

(No Model.)

J. McALLISTER.
STEAM ENGINE.

2 Sheets—Sheet 1.

No. 403,601.

Patented May 21, 1889.

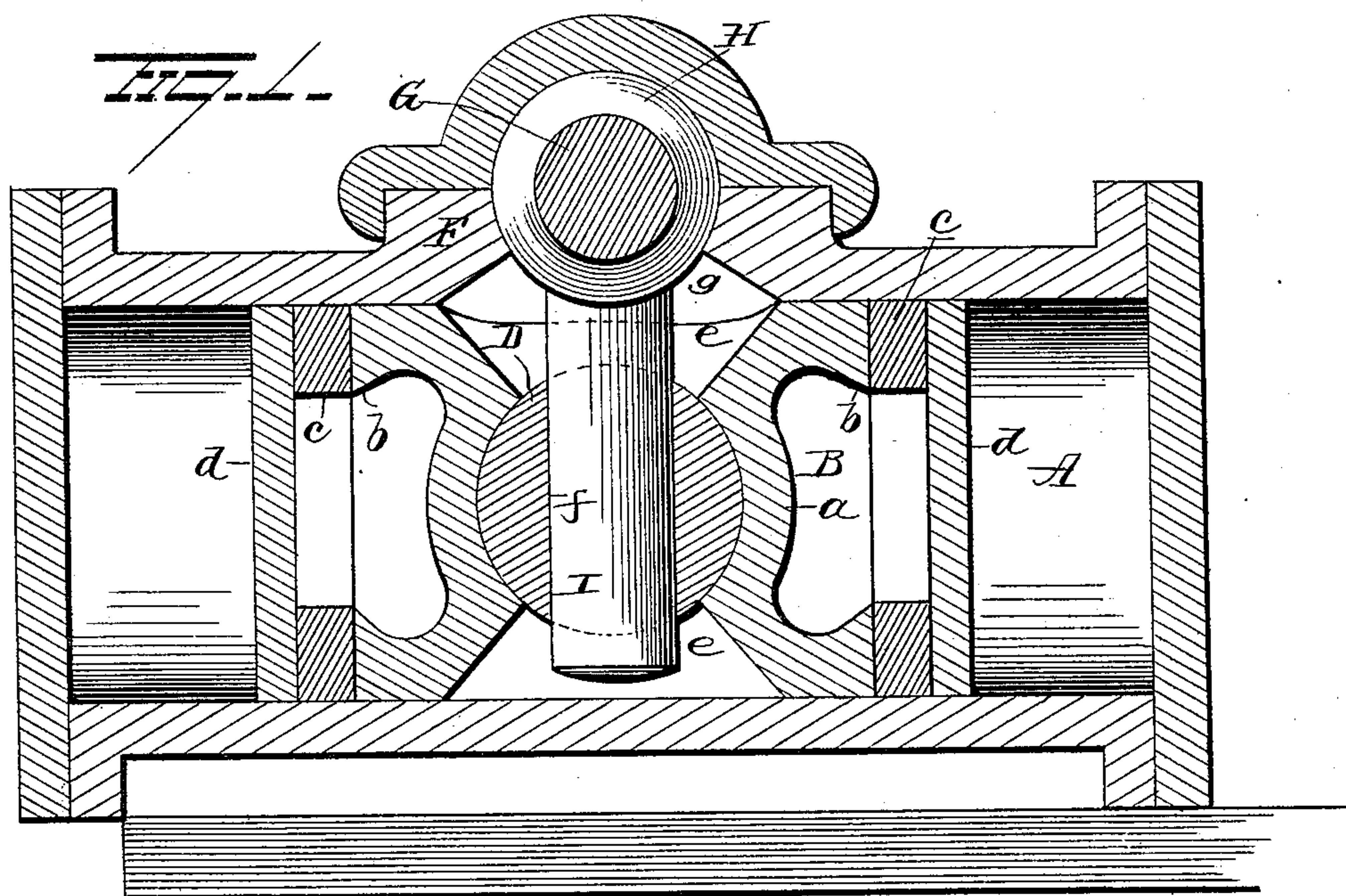
