

A. PRIESTMAN.
PUMPING SYSTEM.
APPLICATION FILED FEB. 17, 1922.

1,415,701.

Patented May 9, 1922.

Fig. 1.

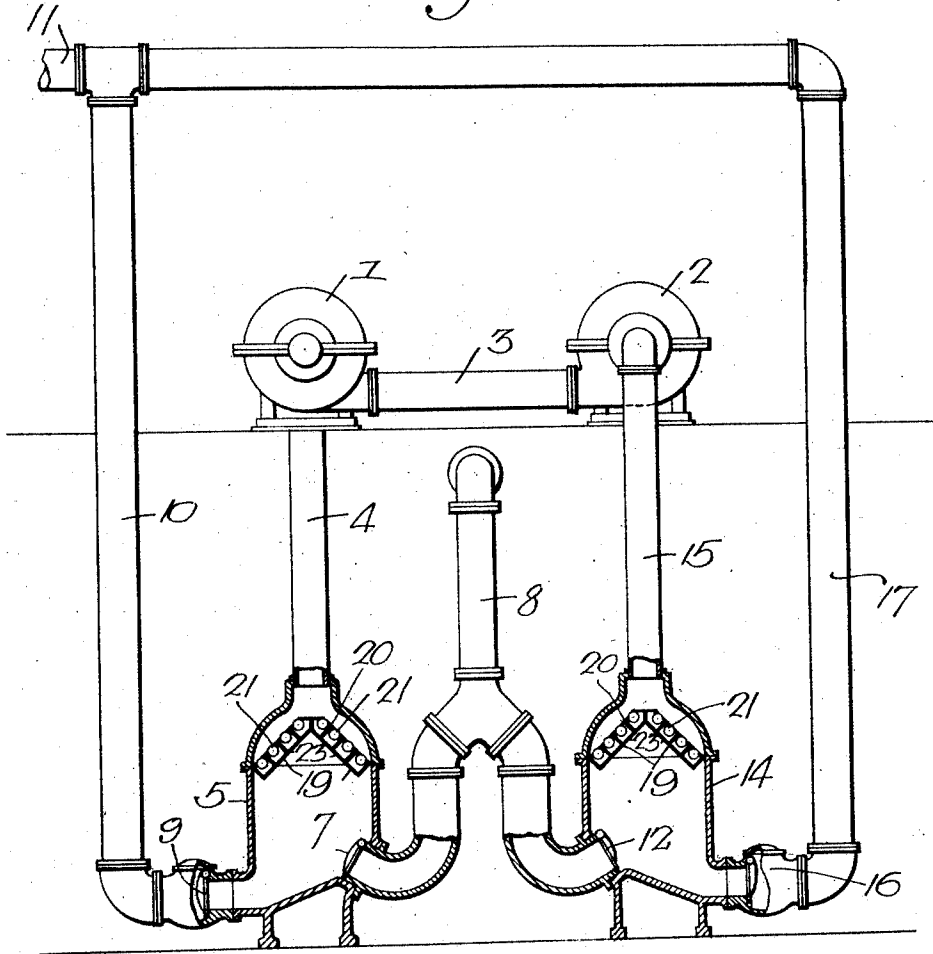


Fig. 2.

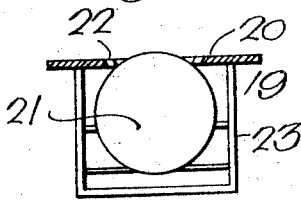


Fig. 3.

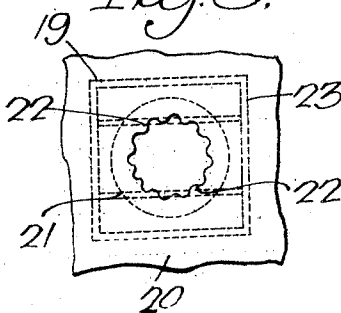
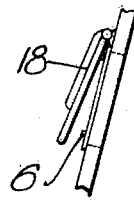


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PUMPING SYSTEM.

1,415,701.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALBERT PRIESTMAN, a subject of the King of Great Britain, residing in Philadelphia, Pennsylvania, have invented Pumping Systems, of which the following is a specification.

One object of this invention is to provide a combination of apparatus which, in addition to being particularly adapted to operate on liquids carrying with them relatively large solid bodies, shall include such an arrangement of parts as will insure the automatic delivery of such masses of small solid particles or collections of semi-solid particles as might otherwise clog up or interfere with the operation of the system.

I further desire to provide a system of the above noted type which shall include a novel form of automatically operative screen providing larger openings or passageways for material, when this is flowing in one direction than when it is flowing in the opposite direction,—the invention especially contemplating a novel form of check valve capable of preventing passage by it of liquid-carried solid bodies when these are flowing in one direction but free to open to allow passage of the liquid with solid matter when the current flow is reversed.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Fig. 1 is an elevation to some extent diagrammatic and partly in vertical section, illustrating a pumping system embodying my invention;

Fig. 2 is a vertical section of one of the check valves forming part of my invention;

Fig. 3 is a plan of the valve shown in Fig. 2; and

Fig. 4 is a side elevation of a modified form of check valve I may use.

