

C. Sellers,
Slide Valve for Steam Riveting Machines.
Patented Mar. 7, 1871.
No 112,385.

Fig: 1.

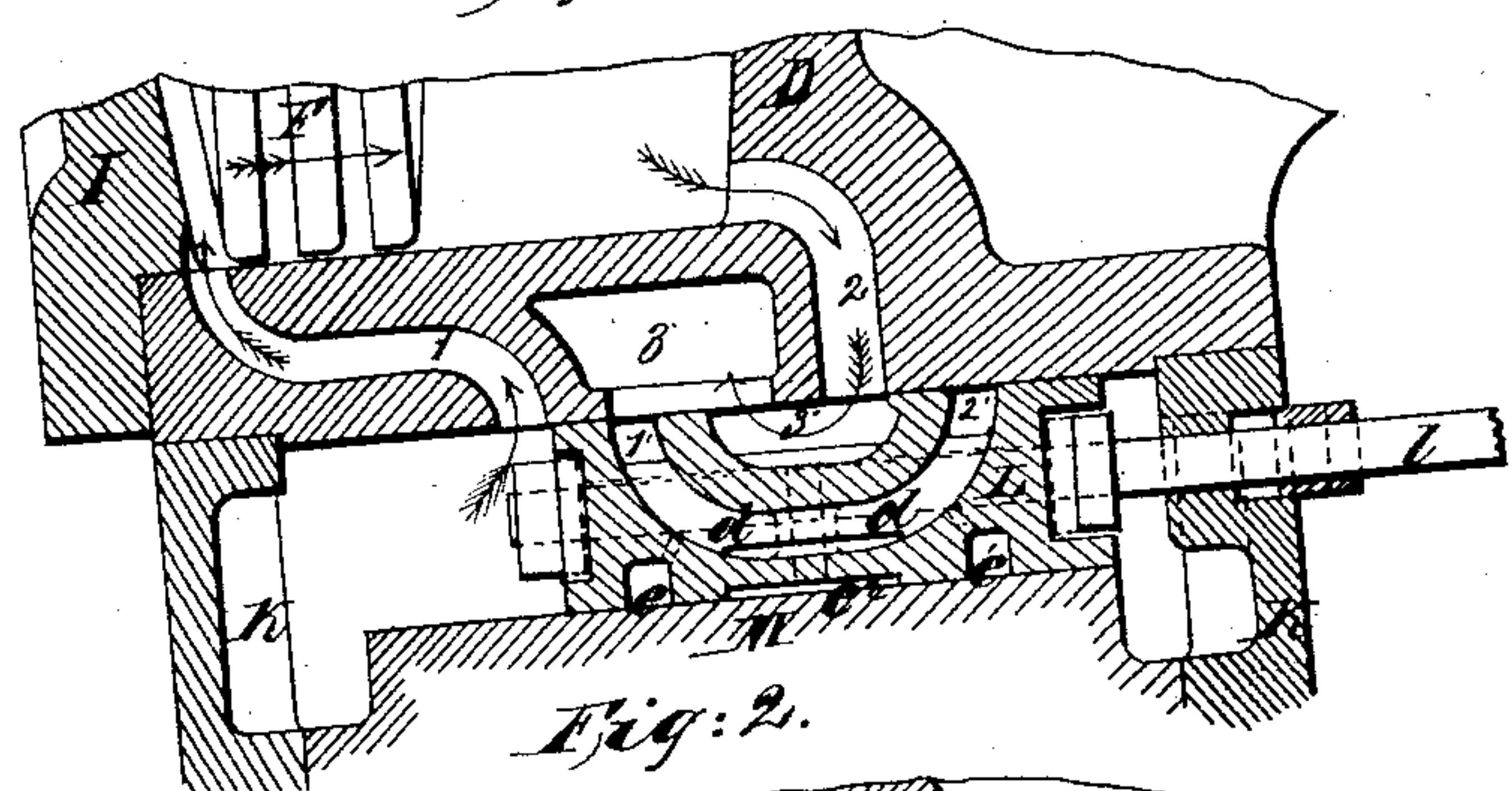


Fig: 2.

