(No Model.)

R. T. THOMAS & T. B. GORTON.

CURLING IRON.

No. 558,533. Patented Apr. 21, 1896.

FIG. 1.

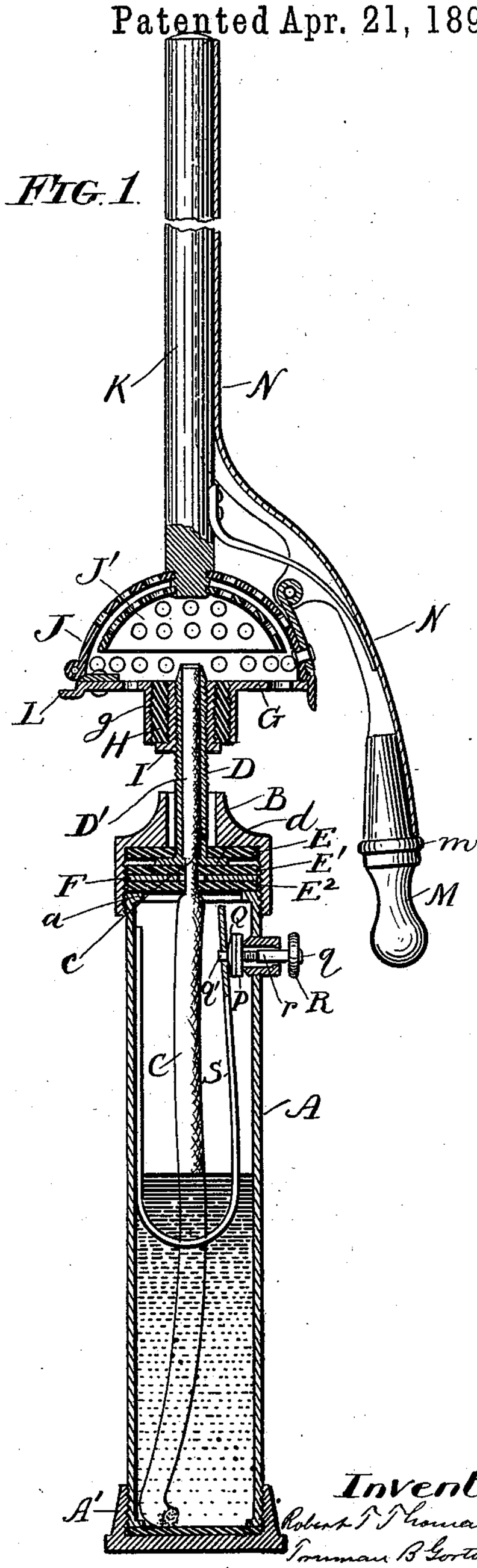


FIG. 3.

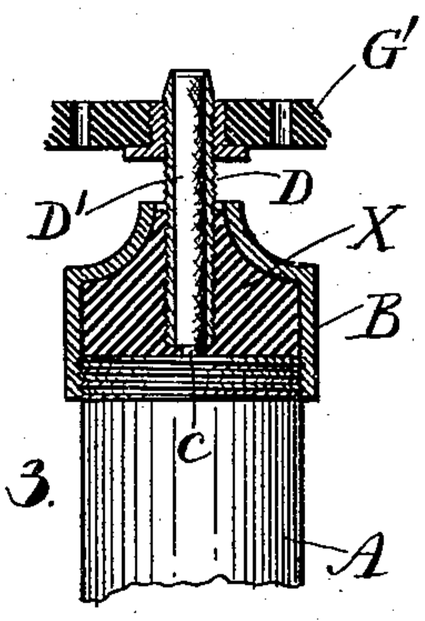
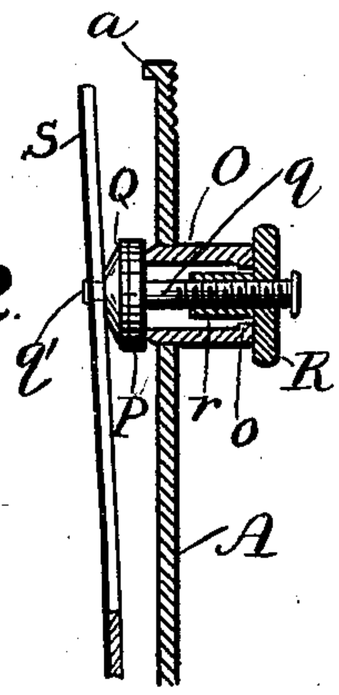


FIG. 2.



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UNITED STATES PATENT OFFICE.

ROBERT T. THOMAS AND TRUMAN B. GORTON, OF CHICAGO, ILLINOIS.

CURLING-IRON.

