

Aug. 8, 1961

J. B. O. PARADIS

2,994,892

AUTOMATIC OUTBOARD MOTOR GUARD

Filed Oct. 2, 1959

2 Sheets-Sheet 1

Fig. 1

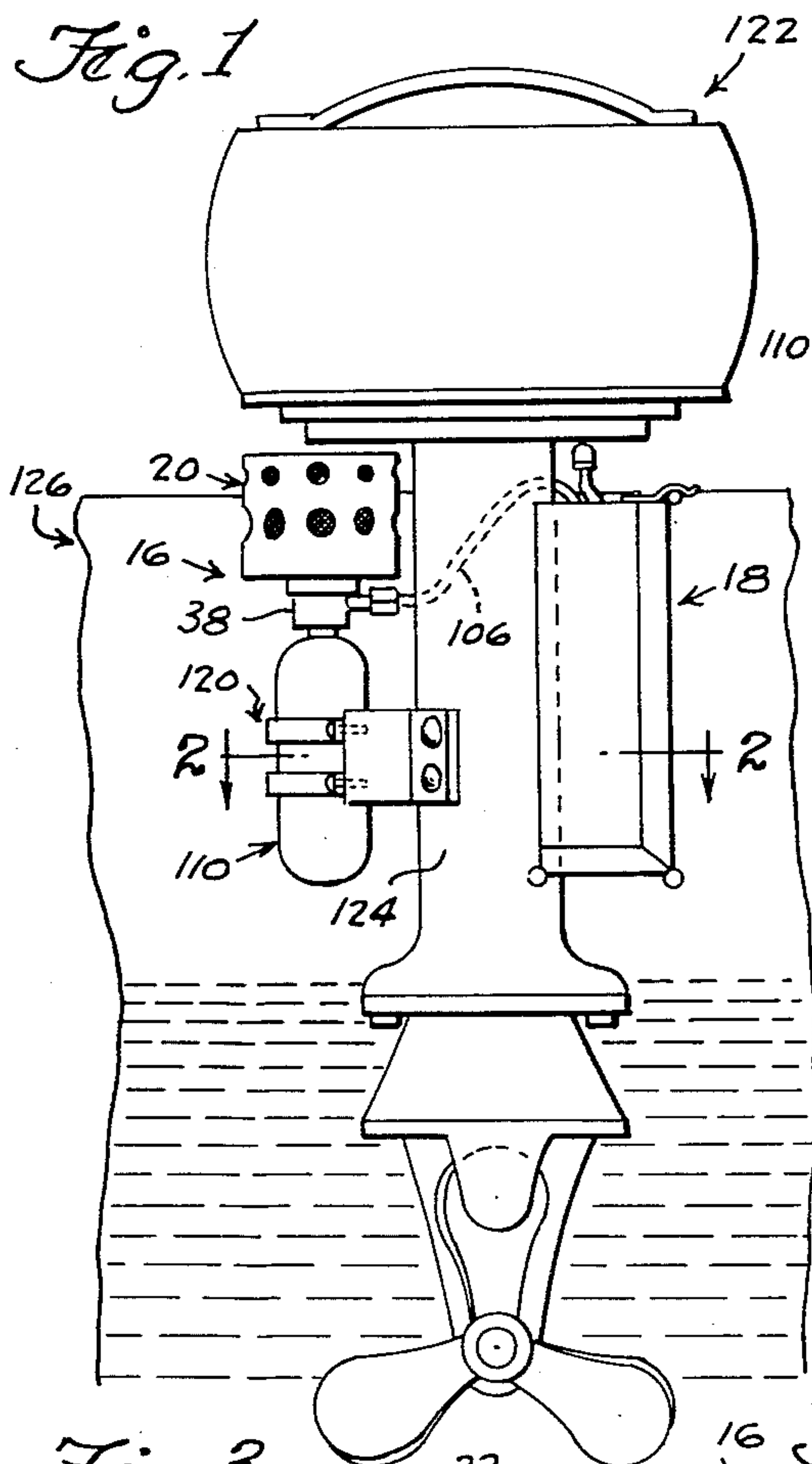


Fig. 2

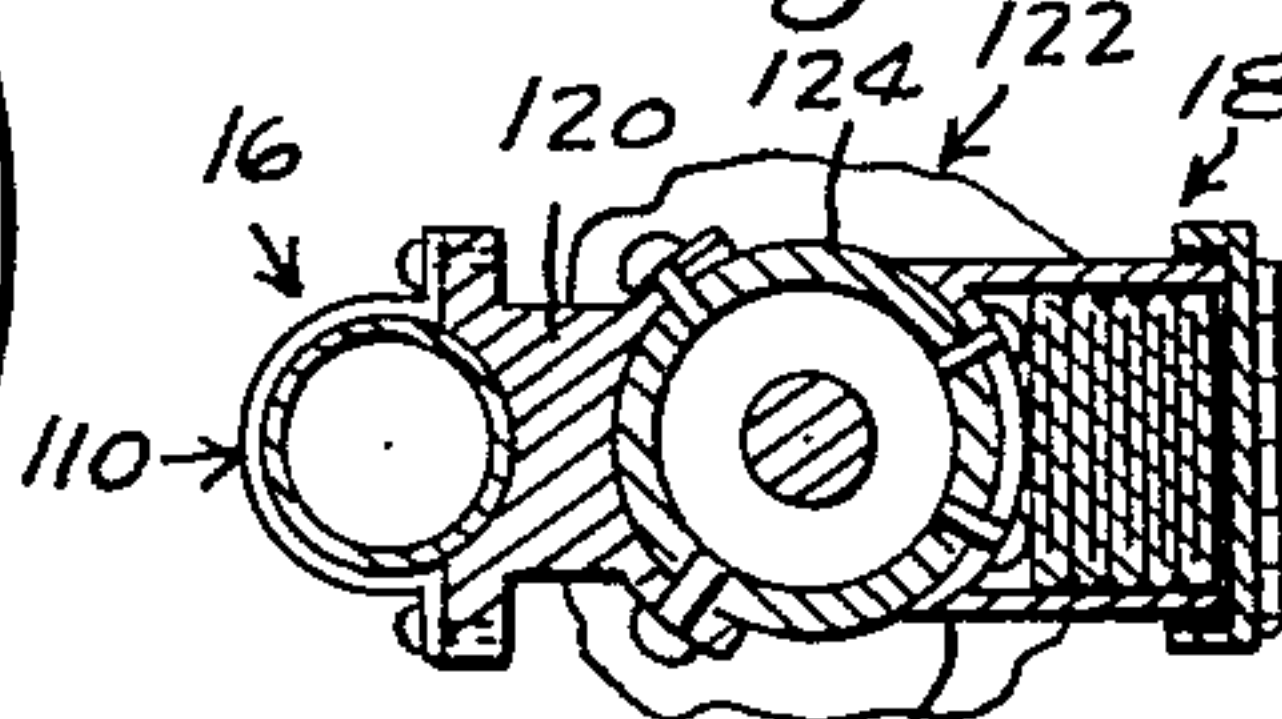


Fig. 11<sup>a</sup>