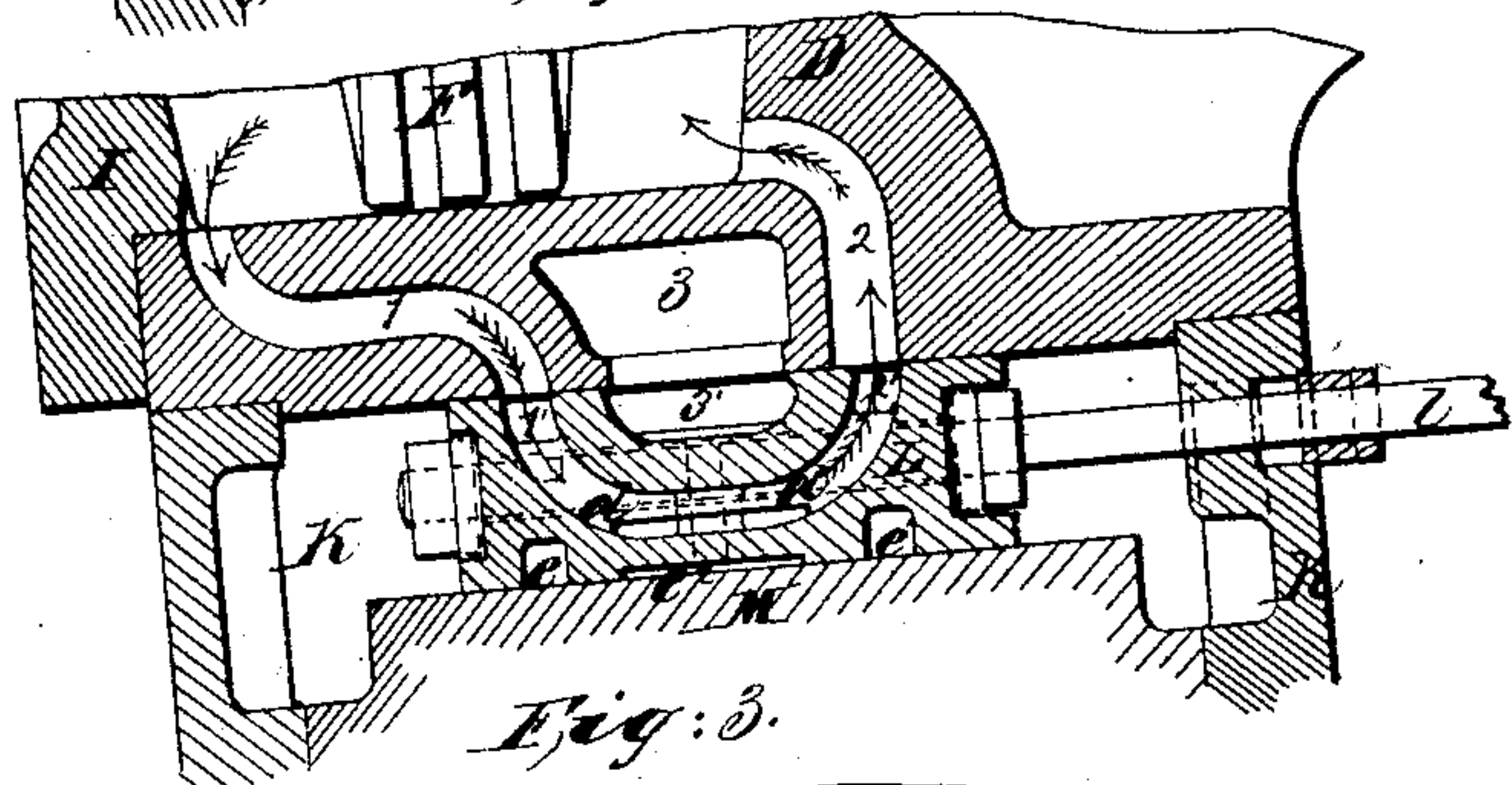


Fig: 3.

