

(No Model.)

2 Sheets—Sheet 1.

R. M. McMANN & H. A. BARNARD.
Steam Traps.

No. 230,030.

Patented July 13, 1880.

Fig. 1.

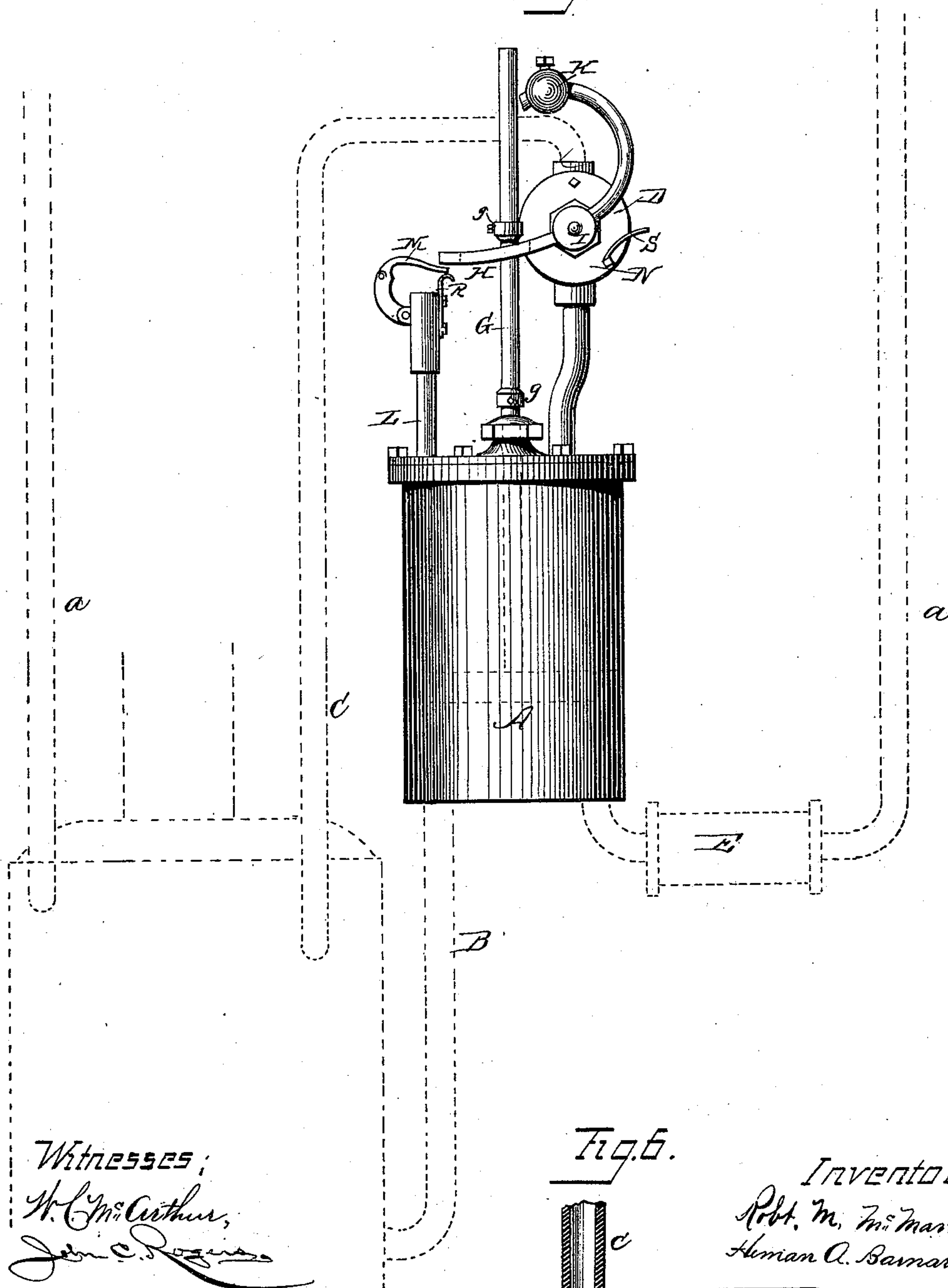
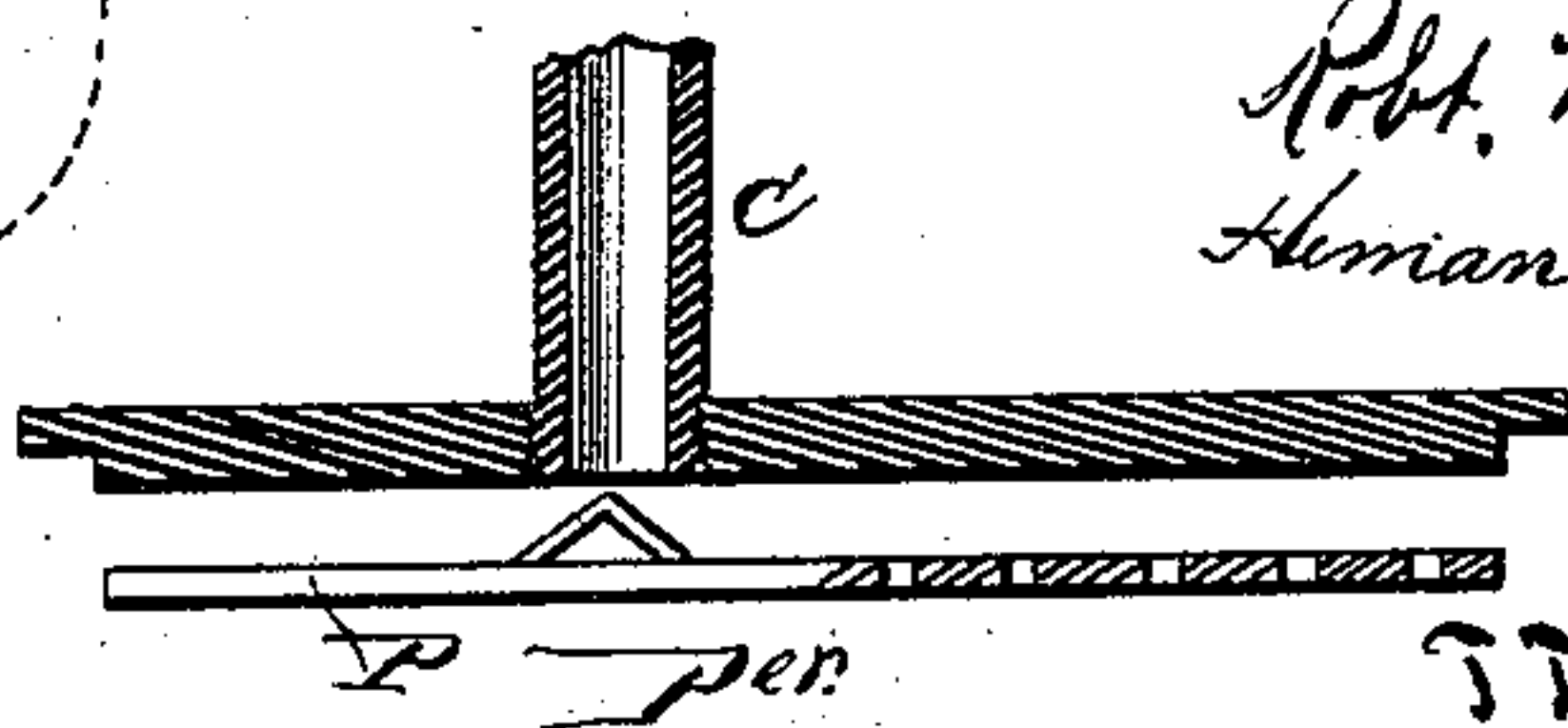


Fig. 6.



