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NOZZLE CONSTRUCTION FOR HAIR DRIERS

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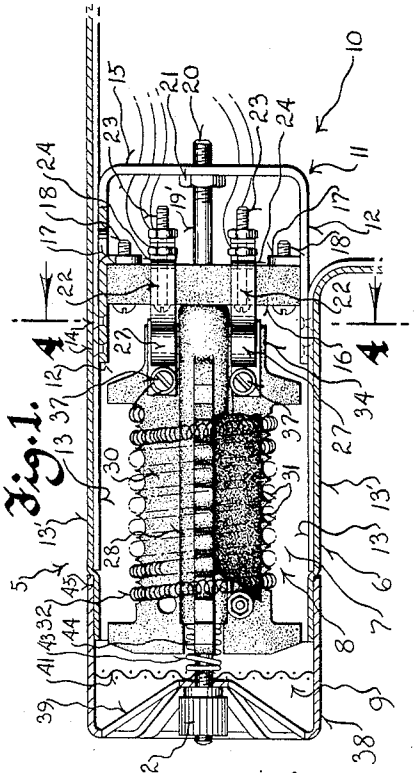


Fig. 1.

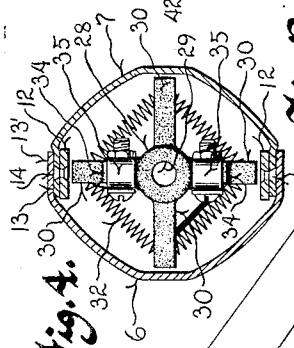


Fig. 4.

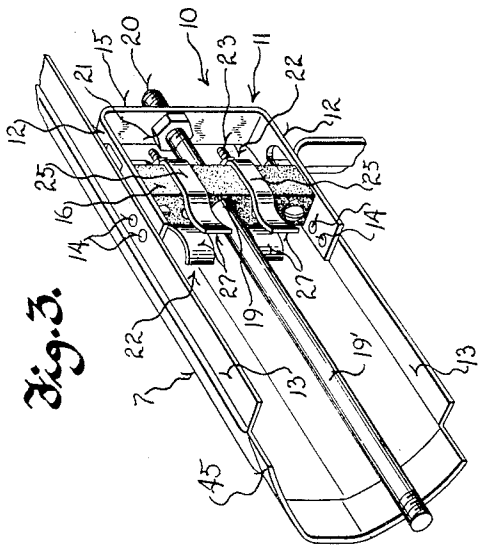


Fig. 3.

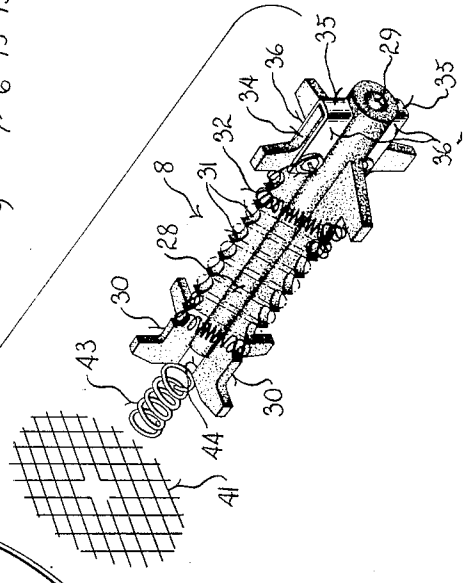
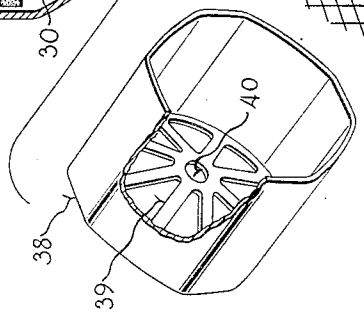


Fig. 2.



Inventor
Fritz Victor Forss
By Dean Milton Jones
Attorney

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NOZZLE CONSTRUCTION FOR HAIR DRIERS

Fritz Victor Forss, Racine, Wis., assignor to John Oster Manufacturing Company, Racine, Wis., a corporation of Wisconsin

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11 Claims. (Cl. 219—39)

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This invention relates to electric appliances and refers more particularly to hair dryers of the type having an electric heating element positioned in the discharge nozzle thereof to heat the air flowing therethrough.

It has been customary in hair dryers of this type to have the heating element of the dryer removable for servicing or replacement. However, removal of the heating element frequently involved such extensive dismantling of the dryer that it was far easier to return the dryer to the factory for repairs.

