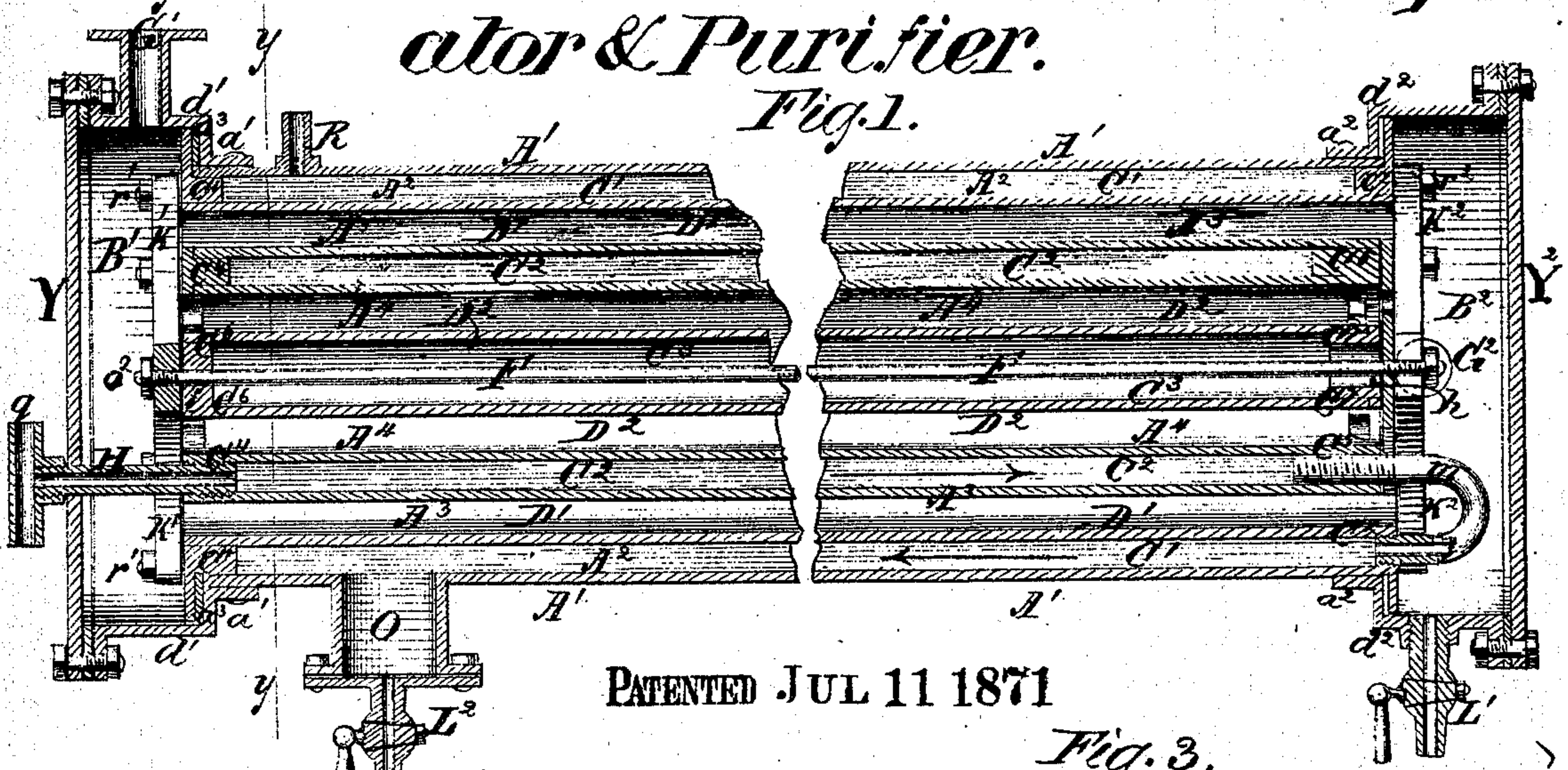


# J. Argalls. Steam Water Heater Attenuator & Purifier.

Fig. 1.



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Fig. 2.

