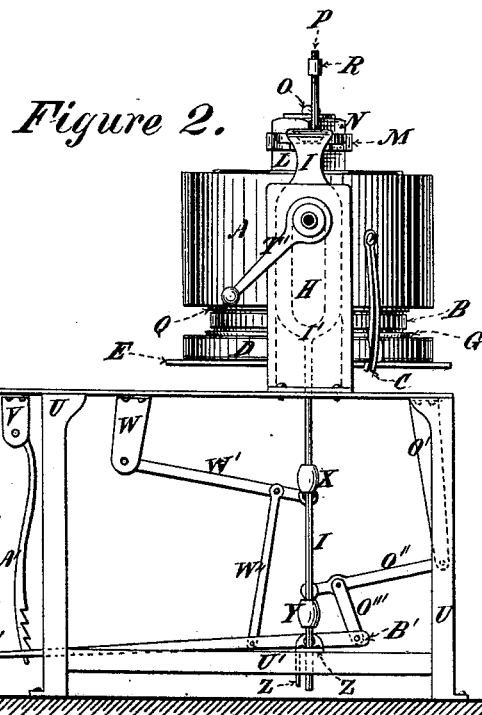
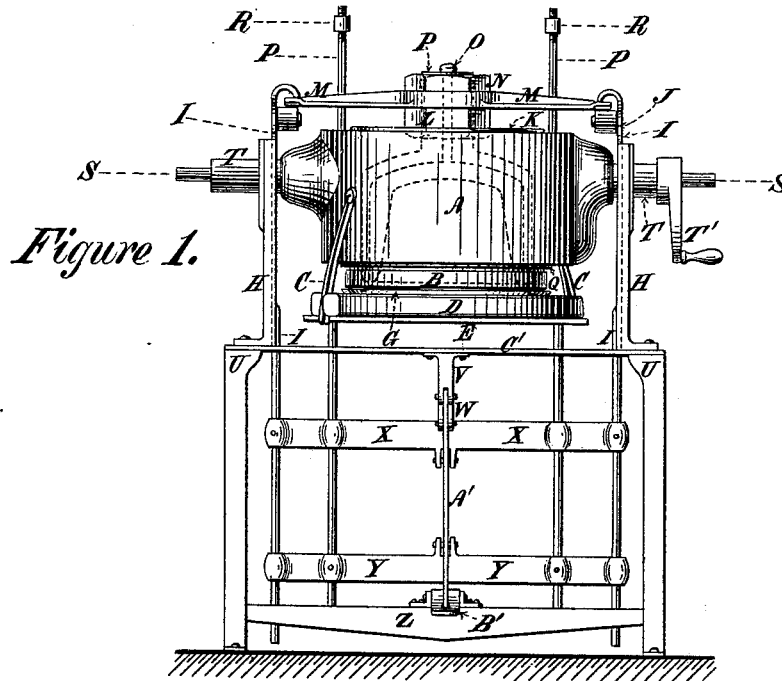


J. SURERUS.
Hat-Finishing Machine.

No. 220,774.

Patented Oct. 21, 1879.



Witnesses:

Edward H. Nicoll.
Frank H. J. Fyatt.

