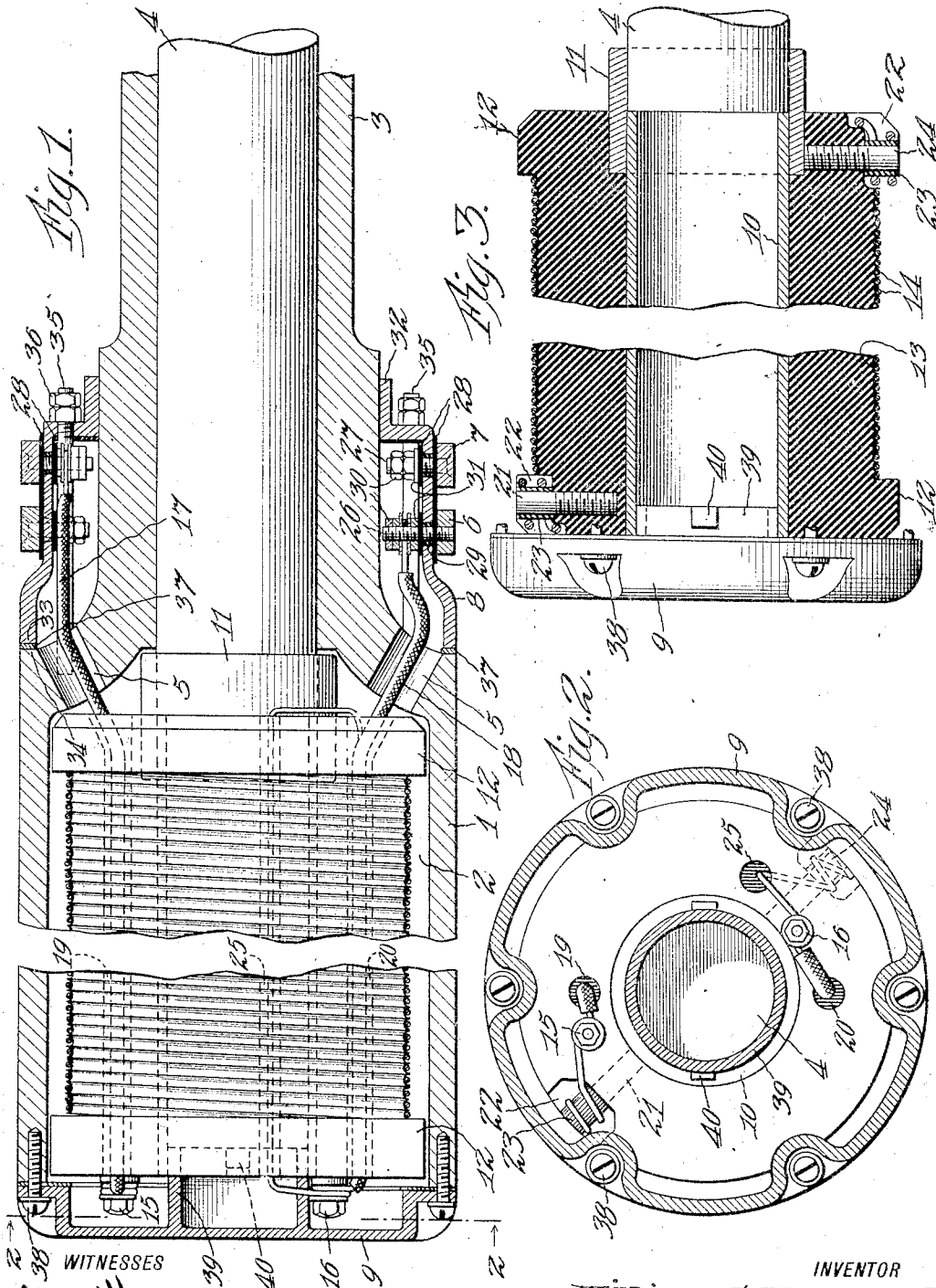


W. S. HADAWAY, JR.
ELECTRIC HEATING DEVICE.
APPLICATION FILED SEPT. 11, 1911.

1,063,535.

Patented June 3, 1913.



WITNESSES
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WILLIAM S. HADAWAY, JR., OF NEW YORK, N. Y.

ELECTRIC HEATING DEVICE.

1,063,535.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM S. HADAWAY, Jr., a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Electric Heating Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to electric heating devices.