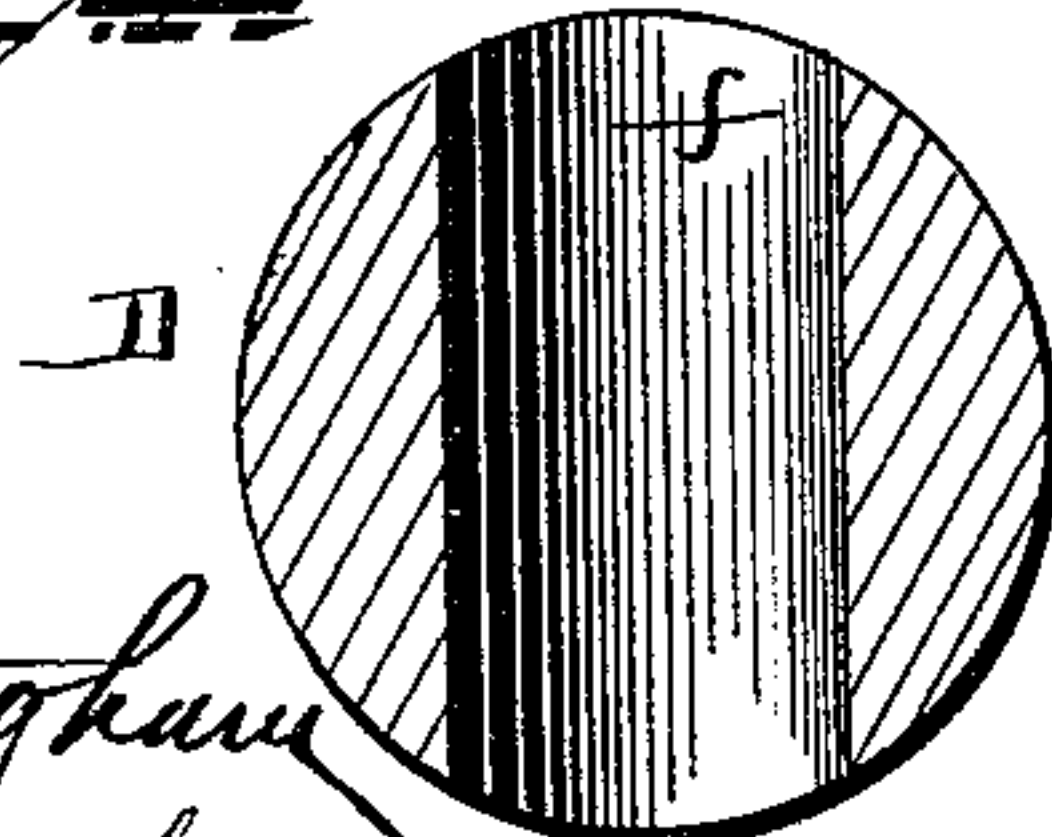
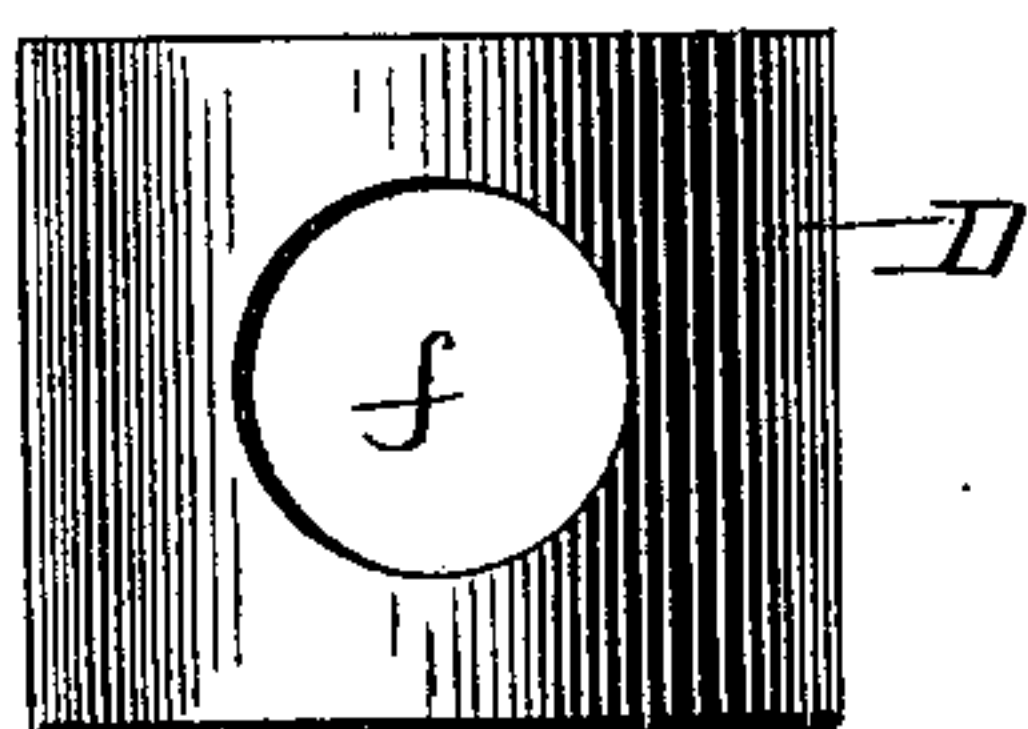
