

(No Model.)

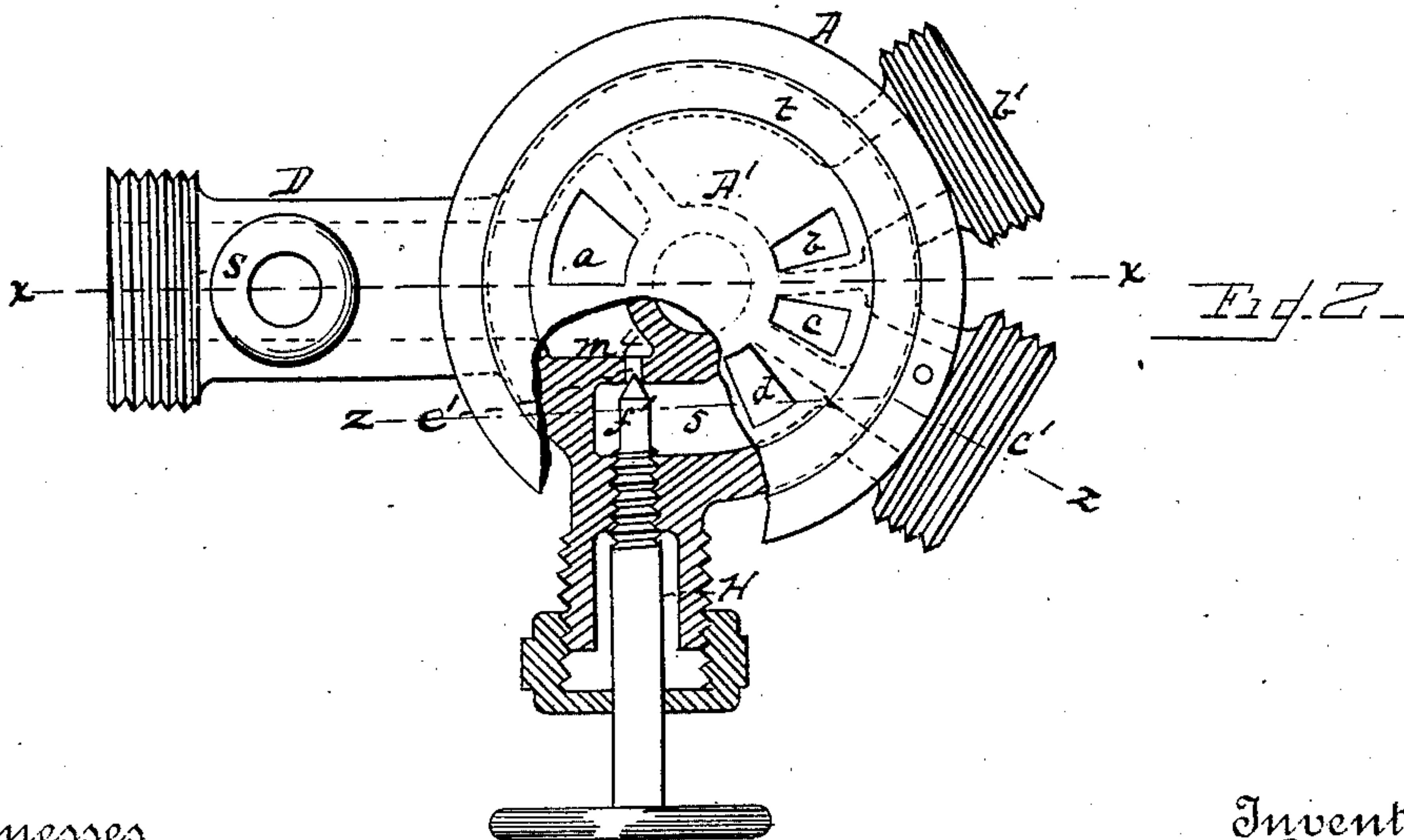