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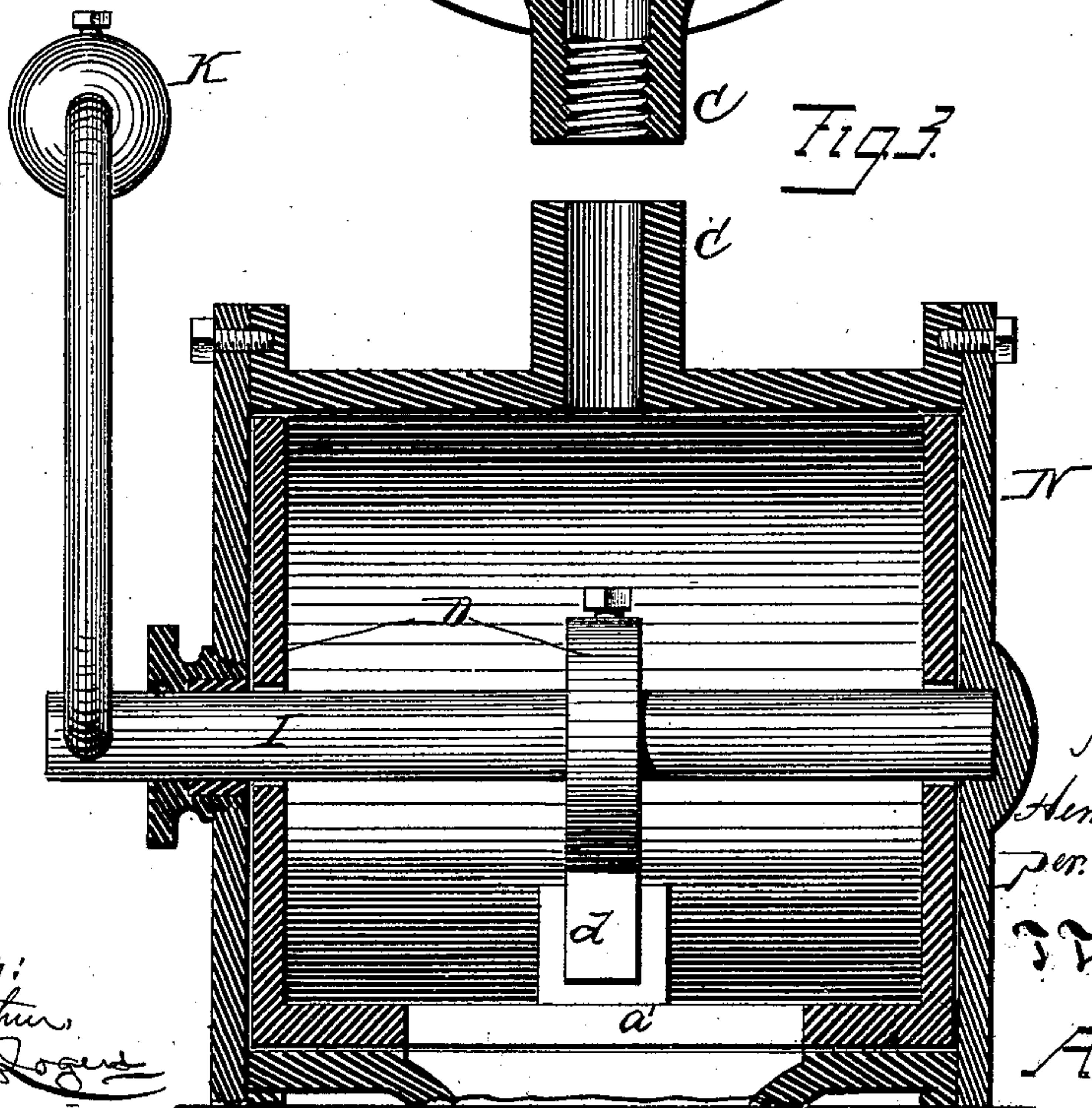
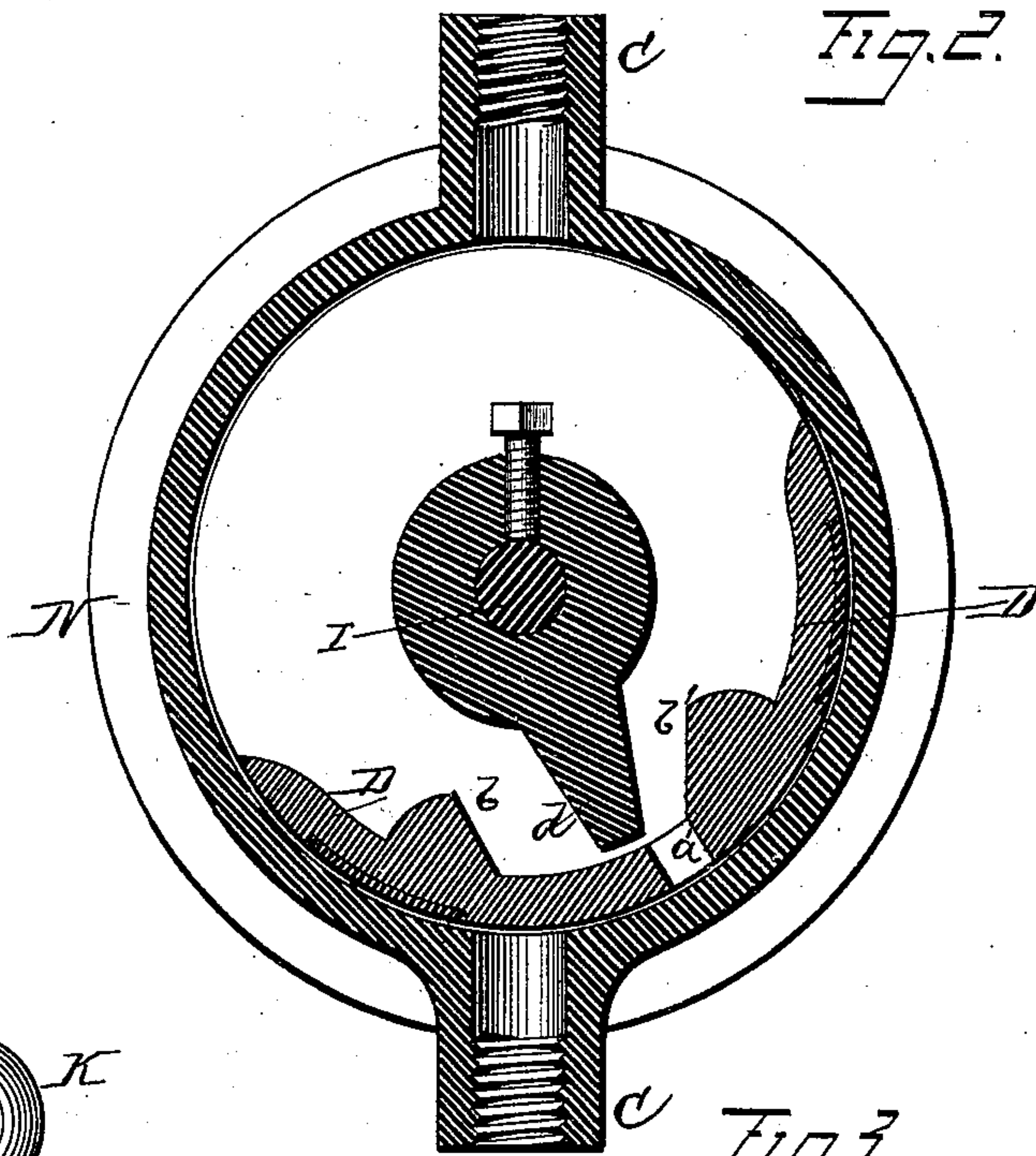
