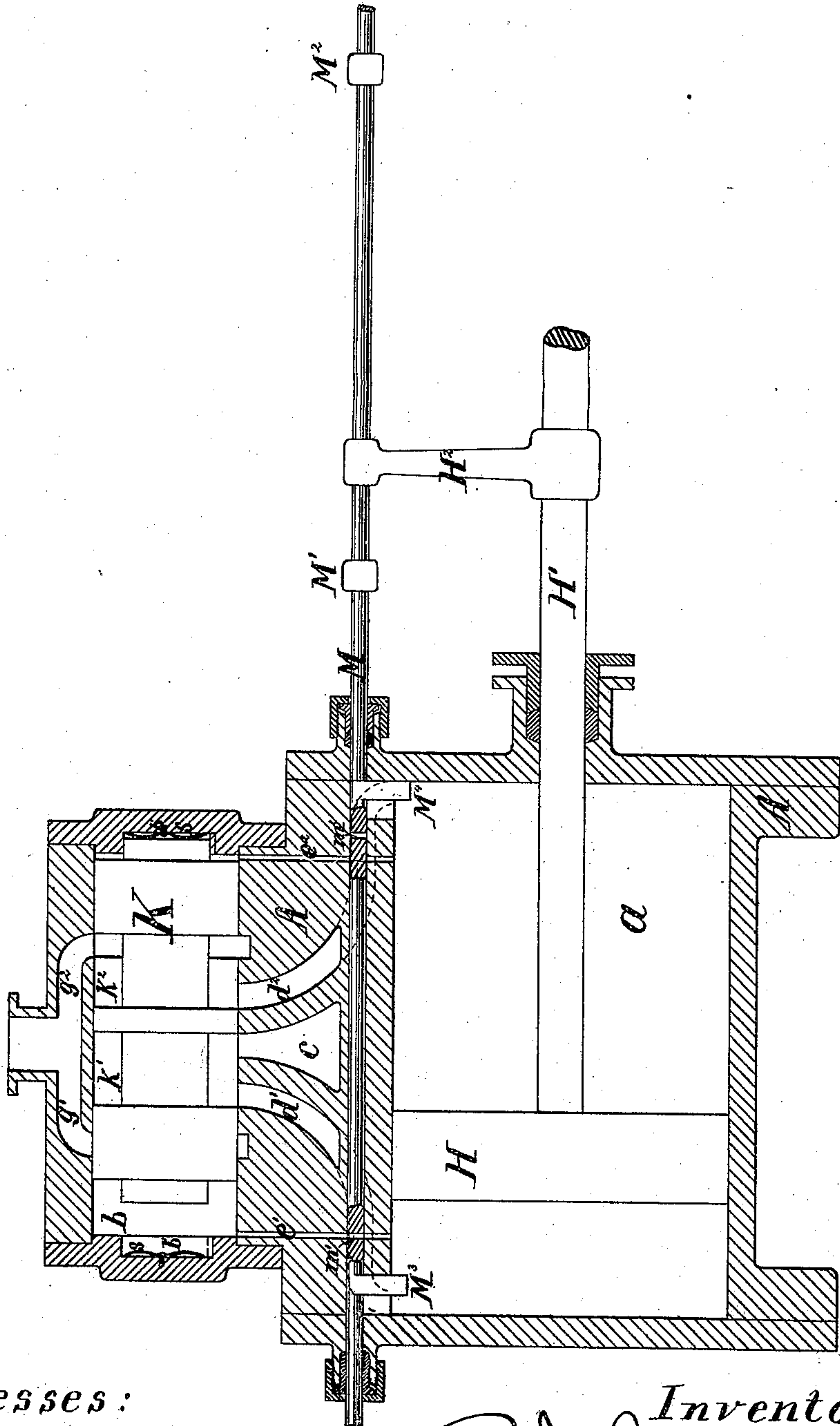


R. J. GOULD.
STEAM-VALVES FOR PUMPING ENGINES.
No. 173,459. Patented Feb. 15, 1876.



Witnesses:

Henry L. Lunt
C. C. Stetson

Inventor.

R. J. Gould
by his attorney *J. D. Stetson*

UNITED STATES PATENT OFFICE.

ROSCOE J. GOULD, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN STEAM-VALVES FOR PUMPING-ENGINES.

Specification forming part of Letters Patent No. **173,459**, dated February 15, 1876; application filed November 10, 1875.

To all whom it may concern:

Be it known that I, ROSCOE J. GOULD, of Newark, Essex county, in the State of New Jersey, have invented certain Improvements relating to Steam-Pumps, of which the following is a specification:

I have devised a construction and arrangement of the parts which control the steam, whereby I obtain an efficient and reliable working-pump, with few parts and with little liability to derangement.

