

(No Model.)

F. M. METCALF.
STEAM, WATER, OR FLUID VALVE.

No. 452,312.

Patented May 12, 1891.

Fig. I.

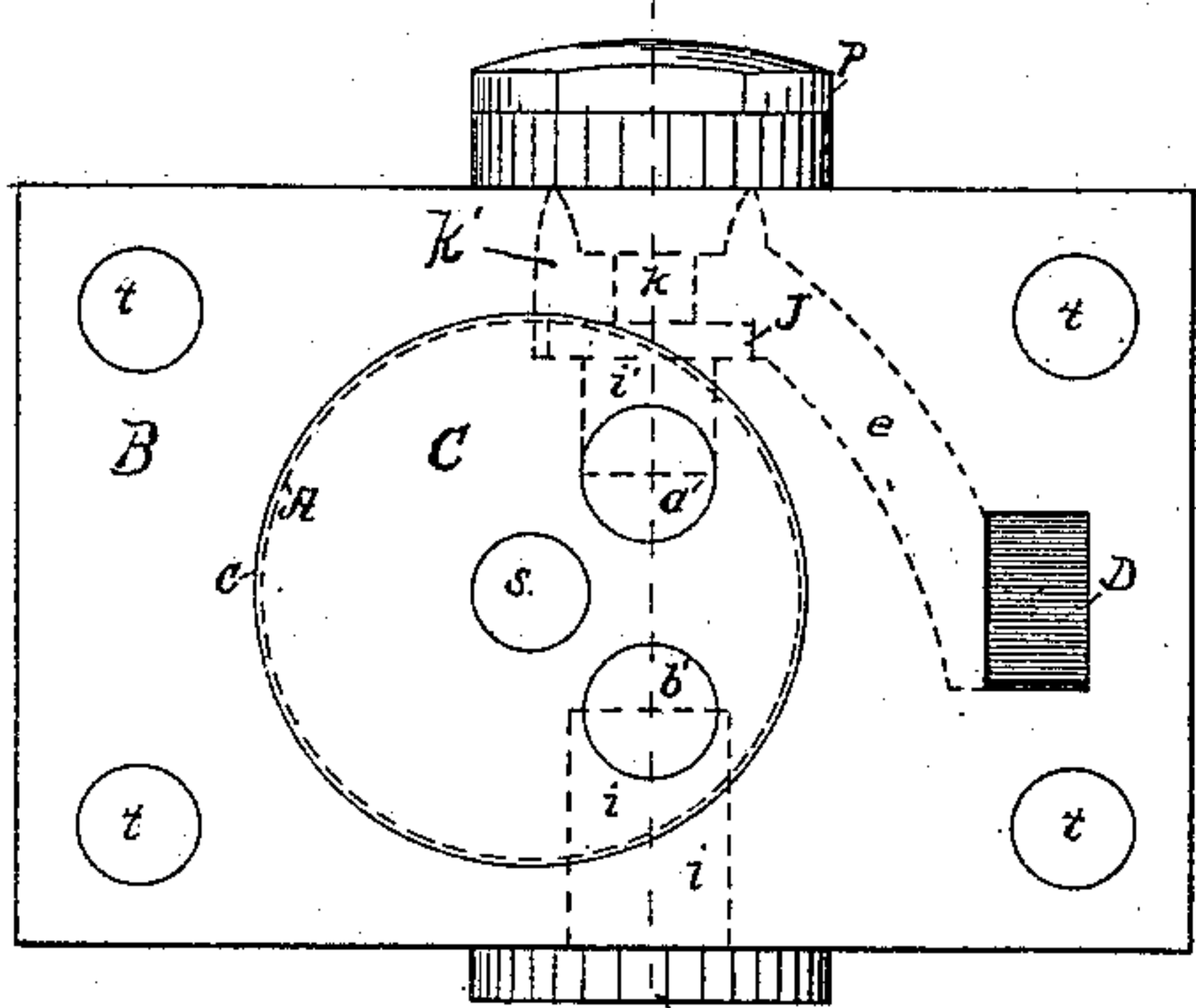


Fig. II.