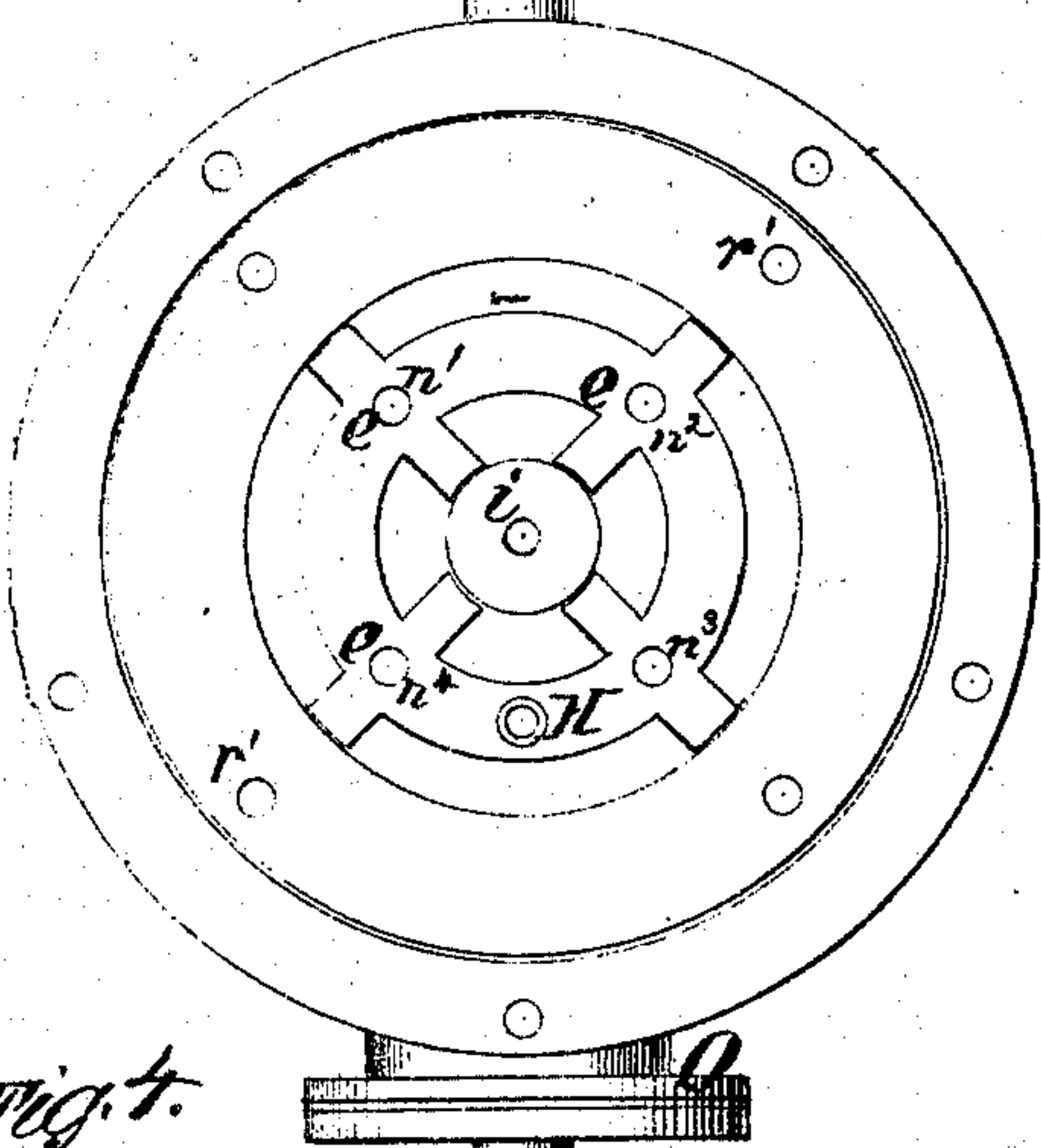
