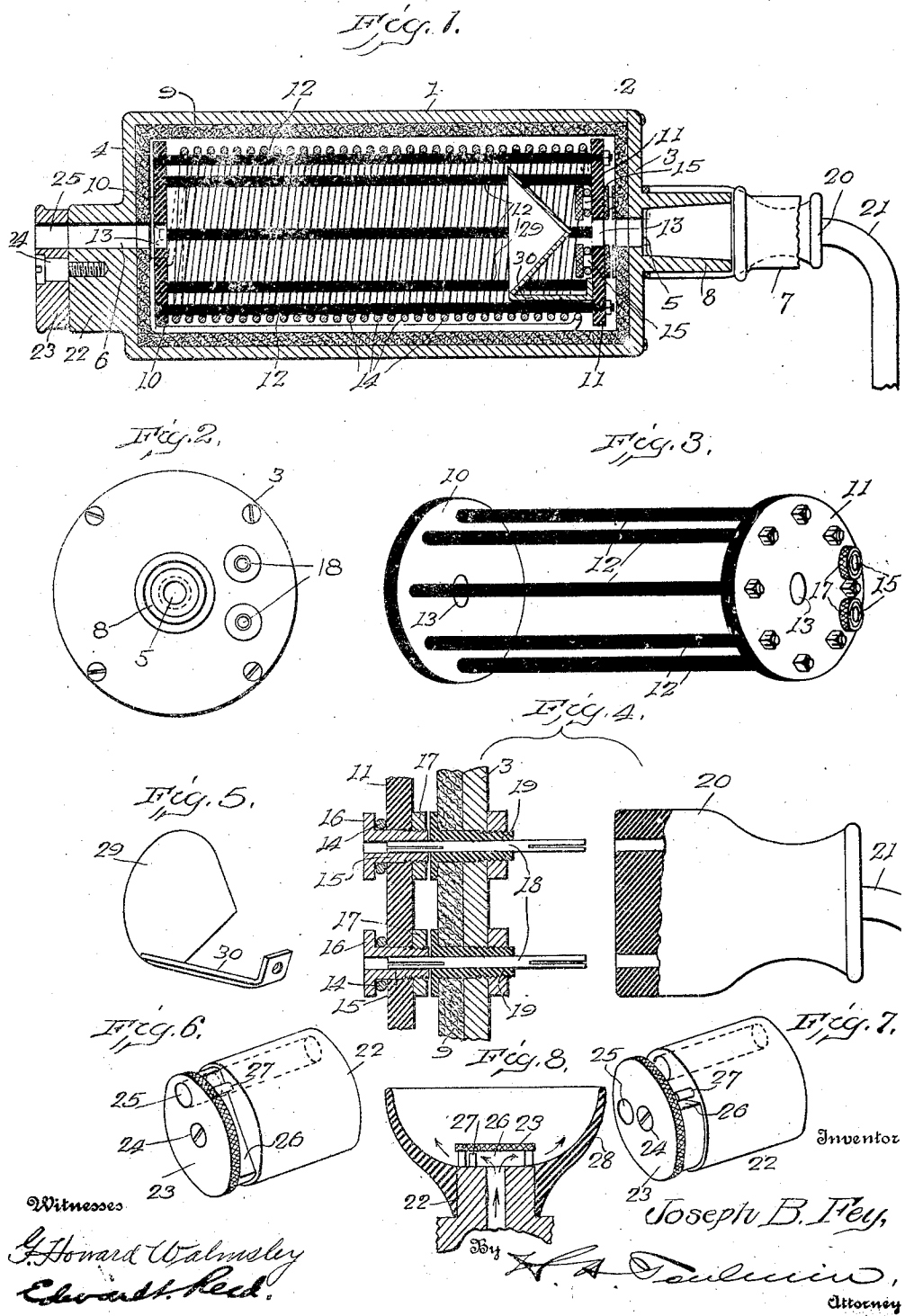


J. B. FEY.
ELECTRICAL HEATER.
APPLICATION FILED FEB. 11, 1910.

989,900.

Patented Apr. 18, 1911.



UNITED STATES PATENT OFFICE.

JOSEPH B. FEY, OF COLUMBUS, OHIO.