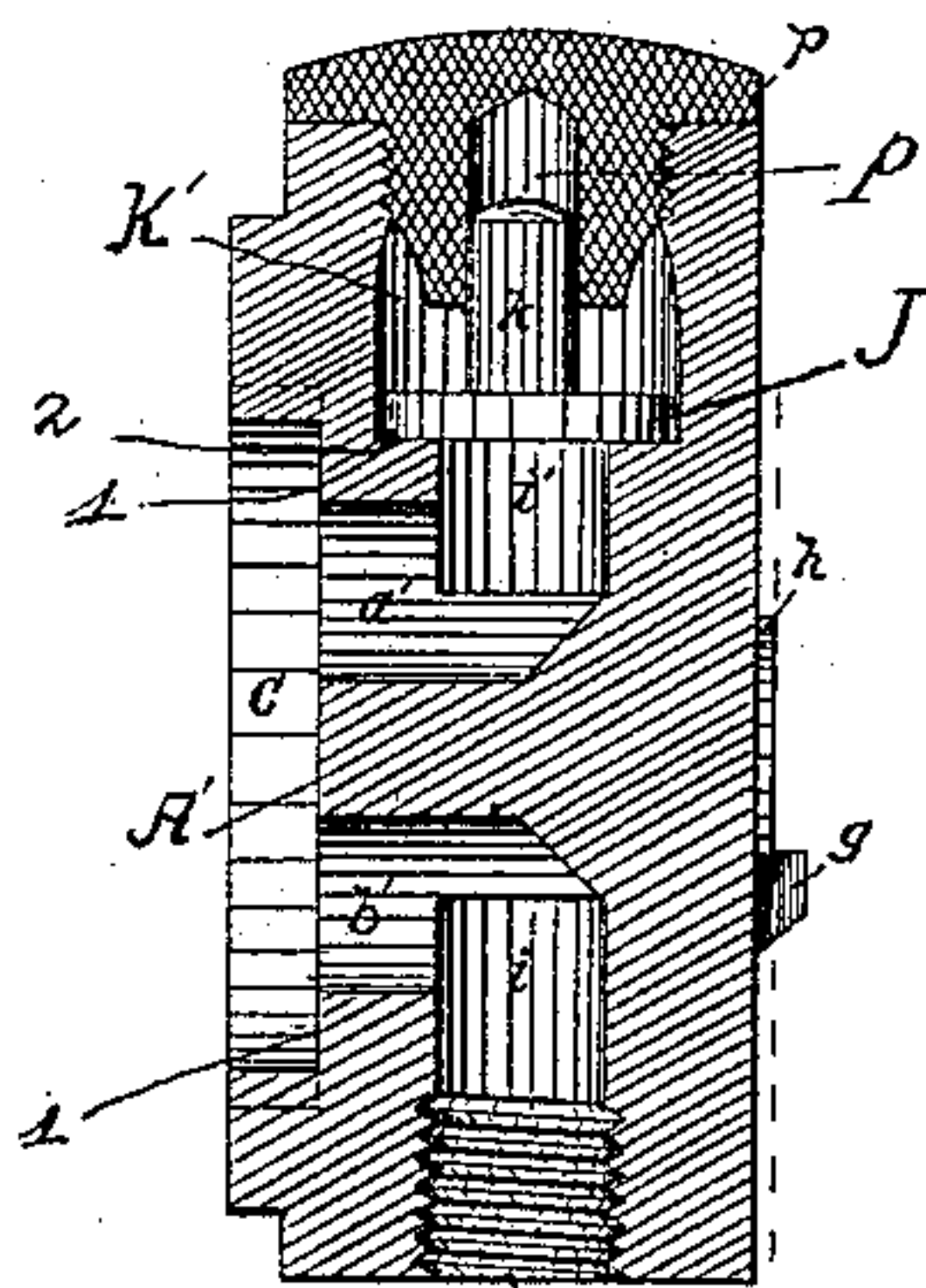


Fig. III.

