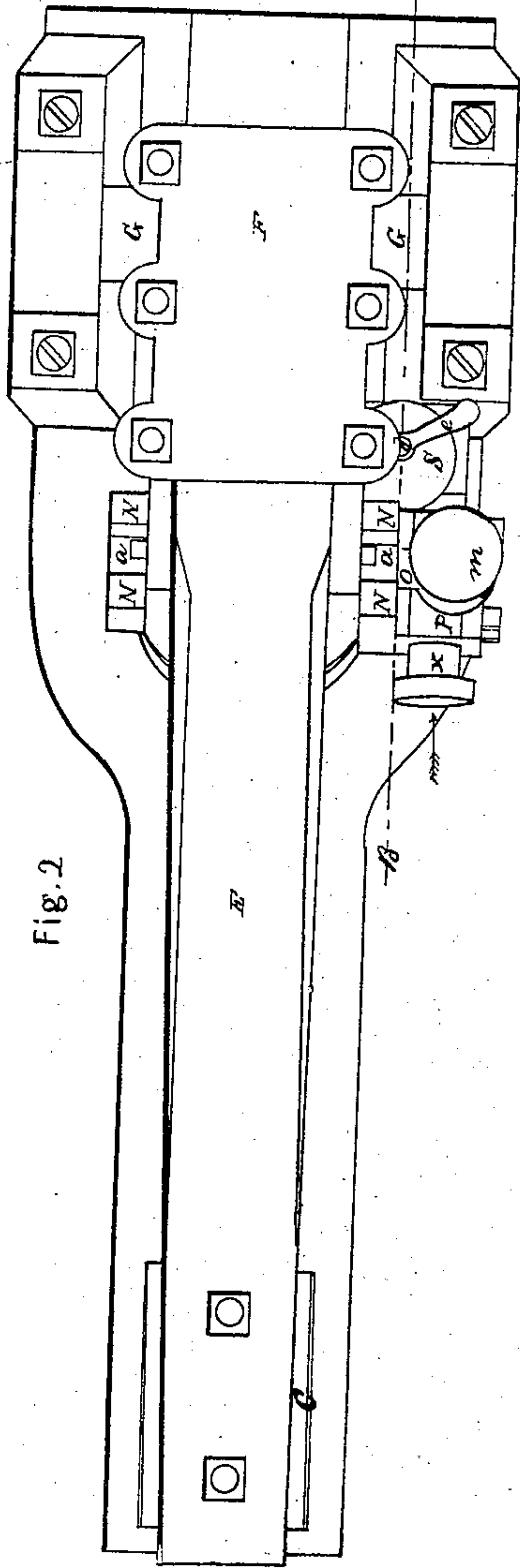
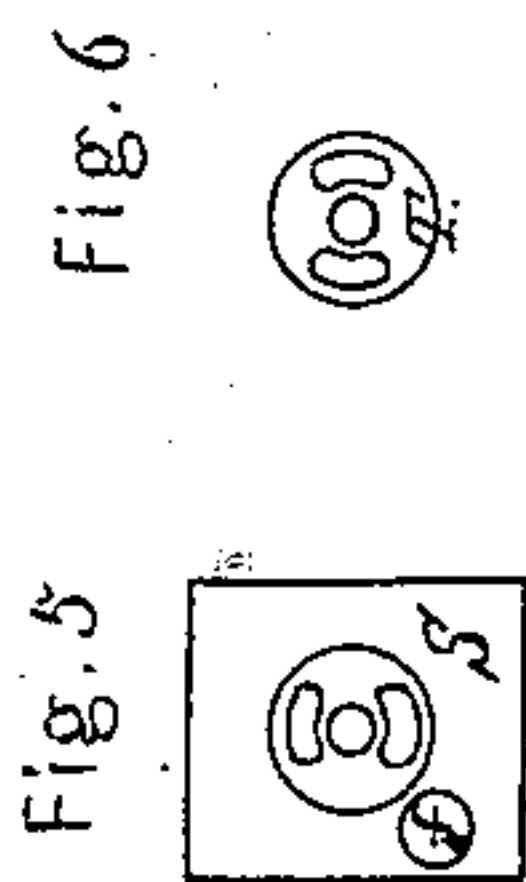
