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S. E. AARON

2,343,269

BILGE PUMP

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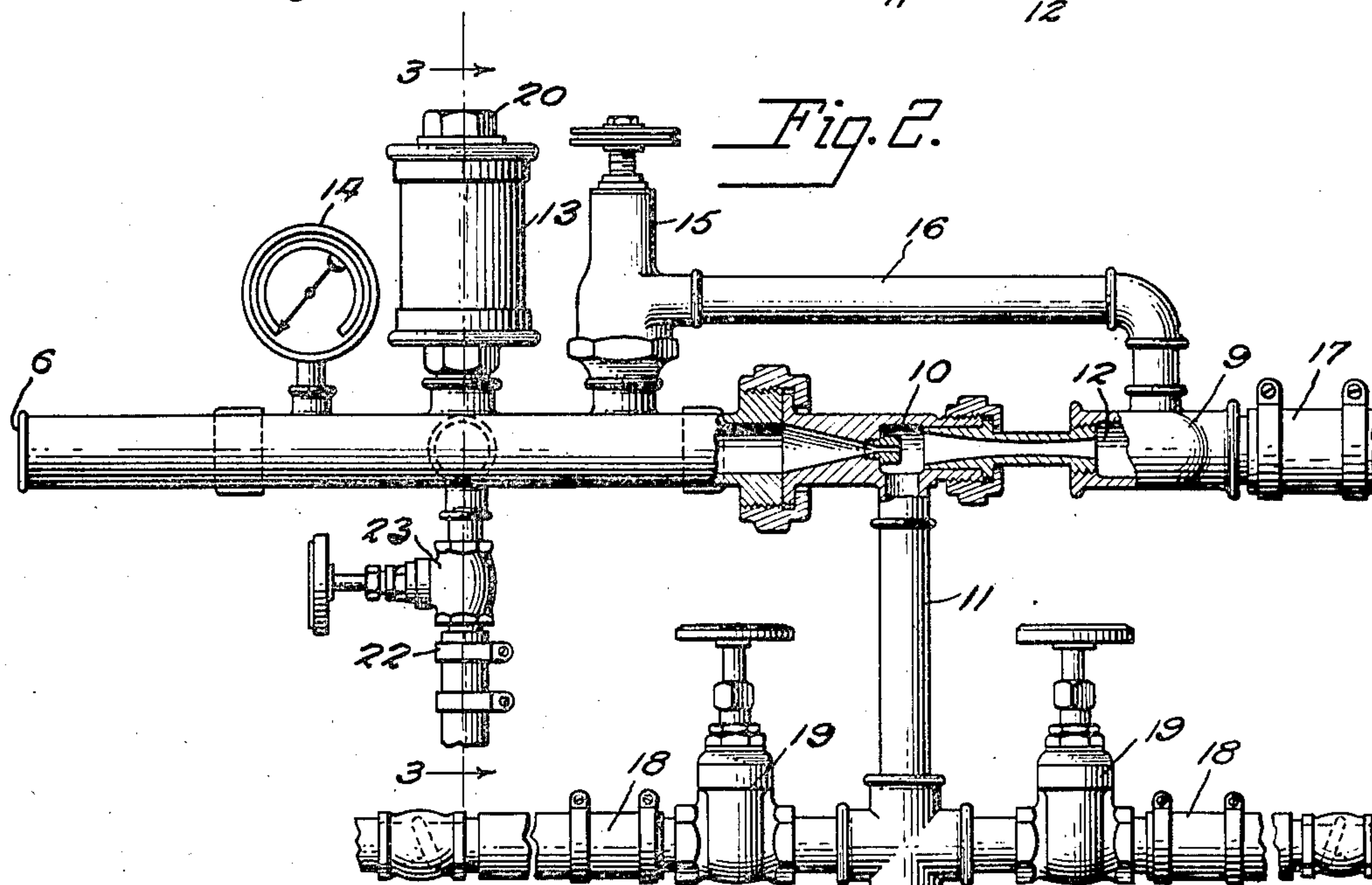
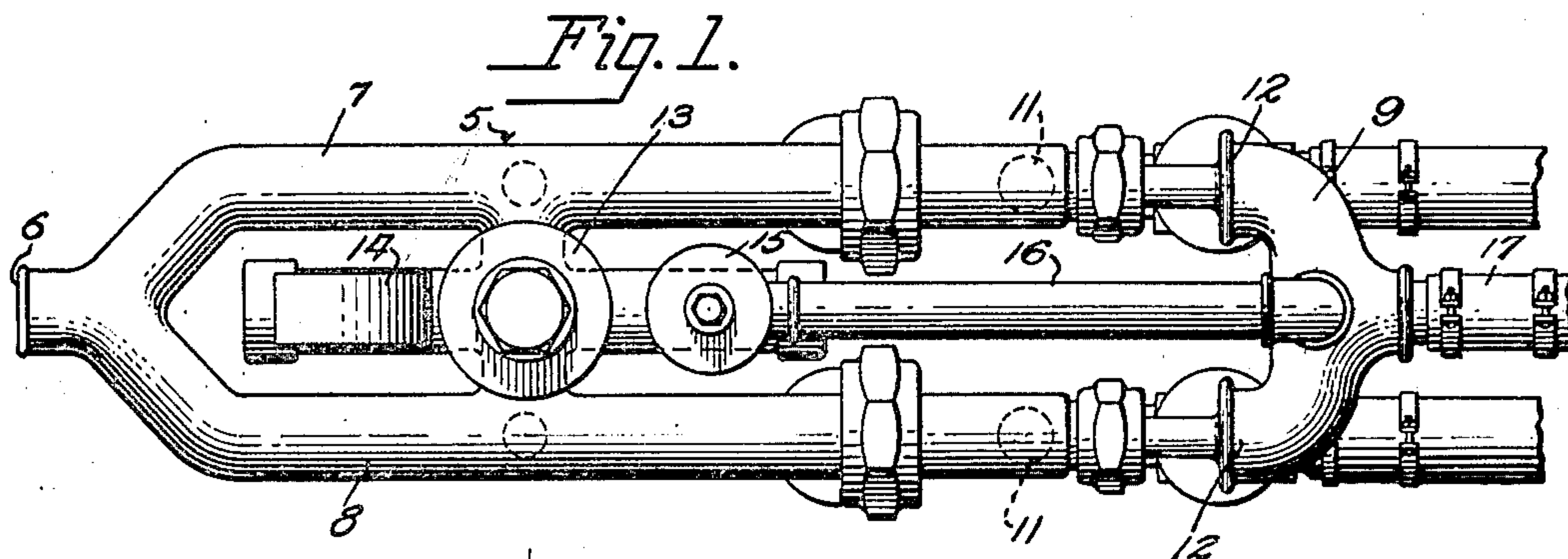