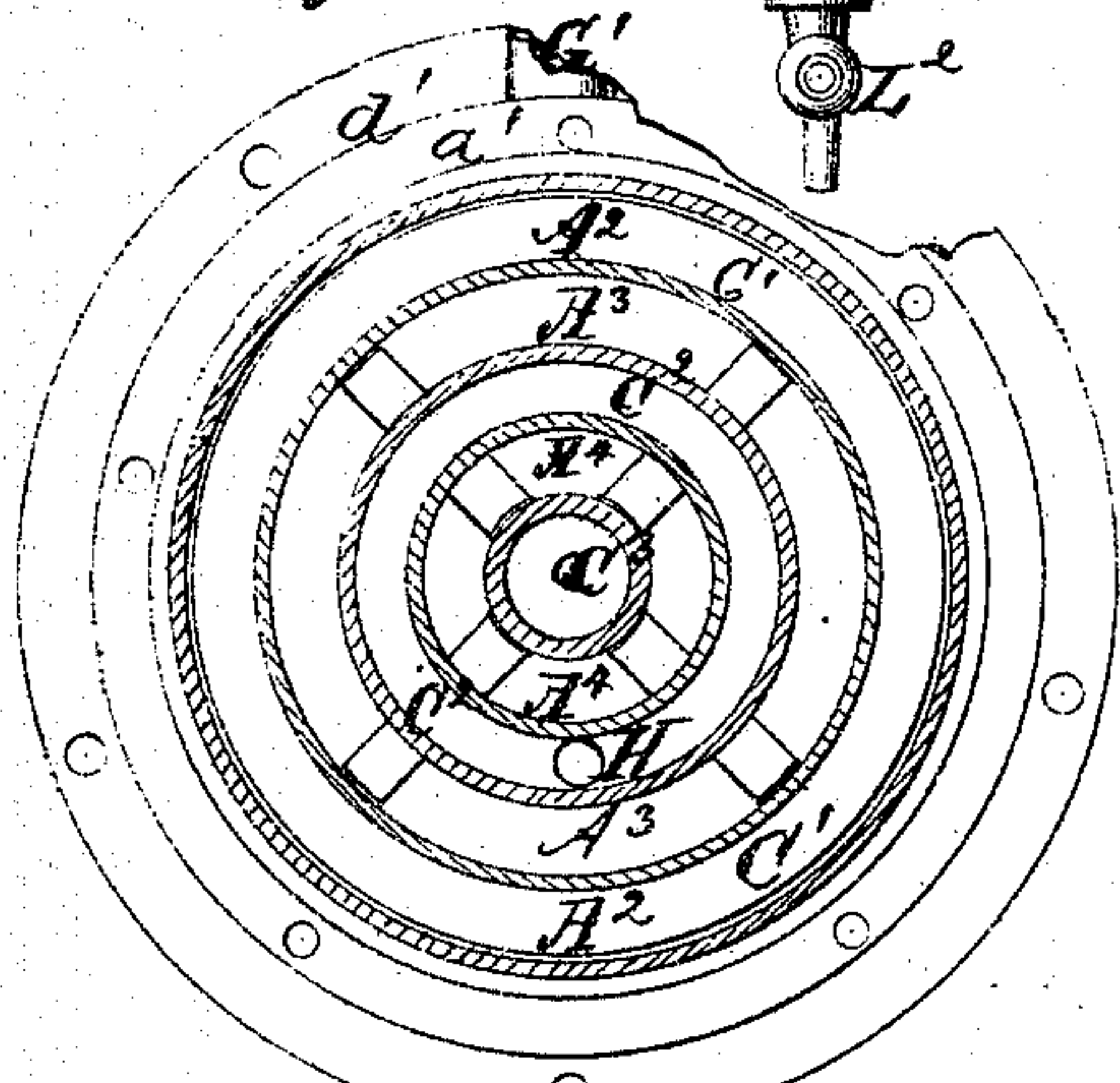