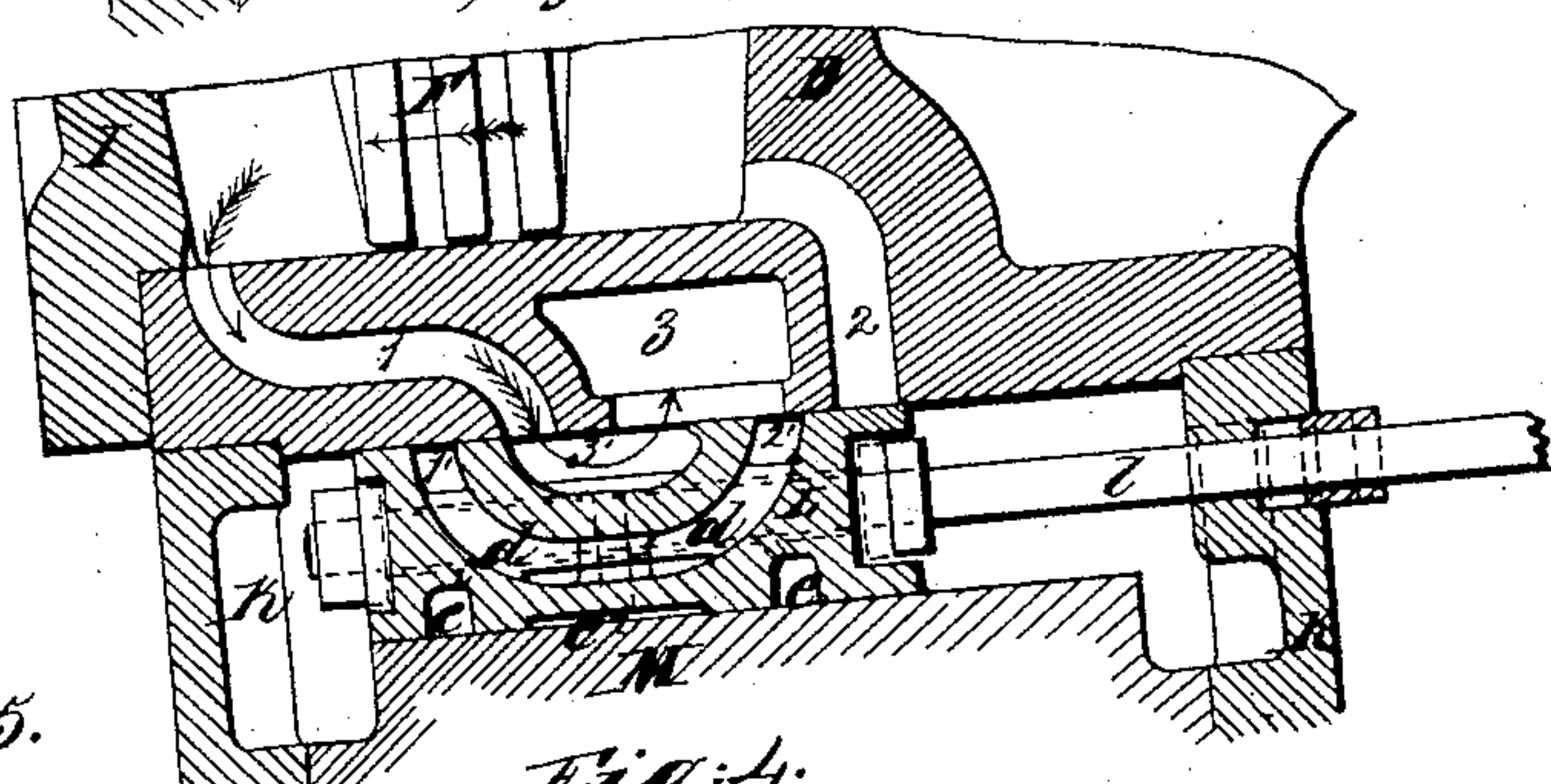


Fig: 5.

