

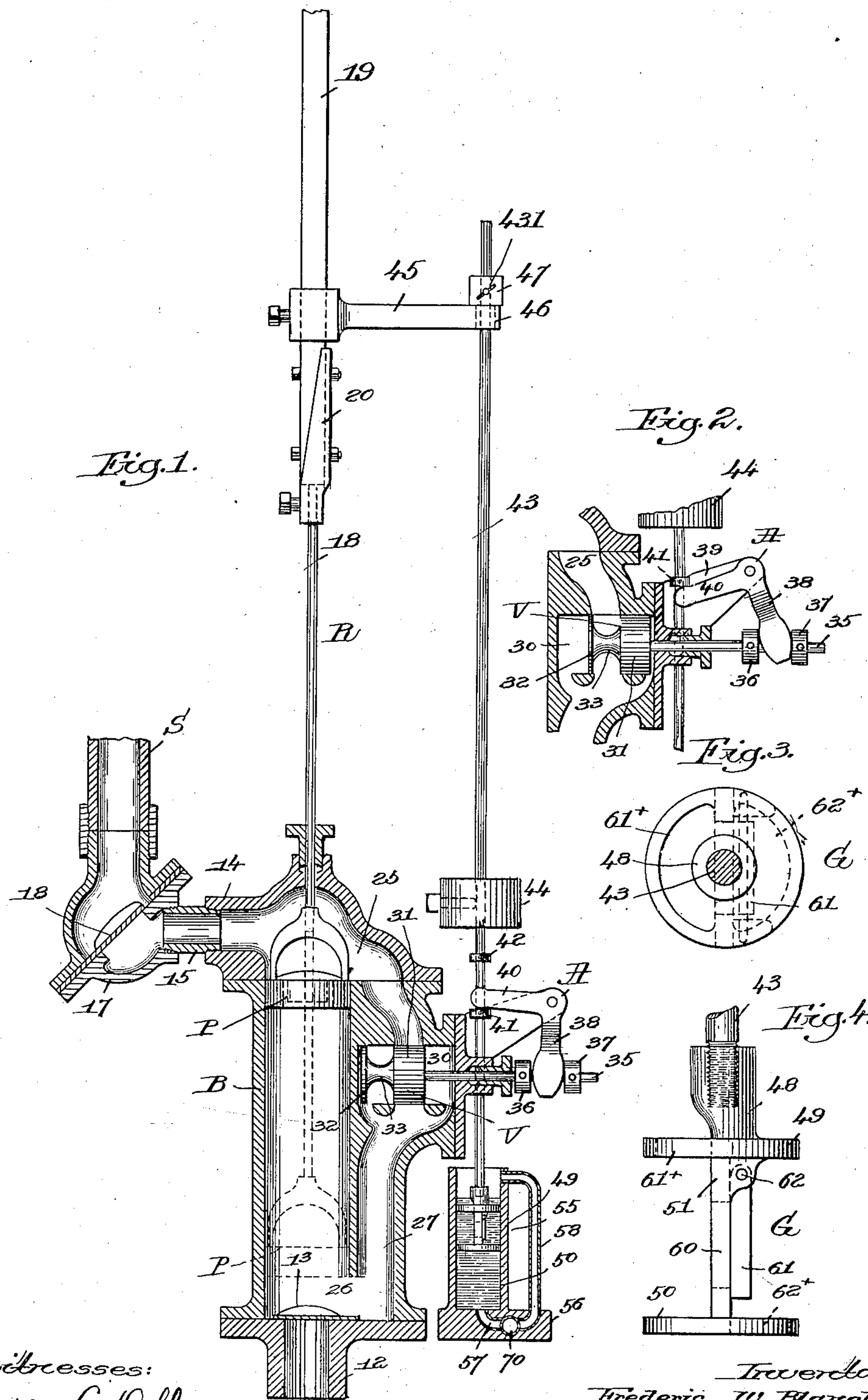
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F. W. BLANCHARD.
PUMP.

(Application filed Nov. 13, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PUMP.

SPECIFICATION forming part of Letters Patent No. 656,834, dated August 28, 1900.

Application filed November 13, 1899. Serial No. 736,761. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC W. BLANCHARD, a citizen of the United States, residing at Holbrook, county of Norfolk, State of Massachusetts, have invented an Improvement in Pumps, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

10 This invention relates to pumps, and while it is adapted for many different purposes it is of prime utility in connection with a wind-wheel or analogous member the actuating-power of which is variable, and the construction is such that the load upon the pump-piston is automatically thrown off the same when the actuating power of the wind-wheel passes below a given speed.

20 In the drawings, Figure 1 is a vertical central sectional elevation of a pump constructed in accordance with my invention in a simple embodiment thereof and showing the relief-valve closed. Fig. 2 is an enlarged detail of the relief-valve and adjacent parts with the relief-valve open. Fig. 3 is a plan view of a governor. Fig. 4 is an elevation of the same.

25 In the drawings, B represents a pump-barrel located over the suction-pipe 12, the passage of water from said suction-pipe to the piston-chamber being controlled by the usual flap-valve 13.

