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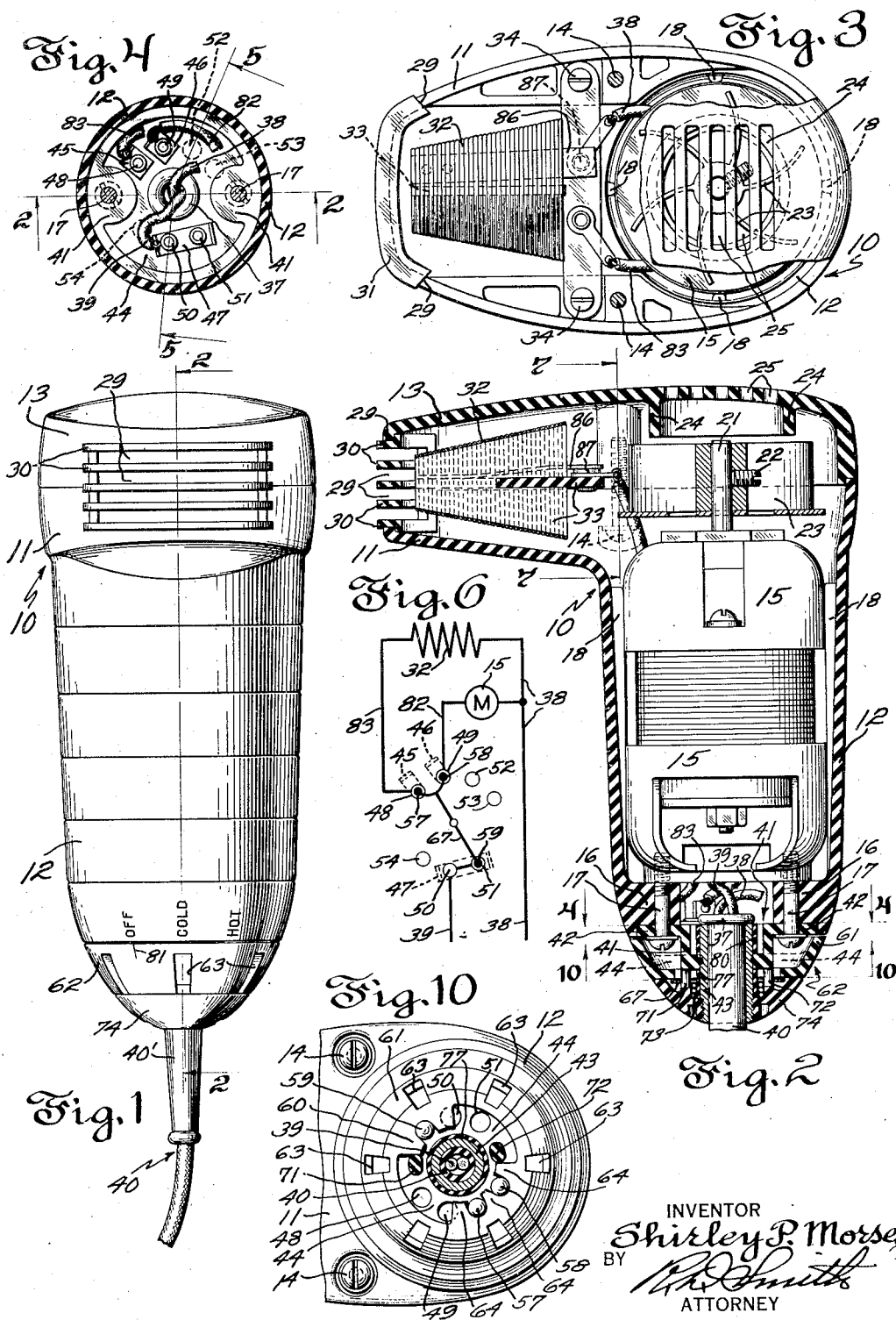
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2,432,067