In the above drawings I have shown my invention as applied to a pumping system such as is described and claimed in the application for U. S. patent of Hubert Beddoes, Serial No. 537,222 filed of even date herewith and in said drawings, 1 and 2 represent reversible pumping apparatus, shown as two pumps having their outlets joined by a conduit 3. The inlet of the pump 1 is connected through a pipe 4 with a screen casing 5 connected through a check valve 7 with one branch of a supply pipe 8 through

which liquid carrying more or less solid material may be admitted. Said casing 5 through a check valve 9 is connected to a conduit 10 delivering into a main discharge pipe 11. The second branch of the supply pipe 8 is connected through a check valve 12 with a screen casing 14, which through a conduit 15 is connected to the intake or central opening of the second pump 2. Said casing is also connected through a check valve 16 and conduit 17 to the main discharge conduit 11.

In each of the casings 5 and 14 is mounted a screen designed to prevent passage of solid bodies to the pumping apparatus 1—2 while permitting free flow of such bodies in the opposite direction. For this purpose I may employ a screen structure 19 including a plate 20 having a number of openings for check valves 21 whose seats are formed with serrated edges 22 as shown in Fig. 3 so that fluid may pass from each casing towards the pumping apparatus while the valve acts to hold back solid bodies in said casing. Suitable cages 23 are provided for the valves.

Under conditions of use, when the pumping apparatus 1—2 is operated in one direction, as by driving the pump 1, material such as sewage carrying solid matter enters through the pipe 8, passes freely through the check valve 7, flows through the screen casing 5, conduit 4, into the pump 1, from whence it passes through the pump 2 into the conduit 15, through screen casing 14, check valve 16, conduit 17 and into the main discharge pipe 11. Any solid material delivered is caught by the screen 19, in the casing 5 so that it cannot pass through the same. If desired, the screens may consist of or include flap valves 18 perforated or not as desired, Fig. 4, and so mounted that they are held partially open as by a pin 6 when the liquid flow is toward the pump 1 from the casing 5 or is toward the pump 2 from the casing 14. As a consequence any solid matter is arrested and prevented from passing to or accumulating in the pumping apparatus or conduits immediately adjacent thereto.

When however a certain amount of solid material has collected against or adjacent the screen in the casing 5, the pumping apparatus 1—2 is reversed as by driving the pump 2, so that the liquid flows from the supply conduit 8 past the check valve 12 through

screen casing 14, conduit 15, pumping apparatus 2—1, conduit 4, screen casing 5, check valve 9 and conduit 10, to the main discharge pipe 11.

5 As before the solid material from the source is arrested, in this case by the screen in the casing 14, so that liquid alone passes to the pumping apparatus 2—1 and this liquid not only carries away to the discharge
10 conduits 10 and 11 the solid material which has accumulated in the screen casing 5, but by reason of the free opening of the valves 21 in said screen casing, allows the escape of any coagulated or agglomerated matter or
15 particles which may have collected in the pumping apparatus or conduits adjacent thereto. At the same time the screen 19 in the casing 14 allows liquid only to flow to the pumping apparatus so that when the
20 latter is again reversed, the solid matter which has accumulated in the casing 14 is discharged and the screen in said casing is swept clean of any solid accumulations, since its valves 21 or 18 open as before, to pass
25 any solid material which may have accumulated or formed in the pumping apparatus or its associated conduits.

From the above description it will be seen that not only is my system particularly
30 adapted for propelling from a source to a point of discharge liquids carrying solid material which would otherwise injure or interfere with the operation of the pump, but in addition, by reason of the peculiar
35 automatically acting screens described, the discharge of solid matter from the pumping apparatus itself is insured. This is particularly advantageous and occurs regardless of the direction of flow of the liquid,
40 since otherwise there is a possibility that solid material might accumulate or form in the pumping apparatus and conduits back

of the screens and interfere with the desired operation and efficient functioning of the system.

I claim:

1. The combination in a pumping system of a reversible pumping apparatus and at least one screen for normally preventing the passage of solid material to said apparatus, said screen including means for automatically permitting free passage of solid material from the pumping apparatus.

2. The combination in a pumping system of a reversible pumping apparatus and a screen associated therewith including means for providing larger openings for the passage of material when the flow is away from the apparatus than when it is toward the same.

3. The combination in a pumping system of a reversible pumping apparatus; two screen casings connected between said apparatus and a source of supply of solid-carrying liquid; discharge conduits connected to said screen casings; and screens in said casings formed to provide relatively larger openings for the passage of material away from the pumping apparatus than are provided for the passage of liquid to the said apparatus.

4. The combination in a pumping system of a reversible pumping apparatus; two screen casings connected between said apparatus and a source of supply of solid-carrying liquid; discharge conduits connected to said screen casings; and screens in said casing including check valves mounted to provide relatively small passages when the flow occurs toward the pumping apparatus but free to open when the flow is away from said apparatus.

ALBERT PRIESTMAN.