Fig. 3.

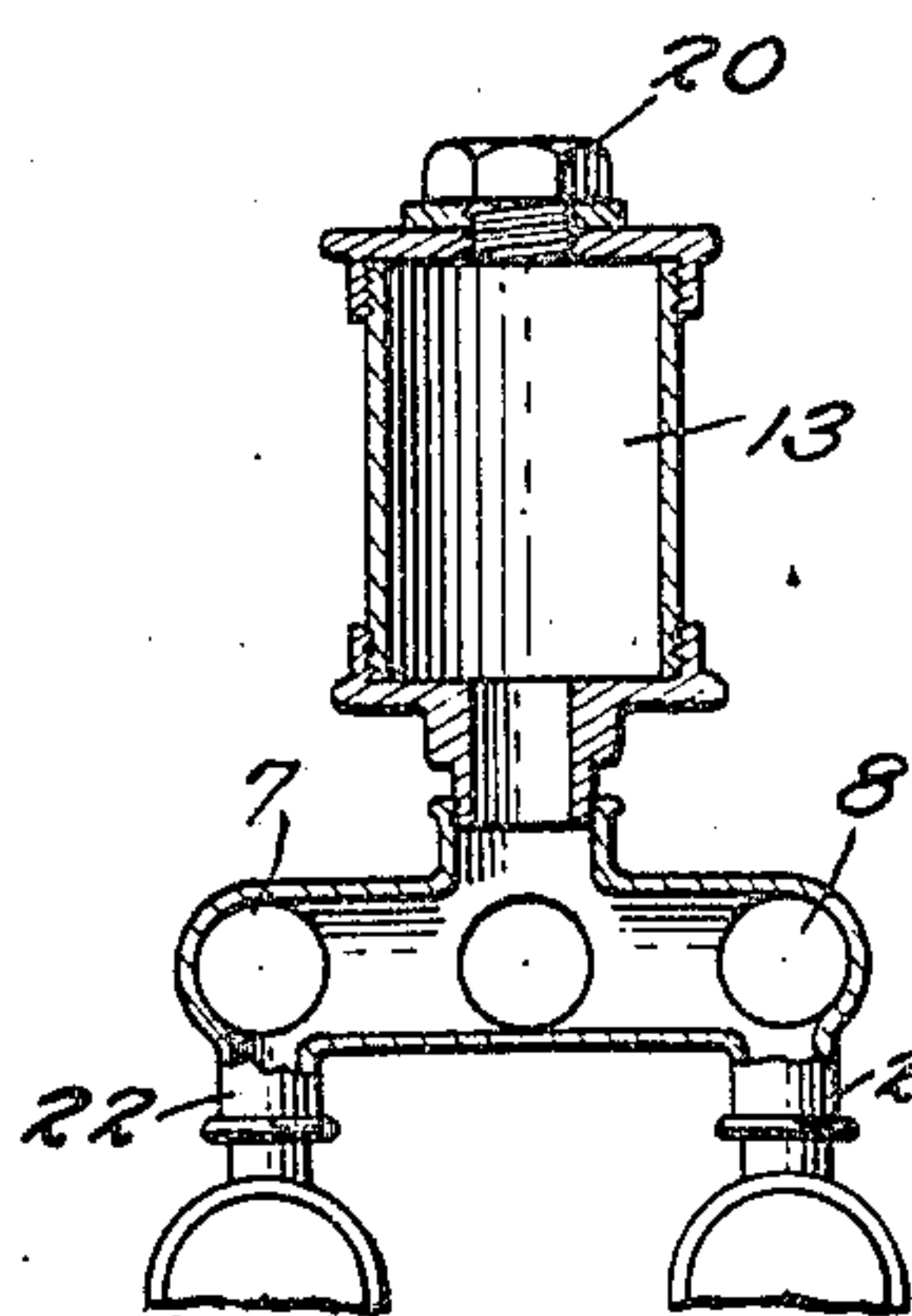