APPLIANCE SWITCH AT ATTACHMENT CORD ANCHORAGE

Filed Sept. 13, 1944

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

Fig. 5

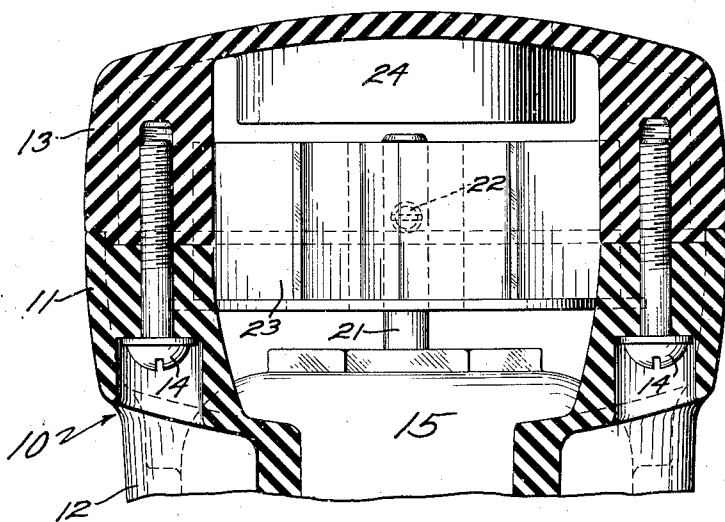
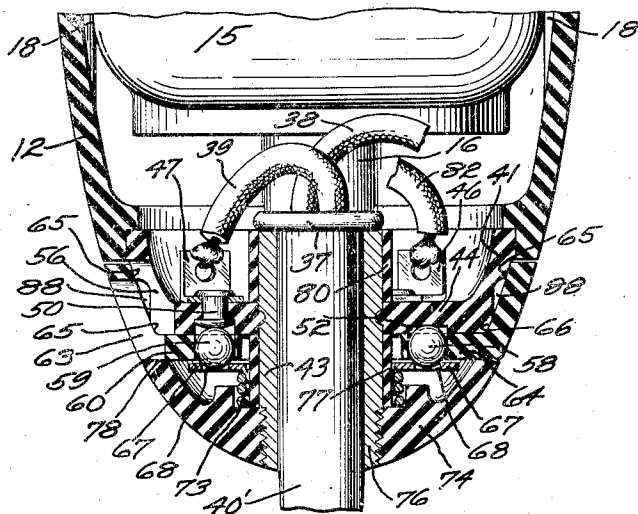


Fig. 7

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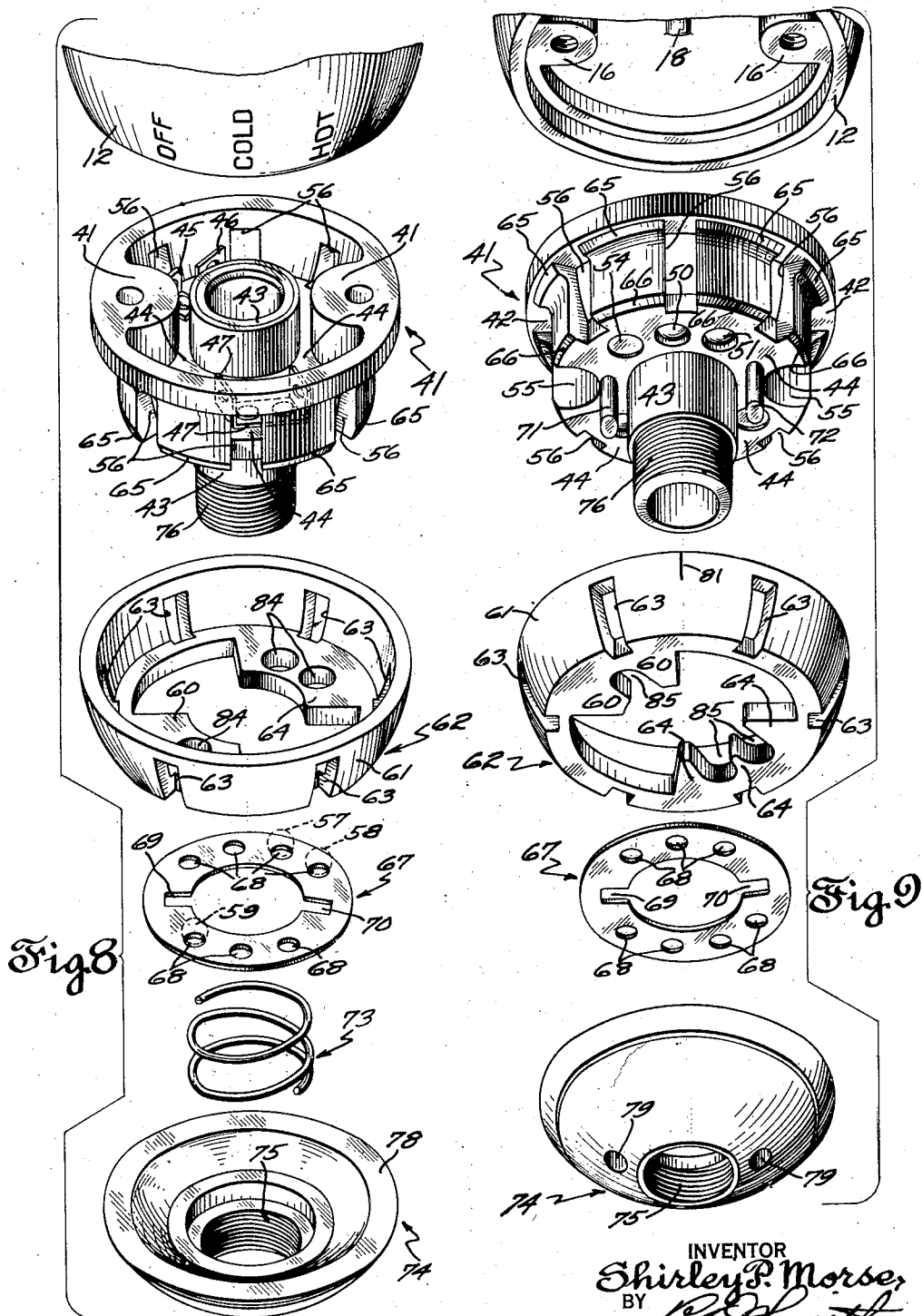
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