SPECIFICATION forming part of Letters Patent No. 558,533, dated April 21, 1896.

Application filed May 1, 1893. Serial No. 472,557. (No model.)

To all whom it may concern:

Be it known that we, ROBERT T. THOMAS and TRUMAN B. GORTON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Curling-Irons, of which the following is a specification.

In the accompanying drawings, which are made a part hereof, Figure 1 is a vertical sectional elevation of a curling-iron embodying the invention in its preferred form. Fig. 2 is a vertical section of portions of a curling-iron, showing the vent-valve in detail. Fig. 3 is a sectional elevation of a portion of curling-iron embodying the invention under a slight modification.

The present invention relates to that class of devices that are known to the trade as "self-heating curling-irons." Its objects appear in the descriptive part of this specification, and the features of novelty in which it consists are particularly pointed out in the claims.

Referring to Fig. 1, A represents the reservoir, provided at one end with threads for engaging corresponding threads of a screw-cap A′, which may be removed for filling the reservoir. The other end of the reservoir is provided with threads on its exterior for engaging corresponding threads on the interior of a screw-cap B, provided with a central opening, and having the metal surrounding said opening spun up, or otherwise brought to a frusto-conical shape. C is the wick, and D is the wick-tube, having at its inner end an enlargement or flange *d*, and having its inner end contracted. This contraction is the result of providing the inner end of the tube with a bore of smaller diameter than the outer end. E, E′, and E² are perforated disks of some material of low heat-conducting properties—such, for example, as rubber or vulcanized fiber—and F is a disk or washer of metal located between the disks E′ and E².

The parts so far described may be assembled in the following order, to wit: First pass the wick through the wick-tube. Then pass the wick-tube through the disk E and bring the disk to bear against the top side of the flange *d*. Then pass the wick through the disks E′, F, and E² in the order named and bring the disk E′ to bear against the bottom side of said flange. Then pass the wick-tube through the opening of the cap, forcing all of the disks well up inside of it. Then screw the cap onto the reservoir, and the parts will be in the positions shown by Fig. 1. The margins of the disks are compressed and tightly clamped between the underside of the cap and the upper edge of the reservoir, and in order to afford an ample bearing for the disk E² the upper margin of the reservoir is spun in to form a flange or shoulder *a*. The flange *d* is of less diameter than the disks E and E′, and hence these disks serve to completely insulate the wick-tube and its flange from the reservoir. The disk F acts as a reinforce and prevents the pressure of the flange *d*—especially the pressure resulting from lateral strains upon the wick-tube—from forcing the disk E′ inward, and the disk E² acts as a packing and insures a perfectly tight joint at the top of the reservoir.

G is a disk, preferably perforated, having a central opening surrounded by a flange *g*, within which is screwed or otherwise suitably secured a ring H of some material of low heat-conducting properties—such, for example, as "vulcabe stone," which is a compound containing a percentage of asbestos and some vulcanizable substance.

I is a bushing secured in the ring H, and provided with internal threads, whereby it is secured to the wick-tube. To the periphery of this disk is hinged a bulb J of perforated sheet metal, to the top of which is secured the curling-iron K, and to the projecting inner end of the said iron K is secured a second perforated bulb J′.

L is a stop secured to or formed with the disk G or some other convenient part, and so located as to engage the bulb when it is thrown back to give access to the tip of the burner and prevent the curling-iron from coming in contact with the hand that grasps the handle.

M is a non-metallic knob secured to the heel end of the clamp N, and provided with a flange *m* for holding the thumb out of contact with the metallic part of the clamp when operating the curler.

Near the upper end of the reservoir, and in such position that it may be easily reached by the thumb while grasping the reservoir, is a vent-valve, the details in the construction

of which are as follows: O is a short tube suitably secured in a perforation formed in the side of the reservoir, and having its outer end spun inward, so as to form a flange *o*. The inner end of this tube projects for a short distance into the reservoir, and is, preferably, of conical shape, in order to form a seat that will to a limited extent embed itself in the surface of a packing-disk P, that is placed against the outer face of the metallic valve-disk Q and surrounds the valve-stem *q*. This stem *q* passes out through the tube O, and at its outer portion is provided with a screw-thread for receiving a small nut or button R, which latter is provided with a projecting portion *r*, that enters the outer opening of the tube. This projecting portion *r* of the button is of such diameter that it does not fill the outer opening of the tube, but leaves an annular space of sufficient capacity for the purpose for which this vent-valve is intended.

Within the reservoir is a U-shaped spring S, one side of which engages the valve Q, and the other side of which is secured to the opposite side of the reservoir. At the point where this spring engages the valve it is provided with a perforation into which fits a stem *q'*, projecting from the inner face of the valve, the object of this construction being to hold the valve and the inner end of the valve-stem in central position with relation to the valve-seat.