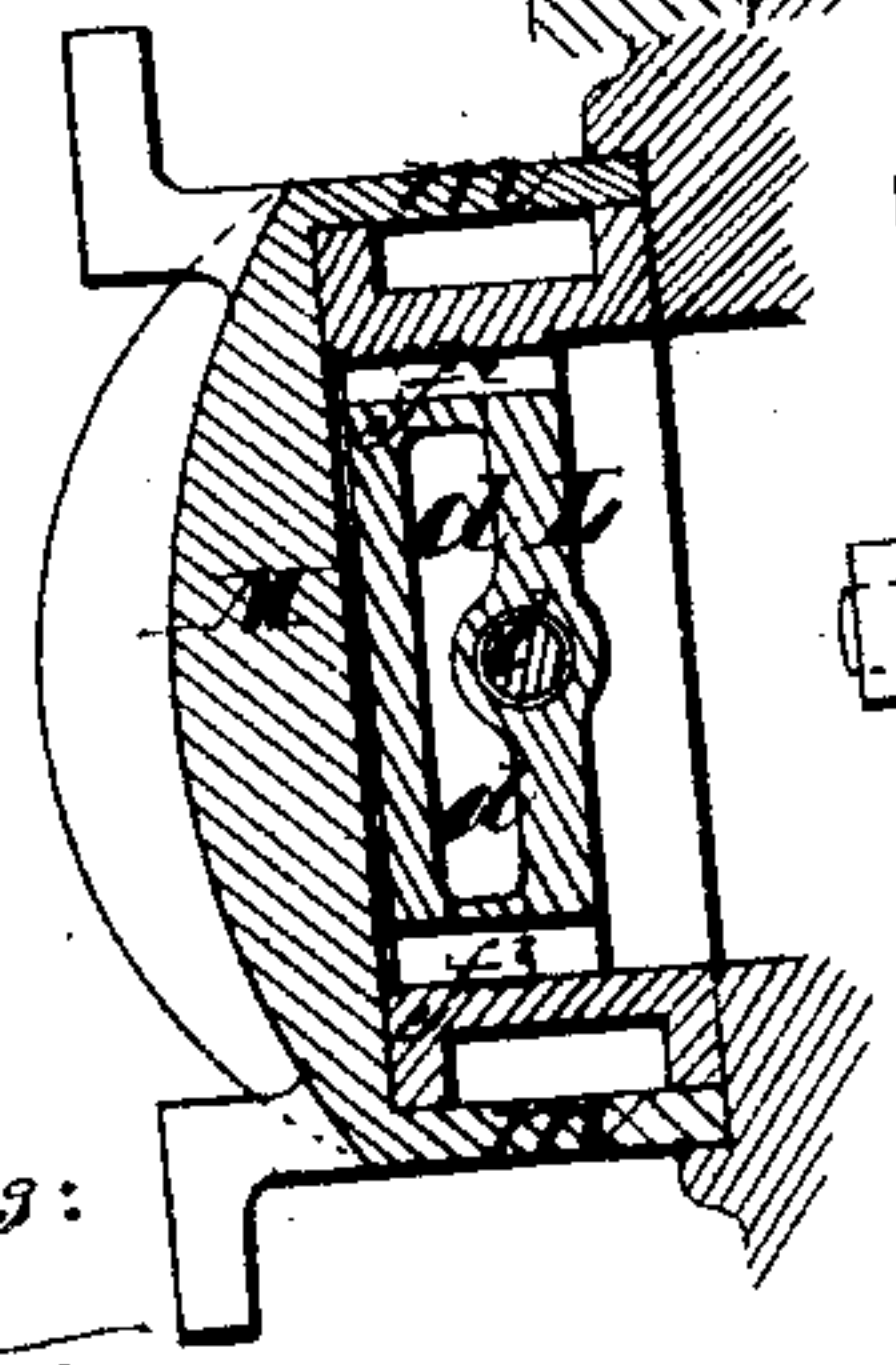
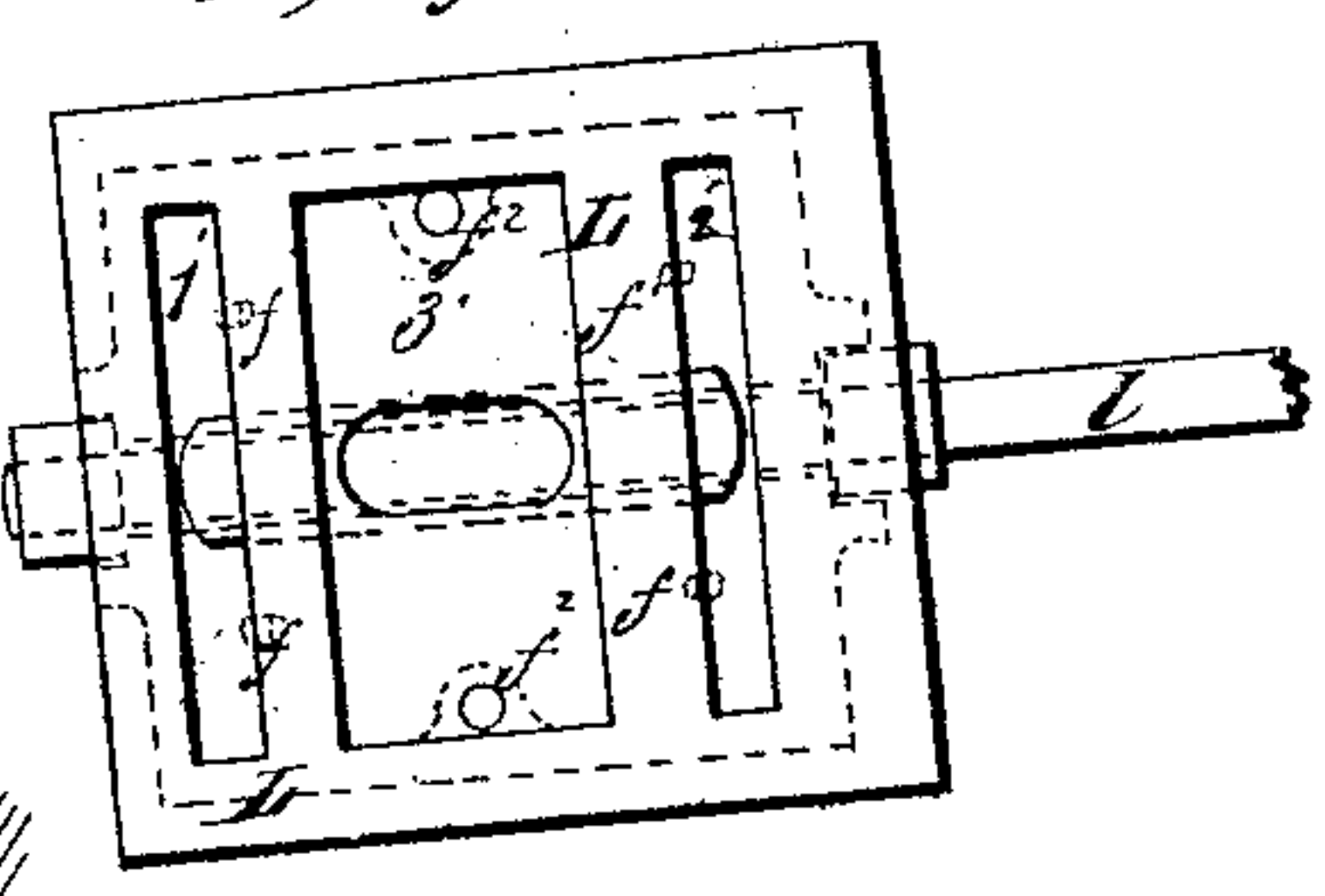


