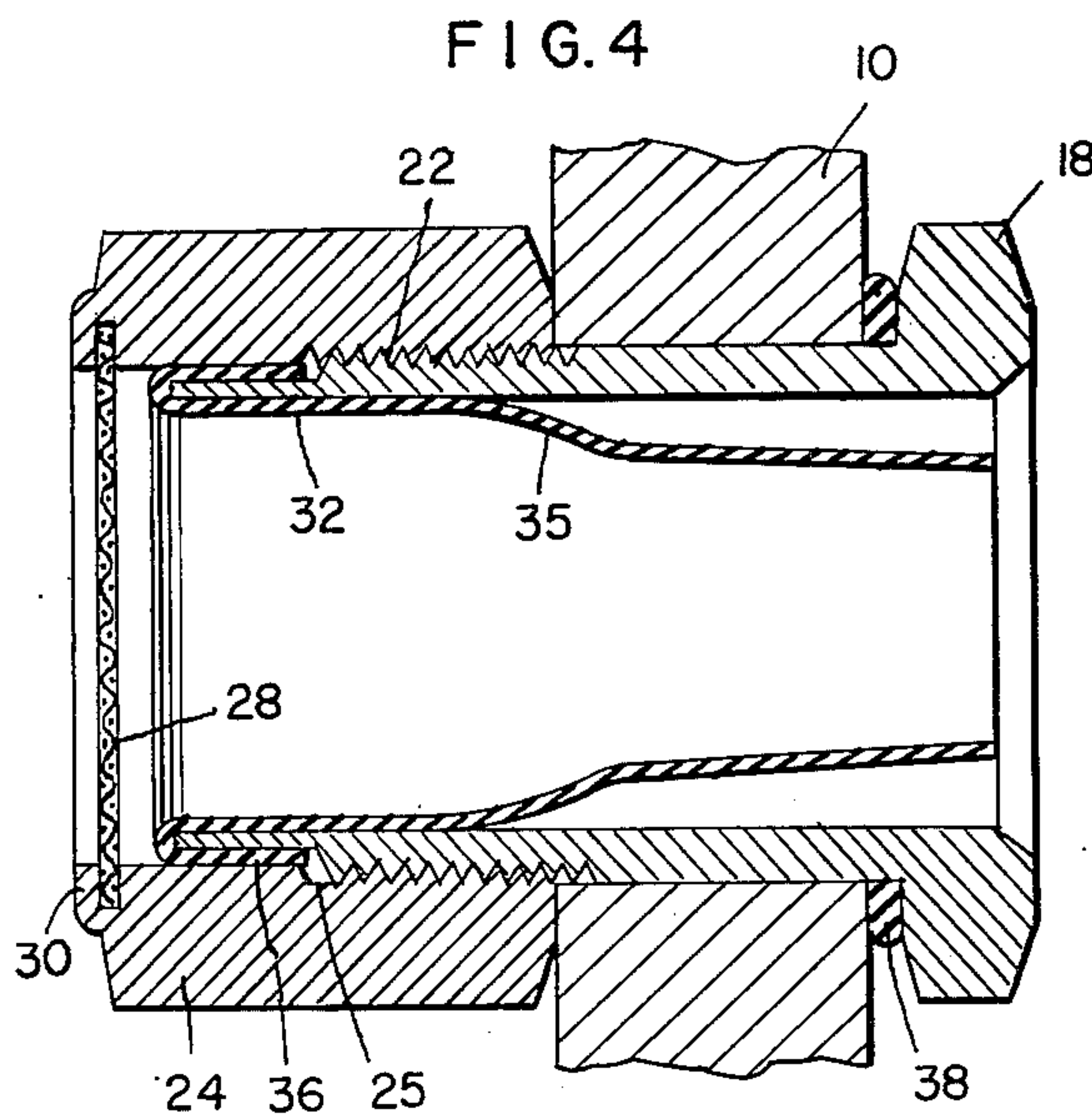


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