Sept. 14, 1926. 1,599,625

J. G. WHITLOCK

PUMP

Filed August 12, 1925 3 Sheets-Sheet 1

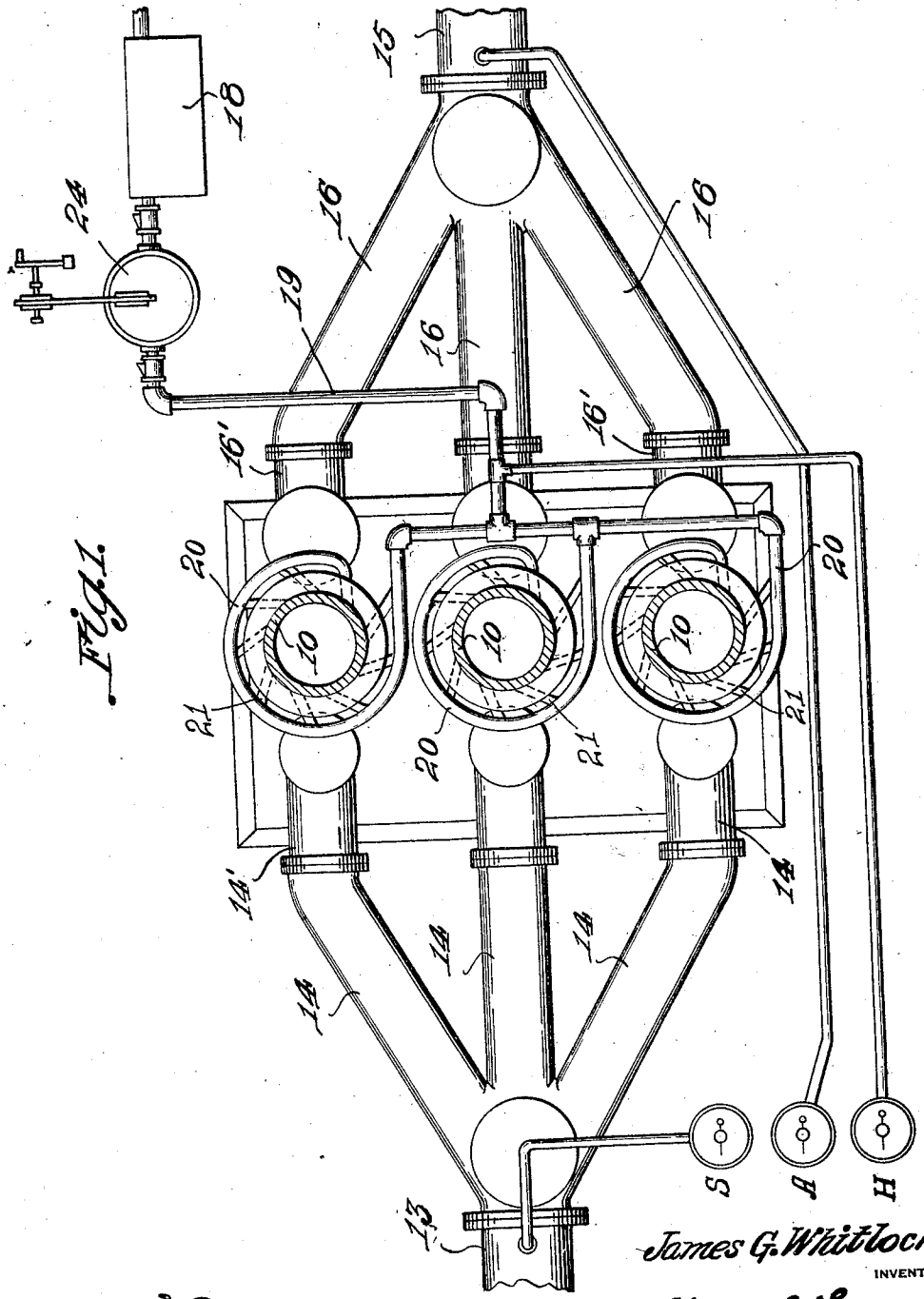


Fig. 1.

James G. Whitlock
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS:

Sept. 14, 1926. 1,599,625

J. G. WHITLOCK

PUMP

Filed August 12, 1925 3 Sheets-Sheet 2

Fig. 3.

