

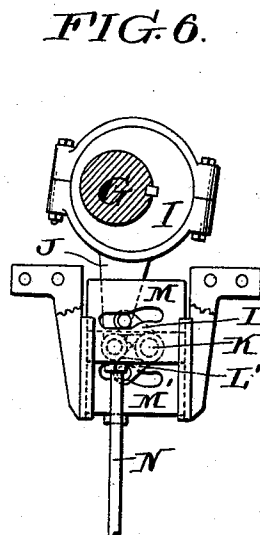
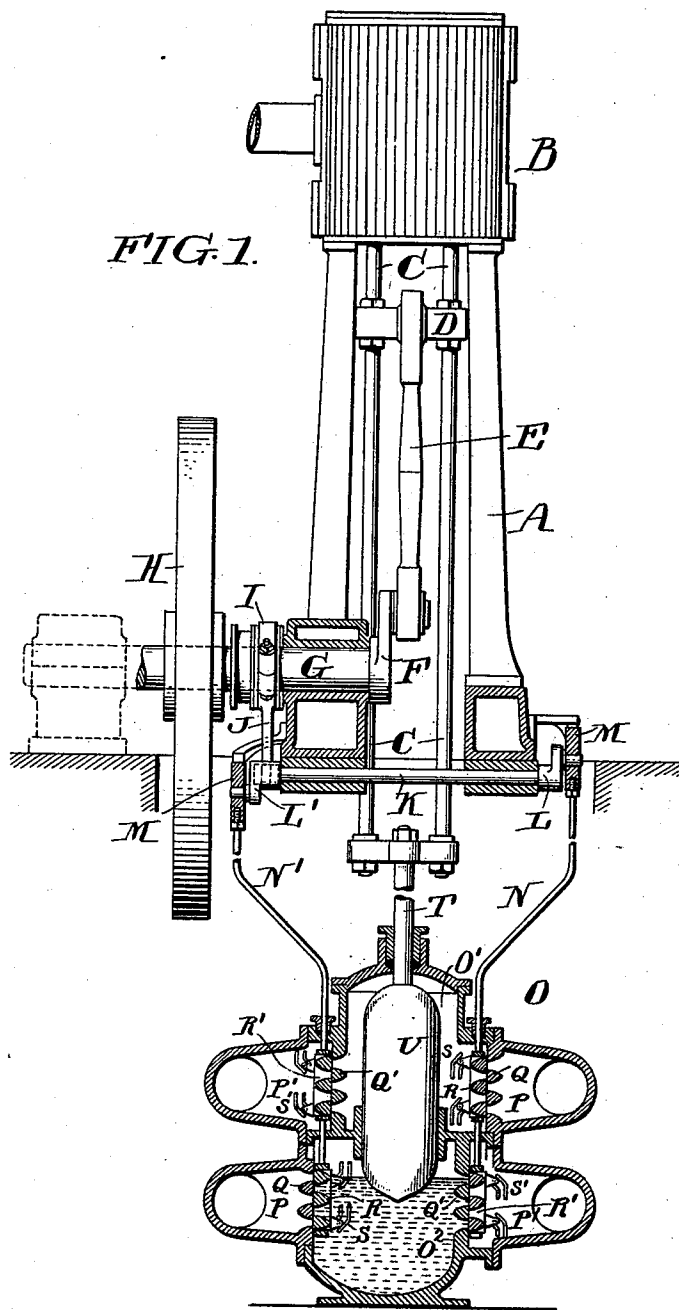
(No Model.)

2 Sheets—Sheet 1.

W. E. GOOD.  
PUMP.

No. 507,537.

Patented Oct. 31, 1893.