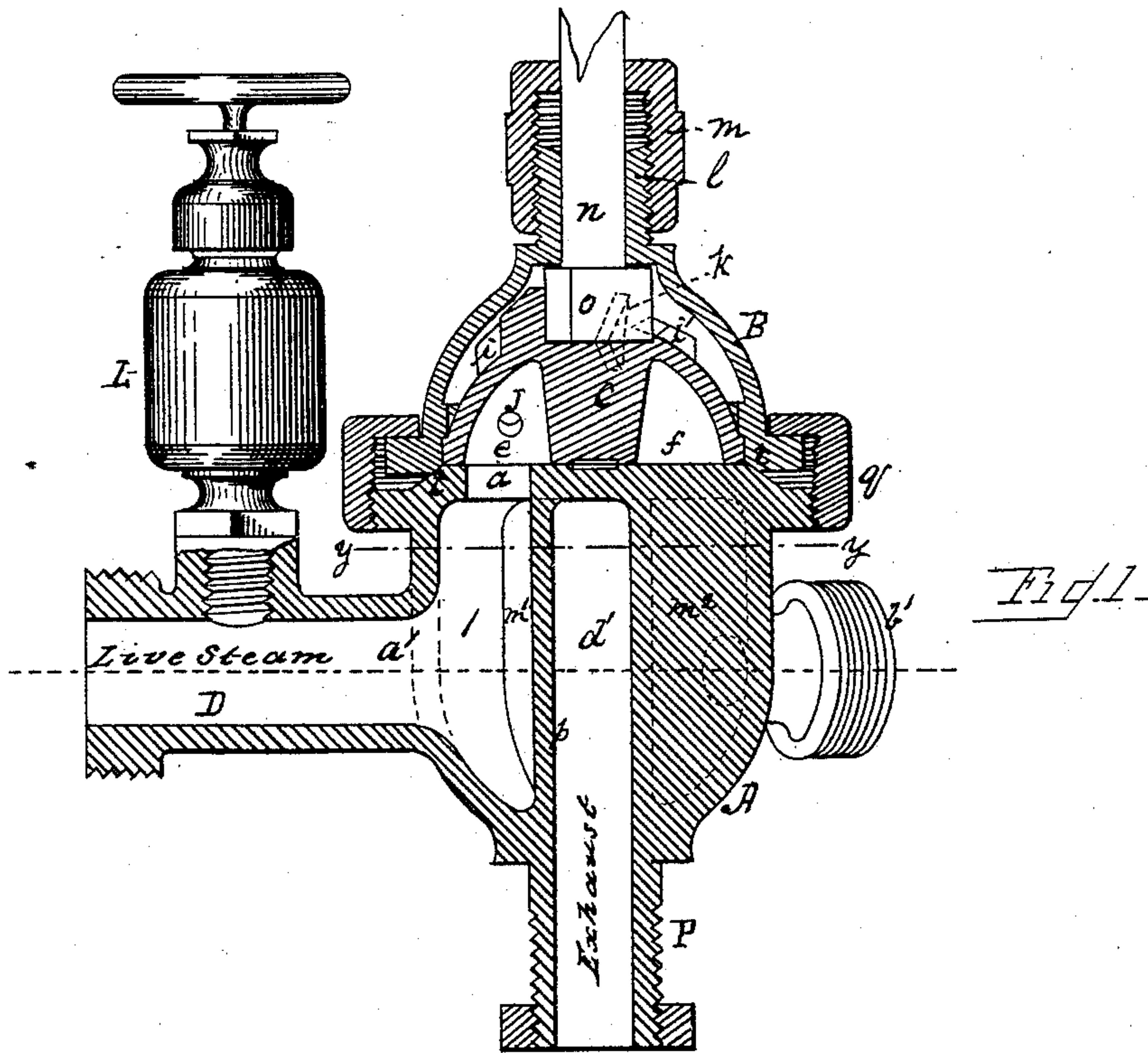
2 Sheets—Sheet 1.