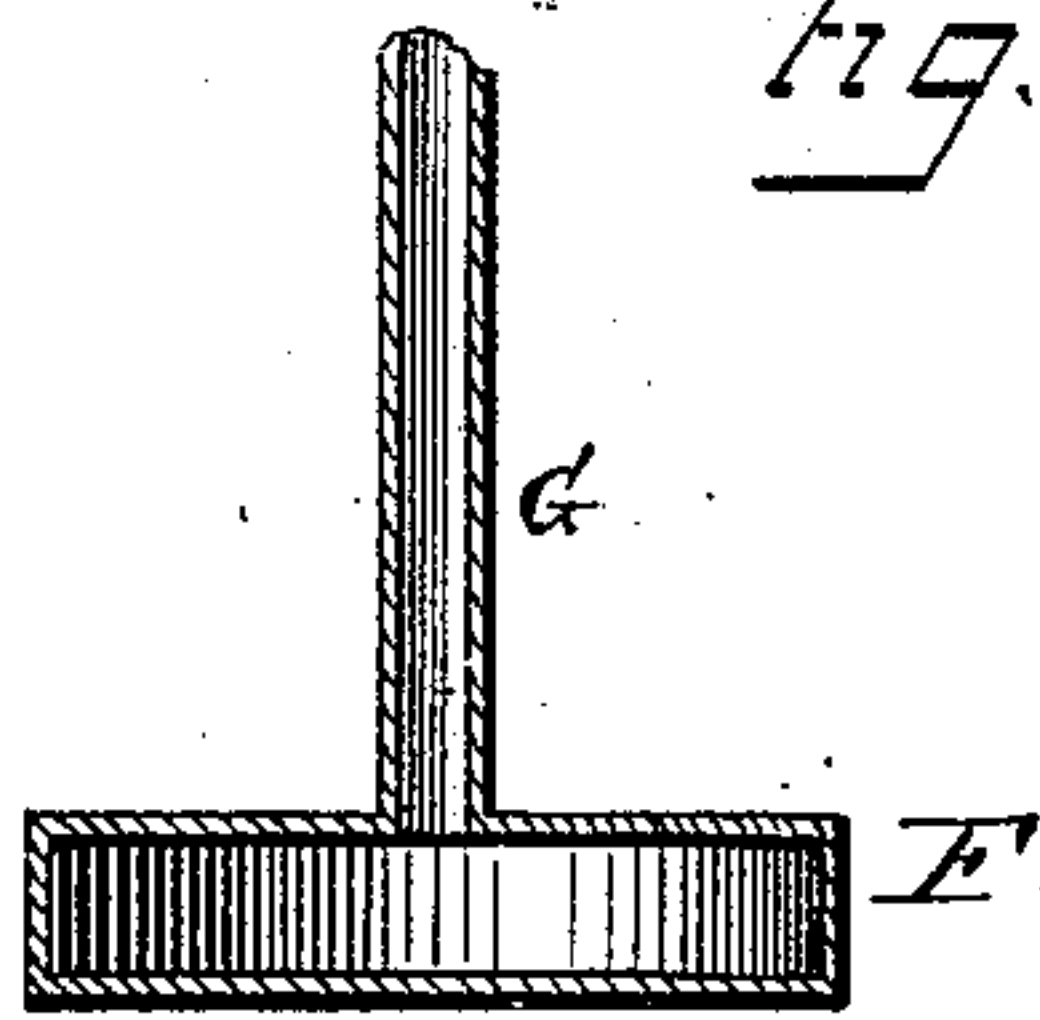
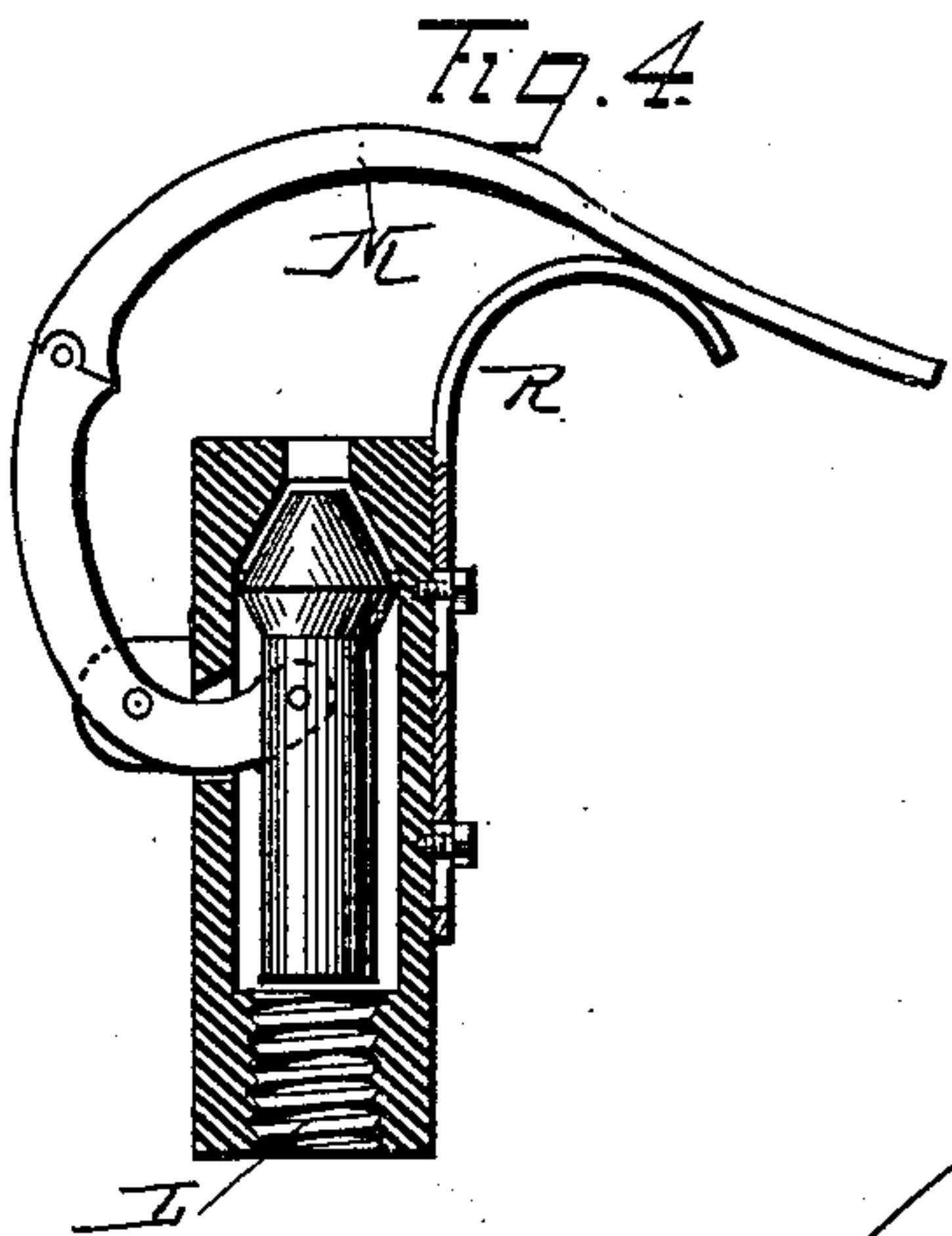
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