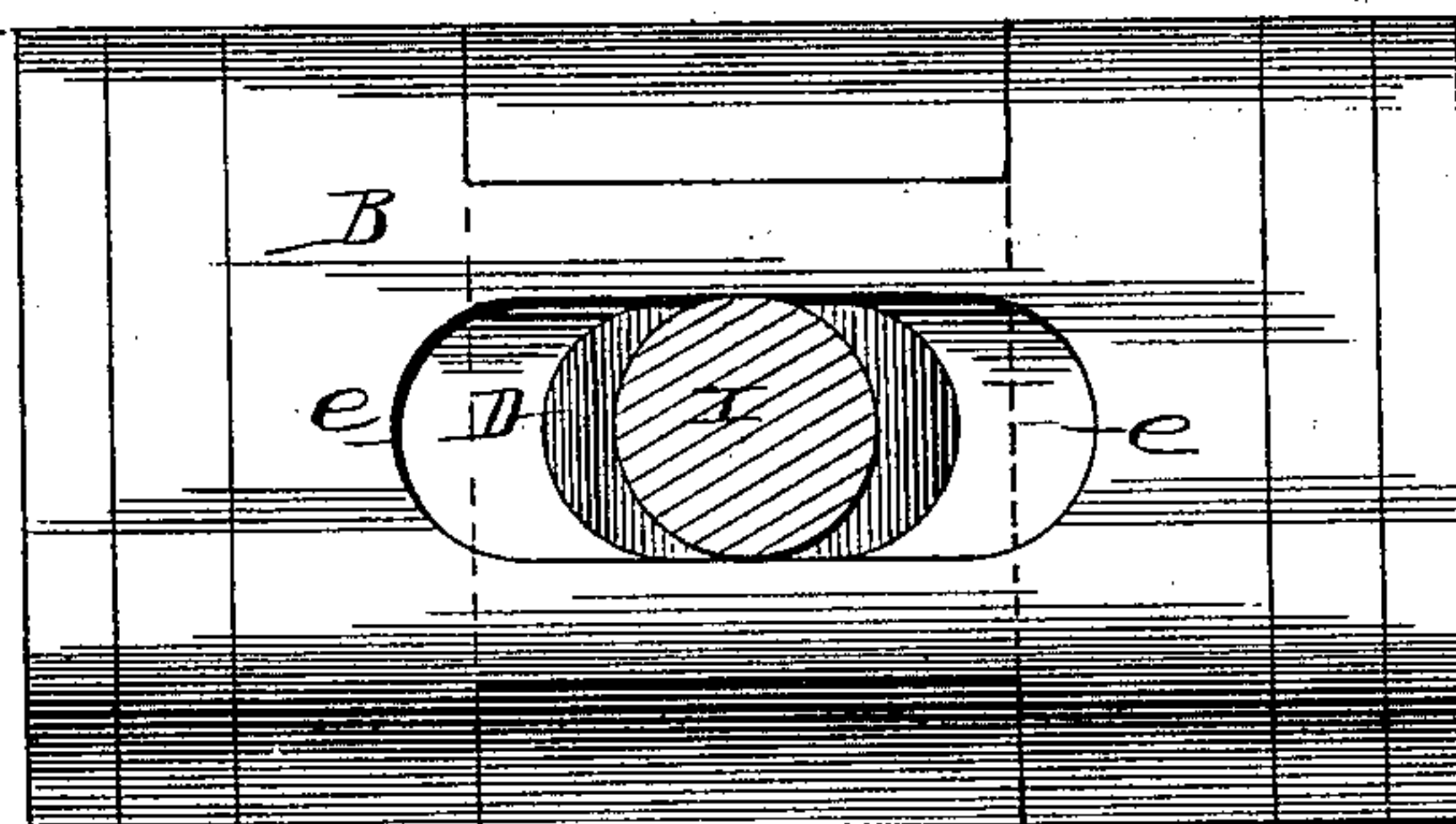
