

J. J. Miller,

Steam Pump.

N^o 43,952.

Patented Aug. 23, 1864.

Fig: 1.

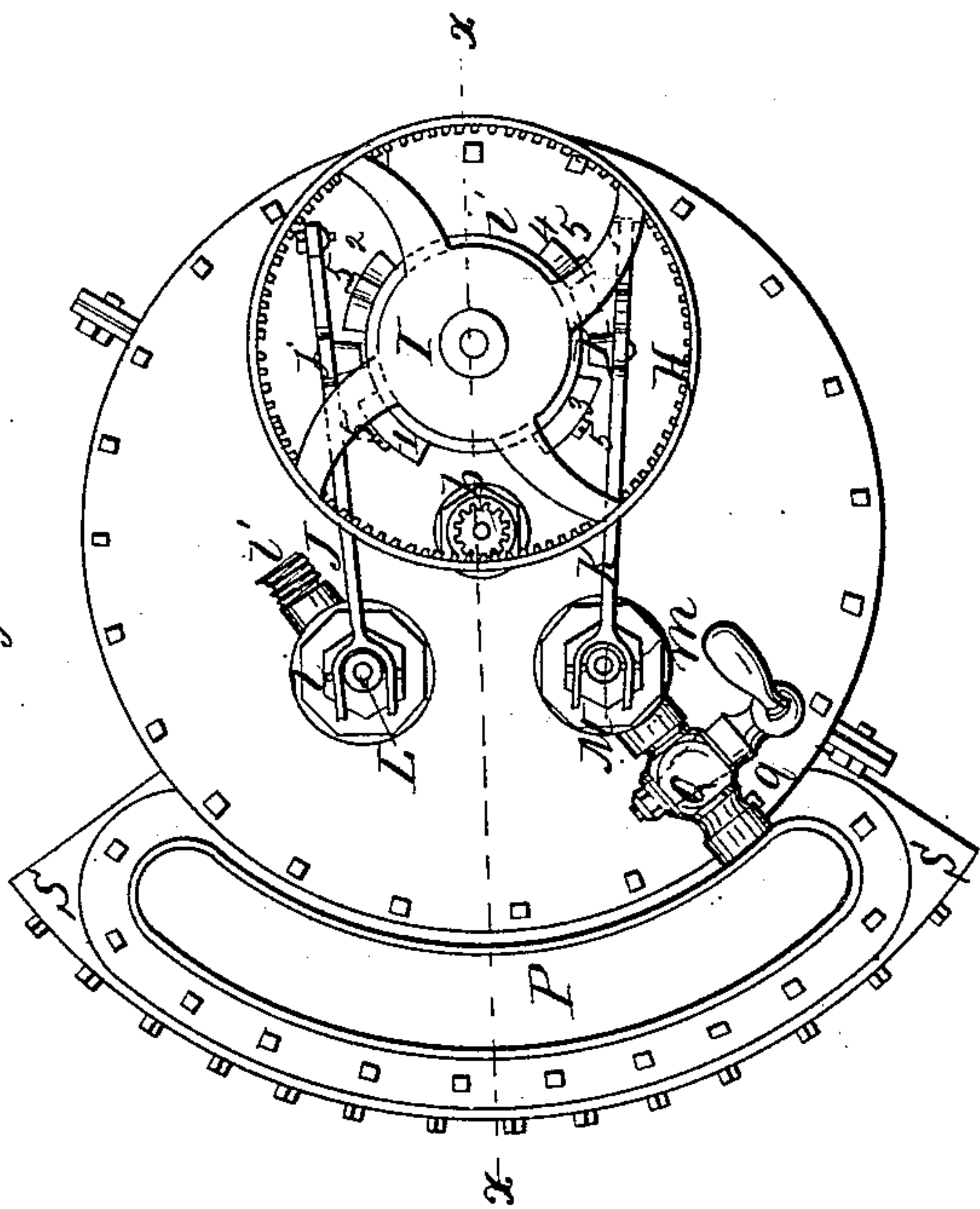
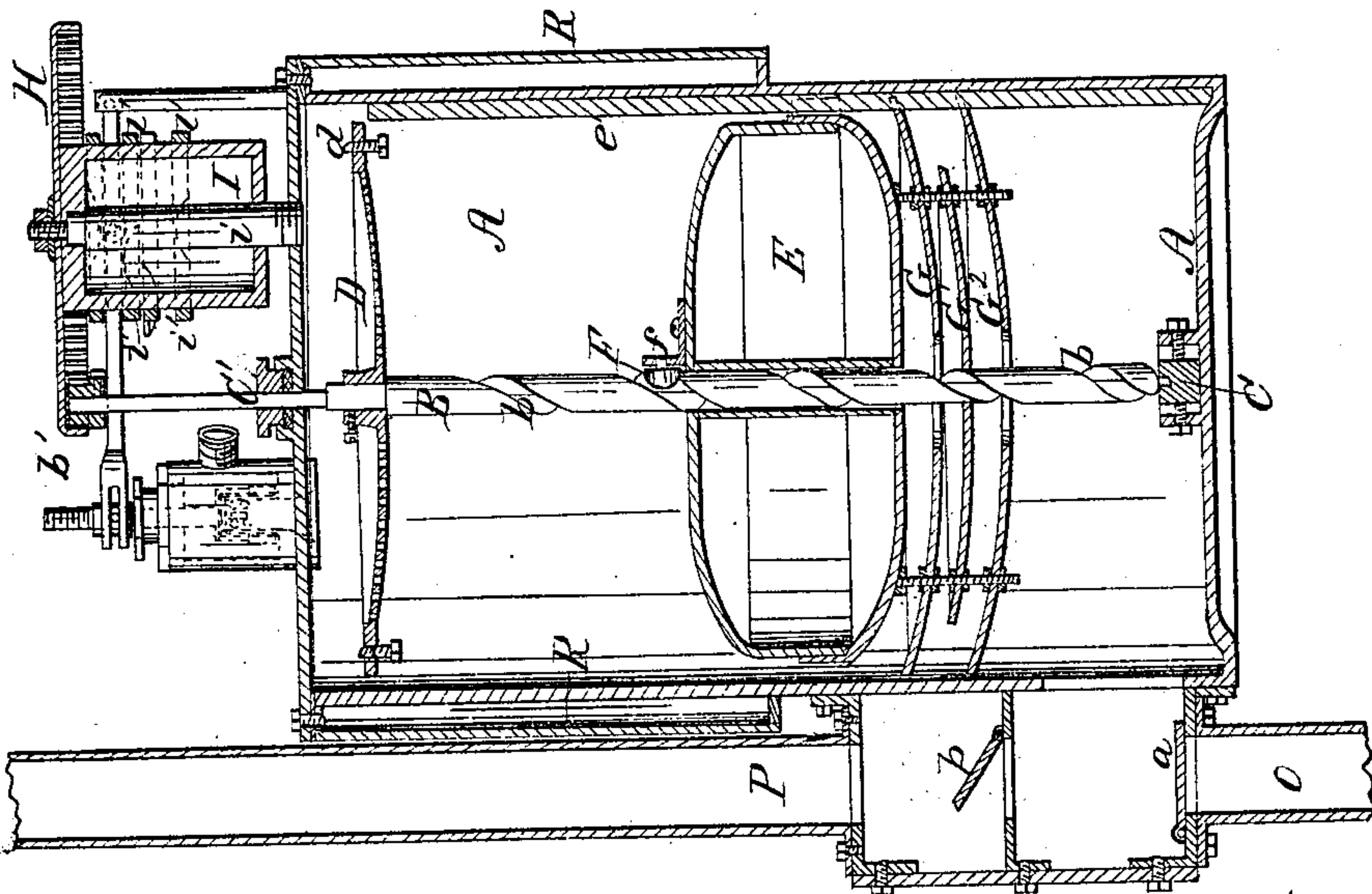