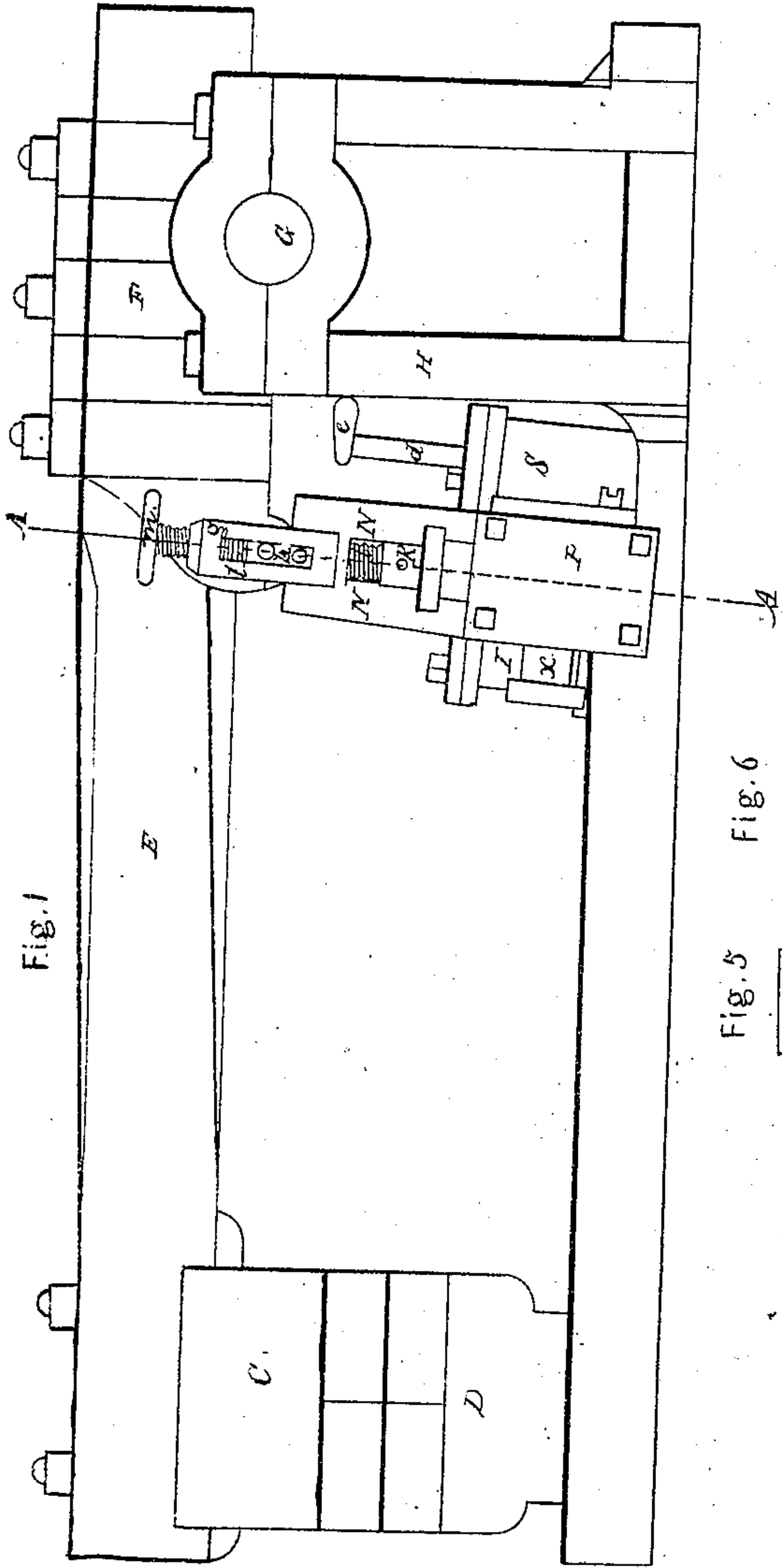
