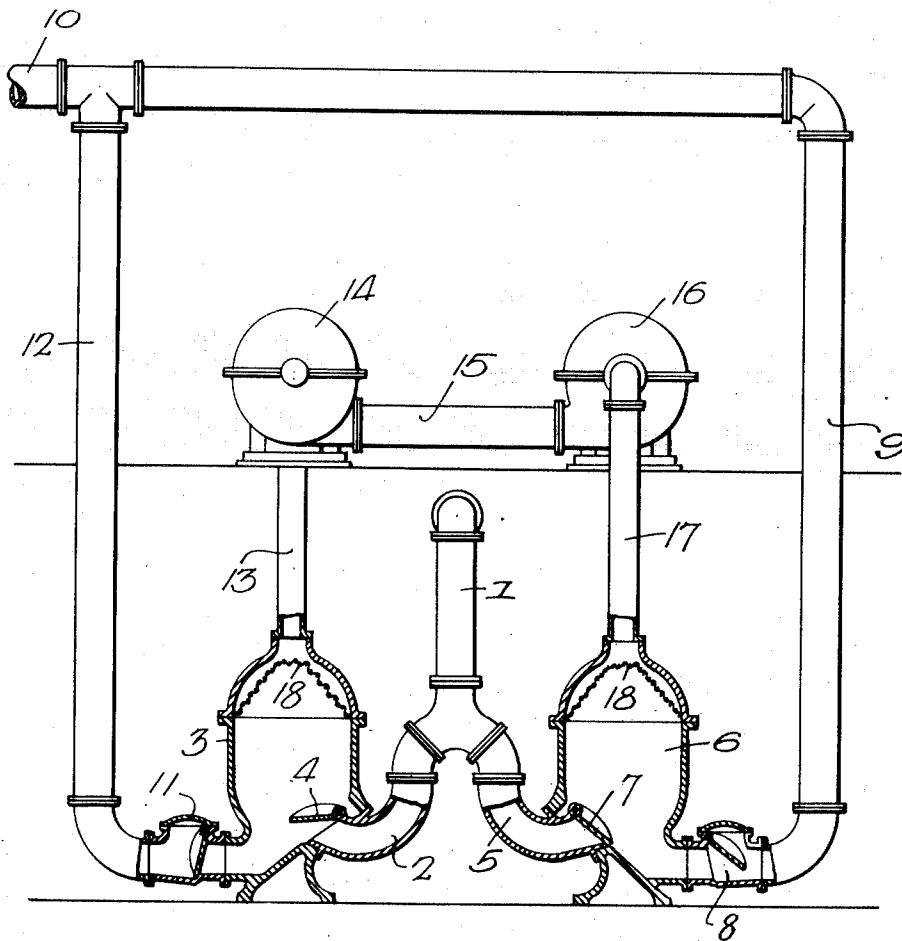


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PUMPING SYSTEM.
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1,415,769.

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PUMPING SYSTEM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HUBERT BEDDOES, a citizen of the United States, residing in Florence, South Carolina, have invented 5 Pumping Systems, of which the following is a specification.

One object of my invention is to provide a relatively simple, reliable and compact arrangement or combination of apparatus 10 particularly designed for propelling sewage or other liquids which contain solid material in large or small masses, and the invention more especially contemplates such an arrangement as will effectually insure the propul- 15 sion and ultimate discharge of the solid material without permitting or requiring its passage through the propelling element or pumping apparatus.

Another object of the invention is to provide a novel combination of conduits, valves and screens particularly designed to permit of the use of a flow-reversing propelling apparatus especially designed to cause the flow of a body of liquid from a source there- 25 of to a point of discharge, without necessitating or permitting passage through said apparatus of solid material carried by said liquid, but which will none the less insure the discharge of such solid material with the liquid discharged. 30

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

35 The figure is an elevation, partly in vertical section and to some extent diagrammatic, illustrating one arrangement of the apparatus comprising my invention.

In the above drawings, 1 represents a conduit, to one end of which solid-carrying liquid such as sewage is delivered either by gravity or otherwise. Said conduit is branched and one branch 2 opens into a casing 3 through a check valve 4, preventing 40 entrance into it of material from said casing. The second branch 5 of the conduit 1 likewise opens into a casing 6 and is similarly provided with a check valve 7 preventing back flow from said casing. The 45 latter through a check valve 8 is connected to a conduit 9 leading to a discharge conduit 10, and the first casing 3 through a check valve 11 and a conduit 12, is likewise connected to the discharge conduit 10.

