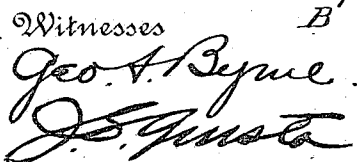


APPLICATION FILED JULY 5, 1910.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.



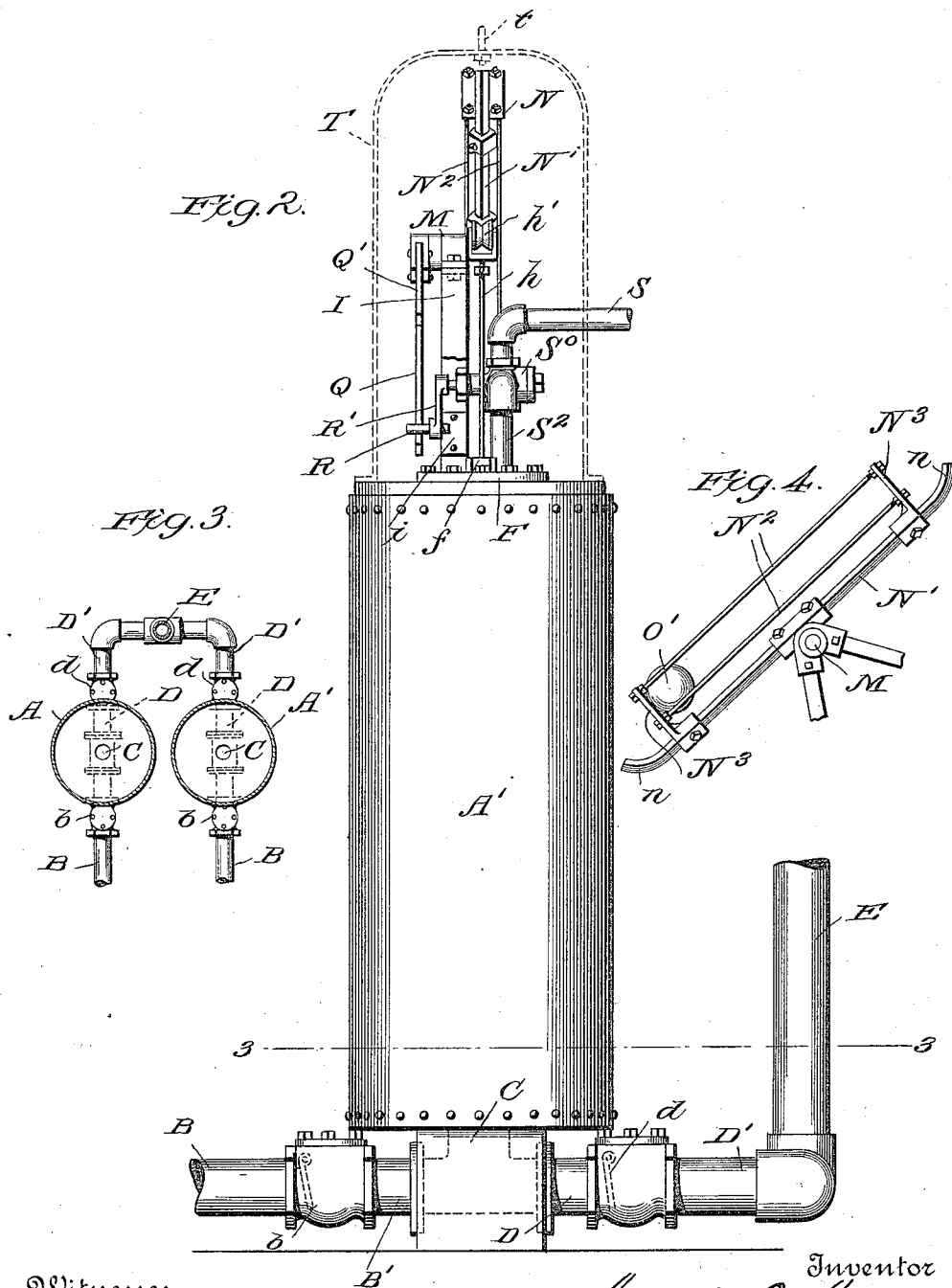
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1,042,226.

H. A. HOGEL.
PUMPING APPARATUS.
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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

HASCAL A. HOGEL, OF BOSTON, MASSACHUSETTS.

PUMPING APPARATUS.

1,042,226.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed July 5, 1910. Serial No. 570,392.

To all whom it may concern:

Be it known that I, HASCAL A. HOGEL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pumping Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in pumping apparatus, and is especially intended to provide a pump automatically operated by compressed air, which is adapted to force water, oil, or other liquid, to a considerable height.

The apparatus contained in my invention comprises one or more pairs of cylinders to which the compressed air and water are alternately admitted, and from which the air or water is alternately expelled by the automatic apparatus herein described and claimed.

The construction disclosed herein embodies certain changes over the arrangement proposed in the construction shown in my co-pending application on a similar invention Serial No. 570,391, and dated July 5, 1910.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is a side elevation of the apparatus showing two pumping chambers one being shown in central vertical section. Fig. 2 is an end view of the apparatus shown in Fig. 1. Fig. 3 is a sectional plan, on a smaller scale, showing the arrangements of pipes for conveying liquid, and, Fig. 4 shows a modification in which a rolling ball is used instead of a quantity of mercury.