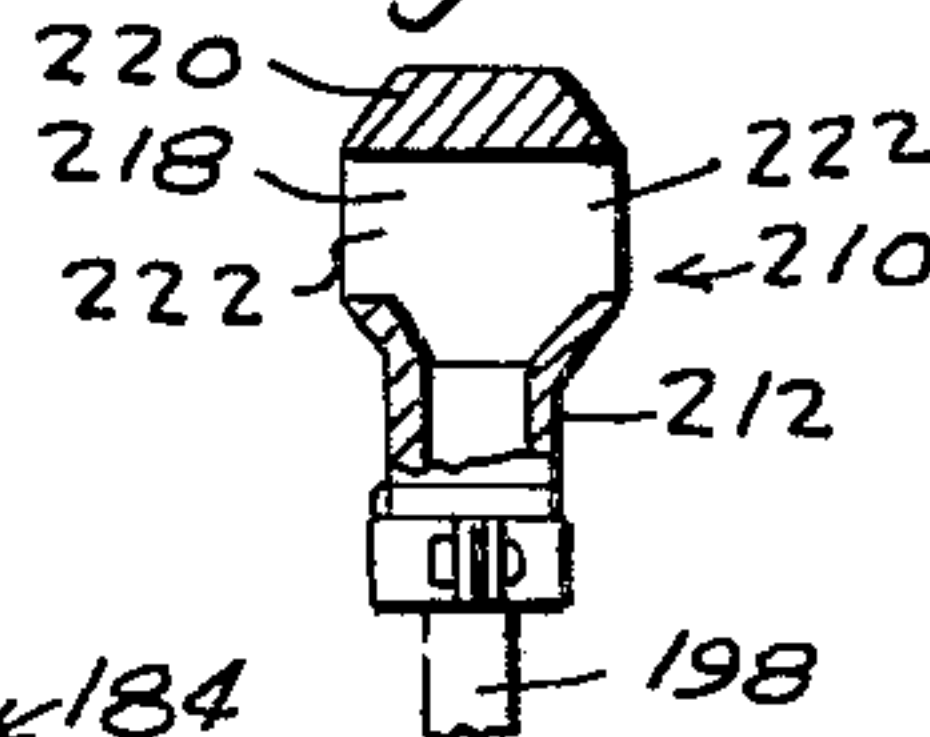


Fig. 4

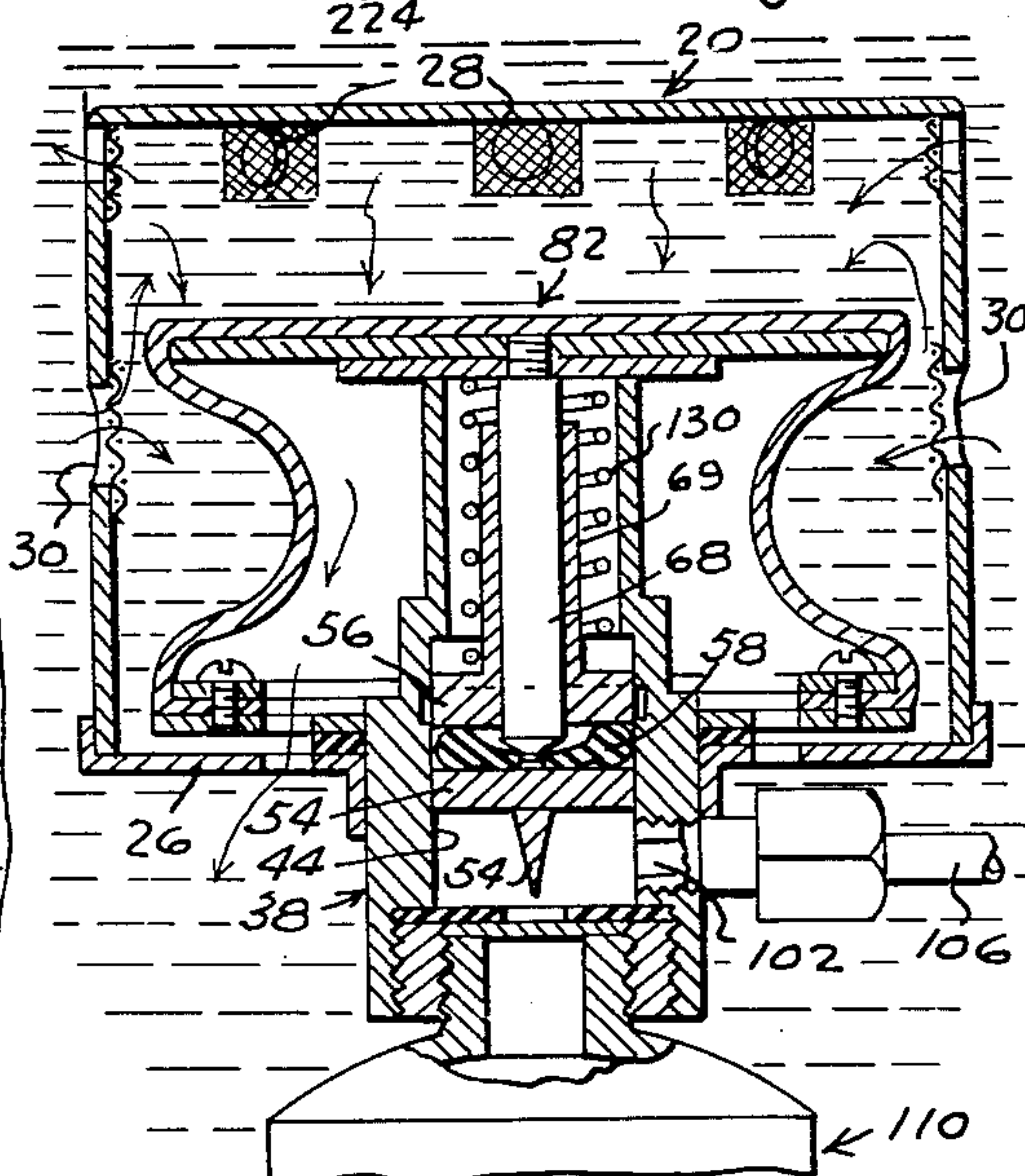


Fig. 3