**WITNESSES:**

Henry Denny  
Stewart

**INVENTOR:**

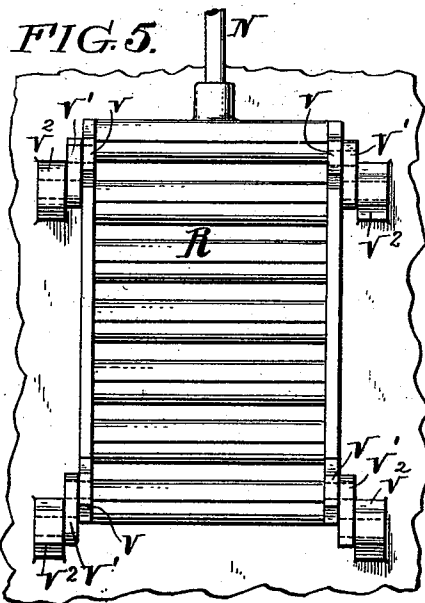
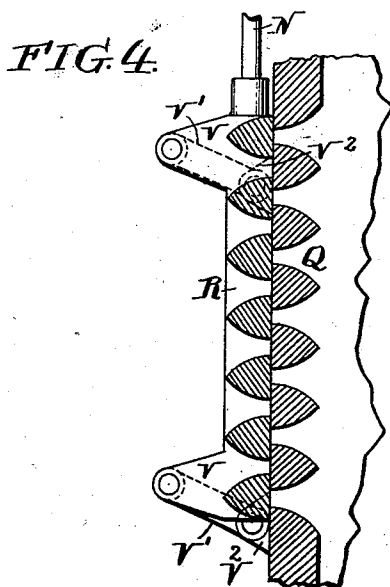
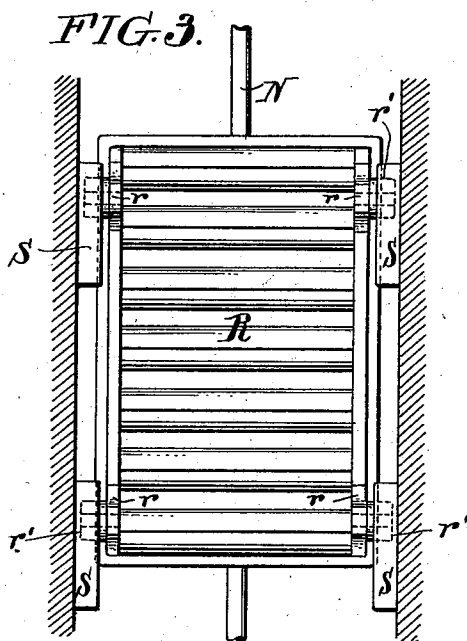
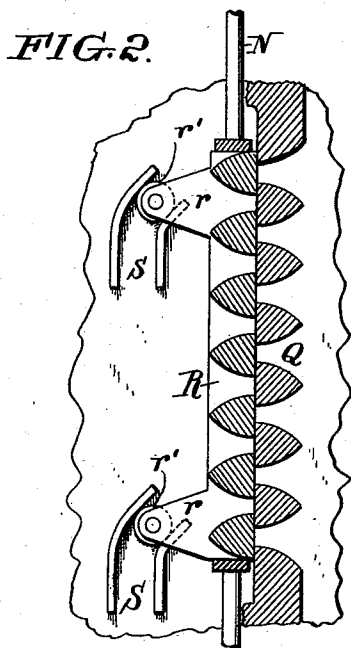
William C. Good  
by her atty

Francis T. Chambers

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Henry D. ...  
...

INVENTOR:

William E. Good  
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Francis T. Chambers

# UNITED STATES PATENT OFFICE.

WILLIAM E. GOOD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE  
SOUTHWARK FOUNDRY AND MACHINE COMPANY, OF SAME PLACE.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 507,537, dated October 31, 1893.

Application filed February 21, 1893. Serial No. 463,213. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. GOOD, a citizen of the United States, residing at the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Pumps, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the construction of pumps and is particularly intended for water and other liquid pumps, although adapted as well for pumps used for compressing air or other gases.

The object of my invention is to provide a pump with longitudinally moving valves situated over its admission or discharge ports or both, which will be automatically raised from their seats when moving to and from the position in which they close the ports, the double motion of the valve, to wit: its motion over the port and its motion to and from the port, being so regulated with respect to the motion of the pump piston or plunger as to open the port in proportion to the energy of the piston action in sucking or forcing fluid through the port.

In another application filed by me, August 15, 1892, Serial No. 443,146, I have shown and described a pump provided with slide valves, the back bearings of which are so placed as to permit the valve to move away from its seat while the mechanism for actuating the valve is arranged to give it longitudinal motion in a certain fixed relation to the motion of the pump piston. This construction in its broader sense is the same as that which forms the subject matter for my present patent; the difference being, that in the present case, the motion to and from the port, as well as the longitudinal motion of the valve are automatic and positive.