Many attempts have been made to devise a steam-pump in which the main valve shall be thrown by steam controlled by a smaller valve, or equivalent device, worked by the main piston. Mine is of that character, but possessing marked features of superiority.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification, and is a central vertical section through the steam portion of my machine.

It will be understood that the pump may be any ordinary or suitable style of reciprocating double-acting pump.

Referring to the drawing, A represents the stationary parts, which may be of cast-iron, while *a* represents the hollow interior of the main cylinder, and *b* the hollow interior of what I term the valve-cylinder. *c* is an ordinary exhaust-port. *d*¹ *d*² are ordinary ports leading from the valve-cylinder to the ends of the main cylinder. *e*¹ *e*² are small passages, drilled or otherwise produced, leading from the ends of the valve-cylinder; and *g*¹ *g*² are ports which admit steam to the valve-cylinder from a boiler not represented. H is the piston. H¹ is the piston-rod, and H² is an arm rigidly fixed thereon and carried therewith. K is a peculiarly-formed piston-valve, mounted in the valve-cylinder *b*, and filling the entire cross-area thereof at three separate places. Between these the valve is of smaller diameter, forming annular chambers *k*¹ *k*², as will be readily understood. Each end is formed with a smaller projection, which matches with tolerable tightness in a corresponding cavity in the end of the main cylinder. M is a nicely-finished sliding bar, adapted to slide smoothly and tightly in a corresponding hole,

and formed with small orifices *m*¹ *m*² at a greater distance apart than the holes *e*¹ *e*². The ends of the rod M move in stuffing-boxes formed in the ends of the pump. One end is prolonged, and extends loosely through the arm H², carried on the piston-rod, and it is equipped with adjustable tappets M¹ M², which, on being struck by the arm H², move the rod M.

The steam entering through the passage *g*² moves freely down through the space *k*² of the valve, and enters the main cylinder through the port *d*², moving the piston H and its connections to the left. As the piston approaches the end of its movement to the left the arm H² strikes the tappet M¹, and moves the rod M to the left. This brings the hole *m*² in line with the passage *e*², and the steam moves actively through the passage thus formed, and, acting on the end of the valve K, throws it sharply to the left. Now, in consequence of the changed position of the annular cavities *k*¹ *k*² of the valve K, the steam is exhausted from the right hand end of the cylinder—consequently flowing back from the right-hand end of the valve-cylinder *b*, through the same passage *e*², and escapes with the exhaust, while live steam is admitted through the passage *g*¹, the annular space *k*¹, and the port *d*¹, to the left-hand side of the piston H, moving it to the right. Near the termination of its movement to the right it acts on the tappet M², and moves the rod M to the right, thus bringing the passage *m*¹ into line with the passage *e*¹, and throwing the valve K to the right, and thus the round of operations is repeated continuously, gently, and certainly.

My pump will work at a great variety of velocities, and with a low pressure of steam. Many modifications may be made in many of the details. Instead of projecting the ends of the rod M through the cylinder ends, I can, if desired, make a short arm extend down from it into the main cylinder, and be struck directly by a corner of the piston. I have shown such arms, marked M³ M⁴, and have represented little spaces in which they may work. As shown, they are in position to be struck by the piston, and to serve as means auxiliary to the arm H² and tappets M¹ M² for moving the rod M. I extend a shallow chan-

nel quite around the valve-cylinder, communicating with each of the passages $g^1 g^2$, to insure that the pressure of the steam is balanced on this valve, so that there be as little resistance as possible from friction. The parts should be so proportioned and operated that the valve will move with a sudden bound from one extreme to the other of its movement. The ends of the valve-cylinder b are formed with recesses b^1 , which receive corresponding projections on the ends of the valve, and are intended to cushion at the termination of each movement, and arrest the motion gently. I provide a channel at one side of each recess b^1 to allow the steam to enter and escape, and to prevent delay by its suction or partial vacuum, and also to allow the steam to be admitted to a larger area to throw the valve. To further insure against concussion I put a spring of steel at the bottom of each cavity b^1 , as indicated by s .

I claim as my invention—

The passages $e^1 e^2$, leading from the main cylinder a to the respective ends of the cylindrical valve-chest, the rod M moved by the piston near the end of each stroke of the latter, having the holes or recesses $m^1 m^2$, adapted to match alternately with the passages $e^1 e^2$, and the cylindrical valve $K k^1 k^2$, and the several passages controlled thereby, combined and adapted for joint operation, as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 8th day of November, 1875, in the presence of two subscribing witnesses.

ROSCOE J. GOULD.

Witnesses:

C. C. STETSON,
PHILLIPS ABBOTT.