

(No Model.)

W. F. MATTES.
Pump.

No. 238,513.

Patented March 8, 1881.

Fig. 1.

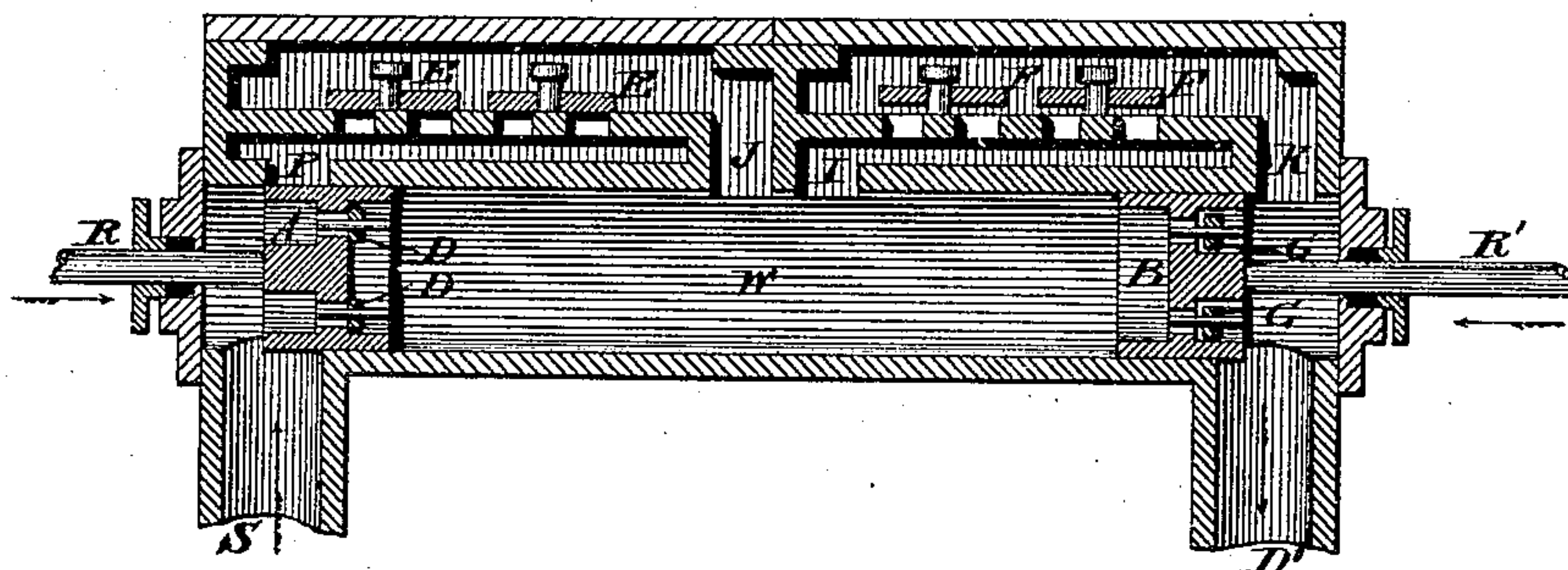
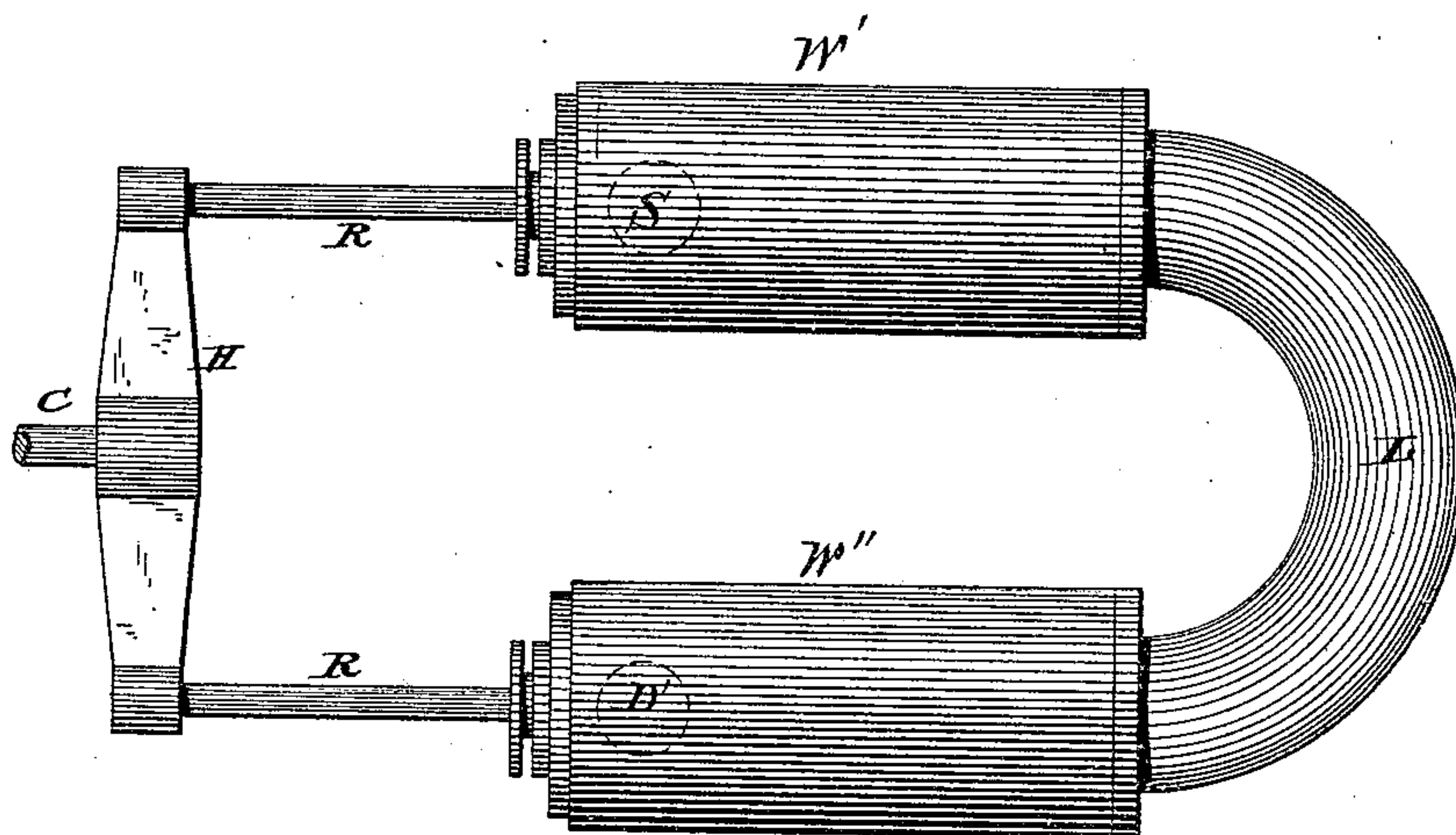