Fig. 4.



WITNESSES.

John Becker.  
J. C. Smith.

Fig. 3.

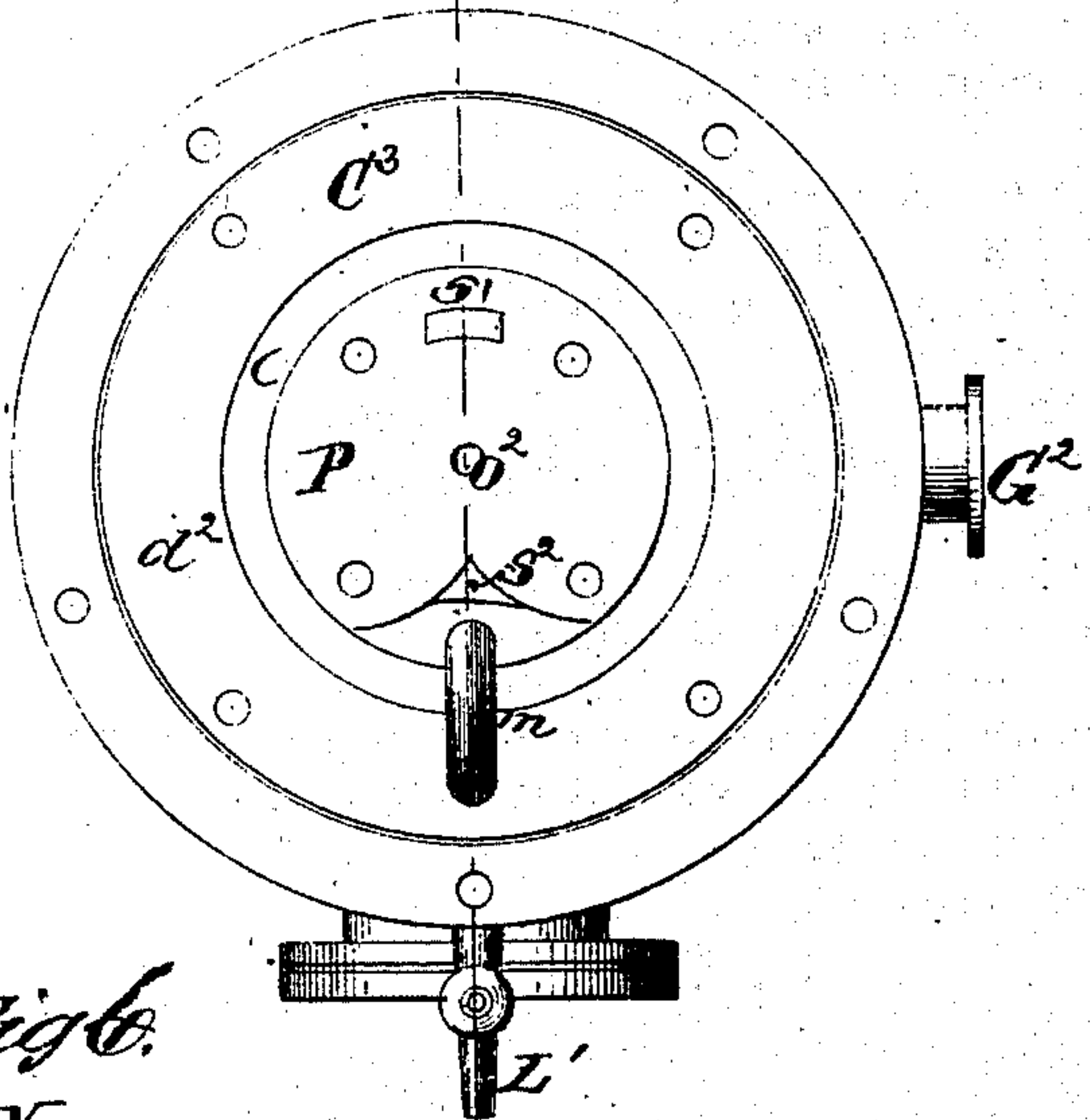


Fig. 6.

