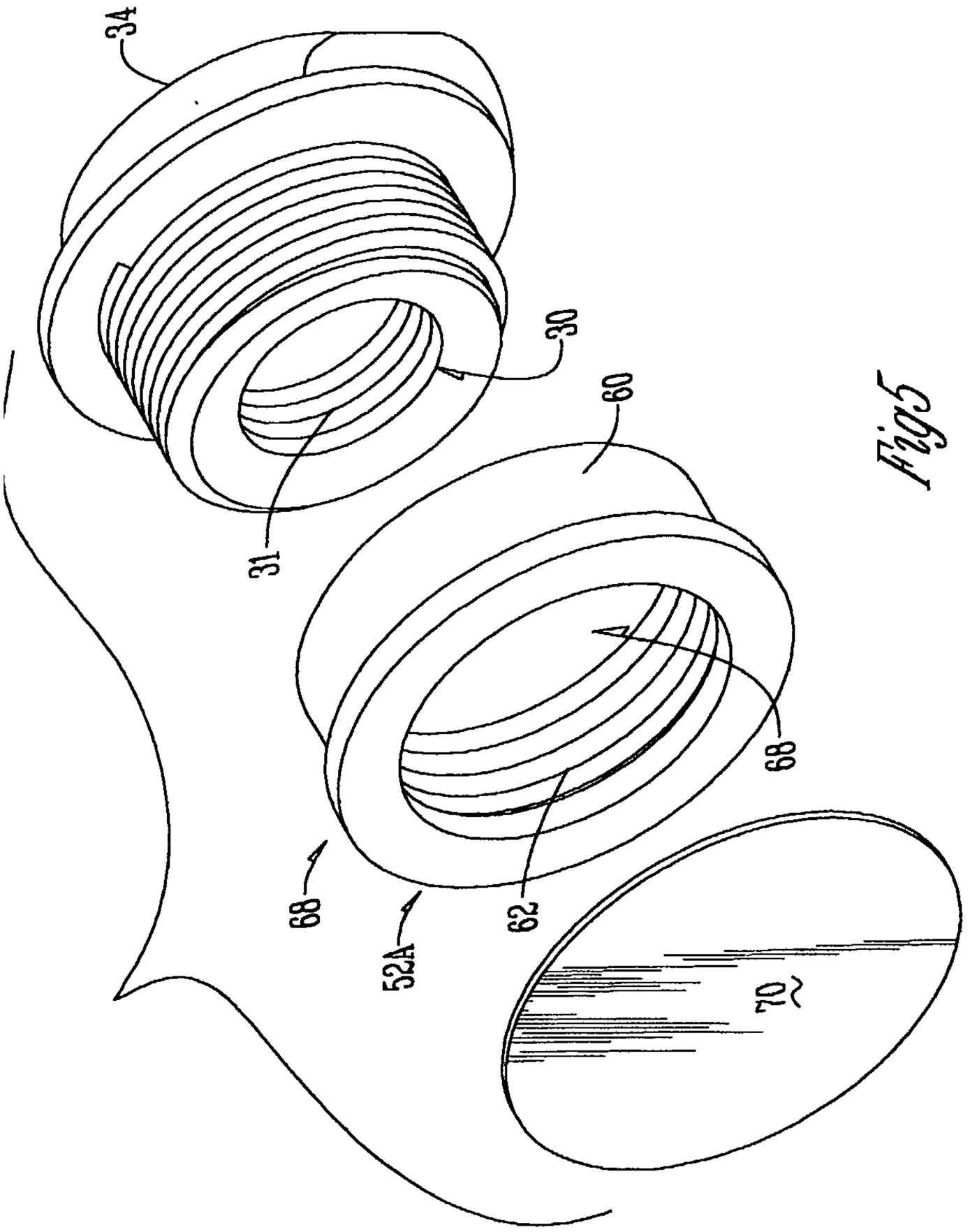


Fig5

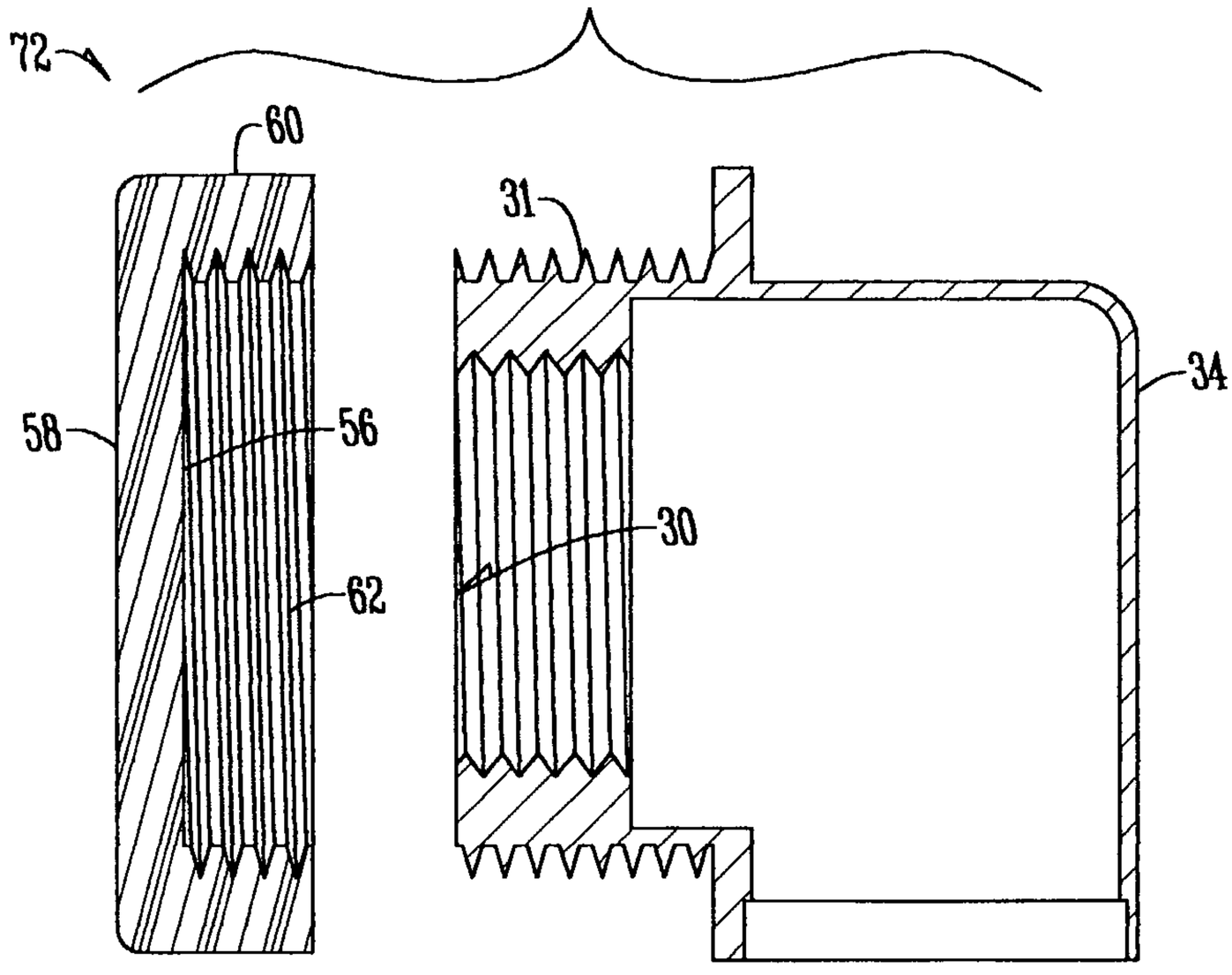


Fig7