The button R is adjustable on the valve-stem toward and from the outer end of the tube, and the outer extremity of the valve-stem is upset slightly, so as to form a head for preventing the button from being entirely removed. The tendency of the spring S is to hold the valve against its seat; but when the button is in the position on the stem shown in Fig. 1, by pressing upon it the valve may be forced from its seat, so as to place the interior of the reservoir in communication with the atmosphere. By screwing the button onto the stem to the position shown in Fig. 2 the valve is held rigidly against its seat, so that no amount of pressure upon the valve-stem or button can unseat it. It is placed in this position when the curler is not in use.

All curling-irons of the self-heating variety use some sort or a bulb for the purpose of confining as much of the heat as possible at the base of the curling-iron, in order that it may be absorbed by said iron instead of passing off in the atmosphere, and for the further purpose of surrounding the flame and preventing objects that would be damaged by it from coming in contact with it. In all such curling-irons of which we have any knowledge there is an unbroken metallic connection between the reservoir, which forms the handle of the curling-iron, and the parts that come in contact with the heat and flame, and as a consequence when the lamp is kept burning a short time the handle becomes heated to a degree that cannot be borne by the hand. Some of this heat that finds its way to the handle is due to the direct contact of the flame and heated air with the end of the wick-tube, but by far the greater portion of it is due to the metallic connections between the bulb and handle. The bulb becomes heated to a higher degree than any other part of the device, and its heat is readily transmitted to the wick-tube and then to the reservoir.

One of the objects of the present invention is to prevent this undue heating of the reservoir, and to this end we interpose insulating material such as above described between the bulb and reservoir, and also between the wick-tube and reservoir. It will be observed that where the bulb is secured to the wick-tube, by insulating the wick-tube the bulb is also insulated, and hence good results could be had even if insulation between the bulb and wick-tube were dispensed with; but we prefer to use it.

In Fig. 3 we have shown insulators of somewhat modified construction. For insulating the wick-tube from the reservoir we have shown a single thick disk or block X, of some insulating material, having a small central opening into which the wick-tube may be either screwed or forced, and for insulating the bulb from the wick-tube we have shown an insulating-disk G', taking the place of the disk G.

A lamp having its wick tightly compressed some distance from the outer end of the tube, as at *c*, operates as follows: Liquid from the reservoir can reach the enlarged chamber D' of the wick-tube only by the capillary attraction of the tightly-compressed portion *c* of the wick, so that when the device is placed in horizontal position the liquid cannot run out. This is one advantage of compressing the wick at this point; but it is not the principal advantage. When the lamp is first lighted, the flame is fed by the liquid that has reached the outer end of the wick by capillary attraction; but as soon as the wick-tube becomes heated it vaporizes the liquid that has found its way into the chamber D' of the tube. After this action commences the wick at its outer end, and for a greater or less distance inward, becomes perfectly dry, and the chamber D' is for the most part filled with the combustible vapor, the only liquid within it being that which saturates that part of the wick adjacent to the compressed portion *c*. Whether the wick-tube is in a vertical position or a horizontal position, this action will continue. Liquid in a limited quantity will continue to enter the chamber D', (by the capillary attraction of the portion *c* of the wick,) where it will be vaporized, and the vapor, by its own expansive force, will escape at the outer end of the tube and feed the flame. But suppose the wick were not compressed at the inner end of the wick-tube and that there were free communication between the inner end of the tube and the reservoir. With the supposed construction the

very instant the wick-tube is brought to an approximately horizontal position the vapor, by reason of its inferior specific gravity, rushes out of the tube and into the reservoir. This leaves the outer end of the wick without either vapor or liquid, and in consequence the flame is extinguished; but by closing the inner end of the wick-tube, except the small opening occupied by this tightly-compressed portion of the wick, the vapor is prevented from escaping therefrom into the reservoir, and the lamp will burn in any position. We do not, however, confine ourselves to any particular means for compressing it.

It is neither practical nor desirable to effectually and completely prevent the transmission of a small amount of heat to the reservoir. Even with the insulator above described the reservoir will become slightly heated; but it cannot become heated to such a degree that cannot be borne by the hand. As a consequence of this slight heating of the reservoir vaporization will take place to a limited extent within it, so that when the curler is in upright position the space above the surface of the alcohol will contain vapor under greater or less pressure. When the lamp is in operation, this pressure will be sufficient to force the vapor through the contracted portion of the wick and into the wick-tube, so that the extent of flame depends to a certain extent upon the generation of vapor within the reservoir.