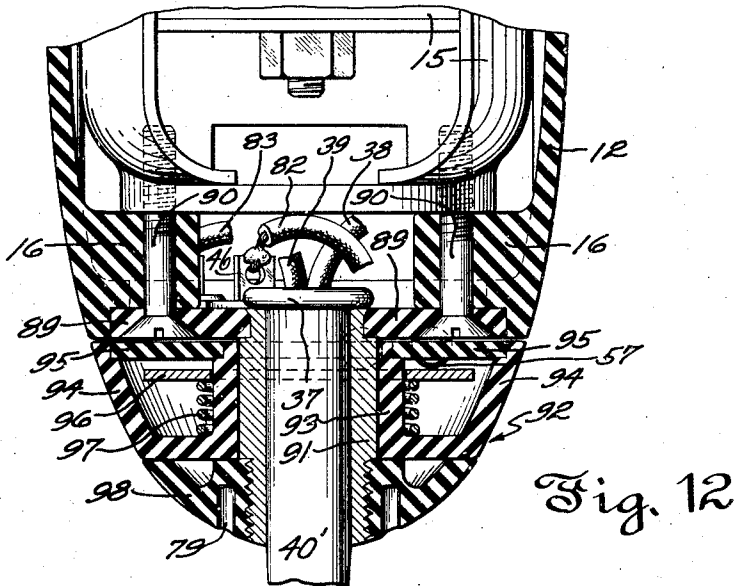


Fig. 12

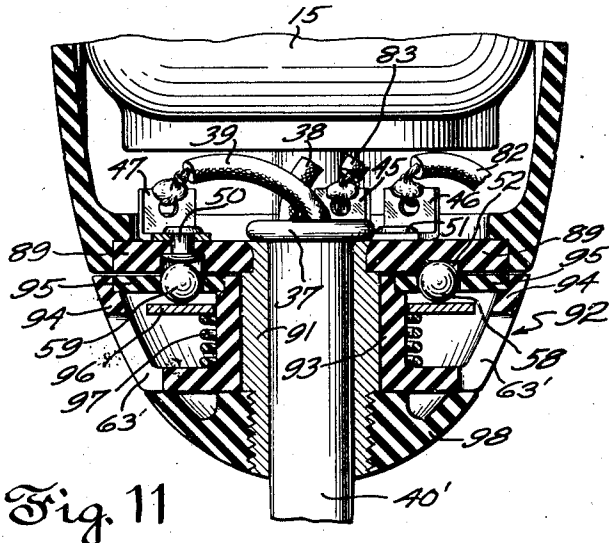


Fig. 11

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UNITED STATES PATENT OFFICE

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APPLIANCE SWITCH AT ATTACHMENT
CORD ANCHORAGE

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23 Claims. (Cl. 219—39)

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This invention relates to portable, hand maneuvered electric appliances. Some of the present improvements are equally useful in a large variety of such appliances while other improvements are particularly concerned with appliances equipped with motor powered tools such as hair cutters for dry shaving, drills, power driven tooth brushes, erasers, etc. The particular motor driven appliance herein chosen to illustrate certain features of the invention is a hair drier incorporating a blower fan and an electrical resistance unit for heating the outblown stream of air.

A structural feature somewhat common to such appliances is an overall casing, usually elongated, and housing an electric power motor. Such casing is equipped with, or shaped to serve as, a handle by means of which the appliance is manually grasped and maneuvered. It is a more recent practice to provide such appliances with an electric attachment cord entering the elongated casing coaxially at the end thereof remote from the applicative end of the appliance and to incorporate at such handle end of the casing a conveniently manipulated electric switch governing the current fed through the attachment cord to the motor or other translatable unit within the casing.

Since it contributes to good balancing, ease of handling and appealing streamlined appearance, the switch containing end of the casing in modern practice is tapered, rounded or torpedo-like in shape. This considerably reduces the room available at such location for the binding posts, the base, and the circuit making and breaking mechanism of an electric switch. Particularly in appliances that are so small as to be graspable in the palm of the hand, room for electric switching mechanism is practically unavailable in any other parts of the casing because the latter so closely hugs the motor body which it houses.

Accordingly one objective of the present improvements is to incorporate working parts of an electric switch in efficient form together with a rugged protective anchorage for the electric attachment cord both within the very restricted quarters that are available at the above described torpedo-shaped end of a tapering or streamlined electrical appliance.

Another object is to prevent interference with

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the working parts of the electric switch by outside pulling on the attachment cord in any direction.

Another object is so to construct such switch that it can control more than one independent circuit for energizing in predetermined relationship a plurality of electric translatable devices within the casing, all energized by current delivered through a common attachment cord.

Another object is to provide an actuating handle for such switch which shall conform externally to the outside contours of the casing and preferably not project appreciably therebeyond.

An object of the improvements pertaining particularly to a portable hair drier includes provision for optional use of the blower motor alone, or of the blower motor together with an air heater, whereby the operator is afforded a choice of blowing heated or unheated air out of the nozzle of the appliance.