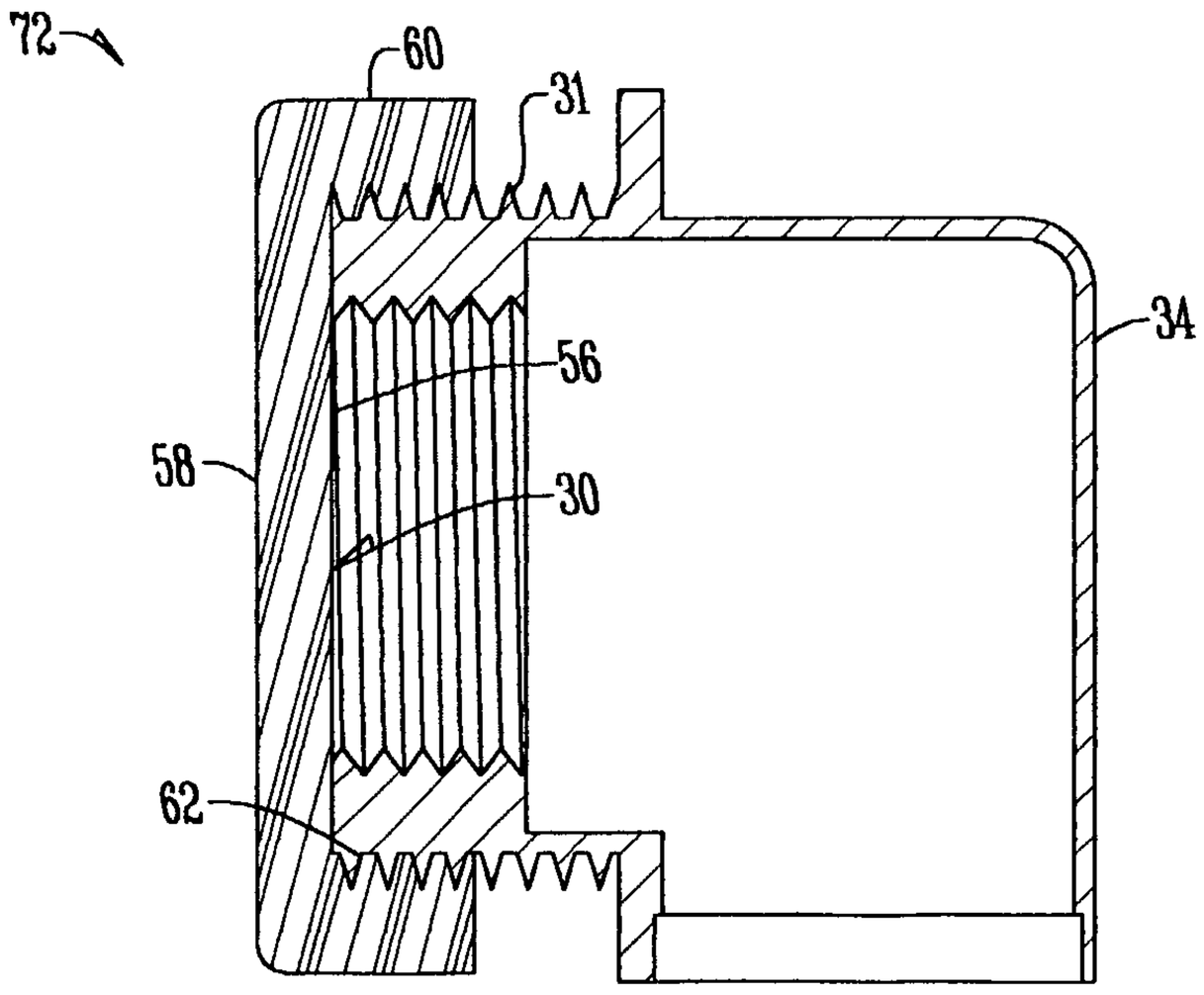


Fig8

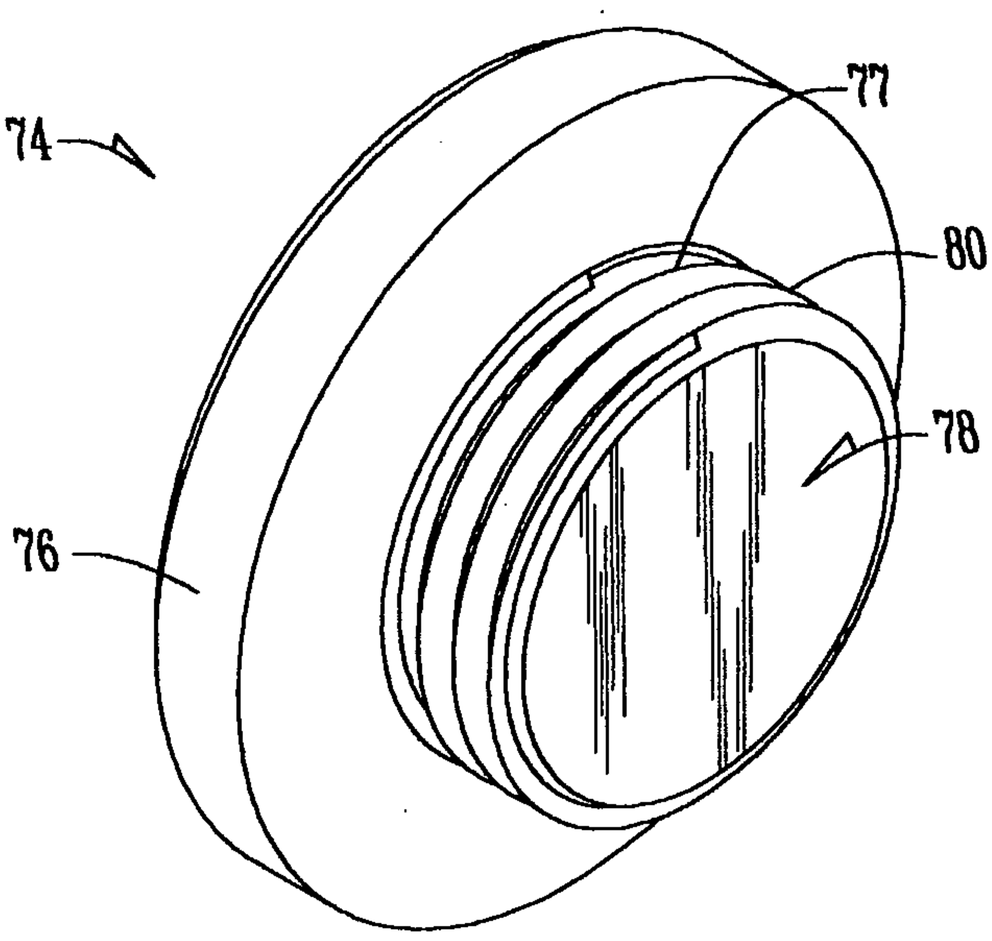


Fig9

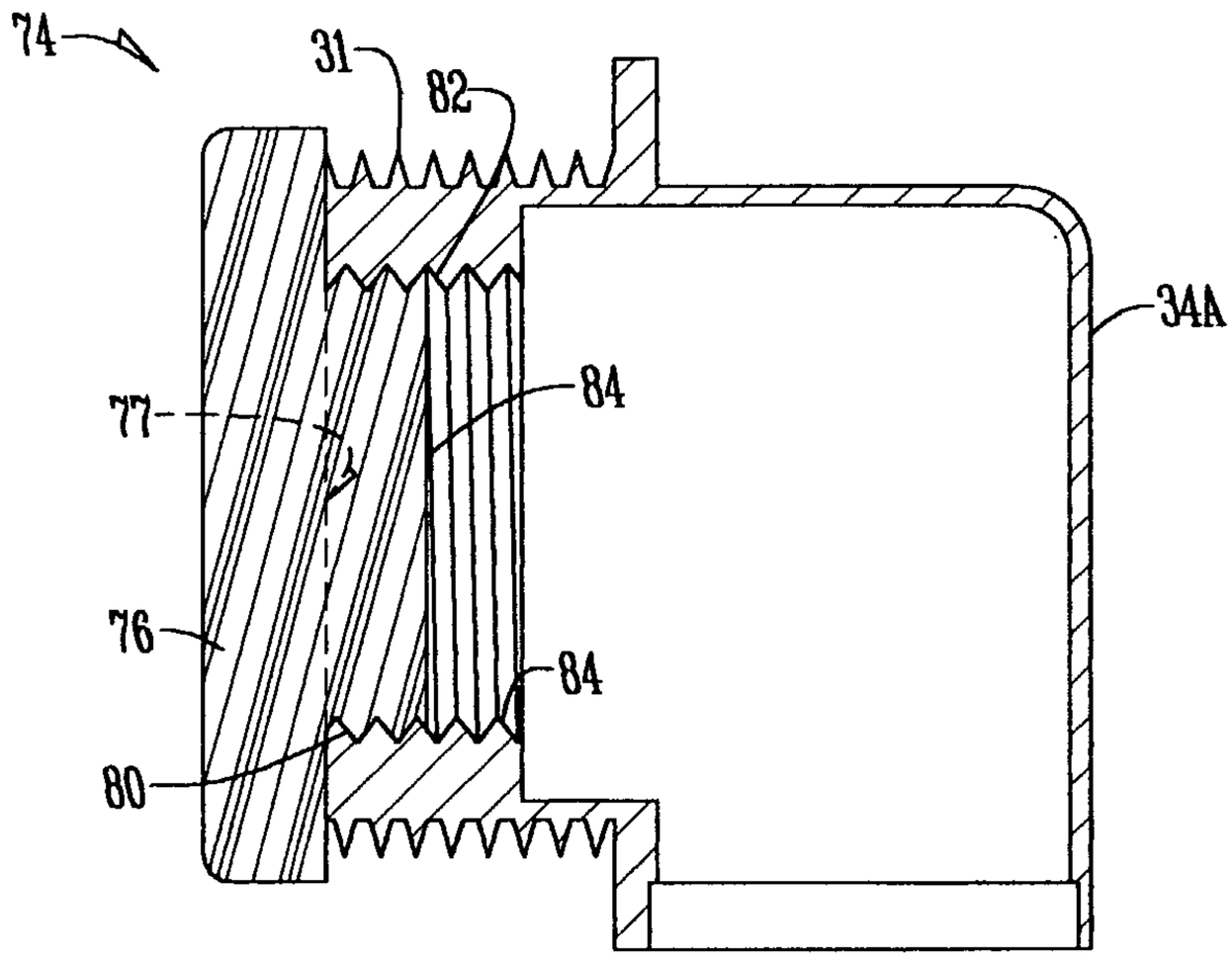