ELECTRICAL HEATER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH B. FEY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Electrical Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to electrical heaters and is designed more particularly for the purpose of heating a column of air as it passes through or is discharged from a conduit.

15 The object of the invention is to provide a heater of this character which will be simple in its construction and of such a character that the several parts thereof can be readily assembled after the manufacture of each part has been completed; and which will have a high degree of efficiency.

To this end it is a further object of the invention to provide a heater of this character having the heating coil arranged to be readily inserted in and removed from the casing; having contact members carried by the casing and detachably connected to the heating coil; having means for causing the air to circulate about the windings of the heating coil; having an adjustable discharge nozzle; and having the several parts thereof so constructed as to form a very simple compact heater which can be manufactured at a low cost.

35 In the accompanying drawings, Figure 1 is a longitudinal, sectional view, taken centrally through a heater embodying my invention; Fig. 2 is an end view of such a heater; Fig. 3 is a perspective view of the spool forming part of the heating coil; Fig. 4 is a sectional, detail view of the detachable contact members; Fig. 5 is a perspective view of the deflector or spreading cone; Figs. 6 and 7 are detail views of the discharge nozzle showing the different adjustments thereof; and Fig. 8 is a longitudinal, sectional view of a portion of the nozzle showing the same attached to a massage cup.

In these drawings I have illustrated one embodiment of my invention and have shown the same as comprising an outer casing 1 having removably mounted therein a heating coil 2. The outer casing 1 may be of any suitable material, such as aluminium. It is preferably cylindrical in shape and has one end or head, 3, detach-

ably secured thereto. The other end or head, 4, is preferably rigidly and permanently secured to the cylindrical walls of the casing. Inlet and outlet openings are formed in the opposite heads, and, in the present instance, I have shown the inlet opening 5 as formed in the detachable head 3 and the outlet opening 6 formed in the fixed head 4. These openings are preferably arranged centrally in their respective heads and the inlet opening is shown a trifle larger than the outlet opening, thus tending to prevent the air passing from the casing too quickly after it has been discharged into the same. The detachable head 3 is provided with means for securing thereto the air conduit which is here shown as a flexible tubing 7. This means preferably comprises a hollow boss 8 rigidly secured to the outer surface of the head 3 and extending about the inlet opening 5. This casing may, if desired, be provided with a suitable lining 9 of asbestos or other non-heat-conducting material.

The heating coil 2 may be of any suitable character which will permit it to be inserted in and removed from the casing 1. I prefer, however, to construct this coil as herein shown. As here constructed it comprises a spool having its opposite ends or heads 10 and 11 connected one to the other by longitudinal rods 12 which are rigidly secured to the respective heads. These rods are arranged in annular series and are spaced some distance apart. Each head has a centrally arranged opening 13, which, when the coil is in position, will be in alinement with the inlet and outlet openings 5 and 6, respectively, and will permit the passage of the air to and from the interior of the coil. A coil of resistance wire 14 is wound about the spool and the several windings thereof are spaced some distance apart to permit the free circulation of the air about the wires. The wire 14 has both its ends connected to that end of the spool adjacent to the inlet opening 5 and, as here shown, the ends of the wire are connected to two hollow binding posts, each comprising a sleeve or bushing 15 extending through the head 11 and provided on one end with a head 16 and on the other end with a nut 17, whereby the end of the wire 14 may be passed about the sleeve and the nut then tightened down to bind it in position in the usual manner. These binding posts are, of course, insulated one from

the other and I accomplish this in a very simple and economical manner by forming the spool end 11 of suitable insulating material. If desired the entire spool may, as here shown, be made of insulating material. The binding posts 15 form contacts for engagement with the contact members carried by the detachable head 3 of the casing. These contact members, in the present instance, comprise pins 18 mounted in the head 3 and insulated therefrom by bushings 19 of insulating material. These pins, which are preferably rigidly held in position in the removable head 3, extend for some distance on each side of that head and are so arranged that, when the removable head is in position on the casing, the pins will extend into the respective hollow binding posts 15 and will fit snugly within the same, thereby forming an electrical contact between the resistance wire 14 and the pins. The outer ends of the pins are arranged to enter a connecting member, such as a plug 20, by means of which they are connected with the electrical conductors 21. The pins 18 are preferably split at both ends to insure perfect contact. It will be apparent that by means of this construction the head 3 may be detached from the casing and the contact pins withdrawn therewith, and, inasmuch as these contact pins form the only connections between the heating coil and the casing the coil may then be readily removed from the casing. When the heating coil has been returned to the casing it is a very simple matter to re-insert the contact pins in the hollow binding posts as the casing head 3 is placed in position on the casing. Thus, the heating coil may be completely manufactured before it is inserted in the casing and it is then a very simple matter to mount the same in the casing and make the necessary electrical connections. While the heating coil is connected to the casing only by the contact pins it will be noted that the fit of the coil within the casing is such that it has a very small amount of movement therein.