A further object is to place the motor, or heaviest part of the casing contained mechanism, in that portion of the casing which is held within the grasp of the operator's hand, instead of placing the center of gravity of the appliance in offset relation to the operator's hand that is used to wield the appliance. This greatly reduces the muscular exertion of the wrist that is required to maneuver the appliance quickly into different positions of use.

The foregoing and other objects of the invention will be understandable in greater particular from the following description of particular illustrative constructions embodying the invention in which description reference is made to the accompanying drawings where the parts that are shown in section are drawn as viewed in the direction of the arrows applied to the several section planes.

In the drawings:

Fig. 1 is a front elevation looking into the blower nozzle of a hot-or-cold hair drying appliance incorporating the present improvements.

Fig. 2 is a side view taken for the most part in section on the plane 2—2 in Figs. 1 and 4.

Fig. 3 is a plan view with most of the structure of the head cap omitted.

Fig. 4 is a view taken in cross section on the plane 4—4 in Figs. 2 and 5.

Fig. 5 is an enlarged fragmentary view taken in section on the planes 5—5 in Fig. 4.

Fig. 6 is a diagram of electric circuit connections.

Fig. 7 is a fragmentary view taken in section on the plane 7—7 in Fig. 2.

Fig. 8 shows an exploded assemblage of the electric switch parts viewed in perspective from their inner or concave sides.

Fig. 9 shows an exploded assemblage of the same parts as Fig. 8 viewed in perspective from their outer or convex sides with slight modification in shape of the ring handle of the switch.

Fig. 10 is a view taken in section on the plane 10—10 in Fig. 2 looking in the direction of the arrows.

Fig. 11 is a view otherwise like Fig. 5 showing a modified construction.

Fig. 12 is a view showing the modified construction of Fig. 11 in section on a plane corresponding to 2—2 in Fig. 4.

The main housing of the appliance is composed of two major separable hollow casing sections, the larger section 10 of which is L-shaped and consists of an upwardly opening head portion 11 that is continuous and rigid with a depending stock portion 12, the latter being elongated and streamlined terminating at a bottom end having the shape of a torpedo nose. The casing stock 12 is axially elongated and of suitable diameter to be grasped in the palm of an operator's hand and encircled by the operator's fingers. The otherwise open top of head portion 11 is capped by a shallow cover 13 removably secured thereto by screws 14. Either or both sections of this housing may be made of molded plastic material and thereby electrically insulative. The casing stock 12 is approximately filled by the body of an electric motor 15 illustrative of an electrical translatable device and one of whose ends is fixedly but removably secured by holding screws 17 to anchored lugs 16 formed internally on the casing stock 12, and whose body is fittingly engaged and steadied by circumferentially spaced ribs 18 projecting from the inside of the wall of stock 12 so as to afford air passageways between said ribs and between the motor body and the casing stock 12 from one end of the motor to the other. From the other or top end of motor 15 there projects upward the armature shaft 21 of the motor on which shaft there is fixed by a set screw 22 the hub of an air impeller or centrifugal fan 23. Just above and axially aligned with impeller 23 a shallow hood 24 is formed internally on the cover 13 to cause air that is sucked inward of the casing to be directed downward toward the hub of impeller 23 and internally of this hood through openings 25 in the cover. Rapid rotation of impeller 23 throws the air admitted through openings 25 outward horizontally from the casing through a nozzle aperture 29 which is spanned by horizontal grid bars 30 mounted by means of their border frame 31 that is lodged jointly and removably between casing head 11 and cover 13. Thus this grid structure is released for removal when the cover is separated from the casing head.

Between impeller 23 and the grid bars 30 there is firmly supported another electrical translatable device in the form of a stationary heater winding of electrical resistance wire 32 mounted on a refractory electrical and heat insulative core 33 which in turn is fixedly mounted by screws 34 on the head portion 11 of the casing section 10.

The bottom end of casing stock 12 carries an assemblage of electric switch and attachment cord

anchorage parts shown in Figs. 2 and 5. These parts are shown separated and on a larger scale in isometric drawing in Figs. 8 and 9.

To attain the combined objectives, first, of providing fixed sturdy constraint and anchorage for the attachment cord 40 in its region of entrance into the end of the casing stock 12 centrally through a current switching mechanism and, second, of providing suitable room and support for desirably large and well spaced moving parts of the switch mechanism so that such parts can move proper distances with a snap action for selectively controlling commercial voltage circuits that separately include the heater wire 32 and the motor 15, the casing stock 12 is made to provide rotary bearing support for an annular switch handle 62 at the bottom end of the casing. While such bearing support might be circularly continuous or might consist of surfaces formed externally on the material of the casing stock 12, itself, the bearing support herein illustrated is afforded by two axially spaced and circularly interrupted annular chamfered shoulders 65 and 66 of differing diametrical sizes formed externally on a skeletonized, cup-shaped switch base 41 of insulative material. Either or both of shoulders 65 and 66 might be supplemented or replaced by circular bearing surfaces formed internally of the cup-shaped switch base 41 or sometimes on the casing stock 12, itself.

