Nov. 18, 1930. O. HAENTJENS 1,782,345

CENTRIFUGAL PUMP PRIMING SYSTEM

Filed May 18, 1929 2 Sheets-Sheet 1

Fig. 1.

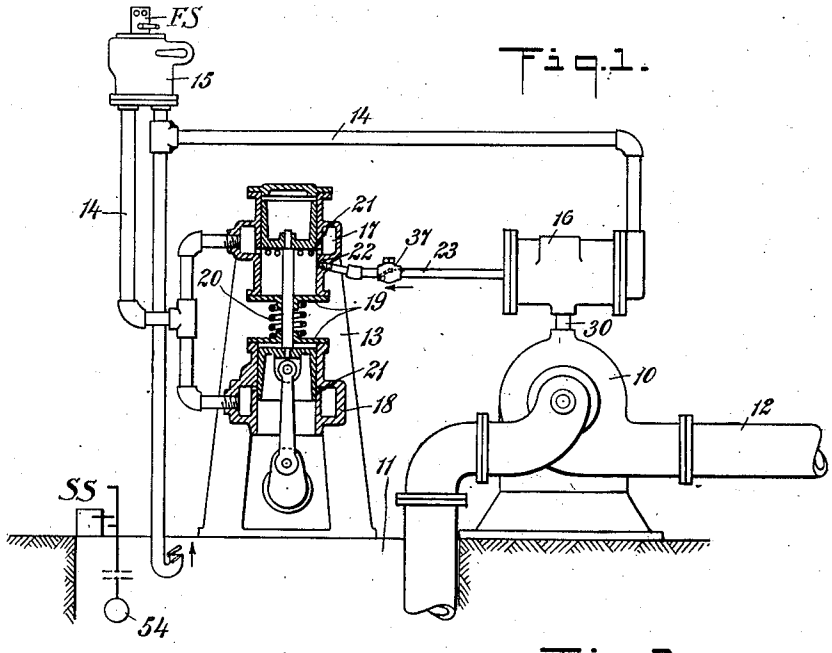
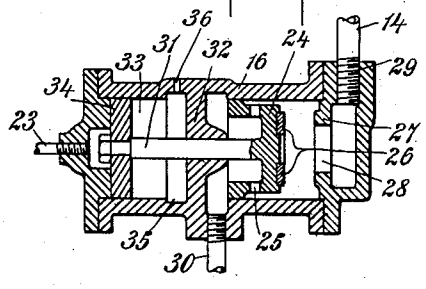