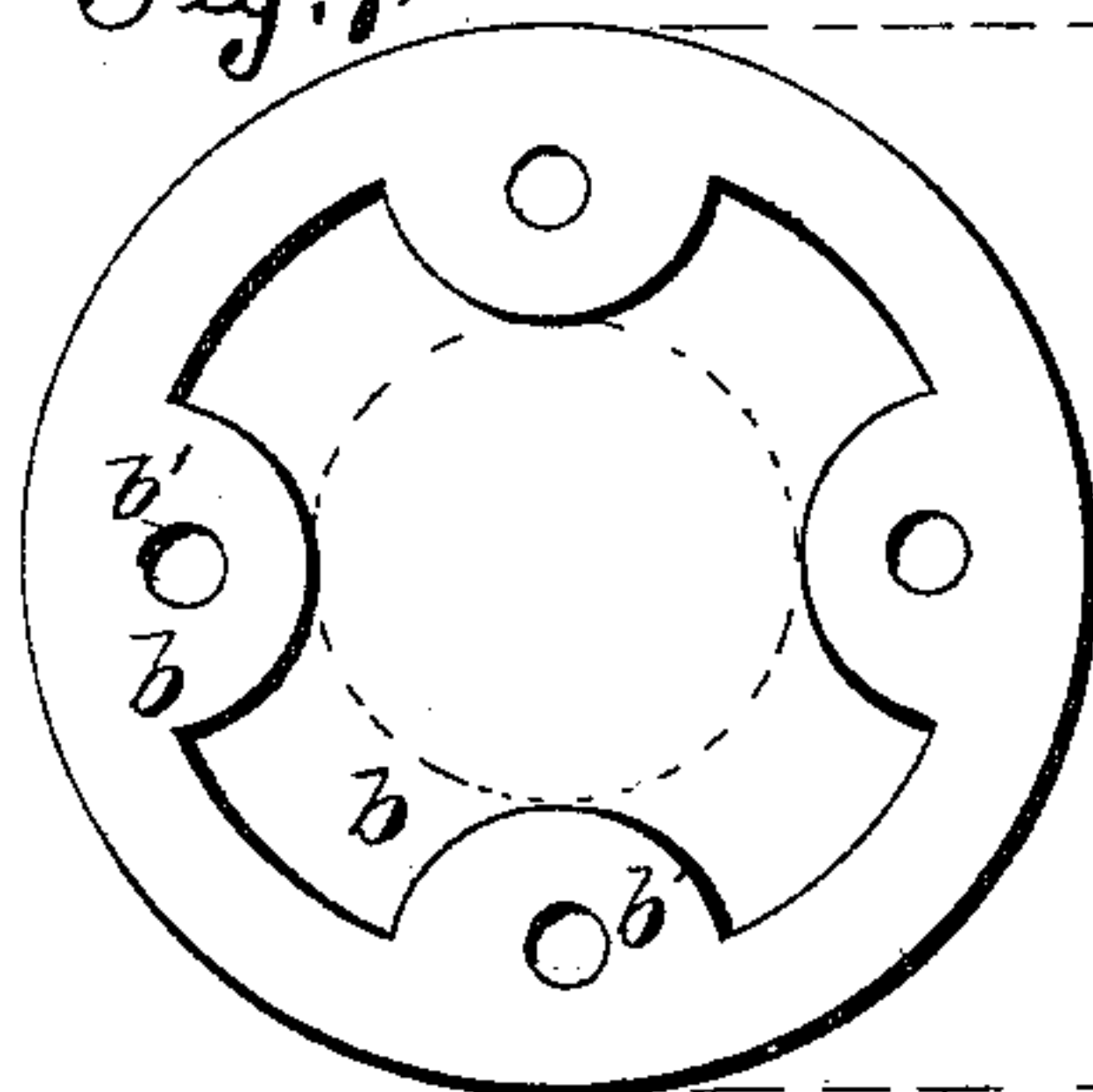
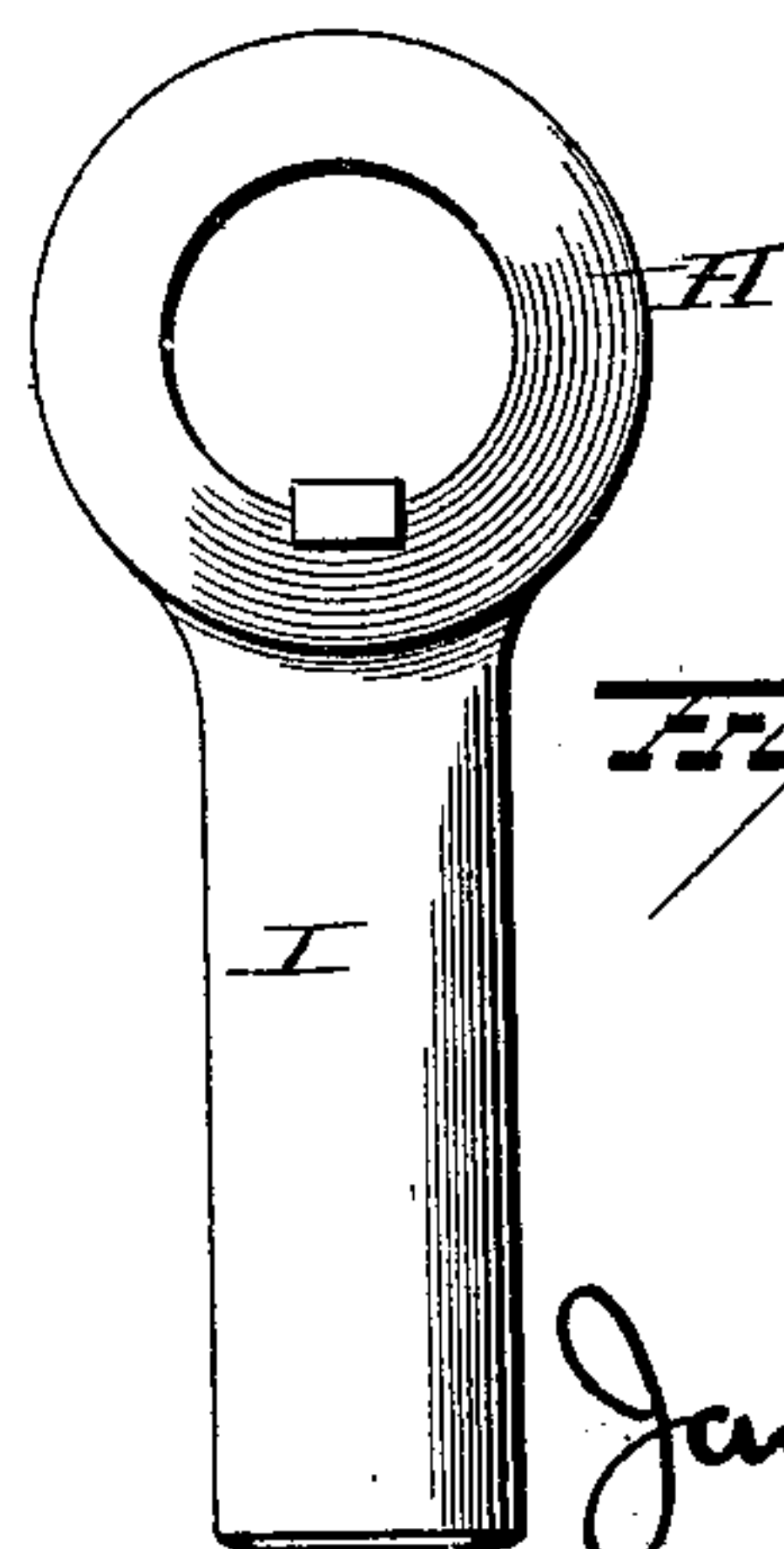