Switch base 41 as a unit is removably secured against the bottom or outer surfaces of lugs 16 of casing stock 12 by means of the same screws 17 that have threaded engagement with motor 15 for mounting the latter firmly against the top of inner surfaces of these lugs. There are clamped under the heads of screws 17 two diametrically opposite, inward directed flanges 42 forming floor portions of two niches 55 bordered by inwardly curved sections of the peripheral wall of switch base 41 and which accommodate the heads of screws 17. A cross wall or web wall 44 of the same insulative material as switch base 41 completes the structure of the latter and is penetrated centrally by an axially extending tubular conduit member or structure 43 fixed therein of considerably smaller compass than the circular bearing shoulders 65, 66 and coaxial with same. Cross wall 44 spans an opening at the bottom end of casing 12 and provides at 43 an inlet of smaller compass than such opening to admit the attachment cord 40. Thus web wall 44, conduit member 43 and bearing support 65, 66 comprise a rigid unitary structure removably attached to the casing of the appliance. Conduit member 43 is preferably rigid and may be of metal or insulative material and is fixedly embedded in web wall 44 during the molding to shape of the switch base thereby to penetrate said inlet and serve as a guide bushing for the attachment cord. If preferred, conduit member 43 may be made a molded homogeneous extension of the insulative material of the switch base 41. It will be seen that web wall 44 is radially intermediate the bearing support surfaces 65 or 66 and the conduit member 43, as well as rigid with both said conduit member and the mounting flange 42 of the switch base thereby to hold said conduit member in its firm fixed relation to casing stock 12. Attachment cord 40 is provided with a molded armoring sheath 40' at its appliance connecting end and the sheath terminates in an oversize bead or flange 37 that prevents withdrawal of the attachment cord outward from conduit member 43 by overhanging the inner end thereof.

The peripheral wall of the switch base between bearing surfaces 65 and 66 is designated 88 and is of channel nature in relation to said bearing surfaces. Cut-outs 56 in the peripheral wall of switch base 41 afford generous passage for air sucked into the casing 10 by fan 23 for cooling motor 15 by flowing upward between ribs 18.

The upper or inner face of web wall 44 has fixedly secured thereagainst by rivets 48, 49, 50 and 51, three metallic, bent-angular, binding-post tabs 45, 46 and 47 for the removable attachment of electric circuit wires and which are related in electrical polarity as evident from Figs. 4 and 6. Since web wall 44 is removable with switch base 41 from the appliance casing 12, the attachment cord wires 39, 82 and 83 can be connected to binding posts 50, 49 and 48 while the attachment cord is separated from the appliance casing. The opposite headed ends of these rivets form circuit terminals and are somewhat sunken in counterbores at the mouths of holes in web wall 44 through which the rivets extend. Three additional and similar blank counterbores are shown at 52, 53 and 54. All of said counterbores are radially intermediate bearing support 65, 66 and the conduit member 43 and are spaced apart in a common circular track concentric with the common axial center of housing stock 12 and of conduit member 43.

The circuit making and breaking elements of the switch are of neutral polarity and include three electrically conductive contact balls 57, 58 and 59, each of like and suitable diameter to seat far enough into any of the counterbores in web wall 44 to make electric contact in various combinations with stationary switch contacts afforded by the heads of rivets 48, 49, 50 and 51. These balls are maintained constantly at the same fixed circular spacing one from another regardless of what variable absolute positions they occupy in relation to the several counterbores and circuit connected rivet heads in web wall 44. This is because the balls are respectively caged by openings in flange-like projections 60, 64 extending radially inward from the rim 61 of a hollow annular switch handle 62. Thus these flanges serve as cage structure and afford handle actuated means operative to shift balls 57, 58 and 59 in unison into and out of different counterbores in web wall 44. As the balls are centered with and larger in diameter than the thickness of flanges 60 and 64 each ball presents a conductive surface that is accessible from the axially outer side of the ring handle 62 of the switch. The openings referred to may take the forms of holes 84 slightly larger than the balls as shown in Fig. 8 or may comprise notches 85 slightly wider than the balls as shown in Fig. 9.

The outer surface of rim 61 forms a smooth continuation of the exterior contour of the housing stock 12 but is perforated by circumferentially separated elongated apertures 63 serving the double purpose of affording better finger grasp of the annular switch handle and admitting air sucked in by fan 23 for cooling motor 15. The coaxial, conically disposed, chamfered shoulders 65 and 66 on switch base 41 afford rotary bearing support for the rim 61 of hollow switch handle 62 by nesting into the same with a fit permitting free swiveling motion thereof. A retainer in the form of thrust nut 74 provided with wrench receptive sockets 79 has threaded engagement with the bottom end of conduit member 43 and presents a flat thrust face to switch handle 62 positioned to leave the latter free to swivel without undue

looseness. Nut 74 conforms in external contour with the torpedo-end shape of casing stock 12 and in assemblage is set up firmly against the ends of stationary posts 71 and 72 fixedly upstanding from switch base 41. A spacer collar 77 of insulative material sleeves conduit member 43. A similar insulative collar 80 sleeves the innermost end of this conduit member.