Fig. 2



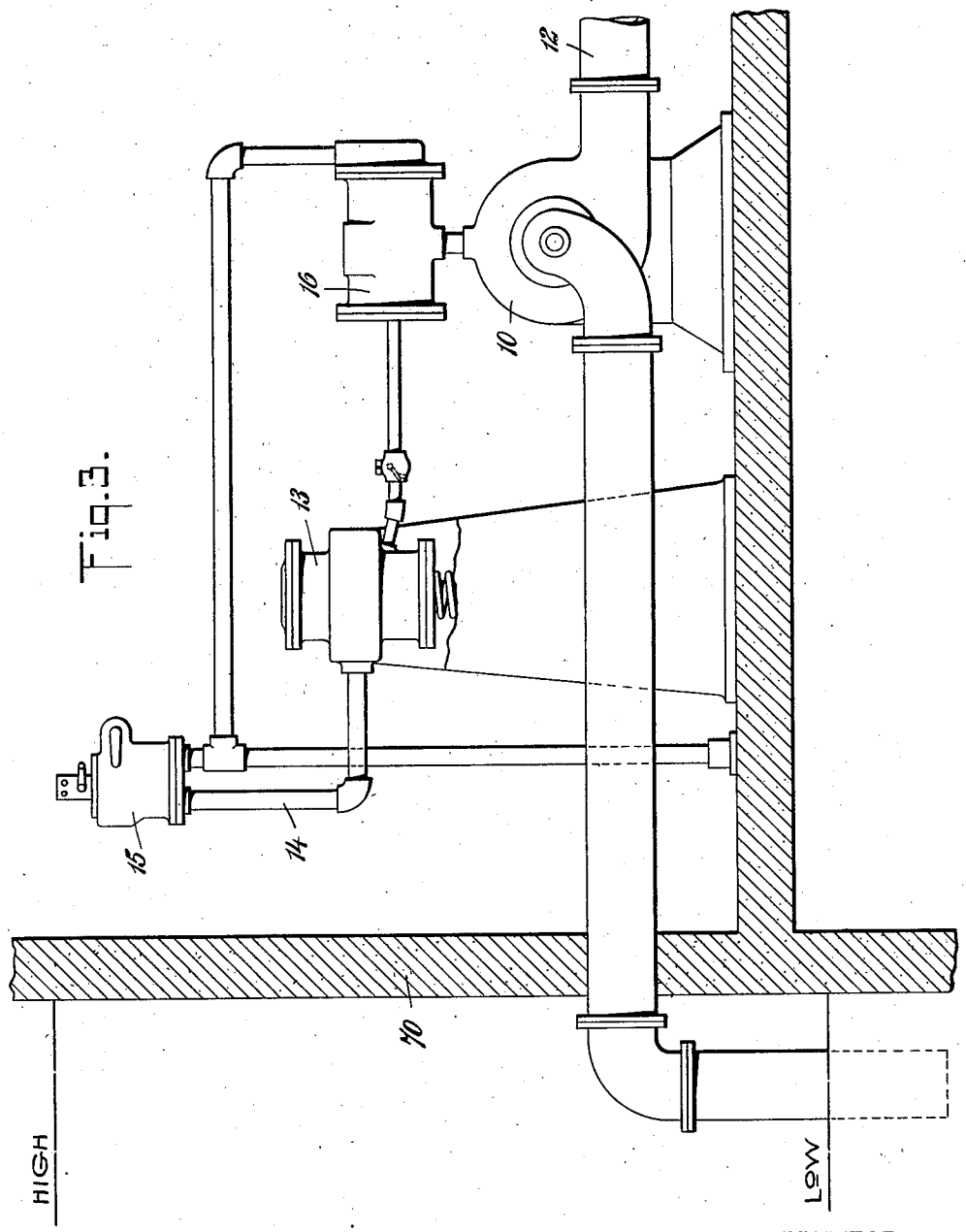
INVENTOR
OTTO HAENTJENS
by his attorneys
Howson and Howson

Nov. 18, 1930. O. HAENTJENS 1,782,345

CENTRIFUGAL PUMP PRIMING SYSTEM

Filed May 18, 1929 2 Sheets-Sheet 2

Fig. 3.



INVENTOR
OTTO HAENTJENS
BY *by his attorneys*
Howson and Howson

Patented Nov. 18, 1930 1,782,345

UNITED STATES PATENT OFFICE

OTTO HAENTJENS, OF HAZLETON, PENNSYLVANIA

CENTRIFUGAL-PUMP-PRIMING SYSTEM

Application filed May 18, 1929. Serial No. 364,189.

This invention has to do with certain improvements in the priming valve which is located in the connection between the centrifugal pump and the priming pump to close the connection when liquid under pressure is delivered by the impeller to the priming connection. For this purpose a particular form of priming pump has been devised making it possible for this priming valve to be held open by a strong suction effort during the priming.

A preferred form of the invention is described hereinafter and is shown in the accompanying sheet of drawings to which reference is made in the course of the description.

In the drawings—

Figure 1 is an assembly view of the two pumps and the associated parts which have to do with the priming, the electrical connections not being shown however. In this view, part of the apparatus is shown in elevation and part in section.

Figure 2 is a view in section through the priming valve, drawn to a larger scale than in Figure 1.

Fig. 3 is a view illustrating the use of the pump with a dam having different heights of water.