Fig: 4.



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UNITED STATES PATENT OFFICE.

COLEMAN SELLERS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
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IMPROVEMENT IN SLIDE-VALVES FOR STEAM RIVETING-MACHINES.

Specification forming part of Letters Patent No. **112,385**, dated March 7, 1871.

To all whom it may concern:

Be it known that I, COLEMAN SELLERS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Steam Riveting-Machines, of which the following is a specification, the accompanying drawings forming part thereof.

My invention relates to that class of riveting-machines in which the rivet-punch is carried upon one end of a piston-rod and is driven up by the direct action of steam upon the piston; and my invention consists in the combination, with a steam riveting-machine, of an improved balance-valve especially adapted to the required movements of the rivet-punch.

As I do not claim any of the parts of a steam riveting-machine as my invention, and as the medium through which the steam acts upon the piston is well understood by all familiar with ordinary steam-engines, it is unnecessary to describe herein anything more than my improved mode of balancing the valve and the mode of connecting it with the machine. I would say, however, that my invention is especially designed for, and applicable to, the improved riveting-machine invented by William Sellers, who has filed an application for Letters Patent therefor simultaneously with the filing of my application for this patent, though it may be attached to, or combined with, any steam riveting-machine now or heretofore in use of which I have any knowledge.

In the drawings, Figure 1 shows the valve in position for admitting steam behind the piston to drive up the punch. Fig. 2 shows the valve in position for establishing an equilibrium of pressure on each side of the piston. Fig. 3 shows the valve in position for exhausting the steam behind the piston and forcing the piston back to the position shown in Fig. 1. Fig. 4 is a plan, showing the valve and the openings through it, by means of which a uniform pressure is established upon both sides of the valve and the valve perfectly balanced. Fig. 5 is a transverse section, showing the saddle-plate cover of the valve, as hereinafter more fully described.