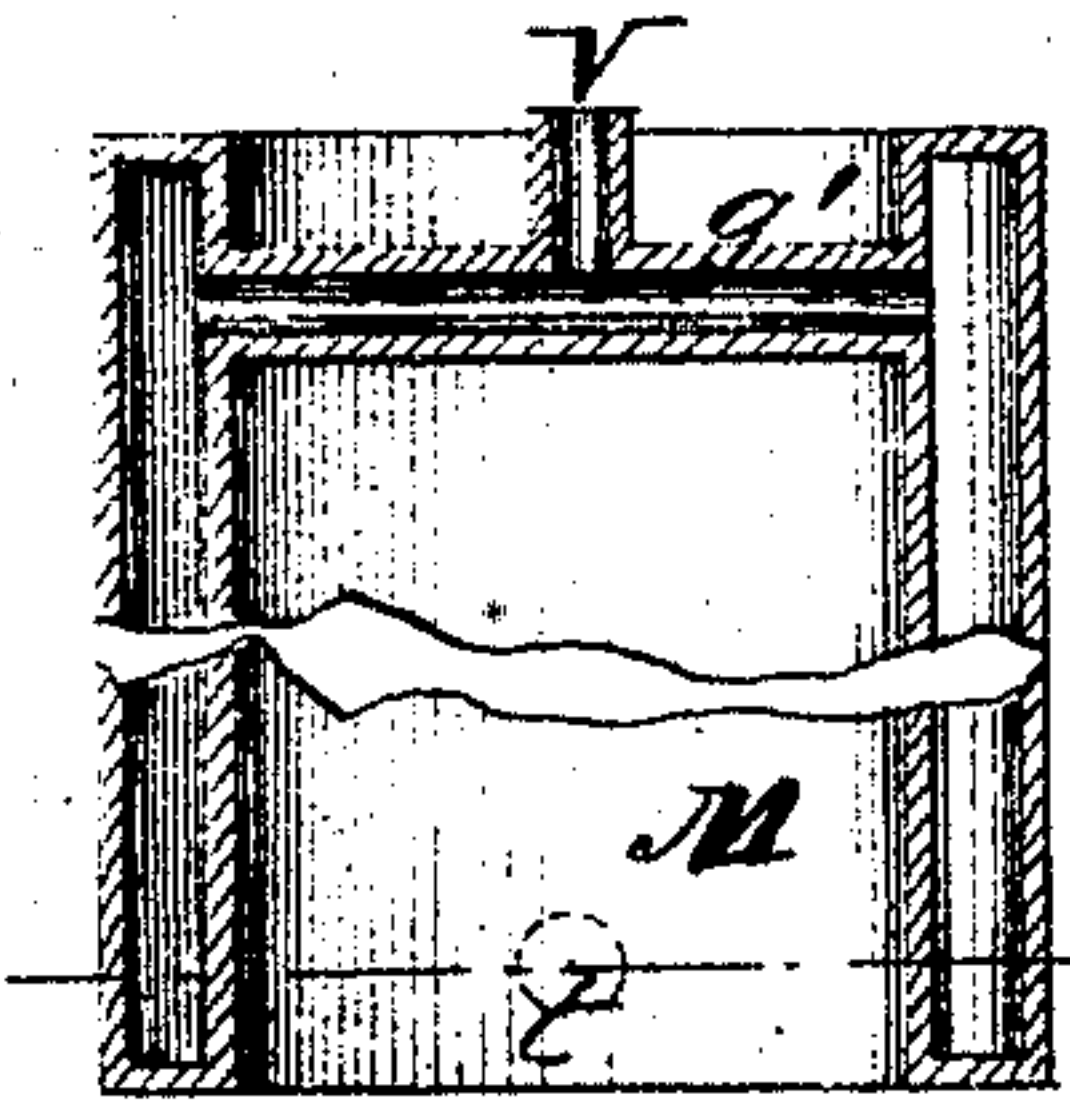


Fig. 5.