The centrifugal pump 10 is arranged to draw from a sump 11 and to deliver to a discharge line 12. It is primed by a suction pump 13 which is of the type shown in my Patent 1,489,122 but modified in certain respects hereinafter described to perform an additional function. Between the two pumps is a priming connection 14 by which the suction effort of the priming pump is communicated to the casing of the centrifugal pump 10 to draw liquid from the sump into and through the centrifugal pump. In this connection 14 there is arranged a float valve 15 which may be identical with that shown in Figure 5 of my Patent 1,513,705 and a priming valve 16, shown in detail in Figure 2, which resembles in its general principle of operation the valve shown in my Patent 1,481,199. The usual drain leg with a check valve opening to the atmosphere is also provided.

The priming pump 13 resembles the pump of my Patent 1,489,122 in that it has two cylinders 17 and 18 and oppositely acting pistons working therein. The discharge valves are in the form of plates 19 at the ends of the two cylinders and are held normally in closed position by a spring 20 which engages both plates. Thus the two cylinders discharge to the atmosphere. There are no inlet valves in the usual sense but the inlet ports 21 are so located in the walls of the cylinders that they are uncovered by the pistons at the ends of their suction strokes. By reason of this, a high degree of vacuum is created in each cylinder before the inlet ports are uncovered so that when the ports are uncovered there is a rush of air through them and a consequent strong suction effort in the priming connection 14 to which both cylinders are connected. In the present form, I provide an auxiliary suction inlet in one cylinder at such a point in the cylinder wall that it is uncovered before the main inlet ports 21 are uncovered.

The auxiliary inlet port 22 in the cylinder 17 is connected by a conduit 23 to the priming valve 16. The latter (see Figure 2) has a piston valve member 24 with ports 25 through it and a washer 26 on its face to engage the valve seat 27 in order to close the port 28 which leads to the connection point 29 for the priming conduit 14. The valve is connected to the centrifugal pump casing by a short pipe 30 which communicates with the valve chamber on the opposite side of the valve from the port 28. The valve stem 31 extends through a partition 32 and into a cylinder 33 and there carries a piston 34 which fits snugly the wall of the cylinder. The auxiliary suction connection 23 from the pump cylinder 18 leads to the side of the piston 34 away from the valve whereby the suction effort exerted therethrough may hold the piston 34 in the position shown in Figure 2 to put the valve in open position. The cylinder 33 is enlarged in diameter at the other end to form the annulus 35 to which the vent opening 36 leads. There is a check valve 37, opening toward the pump as indicated by the arrow, in each of the auxiliary suction connections to permit flow of air to the pump cylinders but to prevent back flow. A dia-

phragm could be used in place of the piston 34. I use the word piston in the claims here to cover any such equivalent.

The arrangement is desirable, when the pump draws from a line, leading through a dam 70 (Fig. 5) behind which the liquid stands at times above and at times below the level of the pump. If automatic operation is desired, it is obvious, that a scheme, employing a priming pump, similar to that of my Patent No. 1,513,705 cannot be used, because the water, when rising behind the dam, would flood the vacuum-breaker and the priming pump.

The valve of the present invention remains closed and prevents the entrance of water into the vacuum breaker, until the starting switch closes.

The particular system described above may be modified in many respects while still utilizing the inventive thoughts which underlie it. I wish therefore to include within the scope of protection afforded me by a patent, all such constructions as are within the fair range of the following claims.

I claim:—

1. In combination, a centrifugal pump, suction priming means therefor including a conduit leading from the pump casing, a valve in said conduit adapted to be closed by pump pressure and suction-operated means tending to hold said valve open.

2. In combination, a centrifugal pump, a suction priming pump having a main inlet opened at the end of the suction stroke and an auxiliary inlet opened at an earlier point in the said stroke, a priming connection from said main inlet to the centrifugal pump, a valve in said connection adapted to be closed by pump pressure and means operated by the suction produced at said auxiliary inlet tending to hold said valve open.

3. For a pump system including a centrifugal pump and a suction priming pump, a valve unit comprising a casing with ports for connection to the centrifugal pump and to the suction priming means, a valve for closing the port leading to the priming means, said valve being adapted to be closed by liquid under pressure from the centrifugal pump, and a piston connected to move said valve, a cylinder for said piston and a port in said cylinder for connection to said suction priming means whereby said valve may be urged toward open position during priming.

In testimony whereof I have signed my name to this specification.

OTTO HAENTJENS.