AUTOMATIC BOAT DRAIN

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FIG. 5

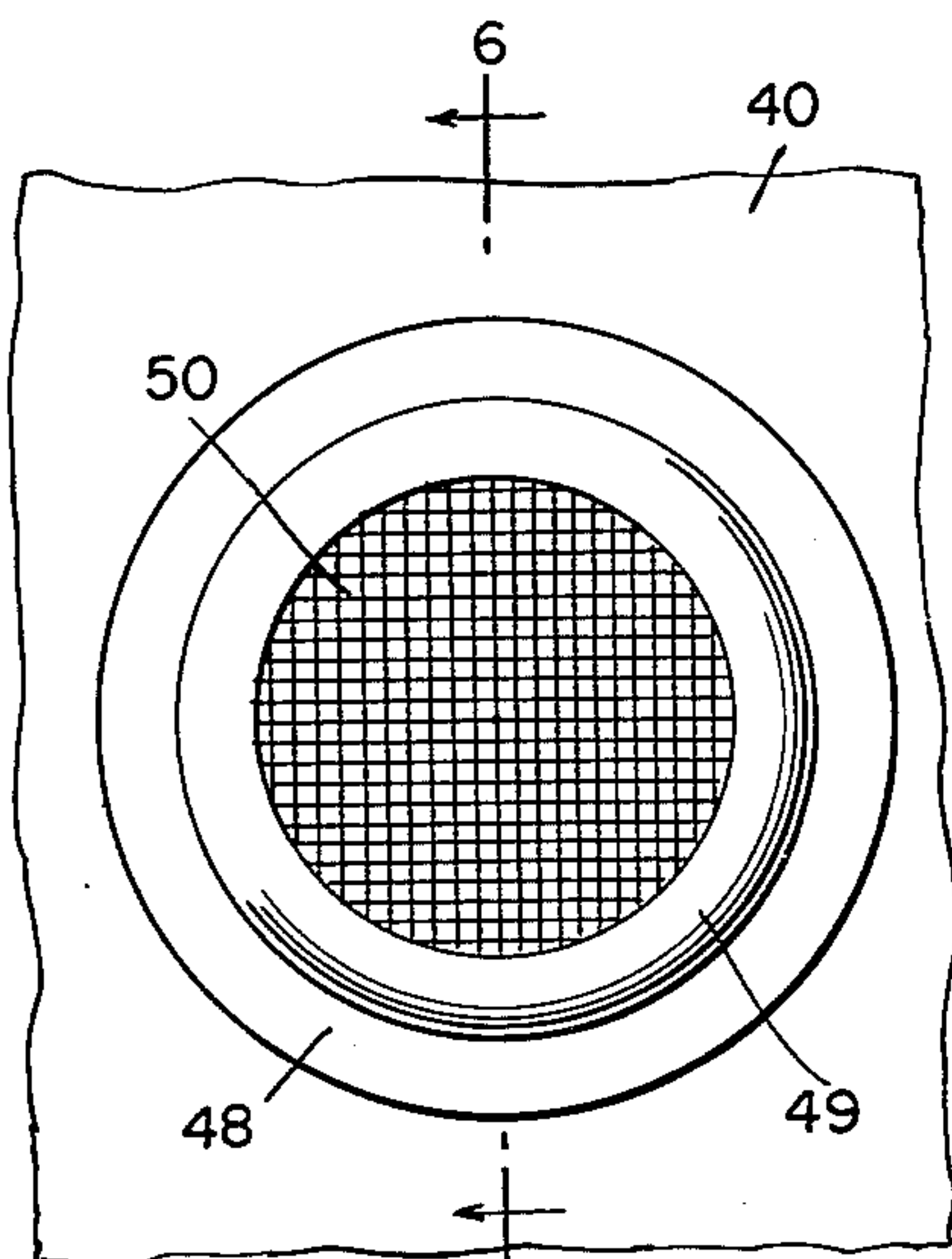


FIG. 6

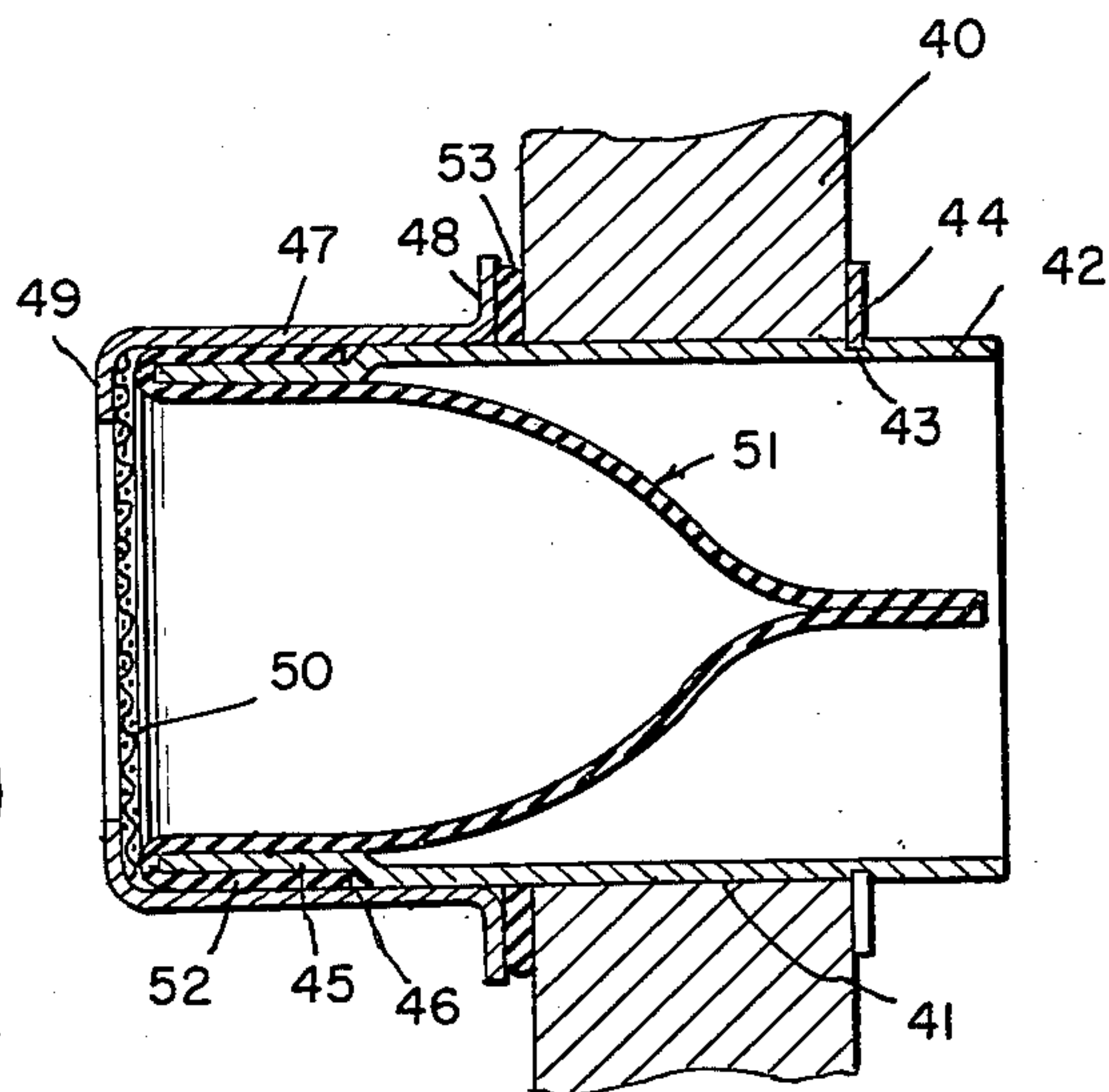