ROBERT M. McMANN AND HEMAN A. BARNARD, OF MOLINE, ILLINOIS.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 230,030, dated July 13, 1880.

Application filed May 15, 1880. (No model.)

To all whom it may concern:

Be it known that we, ROBERT M. McMANN and HEMAN A. BARNARD, of the city of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Steam-Traps; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

Our invention relates to steam-traps employed in connection with boilers for heating buildings; and it consists in the construction and arrangement of devices, as will be hereinafter more fully set forth, and pointed out in the claims.

In the annexed drawings, Figure 1 is a side elevation, showing the connections in dotted lines. Fig. 2 is a central cross-section through the valve. Fig. 3 is a longitudinal section of the same. Fig. 4 is a section of the escape-valve. Fig. 5 is a section of the plunger-rod. Fig. 6 is a section of the lid and spreader.

A represents the receiver, which is connected with the boiler by a suitable pipe, B, (shown in dotted lines,) entering the receiver at the bottom. A pipe, C, extends from the top of the boiler to the top of the receiver, a valve, D, being arranged in the course of said pipe, as shown in Fig. 1.

A steam-pipe passes from the boiler to the coils or heating-pipes, and from thence to the reservoir E, said reservoir being so placed that all the water made by the condensing of the steam will flow into it.

Within the receiver A is a float, F, Fig. 3, arranged upon a valve-stem, G, which works through the top of the receiver. Upon this rod or stem are two adjustable collars, *g g*, which act upon a yoke, H, as the valve-stem is raised or lowered.

The yoke H is secured upon the vibrating stem I of the valve, D, and upon said stem is also secured an arm carrying a counterpoise-weight, K.

A discharge steam-pipe, L, rises from the top of the reservoir, said pipe being provided with a valve and a tripping-arm, M, which is acted upon by the yoke.

The valve D is inclosed within a cylinder,

N, which constitutes a section in the steam-pipe C.

The float F is hollow, and the float-stem G is also hollow, and the opening in the hollow stem connects with the space inside the float, thus allowing any water that may condense or accumulate in the float to pass off through the hollow float-stem, either by evaporation or by inverting the float and stem when out of the receiver.

The valve D is a semicircular shell of brass or other suitable material, with the ends a full circle. It has an opening, *a'*, in the bottom, and two projections, *b b'*, one on each side of the opening. The opening in each end of the valve is larger than the valve-stem I, so that the stem can vibrate a certain distance without moving it. On this stem is keyed a projection, *d*, which strikes the lugs *b b'* on the inside of the valve, thus letting on and cutting off steam.

The trap being arranged on a level with or above the boiler, and connected therewith by the pipe leading from the top of the boiler to the cylinder N, which communicates with the trap by a short section of pipe, steam will pass from the boiler to the trap.

The water from the heating-pipes of the building will be collected in the reservoir E. The force of the steam from the pipe which leads from the boiler to the reservoir through the heating-pipes will force the water of condensation into said reservoir and up into the receiver A. This water raises the float and its stem, and as the float rises the lower collar *g* strikes the yoke-arm H and moves it upward until the other end of it, on which is the ball K, passes over the center of the valve-stem I, when it falls by the attraction of gravity until it strikes on the stop-spring S.

The lugs *b b'* are placed far enough apart so that as the valve-stem I moves from right to left the projection *d* thereon will move from left to right, and will not touch the lug *b* until just before the arm H strikes the spring S, when it strikes said lug and moves the valve D suddenly far enough to bring the valve-opening *a'* over the opening in the bottom of the valve-case, thus allowing the steam to pass from the boiler into the top of the receiver A. As the float then descends the yoke-arm H

remains stationary until the upper collar *g* strikes it, when it pulls the same downward until the ball or weight *K* passes over the center of the stem *I*, when it closes the valve *D* in the same manner as it opened it, only the motion is the reverse.

It will thus be seen that the momentum of the ball *K* moves the valve *D*, the float *F* only throwing the ball past the center each way. At the same time as the yoke-arm *H* descends it opens the valve of the steam-discharge pipe *L*, thus allowing the surplus steam to blow off, thereby reducing the pressure in the receiver *A*, which instantly begins to fill with water from the reservoir *E*. This discharge of the steam from the inside of the receiver *A*, after it has done its work, is of great advantage, as it enables the trap to fill and empty at least four times in a given time, while without its use it would empty and fill but once in the same length of time, thus increasing its capacity fourfold.