It is therefore an object of this invention to provide a hair dryer of the character described which features ready removability of its heating element without the necessity of dismantling the housing of the dryer.

A further and more specific object of this invention is to provide a hair dryer of the character described with a nozzle having means cooperable with the heating element for the dryer to readily detachably mount the heating element in the nozzle in a manner automatically establishing the electrical connections necessary for energization of the heating coil of the element.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a longitudinal sectional view taken through the air discharge nozzle of a hair dryer and showing the heating element of this invention in place therein;

Figure 2 is a group perspective of the heating element, protective screen and nozzle cap shown in the correct order of their assembly within the nozzle;

Figure 3 is a perspective view of one of the complementary sections of the nozzle showing the mounting means for the heating element therein; and

Figure 4 is a view in cross section taken along the plane of the line 4—4 in Figure 1.

Referring now more particularly to the accompanying drawing, in which like numerals identify

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like parts throughout the several views, the numeral 5 designates generally the discharge nozzle of an electrical hair dryer. The housing of the dryer (not shown) is preferably made from complementary sections stamped of sheet metal, and the nozzle is formed by longitudinally extending complementary extensions 6 and 7 on the housing sections which together provide a tubular passage or duct leading from the interior of the housing and through which air is forced by an impeller (not shown) within the housing.

The nozzle 5 is of a sufficient length to house a heating element, indicated generally by the numeral 8, which provides for heating the air flowing from the nozzle to a desirable temperature.

Positioned in the nozzle 5 remote from the discharge end 9 is the heating element supporting structure 10. This structure comprises a U-shaped metal bracket 11, the legs 12 of which project toward the discharge end 9 of the nozzle and overlie diametrically opposite side wall portions of the complementary nozzle section 7. The legs 12 are preferably attached, as by rivets 14, to the longitudinal margins 13 of the section 7 which fit inside similar longitudinal edge portions 13' of the nozzle section 6 so that the riveted connection is concealed by the edge portion 13' of the section 6. The closed end 15 of the bracket 11 thus projects centrally across the interior of the nozzle between the overlapping edges 13 and 13' thereof.

Forwardly of and spaced from the closed end 15 of the bracket 11 is a supporting bar 16 of insulative material and likewise lying transversely of the nozzle 5, parallel to the closed end of the bracket. The supporting bar 16 is assembled to the bracket 11 before the bracket is fixed in the nozzle, and for this purpose the bracket has a pair of ears 17 struck inwardly from the legs 12 thereof to which the bar 16 is secured by means of screws 18 passing rearwardly through the bar and threading into the ears behind the bar.

As may be seen in Figures 1 and 3, the ears 17 are so located that the bar secured thereto is positioned substantially medially of the ends of the legs 12 and in front of the ears. In this manner the legs 12 extend forwardly of the bar 16 a sufficient distance to enable easy securement of the bracket 11 in the nozzle with the rivets 14 passing through the forwardly extending portions of the legs, while enabling removal of the bar from the front or discharge end of the nozzle.

The bar 16 is provided with an aperture 19 at a point medially of its ends and of a size to receive a rod 19' projecting along the longitudi-

nal axis of the nozzle. One end of the rod 19' is securely anchored to the closed end 15 of the bracket 11, and the opposite end terminates adjacent to the discharge end of the nozzle. In the present instance the inner end of the rod is provided with a threaded end portion 20 which threads into a hole provided in the closed end of the bracket. A jam nut 21 on the rod bears against the bracket, at the front side of the closed end thereof, to normally preclude unthreading of the rod from the bracket.

While the aperture 19 in the bar 16, as shown in Figure 3, is sufficiently large to loosely receive the rod 19', it should be understood that the aperture may be sized to snugly receive the rod and provide additional support for it.

Embracing the insulating bar 16 and fixed thereto, is a pair of substantially U-shaped spring clip contacts 22, positioned on the bar in spaced relationship to one another and the walls of the nozzle 5. Each of the contacts 22 is fixed to the bar 16 by a screw 23 which passes through the bar 16 and the closed end 24 of the contact, and a nut threaded onto the screw 23. The arms 25 of the contacts have flat portions which embrace the sides of the bar 16 and the arms project beyond the bar toward the discharge end 9 of the nozzle 5. The free outer end portions of the arms of each contact are bowed slightly toward one another, as at 27, and constitute the clip or socket portion of the contact.