FIG. 7

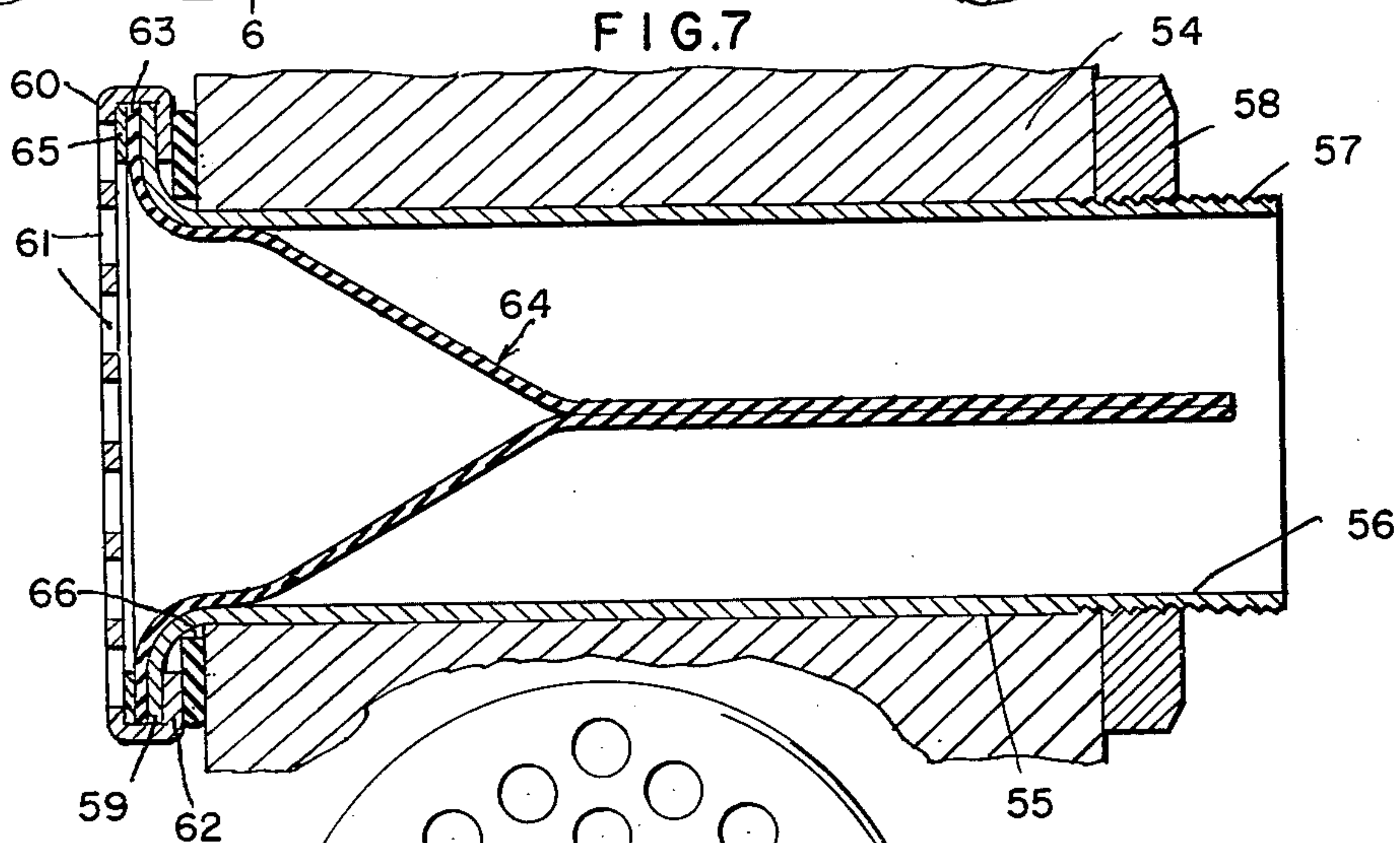
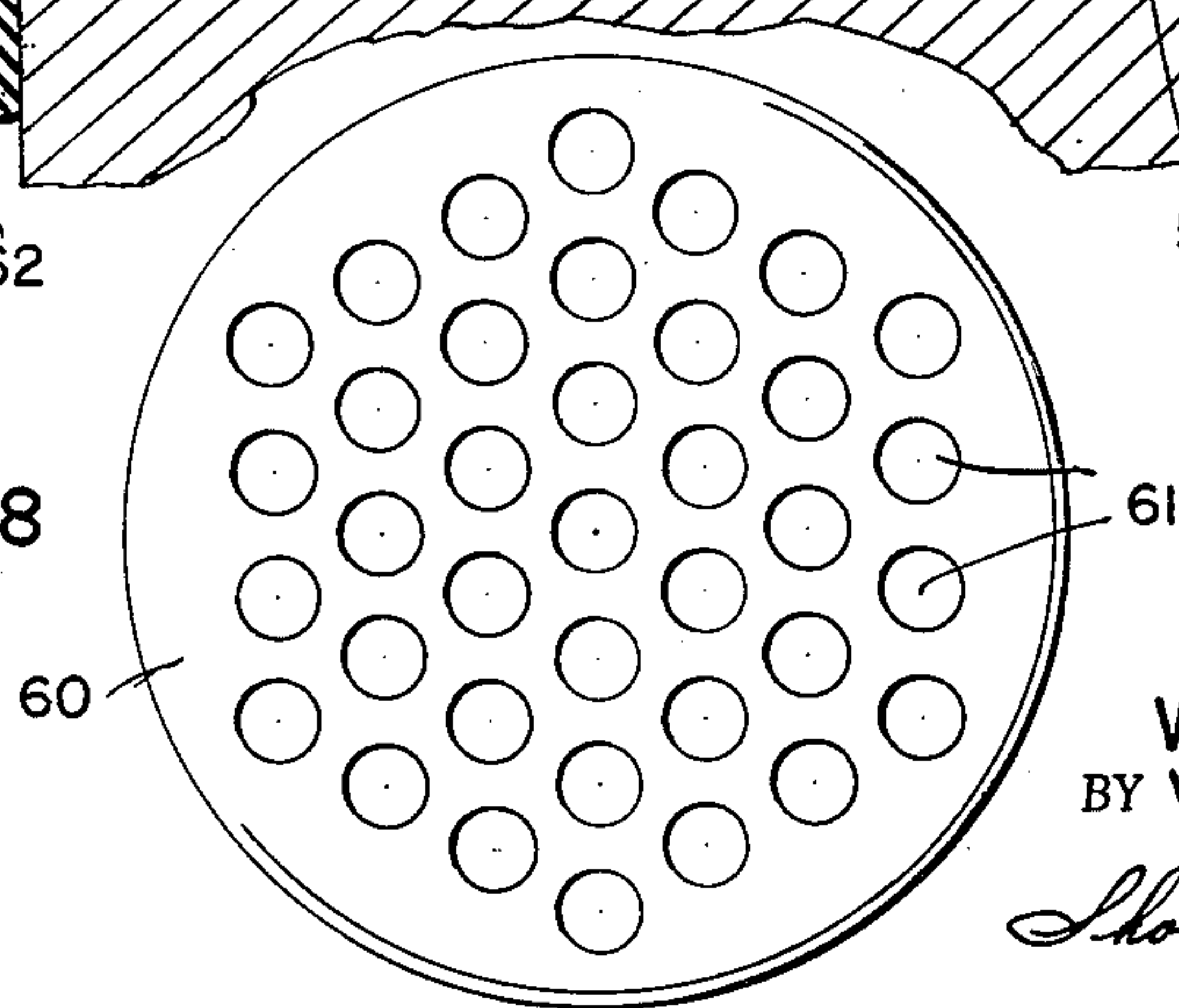