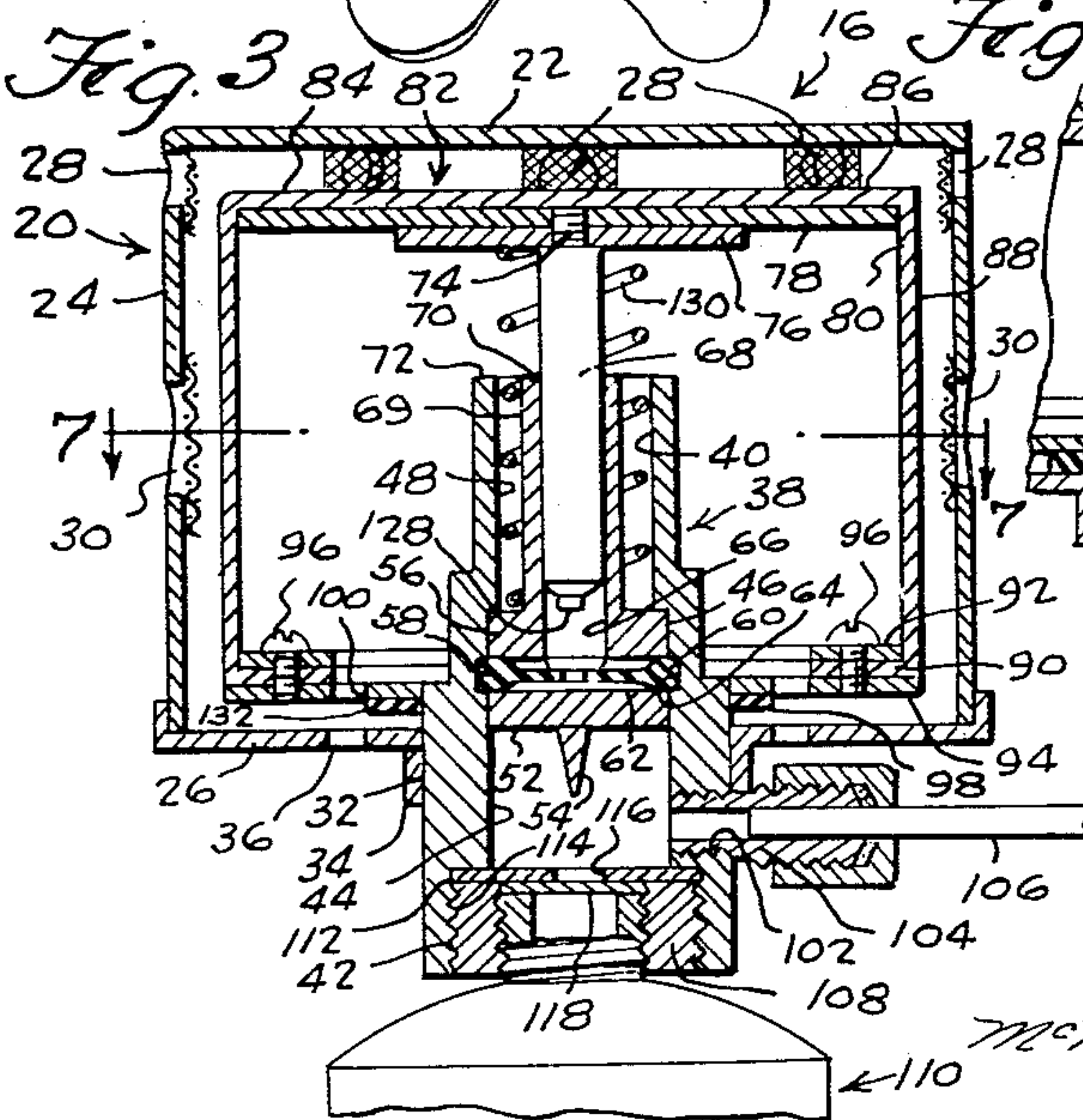


Fig. 5

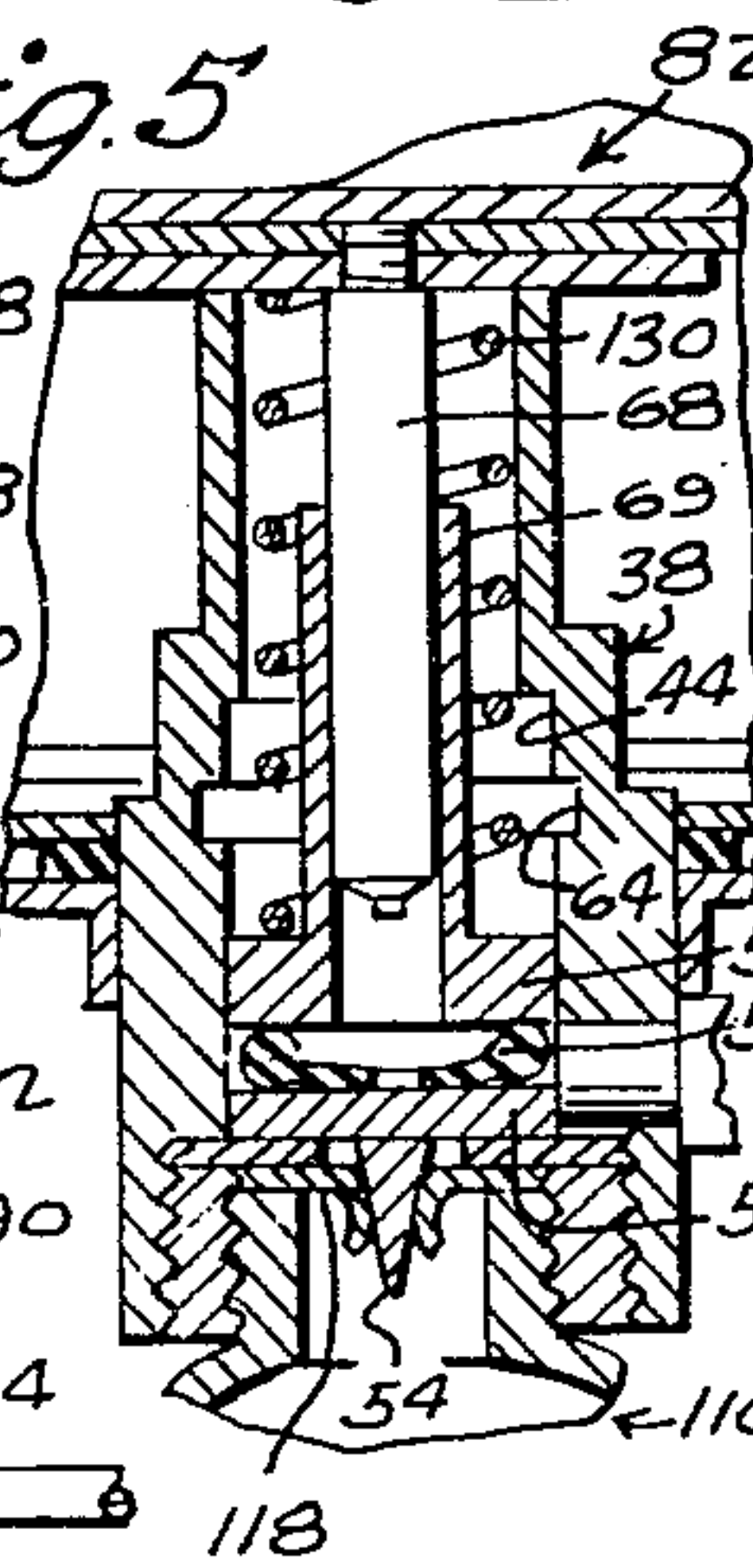
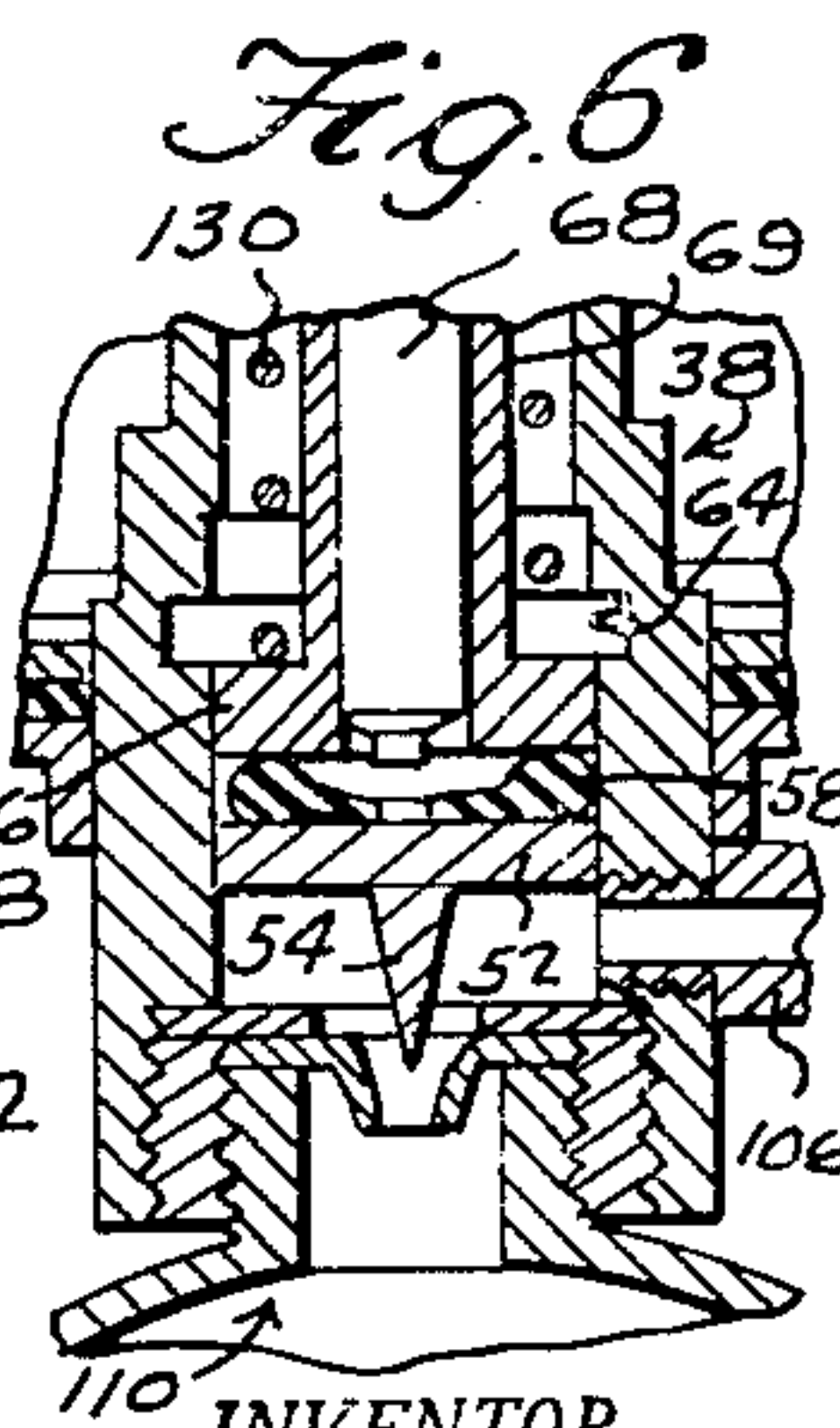