Fig10

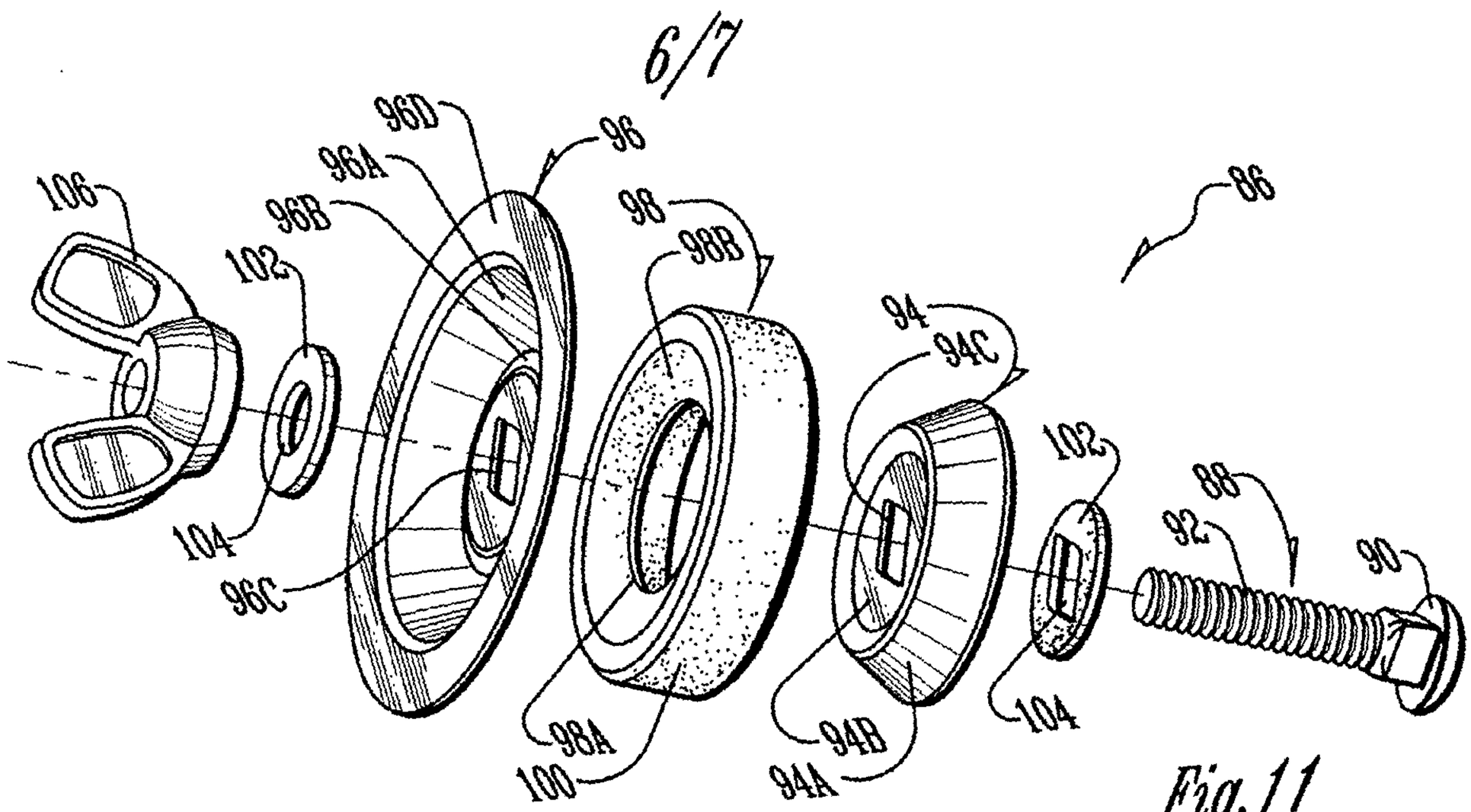

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Fig. 11