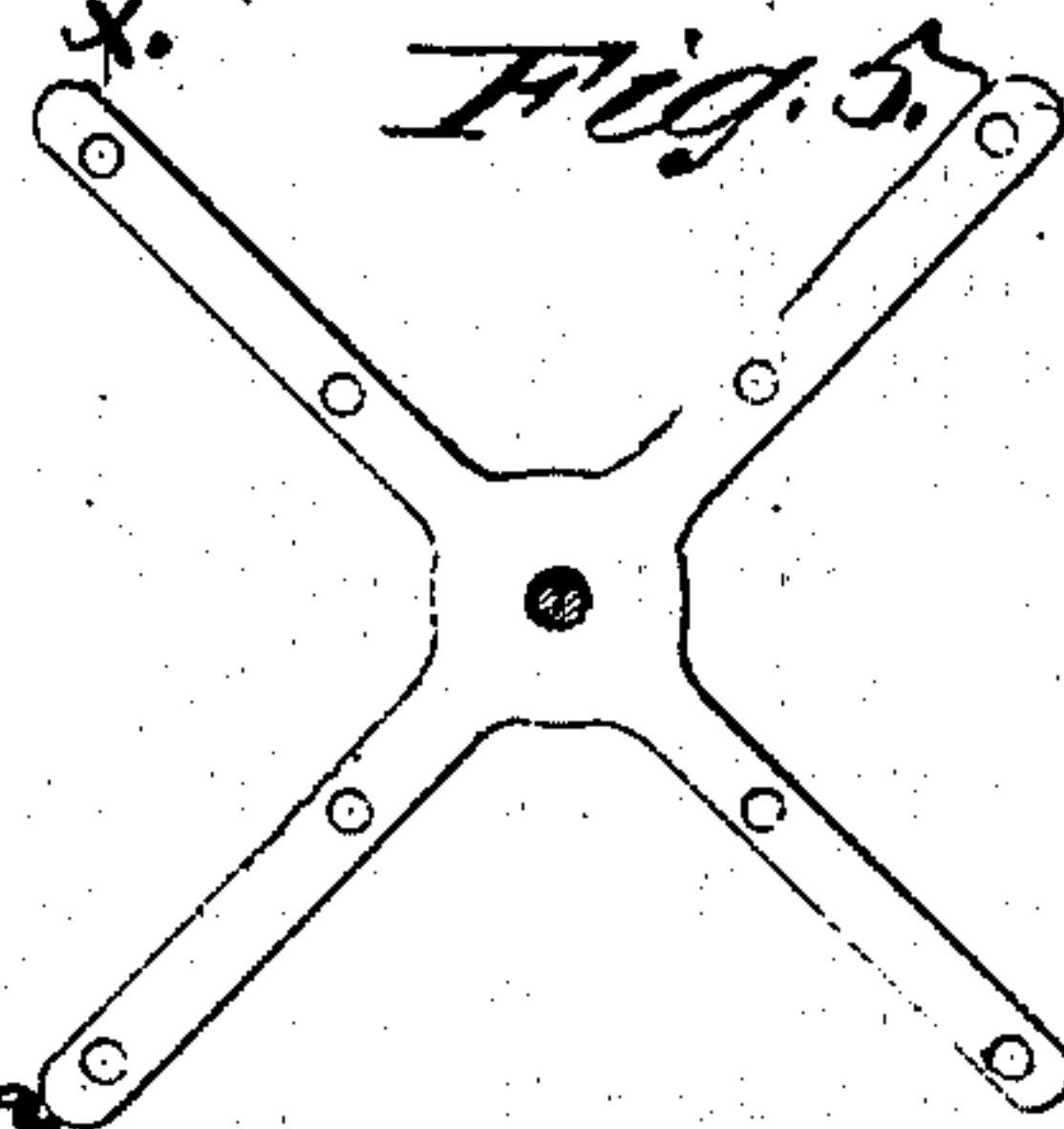
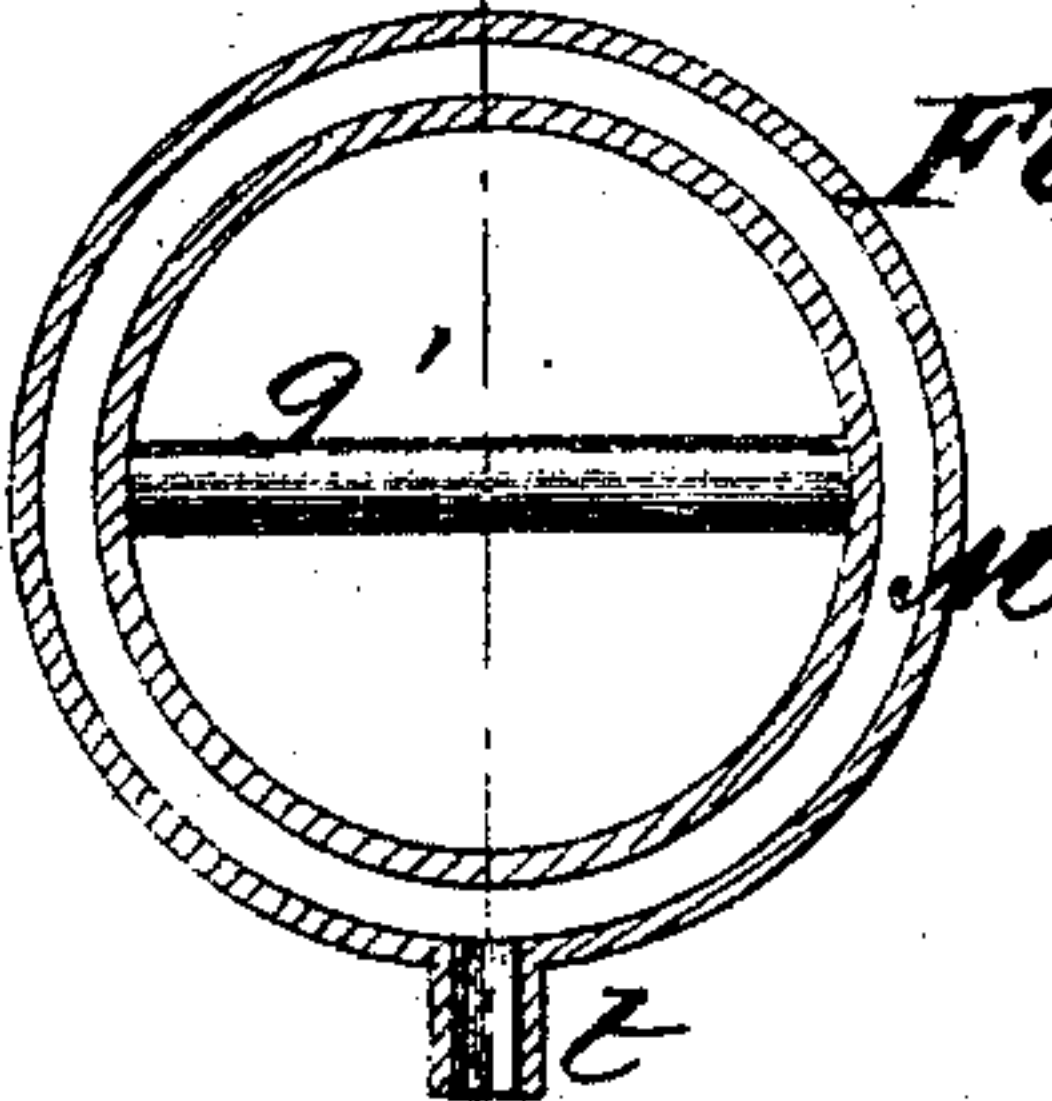


Fig. 7.