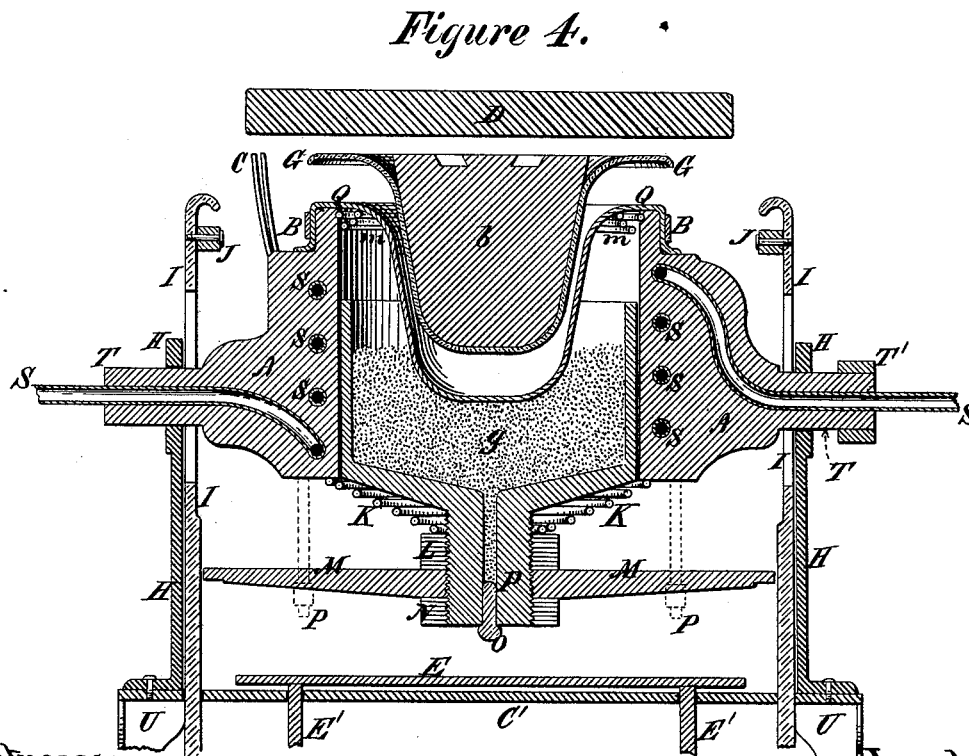
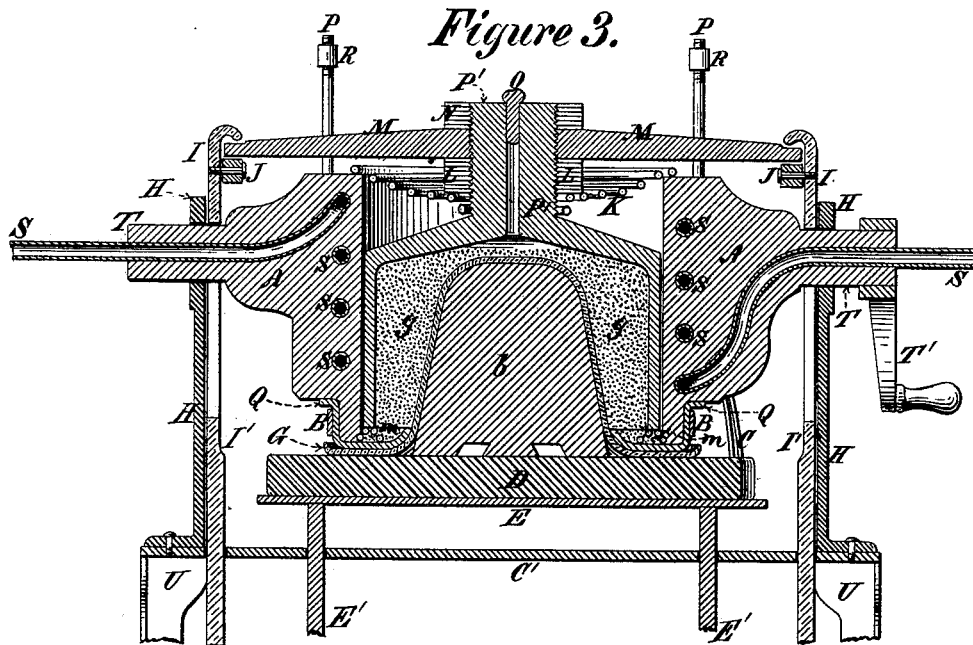
Inventor:

Jacob Surerus
By his attorneys
Edmond Nicoll

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Edward H. Nicoll
Frank H. Hyatt.

Inventor:
Jacob Surerus,
By his Attorneys
Edmonds Nicoll

UNITED STATES PATENT OFFICE.

JACOB SURERUS, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN HAT-FINISHING MACHINES.

Specification forming part of Letters Patent No. **220,774**, dated October 21, 1879; application filed April 29, 1879.

To all whom it may concern:

Be it known that I, JACOB SURERUS, of the city of Newark, county of Essex, and State of New Jersey, have invented a new and useful Machine to be used in the Manufacture of Hats, of which the following is a specification.