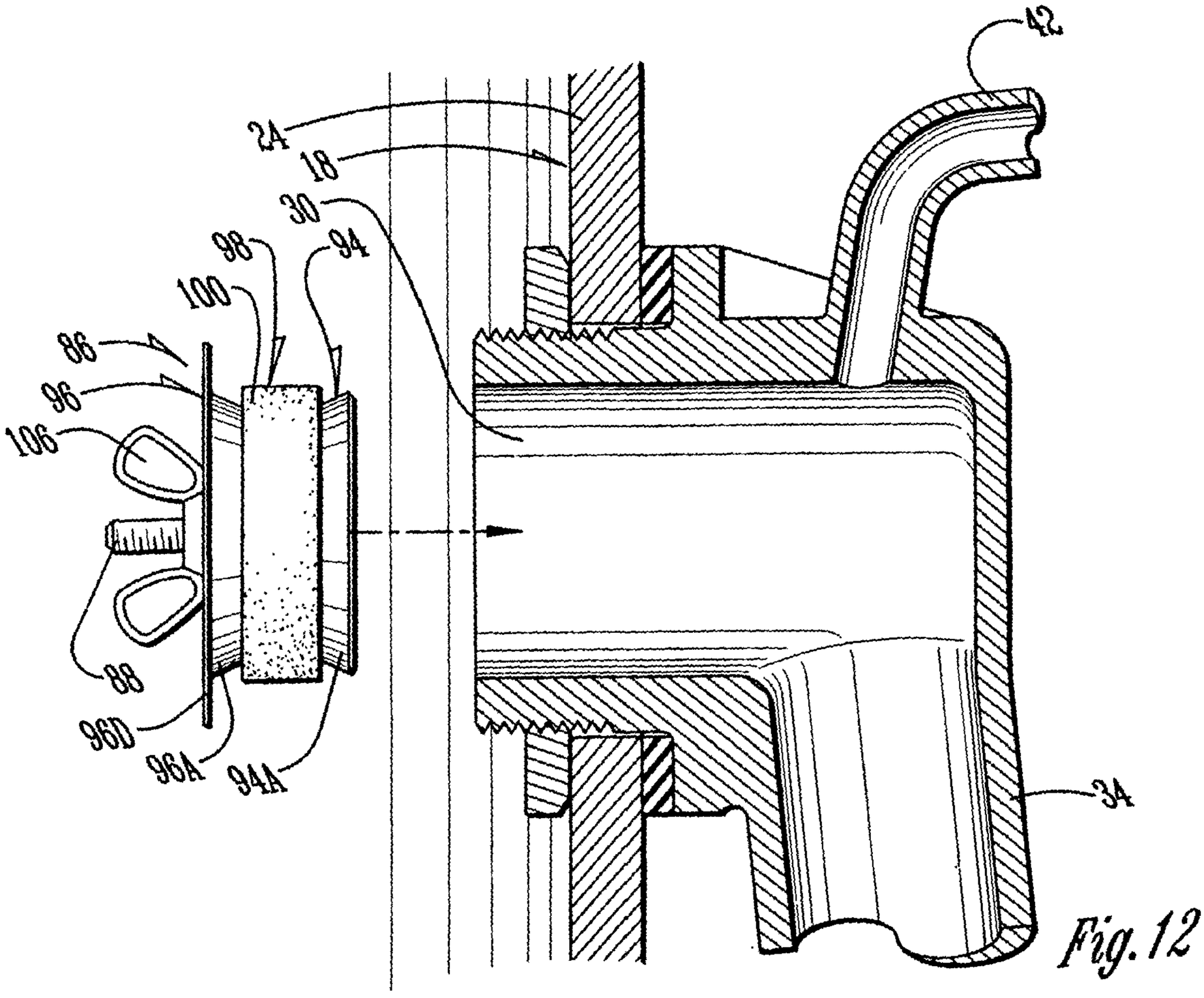

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Fig. 12