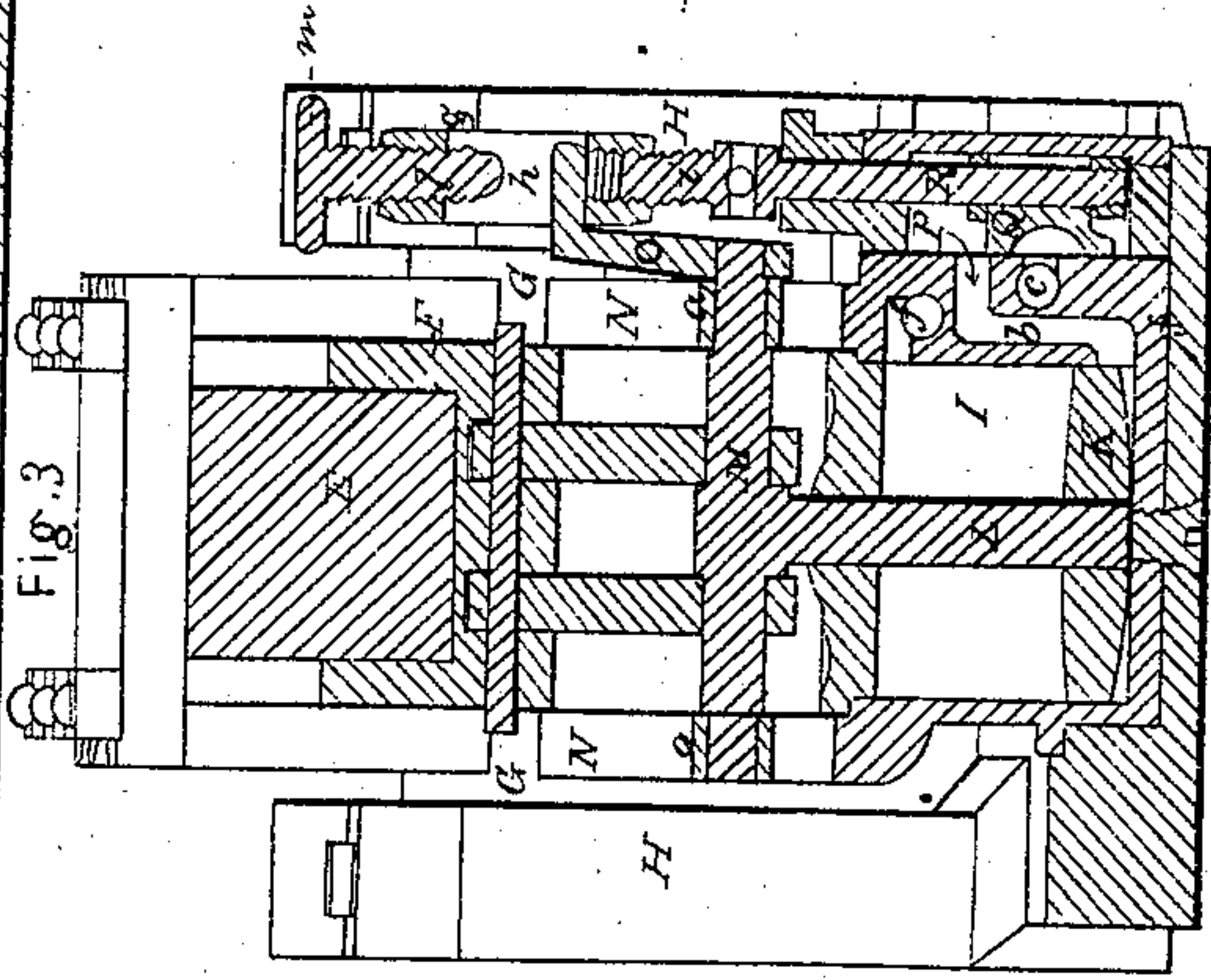
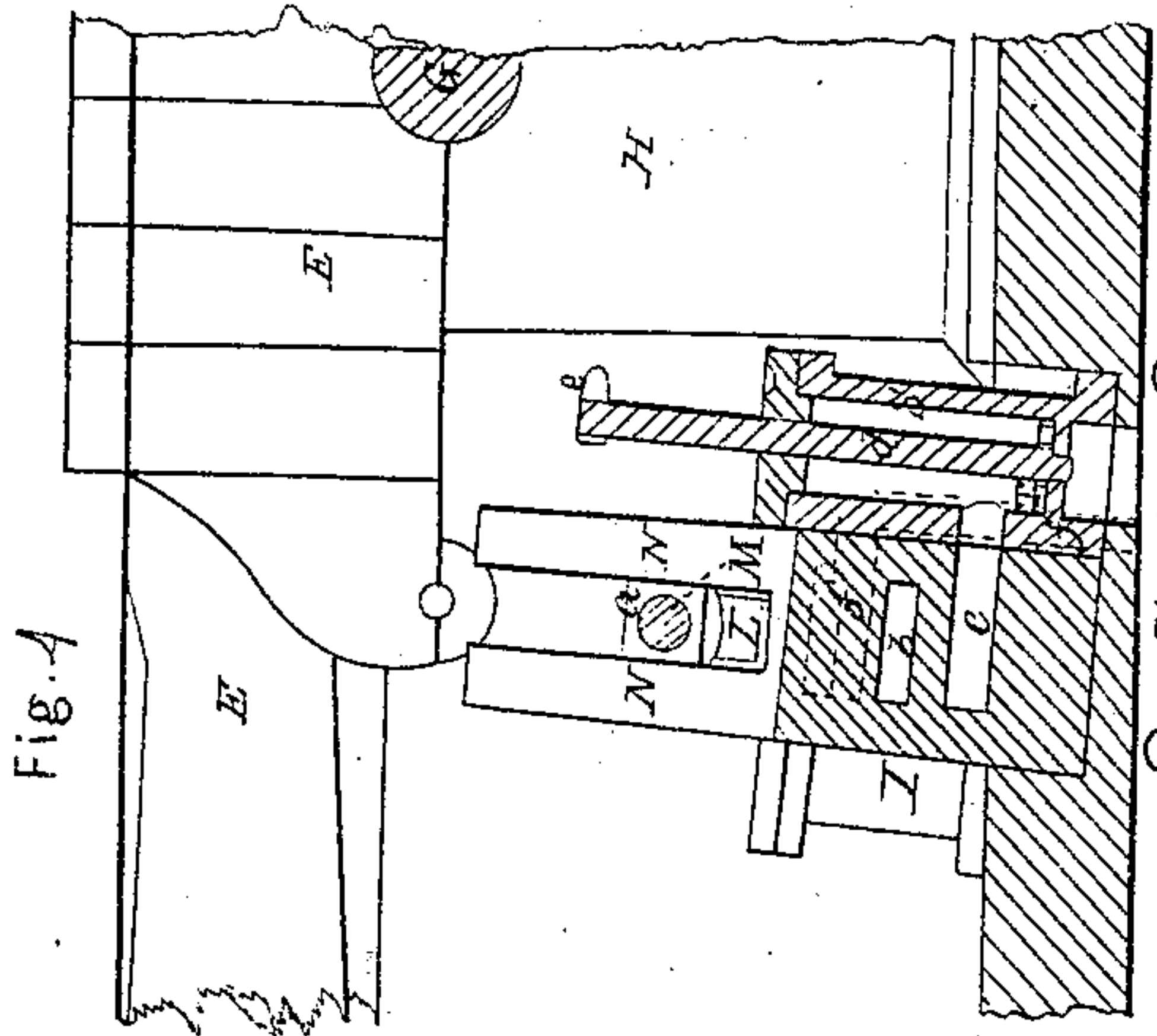