As conductive balls 57, 58 and 59 are shifted in unison in an arcuate path or orbit about conduit member 43 or 91 by swiveling movement of switch handle 62, each ball passes from one to another of detent holes 68 in the non-rotating ball bridging pressor plate 67 of conductive material. Holes 68 are of a size to permit the balls to project only a little therethrough whereby plate 67 constantly presses axially against all of the balls simultaneously under the urge of spring coil 73. This spring surrounds conduit member 43 and is constantly under axial compression between pressor plate 67 and retaining nut 74. Pressor plate 67 also has two key way notches 69, 70 slidably engaged with the said stationary posts 71, 72. This leaves plate 67 free to slide axially but prevents rotation thereof. The inner diameter of plate 67 may have a plate centering fit on sleeve 77 permitting free axial sliding of the plate.

Either of posts 71, 72 can be engaged at times by one or the other of ball impelling flanges 60 and 64 of switch handle 62 and thereby serve as stops limiting the extent of swiveling movement of the switch handle in both rotary directions as evident in Fig. 10.

The flexible attachment cord 40 contains at least the two flexible current supply wires 32 and 39, the former of which as shown in Fig. 6 connects electrically to both the motor 15 and the heater winding 32 while the former connects to the binding post 47 as best shown in Figs. 4, 5 and 6. These electrical connections of various wires to the binding posts are preferably made by tying each wire through a hole in its binding post and then soldering the wire to the binding post so that the joint will be secure both electrically and mechanically. In this manner lead wire 82 electrically connects binding post 49 with the motor 15 and a separate lead wire 83 connects binding post 48 with the heater resistance wire 32 completing the electrical circuits diagrammed in Fig. 6. 86 represents a resilient leaf contact biased to separate automatically from binding post contact 87 if overheating in the appliance melts a drop of solder normally holding 86 and 87 in electrical contact whereby a safety cut-out or automatic circuit breaker is provided to guard against short circuit overloads or other fire hazards.

The operation of my improved appliance will for the most part be evident from the foregoing description of its construction. In the case of the hair drier here illustrated the operator will grasp the casing stock 12 in the palm of either hand with the thumb naturally uppermost or at the head portion 11 of the casing. This places the large preponderance of weight of the appliance inside the grasp of the operator's hand. The head 11 and its contents are so relatively light as to present no appreciable load to the wrist muscles of the holder's hand in maneuvering the appliance quickly to different positions for blowing air out of the nozzle aperture 29, as for drying hair.

The attachment cord 40 always trails the appliance of course and together with the switch handle 62 falls clear of the little finger side of the operator's hand so that the switch handle 62

is readily grasped at any time by the fingers of the operator's other hand and turned in either direction to any one of three different positions which are visibly indicated by the registering of indicium 81 on the ring with any one of the three words "Off," "Cold," or "Hot," marked on the bottom end of the casing stock 12 as shown in Fig. 1. Air inlet apertures 63 are large enough slightly to admit the flesh of the operator's fingers to facilitate a grasp of switch handle 62 for turning it.

When indicium 81 registers "Off," the three contact balls 57, 58 and 59 occupy respectively the three blank counterbores 52, 53 and 54 in the insulative wall 44. Both the motor 15 and the heater 32 are then deprived of current and idle. Upon turning switch handle 62 so that indicium 81 registers "Cold," the said contact balls 57 and 59 will be swung in unison and become seated in contact with rivets 49 and 50 while ball 58 simultaneously occupies the vacant counterbore 52 whereupon current from the attachment cord supply wire 39 passes through binding post clip 47, rivet 50, contact balls 59, pressor plate 67, contact ball 48, rivet 49, binding post terminal 46, lead wire 82 and thus through motor 15 which is constantly in circuit with the return wire 38 of the attachment cord. Now motor 15 will be energized to the exclusion of the heater unit 32 and will rotate impeller 23 to blow air out of nozzle 29 unheated by the heater unit 32.

When indicium 81 is turned to register with "Hot," contact balls 57, 58 and 59 will be seated respectively in counterbores against the heads of rivets 48, 49 and 51 as shown diagrammatically in Fig. 6. Here it is seen that current passes through motor 15 as in the "Cold" position of the switch handle but in addition the heater unit 32 now is energized simultaneously with motor 15 by circuit through attachment cord 39, binding post 47, rivet 51, contact ball 59, pressor plate 67, contact ball 57, rivet 48, terminal clip 45, lead wire 83, and the heater unit 32 which is constantly in circuit with the return wire 38 of the attachment cord. Now air blown out of nozzle 29 by the fan 23 will be heated by the heater unit 32.

The user is thus given the option of heated or unheated air by the mere shifting of position of switch handle 62, which also can cut out of circuit all of the electrical translatable devices in whatever appliance may be equipped with the improvements hereof.