INVENTOR  
J. Argalls.

Attorneys.



# UNITED STATES PATENT OFFICE.

JAMES ARGALL, OF MINERAL POINT, WISCONSIN.

## IMPROVEMENT IN STEAM WATER-HEATERS.

Specification forming part of Letters Patent No. 116,792, dated July 11, 1871.

*To all whom it may concern:*

Be it known that I, JAMES ARGALL, of the city of Mineral Point, in the county of Iowa and State of Wisconsin, have invented a new and Improved Steam Water-Heater, Attenuator, and Purifier, which I call and designate as "Argall's Steam Water-Heater, Attenuator, and Purifier;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, which consists of two parts, reference being had to the annexed drawing making a part of this specification.

Figure 1 is a longitudinal section on the line *xx* of Fig. 3. Fig. 2 is a front view with the plate removed. Fig. 3 is a rear view with cover removed. Fig. 4 is a sectional view on the line *yy* of Fig. 1. Fig. 5 is a detached view of the spider. Figs. 6 and 7 are sectional views of the attenuator.

The heater is constructed as follows: It consists of the outside shell or cylinder  $A^1$ , which is made either of boiler-iron, cast-iron, or other suitable material. The front end of this cylinder is inserted in and encompassed by the flange  $a^1$  of the cylindrical steam-box  $B^1$ , and firmly riveted thereto. The rear end of cylinder  $A^1$  is similarly inserted in and encompassed by and riveted to flange  $a^2$  of the cylindrical steam-box  $B^2$ , which said steam-box is the counterpart of steam-box  $B^1$ . When made of cast-iron these said several parts are cast as in one piece. Inside of cylinder  $A^1$  is cylinder  $A^2$ , which is constructed of the same material and is of the same length, but two inches less in diameter. The front of said cylinder  $A^2$  is fitted within the base of the angular ring  $c$ , which said base is furnished with a shoulder, wherein said cylinder rests and to which it is firmly riveted by attaching cylinder  $A^2$  to the base of ring  $c^1$ . In this manner the perpendicular of said ring is projected outward in a horizontal manner, thus forming flange  $a^3$ . The rear end of cylinder  $A^2$  is inserted in and encompassed by the ring  $c^2$ , having also a shoulder, in which the end of the cylinder rests and to which it is firmly riveted. This cylinder works in cylinder  $A^1$  in a telescopic manner, and when ready for use the flange  $a^3$  overlaps and rests on the base or shoulder  $d^1$  of the steam-box  $B^1$ , and bringing thereby the rear end of cylinder  $A^2$  on a level with the shoulder or base  $d^2$  of box  $B^2$ , and

over which is placed a rubber gasket, secured by the ring  $c^3$ , rendering the same water-tight and forming the cylindrical water-chamber  $C^1$ . The water-chamber  $C^2$  is formed by conjoining cylinders  $A^3 A^4$ , cylinder  $A^3$  being four inches and cylinder  $A^4$  six inches less in diameter than cylinder  $A^1$ , but of the same length. Cylinders  $A^3 A^4$  are joined at their ends by the rings  $c^4 c^5$ , which said rings are provided with the cam-like projections  $e$ , whose office and purpose are to keep separate and equidistant the cylindrical water-chamber  $C^2$  from the cylindrical water-chamber  $C^1$  and from the central cylinder  $C^3$ , thus forming the steam-chambers  $D^1 D^2$ . The under side of the cammed rings  $c^4 c^5$  is of a T-shape, in the shoulders of which rest the cylinders  $A^3 A^4$ , and secured thereto by riveting; or they can be conjoined and secured in the same manner as cylinders  $A^1 A^2$ , thereby enabling of their being readily taken apart and cleaned. The central cylinder  $C^3$  consists of a single cylinder, sunk in and riveted to the stay-rings  $c^6 c^7$ . The front end of the cylinder is covered with the circular cap  $i$ , the rear end being open, as seen by  $h$ . Other cylindrical chambers, constructed in the manner as hereinbefore described, can be substituted in lieu of cylinder  $C^3$ , if thought necessary. These several cylinders, sliding, the one into the other, in a telescopic manner, are secured fast in position on the front side by means of the spider  $K^1$  and the bolt  $F$ , which extends throughout the length of the cylinders and through the center of the spider  $K^1$ , where it is secured by the nut  $o$ . Spider  $K$  is further secured by the stud-bolts  $n^1 n^2 n^3 n^4$ , which screw in the center of the cams  $e$  of rings  $c^4 c^5$ , and also by the bolts  $r$ ; on the rear side they are secured by the circular cap  $P$ , which cap extends to the outer edge of cylinder  $A^3$ , thereby covering the steam-passage  $D^2$ . Over this is placed the spider  $K^2$ , fastened in the same manner as spider  $K^1$ , the bolt  $F$  passing through the center and secured by the nut  $o^2$ . Cap  $P$  has two apertures,  $s^1 s^2$ , to admit of the escape of the steam entering into the steam-passage  $D^2$ . The object of stopping up the said passage and retarding and forcing the steam through said apertures is to more thoroughly economize and utilize its caloric. The cylindrical steam-boxes  $B^1 B^2$  are covered by the circular plates  $F^1 F^2$ , which are securely bolted thereto and rendered perfectly tight by rubber gaskets.