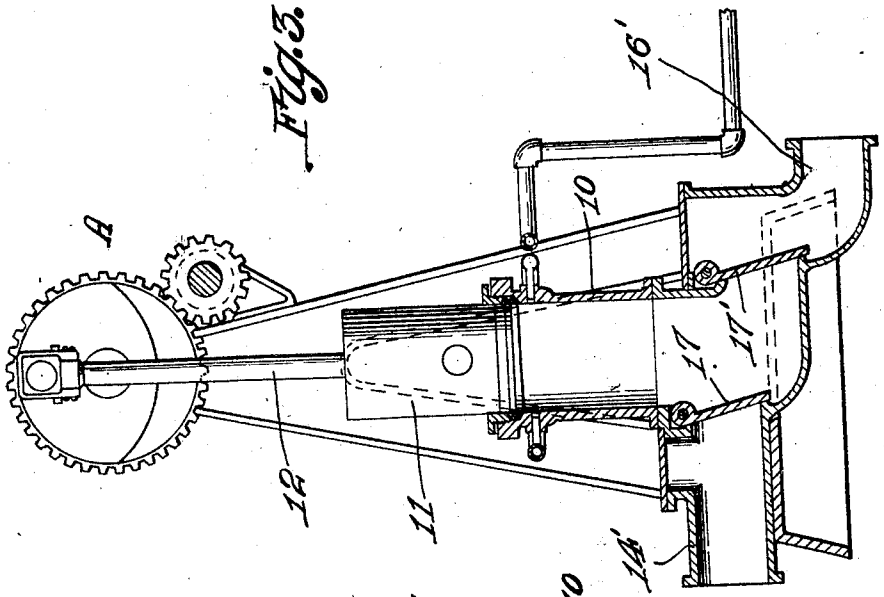
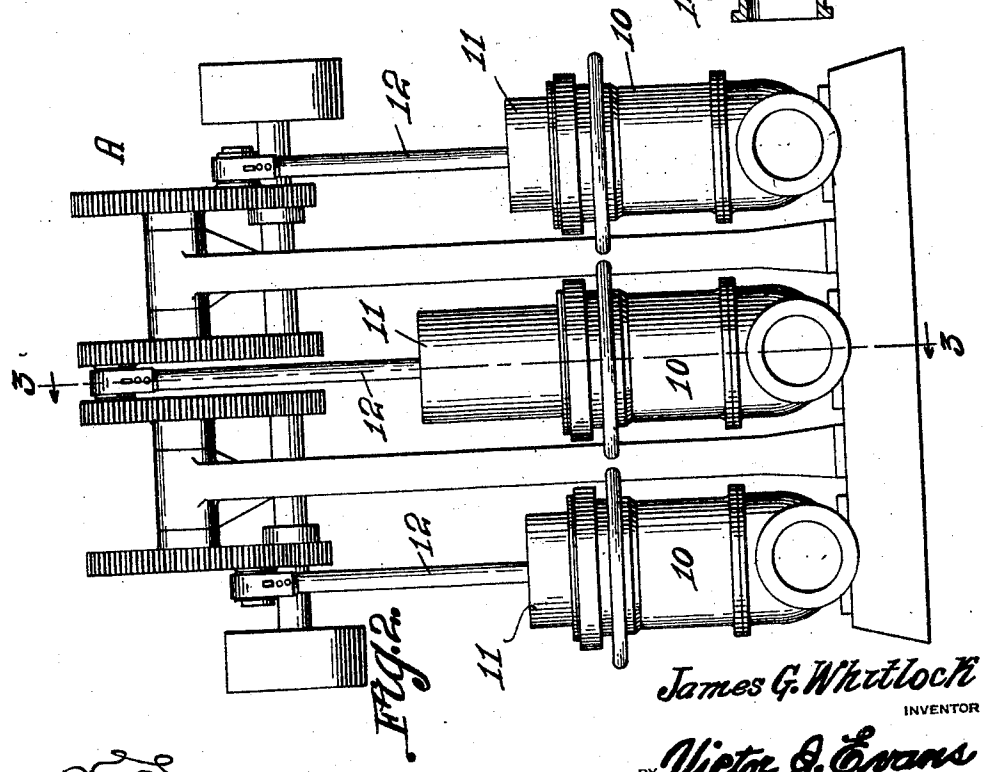


Fig. 2.