The invention relates to machinery and combinations of machinery, hereinafter described, to be applied to the production of certain desirable results, also hereinafter described, in the manufacture of fur or wool hats—to wit, in the final drying and forming and finishing of the same. After a hat-body has been subjected to the several well-known preliminary operations up to that point involved in its manufacture, it receives what is usually called its “trimming”—that is, the leather, or “sweat” and binding, &c., are stitched to it. During this operation the hat, owing to the pressure, warmth, and moisture of the operative’s fingers, loses more or less of the exactness of its shape, and also of the uniformity of its surface luster or other finish. Moreover, the hat has not yet been brought to that state of thorough dryness throughout its substance on which depends the future permanency of its form, nor has the last fine and uniform finish been imparted to its surface. It becomes therefore necessary to extract from the hat all the moisture remaining in its substance, to impart to its entire surface a uniform finish of the kind desired, and to shape it once more into that form which it is intended that it shall permanently retain. After these operations have been performed the hat is ready for wear.

Heretofore, the operations which I have described have generally been performed as follows: The hat having been stretched upon a block of the desired style, the operator would apply a heated iron to the surface of the ground and top of the hat, repeating the application as often as his experience indicated it to be necessary. The operator would also rub or wipe the said surfaces with a bunch of thoroughly dried and heated rags until the aforesaid desirable qualities had been attained. Formerly a similar process was also employed to finish the brim of the hat; but now, so far as the brim is concerned, the result desired is usually attained by laying the brim upon a flange of the desired form, and then simply

laying and allowing to remain upon the same for a sufficient length of time a quantity of sand confined in a bag and heated to a high temperature. This last-mentioned method of treating the brim is much more desirable than that described as applied to the grounds and tops of hats, inasmuch as it is comparatively economical of time, secures a comparatively more uniform and even pressure, and the subjection of every portion of the brim subjected to its influence to a comparatively - uniform degree of heat for the purpose of drying; and, moreover, said process imparts to the surface of the hat what is known as a “dead-finish,” which is now deemed much more desirable than the more or less glazed surface imparted by the former ironing and rag-rubbing process, not only because such dead-finish is altogether preferred as a matter of fashionable taste, but also because of its advantages in the direction of practical utility, a glazed surface being always more or less liable to become spotted by exposure to water—as, for instance, rain-drops—and a dead-finish being almost absolutely free from any such objection.

I am also aware that Letters Patent No. 205,326, dated June 25, 1878, have been issued to one E. Woolley for an improvement in hat-finishing machines, whereby the said process, hereinbefore described, is applied to hats by means of machinery.

All of the methods which I have described are, however, more or less objectionable. The ironing and rag-rubbing process is altogether inferior to the process in which hot sand is employed for the reasons already stated, and the hot-sand process, as at present developed and made use of, is not applied to the tops and grounds of hats, it being practically impossible to apply the bags of sand now employed in such a way as to affect simultaneously those surfaces of a hat which are above its brim, owing to their irregularity of form and angularity.

The hot-sand process is further objectionable, as at present developed and made use of, because it is difficult to heat the bagged sand properly and uniformly to sustain the temperature while it is on the hat, and to eliminate all moisture from the sand so bagged and handled,

and because the weight of the bags necessary to produce the required pressure is so great as to render the operation of lifting them back and forth from the hats to the place of heating a severe manual labor; and because it is difficult, if not impossible, to bring the hot sand so bagged into uniform contact with those parts of the hat which it is desired to operate upon, and because of many other reasons familiar to those conversant with the trade.

The object of my invention therefore is to provide a machine which will rapidly and economically at the same time eliminate the moisture from the substance constituting the grounds and tops of fur or wool hats, develop over the entire surface thereof a uniform and desirable finish, and impart to the hat the final impression of the form which it is desired that the hat should permanently retain.

My invention, therefore, consists of combining in an organized machine the novel reversible cylinder, the novel cylindrical-shaped piston-head and piston, the novel system of levers, and the other mechanical parts, some of them novel and some of them already well-known, as hereinafter more fully described, whereby the top and ground of a fur or wool hat may be finally finished with the assistance of sand heated and operated upon by said machine, or, if not of sand, then with the assistance of any other substance which may be similarly used to affect similar results.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a front elevation of my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section of that part of my machine which rests upon or rises above the table-top C'. Fig. 4 is also a vertical longitudinal section of the same, showing the cylinder A inverted on its axis preparatory to introducing or removing a hat, of a hat stretched on a block, b, and of the flange D raised and separated from each other, so as to show more clearly the method of using my machine.

On the table-top C', supported by legs U U, strengthened by cross-braces Z and U in the usual manner, the whole structure being sufficiently strong to remain rigid during the operations hereinafter described, are secured by bolts or otherwise a pair of upright standards, H H, in which is mounted the cylindrical body A (hereinafter called the cylinder A) in such a manner as to admit of the free revolution of the same on its axis T T.