Fig. 6



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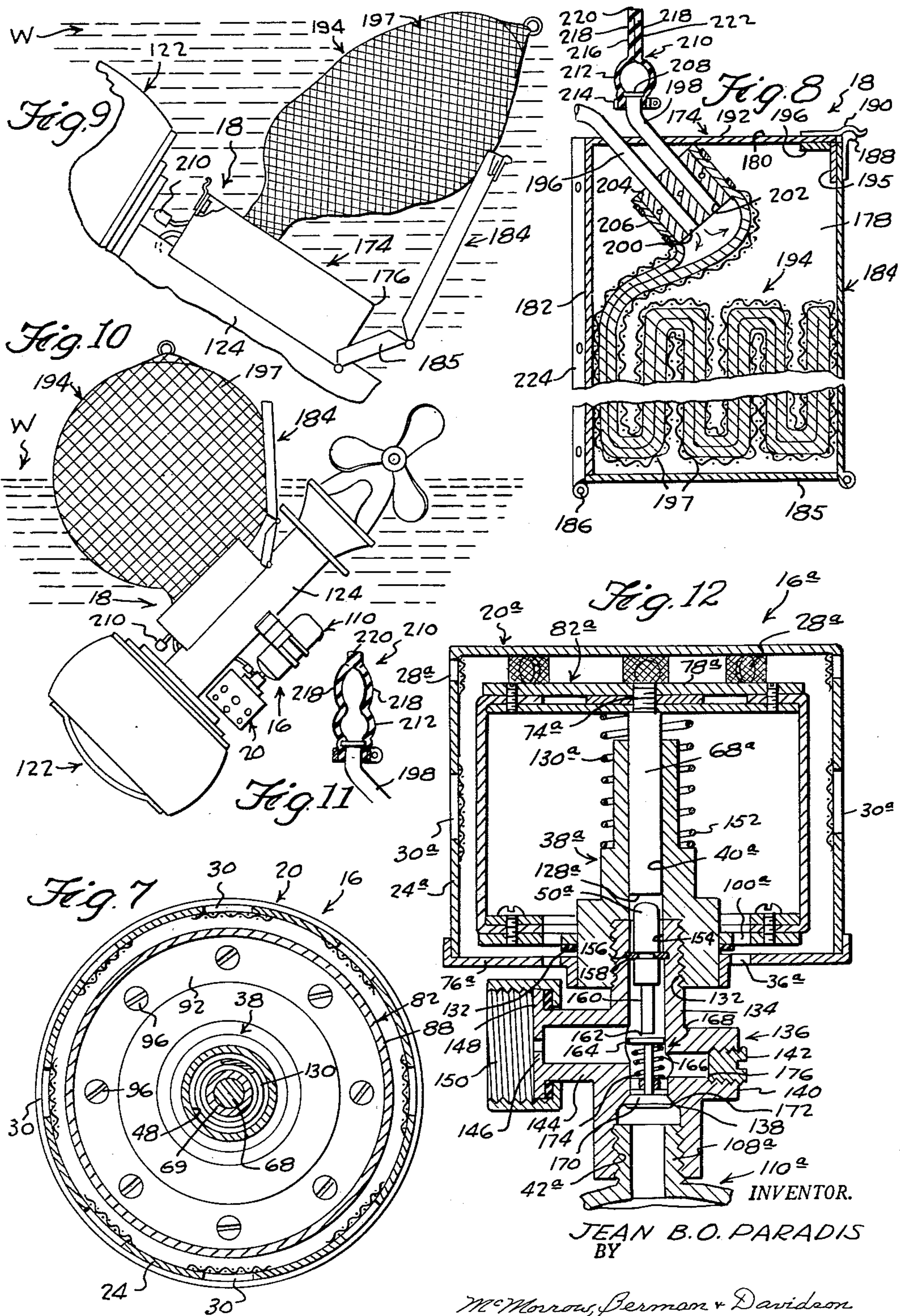
**J. B. O. PARADIS**

**2,994,892**

# AUTOMATIC OUTBOARD MOTOR GUARD

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2 Sheets-Sheet 2





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## 2,994,892 AUTOMATIC OUTBOARD MOTOR GUARD

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6 Claims. (Cl. 9—9)

This invention relates to devices for floating otherwise sinkable objects in water by means of automatic inflation by gas of bladder-like floats attached to the objects arranged to be caused by submersion of such objects in water, as when such objects fall from boats.

The primary object of the invention is to provide a more efficient, effective, and reliable device of the character indicated, which includes means for automatically avoiding unnecessary and potentially dangerous overinflation of the bladder float, and for automatically re-inflating the float, upon leaking or loss of pressure of gas from the float due to such as drops in temperature, and for automatically venting excess gas pressure in the float due to such as rises in temperature.

Another object of the invention is to provide, in a device of the character indicated above a more stable and mechanically and hydraulically efficient gas cartridge puncturing and gas flow control valve means, for producing and controlling inflation of the bladder float, which obtains the desirable inflation results outlined above, in conjunction with improved water-withholding automatic gas valving means connected to the float, which operate also as a safety valve.

A further object of the invention is to provide a more conveniently installable device of the character indicated above which is composed of a gas cartridge carrying and valving unit, and a separate bladder float containing unit, which are devised for installation at adjacent but different locations on a sinkable object to be guarded, so as to make possible and feasible the installation of the device on an object, such as an outboard motor, without harmfully or inconveniently increasing the bulk or interfering with the operation of components of the object, and so that greater compactness and conformance of the device to an object is obtained than would be available in a single unit device.

A still further object of the invention is to provide a device of the character indicated above wherein Freon gas, which is safer to use than CO<sub>2</sub> gas, can be used instead of CO<sub>2</sub> gas.