J. Watt.
Steam Hammer.

No 10,297-

Patented Dec. 6. 1853.



UNITED STATES PATENT OFFICE.

JAMES WATT, OF SOUTH BOSTON, MASSACHUSETTS.

VALVE ARRANGEMENT FOR STEAM-HAMMERS.

Specification of Letters Patent No. 10,297, dated December 6, 1853.

To all whom it may concern:

Be it known that I, JAMES WATT, of South Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Steam-Hammers and in the Method of Operating the Same; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of the same, in which—

Figure 1 is a side elevation of the steam hammer with my improvements attached. Fig. 2 is a plan of the same. Fig. 3 is a section upon the line A A of Fig. 1. Fig. 4 is a vertical section upon the line B B of Fig. 2. Fig. 5 is a bottom view of the cylinder through which the exhaustion takes place. Fig. 6 is a bottom view of the throttle valve which governs the exhaustion of the steam from the cylinder.

C, is the hammer; D, the anvil; E, the hammer helve which is secured to the husk F and vibrates upon trunnions G in suitable boxes upon the standards H.

I is the steam cylinder; K, the piston; L, the piston rod attached to the cross head, M, the ends of which pass through the sliding boxes *a* which play vertically between the upright ways or guides N.

O is an arm projecting from the cross-head M by which the valve rod is actuated and which is thus made to move with less friction than has heretofore been the case, when the actuating arm was attached directly to the helve of the hammer.