It has among its objects, to provide an improved electric heating device of high efficiency wherein the heating element is very compactly arranged and securely housed, and the terminal connections for the same are so disposed as to be fully protected.

A further object of my invention is to provide an improved heating device which is particularly adapted to use in connection with electrically heated rolls, wherein the heating element is inclosed within the roll and provided with terminal connections at the end of the roll.

Other objects and advantages of my improved construction will hereinafter appear.

In order to illustrate the principle of my invention I have in the accompanying drawings, shown one form which it may assume in practice.

My invention is not, however, limited to this specific form chosen for purposes of illustration.

In the views of the drawings:—Figure 1 shows a longitudinal sectional view of the roll. Fig. 2 shows a transverse sectional view on line 2—2 of Fig. 1. Fig. 3 shows a longitudinal sectional view of the heating unit and its supporting means in elevation.

In the construction shown in the drawings a metallic laundry roll 1, of substantially cylindrical shape is provided with a central cylindrical chamber 2, and a reduced neck 3. A shaft 4, arranged to rotate with the roll, extends through the neck 3, to one end of the chamber 2. Within this chamber 2, is housed the heating element hereinafter described. In order to enable the electrical connections to be made to the heating element, the roll 1 is provided with suitable openings 5 on opposite sides and at one end of the chamber 2, so that the conductors leading to the heating unit may extend to slip rings 6 and 7, carried upon a removable annular casting 8, which is slipped over the

reduced end of the roll and snugly fitted over the end of the roll. A cap 9 which seals one end of the chamber 2 and coöperates with the end of the shaft 4 to support the unit, is preferably fixed to the opposite end of the roll over the mouth of the chamber 2.

The heating element is preferably substantially cylindrical in form, having a central cylindrical opening which is arranged to receive the end of the shaft 4 so that the unit may be slid into position over the end of the shaft, and within the chamber 2. The body of the unit is preferably formed of a heat absorptive material. In a preferred form I use soap-stone as this material, although other materials may be used if desired. This heat absorptive body of the unit is preferably provided with an inner cylindrical sleeve 10, preferably of metal, and at the end of the shaft 4 an additional metallic sleeve 11, of slightly larger diameter is provided. As illustrated in Fig. 3, the end of the shaft 4, is received within the sleeve 11, and the periphery of the shaft engages the inner periphery of the sleeve 11, while the vertical end of the shaft abuts against the end of the sleeve 10. Thus the unit is positioned upon the end of the shaft. In order to provide an additional means of positioning the unit within the chamber 2, and to protect the same, the unit is preferably provided with flanges 12, on its ends, which are of such a diameter, that while the unit may be slipped into the chamber 2, it may not have a radial movement within the same. In a preferred form, the outer surface of the unit, between the flanges 12, is spirally grooved, as at 13, and a high resistance material such as chromium nickel or copper nickel alloy, preferably in the form of a wire 14, is wound spirally within these grooves, so that it presents a compact, smooth coil and is in intimate contact with the heat absorptive material forming the body of the unit. Other forms of resistance material may be used if desired.

The ends of the heating conductor 14 are connected to suitable binding posts 15 and 16 upon the end of the unit, as shown in Figs. 1 and 2. Suitable leads 17 and 18 are brought in from the slip rings 6 and 7 through the openings 5 in the end of the roll and passages or chambers 19 and 20 in the body of the unit to these binding posts 15 and 16. In a preferred form these leads are heavy and fully protected by suitable insu-

lation, so that they are not apt to become worn in service. In order that the heating conductor may be wound around the unit in the spiral grooves 13, one end of the conductor passes from the binding post 15 to a pin 21, which is mounted upon one of the flanges 12. In a preferred form the pin 21 is seated in the flange as shown in Fig. 2, so that its upper surface lies substantially flush with the upper surface of the flange and extends into a chamber 22, in such a manner as to permit one or more turns of the conductor to be passed around the pin. In order to insulate the heating conductor from the pin a suitable mica sleeve 23 is placed around the upper end of the pin, as shown in Fig. 3. After the conductor has been passed around the insulated pin 21, the wire is then wound spirally around the unit as shown in Fig. 3, until it is brought to the opposite end of the unit, where it is fixed to a pin 24, similar to the pin 21, but on the opposite side of the unit, and in the opposite flange 12. After the conductor has been passed around this insulated pin one or more times, it is then brought back to the other binding post 16 through a longitudinally extending chamber 25, as shown in Fig. 2. Thus it is seen that the ends of the heating conductor are brought to the binding posts, which are located upon the same end of the unit opposite the removable cap 9, so that the unit may be readily removed by removing the cap and loosening the connections at the binding posts 15 and 16.