I make this cylinder A of a single casting of iron, though other metals or substances might be employed. Two opposite sides of said cylinder are so shaped as to form projections which, when properly finished as shown in the drawings, constitute the axles T T, on which the cylinder itself revolves. Entering the walls of said cylinder through said axles, as shown in the drawings, Figs. 3 and 4, is the steam coil or worm S S, which passes spirally from top to bottom of said cylinder

within the walls thereof. I cast the cylinder itself around said coil.

Connections may be made with the extremities of said worm or coil in a manner well known, whereby a current of steam or hot air from gas-jets or other sources of heat may be supplied for heating purposes; but I regard steam as the best means of heating in this case wherever the same is attainable.

On one of said axles is secured the arm and handle T', to enable the operator easily to revolve or invert the cylinder.

Within the cylinder A, and fitting the same as exactly as possible, is the piston-rod P', having a peculiarly-shaped head, (see Figs. 3 and 4,) which piston rod and head I make out of a single casting of iron, though it might be made of other metals or substances, and shall hereinafter term the "cylindrical piston P'," meaning thereby to designate the whole piston, including rod and head. The head of said piston, as already implied, is cylindrical in form, and the rod is centrally bored out, so that an opening extends from the extreme end of said rod completely through the center of the same, down to the bottom of the interior of the cylindrical head and opening thereinto. On the outside surface of said rod, throughout its entire length, is cut a strong screw-thread, on which are screwed up or down the strong nuts N and L, which serve to regulate the position of the cross-beam M on the said rod, and to keep it firmly fixed wherever desired.

O is the sponge, the use of which is to close the bore of said rod, thereby preventing the sand employed, as hereinafter described, from falling out when the cylinder A is inverted, and by reason of its porosity admitting the escape of any vapors or moisture from the interior of the cylindrical piston P', and also of the air within, when the same is compressed by the descent of said cylindrical piston, as hereinafter described.

The cross-beam M is constructed of metal or of any other substance which will insure rigidity. As already indicated, it may be adjusted at any point desired on the piston-rod, and when so adjusted is there secured by the nuts N and L. The said cross-beam, together with the entire cylindrical piston P', is guided in its upward and downward movements by the guide-rods P P, which are fixed into the cylinder A, and, passing through the said cross-beam, are fitted at their upper extremities with the nuts R R, the latter serving to regulate the distance along the rods P P which it is desired that said cross-beam and cylindrical piston should travel.

K K is a powerful spiral-shaped spring, secured by one of its extremities to the piston-rod at the point where the latter begins to expand into the said piston-head, and the other of its extremities resting upon the top of the cylinder A, as shown in Fig. 3. The use of said spring is to assist in raising the cylindrical piston after the same has been released

from the downward pressure of the levers, as hereinafter described.

m m is another large spiral spring, secured to the lower lip of the cylinder A, within the cylinder, said spring, when pressed flat, lying in a plane at right angles to the inner sides of said cylinder. The use of said spring is twofold, one being to increase the width of the edge or lip of the cylinder A, in order to prevent a hat from falling into the cylinder A when the same is inverted, as represented in Fig. 4, and the other use being to assist in preventing injury to the hat-brim when the cylindrical piston P' is forced down, as hereinafter described, by breaking the shock of the latter's descent.

Fitted into grooves within the standards H H, in such a way as to travel easily and smoothly up and down within the same, (see Fig. 2,) are the rods I I. These rods, up to the point I' I', as shown in Fig. 3, are of the ordinary shape. At this point, however, the rod begins to be broadened and flattened, so as to fit the said grooves in the standards H H, (see the dotted lines, Fig. 2,) and in said rods, so broadened and flattened, as aforesaid, is cut a longitudinal opening, to admit of said rods gliding up and down within the standards H H, in spite of the axles T T, which pass through such longitudinal openings on their way to rest on the standards H H.

The width of said longitudinal openings is, of course, a trifle greater than the diameter of said axles, and the length of said openings is sufficient to enable the rods I I to travel up and down the distance which may be desired, as hereinafter described.

The upper extremities or heads of the rods I I are also flattened and broadened, as the already-described portions of the same which slide within the standards H H, and in which the longitudinal openings are cut, as will be readily perceived by reference to the Fig. 2. The extreme tops of said rods are bent inward toward the cylinders already described, the portions so bent being about the width of the cross-beam M at its extremity. The said rods are thus enabled to engage with the cross-beam M along the whole width of its extremities, for the purpose of a downward pull.