FIG. 8



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3,060,882

## AUTOMATIC BOAT DRAIN

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7 Claims. (Cl. 114—185)

This invention relates to improvements in devices for use in boats for effecting the draining of water from the hull thereof.

In the operation of all types of water craft, particularly outboard and inboard driven boats of small or medium size, the accidental taking in of water is a common occurrence. This then requires the use of some type of bailing device which may be in the form of a small hand manipulated receptacle or a hand operated pump or the like. In any event, such an operation necessitates the services of a rider in or occupant of the boat.

It is a particular object of the present invention to provide a new and novel boat draining device which will function automatically while the boat is in motion, to effect the extraction of bilge water therefrom.

A further and more particular object of the invention is to provide an automatically functioning device for removing bilge water from a boat, which device operates, under or as a result of two conditions which may occur simultaneously or successively, as a result of the movement of the boat through the water, one of which conditions being the creation by such boat movement of an area of reduced water pressure around a part of the device lying outside of the boat and the other condition resulting from the inertia of the bilge water causing it to be forced through the device as the forward movement of the boat increases or as the boat movement is accelerated.

More particularly it is an object of the invention to provide a small uncomplicated tubular device which is adapted to be set in an opening in the boat transom so as to have one end exposed upon the interior of the boat near the bottom thereof and the other end extending into the water behind the transom, with a valve element therein which is of a character to be opened as a result of the reduction of water pressure around the outer end of the device when the boat is in operation, to effect the extraction of water therethrough from the interior of the boat.

The invention broadly contemplates the provision of a tube, sleeve or cylinder of a length to extend through the transom of a boat. Such tube or cylinder carries on one end a suitable flange or encircling member which is drawn against a gasket encircling the opening in the transom at the rear side thereof, while the opposite or inner end of the member carries a collar which may be permanently fixed or may be in the form of a nut, between which and the gasket at the outer side, the transom body is clamped.

The tubular body or cylinder has secured to the wall thereof at its inner end, one end, or the periphery of one end, of an elastomeric tubular body, the opposite end of which tubular body is free and directed rearwardly in the surrounding body or cylinder and is flattened to a closed condition. Accordingly such elastic body functions in the nature of a one-way valve capable of being opened only toward the outer end of the device and closing to a condition which will prevent reverse flow of water into the boat through the transom.

With the device mounted to extend through the transom of the boat close to and parallel with the bottom or floor thereof, when the boat hull planes in the water its motion creates a condition where there is actually no water behind the transom at all since the water is being displaced by the movement of the hull through it. This will create something of a reduced pressure condition at the rear or

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outlet end of the tubular body which will have a tendency to pull water from the hull outwardly and further, the velocity of the hull movement in attaining this planing speed is such that any water present in the hull will be caused through the effect of inertia to rush to the back of the boat where it is restrained or contained by the transom of the boat. Accordingly since at the outer side of the transom there is a reduced water pressure or there is no water at all, the absence of any counteracting pressure or weight on the outlet end of the tubular body would permit the outer end of the tubular body, which is shaped in the nature of a pair of lips which are normally pressed together, to open by the pressure of the water from within the hull pushing against the inside of such lips of the drain valve and the water would, therefore, simply drain out from the hull. When the speed of the boat is slackened so that the water displacement is not so great as previously, the water at the outside of the transom would then press against the lips of the tubular body to close and effectively seal such body, thereby preventing water from entering the boat.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming part of the specification, with the understanding, however, that the invention is not confined to a strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

FIG. 1 is a view illustrating in cross section a portion of a boat transom and boat bottom showing in side elevation in operative position in the transom a draining device constructed in accordance with one embodiment of the invention;

FIG. 2 is a view in elevation of the device looking at the inner end thereof and showing portions of the surrounding transom;

FIG. 3 is a sectional view taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is a sectional view taken substantially on the line 4—4 of FIG. 3, the line of section being at right angles to that of FIG. 3;

FIG. 5 is a view in elevation of the inner end of a second embodiment of the invention showing portions of the surrounding transom;

FIG. 6 is a sectional view taken substantially on the line 6—6 of FIG. 5;

FIG. 7 is a sectional view through a third embodiment of the invention, the plane of the section corresponding to the planes for the sections of FIGS. 3 and 6;

FIG. 8 is a view in elevation of the inner end of the embodiment shown in FIG. 7.