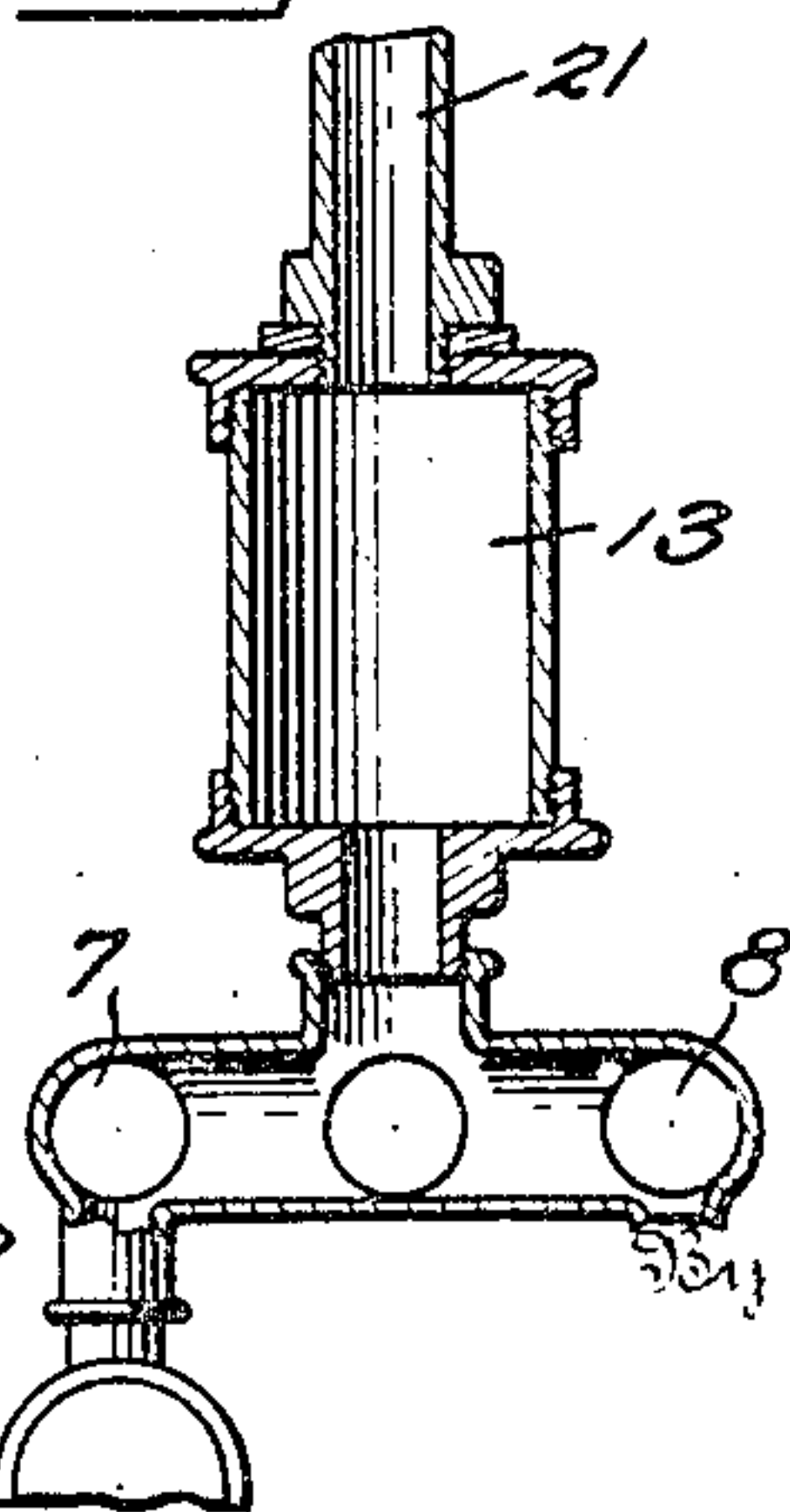