James G. Whitlock
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS:

Sept. 14, 1926. 1,599,625

J. G. WHITLOCK

PUMP

Filed August 12, 1925 3 Sheets-Sheet 3

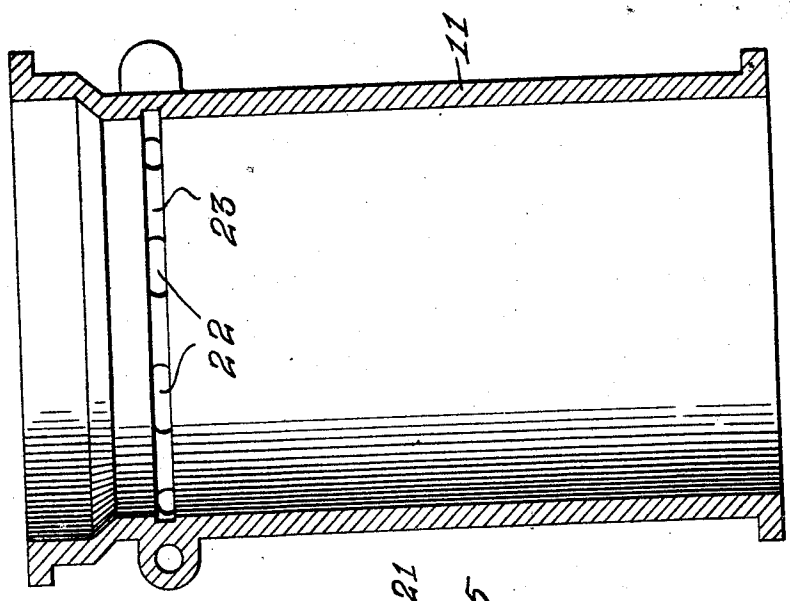


Fig. 5.

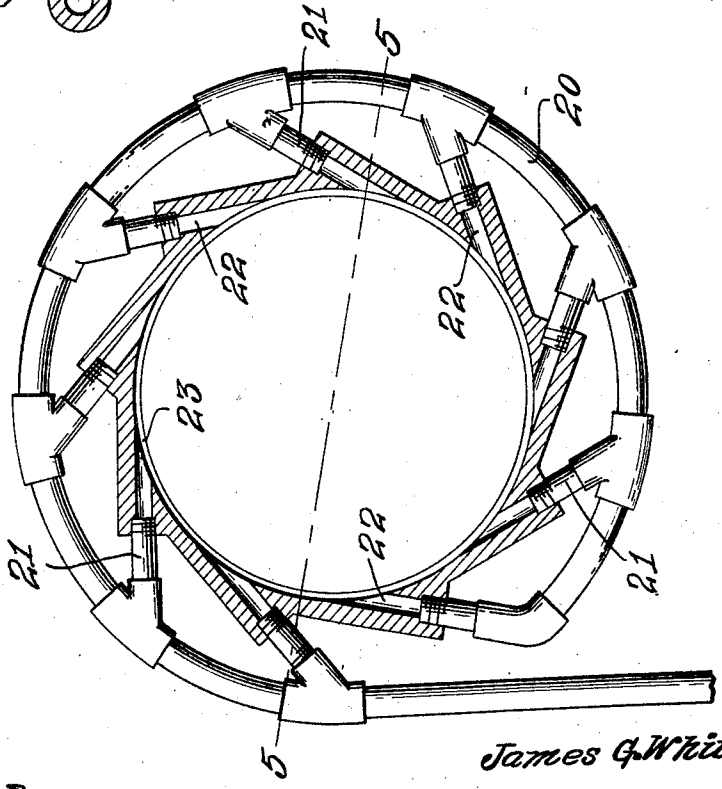


Fig. 4.

James G. Whitlock
INVENTOR

BY Victor J. Evans
ATTORNEY

Leo Hayes,
WITNESS:

Patented Sept. 14, 1926. 1,599,625

UNITED STATES PATENT OFFICE.

JAMES G. WHITLOCK, OF RICHMOND, VIRGINIA.

PUMP.

Application filed August 12, 1925. Serial No. 49,817.

This invention relates to pumps and more particularly to dredging pumps, an object being to provide means for introducing water under pressure into the pump cylinders to prevent sand or other foreign matter from entering the cylinders and damaging the cylinder walls and the piston and its packing.

Another object of the invention is the provision of means for introducing water under pressure into the cylinders so as to provide a continuous band of water around the inner walls of the cylinders so as to insure proper distribution of the water within the cylinders and prevent sand and so forth from rising upward.

Another object of the invention is the provision of means for boosting or building up the water pressure so that a hydraulic pump may be located at a point remote from the dredging pump without undue loss of pressure between the pumps.

With the above and other objects in view, the invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings:—

Figure 1 is a plan view showing the invention applied to a multiple cylinder dredging pump.

Figure 2 is an end elevation with the branch pipes removed.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is an enlarged horizontal sectional view through one of the pump cylinders.