Referring now more particularly to the drawings, the numeral 10 designates in FIGS. 1 to 4 a portion of a boat transom shown in vertical section while the numeral 11 designates a portion of the boat bottom to which the bottom part of the transom is joined.

For the installation of the boat bailer or draining device of the present invention the transom 10 is provided near the bottom thereof with an opening 12 of proper diameter to receive the body of the draining device.

The numeral 14 generally designates a device constructed in accordance with one embodiment of the invention. In this embodiment of the invention there is provided a cylinder 16 having formed or cast integrally therewith at one end the polygonal collar or flange 18.

The opposite end of the cylinder 16 is externally reduced in diameter to form the set-back or encircling recess 20. From the inner end of this recess 20 through



a portion of its length the body of the cylinder has screw threads 22 cut therein.

The threaded end of the cylinder 16 is adapted to receive a cap nut which is generally designated 24. This cap nut is of reduced inside diameter through a portion of its length from one end thereof as indicated at 25 and the face of this reduced portion is provided with screw threads 26 adapted for engagement with the threads 22 of the cylinder body. From the reduced portion 25 to the opposite end thereof the cap nut inside diameter is equal to the inside diameter of the nut in the threaded portion thereof. Accordingly it will be seen that when the cap nut is threaded onto the threaded inner end of the cylinder, there will be a small space between the unthreaded inner surface of the nut which is designated 27, and the outer surface of the set-back or recess 20, the purpose for which will be hereinafter made clear.

The inner end of the cap nut is covered by a suitable foraminous sheet or screen 28. The periphery of this screen 28 is secured in a suitable manner to the body of the nut as for example a recessed end area may be formed therein at 29 to provide a shoulder against which the periphery of the screen is placed after which the outer part of such recessed area may be turned inward to form the screen retaining flange or lip 30.

As an alternative to the arrangement illustrated in FIGS. 3 and 4 for securing the screen 28 in position, a simple recess may be formed in the end of the cap nut in which the screen is placed and use then made of a snap ring or other suitable securing element. No illustration of this use of a snap ring for securing the screen in place is made, but it is believed that the manner of employing such a securing means will be readily obvious without illustration.

Fixed within the cylinder 16 is a tubular valve body which is generally designated 31. This valve body is formed of a suitable elastomer such as natural or synthetic rubber or an appropriate type of plastic.

The valve body 31 is molded to have a cylindrical form at one end as indicated at 32 while at its opposite end it is flattened through a portion of its length to provide the flat wall portions 33 which normally lie in contact or flat against one another, thereby closing this end of the tubular valve body, as clearly illustrated in FIG. 3. The flat wall portions 33 are tapered in the width thereof as is clearly shown in FIG. 4 so that the joined edges of these flat wall portions diverge slightly from the free ends thereof toward the cylindrical portion of the body, bowing out widely from the flat sides as indicated at 34 in FIG. 3 and also bowing out to some extent from the edges or narrow sides as indicated at 35 in FIG. 4.

The flexible valve body 31 is fixed at its cylindrical end portion 32 to the inner end of the cylinder 16 by having a portion thereof turned back as indicated at 36 over the inner end of the cylinder 16 so that such turned back portion will lie in the recess 20. Thus when the cap nut 24 is threaded onto the inner end of the cylinder 16, the unthreaded wall portion 27 will press against the turned back portion 36 of the valve body and compress it in the recess 20, thereby forming a tight joint between the inner cylindrical end of the valve body and the inner end of the encasing cylinder.

It will be seen that the outward bowing of the portion of the valve body wall lying between the cylindrical end 32 and the flattened outer end, forms a relatively large reservoir 37 which tapers toward the adjoining flat end walls 33. The automatic draining is installed in the boat transom by inserting the cylinder 16 into the opening 12 from the outer side of the transom. A suitable gasket 38 encircles the cylinder 16 and is interposed between the polygonal flange 18 and the outer wall of the transom and thus when the cap nut is threaded onto the inner end of the cylinder 16 and drawn up tightly against the inner side of the transom, the gasket 38 will be compressed and a tight seal will be established between the device and the transom.

As boats ordinarily have a quantity of water lying in the bottom thereof, the screened inner end of the draining device will normally be covered by such water and the reservoir 37 will remain filled. Thus when the boat moves forwardly the weight of this water in the filled reservoir will cause it to move through inertia against the closed rear end of the resilient valve body to force the wall portions or what may be described as lips thereof, apart and this will then establish a drawing or draining action to pull the water out from the boat. Such action will, of course, be helped or maintained by a reduced water pressure at the outer end of the cylinder 16 resulting from the forward movement of the boat in the water.