J J are guide-rollers for the purpose of guiding and steadying the cross-beam M on its way to and in the position in which it becomes engaged with the rods I I.

Following the rods I I in their course below the table-top C', we find them passing through the cross-beam X X, (see Fig. 1,) and securely bolted to the latter. To the cross-beam X X is in turn attached, by a pivot-fastening or its equivalent, one extremity of the lever W', the other extremity of which is attached also by a pivot-fastening or its equivalent to the bracket W. At a point along the length of the lever W', as shown in Fig. 2, one extremity of the connecting-rod W'' is attached by a pivot-fastening, or its equivalent, to said lever

W'. The other extremity of said connecting-rod is, in turn, attached by a pivot-fastening, or its equivalent, to the main treadle-lever B'.

E is a metallic platform of sufficient weight to fall back by its own gravity onto the table-top C' whenever said platform is released from the raising force applied to it through the system of levers hereinafter described. Said platform's weight must be sufficiently great also to raise, by its falling back into the table-top C', as aforesaid, the rods I I, bearing with them the cylindrical piston P', and thus to bring my machine automatically into that position in which it is ready for an inversion of the cylinder A, as hereinafter described. The platform E is fastened to the two sliding rods E' E', which slide through the cross-beam X X, and are fastened into the cross-beam Y Y, through which they also pass.

The cross-beam Y Y is at its center attached by a pivot-fastening or its equivalent to one extremity of the lever O'', the other extremity of which is similarly connected with the end of the bracket O'. To the lever O'' is in turn attached, at a point along its length, as shown in Fig. 2, one extremity of the connecting-rod O''', by a pivot-fastening or its equivalent. The other extremity of said last-mentioned connecting-rod is in turn similarly fastened to the extremity of the main treadle-lever B', as shown in Fig. 2.

The main treadle-lever B' is itself attached by a pivot-fastening or its equivalent to the strong cross-beam Z Z.

V is a bracket, to the extremity of which is attached by a pivot-fastening or its equivalent the catch-bar A', the lower extremity of which passes through a slit in the main treadle-lever B'. Said catch-bar is indented with several ratchets on one side of its lower extremity, as shown in Fig. 2, and thus serves to enable the operator to set the main treadle-lever permanently at any desired degree of elevation.

D is a solid wooden flange, the upper surface of which may be made of any desired shape to fit the style of brim desired in the hat. When in use this flange is held in position by means of the spring-spreaders C C, which are fastened, as shown in the drawings, to the outside of the cylinder A, and engage with projections left in the wood of said flange.

G represents a hat stretched on a block, *b*, ready to be subjected to the operation of my machine.

Q is a circular piece of felting or other material placed over the lips of the cylinder A, to protect the hat during the operation of the machine. Said band Q is secured in its place by the metallic ring B, which slips tightly over the said band into its proper position, as shown in the drawings. Q is also partly secured and held in its place by the spiral spring *m m*, already described, which helps to keep said band Q in position when the cylinder A

is inverted, as shown in Fig. 4. This band Q I make use of in the ordinary operation of my machine; but when a particularly fine finish is desired, or an unusually fine and delicate quality of hat is to be operated upon, I substitute for the band Q the complete felt-hat body Q', as shown in Fig. 4.

g g is ordinary sand, free from all impurities or foreign matter, and thoroughly dried and heated by means of the appliances already described.

The operation of my said machine is as follows: Sufficient sand, as before described, is placed in the piston-head P' to insure the entire covering of the hat to be operated upon with said sand, when the cylinder A is turned into the position shown in Figs. 1, 2, and 3. The quantity of sand will of course vary with each size of hat to be operated upon, and may be readily determined by any experienced workman. As soon as said sand is thoroughly hot and all moisture wholly expelled therefrom by the influence of the heating apparatus described, the machine is ready for operation.

The operator, standing in front of the machine, Fig. 1, by means of the handle T', brings the cylinder A and all the parts attached thereto into the position shown in Fig. 4. He then adjusts the band Q, or the body Q', according to the quality of the hat to be operated upon, as before described, over the lips of the cylinder A, and secures it there. The hat to be operated upon having been previously stretched onto a block of the desired style is then (block and all) inverted, and its whole ground and top thrust into the cylinder A. Fig. 4 illustrates this part of the operation, showing the hat G on the block b in the act of descending into its place. The flange D is then laid over the hat-brim and block, and secured there by the spring-catches C C. The operator then again inverts the cylinder by the handle T', until the cross-beam M becomes engaged with the heads of the sliding rods I I.