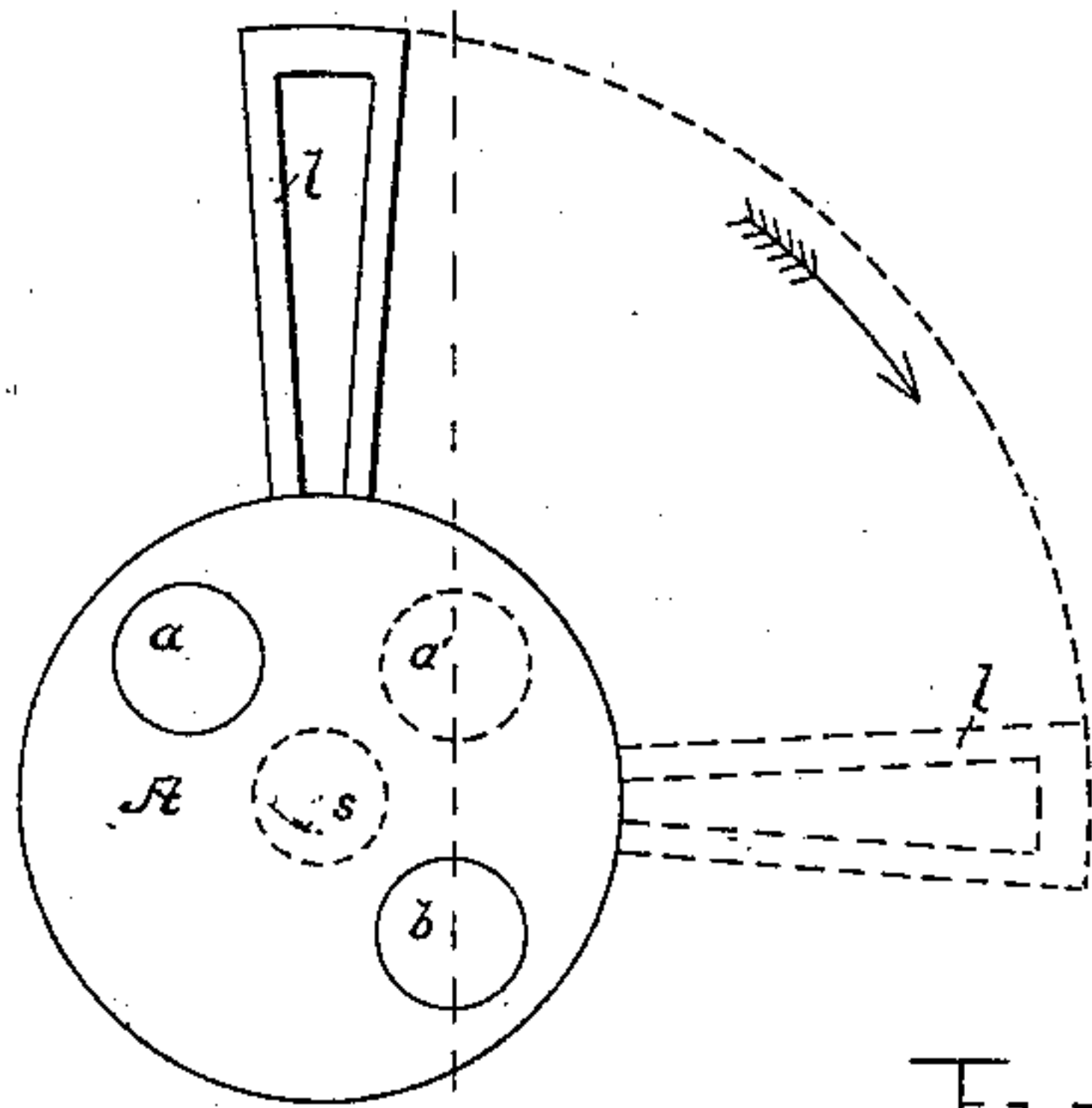


Fig. IV.