Fig. 7.



FF. 5.



Witnesses.

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By his

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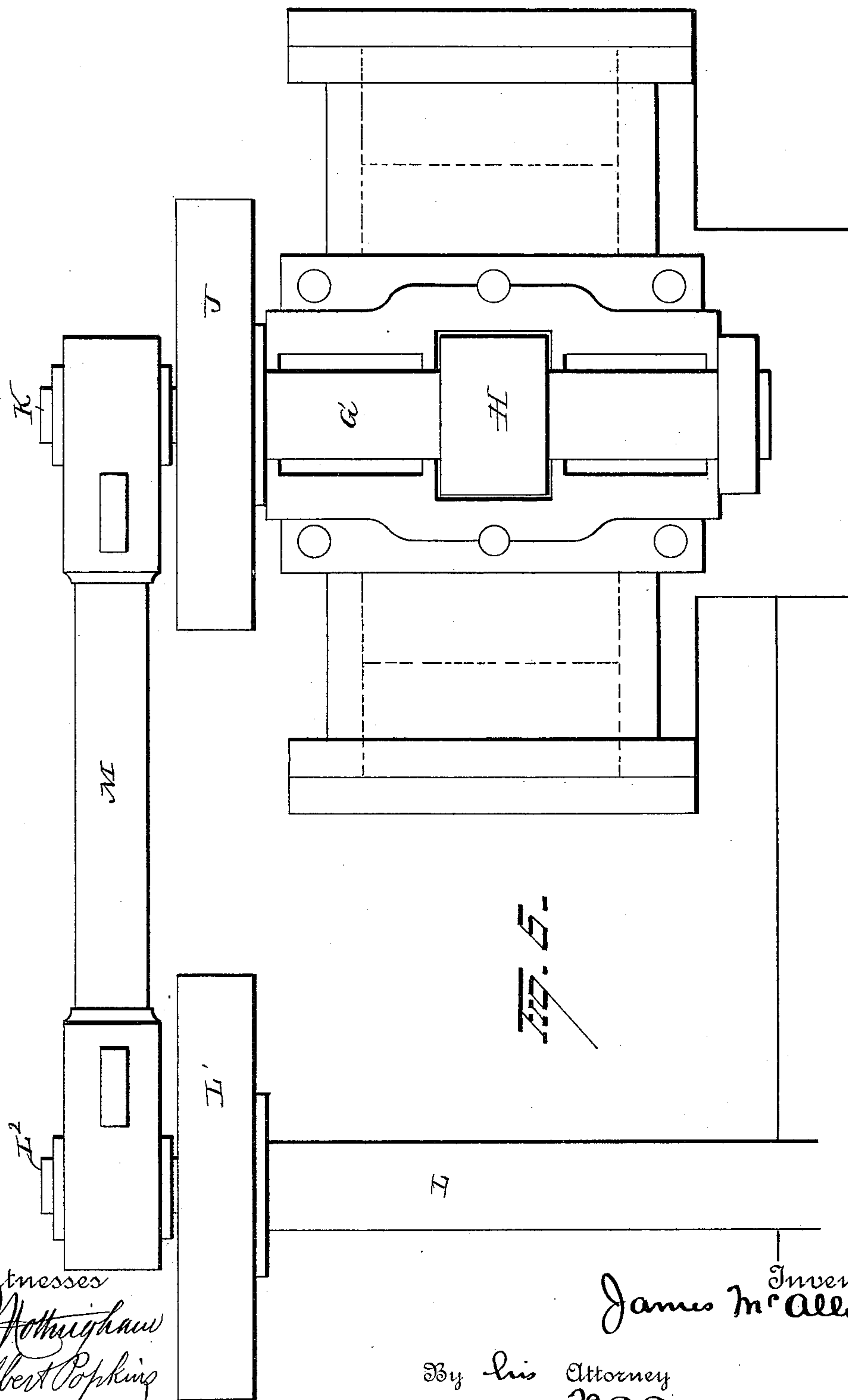
(No Model.)