Fig. 2.



Attest.

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PUMP.

SPECIFICATION forming part of Letters Patent No. 238,513, dated March 8, 1881.

Application filed December 30, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. MATTES, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a longitudinal sectional diagram, showing the principle of construction of my improved pump; and Fig. 2 is a side elevation of a pump having the form in which I prefer to apply my improved construction in practice.

Corresponding parts are marked by similar letters in both figures.

The object of my invention is to provide a pump which will run smoothly at high speed and be free from the slamming or "pounding" of the valves which is so common and so objectionable in ordinary power-pumps.

It consists in combining with the double pistons or plungers having small valves of the ordinary kind a system of relief passages and valves to facilitate the entrance and escape of the water and relieve friction on the water-passages of the pistons, the ports of said first-named passages being alternately closed, at the change of stroke, before taking pressure from the opposite side, so that the slamming or pounding of the valve is effectually prevented.

In the drawings, W is the working-chamber, having the usual cylindrical form; S, the suction-pipe; D, the discharge-pipe; A and B, the pistons. These pistons move alternately from and toward each other, being shown in Fig. 1 at the end of the outward stroke and just beginning to move inward, as designated by the arrows on the piston-rods R and R'. This inward movement of piston A causes the water in working-barrel W to be forced through the valves F and G into the discharge-pipe D. The same action closes the valves D and E and fills the space behind piston A with a fresh supply of water from suction-pipe S.

It will be observed that piston B, moving inward simultaneously with piston A, accom-

plishes no work, and that the small valve-area obtainable in said piston B would be insufficient to pass the water forced forward by piston A without very great friction. This friction is prevented by the action of the large valves F, which pass most of the water. When the inward stroke has been completed and the pistons, having met near the middle of the working-chamber, begin to separate, the valves F and G close and the valves D and E open, a fresh supply of water from the suction-pipe S being drawn through them. The piston A, in turn, becomes an idler, and piston B forces the water before it into the discharge-pipe D'.

The difficulty so common in ordinary power-pumps, and which I seek to overcome, is that when the pump is operated at high speed the valves, after being opened for the passage of water, are slammed violently to their seats by each change of stroke. This slamming or pounding action has been prevented in this pump by the device of locating the ports P and I, by which water is passed from the working-barrel W to the valves E and F, so that one of said ports—to wit, whichever of them shall correspond to the set of valves open at such time—shall be closed by one of the pistons, A or B, at the time of changing stroke, thus shutting from beneath the supply of water to said valves and permitting them to close before pressure shall come upon them from the other side. This is shown in Fig. 1, the piston A closing the port P at the completion of the outward stroke. In like manner the piston B will close the port I at the end of the inward stroke. Actual trial shows that it is not necessary that this closing of the ports shall be complete, but that a very slight opening may be left with advantage. For the instant during which the port is closed the small valves in the piston must serve to prevent the shock or jar which would result from the sudden checking of the momentum of the water if the piston were solid. The valves in the pistons do not jar, because each piston, upon changing stroke, takes up its work in the direction of the current.

In most cases, particularly for machines of moderate size, the form shown in Fig. 1 is convenient and the application of power costly. A much more compact and convenient ar-

5 rangement is shown in Fig. 2, which is obtained by cutting Fig. 1 in two in the middle and connecting the severed ends by the curved pipe L, the piston-rods R and R' being thus brought into convenient position to be attached to the cross-head H, to which the piston-rod C of a steam-cylinder or other power may be attached. This change of form in no manner alters the principle of construction of
10 the pump.

What I claim, and desire to secure by Letters Patent, is—

The combination, in a pumping-engine, of the pistons or plungers A B, having valves D G, the ports P I, valves E F, and water-ways J K, all substantially as and for the purposes set forth. 15

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

W. F. MATTES.

Witnesses:

ALEX. H. SHERRERD,
GRAM CURTIS.