As will be readily perceived, this inversion brings the hot sand into immediate contact with the hat, or its protecting body Q', as illustrated in Fig. 3. The operator then immediately applies his foot to the extremity of the main pedal-lever B', and presses downward. The force thus brought to bear upon said lever is, as will be readily understood from the foregoing description of my machine, applied and transmitted by means of the connecting-rod W'', the lever W', the cross-beam X X, and the sliding rods I I to the cross-beam M M, which is thereby forced down, carrying with it the piston-head P' P', and forcing the hot sand g g closely upon the hat G or its protecting body Q'.

Simultaneously, also, the force brought to bear upon the main pedal-lever B' is transmitted, by means of the connecting-rod O'', to the lever O', the cross-beam Y Y, the sliding rods E' E', to the platform E, which is there- by pushed upward until it encounters the flange

D, and pressed against said flange with precisely the same degree of force brought to bear, as already described, on the hat, resting on said flange from the opposite direction, and thus the hat is maintained in the proper position during the operation.

Having applied the required degree of pressure to the lever, the operator retains the pressure by engaging the lever with the catch-rod A', as hereinbefore described. Having allowed the machine to remain in this last described position for a few moments, (the length of time will, of course, vary with the condition of the hat to be operated upon,) the operator disengages the lever B'. Thereupon the platform E falls back upon the table-top C', bringing the whole machine, as will be readily understood from the foregoing description, into the same position in which it was when the operator began to apply his foot and downward pressure to the main pedal-lever B'. The cylinder A is then again inverted, the flange D removed, and the hat withdrawn. The entire surface of the top and ground of said hat will now be found to be beautifully finished and ready for the market, the whole operation having consumed about one-third of the time required to produce an inferior result without my machine.

Immediately on withdrawing the hat operated upon from the machine, the latter is all ready for the same operation on another hat, which has merely to be introduced in place of the hat withdrawn, and the aforesaid operation repeated.

What I claim as new, and desire to secure by Letters Patent, is—

1. The reversible cylinder A, provided with the coil or worm S, provided also with the spiral spring m, substantially as described, and for the purposes hereinbefore indicated.

2. The cylindrical piston P', provided with the adjusting-nuts N and L, and with the cross-beam M, and with the spiral spring K, and with the sponge-stopper O, substantially as described, and for the purposes hereinbefore indicated.

3. The combination of the platform E and the cylindrical piston P' with the levers W' and O'', and of said levers with each other, together with their respective brackets, connecting-rods, cross beams, and sliding rods, whereby said platform is pushed upward and said cylindrical piston simultaneously drawn downward by force applied in one direction to the main pedal-lever B', substantially as described, and for the purposes hereinbefore indicated.

4. The combination of the cylinder A with the cylindrical piston P', substantially as described, and for the purposes hereinbefore indicated.

5. The combination of the cylinder A with the cylindrical piston P', provided with its nuts, cross-beam, and spiral spring, with the platform E and the slide-rods I I and E' E', together with the cross-beams, connecting-rods,

and levers attached to said slide-rods, substantially as described, and for the purposes hereinbefore indicated.

6. The combination of the lever W' and the lever O'', together with their respectively attached brackets, connecting-rods, cross-beams, and sliding rods, with the main pedal-lever B', substantially as described, and for the purposes hereinbefore indicated.

7. The combination of the cylinder A with the heating coil or worm S, substantially as described, and for the purposes hereinbefore indicated.

8. The combination of the spiral spring m with the cylinder A, substantially as described, and for the purposes hereinbefore indicated.

9. The combination of a protecting-band, Q, or of a protecting-body, Q', with the cylinder A, substantially as described, and for the purposes hereinbefore indicated.

10. The combination of a sponge or other porous stopper, O, with the cylindrical piston P', substantially as described, and for the purposes hereinbefore indicated.

11. The combination of the ring B with the band Q or the body Q' and the cylinder A, substantially as described, and for the purposes hereinbefore indicated.

JACOB SURERUS.

Witnesses:

EUGENE M. JEROME,
WALTER D. EDMONDS.