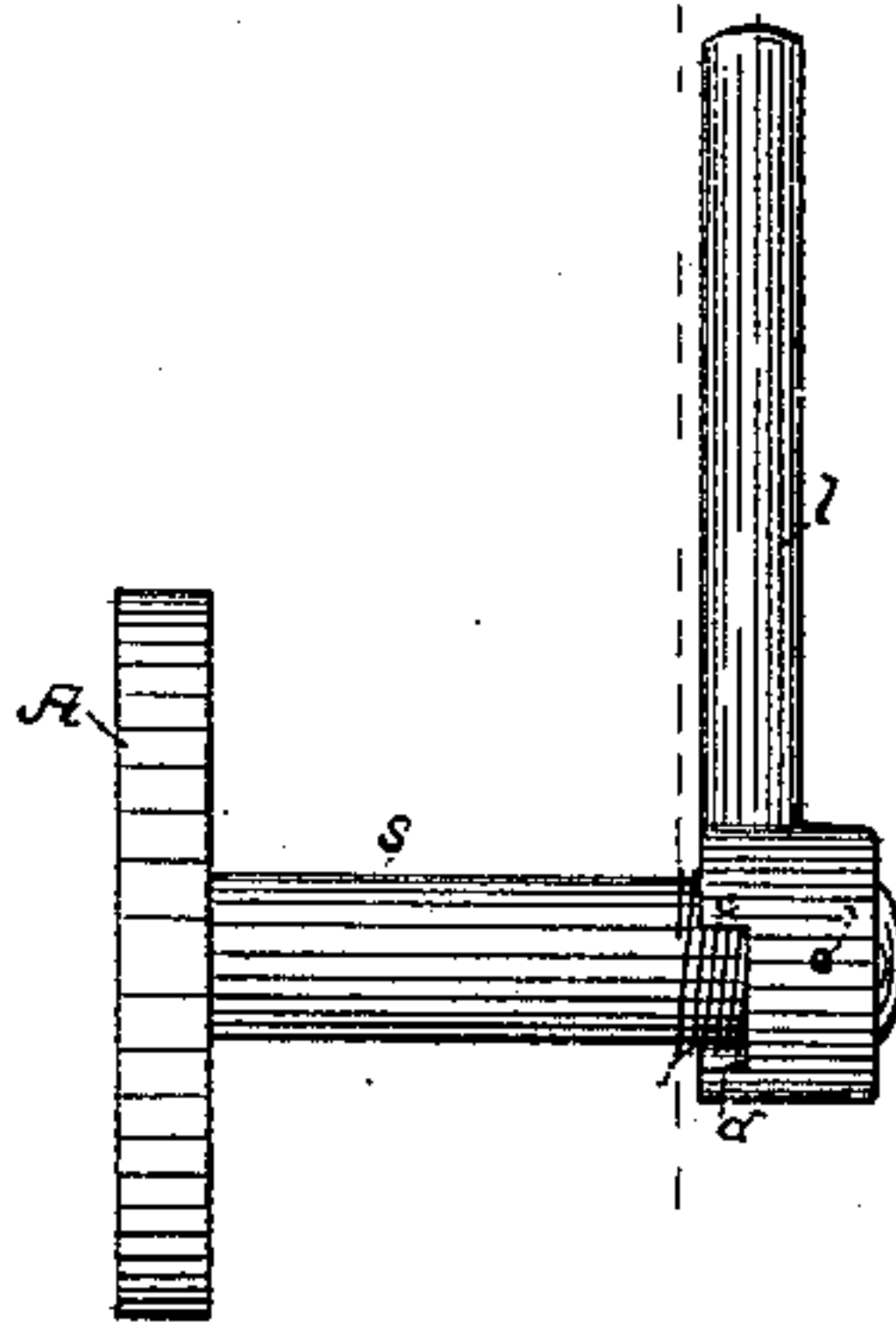
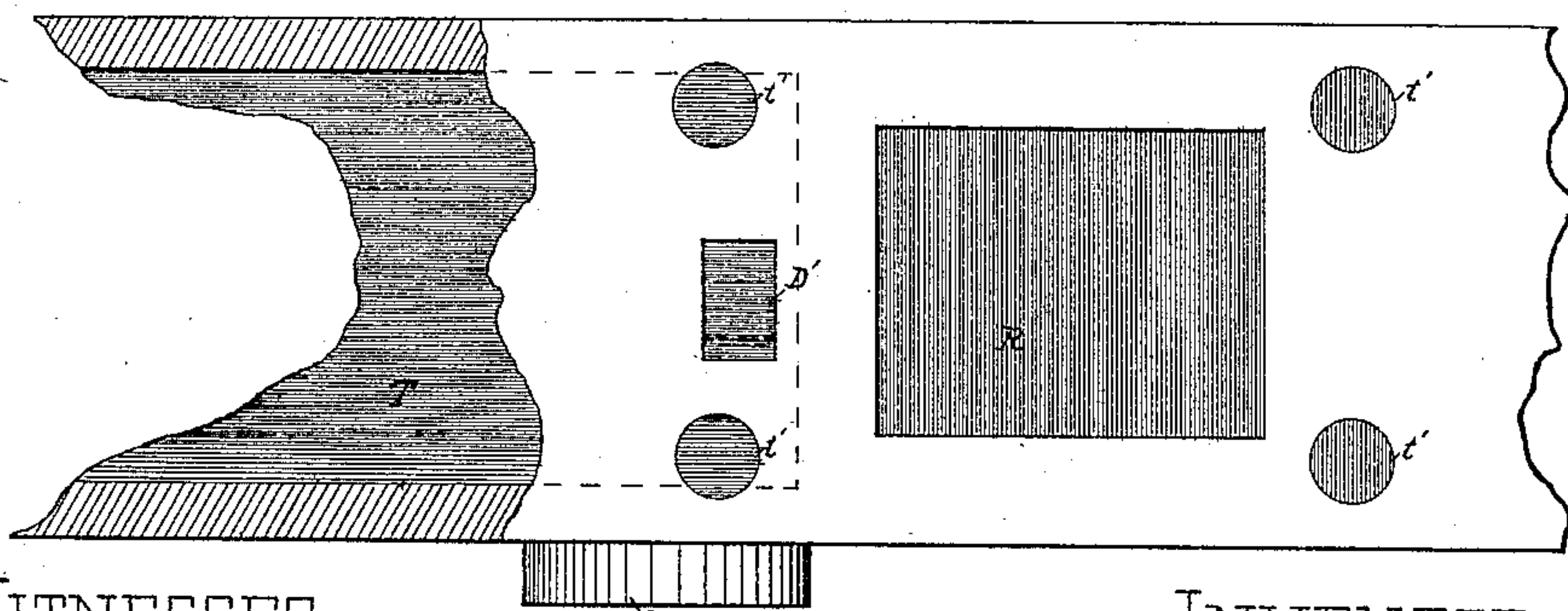