The piston F is inclosed and packed in a cylinder, D, and supported in any of the ordinary approved ways, and the valve-chest K is

suitably connected with the cylinder, so that steam may be admitted to either side of the piston through the ports 1 2, and exhausted, after having performed its office, through the port 3, which ports lead into the steam-chest K, and are covered by the valve L.

The valve L is provided with a saddle-plate, M, fitting against the back of the valve L, and supported upon legs *m m*, Fig. 5, for the purpose of relieving the back of the valve from the pressure of the steam.

Openings 1' 2' 3' are formed in the valve L, corresponding to ports 1 2 3 in the cylinder, so that when opening 1' in the valve is over port 1 in the cylinder the openings 2' 3' in the valve will be respectively over their corresponding ports 2 3 in the cylinder. (See Fig. 2.)

As the openings 1' and 2' communicate with each other through the curved passage *d*, it will be seen that, whenever the openings in the valve are over their respectively corresponding ports in the cylinder, there is free passage for the steam through the duct *d* along the cylinder, from one side of the piston to the other, but at the same time no communication between the exhaust 3 and the ports 1 and 2, or either of them. This position, in which equilibrium is maintained between the steam-pressures on each side of the piston F, is shown in Fig. 2 of the drawing.

In order to balance the valve perfectly, three recesses, *e e¹ e²*, are provided on the back of it, corresponding, respectively, with the three openings 1' 2' 3' on the face, and separate communications are established between the openings and their corresponding recesses through ducts or perforated bosses *f f¹ f²*, cast in the curved passage *d*. I wish to be explicit on this point, that each of these recesses must communicate with, and only with, its proper opening, and through, and only through, its proper ducts or hollow bosses. Any intercommunication between one recess and another, or between one recess and any of the openings other than the one proper to that recess, or any communication between one of the recesses and its proper opening, otherwise than through its proper perforated bosses or ducts, must be provided against, and this precaution will insure the desired result—that is to say, while the communication

between the openings 1' and 2' through the passage *d*, as exemplified by the position shown in Fig. 2, will insure a uniform pressure of steam in these openings and in their corresponding recesses *e e*¹, the direct communication simultaneously established between the exhaust-opening 3' and its recess *e*² will also insure a uniform pressure of steam in the exhaust and in the recess without reference to the pressure in the openings 1' 2', and thus effect a very perfect balancing of the valve.

The valve is operated, through a valve-rod, by means of a hand-lever, and the steam is admitted to the steam-chest K through a pipe and carried off by another pipe, all in any of the ordinary approved modes.

The operation is as follows: The lever being moved so as to bring the valve into the position shown in Fig. 1, the steam rushes from the steam-chest K, through the port 1, into the cylinder D, behind the piston F, and drives the punch against the rivet. The lever is then moved back to its original position, and in this movement the valve will, in passing over the ports, be at one moment in the position shown in Fig. 2—that is to say, with the communication established along the cylinder, between the openings 1 2, through the duct *d*, as hereinbefore described, so that a portion of the steam that was employed in compressing the rivet passes to the other end of the cylinder, thus establishing an equilibrium of pressure upon each side of the piston and bringing the piston to the position shown in this figure. From this point the valve comes into the position shown in Fig. 3—that is to say, the port 2 is closed and the exhaust-port 3 brought into communication with the port 1 through the opening 3', thus permitting the steam

which remains on that side of the piston to which it was admitted by the first movement of the lever to escape freely. A tendency being thus developed to create a vacuum behind the piston, the steam which passed into the cylinder on the opposite side through the passage *d*, when the valve was in the position shown in Fig. 2, being still confined by reason of the port 2 being closed, will, by its expansion, drive the piston back to the end of the cylinder, where fresh steam is admitted for another blow, thus compressing a rivet with each movement of the lever in one direction, and retiring the punch with each movement of the lever in the opposite direction, using for the latter purpose a portion of the same steam employed in compressing the rivet.

Having thus described my invention, I do not wish to be understood as claiming any valve so constructed as to use a portion of the steam employed to compress the rivet in drawing back the punch, my invention relating only to a valve for such purpose when balanced, as hereinbefore described.

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

1. The combination, with a steam riveting-machine, of the balanced equilibrium-valve L, constructed and operating substantially as and for the purpose described.

2. The combination of the openings 1' 2' 3', the connecting-duct *d*, the recesses *e e*¹ *e*², and the ducts or hollow bosses *f f*¹ *f*¹ *f*² *f*², substantially as and for the purpose described.

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Witnesses:

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