Fig. 4.



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BILGE PUMP

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3 Claims. (Cl. 103—262)

This invention is an improvement over that disclosed in my Patent No. 1,856,367, issued May 3, 1932.

I have found my bilge pump as covered by said patent is satisfactory in many respects and generally serves a long felt want. However, it is highly desirable that the pumping facilities be increased and that provision be made for utilizing a city supply of water for pumping when the boat is tied up at the wharf. The problem of removing gasoline vapors and accumulated liquids from different portions of a boat has presented a serious situation, particularly in small motor craft where gasoline is used and collects in inaccessible portions of the boat. The use of flexible suction lines utilizing an ejector, a pressure inlet passage and a suction passage utilizing water from any suitable source has proved fairly satisfactory. Due to the limited passage of the ejector, water will back up, enter the air chamber and in turn operate a relief valve which by-passes the ejector. In my improved form I provide means to obtain additional pumping action, and also provide facilities for operating the pump system when the boat is tied up without the necessity of operating the engine.

The principal object is to produce a more efficient bilge pump by providing greater pumping facilities, utilizing the same source of supply.

Another object is to utilize a shore supply of water, such as that from the city, when the boat is not in use, without operating the engine.

Other objects will be disclosed in the specification and claims forming a part of this invention.

In the drawing:

Figure 1 is a top plan of the double ejector;

Figure 2 is a side elevation of the double ejector, partly broken away;

Figure 3 is a vertical section taken on the line 3—3 of Figure 2; and

Figure 4 is the same as Figure 3, except showing the cap removed and the extension in place to receive a supply of fluid.

Referring to the drawing, in which similar parts are designated by like numerals:

Numeral 5 designates a double ejector having an inlet orifice 6 through which water under pressure enters from any suitable source. The ejector takes the form of two branches 7 and 8 coming together by the way of a header 9. Each branch 7 and 8 has an ejector nozzle or orifice 10, and a suction passage 11 for the entrained stream, and an outlet 12 for the combined actuating and entrained stream. Extending across and connecting the two branches 7 and 8 is an air

chamber 13 for relieving the pulsation of a pump, not shown, but which is of any usual construction, and forces the water through the branches 7 and 8. The air chamber 13 is in full communication with both branches 7 and 8; and in addition, there is a pressure gauge 14 used in conjunction with an adjustable relief valve 15 so that the relief valve can be set in accordance with the pressure indicated by the pressure gauge 14. A line 16 leads from the relief valve 15, by-passing the ejector nozzles 10 and connecting with the header 9, from which extends a discharge pipe 17, preferably flexible, for overboard discharge. The suction passage 11 extending from the ejector orifice 10 in each branch 7 and 8 has a Christmas tree arrangement consisting of a plurality of bilge suction pipes 18 with strainers on the end (not shown). Valves 19 control each of the suction pipes 18, the suction pipes 18 extending into different portions of the boat, and, since the same arrangement is present in each branch 7 and 8 practically the entire area of the boat is covered, and since the pipes are preferably of hose, or other flexible material, they may be flexed to the desired position.