30 The piston is denoted by P, and its rod R extends upward therefrom and passes through the usual stuffing-box in the top of the pump-barrel. The pump-barrel has near the top thereof the nozzle 14, connected by the nipple 15 with the casing 17. Said casing incloses the flap-valve 18, controlling the admission of water from the pump to the stand-pipe or riser S, coupled to the casting or valve casing 17 in some convenient manner.

35 The foregoing description relates to a well-known form of lift-pump, and my improvements may be used in connection therewith and are intended to operate automatically in conjunction with a member whose actuating force varies, such as a wind-wheel.

40 I have not deemed it necessary to represent in the drawings the connection between the wind-wheel and the pump-rod, for these may be of any suitable kind.

The rod R is represented as consisting of two sections 18 and 19, adjustably connected together by means of a suitable clamp, as 20.

My invention is of importance in connection with a wind-wheel the speed of which varies materially, due to changes in the velocity of the wind operating the same, and the mechanism is of such a character that the pump-piston is relieved of excessive weight when the wind goes down, so that both of these parts can continue to operate, but without lifting the water from the suction-pipe into the stand-pipe. When, however, the movement of the wind-wheel again reaches the necessary speed, the parts will be returned to their normal positions, whereby the pump can again operate to supply the stand-pipe S.

45 The pump-barrel has openings 25 and 26 therein, leading into the conduit 27, shown as formed in a casting integral with the pump, although, of course, this construction is not essential. The opening 25 is shown located above the piston when the same is at the upper end of its stroke, while the opening 26 is illustrated as being below said piston when the same is at the lower end of its stroke, as shown by full and dotted lines, respectively, in Fig. 1. By this construction water can be pumped from the piston-chamber into the conduit 27 and can then pass into the piston-chamber, so as to be circulated through said parts without passing by valve-chamber 17 and without entering the suction-pipe 12 when a valve controlling said conduit is open. The conduit 27 is intersected at a convenient place intermediate the inlet and outlet openings 25 and 26, respectively, by the valve-chamber 30, in which the piston-valve V is mounted for sliding movement transversely to that of the piston. The relief-valve V has a substantially-cylindrical body or valve proper, 31, connected to the shallow head or disk 32 by the reduced neck 33. The stem 35 of the relief-valve V extends through the pump-casting and is provided at properly-separated points with stops or collars 36 and 37, suitably held thereon and adapted to receive between them the arm 38 of the angle-lever A, fulcrumed at its angle to the bearing 39. The other arm 40 of said angle-lever is adapted to be operated alternately by the

stops 41 and 42 of the automatic valve-actuator 43, shown as a weighted rod the weight of which is denoted by 44.

The pump-rod R at a suitable point in its height is provided with a lateral arm 45, the hub of which is suitably secured thereto and which has at its free end the relatively-large opening 46, through which the vertical actuating-rod 43 freely passes. The rod 43 is provided with a collar 47, adjustably held thereon by the set-screw 43' and disposed in the path of the normally-free end of the operating-arm 45. The lower end of the actuating-rod 43 is tapped into the boss or projection 48 upon the upper side of the disk 49, connected to a lower disk 50 by the web 51, said disks, with the connecting-web, forming part of a duplex resistance device or governor, (designated in a general way by G.) The governor G is shown as mounted for vertical reciprocative movement in the cylinder 55, the base-piece 56 of which can be secured in proximity to the pump. The base-piece 56 has a passage 57 communicating with the bottom of the casing or cylinder 55 and also with the pipe 58, the upper end of which is connected to the cylinder above the governor when the same is at the end of its advancing stroke, whereby an uninterrupted conduit is provided in communication with said cylinder at both sides of the governor. The web 51, between the two disks 49 and 50, has a port 60, shown controlled by the gravity-valve 61, pivoted to said web, as at 62. (See Fig. 4.) The upper disk has a port 61^x, while the lower one has a port 62^x, and these ports are located, respectively, at opposite sides of the web 51, as indicated in Figs. 3 and 4.

The cylinder 55 is adapted to contain a body of liquid of suitable kind adapted to sustain the governor in its upper position. (Shown in Fig. 1.) Referring to Fig. 1, it will be assumed that the pump-rod is being operated at its normal speed by a power-applying member. (Not illustrated.) In this case the arm 45 upon the pump-rod by striking the stop or projection 47 upon the valve-rod 43 will maintain said rod in its elevated position, aided by the resisting fluid, which upholds the governor in the cylinder 55, such fluid serving to prevent the immediate gravitation of said rod by the action of the weight 44. With the parts in the position illustrated in Fig. 1 the arm 38 of the angle-lever A, by acting against the left-hand stop or collar 36, will hold the body or effective portion 31 of the relief-valve V in such position that it obstructs or closes the conduit 27, whereby the water lifted by the piston can pass into the stand-pipe S in the usual manner. When, however, the speed of the rod R is reduced, owing to a reduction of velocity of the wind operating the wheel, the arm 45 will gradually fall from under the stop 47, thereby permitting the rod 43 to be lowered by the action of the weight 44, and as the weight descends the stop or pro-