FIGS. 5 and 6 illustrate another form of the boat draining device wherein the essential features are the same and function in the same manner as in the form shown in FIGS. 1 to 4, the difference in the construction of the device residing in the part thereof in which the valve body is housed. In these figures the numeral 40 designates a portion of a boat transom having formed therethrough a passage or bore 41.

The numeral 42 designates the cylindrical body of the device which is here shown as being tubular and of materially less thickness than the cylinder 16 and adjacent to one end of this body the outer side or surface thereof is formed with a groove 43 designed to receive a snap ring 44.

The cylinder 42 is formed at its opposite or inner end with the inset circular portion 45 which corresponds to the set-back formed at the inner end of the cylinder 16. The degree to which this portion 45 is set in corresponds approximately to the thickness of the cylinder wall forming the encircling outside recess 46.

The numeral 47 designates a circular or annular cap which has an inside diameter corresponding to the overall diameter of the cylinder 42 and is adapted to be fitted over the inner end of the cylinder 42 in the manner shown. This cap at one end is defined by the outturned flange 48 while at its inner end it has the inturned flange 49 against the inner end of which is secured a foraminous disc or screen 50. The numeral 51 generally designates the resilient valve body which is of the same form or design as the body 31 and the inner end of this body is of an outside diameter to fit within the area defined by the inset portion 45 and the valve body 51 is maintained in position by having a portion of its inner end turned back over the edge of the inset portion 45 so that this turned back portion which is designated 52 may lie in the recess 46, being compressed therein between the annular portion 45 and the encircling cap 47 when the latter is fitted onto the end of the cylinder 42.

The draining device is put into use by inserting the outer end portion or that portion carrying the snap ring 44 into the bore 41 from the inner side of the transom and the snap ring 44 is then forcibly applied to the outer end of the cylinder to be held thereon by friction and encircling the body 42 is a gasket 53 which is compressed between the inner side of the transom and the flange 48 in the manner shown.

Since the resilient valve member 51 is of the same construction or form as the member 31, a detailed description here of this valve member is not believed to be necessary.

FIG. 7 illustrates a third embodiment of the invention shown in applied position and in this figure the transom in which the draining device is positioned is generally designated 54 and has the bore or passage 55 therethrough.

In this third embodiment of the invention the cylinder body is designated 56 and has one end externally screw threaded as indicated at 57 to receive a retaining nut 58. This end carrying the nut 58 forms the outer end of the device.

The inner end of the cylinder 56 is turned or flared outwardly to provide the flange 59 to which is secured



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the cap and the inner end of the resilient valve body.

The numeral 60 designates the cap which is secured to the inner end of the cylinder or to the flange portion 59 thereof. This cap is in the form of a disc which is stamped to form therein the multiplicity of apertures 61 whereby the cap functions as a strainer in an obvious manner.

The cap 60 outside of the apertured area is flanged inwardly as indicated at 62 around the edge of the flange 59 to extend along or against the underside of the flange 59 and in the operation of fitting the cap 60 to the end of the cylinder body in this manner the inturned flange 62 thereof effects the clamping between the cylinder flange 59 and the inner side of the cap, of a portion 63 of the periphery of the resilient valve body which is generally designated 64 and a gasket 65.

It will be apparent, of course, that in this third embodiment the device will be completely formed or put together ready for installation in the transom opening 55 so that the end portion of the cylinder 56 carrying the screw threads 57 will in this case be inserted into the opening from the inner side of the transom to project beyond the outer side thereof so as to receive the securing nut 58. The nut 58 when applied will thus bear against the outer side of the transom to draw the flanged inner end portion of the device toward the inner side of the transom and in order to seal the opening at the inner side of the transom a gasket 66 is interposed between the surface of the transom and the inturned flanged portion 62 of the cap 60.

The form of the valve body 64 here shown is, of course, substantially the same as that shown in the preceding figures or preceding forms of the invention and designated 31 and 51 and it will be seen, therefore, that its function will be exactly the same as in these previously described forms.

From the foregoing description it will be apparent that there is provided by the present invention a device, which when installed in the transom of a boat at a sufficiently close location to the bottom of the boat where it will be covered by water lying therein, will function in the movement of the boat forwardly to drain off the water from within the boat. This operation will be continuous and automatic at all times that the boat is moving forwardly. Of course, upon reverse movement of the boat, the resilient valve body will remain closed and prevent the entrance of water into the boat through the cylinder of the draining device.