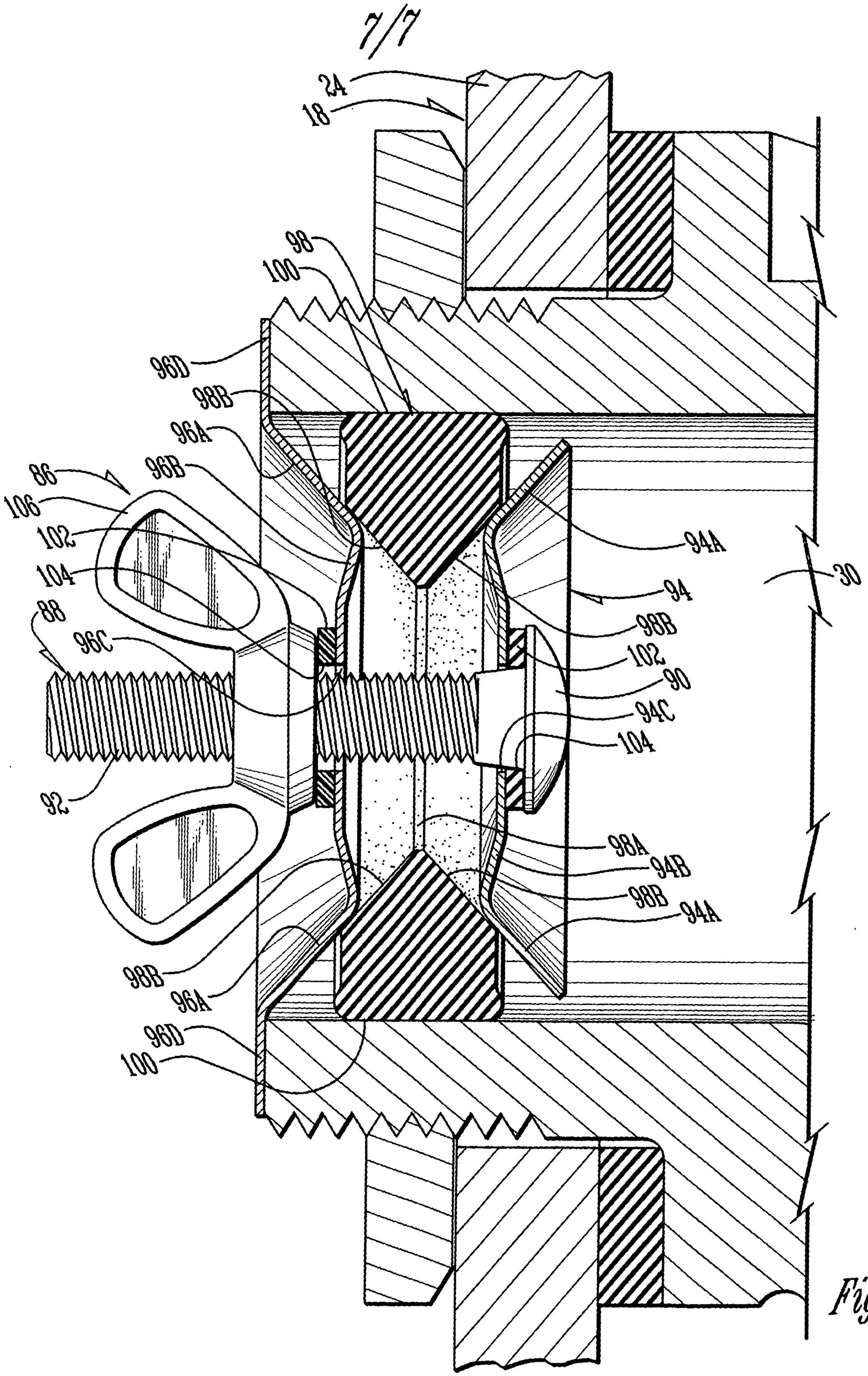
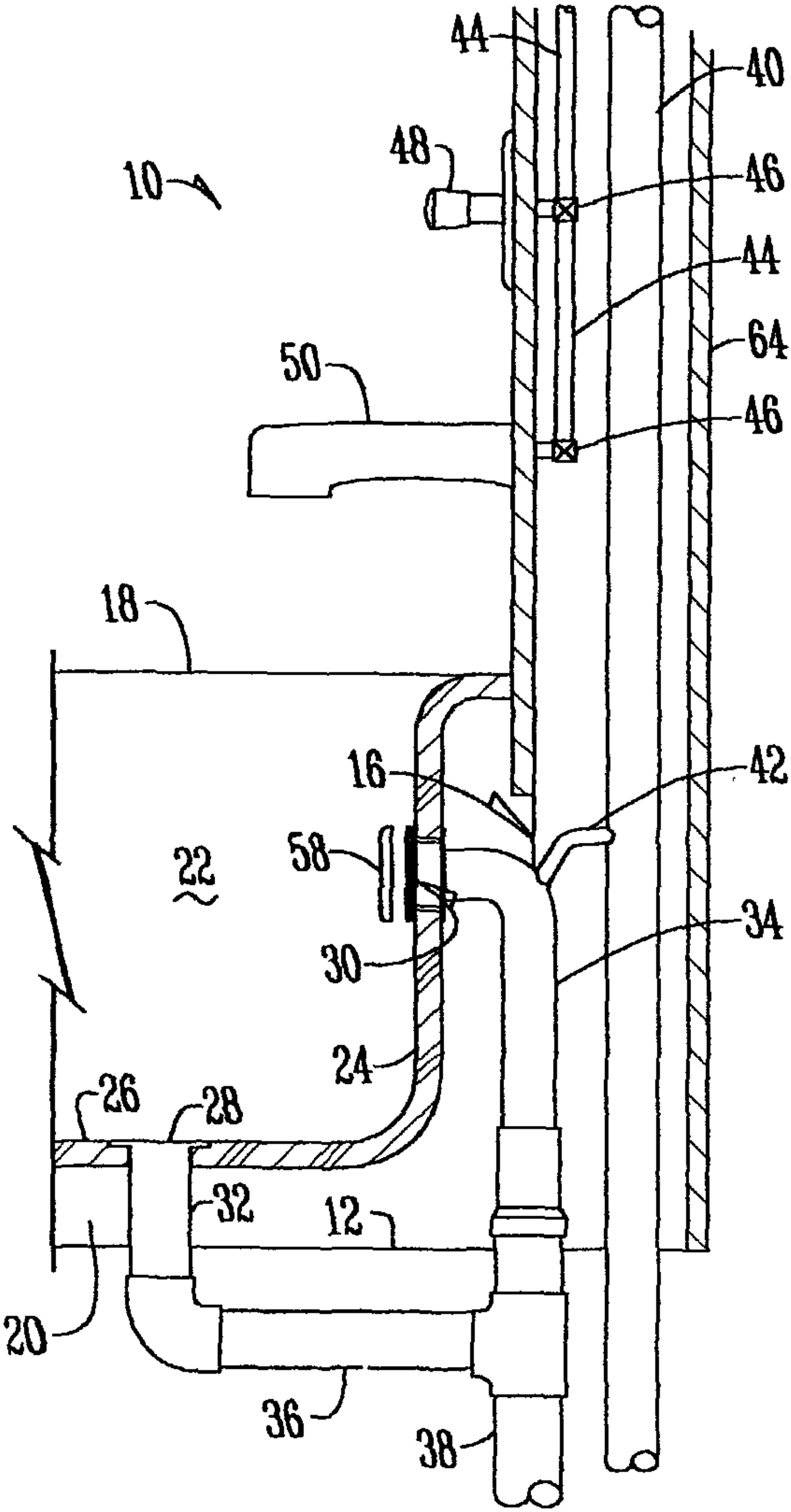

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96D
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96B
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102
104
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96C
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98B
102
90
94C
104
98A
94B
98B
94A
98B
96A
96D
100

Fig. 13


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