Figure 5 is a section on the line 5—5 of Figure 4.

Referring to the drawings in detail wherein like characters of reference denote corresponding parts, the pump shown comprises three cylinders 10, but it is of course understood that one or more cylinders may be employed. Operating within each cylinder is a piston 11 which is connected by means of a rod 12 with suitable operating mechanism indicated at A and driven from any suitable source of power. The inlet pipe of the pump is indicated at 13 and is connected to the pump cylinders by branch pipes 14, while the outlet pipe 15 is connected with the cylinders by means of branch pipes 16. The pipes 14 and 16 are connected to pump inlets and outlets 14′ and 16′ respectively, the cylinders being separated from these inlets and outlets by check valves 17 and 17′. By reference to Figure 3 of the drawings it will be seen that as the piston 11 moves upward, the dredged matter will be drawn inward past the valve 17 while the valve 17′ will remain closed and upon downward movement of the piston 11, the valve 17 will remain closed and the valve 17′ will be opened to permit of the outward passage of the dredged matter.

During the upward movement of the piston 11, sand and other matter injurious to the cylinder and the piston are drawn into the cylinder and in order to prevent this, water under pressure is introduced into the upper ends of the cylinders so as to resist upward movement of the sand and so forth and force the same outward past the valve 17′. For this purpose water under pressure is supplied to the cylinders from plunger pumps, or a hydraulic pump 18 through pipe 19, the latter having branch pipes 20 which extend to the cylinders. Extending from the branch pipes 20 are nozzles 21 which communicate with passages 22 spaced around the cylinders, the said nozzles and passages being arranged tangentially with respect to the walls of the cylinders. Water entering the cylinders will thus be directed circumferentially around their inner walls and to guide the water and aid in its travel, the inner ends of the passages 12 are in communication with an annular groove 23 which extends around the inner wall of each of the cylinders. Any number of points of entrance for the water into the cylinders may be provided and while nine of such points are illustrated in the drawings, it is understood that this number may be varied in accordance with the bore of the cylinders or the character of the work. It is preferred however to provide a sufficient number of points of entrance and a sufficient amount of pressure to insure a complete band of water within each cylinder. In varying the number of points of entrance of the water, some of the nozzles 12 may be omitted and the outer ends of the passages 22 may be closed by suitable plugs, or the cylinders may be especially constructed for a given number of nozzles. By introducing the water in the manner shown and described, the water will travel around the groove 23 and

during the downward movement of the piston, this water will move downward within the cylinder with a swirling or spiral movement so that the entire surface of the cylinder bore and the piston will be covered and the sand and so forth washed downward and kept from coming up between the cylinder and plunger as stated.

In order to insure proper water pressure at the points of discharge of the water within the cylinders when the pump 18 is located an appreciable distance from the dredging pump, there is provided a hydraulic pressure tank 24 whose pressure is regulated by a weighted arm 25, so that water from the pump 18 may be forced into the pressure tank 24 and the pressure of the latter will act to force the water into the cylinders 10. The tank 24 thus forms what might be termed a relay or booster. When not needed, the pressure tank may be rendered inactive by the removal of the weights from the arm 25.

The pressure of the water entering the cylinders must be greater than the pressure of the dredge plunger on the sand and so forth in the valve cases and in order to determine the amount of this pressure there is provided a hydraulic pressure gauge H which communicates with the pipe 19, a discharge pressure gauge D which communicates with the outlet pipe 15 and a vacuum or suction pressure gauge S which communicates with the pipe 13. These gauges are placed in convenient position to indicate the various pressures so that the latter may be suitably controlled.

The invention is susceptible of various changes in its form, proportions and minor details of construction and the right is herein reserved to make such changes as properly fall within the scope of the appended claims.

Having described the invention what is claimed is:—

1. In a pump, a cylinder, a piston operating within the cylinder, means disposed tangentially with respect to the walls of the cylinder to introduce water under pressure into the cylinder and means within the cylinder to guide the water circumferentially around the walls of the cylinder.

2. In a pump, a cylinder having a groove extending around its inner wall, a piston operating within the cylinder, means disposed tangentially with respect to the walls of the cylinder to introduce water under pressure in the groove of the cylinder and means within the cylinder to guide the water circumferentially around the walls of the cylinder.

3. In a pump, a plurality of cylinders, pistons operating within the cylinders, means to introduce water under pressure into each of the cylinders and means common to each of the water introducing means to simultaneously supply water to all of the cylinders.

In testimony whereof I affix my signature.

JAMES G. WHITLOCK.