G. H. POOR.

COMBINED VALVE AND HEATER.

No. 354,221.

Patented Dec. 14, 1886.



Witnesses
L. A. Tauberschmidt
J. B. Foulton

Inventor
Gorge H. Poor
By his Attorney *F. M. Ritter Jr*

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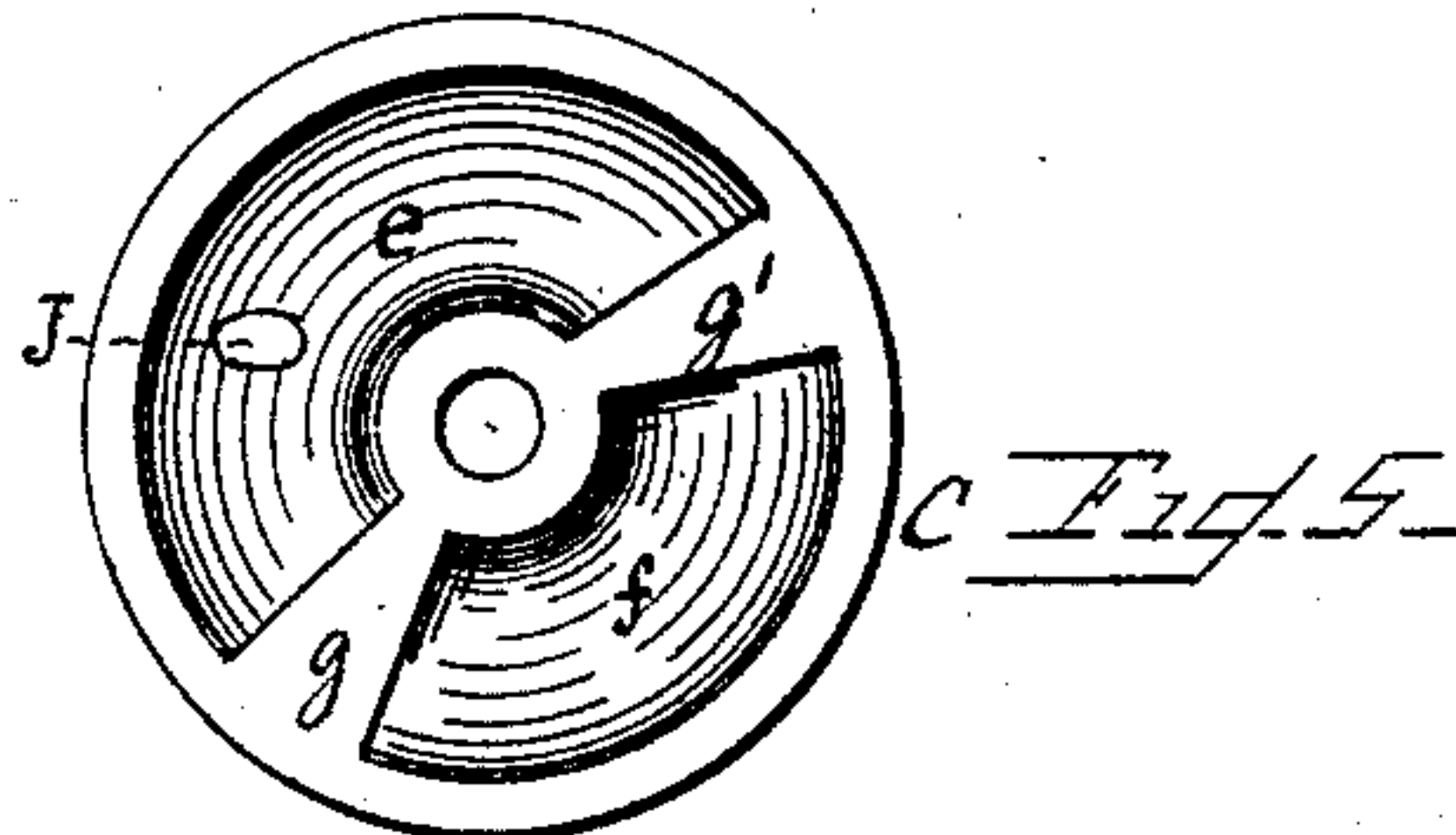
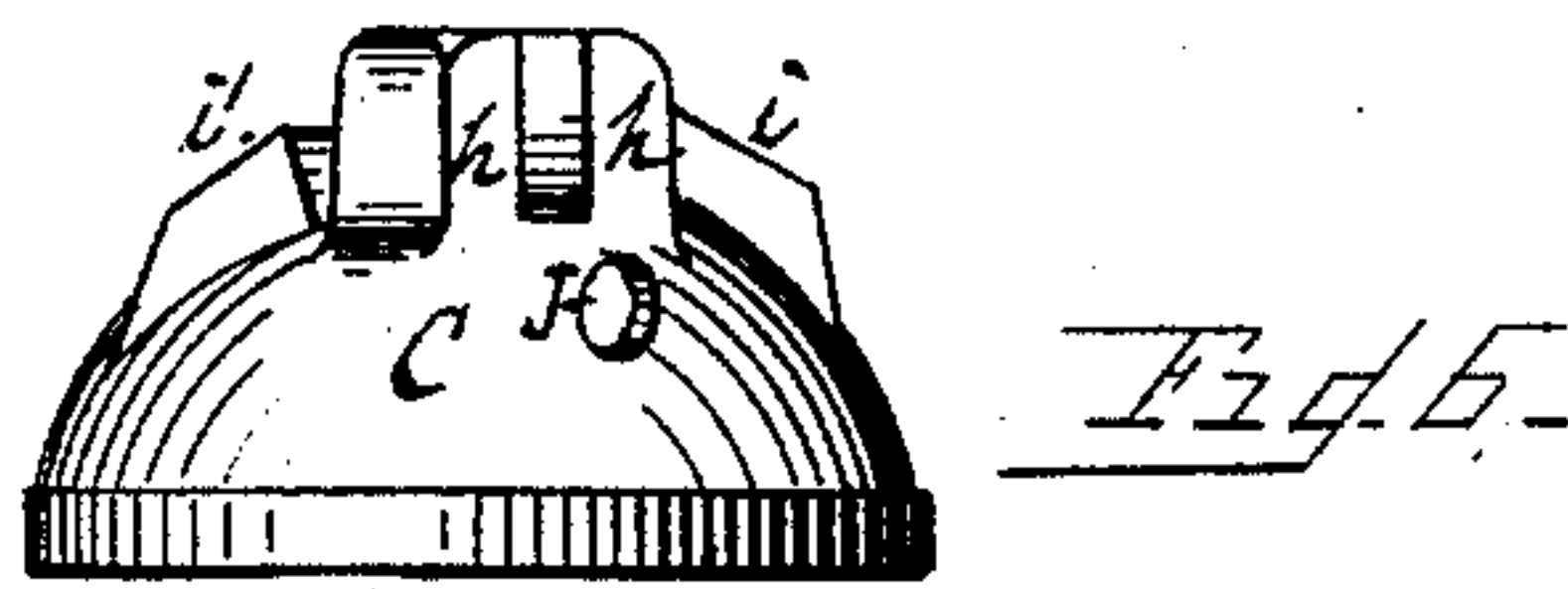