Into steam-box  $B^1$  opens the receiving-pipe  $G^1$ ; through its cover  $I'$  also passes the water-pipe  $H$ , which extends through the said steam-box and screws and opens into the water-chamber  $C^2$ . The box  $B^2$  is furnished at its lower end with the stop-cock  $L^1$  for the escape of condensed water, and at the side with the steam-escape pipe  $G^2$ , being the counterpart of pipe  $G^1$ . The water-chambers  $C^1$   $C^2$  are connected by means of the return-pipe  $m$ , which screws into the same by a right-and-left screw-thread. At the lower front end of cylinder  $A^1$  is attached and firmly riveted the circular reservoir on deposit-box  $O$ . The mouth of reservoir  $O$  is covered by a circular plate, being either of a flat or conical shape, and centering in the stop-cock  $L^2$ . To cylinder  $A^1$  is also attached, at its upper front end, the pipe  $R$ , leading into the boiler and connecting the water-chambers of the heater with the boiler.

The attemperator  $M$  consists of the cylindrical steam-chamber, which is constructed in the same manner as water-chamber  $C^2$  of the heater, its size and dimensions being dependent on the sized tank in which it is intended to be used. At its upper end, and crossing it transversely, is distributing-pipe  $g'$ , in the center of which is the receiving-pipe  $v$ , which connects with the exhaust-steam pipe  $G^2$  of the heater. At the lower part, if necessary, is another pipe, the counterpart of pipe  $g'$ , and also the escape-pipe  $t$ , which faces toward the outside.

The manner in which my machine is operated is as follows: The heater is attached to the engine so that the exhaust steam therefrom passes into the receiving-pipe  $G$ , by which it is conducted into steam-box  $B^1$ , which same it fills instantaneously, and whence it passes, through the steam-chambers  $D^1$   $D^2$ , into the exhaust-steam box  $B^2$ , from where it escapes either through

stop-cock  $L^1$  as condensed water or through escape-pipe  $G^2$ . The water-pipe  $H$  being connected with the pump, the water is forced through it into the water-chambers  $C^2$ , from where it passes into the water-chamber  $C^1$  through the return-pipe  $m$ . As a consequence, after the water in chamber  $C^1$  has risen to a level with chamber  $C^2$ , both will equally fill together until water-chamber  $C^1$  is full, the water-course being indicated by the straight arrows. After water-chamber  $C^1$  is full, the water, which is now boiling, is forced through pipe  $R$  into the boiler, as will be seen.

My heater consists of a series of concentric cylinders, the one inclosing the other in such a manner as to leave an inch space, (more or less, as is advisable or thought necessary,) forming thereby the alternate cylindrical water and steam-chambers  $C^1$   $C^2$  and  $D^1$   $D^2$ . The attemperator is placed in the water-tank so that the escape-pipe  $t$ , which may be furnished with a safety-valve, projects through on the outside. The receiving-pipe  $v$  is then connected with the exhaust-pipe  $G^2$  of the heater, through which the exhaust steam from the heater passes into the distributing-pipe  $g'$ , and from there is conducted into the cylindrical steam-chamber  $M$ , which same it instantaneously fills, and after expending its caloric escapes through pipe  $t$  as condensed water or very exhaust steam.

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

A steam water-heater, consisting of a series of concentric cylinders, with the parts connected therewith, constructed and arranged substantially as and for the purposes herein shown and described.

Witnesses:

JAMES ARGALL.

E. P. WEBER,

R. CHAS. EVANS.