One object of the present invention is to provide means for controlling and regulating the extent of flame, and it is to this end that the reservoir is provided with the vent above described, the operation of which is as follows: While the lamp is burning, if the flame is too large, it is simply necessary to press upon the button R, and thereby unseat the valve, and place the upper portion of the reservoir in communication with the atmosphere. The vapor in this upper portion of the reservoir instantly escapes, and the pressure within the reservoir is reduced to atmospheric. The effect of this is to deprive the flame of the vapor that had been passing to it from the reservoir, and the size of the flame is instantly reduced.

If the flame is too small, and it be desired to increase it, it is simply necessary to invert the curler, so that the alcohol fills the upper part of the reservoir and saturates the wick at and adjacent to its compressed portion, and at the same time press the button R. That these operations will have the effect of increasing the flame has been demonstrated by actual practice. The increasing of the flame is due, primarily, to the saturation of the wick at and adjacent to its compressed portion; but the result will not follow unless the button be depressed, as described. The reason for this is, when the reservoir is inverted the vapor which fills the upper part of it is brought into direct contact with and passes through the body of alcohol. The effect of this is of course to condense the vapor, and the effect of this condensation is to form a partial vacuum within the reservoir, so that unless the button is pressed, as described, this partial vacuum will exhaust from the wick-tube what little vapor remains in it, and the flame will be extinguished. On the other hand, if the button be pressed, atmospheric air enters through the tube O and prevents the formation of a vacuum.

The object of the second bulb J′ is to prevent, as far as possible, the undue heating of the outer bulb, and to more effectually prevent the escape of any part of the flame. With the arrangement shown in the drawings the flame has direct contact with the inner bulb, and by reason of the direct metallic contact of this inner bulb with the curling-iron the latter absorbs the most of the heat, and the outer bulb is thereby at a comparatively low temperature.

Having thus described our invention, the following is what we claim as new therein and desire to secure by Letters Patent:

1. In a curling-iron, the combination with the curling-iron proper of a reservoir, a perforated disk of non-conducting material closing one end of said reservoir, and a wick-tube fitting in the perforation of said disk whereby it is held out of contact with the reservoir, substantially as set forth.

2. In a curling-iron, the combination with the curling-iron proper, of the reservoir A having the cap B, the wick-tube D having the flange *d*, and perforated disks of non-conducting material fitting against the opposite faces of the flange *d*, and clamped between the reservoir and cap, substantially as set forth.

3. In a curling-iron, the combination with the curling-iron proper, of the reservoir A having the cap B, the tube D having the flange *d*, the perforated disk E surrounding the tube and fitting against the flange, the perforated disk E′ fitting against the flange, said disks being of non-conducting material, the perforated metallic disk F fitting against the disk E′, and the perforated non-conducting disk E^2 fitting against the disk F, the margins of said disks being clamped between the cap and reservoir, substantially as set forth.

4. In a curling-iron, the combination with the curling-iron proper, the reservoir and the wick-tube, of a bulb to which the curling-iron proper is secured, the disk G to which said bulb is secured, said disk having a central opening, the insulating-sleeve H fitting in said opening, and the bushing I fitting in said sleeve and upon the wick-tube, substantially as set forth.

5. In a curling-iron, the combination of the curling-iron proper, the burner, the reservoir having a vent, and a valve for controlling said vent, substantially as set forth.

6. In a curling-iron, the combination with the curling-iron proper, the burner and the reservoir having a vent, of a valve for closing said vent, a spring for holding said valve nor-

mally seated, and a push-button suitably connected with the valve whereby it may be unseated by pressing upon the button, substantially as set forth.

7. In a curling-iron, the combination with the curling-iron proper, the burner and the reservoir having a vent, of an outward-seating valve adapted to close said vent, a spring for holding said valve normally seated, a valve-stem extending out through the vent, and a push-button carried by said stem, substantially as set forth.

8. In a curling-iron, the combination with the curling-iron proper, the burner and the reservoir having a vent, of an outward-seating valve adapted to close said vent, a spring holding said valve normally seated, a screw-threaded valve-stem projecting outside of the reservoir, and a push-button adjustable on said stem and adapted to lock the valve upon its seat, substantially as set forth.

9. In a curling-iron, the combination with the curling-iron proper, the burner, the reservoir and a vent-tube O having the inturned flange *o*, of an outward-seating valve adapted to close the inner end of said tube, a spring holding said valve normally seated, a valve-stem, and a push-button on said stem, substantially as set forth.

10. In a curling-iron, the combination with the reservoir and the burner, of a disk supported by the wick-tube of the burner, a perforated bulb hinged to the disk, the curling-iron secured in the said bulb and having its end projected into the bulb, and a screw-perforated bulb located within the first-named bulb, and secured to and supported by the projecting end of the curling-iron, substantially as and for the purpose specified.

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