Fig. 3.

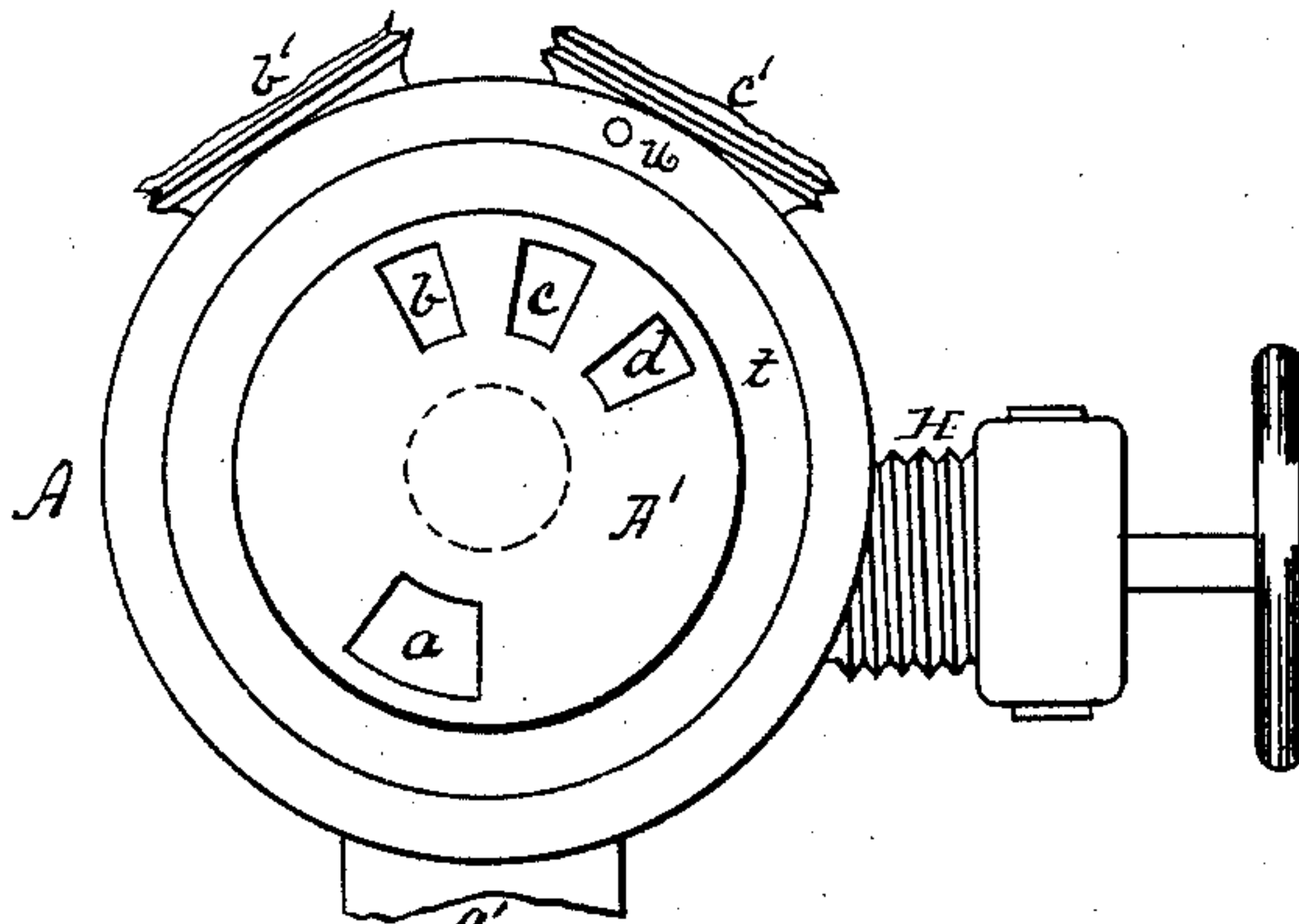