The air chamber 13 is shown as an enlarged section in Figure 3, and has a threaded cap 20 which may be removed to receive an extension 21, as shown in Figure 4. This extension forms a part of a water supply, such as the city water works, and may be utilized when the boat is in the harbor. The pressure in the water works is usually uniform, and, therefore, the air chamber is not needed. A pipe 22 having a valve 23 may be utilized to pass water into the boat so that when desired the boat may be thoroughly washed by establishing the cycle consisting of passing water into the boat through the pipe 22 and pumping it out through the bilge suction pipes 18.

As actually used, water from any suitable source is passed through the orifice 6 of the double ejector 5, the water separating and travelling down the two branches 7 and 8 until it reaches the ejector nozzle 10 in each branch. The flow of the water over the suction passage 11 through the outlet 12 creates a suction in the various bilge suction pipes 18. Due to the pulsation of the pump, the pressure in the branches 7 and 8 will vary, and, therefore, the air chamber 13 is provided to utilize this pressure. Usually the supply of water exceeds the capacity of the ejector nozzle 10, and, therefore, the by-pass 16 is provided in each branch, the valve 15 being automatically operated by the pressure of the water,

its limits being controlled by a hand setting, the pressure in the branches being indicated by the pressure gauge 14.

There may be times when the pressure of the water becomes too great for the relief valve 15 to safely carry off the excess without high back pressures being set up in the line. In such an event, pipe 22 may be put overboard and valve 23 opened. In this case valve 23 functions as a manually operated auxiliary relief valve.

When the boat is in drydock or anchored close to shore, it is usual to clean the boat which can be accomplished by removing the cap 20 from the air chamber 13, placing an extension 21 on the top of the chamber which in turn is connected to a land supply of water. The bilge pumps will then operate in the usual manner; and if it is desired to flush the boat, the valve 23 will be opened permitting the water to flow through the pipe 22, the bilge pumps continuing to function in the usual manner.

I have found that by my arrangement I provide a compact, efficient bilge pump capable of greater pumping capacity, utilizing the same source of supply and at the same time providing a cycle of operation which will flush the boat, and may, when desired, utilize a land supply of water with very slight modification.

Numerous variations may doubtless be devised by persons skilled in the art without departing from the principles of my invention. I, therefore, desire no limitations to be imposed on my invention, except such as are indicated in the appended claims.

What I claim is:

1. A bilge pump of the ejector type comprising an ejector casing divided into a plurality of branches between its ends and having a common inlet orifice near one end for the admission of an actuating stream to said branches, an ejector nozzle in each branch, individual inlet suction pipes to each branch for the entrained streams communicating with the said ejector nozzles, and a common outlet passage for the com-

bined actuating and entrained streams whereby the actuating stream in one branch may entrain water from its suction pipe when the water seal in a suction pipe to another branch is broken, an equalizing pipe interconnecting the said branches to maintain equal pressures in each branch.

2. A bilge pump of the ejector type comprising an ejector casing divided into a plurality of branches between its ends and having a common inlet orifice near one end for the admission of an actuating stream to said branches, an ejector nozzle in each branch, individual inlet suction pipes to each branch for the entrained streams communicating with the said ejector nozzles, and a common outlet passage for the combined actuating and entrained streams whereby the actuating stream in one branch may entrain water from its suction pipe when the water seal in a suction pipe to another branch is broken, an equalizing pipe interconnecting the said branches to maintain equal pressures in each branch, and a by-pass communicating with said equalizing pipe and said common outlet.

3. A bilge pump of the ejector type comprising an ejector casing divided into a plurality of branches between its ends and having a common inlet orifice near one end for the admission of an actuating stream to said branches, an ejector nozzle in each branch, individual inlet suction pipes to each branch for the entrained streams communicating with the said ejector nozzles, and a common outlet passage for the combined actuating and entrained streams whereby the actuating stream in one branch may entrain water from its suction pipe when the water seal in a suction pipe to another branch is broken, an equalizing pipe interconnecting the said branches to maintain equal pressures in each branch, an expansion chamber communicating with said equalizing pipe, and a by-pass communicating with said equalizing pipe and said common outlet.

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