P is the steam chest; *b*, the steam way to and from the cylinder; Q, the steam valve; R, the valve rod; *c*, the exhaust passage. This passage leads into a cylinder or chamber S (Fig. 4) a bottom view of which is seen in Fig. 5. The exit from this chamber is commanded by a throttle valve T (Figs. 4 and 6) to which is attached the rod *d* and handle *e*. It will be perceived that by closing the throttle T more or less the steam is made to exhaust more or less freely from beneath the piston, and thus the hammer, whether working at full stroke or not, may be caused to strike as lightly as may be required by simply diminishing the passage through which the steam is permitted to exhaust; and should the hammer then be instantly required to strike with its full force, it is only necessary to open the throttle T to its full capacity, and permit the steam

to escape freely from beneath the piston, and if the throttle be closed entirely the hammer is held suspended above the anvil. The steam enters the steam box through the pipe *w*.

f is the passage into the exhaust pipe by which any steam that may leak through into the space above the piston is permitted to pass off.

When the hammer is operating upon a large mass of iron, it becomes necessary that the steam be admitted beneath the piston when the hammer is at a greater distance from the anvil, than when it is operating upon a smaller mass. To effect this change the following device is made use of: *g* is a barrel connecting with the upper end of the valve rod R by the screw *i* and having a slot *h* in which plays the arm O to raise and lower the valve. The valve rod R is so attached to the valve Q as to admit of being turned freely. Upon the upper end of this rod is cut the screw *j* which works in a corresponding female in the lower end of the barrel *g*. If now the valve rod be turned in one direction, the barrel *g* will be raised, and when the valve rod is turned in the opposite direction the barrel will be depressed. When the valve rod is turned so as to raise the barrel *g* the steam is admitted to the cylinder before the hammer reaches the surface of the anvil. When on the contrary the article operated upon is of slight thickness, the barrel *g* is depressed by turning the valve rod, and the steam is not admitted to the cylinder until the hammer arrives nearly to the surface of the anvil.

l is a screw stop which is tapped through the top of the barrel *g* and is raised or lowered by turning the hand wheel *m*. As the screw *l* is raised the length of stroke of the hammer is increased and as the same screw is depressed the length of stroke is diminished.

The operator has it thus within his power to regulate the length of stroke of the hammer as required, and by turning the valve rod *i* and raising or lowering the barrel *g* he is also enabled to admit the steam beneath the piston when the hammer is at any point of its fall to accommodate the stroke as before stated to the thickness of the piece of iron to be operated upon. Where two adjustable stops upon the valve rod are made use, if the lower one were to be raised for the purpose of admitting steam to the

cylinder before the hammer reaches the anvil, as the upper stop remains stationary, the length of stroke of the hammer would be very much diminished. The upper stop
5 must then be adjusted to correspond with the new position of the lower stop; and when the hammer is again required to strike nearer to the surface of the anvil, both of these adjustments would require to be again
10 altered, and thus the effective stroke of the hammer would be constantly varying. For this reason these stop nuts have never been made use of for the purpose of producing the momentary changes required in the force
15 and length of the stroke of the hammer, but they have been confined to the valve rod by jam-nuts, while double valves, sliding plates and other complicated contrivances have been made use of to regulate the temporary
20 changes required in the action and operation of the hammer.

In the arrangement which I have described above, it will be perceived that the distance between the upper and lower stops
25 remains unchanged when the barrel is raised for the purpose of operating upon a thick piece of iron, and upon this capability and

peculiarity I shall base my first claim to novelty.

What I claim as my invention and desire 30 to secure by Letters Patent is—

1. The revolving valve rod, the barrel *g*, and the adjustable screw-stop *l*, constructed arranged and operating in the manner substantially as described, by which I am enabled at any instant to admit the steam beneath the piston during any portion of the fall of the hammer, without altering the effective force and length of the stroke. 35

2. I claim in connection with the above 40 the arrangement for throttling the steam on its way from beneath the piston by which means I am enabled to regulate the intensity of the blow of the hammer to any degree of nicety or to hold the same suspended above 45 the anvil in the manner and for the purpose substantially as set forth.

In testimony whereof I have hereunto set my signature.

JAMES WATT.

In presence of—

CANSTER BROWNE,
SAM COOPER.