It should be noted that the screws 23 project to the rear of the bar 16 and have sufficient length to allow electric supply conductors to be connected thereto in a conventional manner.

Particular attention is directed to the fact that the component parts of the supporting structure 10 can be subassembled to the bracket 11 prior to assembly in the nozzle and, hence, the entire structure 10 may be readily assembled in the nozzle as a unit.

The removable heating element 8, shown best in Figures 1 and 2, comprises an elongated hub 28 having a central aperture 29, and circumferentially spaced ribs 30 extending longitudinally along the hub and projecting radially therefrom. In the present instance there are four ribs, and their edges have equi-spaced notches 31 therein so disposed as to partially receive the convolutions of a resistance coil 32 helically wound about the ribs. While two diametrically opposite ribs terminate remote from the inner end of the hub 28, the remaining two diametrically opposite ribs have rearward longitudinal extensions 34 which extend to a point adjacent to but slightly inwardly of the inner end of the hub.

Each of the extensions 34 of the ribs 30 has a metallic U-shaped prong 35 attached thereto. The closed ends of the prongs extend across the outer ends of the rib extensions and the arms 36 of the prongs overlie the sides of their respective rib extensions and project forwardly along the hub. The prongs 35 are rigidly fixed in these positions by means of a bolt 37 passing through the forward or outer ends of each of the prongs and the rib extension embraced thereby. The bolts 37 likewise serve to electrically connect one end of the coil 32 with each prong 35. Hence it can be seen that the hub 28 is interposed between the pair of prongs 35 to electrically separate and aid in supporting them on the spider provided by the hub and its ribs.

The heating unit is positioned in the nozzle 5 with the rod 19' received in the aperture 29 of the hub 28 and projecting from and beyond the end

of the hub and the discharge end 9 of the nozzle 5. The inner end of the hub 28 abuts the front of the insulating bar 16 to properly position the heating element longitudinally in the nozzle, and the arms of each of the prongs 35 are releasably gripped between the spring clip portions 27 of the contact clips 22. In this manner the contact clips cooperate with the rod 19' to establish a mechanical connection between the heating element and the supporting structure 10 to normally preclude longitudinal shifting of the element on the rod, and, in addition, the clips serve to electrically connect the resistance coil with the electric supply conductors of the dryer. In this respect, it is to be noted that the clips cooperate with the rod to maintain the heating element centered in the nozzle.

Telescoped over the discharge end of the nozzle 5 to hold the complementary nozzle sections together is a cap 38 having a vented end wall 39 extending across the end of the nozzle. A central aperture 40 in the end wall 39 is of a size to receive the forwardly projecting end of the rod 19' so that a nut 42 threaded onto the projecting end of the rod holds the cap against displacement from the discharge end of the nozzle.

In addition the cap 38 and the aperture therein constitutes, in effect, a front bearing structure for the rod 19' to more positively hold it and the heating element 8 centered in the nozzle. The cap 38 also provides positive assurance against axial forward shifting of the heating element. This may be accomplished by direct engagement between the end wall 39 of the cap and the forward end of the element, but as shown, a compression spring 43 encircling the rod 19' is interposed between the end wall of the cap and the element, being seated in a well 44 formed in the front of the element. In this manner the spring yieldingly resists forward shifting of the heating element and in fact urges the same rearwardly against the insulating bar 16 to maintain the prongs on the element between their spring clip contacts.

The use of the spring 43 is preferable since it automatically compensates for longitudinal variations of the nozzle components which result both from manufacture and assembly of the components in the nozzle; and always allows the cap to telescope over the entire outer reduced end portion 45 of the nozzle. Hence, it will be seen that while the spring clip contacts grip the prongs of the heating element with sufficient force to normally hold the element against forward shifting, the cap, acting through the spring 43, prevents such shifting of the element and disengagement of the contacts which might result from abusive handling of the hair dryer.

In accordance with the Underwriters' code, a protective wire screen 41 is slipped on over the forward end of the rod ahead of the spring 43 but behind the end wall 39 of the cap. The screen extends across the entire nozzle and is held in abutting relationship with the end wall 39 of the cap by the force of the expansive spring 43 acting between the cap and the heating element.

The heating element 8 may easily be removed from the nozzle without dismantling the dryer by first removing the nut 42 and the cap, screen and spring, and by grasping the front end of the element and applying an outward force to disengage the prongs from their spring clip contacts. The element is then easily slid along the rod and off the outer end thereof.

Hence it can also be seen that the act of inserting the heating element into the nozzle also establishes electrical contact between the ends of the heating coil on the element and the supply terminals of the dryer.