Reference is now had to the drawings in which my invention is illustrated, and in which—

Figure 1 is an elevation of a pump constructed in accordance with my invention showing the pump cylinders and valve chambers in section. Fig. 2 is a longitudinal section through the valve, taken on the line  $x-x$

of Fig. 3. Fig. 3 is a plan view of the valve; Fig. 4 a longitudinal section through a modified construction of the valve taken on the line  $y-y$  of Fig. 5; Fig. 5 a plan view of the said modified valve, and Fig. 6 is a side view showing the construction of the cam blocks and their connection with the rock shaft.

A indicates the frame of the pump; B, the steam cylinder; C, C, the piston rods; D a cross-head attached to the piston rods and to which is attached the connecting rod E, said rod being attached at its other end to the crank F of the shaft G, upon which is situated a fly wheel H.

I, indicates an eccentric secured to the shaft G; J, an eccentric strap and link, the strap being secured to the eccentric I and the link to a crank on a rock shaft K; said rock shaft has at each end cranks L and L' which cranks engage cam blocks M and M', said blocks moving in suitable slides and having attached to them the valve rods N and N'.

O, indicates the pump proper, having in the construction shown, two chambers O' and O<sup>2</sup>.

P is the supply pipe, one as shown, connecting with each cylinder and P' P' indicate the delivery pipes of the pump chambers.

Q Q indicate the supply ports of the two chambers, said ports having valve seats formed upon their inner faces.

Q' Q' indicate the delivery ports having valve seats formed upon their outer faces; R R indicate the admission valves moving over the ports O.

R' R' indicate the delivery valves moving over the ports Q'. The valves are connected with the rods N and N' and in the special arrangement shown, which forms no part of my present invention as it is claimed in the former case mentioned, the admission and delivery valves of the two cylinders are connected together as they can be, because the admission valve of the one cylinder should move at the same time and to the same extent with the delivery valve of the other cylinder.

In all of the particulars noted above, the pump shown does not differ from that shown in my former application, but in place of holding the valve to and moving it from its seat by the action of the fluid pressing against it, I provide automatic mechanism which lifts

the valve from its seat as it is moved longitudinally over its seat. Various mechanical appliances for performing this function could be used. I have shown in Figs. 1, 2 and 3 a construction in which curved slots S S are formed in or attached to the valve casing and engaged by rollers  $r'$  attached to the ends of arms  $r$  connected in turn with the valve. Obviously a thrust from the rod N tending to move the valve over its seat in the direction of the arrow shown in Fig. 2 will cause the rollers to ride up in the curved slot S lifting the valve from its seat, and this lift of course should be proportioned to the volume of water tending to pass through the port which in turn is of course proportioned to the sweep of the plunger. By the construction shown, the valve is lifted and held from its seat during its whole reciprocating motion from the time it is set in the position shown in Fig. 2 until it returns to the same position.

In the modification shown in Figs. 4 and 5, the valve R is connected by links  $V'$  with supports  $V^2$  situated in the valve chamber, said links being attached to projections V secured upon the valve; it is of course obvious that when the valve R moves in the direction shown in Fig. 4 it will be lifted from its seat by the action of the links.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a pump, a valve seat therein a slide valve arranged to close the port in said seat and means as described whereby said valve is lifted and held above its seat while moving longitudinally thereover.

2. In a pump the combination with a pump cylinder, having one or more valve seats therein, of a piston moving in said cylinder, one or more slide valves adapted to close the port or ports in the valve seats, valve actuating mechanism actuated by a moving part of the pump to move the valves longitudinally in a fixed relation to the movements of the piston, and means as described arranged to lift and hold the valve away from its seat as it moves longitudinally over it.

3. In a pump the combination with a pump cylinder, having one or more valve seats therein, of a piston moving in said cylinder, one or more slide valves adapted to close the port or ports in the valve seats, valve actuating mechanism actuated by a moving part of the pump to move the valves longitudinally in a fixed relation to the movements of the piston, and means as described arranged to lift the valve away from its seat in the direction which the fluid flows through it as it is moved longitudinally.

W. E. GOOD.

Witnesses:

ALF. H. FABER,

FRANCIS T. CHAMBERS.