It will be apparent from the foregoing description that by the novel formation of the wall of the elastic tube of the drain element with the enlarged portion of the tube being at the end where it is bonded to the metal part in which it is enclosed, there is no stress imposed upon the elastic material so that free passage of the water through the tube is permitted. This is an action which is different from or would not be obtained in a case where the elastic tube might be initially of unshaped form or of substantially unvarying diameter from one end to the other and having one end stretched to engage over or to fit the metal housing in which it is enclosed. Such stretching of a tube of unvarying diameter would create considerable stress in the material through the stretched area so that the tube would strongly resist being opened at the free end by the water being forced therethrough from within the hull and it would take a tremendous weight of water inside the boat hull to overcome this stress. With the present invention by preliminarily shaping the attached end of the tube in the manner hereinbefore described, no such resisting stresses are set up and accordingly much less weight of thrust by the water from within the boat into the tube and between the closed lips at the rear end thereof is required to open the lips to permit the water to escape.

We claim:

1. A boat draining device for installation in a boat

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transom, said device comprising a cylinder having open inner and outer ends, means encircling the cylinder adjacent to the outer end for engaging the outer side of a transom through which the device is extended, the cylinder at its inner end having a terminal portion formed to provide an encircling outside recess, a tubular elastomer valve body lying in and longitudinally of the cylinder, the valve body having an inner end portion turned back and lying upon the outer side of the cylinder in said recess, a cap fitted over and secured to the inner end of the cylinder and compressing said turned back portion of the valve body in the recess, the valve body being closed at its outer end by having opposite sides of the wall pressed together but yieldingly separable to permit liquid to pass therebetween, and means encircling the inner end of the cylinder for coaction with the first stated means for securing the device to a boat transom lying between the said means.

2. The invention according to claim 1, wherein the cap is secured to the cylinder by screw threads formed in the cylinder between the recess and the outer end of the cylinder.

3. The invention according to claim 1, wherein the cap is secured by friction to the cylinder in the part of the latter adjacent to and lying radially outwardly beyond the bottom of the recess.

4. A boat draining device for installation in a boat transom, said device comprising a cylinder having open inner and outer ends, means encircling the cylinder adjacent to the outer end for engaging the outer side of a transom through which the device is extended, the cylinder at its inner end having a part thereof outturned to form an encircling flange, a tubular elastomer valve body lying in and longitudinally of the cylinder, the valve body having an inner end portion turned outwardly and lying upon said flange, a cap comprising an apertured plate overlying the flanged end of the cylinder and the outturned end portion of the valve body, and said cap being secured to the cylinder by an underturned flange encircling the cylinder flange and encasing the latter and compressing the outturned portion of the valve body between the cap plate and the cylinder flange.

5. A boat draining device for installation in a boat transom, said device comprising a cylinder having open inner and outer ends, a screen body overlying said open inner end, means for securing the cylinder in an opening in and extending through a boat transom, and a tubular elastomer valve body lying in and longitudinally of the cylinder, said valve body being open at its inner end to the full inside diameter of the inner end of the cylinder and formed at its outer end to permit fluid flow therethrough only in an outward direction, said cylinder carrying an encircling body adjacent to the outer end thereof, a cap secured to and over the inner end, and coacting means between said cap and said inner end of the cylinder between which the inner end of the valve body is secured, the securement of said inner end of the valve body being effected by a portion of the valve body being turned back to lie over the outer side of the inner end of the cylinder and the coacting means comprising a portion of the cap and the said outer side of the cylinder.

6. A boat drain device for installation in an opening formed through a boat transom, said device comprising an elongate tubular unit having an open inner end and an open outer end, the unit having an overall length greater than the length of the opening in the boat transom in which it is installed, the tubular unit being of a diameter in a part thereof permitting its extension through the transom opening whereby the open inner end is exposed at the inner side of the transom to receive bilge water from within the boat and whereby the open outer end is exposed on the outer side of the transom for discharging the bilge water, a tubular elastomer valve body having an open inner end and the valve body having a portion of said open inner end secured to the tubular



unit in a position to receive bilge water entering the unit through the said open inner end of the unit, the said portion of said open inner end of the valve body lying outside of the major outside diameter of a portion of the tubular unit, annular means carried by the tubular unit and opposing and engaging that said portion of the valve body lying outside of the said major outside diameter portion of the tubular unit for holding the said portion of the inner end of the valve body against separation from the said portion of the tubular unit, the valve body having the major longitudinal extent thereof lying within the tubular unit and having its other end directed toward the open outer end of the unit, the valve body having a portion thereof at its other end flattened whereby to permit flow of water therethrough only toward said open outer end of the unit, and means carried by the tubular unit for engagement against the inner and outer sides of

the transom for securing the unit in the transom opening.

7. The invention according to claim 6, wherein the said means comprises two members encircling the tubular unit, at least one of which members is threaded on the unit to be moved relative to the other member to clamp the transom between the members.

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