50 The upper part of the casing 3 is connected through a conduit 13 with a suitable flow re-

versing pumping apparatus; in the present case with the intake of a centrifugal or other suitable pump 14 whose outlet, through a conduit 15 is connected to the outlet of a 60 second similar pump 16, whose inlet through a conduit 17 is connected to the upper part of the second casing 6. The two casings 3 and 6 are each provided with a suitable screen 18 preferably placed in their upper 65 portions, whereby solid bodies such as tin cans, pieces of wood or the like are effectually prevented from passing to the liquid propelling apparatus constituted by the pumps 14 and 16. 70

Under conditions of operation, sewage or similar liquid enters by gravity and suction into the conduit 1 and passes through the branch 2 thereof for example, into the casing 3. If it be assumed that the pump 14 75 is so operated as to create a suction in the conduit 13 and casing 3, the liquid thereupon passes from said casing through said conduit 13, through the pump 14, conduit 15, pump 16, conduit 17, casing 6, through 80 the check valve 8 and conduit 9 into the discharge conduit 10. Any solid bodies are however prevented by the screen 18 in the casing 3 from passing to the pumps and are retained in said casing. 85

After the lapse of a suitable time, the direction of operation of the pumping apparatus is altered, as by driving the pump 16 so that suction is exerted in the conduit 17 and casing 6, with the result that the 90 liquid passes from the inlet conduit 1, through the check valve 7 into said casing 6, flowing thence through the conduit 17, pump 16, conduit 15, pump 14, conduit 13, casing 3 and out through the check valve 11 95 and conduit 12 to the discharge conduit 10. The solid material previously trapped in the casing 3 is thereupon caught in this outflowing current of liquid and carried with it into the discharge conduit 10, while 100 the solid material entering from the supply conduit 1 is now caught and held by the screen 18 in the casing 6, where it is retained until, after the solid matter has been completely delivered from the casing 3, 105 the pumping apparatus is again reversed, whereupon the reversal of the current flow causes the solid bodies caught in the casing 6 to be in turn delivered to the discharge conduit 10. This cycle of operation may be 110 continued indefinitely.

From the above description it will be noted

that the screens 18 effectually prevent any objectionable solid bodies passing to the pumping apparatus comprised by the two pumps 14 and 16, while at the same time the repeated reversals of said pumps causes the solid bodies trapped in the two casings 3 and 6 to be discharged from the system into the outlet conduit 10. Damage to and undue wear of the pumps, as well as any interference with their operation, is thus effectually prevented so that by the use of my system I am enabled to propel and deliver to any desired point liquids carrying such large quantities of solids as to have been hitherto considered unmanageable.

It is to be noted that by the term "reversible" pumping apparatus I include any suitable device whereby successive reversals of the direction of flow of the fluid in the casings 3 and 6 may be accomplished.

I claim:

1. The combination of flow reversing pumping apparatus; a source of solid-carrying liquid and a delivery conduit both connected to said apparatus; and a screen connected between said pumping apparatus, the source and the delivery conduit for preventing solid bodies passing to the pumping apparatus.

2. The combination of flow reversing pumping apparatus; supply and delivery conduits connected to said apparatus; check valves for said conduits; and a screen between said valves and the pumping apparatus positioned to prevent solid material passing to said apparatus.

3. The combination in a pumping system of a casing connected to a source of solid-carrying liquid; a reversible pumping apparatus connected to the casing; a delivery conduit also connected to the casing; and a screen mounted to prevent solid material passing to the pumping apparatus.

4. The combination in a pumping system of two casings connected to a source of solid-carrying liquid; a reversible pumping apparatus connected to both casings; an outlet conduit connected to the casings; screens for preventing solid material passing from either casing to the pumping apparatus; with valves arranged to cause liquid to flow successively through one casing, the pumping apparatus and the other casing to the

outlet when said apparatus is operated in one direction and to flow successively through the latter casing, the pumping apparatus and the first casing to the outlet conduit, when said apparatus is reversed.

5. The combination in a pumping system of two casings connected to a source of solid-carrying liquid; a reversible pumping apparatus connected to first draw liquid from the source through one casing and deliver it through the other casing and then reverse its direction of flow; with screens for preventing solid material from flowing to the pumping apparatus from either casing while leaving it free to be discharged when liquid is being delivered therethrough by said pumping apparatus.

6. The combination in a pumping system of two casings both connected to a source of solid-carrying liquid and to an outlet conduit; reversible pumping means having its openings both capable of serving either as an inlet or as an outlet and connected respectively to the casings; screens for preventing solid material passing from either casing to the pumping apparatus; and valves for causing reversal of the flow through the casings when the pumping means is reversed.

7. The combination in a pumping system of two casings both connected to a source of solid-carrying liquid and to an outlet; two pumps having their outlets connected together and their inlets respectively connected to the casings; screens for preventing solid material passing from either casing to the pumps; and valves for causing reversal of current flow in the casings when the pumps are reversed.

8. The combination of two centrifugal pumps having their tangential openings connected together; two casings connected respectively to the center openings of said pumps; screens for preventing passage of solid material from the casings to the pumps; outlet conduits for the casings; and a source of solid-carrying liquid connected to both casings, the pumps being operated to cause liquid to flow into one casing from the source to said pumps and from the latter through the second casing or vice versa.

HUBERT BEDDOES.