Yet another object of the invention is to provide a device of the character indicated above which is uncomplex in construction, is composed of a small number of simple and easily assembled and easily serviced and long life parts, and which can be made in well-finished and rugged forms at relatively low cost.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is a rear elevation showing a device of the invention installed on an outboard motor mounted on the transom of a boat;

FIGURE 2 is a horizontal section taken on the line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged central vertical section taken through the valving unit, showing the bellows expanded and the cartridge piercing pin in elevated relation to a gas cartridge mounted to the unit;

FIGURE 4 is a view like FIGURE 3, showing the bellows partially collapsed and the pin depressed to an intermediate position;

FIGURE 5 is a fragmentary view like FIGURE 4,

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showing the bellows fully collapsed and the pin piercing the gas cartridge, and the valve closing the discharge port;

FIGURE 6 is a fragmentary view like FIGURE 5, showing the pin elevated out of the gas cartridge and the valve elevated to uncover the discharge port;

FIGURE 7 is a horizontal section taken on the line 7—7 of FIGURE 3;

FIGURE 8 is an enlarged vertical central section taken through the float unit, showing the float bladder confined in an uninflated collapsed condition;

FIGURE 9 is a fragmentary schematic side elevation showing the float out of the float unit and in partially inflated condition and floating the outboard motor below the surface of water;

FIGURE 10 is a view like FIGURE 9 showing the float fully inflated and floating the outboard motor at the surface of the water;

FIGURE 11 is a vertical section taken through the float relief and safety valve, showing the same in open position, in contrast to the closed position thereof shown in FIGURE 8;

FIGURE 11a is a vertical section taken at right angles to FIGURE 11; and

FIGURE 12 is a view like FIGURE 3 taken through another form of valving unit of the invention, for use with a Freon gas cartridge, the valve being in closed position.

Referring in detail to the drawings, wherein like and related numerals designate like and related parts throughout the several views, and first to FIGURES 1 to 12, thereof, the device illustrated therein comprises a gas valving unit 16, and a bladder float containing unit 18.

The valving unit 16 comprises a rigid hollow cylindrical container 20, of suitable non-corrosive material, having an imperforate top wall 22, a side wall 24, and a bottom wall 26. The side wall 24 is formed with upper circumferentially spaced, suitably screened, water entrance holes 28, and with lower screened water entrance holes 30 which are spaced from the bottom wall 26. The bottom wall 26 is imperforate except for a central opening 32, which is surrounded by a depending collar 34, and vent holes 36 located close to the central opening 32.

Extending upwardly through, and suitably fixed to and in the central opening 32 and the collar 34, is a vertical tubular housing 38, which has a compound bore 40 extending therethrough which is composed of a threaded socket 42 in the lower end of the housing, opening into a smooth walled lower bore portion or cylinder 44, which has a shoulder 46 at its upper end. At its upper end the cylinder 44 opens into an upper smaller diameter bore portion 48.

Working vertically in the cylinder 44 is a component piston 50 which comprises a flat lower rigid disc 52 having on its underside a fixed central piercing point 54, an upper flat rigid disc 56, and a flexible and compressible sealing disc 58 located between the discs 52 and 56. The flexible disc 58 comprises a relatively large cross section rim 60 and a relatively thin, easily flexible central portion 62. As shown in FIGURE 3, the upper piston disc 56 has an elevated starting position in stop engagement with the shoulder 46. The enlarged rim 60 of the flexible disc 58 is seated in an annular groove 64 formed in the wall of the cylinder 44 at a location near to and spaced from the shoulder 46.

The upper piston disc 56 has an axial opening 66 through which works the lower part of a plunger 68 which extends slidably through a vertical axial tubular fixed extension 69 on and rising from the upper disc 56 around the opening 66, and having an upper end 70 on a level with the upper end 72 of the tubular housing



38. The plunger 68 extends above the housing 38 and has fixed on its upper end, as by means of a stud 74, threaded through the center of a supporting plate 76, and into the center of a rigid top plate 78, the top plate 78 being smaller in diameter than the container 20 and having a peripheral edge 80 which is close to and concentrically spaced from the container side wall 24.

The top plate 78 is the top wall of a cylindrical bellows 82, which comprises a flexible impervious cover 84 which has a top portion 86 overlying and secured upon the top plate 78, a side wall portion 88 depending from the top portion 86 around the edge 80 of the top plate 78, and an annular internal flange portion 90 on the lower end of the side wall portion 88. Upper and lower stiffening rings 92 and 94, respectively, are engaged with opposite sides of the flange portion 90, and are secured thereto and together by studs 96. The lower ring 94 is wider than the upper ring 92, and its opening 98 is dimensioned to slidably receive the relatively large diameter lower part of the tubular housing 38. The bellows 82 is closed except for circumferentially spaced air transfer holes 100 which are provided in the lower ring 94 and which are registered with the holes 36 in the container bottom wall 26.

At a point below the collar 34 the side wall of the housing cylinder 44 is traversed by a threaded hole 102 into which is threaded a nipple 104 on the related end of a gas pipe 106 which leads to the float unit 18. Threaded up into the socket 42 in the lower end of the housing 38 is the neck 108 of a CO<sub>2</sub> gas cartridge 110, with a lead washer 112 interposed between the upper end of the neck 108 and the top 114 of the socket. The opening 116 in the washer 112 exposes a relatively thin puncturable disc 118 which closes and seals the cartridge 110. Suitable bracket means 120, secured to and preferably clamped around the cartridge 110, is provided for mounting the valving unit 16 on the object to be floated, such as an outboard motor 122, the bracket means 120 being preferably secured to one side of the vertical propeller shaft column 124 of the motor.

Whenever either through sinking of a boat 126, on which the motor 122 is mounted, or detachment of the motor therefrom and sinking of the motor in water, water enters the container 20, through the screened side wall holes 28 and 30, the bellows 82 is compressed by the water so that the bellows is collapsed downwardly as shown in FIGURE 4, so that the side wall 88 is pushed inwardly and the top plate 78 moves downwardly, so as to depress the plunger 68. The plunger 68 has a reduced diameter tip 128 on its lower end, which, when the plunger 68 reaches an intermediate depressed position, as shown in FIGURE 4, indents the flexible central portion 62 of the flexible disc 58, pulls the disc 58 out of the groove 64, and starts the piston 50 downwardly in the housing 38. As the collapsing water pressure increases, on the bellows 82, the plunger 68 moves further downwardly, accompanied by the piston 50, until the point 54 engages and distorts the flexible disc 58 downwardly and pushes the piercing point 54 through the closure disc 118 of the gas cartridge 110, as shown in FIGURE 5.