2 Sheets—Sheet 2.

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STEAM ENGINE.

No. 403,601.

Patented May 21, 1889.



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UNITED STATES PATENT OFFICE.

JAMES McALLISTER, OF CHIPPEWA LAKE, MICHIGAN.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 403,601, dated May 21, 1889.

Application filed January 25, 1889. Serial No. 297,508. (No model.)

To all whom it may concern:

Be it known that I, JAMES McALLISTER, a citizen of Chippewa Lake, in the county of Mecosta and State of Michigan, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in steam-engines, and more particularly to such as are known in the art as "direct-acting" engines, the object being to so construct the piston and working parts connected therewith that a reciprocating movement of said piston will transmit an oscillatory motion to a shaft connected with the piston, which shaft will in turn, through suitable gearing, transmit rotary motion to another shaft.

A further object is to provide a simple and efficient means for connecting the piston of a steam-engine with a shaft, whereby the reciprocation of the piston will transmit an oscillating motion to a shaft.

A further object is to produce a direct-acting steam-engine which shall be simple in construction, effective in operation, and comparatively cheap to manufacture.

With these objects in view my invention consists in certain novel features of construction and peculiar combinations and arrangements of parts, as hereinafter described, and set forth in the claims.

In the accompanying drawings, which form a part of this application, Figure 1 is a side elevation in section of a steam-engine cylinder and piston embodying my invention. Fig. 2 is a plan view of the piston; Figs. 3, 4, and 5, detail views. Fig. 6 is a plan view illustrating the manner of connecting gearing with my improved engine; and Fig. 7 is an end view of the piston, the packing-rings and cap-plates being removed.

A represents the cylinder of a steam-engine, within which the piston B is arranged to reciprocate. Projecting internally from the protruding ends of the piston is a series of lugs, *b*, having perforations *b'*. Placed against the protruding ends of the piston are packing-rings *c*, of any suitable material, se-

cured by suitable fastening devices. Cap-plates *d*, completing the piston-heads, are next secured to the packing-rings *c* by means of any suitable fastening devices.

It is not essential to a proper understanding of my present invention that a valve-chest and steam inlet and outlet ports be shown and described in this case, as any preferred construction of parts for the admission and exhaust of steam to the cylinder for moving the piston may be employed.

The center of the piston is cut away on opposite sides to produce recesses *e e*, the front and rear walls of which are inclined and diverge from a common center. That portion of the piston between the recesses *e e* is next removed, and thus an opening or passage through the piston C is completed, the walls of which are curved to produce bearing-faces for a drum, D. This drum D, which is preferably made of steel and has a central perforation, *f*, passing through it at right angles to its longitudinal axis, is so mounted in the curved bearings in the center of the piston C that it will have a free rocking or oscillatory movement, as hereinafter set forth.

The top wall of the cylinder A is provided with an A-shaped perforation, *g*, the walls of which are inclined in a reverse direction to the corresponding walls of the upper recess, *e*, of the piston C.