Fig. V



WITNESSES.

W. Andrews
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INVENTOR_

Poster M. Metcalf
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UNITED STATES PATENT OFFICE.

FOSTER M. METCALF, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO THE
BATTLE CREEK MACHINERY COMPANY, OF SAME PLACE.

STEAM, WATER, AND FLUID VALVE.

SPECIFICATION forming part of Letters Patent No. 452,312, dated May 12, 1891.

Application filed August 19, 1890. Serial No. 362,443. (No model.)

To all whom it may concern:

Be it known that I, FOSTER M. METCALF, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Steam, Water, and Fluid Valves, of which the following is a specification.

This invention relates to an improvement in steam and other valves; and it consists in providing a cheap, simple, effective, and durable valve whereby the practical difficulties caused by wear, leaking, and sticking, due to dirt, grit, and unequal expansion of the parts under high temperatures, &c., are entirely obviated and overcome. For this purpose I employ a valve of such simple disk-form construction that a single current of steam, water, or other fluids or liquids may be divided and its parts distributed, one, two, or more circuits united and their constituents commingled, directed, controlled, and delivered, and, further, as preferably constructed, without stuffing-boxes or other vexatious hindrances to the free and easy manipulation and durability thereof. As preferably made, my novel valve has no stem-opening to the atmosphere from the receiving-chamber against the incoming current, and the flat rotary seat-surface thereof renders the use and wear a self-preservative of a tight joint at all times, and its construction and use are such that it offers no place for lodgment of dirt or grit thereunder, as a mere inspection of the drawings will show.

In the accompanying drawings is shown the manner in which I apply my novel invention to a steam-pump for combining the exhaust-steam with the water being pumped.

Figure I represents a rear view of the valve-casing with the disk valve proper removed. Fig. II is a vertical section of the same, drawn on the dotted line of Fig. I. Fig. III is a face view of the disk valve proper, and Fig. IV is a representation of the same turned at a right angle. Fig. V is a partial inner view of the side of pump to which the casing is to be attached, showing the suction and exhaust chambers thereof, T and R, respectively.

The same letters and numerals of reference

are used to designate the same or corresponding parts in the several figures.

A is the disk valve, which is received by an annular chamber C, formed in the valve-casing B, and is seated against the inner wall 1 of said chamber. This casing B is formed with passages $i\ i'$, which respectively communicate with the valve-chamber C above and below the center thereof through passages b' and a' . The passage i opens into the atmosphere and the passage i' leads to the suction-chamber T of the pump through chamber K, passage e , and ports D D', said chamber, passage, and ports being all formed in said casing. Within the passage K' is located a check-valve J, which is seated on the flange 2, and is designed to be automatically moved away from its seat to open said passage by the pressure of the steam on its lower face. This valve J is provided with an upwardly-extending stem k . The upper end of the chamber K is closed by a screw-cap P, whose central inside bore p' is of such size as to fit over the stem k and form a guide therefor in the operation of the check-valve J.