A suitable discharge nozzle is preferably secured to that end of the casing opposite the detachable head which carries the inlet opening. This nozzle is here shown as comprising a fixed part 22 rigidly secured to the fixed head 4, and, in the present instance, is shown as formed integral therewith. This fixed part of the nozzle has a longitudinal opening forming a continuation of the outlet opening 6 in the head 4. Mounted on the outer end of the fixed portion 22 is a movable portion or cap 23 connected to the fixed portion 22 by a central pivot pin or screw 24. This cap has a longitudinal opening 25 adapted to be moved into alinement with the longitudinal opening in the fixed part of the nozzle, and, when in this position, it is apparent that the air will be discharged from

the interior of the casing in a straight jet. The movable portion or cap 23 of the nozzle has its side portion cut away near the inner end thereof to form a recess 26 between the outer surface of the movable portion and the end of the fixed portion 22. By rotating the movable portion 23 of the nozzle about its pivotal center the opening 25 will be moved out of alinement with the opening in the fixed portion of the nozzle and the recess 26 brought into alinement with this opening and the air discharge through the outlet opening will impinge against the outer wall of the recess and will be discharged laterally therefrom. A stop or pin 27 mounted in the end of the fixed portion of the nozzle serves as a stop to engage the rear chord-like wall of the lateral recess to limit the movement of the movable part of the nozzle and to cause either the opening 25 or recess 26 to cooperate with the longitudinal opening in the fixed part of the nozzle. Thus, when the end of the nozzle is inserted in a massage-cup as shown at 28, the air which is discharged through the lateral recess 26 will come in contact with the walls of the massage-cup and will be discharged forwardly in a spray. I also prefer to provide a deflector by means of which the air entering the casing through the inlet may be caused to circulate about the coil, and, to this end I have mounted within the coil a cone-shaped spreader 29 having its apex arranged adjacent to and in alinement with the opening 13 in the head 11 of the spool forming a part of the coil. Thus, the air entering through this opening will be split up by the cone and the diverging walls thereof will deflect the air toward the sides of the casing thus causing it to pass between the winding of the heating coil and to circulate about the same in such a manner as to become thoroughly heated before it is discharged from the casing. This deflector may be supported within the coil in any desired manner, but I have here shown the same as having an arm 30 rigidly secured to one side thereof, extending longitudinally of the coil and rigidly secured to the head 11 of the spool thereof.

The operation of the device will be understood from the description of the several parts thereof and it will be apparent that the device as a whole is very simple in its construction and possesses a high degree of efficiency, being so arranged as to cause the air to circulate about a heating coil in such a manner as to permit it to be thoroughly heated while within the casing; that the construction of the heater which permits the heating coil to be readily removed from and inserted within the same and the separable contact pin enable the manufacturer of the several parts of the device to be completed and the device then assembled and all

connections made with very little trouble or work, as distinguished from those heaters in which the coils must be built within the casing.

5 While I have shown and described the heater as particularly adapted for use in connection with a flexible tubing through which a column of air is forced, such, for instance, as massaging machines, it will be
10 apparent that the use of the heater is much broader than this and it will further be understood that the several features of construction can be modified to adapt the heater to different uses without departing from the
15 spirit of my invention. I, therefore, wish it to be understood that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. In a heater of the character described, a casing having air inlet and outlet openings
25 in the opposite ends thereof and a hollow heating coil arranged within said casing and comprising end members having openings arranged to register with the openings in said casing, rods connecting said end
30 members, and resistance wire wound about said rods and having the several windings thereof spaced apart to permit the circulation of the air between the same, as it passes from said inlet opening to said out-
35 let opening.