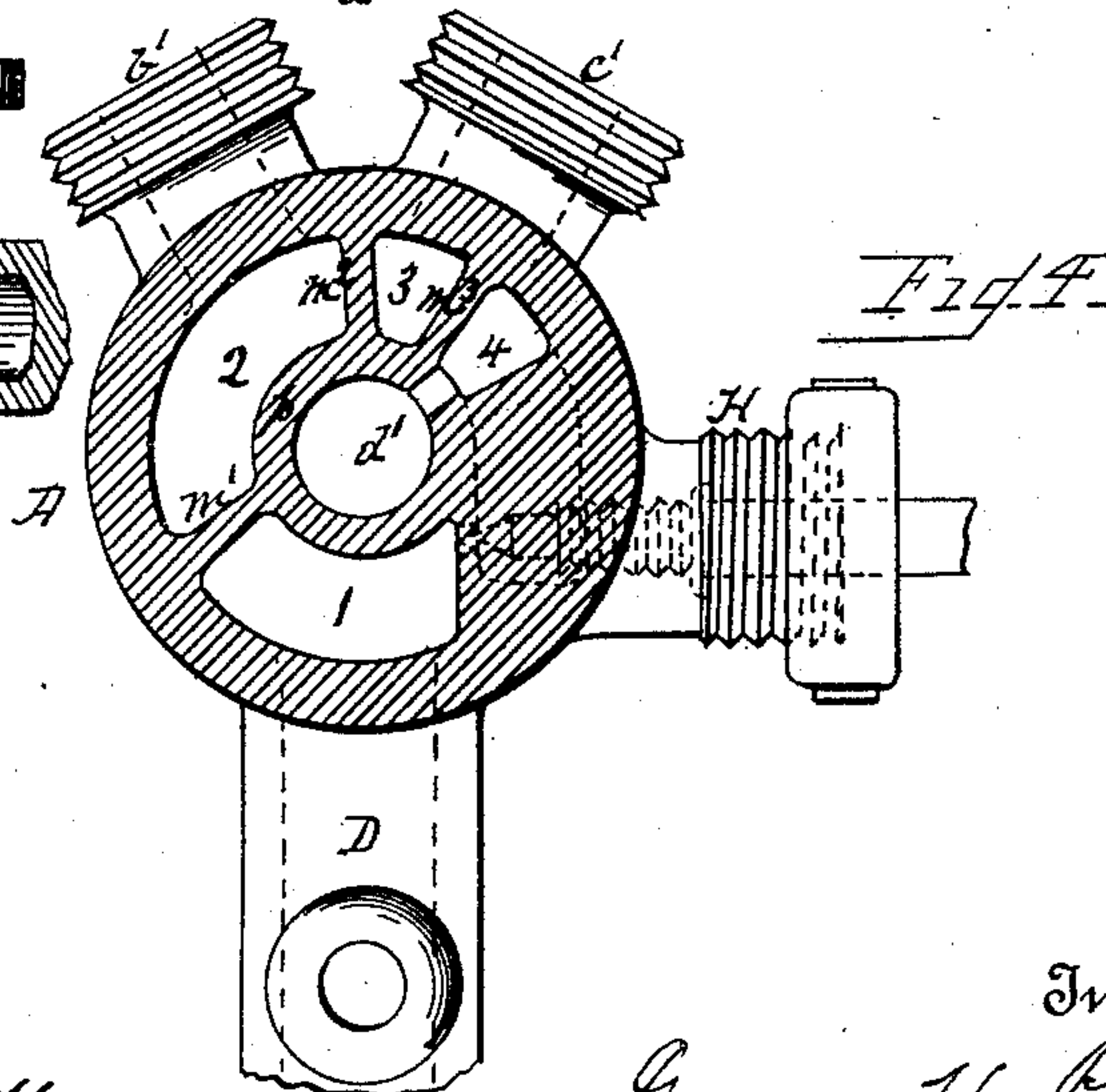
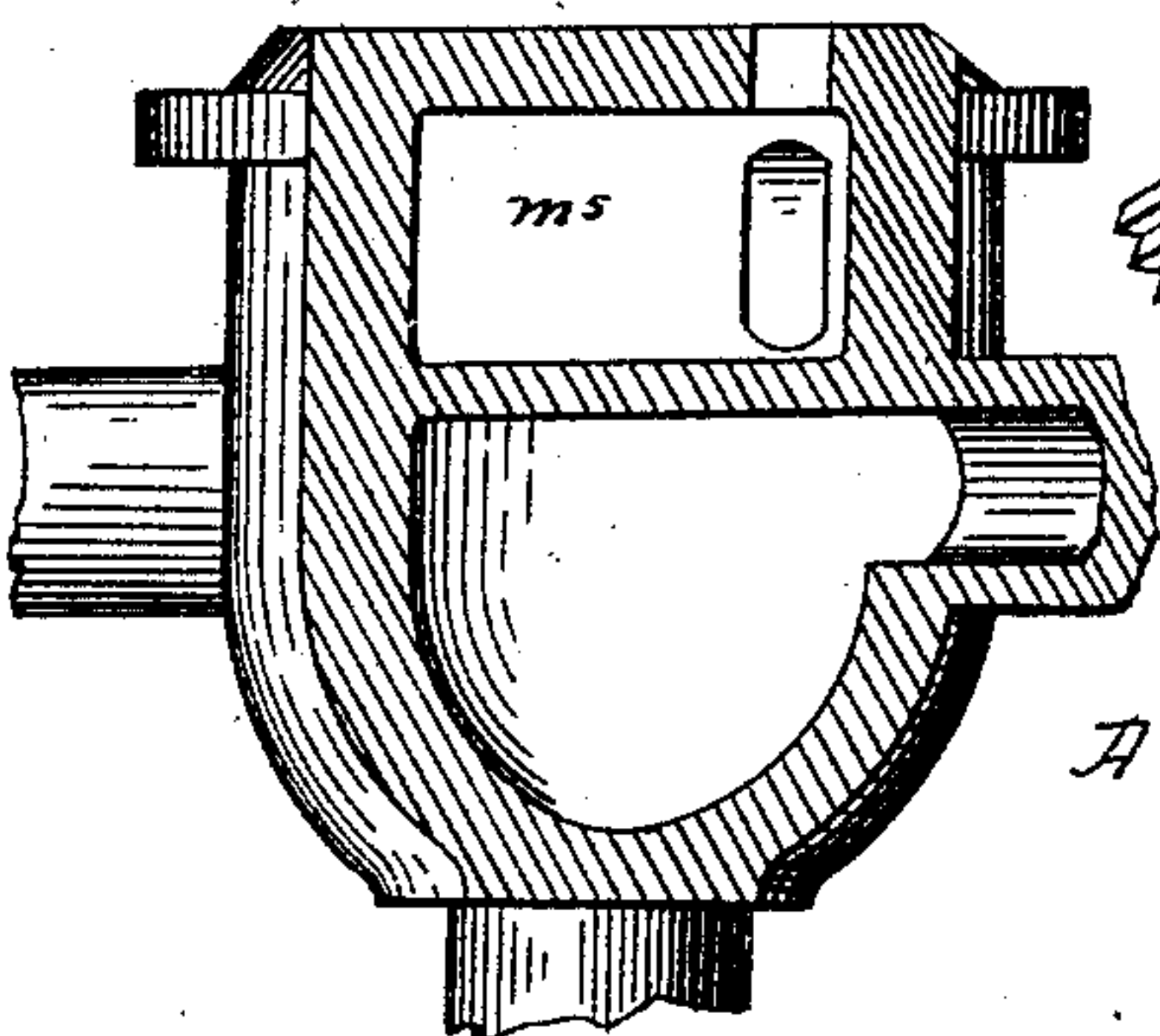