Fig: 2.



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IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. 43,952, dated August 23, 1864; antedated February 15, 1863.

To all whom it may concern:

Be it known that I, JOHN JACOB MILLER, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Steam-Pump; and I do hereby declare the following to be a full and exact description of the same; reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top view of my improved pump. Fig. 2 is a vertical section of the same at *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

The subject of my present invention is an automatic steam-pump in which the steam acts directly upon the surface of the liquid in the pump-cylinder without the intervention of a piston, and is afterward condensed to cause or permit the refilling of the cylinder with liquid.

The invention particularly relates, first, to devices employed to operate the steam and water valves; second, to devices employed to protect the steam from condensation by contact with the water.

To enable others skilled in the art to which my invention appertains to fully understand and use the same, I will proceed to describe its construction and operation.

A is a steam-cylinder.

B is a vertical shaft, resting in a step, C, and journaled at top in a stuffing-box, C'.

b is a deep spiral groove, running nearly from end to end of the shaft B.

D is a perforated concave plate, secured to the shaft B near the top of the cylinder A.

E is a hollow metal float, fitted to work loosely upon the shaft B. The float E is provided with one or more pins or flanges, *e*, which work in guides *e'* on the side of the cylinder, so as to prevent the rotation of the said float as it rises and falls.

F is an anti-friction roller, pivoted in a lug, *f*, on the float, and engaging in the spiral groove *b*, so as to impart a rotary motion to the shaft B, so as to impart a rotary motion to the shaft B by the vertical motion of the float.