2. In a heater of the character described, a casing having an air inlet opening centrally arranged in one end thereof and an air outlet opening centrally arranged in
40 the opposite end thereof, a hollow heating coil arranged within said casing and comprising end members having openings arranged to register with the openings in said casing, rods connecting said end members,
45 and resistance wire wound about said rods and having the several windings thereof spaced apart, to permit the air to circulate about the same as it passes from said inlet opening to said outlet opening, the external
50 diameter of said coil being less than the internal diameter of said casing.

3. In a heater of the character described, a casing having inlet and outlet openings and having a removable head, contact pins
55 carried by said removable head, a heating coil loosely mounted within said casing, hollow binding posts carried by said coil and adapted to receive the contact pins on said removable head, said contact members also
60 serving to support said coil in position within said casing.

4. In a heater of the character described, a casing having inlet and outlet openings and having a removable head, a heating coil
65 mounted within said casing and comprising

a hollow spool having resistance wire wound about the same, hollow contact members extending through that end of said spool adjacent to said head and having said wire connected to the inner ends thereof, and contact pins carried by said removable head and adapted to enter said hollow contact members of said heating coil. 70

5. In a heater of the character described, a casing having inlet and outlet openings
75 and having a removable head, a heating coil loosely mounted within said casing and comprising a spool having resistance wire wound thereon, hollow binding posts carried by that end of said spool adjacent to
80 said removable head and having the ends of said wire connected thereto, and contact pins carried by said removable head and arranged to enter said hollow binding posts and to make electrical contact therewith. 85

6. In a heater of the character described, a heating coil comprising end members, an annular series of rods connecting said end members one to the other, resistance wire wound about said annular series of rods
90 and having the several windings thereof spaced apart, inlet and outlet openings formed in the respective end members within said annular series of rods, and contact members secured to one of said end members and having
95 the respective ends of said resistance wire connected thereto.

7. In a heater of the character described, a heating coil comprising end members, an annular series of rods connecting said end
100 members one to the other, resistance wire wound about said connecting rods and having the several windings thereof spaced apart, said end members having inlet and outlet openings, respectively, and a deflector
105 mounted within said coil to cause the air to circulate about said coil.

8. In a heater of the character described, a heating coil comprising end members, an annular series of rods connecting said end
110 members one to the other, resistance wire wound about said connecting rods and having the several windings thereof spaced apart, said end members having inlet and outlet openings, respectively, and a cone-shaped deflector supported within said coil
115 with its apex in alinement with said inlet and having its walls diverging away from said inlet.

9. In a heater of the character described, a casing having an inlet and an outlet, a heating coil mounted within said casing between said inlet and said outlet, and a discharge mouth secured to said casing in alinement with said outlet and adjustable to
125 vary the character of the current of air discharged therefrom.

10. In a heater of the character described, a casing having an inlet and an outlet, a heating coil mounted within said casing 130

between said inlet and said outlet, a discharge nozzle comprising a fixed part having an opening in alinement with said outlet, and a movable part having a longitudinal opening and a lateral recess, either of which may be moved into alinement with the opening in the fixed part of said nozzle.

11. In a heater of the character described, a casing having an inlet and an outlet, a heating coil mounted within said casing between said inlet and said outlet, a nozzle comprising a fixed part having an opening forming a continuation of said outlet, a movable part mounted on said fixed part and having a laterally extending recess thereon adapted to be moved into alinement with the opening in the fixed part of said nozzle, and a cup secured to said nozzle and having its walls extending beyond said lateral recess.

12. In a heater of the character described, a casing having an inlet and an outlet and having a removable head, a heating coil removably mounted within said casing and having contact members, contact members carried by said removable head and arranged to cooperate with the contact members of said heating coil, a discharge nozzle comprising a fixed part having an opening forming a continuation of said outlet, and an adjustable part having a longitudinal opening and a lateral opening either of which may be moved into alinement with said outlet.

In testimony whereof, I affix my signature in presence of two witnesses.

JOSEPH B. FEY.

Witnesses:

H. J. BRADSHAW,
N. C. SMITH.