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE H. POOR, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE AMERICAN BRAKE COMPANY, OF SAME PLACE.

COMBINED VALVE AND HEATER.

SPECIFICATION forming part of Letters Patent No. 354,221, dated December 14, 1886.

Application filed August 2, 1886. Serial No. 209,732. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. POOR, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in a Combined Valve and Heater for Maintaining the Temperature and Preventing Condensation in Pipe Systems where Steam is Used Intermittently; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, illustrating the manner of applying my invention, and wherein—

Figure 1 is a vertical central section of a rotary valve embodying my invention, on the line *x x*, Fig. 2. Fig. 2 is a plan or top view of the lower section of the valve-shell, portions in section to show a sub-valve or leak-valve, the chambers of the lower section of the shell being indicated by dotted lines. Fig. 3 is a top view of the lower section of the shell, showing the valve-seat and ports therein. Fig. 4 is a section of the shell just below the valve-seat on the line *y y*, Fig. 1, showing how the valve exhausts through the hollow stem. Fig. 5 is a bottom view of the rotary valve. Fig. 6 is an elevation of the same. Fig. 7 is a section on the line *z z*, Fig. 2, showing the horizontal wall, which divides chamber 4 so as to form recess 5, which communicates with chamber 3.

Like letters refer to like parts wherever they occur.