From the foregoing description, taken together with the accompanying drawing, it will be readily apparent that this invention provides an inexpensive yet highly effective manner of removably securing the heating element of a hair dryer in place in the nozzle of the dryer.

What I claim as my invention is:

1. In an electrical appliance: a tubular nozzle through which air is adapted to flow; an insulating member fixed inside the nozzle a distance from the discharge end thereof and extending across the interior of the nozzle; a pair of spring clip contacts fixed on said insulating member and to which electric power wires are adapted to be attached; a heating unit inside the nozzle of a size to clear the sides of the nozzle when the unit is centered in the nozzle, said heating unit including a heating coil; and means for holding the heating unit centered in the nozzle and against displacement axially of the nozzle including a pair of contacts fixed to the heating unit and each releasably gripped by one of said spring clip contacts, each of said contacts being electrically connected with one end of the heating coil.

2. In an electrical appliance: a tubular nozzle through which air is adapted to flow; a supporting bracket fixed inside the nozzle a distance from one end thereof; an insulating bar secured to said bracket in a position extending across the interior of the nozzle; a pair of spring clip contacts fixed on said insulating bar and to which electric power wires are adapted to be attached; a heating element mounted inside the nozzle and of a size to clear the sides of the nozzle, said element including a heating coil; and means for holding the heating element against displacement axially of the nozzle including a pair of contacts fixed to the heating element and each releasably gripped by one of said spring clip contacts, each of said contacts being electrically connected with one end of the heating coil.

3. In an electrical appliance: a tubular nozzle through which air is adapted to flow; a block of insulative material fixed in the nozzle a distance back from its discharge end; a heating element inside the nozzle including a spider of insulative material having its exterior spaced from the sides of the nozzle, and a resistance coil wound about the exterior of the spider; and interengaging parts carried by said block and the spider brought into engagement with one another by motion of the spider in a direction toward the block, the block carried parts being adapted to have supply conductors connected thereto, and the spider carried parts being electrically connected with the ends of the coil thereon so as to establish an electrical connection between the coil and the supply conductors when said parts are interengaged, said interengaging parts establishing a mechanical connection between the spider and the block to hold the spider against longitudinal shifting in the nozzle.

4. The electrical appliance set forth in claim 3 further characterized by the provision of a cap on said end of the nozzle having a vented wall portion extending across said end of the nozzle; and detachable means for holding the cap in place on said end of the nozzle.

5. In an electrical appliance: a tubular nozzle through which air is adapted to flow for discharge from one end of the nozzle; a supporting bracket secured to the nozzle at the inside thereof a distance back from its discharge end; a block of insulative material carried by said supporting member; a pair of substantially U-shaped spring clips fixed to said block of insulative material and each having spaced arms embracing the block and extending beyond the block toward the discharge end of the nozzle, said spring clips being adapted to have supply conductors connected thereto; a rod supported at one end by said bracket and projecting lengthwise along the axis of the nozzle to have its opposite end adjacent to the discharge end of the nozzle; a heating unit slidably received on said rod with its exterior spaced from the side wall of the nozzle, said heating unit including a spider of insulative material, a resistance coil wound about the exterior of the spider, and a pair of metallic prongs fixed to the spider and each electrically connected with one end of the resistance coil, each of said prongs being detachably received between and securely gripped by the arms of one of said spring clips whereby said spring clips normally hold the spider against longitudinal shifting on said rod; a cap received on the discharge end of the nozzle and having a vented end wall extending thereacross and provided with a central aperture through which said opposite end of the rod projects to receive support from the cap; and means detachably engaged with said projecting end of the rod for holding the cap against displacement from the discharge end of the nozzle.