A and A' represent two closed pumping chambers, each of which is connected, as by pipes B and B', to an elevated source of liquid supply, so that the liquid will flow by gravity into the chamber when there is no air pressure on.

C represents a pipe opening into the bottom of the chamber, through which the liquids flows alternately in reverse directions.

D is an outlet pipe for the liquid, connected to the pipe D', opening into the delivery pipe E.

Check valves *b* and *d* are provided in the

liquid inlet and outlet pipes, the former opening inward and the latter opening outward, as shown in Fig. 2.

F represents a manhole cover, secured to the top of the chamber, and is provided with a stuffing box *f*, through which runs the rod *h*, connected to the float H, which is provided with guide lugs *h*², engaging the guide rods G secured to the manhole cover F.

I is a frame connected to the two receptacles and preferably provided with rubber spring buffers *i*, as shown in Fig. 1.

M is a rock shaft, to which is rigidly attached the frame N and the rocking arms Q and Q', each having a bent in end *q*, see Fig. 1. The frame N is provided with a shoe N', having curved ends *n*, and with guide rods N² to hold the end pieces N³ in which the iron or steel tube P is mounted. In this tube, a quantity of mercury O is placed. Instead of the mercury in the tube, a ball O', shown in Fig. 4, may be provided, running between the guide rods N².

S represents a pipe, connected to a suitable source of supply of compressed air, not shown. This pipe leads to a cross having four passages therethrough, controlled by the four way cock R², operated by the pin R on the crank R'. Connected to this cross, in addition to the supply pipe S, are the branch delivery pipes S' and S² and the exhaust pipe S³, shown most clearly in Fig. 1.

The parts should preferably be covered by a suitable hood, such as is shown in dotted lines at T, and this hood may be provided with eye bolts *t* for convenience in hoisting into and out of position when desired.

The operation of the device is the same whether the mercury is used or whether the ball is used, and is as follows:—The frame N and the arms Q and Q', all rocking together, may be conveniently known as a tumbling bob, and this is alternately rocked automatically, as will now be described. Suppose the two floats H and H' to be in the position indicated in Fig. 1, and the top of the chamber A to be connected to the exhaust pipe S³, and the top of the chamber A' to be connected to the supply pipe S. The liquid will rise under gravity in the chamber A, lifting the corresponding check valve *b*, while at the same time the air pressure will close the check valve *b* of the chamber A' and will open the valve *d* of said chamber, forcing the liquid out and up into the delivery pipe E. As the liquid rises in

the chamber A, it will in due time reach the float H and lifting same will cause the rollers h' to engage the curved end n of the shoe N' . This will gradually rock the tumbling bob until it is just past the horizontal position, when the mercury, or the ball, running down toward the opposite end of the frame N, will swing the tumbling bob rapidly, causing the end q of the arm Q' to strike the roller r on the pin R, and swinging the arm R' and the four-way cock R^2 suddenly, will turn on the air pressure to the chamber A and will connect the chamber A' to the exhaust. The liquid will now begin to rise in the chamber A' , and to flow from the chamber A, being forced out by the air pressure and up into the pipe E. As the float H' rises, its corresponding roller h' will engage the opposite end of the shoe N' and will swing the tumbling bob in the reverse direction, the operation being again reversed. The cycle of operations will continue indefinitely as long as there is a source of supply of liquid and another source of supply of compressed air.

It will be seen that I provide a simple and effective arrangement by which compressed air may be used automatically to pump liquid to the desired height.

It will be obvious that various modifications might be made in the herein described apparatus, which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:—

1. A pumping apparatus comprising a pair of closed vessels, a source of liquid supply communicating with said vessels with check valves controlling said liquid; a source of supply of compressed air connected to both of the vessels, a vertically movable float mounted in each of said vessels, a pivoted rocking frame provided with a track curved at the ends, a sliding weight mounted in said rocking frame, and adapted to travel by gravity backward and forward therein as said frame is rocked, a rod connected to each float and having a roller en-

gaging said track on the rocking frame, and means operated by said frame for admitting compressed air alternately to each of said vessels and for simultaneously allowing the compressed air to escape from the other vessel, substantially as described.

2. A pumping apparatus comprising a pair of closed vessels, a source of liquid supply communicating with said vessels with check valves controlling said liquid; a source of supply of compressed air connected to both of the vessels, a vertically movable float in each of said vessels, a pivoted rocking frame provided with a track curved at the ends and also with inclined downwardly projecting arms, a sliding weight mounted in said rocking frame, and adapted to travel by gravity backward and forward therein as said frame is rocked, and a four-way cock operated by said arms for admitting compressed air alternately to each of said vessels and for simultaneously allowing the compressed air to escape from the other vessel, substantially as described.

3. A pumping apparatus comprising a pair of closed vessels, a source of liquid supply communicating with said vessels with check valves controlling said liquid; a source of supply of compressed air connected to both of the vessels, a vertically movable float in each of said vessels, a pivoted rocking frame provided with a track curved at the ends and also with inclined downwardly projecting arms, a ball mounted in said rocking frame, and adapted to roll by gravity backward and forward therein as said frame is rocked, and a four-way cock operated by said arms for admitting compressed air alternately to each of said vessels and for simultaneously allowing the compressed air to escape from the other vessel, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

HASCAL A. HOGEL.

Witnesses:

MOSES ELY,
JOSEPH G. HUNT.