In systems of steam-piping provided with suitable valves of any character, wherein steam is intermittently used, there is always a liability, when the steam is cut off, for condensation to take place on one or both sides of the valve, and when the valve is opened to admit steam to the system, if the pipes have fallen materially in temperature, there is loss of power by condensation until the temperature of the system is again raised; and, further, there is the additional trouble of the water of condensation, which has accumulated while the steam was cut off, being forced through the system until the exhaust or some other outlet or escape therefor is reached. While this is the case in all the steam-pipe systems where steam is used intermittently, and with all kinds of valves,

so that my present invention is of broad scope and general utility, it is markedly the case in steam-brake systems, when the brakes are applied, and like positions exposed to changes and extremely low temperatures; and it is in such positions that my device has special advantages by preserving the temperature of the system, so that the full power of the steam may be applied instantly in applying the brakes to an engine or train, or for like purposes. While by the exercise of proper care and foresight the bad effects of condensation in such a system can be measurably avoided, yet trouble therefrom so frequently occurs that it is now commonly guarded against by connecting the pipes leading from the main supply-pipe, back of the main valve, with the system, cylinders, or other point of utilization of the steam by a branch pipe, suitably valved to permit the flow of a small inoperative quantity of steam and to act as a heater for the cylinders or system, as the case may be.

The object of my invention is to combine, with the main valve of the system, means for maintaining the temperature of the pipe system or systems, so as to diminish or avoid condensation when the body of steam is admitted for applying the brakes or for like purposes, all as will hereinafter more fully appear.

I will now proceed to describe my invention more specifically, so that others skilled in the art to which it appertains may apply the same.

For purposes of illustration I have shown the invention as applied to a rotary steam valve of the character described in my Patent No. 304,751, dated September 9, 1884; but I do not herein claim anything therein contained; neither do I limit my invention to the specific valve or class of valves so shown and described.

In the drawings, A indicates the lower and B the upper section of the shell, and C the valve, which sections may be beveled or ground off, so as to form a close or ball joint, and may be coupled or connected by a spanner-nut, *g*, or in any other suitable way.

The upper section, B, of the shell has its port for the passage of the valve-stem *n*, surrounded by the gland *m* and stuffing-box *l*.

The lower end of the stem *n* has a foot or key, *o*, to engage in a suitable recess formed by lugs *h h* (see Fig. 6) on the top of the valve.

This section B of the shell has also on its inner surface a lug, *k*, to engage with lugs *i i'* on the top of the valve C, and limit its movement, and a dowel-pin, which enters a suitable hole, *u*, in the flange of the lower section, A, and insures the proper relation of the rotary valve C to the ports in the valve-seat.

C indicates the valve, which has the lugs *i i'* upon its upper surface to engage with lug *k* on shell-section B and lugs *h h* for its connection with and operation by the valve-stem *n*.

This rotary-valve C is cupped on its under surface, and divided into two chambers by radial bars or diaphragms *g g'*, one chamber or recess, *e*, for live steam, and another chamber, *f*, for covering the ports *b c d* of the valve-seat.

J indicates a hole or port in the top of live-steam chamber *e*, to permit an escape of live steam into the shell B above valve C to balance the valve.

A indicates the lower section of the shell, which is covered or closed by the valve-seat A', having ports *a b c d*. This shell A is provided with a central annular wall, *p*, which projects beyond the bottom of the shell, as at P, to form the stem that supports the valve-shell, and at the same time a steamway or exhaust. The interior of the shell is divided up by a series of vertical radial diaphragms or walls, *m' m² m³*, (see Fig. 4,) into a series of chambers, 1 2 3, and by a transverse vertical wall, *m⁴*, (see Fig. 2,) which forms a fourth chamber, 4. Of these chambers 1 is for live steam, and has its receiving-port *a'* and its discharging-port *a* through the valve-seat below recess *e* of the rotary cup-valve. 2 is for the supply to the tender-brake or first system of pipes, and has its port *b* through the valve-seat A', by which it receives and exhausts, and its port or pipe *b'*, leading to its system or cylinder, while the third, 3, is for the driver-brake cylinder or a second pipe system, and has its port *c* in the valve-seat, by which it takes and exhausts steam, and its port *c'*, leading to said driver-brake cylinder or to said second system of pipes.

In addition to the ports *b c* of the valve-seat A', there is a third port, *d*, therein, which is always an exhaust-port, and opens into the fourth (or exhaust) chamber, 4, of shell-section A, which chamber 4 communicates with the central annular exhaust-chamber, *d'*. There is also a horizontal wall, *m⁵*, which divides the chamber 4, so as to form a chamber or recess, 5, (see Fig. 2,) which communicates with chamber 3 and ports *c c'*. In the vertical wall *m⁴*, which separates this pocket or recess 5 from the live-steam chamber 1 a small hole, *e'*, is drilled, which will allow steam to enter the recess 5 from the live-steam chamber 1, and this small hole *e'* is provided with a needle or equivalent valve, *f'*, having its stuffing-box H

formed on the lower section, A, of the valve shell or case.