Mounted in suitable bearings, F, cast integral with the cylinder A and projecting over the opening *g* in the cylinder, is a shaft, G, upon which is keyed, directly over the opening *g*, a ring, H, made, preferably, of steel. Projecting downwardly from, and preferably integral with, the ring H is a steel pin, I, which enters the opening *g* in the cylinder and passes loosely through the opening *f* in the drum D. Secured to one end of the shaft G is a disk, J, having a crank-pin, K, fixed to one face thereof at a point some distance removed from the center of the disk. A crank-shaft, L, is journaled in suitable bearings a proper distance from the shaft G and furnished at one end with a crank-disk, L', which disk is also provided on one face with a crank-pin, L², located at a point on said disk nearer the center than the location of the pin K on disk J. In other words, pin K should be

about twice as far from the center of its disk as the pin L^2 is from the center of its disk L' , so that a quarter-revolution of disk J will cause a half-revolution of disk L' , and the return revolution of the disk K will complete the revolution of disk L' , the two crank-pins being connected by a pitman, M. Thus it will be seen that a rotary motion is imparted to the shaft L by the oscillating motion of the shaft G.

From the above-described construction and arrangement of parts it will be seen that as soon as steam is admitted to the cylinder at one end of the piston the latter will move to the opposite end of the cylinder and carry with it the free end of the pin I, thus causing the drum D to rock in its bearings and the shaft to make about a quarter of a revolution, these movements being permitted by the free movement of the pin I through the drum D.

Many slight changes might be made in the constructive details of my invention without departing from the spirit thereof or limiting its scope; hence I do not wish to limit myself to the precise details of construction herein set forth; but,

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

1. The combination, with a piston and a shaft mounted in proximity to the same, of a drum mounted in said piston, and a pin secured to said shaft and passing loosely through the drum, substantially as set forth.

2. The combination, with a piston having a recess with diverging walls and a shaft mounted in proximity to said piston, of a drum mounted in said piston, and a pin secured to the shaft and passing loosely through said drum, substantially as set forth.

3. The combination, with a piston and a shaft mounted in proximity thereto, of a drum mounted in said piston, a ring keyed to the shaft, and a pin projecting from said ring and passing loosely through the drum, substantially as set forth.

4. In a steam-engine, the combination, with a cylinder having an opening with diverging walls and a piston having a recess with diverging and curved walls, of a drum mounted in said piston, a shaft in proximity to the opening in the cylinder, and a pin secured to

the shaft and passing through said opening and through an opening in the drum, substantially as set forth.

5. In a steam-engine, the combination, with a cylinder having an opening, and a piston in said cylinder having a recess with curved walls to produce bearing-faces, of a drum having a central perforation mounted in the piston and adapted to oscillate on said bearing-faces, a shaft mounted in proximity to the opening in the cylinder, and a pin secured to said shaft and passing through the openings in the cylinder and drum, substantially as set forth.

6. The combination, with a cylinder having an opening therein and a shaft mounted in proximity to said opening, of a piston in said cylinder, packing-rings secured to said piston and heads secured to said rings, and a drum mounted in said piston and having a perforation, and a pin secured to the shaft and passing through the drum, substantially as set forth.

7. In a steam-engine, the combination, with a cylinder and piston therein, of a drum mounted in said piston, a shaft carrying a crank-arm mounted in proximity to an opening in said cylinder, and a pin secured to said shaft and passing through an opening in the drum, substantially as set forth.

8. In a steam-engine, the combination, with a cylinder and a piston therein, of a drum mounted in said piston, a shaft mounted in proximity to an opening in said cylinder, a pin secured to said shaft and passing through an opening in the drum, a crank-arm at one end of said shaft, a second shaft carrying a crank-arm, and a pitman connecting said crank-arms, substantially as set forth.

9. In a steam-engine, the combination, with a cylinder, a shaft mounted in bearings cast integral with said cylinder, and a piston, of a drum mounted in said piston, and a pin secured to the shaft and passing through an opening in the cylinder and through said drum, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAMES McALLISTER.

Witnesses:

JOHN F. HUGHES,
GEO. L. MEDES.