The pressure of the gas emerging from the cartridge 110 through the ruptured closure disc 118, acts upon the lower end of the lower piston disc 52 so as to force the piston 50 upwardly until the lower disc 52 clears above the bore 102, so that gas flows from the cartridge to the unit 18 through the pipe 106. Providing controlled resistance to upward displacement of the piston 50 by gas issuing from the cartridge 110, is a helical spring 130 which is circumposed on the extension 69 and the plunger 68 and is compressed between the top plate 78 and the upper piston disk 56. The lower stiffening ring 94 at the bottom of the bellows has compressible spacing pads 132 on its underside, to engage the upper surface of the bottom wall 26 of the container 20, so as to maintain

communication, via the openings 100 and 36, between the bellows 82 and the interior of the container 20, and between the container 20 and the air or water outside of the container, which would be interrupted by direct engagement of the bellows bottom with the container bottom wall 26. It is to be noted that when inactive the spring 130 is not loaded, and is, therefore, not subject to loss of tension incidental to springs which are constantly under tension.

The alternative form of valving unit shown in FIGURE 12, and generally designated 16a, is devised to be made in larger sizes than the above described unit 16, and to accommodate the use of a Freon gas cartridge 110a, which enhances the safety of the device. The container 20a and bellows 82a are the same as in the unit 16, but the tubular housing 38a differs from the housing 38.

The housing 38a has a single bore 40a which opens at its lower end in a threaded socket 132 in the lower end of the housing, into which the vertical tubular arm 134 of an adapter 136 is threaded. The adapter 136 comprises a vertical tubular body 138 having a threaded socket 42a in its lower end, into which is threaded the neck 108a of a Freon gas cartridge 110a. A first lateral tubular arm 140 on the adapter 136 is plugged by an access plug 142. A second lateral tubular arm 144 on the adapter 136 on the side opposite the first arm 140 and upwardly offset relative thereto, is substantially closed by a restricted aperture 146. A coupling flange 148 on the outer end of the arm 144 retains a coupling nut 150, engaged on the arm 144, which can be coupled to the gas pipe 106 of the unit 18.

Working in the bore 40a of the housing 38a is a plunger 68a which is secured at its upper end, as indicated at 74a, to the bellows top plate 78a. A helical spring 130a is circumposed on the upper part of the housing 38a, and is compressed between the bellows top plate and a shoulder 152 provided on the housing 38a within the bellows 82a. The plunger 68a has a squared lower end 128a arranged upon collapse of the bellows 82a to engage the upper end of and depress a portion 50a which works freely in the bore 154 of the adapter arm 134 and is surrounded by a packing ring 156 which is removably seated in a groove 158 in the bore 154. The piston 50a has a stem 160 depending from its lower end which has a lower end 162 which is normally spaced above a disc 164 on the upper end of the stem 166 of a tappet valve 168. A bevelled valve head 170 on the lower end of the valve stem 166 is located beneath a bevelled valve seat 172 which is provided at the upper end of the socket 42a. A helical valve spring 174 is circumposed on the valve stem 166 and is compressed between the disc 164 and a spider 176 through which the valve stem 166 works. Downward collapse of the bellows 82a upon entrance of water into the container 20a, incidental to sinking in water of the object to which the container 20a is attached, depresses the piston 68a, so that the piston 50a is depressed, and the valve head 170 is depressed out of engagement with the seat 172, so that gas can flow from the cartridge 110a, to the coupling arm 144 of the adapter, and flow to the float unit 18, through the gas pipe 106.

The float containing unit 18, as shown in FIGURES 8 to 10, comprises a rigid vertically elongated and preferably rectangular impervious container 174, having an open bottom 176, side walls 178, a top wall 180, and an end wall 182, the other end of the container 174 being open and being closed by a door 184 which has a hinged bottom section 185 which is hinged at 186 to the lower end of the end wall 182. The door 184 has on its upper end an external detent 188, over which is releasably engaged a spring keeper 190 secured upon the upper side of the top wall 192. Bar magnets 195 and 196 are fixed to the inward sides of the door 184 and container top wall 192, respectively, and are disposed to engage in the closed position of the door, the attraction of the magnets



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and retentive force of the keeper 190 and detent 188 being sufficient to keep the door closed unless and until the bladder float 194 within the container 174 is inflated with gas from the unit 16 or 16a.

Secured rigidly through the top wall 192 of the container 174 and disposed at an acute angle thereto, is a gas pipe section 196 and a valved safety pipe 198 which are in parallel spaced relation to each other, and have open lower ends 200 and 202, respectively, fixed through a block 204 which is suitably secured to the underside of the top wall 192. The block 204 is in the form of a plug for the reduced open end 206 of the elongated bladder float 194. The float 194 is enclosed within a protective net 197 and when uninflated, can be folded back and forth between its ends, as shown in FIGURE 8, and confined within the container 174, between the end wall 182 and the door 184, so that when the float expands as it is inflated, it initially pushes the door 184 to open position, as shown in FIGURE 9, and emerges partly from the container 174 through its open end, and then expands further to final full contour, as shown in FIGURE 10, whereby the sinkable object, such as the outboard motor 122, is tilted and is floated up in the water W, until the float 194 rides at the surface of the water W, with the motor 122 near the surface.

The safety pipe 198 has an open end 208 outside of the container 174, which is provided with a water and debris excluding exhaust or relief valve 210, of the platypus type, involving a flexible and resilient tubular body 212 having an open inner end 214 clamped on the pipe 198 and an outer end on which is formed a flat portion 216 having normally engaged and opposed side walls 218 which are connected together at their outer ends, as indicated at 220, and are disconnected at their side edges, so as to provide normally closed discharge slots 222 which open up, as shown in FIGURE 11, upon development of excess gas pressure within the float 194 and relieve such excess pressure.

The relief valve 210 acts in conjunction with the pistons 50 and 50a of the valving units 16 and 16a, respectively, for producing balanced inflation of the float 194, whereby sinking of the unit 18 in water from a prior established level, as from reduction of ambient temperature of the water and accompanying reduction of gas pressure in the float 194, causes corresponding inflation of the float 194 and a rise of the object in the water; and a rise in temperature of the water which increases the gas pressure within the float 194, is compensated for by exhaust of gas from the float 194 through the valve 210. In the first case, the springs 130 and 130a of the units 16 and 16a, respectively, let the related pistons be elevated in their housings by the gas coming out of the cartridges so that these pistons uncover more of the ports 102, whereby more gas is passed through the gas pipe 106 to the unit 18. Suitable brackets 224 on the closed end of the container 174 are provided for mounting the unit 18 on the side of the outboard motor column 124 opposite the unit 16.