The nozzle or pipe D, by which the valve-case or its lower section is coupled with the live-steam supply pipe, is extended considerably beyond its usual length, and cast integral with the valve shell or section A thereof, and provided with a threaded or equivalent boss, *s*, for the reception of an oil-cup, L, of any suitable character, whereby the live steam may be made to convey the lubricant to the valve-seat.

The devices, being substantially such as described, will operate as follows: The steam which enters by port *a'* into the chamber 1 passes thence by port *a* into the recess *e* of the cup-valve C. If, now, the valve C is rotated so as to carry the bar or diaphragm *g* past the port *b* of the valve-seat A', the live steam will descend through port *b* into chamber 2, and pass thence through port *b'* to the tender-brake cylinder or first system of pipes; and if the movement of the valve C is continued until the bar *g* passes the port *c* the live steam will then pass from recess *e* down through port *c* of the valve-seat A' into chamber 3, and thence by its port *c'* to the driver-brake cylinder or pipes. On the reverse movement of valve C, as soon as the bar *g* passes back over port *c*, the driver-brake cylinder or second system of pipes will be put in communication with the exhaust through port *c'*, chamber 3, port *c*, recess *f* in the cup-valve C, and exhaust-port *d* of the valve-seat, and as the bar *g* continues its return movement the tender-brake cylinder or pipe system No. 1 will be put in communication with the exhaust through port *b'*, chamber 2, port *b*, recess *f* of the valve, and exhaust port *d* in the valve-seat A'. Whether the port *e'* of the heater system be open or closed it will not interfere with the usual operation of this or any other valve with which it is combined. When, however, it is open, a small quantity of live steam, sufficient to preserve the temperature of the pipe systems with which the valve is connected and prevent condensation therein when the body of steam is admitted to apply the brakes or for like purposes, will constantly escape from live-steam chamber 1 through port *e'* into recess or chamber 5, and will diffuse itself, passing from recess or channel 5 into chamber 3, part passing thence by port *c'* to the driver-brake cylinder or system No. 2 of steam-pipes, and part passing through port *c* into the recess or chamber *f* of valve C, and thence by port *b* into chamber 2, to diffuse itself in the tender-brake cylinder or first system of steam-pipes, while some escapes by port *d* of the valve-seat, thus causing a gentle circulation through all the pipes and cylinders of the system of a small inoperative volume of steam, which preserves the temperature of the system and prevents condensation therein when the steam is cut off by the main valve C. When it is desirable to prevent the circulation of steam,

the port *e'* may be closed by its needle-valve *f'*, or said valve may be manipulated to regulate the amount of steam escaping through port *e'*.

5 Among the advantages of my invention are that I am enabled thereby to prevent the collection of condensed steam in the pipe between the main valve and boiler, so that the main valve, shell, &c., will not be flooded when the
10 valve is opened. I am also enabled to prevent condensation in the pipes or cylinders controlled by the main valve when the body of steam is admitted to the system to apply the brakes or for like purposes; and I am enabled to maintain the temperature of the cylinders or pipe system, so as to prevent condensation, and thus obtain the full force of the steam-pressure the instant the main valve is opened.

20 As before specified, I do not limit my invention to any particular form or class of valves, or valves employed for any particular purpose, as the invention is evidently applicable to any position or system where steam
25 is intermittently used, and one manner of applying the invention having been indicated, it can be modified to suit various well-known constructions of valves.

30 Having thus set forth the nature, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

35 1. A valve-shell having a series of steam-chambers controlled by a valve, one of said chambers having communication with the live-steam chamber independently of the valve, whereby a continuous circulation of steam through the shell may be maintained, substantially as and for the purposes specified.

2. In a steam-valve, the combination, with a main valve, of an independent sub-valve 40 arranged therein to allow a slight flow of steam through the same system controlled by the main valve, substantially as and for the purposes specified.

3. A steam-valve having a series of chambers, two of which communicate by means of a leak or port independent of the position or movement of the main valve, substantially as and for the purposes specified. 45

4. The combination, with a steam-valve having a series of steam-chambers, two of which communicate by a port or passage other than the ports of the valve-seat, of a plug or cut-off for controlling the flow of steam independent of the main valve through which said chambers communicate, substantially as and for the purposes specified. 55

5. The combination, with a valve-shell having a valve-seat provided with ingress and egress ports, said shell divided into chambers, two of which communicate through a leak-port, of a rotary cup-valve, substantially as and for the purposes specified. 60

6. A valve whose shell has an elongated coupling-pipe or nozzle provided with a boss 65 for the oil-cup, said nozzle integral with the shell of the valve, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 29th day of July, 1886. 70

GEORGE H. POOR.

Witnesses:

W. L. COOPER,
WM. JONES.