The terminals for the device shown are the slip rings 6 and 7 carried upon the removable annular casting 8. In a preferred form these slip rings are formed of metal and are bolted to the casting by suitable bolts 26 and 27. In order to insulate the rings from the casting 8, I preferably place insulation 28 between the same. In a preferred form I use one or more sheets of mica as this insulation. In addition to the mica sheets 28 the bolts 26 and 27 may also be suitably insulated by insulating bushings 29. As in the usual construction the ends of the leads 17 and 18 may be secured to the inner ends of the bolts by taps 30, provided with suitable washers 31. As illustrated in Fig. 1, the lead 17 is preferably connected to the slip ring 7 through the bolt 27 while the lead 18 is connected to the slip ring 6 through the bolt 26.

In order to form a compact structure in which the heating unit is so inclosed as to prevent the fine particles worn off from the same after long usage from passing out so that they may reach the surface of the roll and soil the articles being ironed, I snugly secure the casting 8 to the roll in such a manner that none of these particles may pass out through the openings 5 to the surface of the roll. In a preferred form the casting 8 is

provided with a flange 32 which fits snugly upon the reduced neck of the roll so that a flange 33, on the opposite end of the casting, is brought snugly against a shoulder 34 on the end of the roll. If desired, one or more longitudinally extending bolts 35 having their inner ends seated in threaded openings in the end of the roll and their outer ends extending through openings in the casting 8, may be used to force the casting firmly against the shoulder by means of thread nuts 36. If desired, a suitable washer or packing 37 may be placed between the edge of the flange 33 and the shoulder 34 in order to make a more tight joint. Thus it is seen that the terminal connections for the unit are firmly secured to the roll, and while readily accessible for adjustment, these terminal connections are so inclosed as to prevent, effectually, any passage of the minute particles worn off from the unit to the surface of the roll. The sealing of the unit within the chamber is also effectually brought about by the provision of the cap 9, which may if desired be attached to the end of the roll over the end of the chamber 2, by one or more bolts 38. If desired, suitable washers may be placed between the cap 9 and the end of the roll 1. In a preferred form the cap 9, not only serves the function of sealing the end of the chamber, but also serves to position the unit within the chamber, and to prevent the rotation of the unit with respect to the roll. This is accomplished by the provision of a boss 39, on the inner surface of the cap, which extends into the open end of the inner sleeve or tubing 10 of the unit. When the cap is fixed in position the boss 39 occupies a position within the end of the sleeve 10, as shown in Fig. 3, so that the unit is supported between the cap 9 and the end of the shaft 4. In order that the unit may not rotate within the chamber 2, independently of the roll, suitable lugs 40 may be provided upon the boss 39, which enter corresponding notches in the sleeve 10. By my improved construction I have provided an exceedingly rugged heating device in which a heating unit of high efficiency and of high heat absorptive and storage capacity is securely and compactly inclosed within the object to be heated, so that the combined effects of heating by radiation and conduction are obtained. It is of course obvious that the flanges 12 may be constructed of any desired height so that the unit may be brought into more or less intimate relation with the inner surface of the roll 1. Further, by positioning the unit within the roll in my improved manner, the unit, while securely held in position, may be readily removed whenever it is desired by simply removing the cap 9 and loosening the connections at the binding posts 15 and 16. When this is done, the whole unit may

be withdrawn, since the leads 17 and 18 will be drawn through the chambers in the body of the unit. Thus it is seen that a unit may be renewed or repaired whenever it is necessary. Further, by the provision of the lugs on the cap, I am able to effectually prevent the movement of the unit within the chamber. By the provision of the inner metallic sleeve, I am able to materially reduce the amount of wear upon the unit. By the provision of the flanged unit, I am enabled to provide an additional means of positioning the unit within the chamber. By the provision of the longitudinally extending slots in the unit, I provide a convenient means for connecting the leads to the unit and bringing the end of the heating conductor back to binding posts located in such a position as to be readily accessible. By the provision of the tight fitting casting carrying the collector rings for the heating unit, I am able to prevent effectually the passage of any particles worn off from the body of the unit to the surface of the roll, so that the articles to be ironed are fully protected from being soiled. Further, by my improved arrangements of collector rings, I am able to provide a very convenient means of conducting the current to the roll, and one which is sturdy and well calculated to withstand long usage.