G G' G² are a series of metal plates, secured at some distance apart beneath the float E. The upper and lower plates, G G², may nearly fit the internal diameter of the cylinder and

have apertures of considerable size in their centers, as shown, while the center plate, G', may be of smaller diameter than the others, but fit more closely to the shaft B, so that water cannot pass from above to beneath the plates, or vice versa, without traversing their entire surface. The shaft B carries at top a pinion, *b'*, which gears with a cog-wheel, H, secured to a drum, I, which is journaled upon a standard, *i*, on the top of the cylinder. The drum I has upon its periphery a number of cams, 1 2 3 4, which act upon rollers *j k*, projecting from levers J K, so as to operate the steam and water valves L M in the manner hereinafter to be explained. The said cams are attached to rings *i'*, secured to the drum I in any suitable position by means of set-screws 5, so as to regulate the length of stroke as may be needful.

l m are the valve-chests in which the valves L M work. The said valve-chests communicate with the interior of the cylinder. The valve-chest *l* is supplied with steam through a port, *l'*.

O is the induction water-way guarded by valves *o*. P is the induction water-way guarded by valve *p*.

S is the chest of the induction and eduction water-valves. Fig. 1 shows the segmental form adopted for the said water valve-chest and water-ways in the present illustration. They may, if preferred, be located beneath the cylinder, or in any other suitable position and form, and in any case the valves will be constructed and arranged in any number and manner which may be found desirable.

Q is a pipe connecting the exit water-way P with the valve-chest *m*. The said pipe is provided with a regulating-cock, *q*.

R is a jacket or closed air-chamber to protect the steam within the chamber from too rapid condensation by radiation of heat.

The operation is as follows: The cylinder being filled with water, and the float consequently in its upper position, steam enters through the valve L, and, pressing upon the surface of the water, forces it downward and outward through the eduction-way P till the cylinder is nearly depleted. The float E, descending by its own weight, imparts rotation to the shaft B, which, through the pinion *b'*, is communicated to the wheel A, and thereby to

the drum I. As the float approaches its lowest portion the cam 3, passing over the roller *k*, opens the valve M, which is almost immediately closed by the cam 4. The opening of the said valve causes a quantity of cold water to be injected on top of the plate D, which water, by reason of the perforation and rotation of the said plate, is distributed in a fine shower upon the steam within the cylinder, effecting the instantaneous condensation of the said steam. The partial vacuum thus produced within the cylinder causes it to be again filled with water through the induction-way O by atmospheric pressure, and the float E, rising by its own buoyancy, rotates the shaft B in a reversed direction, which, as the float approaches its highest position, opens and closes the steam-valve L by means of the cams 1 2, roller *j*, and lever J, admitting a sufficient quantity of steam to again expel the water within the cylinder through the exit-way P, as before explained. If the pressure of steam be found too great, the cams 1 and 2 are by means of the set-screw 5 secured at a less distance apart, so as to hold the steam-valve L open a shorter time, or, if the pressure be too light, the said cams are set farther apart. In like manner the cams 3 and 4 are adjusted at such a distance apart that the valve M will be kept open just long enough to admit sufficient water to effect the condensation of the steam. A heavy rim, *d*, applied to the perforated plate D near its edge, operates as a fly-wheel to equalize the motion of the cams, and cause them to act with sufficient force upon the valves.

The valves shown in the present illustration are such as described in my application of even date herewith for Letters Patent for an improvement in valves. Other forms of valves may, however, be employed, the mechanism for operating the valves being suitably adapted thereto.

The plates G G' G² in a measure confine the upper stratum of water, so that that heated by contact with the steam shall not mingle

with the main body of fresh water introduced into and expelled from the cylinder. The same stratum of heated water being thus continually in contact with the steam, the latter is preserved from the rapid condensation which would occur if it were thrown into contact with fresh water at every stroke. This result may be more fully realized by the introduction of a small quantity of oil or other fatty matter, which being lighter than the water, will float thereon, always remaining within the cylinder and preventing contact between the steam and water.

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

1. The combination of the float E and rotary shaft B, operating, substantially in the manner explained, to open and close the steam or water ports of the cylinder A, as explained.

2. The perforated and rotating plate D, employed in the described combination, with the shaft B and float E, to distribute the condensing-water, as explained.

3. The plates G G' G², employed in the described combination, with the float E, to prevent the mingling of the heated with the fresh water, as explained.

4. The use of a stratum of fatty matter employed in a steam-pump, operating, substantially as above described, to prevent injurious contact between the steam and water, as set forth.

5. The manner of regulating the length of stroke by adjusting the cams 1 2 3 4, substantially as set forth.

6. The combination of the cylinder A, spiral shaft B *b*, perforated plate D, float E, plates G G' G², and valves L M, all constructed, arranged, and operating substantially as and for the purposes set forth.

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