jection 42 upon the rod 43, by acting against the arm 40 of the angle-lever, will swing the arm 38 to what is herein shown as the right, as indicated in Fig. 2, so that the body or effective portion 31 of the relief-valve can uncover the conduit 27. When the relief-valve opens in this manner, the water will pass from the piston-chamber into the conduit 27 and from thence again into the piston-chamber, and will be thus circulated while the valve 31 is open, so that the piston supports a very small body of water when the wind-wheel slows down and does not sustain the column of water in the stand-pipe, as is ordinarily the case. As the governor descends it will force the liquid below the same into the passage 57, and from thence into the pipe 58, after which it flows into the top of the cylinder. During this motion of the governor the liquid will pass through the port 62^x and act against the upper disk 49 and also against the valve 61, so that the latter will be held closed, thereby to secure the proper amount of resistance to the descent of the same. Upon the ascent of the governor G the fluid can easily force open the valve 61 and freely pass below said governor. On the ascent of the rod 43 when the wind reaches the proper velocity the projection 41 will strike the angle-lever A to secure the closure of the relief-valve.

The passage 57 is intersected by a plug-valve 70 of suitable kind, by which the flow of the resistance fluid can be regulated to increase or decrease the resistance.

The apparatus hereinbefore described can be materially modified within the scope of the appended claims, and hence the invention is in no wise limited to the character or arrangement of the parts previously set forth. Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A pump-barrel having a piston, a governor, a conduit communicating with the barrel, a relief-valve controlling said conduit, mechanism actuated by the piston-rod to close said relief-valve at or before the beginning of each stroke, and means acting in opposition to said mechanism and controlled by said governor and serving to open said valve when the speed of the piston goes below the normal.

2. A pump-barrel having a piston, a conduit communicating with the barrel, a relief-valve controlling said conduit, a weighted rod, means connected with the piston and acting against the weighted rod to elevate the same when the speed of the piston is at its normal, and means between the weighted rod and the relief-valve whereby said rod can actuate the valve.

3. A pump-barrel having a piston, a conduit communicating with the barrel, a relief-valve controlling said conduit, mechanism actuated by the piston-rod to close said relief-valve when the speed of the piston is at its normal, valve-opening means acting in opposition to said mechanism and controlled by the piston,

and a governor coöperative with the valve-opening means and serving to retard the action thereof.

4. A pump-barrel having a piston, a conduit
5 communicating with the barrel, a relief-valve
controlling said conduit, an automatic actuator
provided with means for moving the same
normally in one direction, means connected
with the piston-rod to operate said actuator
10 to move it in the opposite direction and to
hold it in its retracted position when the speed
of the piston is at its normal, a governor serving
to retard the operation of the actuator as
it moves in a direction to open the valve, and
15 connections between said actuator and the
valve.

5. A pump-barrel having a piston, a conduit
communicating with the barrel, a relief-valve
controlling said conduit, an automatic actuator
20 provided with means for moving the same
normally in one direction, means connected
with the piston-rod to operate said actuator
to move it in the opposite direction and to hold
it in its retracted position, a governor serving
25 to retard the operation of the actuator as it
moves in a direction to open the valve, a plurality
of remotely-disposed projections upon
the actuator, and means to be alternately engaged
by said projections, serving to actuate
30 the valve.

6. A pump-barrel having a piston, a conduit
communicating with the barrel, a relief-valve
controlling said conduit, a rod provided with
a plurality of projections, means to move said
35 rod in a direction to open the valve, a lever
to alternately engage said projections, and
serving to actuate the relief-valve, means
upon the piston-rod to lift said rod, and a
governor to retard the descent of said rod.

40 7. A pump-barrel having a piston, a conduit
in communication with the barrel, a piston re-

lief-valve, a piston-rod provided with an arm
having an opening, a weighted relief-valve
actuator extending freely through said opening
and having a projection disposed in the 45
path of said arm and governing means for
said actuator.

8. A pump-barrel having a piston, a conduit
in communication with the barrel, a relief-
valve controlling said conduit, a piston-rod, 50
an automatic valve-actuator controlled by the
piston-rod, a fluid-containing cylinder and a
governor in said cylinder connected with the
actuator.

9. A pump-barrel having a piston, a conduit 55
in communication with the barrel, a relief-
valve for said conduit, a piston-rod, projections
on the stem of the relief-valve, a lever,
one arm of which is disposed between said
projections, an actuating-rod having projec- 60
tions adapted to receive the other arm of said
lever and controlled automatically by the piston-
rod and governing means for said actuating-rod.

10. A pump-barrel having a piston, a conduit 65
communicating with the pump-barrel at
points beyond the piston when the same is at
the limits of its respective strokes, a relief-
valve in said conduit, automatic means for
positively closing said relief-valve at or before 70
the beginning of each stroke, and regulatable
means for opening said relief-valve at
each stroke of the piston that is slower than
the predetermined speed.

In testimony whereof I have signed my 75
name to this specification in the presence of
two subscribing witnesses.

FREDERIC W. BLANCHARD.

Witnesses:

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LOUISE ROTHSTEIN.