6. In an electrical appliance: a tubular nozzle through which air is adapted to flow for discharge from one end of the nozzle; a U-shaped supporting bracket fixed in the nozzle remote from the discharge end thereof, said U-shaped supporting bracket having its closed end extending transversely across the interior of the nozzle and having its legs projecting toward the discharge end of the nozzle and overlying diametrically opposite side wall portions of the nozzle, said legs having a pair of ears struck inwardly therefrom a distance from said closed end of the bracket; a transverse insulating bar fixed to said ears; a pair of female spring clip contacts secured to said insulating bar in spaced relation to one another and projecting toward the discharge end of the nozzle with the entrance between the contacts facing said discharge end of the nozzle, each of said spring clips being adapted to have an electrical supply conductor connected thereto; a rod having its inner end fixed to the closed end of the U-shaped bracket and extending lengthwise along the axis of the nozzle toward the discharge end thereof, the outer end of the rod terminating adjacent to said discharge end of the nozzle; and a heating unit supported on and held centered in the nozzle by said rod, said heating unit being slidable off of the outer end of the rod to enable removal of the heating unit from the nozzle, and said heating unit including an elongated spider of insulative material, a resistance coil wound about the exterior of the spider, and a pair of metallic prongs fixed to the inner end of said spider and each electrically connected with one end of the resistance coil, each of said prongs being snugly embraced by one of said spring clip contacts so as to electrically connect the coil with the electrical supply conductors and to normally hold the spider against longitudinal shifting in the nozzle, and said prongs being readily connectable with and disconnected from the spring

clip contacts by sliding the heating unit in one direction or the other along said rod.

7. As an article of manufacture, a heating element comprising: a spider of insulative material having an elongated hub, and a plurality of circumferentially spaced longitudinal ribs projecting radially from the exterior of said hub, a pair of said ribs being longitudinally extended at one end of the hub; a heating coil wound around said spider and supported on the ribs thereof; a U-shaped contact fixed to each of said rib extensions with their closed ends extending across the outer ends of their rib extensions and with their arms embracing the sides of their rib extensions and projecting longitudinally of the hub of the spider; and an electrical connection between each of said contacts and one end of the heating coil.

8. As an article of manufacture, a heating element comprising: an elongated spider of insulative material having a hub and a plurality of circumferentially spaced longitudinal ribs projecting radially therefrom, certain of said ribs terminating short of one end of the spider, and a substantially diametrically opposite pair of said ribs having extensions terminating adjacent to the ends of the spider, a heating coil wound around said spider and supported on the ribs thereof; a U-shaped contact on each of said rib extensions with their closed ends extending across the longitudinal extremities of the extensions and with their arms embracing the sides of the extensions and projecting longitudinally along the hub of the spider, said rib extensions having one end portion of the hub interposed therebetween; means securing each of said contacts on its rib extension; and electrical conductors leading from the ends of the heating coil to the contacts and maintained connected with the contacts by said securing means for the contacts.

9. In a device of the character described: a tubular nozzle through which air is adapted to be discharged, said nozzle comprising complementary longitudinal nozzle sections, each of said sections having substantially diametrically opposite longitudinally extending marginal edge portions with the edges of one section overlying the edges of the other section; a heating element in the nozzle; supporting means for holding said heating element in place in the nozzle including a bracket; a riveted connection between the bracket and the marginal edges of said other nozzle section concealed by said overlying marginal edges on the first designated nozzle section; a rod carried by said bracket and projecting longitudinally along the center of the nozzle toward the discharge end thereof; a cap on the discharge end of the nozzle surrounding the nozzle sections to hold the same together; and means cooperable with said end of the rod for holding said cap in place on the discharge end of the nozzle.

10. In an electrical appliance: a tubular nozzle through which air is adapted to flow; an insulating member fixed inside the nozzle a distance from the discharge end thereof and extending across the interior of the nozzle; a pair of spring clip contacts fixed on said insulating member and to which electric power wires are adapted to be attached; a heating unit inside the nozzle of a size to clear the sides of the nozzle when the unit is centered in the nozzle, said heating unit including a heating coil; a cap detachably secured on the discharge end of the nozzle and having a vented wall portion extending across the nozzle; and means for holding the heating unit centered in the nozzle and against displacement axially of the nozzle including a pair of contacts fixed to one end of the heating unit and each releasably gripped by one of said spring clip contacts, and an expansive spring interposed between the opposite end of the heating unit and the vented wall portion of the cap.

11. In a device of the character described; a tubular nozzle through which air is adapted to be discharged, said nozzle comprising a pair of complementary longitudinal nozzle sections, each of said sections having substantially diametrically opposite longitudinally extending marginal edge portions with the edges of one section overlying the edges of the other section; a heating element in the nozzle; supporting means for holding said heating element in place in the nozzle including a bracket; a riveted connection between the bracket and the marginal edges of said other nozzle section concealed by said overlying marginal edges on the first designated nozzle section; a cap detachably secured over the discharge end of the nozzle and having a wall portion extending thereacross; and means for holding said heating element centered in the nozzle and against displacement axially of the nozzle including a spring interposed between the heating element and the cap, and by which the heating unit is urged against a portion of said supporting means.

FRITZ VICTOR FORSS.

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