While there have been shown and described herein preferred forms of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. A guard for a sinkable object, said guard comprising a first gas supplying and valving unit mountable on the object, a second bladder float containing unit mountable on the object, and a gas pipe leading from the first unit to the second unit, said second unit comprising a container having an open end and an open bottom, said container having side walls, a top wall, and an end wall having a lower end, a hinged section door having a first

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bottom section hinged to the lower end of said end wall for closing the open bottom of the container and a main section for closing the open end of the container, and detent means comprising a keeper on the top wall and a detent on the main door section, an elongated flexible bladder float folded within the container and having an open end, a plug in the open end of the bladder and secured to the container top wall, a gas pipe section extending through the plug and connected to said gas pipe and having an end opening into the bladder float, and a valved pressure relief pipe extending through the plug and having a first end outside of the container and a second end opening into the bladder float.

2. A guard for a sinkable object, said guard comprising a first gas supplying and valving unit mountable on the object, a second bladder float containing unit mountable on the object, and a gas pipe leading from the first unit to the second unit, said second unit comprising a container having an open end and an open bottom, said container having side walls, a top wall, and an end wall having a lower end, a hinged section door having a first bottom section hinged to the lower end of said end wall for closing the open bottom of the container and a main section for closing the open end of the container, and detent means comprising a keeper on the top wall and a detent on the main door section, an elongated flexible bladder float folded within the container and having an open end, a plug in the open end of the bladder and secured to the container top wall, a gas pipe section extending through the plug and connected to said gas pipe and having an end opening into the bladder float, and a valved pressure relief pipe extending through the plug and having a first end outside of the container and a second end opening into the bladder float, a normally closed relief valve on the first end of the pressure relief pipe comprising a flexible and resilient tubular body having an inner end secured on the first end of the relief pipe and an outer end, spaced and connecting flat walls on said second end defining gas discharge slots at opposite sides, the walls being normally engaged with each other to close the slots.

3. A guard for a sinkable object, comprising first and second units mountable on an object, said first unit comprising a rigid closed container having first and second ends, a collapsible bellows mounted within said container at said second end, said bellows having first and second ends, water admitting means on the container for collapsing the bellows by water pressure, spring means resisting collapse of the bellows, an assembly secured through said second end of the container and extending out of the container, said assembly comprising a tubular housing having a first open end within the bellows and a second open end outside of the container, a gas cartridge outside of said container having a neck secured to the second end of said housing, a gas outlet port on said housing between said container and said neck, said second unit comprising an inflatable bladder float and a pipe connected to said port, and gas release mechanism within said assembly housing, said mechanism comprising a puncturable disc closing the gas cartridge neck, a piston having a piercing point extending toward said disc, a plunger aligned with said piston and secured to the first end of the bellows, said first end of the bellows being otherwise unconnected to the container.

4. A guard for a sinkable object, comprising first and second units mountable on an object, said first unit comprising a rigid closed container having first and second ends, a collapsible bellows mounted within said container at said second end, said bellows having first and second ends, water admitting means on the container for collapsing the bellows by water pressure, spring means resisting collapse of the bellows, a valve assembly secured through said second end of the container and extending out of the container, said valve assembly comprising a tubular housing having a first open end within the bellows and a second open end outside of the container, a gas



cartridge outside of said container having a neck secured to the second end of said housing, a gas outlet port on said housing between said container and said neck, said second unit comprising an inflatable bladder float and a pipe connected to said port, and gas valve mechanism within said assembly housing, said mechanism comprising a tubular member having a first end unsecured to the first end of the container and a second end secured to the first end of the housing, a plunger having a first end secured to the first end of the bellows and working through the first end of said member, said plunger having a free second end, a piston working in said housing between said plunger and the second end of the housing, valve means in the housing normally blocking communication between the gas cartridge and said port, and engageable by the free end of the piston only in a collapsed condition of the bellows for producing an open condition of said valve means.

5. A guard for a sinkable object, comprising first and second units mountable on an object, said first unit comprising a rigid closed container having first and second ends, a collapsible bellows mounted within said container at said second end, said bellows having first and second ends, water admitting means on the container for collapsing the bellows by water pressure, spring means resisting collapse of the bellows, an assembly secured through said second end of the container and extending out of the container, said assembly comprising a tubular housing having a first open end within the bellows and a second open end outside of the container, a gas cartridge outside of said container having a neck secured to the second end of said housing, a gas outlet port on said housing between said container and said neck, said second unit comprising an inflatable bladder float and a pipe connected to said port, and gas release mechanism within said assembly housing, a plunger having a first end secured to the first end of the bellows and working through the first end of said housing, said plunger having a free second end, a piston working in said housing between said plunger and the second end of the housing, means in the housing normally blocking communication between the gas cartridge and said port, and engageable by the free end of the piston only in a collapsed condition of the bellows for producing an open condition of said blocking means, said blocking means comprising a puncturable disc closing the cartridge neck, and a piercing point on the free end of the piston for piercing said disc.

6. A guard for a sinkable object, comprising first and

second units mountable on an object, said first unit comprising a rigid closed container having first and second ends, a collapsible bellows mounted within said container at said second end, said bellows having first and second ends, water admitting means on the container for collapsing the bellows by water pressure, spring means resisting collapse of the bellows, a valve assembly secured through said second end of the container and extending out of the container, said valve assembly comprising a tubular housing having a first open end within the bellows and a second open end outside of the container, a gas cartridge outside of said container having a neck secured to the second end of said housing, a gas outlet port on said housing between said container and said neck, said second unit comprising an inflatable bladder float and a pipe connected to said port, and gas valve mechanism within said assembly housing, said mechanism comprising a tubular member having a first end unsecured to the first end of the container and a second end secured to the first end of the housing, a plunger having a first end secured to the first end of the bellows and working through the first end of said member, said plunger having a free second end, a piston working in said housing between said plunger and the second end of the housing, valve means in the housing normally blocking communication between the gas cartridge and said port, and engageable by the free end of the piston only in a collapsed condition of the bellows for producing an open condition of said valve means, said valve means comprising a valve seat formed in the bore of said housing and facing the second end of the housing, a spring-closed valve working in the housing between the valve seat and the second end of the housing, with which the free end of the piston is adapted to engage.

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