Turning of this switch handle in either direction beyond the "Off" position and the "Hot" position is prevented by the stop posts 71 and 72 as hereinbefore explained. Each of the contact balls falls into its counterbore with a naturally quick circuit breaking movement expedited by the thrust of spring-backed pressor plate 67. In being forced to roll sidewise by the loosely engaging switch handle flanges 60 or 64, each ball because of the seating pressure of spring 73 and the sharp rim edges of the counterbores resists leaving its seat in the counterbore in web wall 44 until increasing manual turning urge is built up in muscles of the operator's hand, whereupon a very abrupt popping up of all three balls simultaneously out of their respective recesses takes place producing a quick circuit breaking or "snap" action of the current controlling parts which effectively prevents sparking and pitting of the contacts. The contact balls may be made of bronze, brass or other metal of good conductivity. When any of the circuit making balls reaches a

position for dropping into any one of the counterbores over the sharp rim thereof, the before mentioned looseness of fit of each ball in lateral relation to its hole or notch in either handle flange 60 or 64 permits the axial urge of pressor plate 67 to snap the ball smartly into its rivet contacting, fully seated position in the counterbore so that quick making as well as quick breaking of the circuit occurs.

It will be obvious from Figs. 2 and 5 that no sidewise tugging on attachment cord 40 can act in any way to impair or interfere with the free action of the circuit making and breaking parts of the switch because the cord is at all times anchored against withdrawal from conduit member 43 at the innermost side of both the casing and the circuit switching mechanism by means of the bead 37 of its armoring sheath 40' and is positively constrained laterally by the rigidity of conduit member 43 which extends from the outermost side to the innermost side of both the casing and the circuit switching mechanism.

Figs. 11 and 12 show a modified construction wherein a modified form of base 89 is composed of a flat disc of insulative material removably secured to the lugs 16 of the casing stock 12 by flat headed screws 90 passing through clearance holes in said lugs and having threaded engagement with motor 15. This flat switch base 89 may be provided with the same kind and arrangement of counterbores, rivets, and binding posts as is the cross or web wall 44 of the cup-shaped switch base 40 in Fig. 5. Modified switch base 89 will also support in fixed relation thereto a somewhat modified form of rigid conduit member 91 projecting axially outward therefrom and providing rotor bearing support for a modified form of switch handle 92. This form of switch handle has a hub 93 rotatably supported on conduit member 91 and includes between hub 93 and its peripheral rim portion 94 an impelling plate 95 of insulative material detachably fixed thereto by screws or other suitable means and closely flanking the flat switch base 89 and provided with either holes or notches similar to 63 or 65 in the flanges 60 and 64 of the cupped switch handle 62.

In the hollow interior of switch handle 92 a current carrying member or pressor plate 96 surrounds the hub 93 and is urged axially against the contact balls by the axially compressed spring 97 in a manner to present its annular flat face into contact with all the balls and thus bridge the balls conductively. Spring 97 is loosely coiled about hub 93. Since this pressor plate 96 is free to turn in unison with the switch handle, it need not have ball seating apertures such as 68 in pressor plate 67.

Retaining thrust for the modified switch handle 92 may be provided by a nut 98 which after the fashion of nut 74 threads onto the outer end of conduit member 91 and tightly against a shoulder thereon at the end of the threads being thus positively and fixedly positioned to give full freedom of switch handle 92 to turn in rotary unison with spring 97, pressor plate 96 and contact balls 57, 58 and 59. Retainer 98 is shaped and disposed to complete the enclosure of a hollow space in outboard relation to the said ring handle, said space being occupied by switch handle 92 and by the current carrying pressor plate 96.

As each contact ball jumps up out of or back into one of the counterbores in the switch base 89 quick making and/or breaking of the circuit will occur as in the case of the switch of Fig. 5. The flat switch base 89 and the impelling plate

95 will be perforated with air passage openings wherever possible to admit to the motor compartment within casing stock 12 the air that is in-drawn by fan 23 through switch handle apertures 63'.

The operation of the modified form of construction shown in Figs. 11 and 12 does not differ from that in the other figures of the drawings except that the pressor plate 96 is free to rotate with the travel of contact balls 57, 58 and 59 as is also the spring 97.

As the two possible forms of embodiments of the invention which are herein disclosed will be informative to those skilled in the art of many other modifications that may be based on the principles of construction and arrangement underlying this invention, the appended claims are intended to cover and apply to all parts and arrangement that are obvious equivalents for those disclosed herein insofar as same come fairly within the intended scope and meaning of the claim definitions.

I claim:

1. In a portable electrical appliance containing an electrical translatable device adapted to be connected in circuit with an appliance attachment cord, the combination with said cord of, a casing carrying and housing said device, electric circuit controlling mechanism at one end of said casing, and a tubular member rigid with said casing forming a constraining conduit for said cord extending from the outermost side to the innermost side both of said casing and of said circuit switching mechanism centrally of the latter, said attachment cord being anchored against withdrawal from said conduit at the innermost side of both said casing and said circuit switching mechanism.

2. In a portable electrical appliance containing an electrical translatable device adapted to be connected in circuit with an appliance attachment cord, the combination with said cord of, a casing carrying and housing said device having an opening to admit said attachment cord, a cross wall spanning said opening containing an inlet of smaller compass than said opening, electric circuit controlling mechanism at the outer side of said cross wall, circuit terminals at the inner side of said cross wall, a current conducting attachment cord extending past said circuit controlling mechanism and into said casing through said inlet thereby to reach said circuit terminals, and means at the inner side of said cross wall operative to prevent withdrawal of said attachment cord from said cross wall.