While I have in this application described one specific form which my invention may assume in practice, I do not wish to be limited to this specific form, but wish rather to include all of those forms of my invention which fall within the spirit.

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

1. In an electrically heated roll, a metallic roll having a chamber therein and openings in its ends, a shaft extending into one of said openings, a cap covering another of said openings, and a heating unit positioned in said chamber by said shaft and cap.

2. In an electrically heated roll, a metallic roll having a chamber therein and a neck of reduced diameter, a heating unit housed in said chamber, means for positioning said unit in said chamber and an annular member to which the unit leads are connected snugly fitted upon the neck of said roll and hermetically sealing said unit in said chamber.

3. In an electrically heated roll, a metallic roll having a chamber therein, said chamber having an opening in its end, a heating unit housed in said chamber having its leads extending through said opening, a metallic sealing member for said opening, and slip rings connected to said leads and carried on said sealing member.

4. In an electrically heated roll, a metallic roll having a chamber formed therein, said chamber having openings in its ends, a

substantially cylindrical heating unit housed in said chamber, said heating unit having a plurality of passages extending through the same for its conductors, and means for holding said unit in position.

5. In an electrically heated roll, a metallic roll having a chamber formed therein, said chamber having openings in its ends, a shaft extending into said roll, a cap fixed to one end of said roll and sealing one end of said chamber, said cap cooperating with said shaft to position said unit in said chamber, and electrical connections for said unit arranged to permit said unit to be withdrawn from one end of said roll.

6. In an electrically heated roll, a metallic roll having a chamber formed therein, said chamber having openings at its opposite ends, a cap for sealing one of the openings in said chamber, an annular sealing member for sealing the other openings in said chamber, means for positioning said heating unit within said roll and preventing the independent rotation of the same, and means carried on said annular sealing member for conveying the current to said heating unit.

7. In an electrically heated roll, a metallic roll having a chamber formed therein, said chamber having openings in its ends, a shaft extending into said roll, a cap sealing one end of said chamber, means for positioning said unit in said chamber between said cap and said shaft, electrical connections for said unit arranged to permit said unit to be withdrawn from one end of said roll, and means for sealing the other end of said chamber including an annular sealing member.

8. In an electrically heated roll, a metallic roll having a chamber formed therein, said chamber having openings at its ends, a cap for sealing one of the openings in said chamber, an annular sealing member for sealing another opening in said chamber, means for positioning said heating unit within said roll and preventing the independent rotation of the same, and means for conveying the current to said heating unit including a plurality of slip rings carried on said annular sealing member.

9. In an electrically heated roll, a metallic roll having a chamber formed therein, said chamber having openings in its ends, a shaft extending into said roll, a cap sealing one end of said chamber, an annular sealing member sealing the other end of said chamber, means for positioning said unit in said chamber between said cap and said shaft, electrical connections for said unit arranged to permit said unit to be withdrawn from one end of said roll, and means for conveying current to said unit including a plurality of slip rings carried upon said annular sealing member.

10. An electrically heated unit for a heat-

- ing roll comprising a substantially cylindrical insulating base having longitudinally extending chambers formed therein, a heating conductor carried upon the periphery of said insulating base and extending through one of said chambers, leads for said conductor extending through said chambers, and terminal connections for said leads and said conductor at one end of the base.
- 10 11. An electrically heated unit for a heating roll comprising a substantially cylindrical insulating base having longitudinally extending chambers formed therein, a heating conductor carried upon the periphery of said insulating base and extending through one of said chambers, leads for said conductor extending through said chambers, and binding posts upon one end of said base to which the ends of said leads and the ends of said conductor are connected.
- 20 12. An electrically heated unit for a heat-

ing roll comprising a substantially cylindrical base having a central bore and flanges on its ends, said base having a plurality of longitudinally extending chambers therein upon opposite sides of said bore, a heating conductor wound spirally around the periphery of said base between said flanges, means carried on said flanges around which said conductor is passed, and binding posts carried on one end of said base adjacent said longitudinally extending chambers and arranged to connect the leads for said unit with the said heating conductor.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM S. HADAWAY, JR.

Witnesses:

A. B. HUBBELL,
EDWIN N. LIGHTFOOT.