The pipe leading from the bottom of the receiver will, of course, be provided with suitable check-valves.

A perforated diaphragm, *P*, is connected with the cap of the reservoir, and arranged within the reservoir so that a space will be left between the diaphragm and cap. Upon the said diaphragm, and just below the steam-pipe which passes down into the reservoir at its top, is a deflector, *Q*, which distributes the steam over the surface of the diaphragm, so that the steam will, in passing through the perforations, be distributed upon the body of water within the receiver.

On the side of the steam discharge or escape valve *L* is a spring, *R*, attached by tap-bolts, which spring extends upward under and to the arm *M* of said discharge-valve *L*. This spring *R* has slotted holes where the bolts go through, so that it can be moved up or down and be adjusted at pleasure. The object of this spring is to regulate the opening of the discharge-valve *L*. By moving it up high enough it takes the force of the blow of the valve-arm or yoke *H*, that strikes onto the arm *M*, and prevents it from moving downward, and thus prevents any steam from discharging; or it can be moved low enough to allow the discharge-valve *L* to open wide, or it can be set to any intermediate point between these, thus effectively regulating the discharge of steam through the discharge-valve *L*.

The advantage of this arrangement is, that when it is desired to have the trap work fast (that is, empty and fill quickly) the spring is to be set down, which allows the valve to open wide; but when it is desired to work more slowly, then, by moving up the spring *R*, the discharge-valve will be opened but little, or not at all, at the pleasure of the operator, and the steam will not be wasted or any more of it used than is actually necessary to perform the work required.

There is also a stop joint or hinge in the arm *M*. This is of advantage in connection with the adjusting-spring *R*, as by its use the force of the blow of the arm of the valve *D* is taken by the spring *R*, which can give a little without opening the discharge-valve *L*.

There is also a spring, *S*, fastened to the case of the valve *D*, to receive the vibrating stem or yoke *H*, with the ball *K* attached, as it falls to the right, and stop it in its proper place in the same manner as the spring *R* receives it as it falls to the left.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a steam-trap, the combination, with reservoir *E*, having a pipe-connection with the boiler through the heating-coils, and also with the receiver, of float *F*, with its stem, for automatically operating valve mechanism to admit steam into the receiver, for the purpose of ejecting or forcing the water of condensation therefrom back again into the boiler, substantially as herein described.

2. In a steam-trap, the combination of escape-valve *L*, adjusting bar or spring *R*, and arm *M*, whereby the steam may be discharged from the receiver at closer or longer intervals, substantially as herein set forth.

3. The combination, in a steam-trap, of the receiver *A* with the boiler, connecting-pipes, a reservoir, and an apparatus for automatically allowing the water of condensation to be forced back into the boiler, and for opening a valve to allow the steam to blow off from the receiver, as specified, all constructed and arranged to operate substantially as herein set forth.

4. The combination of the receiver *A* with the valve *D*, yoke *H*, steam-discharge *L*, and tripping-arm *M*, substantially as set forth.

5. The combination, in a steam-trap, of the receiver *A* with the valve *D*, yoke *H*, steam-discharge *L*, tripping-arm *M*, and adjusting-spring *R*, substantially as and for the purposes herein set forth.

6. The combination, in a steam-trap, of valve *D*, having a yoke, *H*, and weight *K*, of float *F*, stem *G*, and steam-discharge *L*, with their essential actuating devices, all substantially as and for purpose described.

7. In a steam-trap, the combination, with a discharge-valve arranged to discharge the steam at faster or slower intervals, of a receiver with its float and stem, substantially in the manner herein described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

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HEMAN A. BARNARD.

Witnesses:

GEO. W. VINTON,
FRANK H. HEAD.