The casing B is secured to the side of the pump by bolts or other suitable fastening means, which pass through the holes t , said holes and the port D facing and registering with corresponding holes t' and the port D', and is so located with respect to the pump that its valve-chamber C will face the exhaust-chamber R thereof.

The disk valve A is provided with a shaft or stem s , which has its bearing in the valve-seat and extends therethrough to the outside of said casing, being provided at the latter point with an operating hand-lever l , which is formed at its lower end with an inner annular recess or chamber c for the reception of a spring c' , which is wound loosely around the valve-shaft s at this point, and also with a notch d , which in conjunction with a stop g , secured to or formed integral with the outer side of the casing B, adjacent to the hub h thereof, limits the throw of said lever. The valve is formed with openings a and b , which respectively are intended to register with the passages a' and b' in the operation of the device.

The mode of operation of my improvement

as applied to the steam-pump for combining the exhaust of the engine with the water being pumped is as follows, to wit: With the operative lever in a vertical position, Fig. III, 5 steam is admitted through port *b* of the disk valve A and delivered by ports *b'* and *i i* of the casing to the atmosphere. Now by throwing the lever to a horizontal position, as indicated by the arrow and dotted lines, steam is 10 deflected and directed through port *a'* of said plate B, now registering with *a* of the disk valve, whereby the current thereof, actuating the check-valve J, passes through chamber *k'*, passage *e*, and by ports D D' to the suction-chamber T of the pump, where it is instantly 15 condensed by the water there present and carried onward to the steam-boiler or other desired destination. I have here preferably placed the spring C' upon the chamber-stem 20 *n* of the disk valve in lieu of on the lever end of the valve-shaft *s*, although the said spring is not a necessity in either form shown. The lever *l* may be returned to its closed or normal position, or vice versa, by means of a 25 spring placed opposite the lever-stop *g*, and the cap *m* closes the inlet-chamber, as seen.

For the purpose of adapting my invention to drinking-fountains, water-coolers, and the like, a spring placed suitably opposite the stop 30 *g*, Fig. II, may be used, as is evident.

Having thus fully described and illustrated my invention and pointed out some of the uses to which it is adapted, what I claim, and desire to secure by Letters Patent of the United 35 States, is—

1. In combination, a steam-pump, the attached casing provided with suitable ports, passages, and chambers, a check-valve within the same and connected with said ports and 40 passages, the disk valve coacting therewith, having one or more ports, and a circular shaft having its bearing extended through the disk-

valve seat to the outside of said casing and the operative lever thereto attached, substantially as and for the purposes illustrated and 45 described.

2. In combination, a steam-pump, a casing fixed thereto, having suitable ports, passages, and chambers, a check-valve connected therewith, and a disk valve provided with one or 50 more ports therethrough and having a circular shaft or stem extending through the said disk-valve seat to the outside of said casing and there provided with the operative lever.

3. In combination, a steam-pump, the attached casing provided with suitable ports, 55 passages, and chambers, a check-valve therein and coacting with said ports and passages, the disk valve having ports *a b*, valve-seat, and ports *a' b'*, passages *i i'*, chamber *k'*, passage *e*, ports D D', disk-valve shaft *s*, carrying spring and operative lever, all constructed, arranged, and operating substantially as 60 shown, and for the purpose set forth.

4. In a steam-pump, the attached casing 65 provided with ports, passages, and chambers, the check-valve J, chamber *k'* in connection with said ports and passages, the cap P, provided with recess or bore for stem *k* of said check-valve, the disk valve provided with 70 ports or passages therethrough and in connection with the ports and passages of the casing and having a shaft projecting through the seat thereof to the outside of said casing, and the operative lever fixed thereto, substan- 75 tially as shown and described.

In testimony that I claim the foregoing I have hereunto affixed my hand and signature, this 19th day of July, A. D. 1890, in presence of two witnesses.

FOSTER M. METCALF.

Attest:

WILL A. CROSBY,
G. W. NICHOLS.