3. In a portable electrical appliance as described in claim 2, the combination defined in said claim, together with a rigid guide bushing sleeving the said attachment cord and penetrating the said inlet in rigid relation to the said cross wall.

4. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination of, an axially elongated casing carrying and housing said device, rotary bearing support at one end of said casing circularly disposed near the periphery thereof, a tubular conduit member of smaller compass than said bearing support joined fixedly and coaxially therewith and opening into said casing in a manner to admit therethrough said attachment cord and restrict lateral deflection of the latter, a web wall radially intermediate said conduit member and said bearing support rigid with both said conduit

member and said casing for supporting the conduit member in fixed relation to the casing, at least one electric switch element movable between circuit controlling positions stationed radially intermediate said tubular conduit member and said circularly disposed bearing support, a switch handle guided by said bearing support for turning movement relative to said casing, and handle actuated means operative to shift said element from one to another of said positions.

5. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, together with at least one circuit terminal stationed on said web wall radially intermediate the said conduit member and the said bearing support in position to be conductively contacted by the said contact element.

6. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, together with at least one binding post for the attachment of an electric wire of the said attachment cord mounted on the axially inner side of said web wall, and a stationary circuit terminal on the axially outer side of said web wall electrically connected with said binding post and positioned to be conductively contacted by the said contact element.

7. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, together with a second electric contact element movable between different circuit controlling positions stationed radially intermediate the said conduit member and the said bearing support, both of the said contact elements being on the axially outer side of the said web wall, a conductive element bridging plate stationed to contact electrically with both of said contact elements, and means to stay said plate against movement with said elements in at least one direction.

8. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which the said rotary bearing support and the said switch handle are cooperatively shaped and relatively disposed to nest one within the other thereby to reduce the extent of axial space occupied jointly by said support and handle.

9. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, together with a thrust nut having threaded engagement with the said conduit member shaped and positioned to retain the said switch handle turnably sleeved upon the said bearing support.

10. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which the said web wall is removably attached to the said casing of the appliance, together with binding posts on the axially inner side of said web wall for attachment of conductive wires of the said attachment cord, whereby said wires may be connected or disconnected from said binding posts while the attachment cord is separated from the appliance casing.

11. In a portable electrical appliance containing an electrical translatable device connectable in

circuit with an appliance attachment cord, the combination defined in claim 4, in which the said web wall and the said conduit member and the said bearing support comprise a rigid unitary structure removably attached to the said casing of the appliance.

12. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which the said web wall, the said conduit member and the said bearing support comprise a unitary cupped structure removably attached to the said casing with the concave side of said structure facing the casing in a manner to hold said web wall at a maximum axial distance from the latter thereby to allow maximum room for attachment cord connections within the hollow of said cupped structure and to save room within the casing.

13. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, together with a thrust nut having threaded engagement with the said conduit member shaped and positioned to retain the said switch handle turnably sleeved upon the said bearing support, the electric switch element being axially confined between said thrust nut and the said web wall.

14. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which the said rotary bearing support and the said switch handle are cooperatively shaped and relatively disposed to nest one within the other in telescoping manner, both said support and said handle having apertures in their relatively telescoped peripheral walls disposed to admit ambient air therethrough to the interior of the said casing for cooling the said electrical translatable device.

15. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which there are a plurality of the said electric switch elements of neutral polarity movable between the said circuit controlling positions, together with an electrically driven fan inside of the said casing and an electric heater in the path of air propelled by said fan inside of said casing, and plural electric circuits containing said motor and heater, said circuits respectively including circuit terminals of relatively opposite polarity stationed to be conductively bridged in different combinations through contact with said electric switch elements in the said different circuit controlling positions of the latter.

16. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which the said electric switch element comprises a conductive ball, and the said handle actuated means include a cage structure carried by the said switch handle and loosely flanking the said ball for impelling the latter from one to another of its said different circuit controlling positions.

17. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined in claim 4, in which a plurality of conductive balls comprise a plurality of the said electric switch elements, and the said handle actuated means includes a cage structure

carried by the said switch handle impellingly engaging said balls in a manner constantly to maintain the latter at fixed spacing from one another.

18. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination of, an open ended axially elongated casing carrying and housing said device, a cross wall spanning an open end of said casing, a tubular conduit member in fixed relation to said cross wall penetrating the same and opening into said casing in a manner to admit said attachment cord through said member and restrain said cord against lateral deflection, at least one electric switch element movable between circuit controlling positions stationed in circular arrangement about said tubular conduit member, a switch handle rotatably supported on said conduit member for turning movement relative to said casing, and handle actuated means operative to shift said element from one to another of said positions.

19. In a portable electrical appliance containing an electrical translatable device connectable in circuit with an appliance attachment cord, the combination defined by claim 18, in which the said cross wall comprises a plate removably attached to the said casing, together with stationary electric circuit terminals carried by said plate in the path of movement of the said switch element.

20. A portable electrical appliance comprising, in combination, a motor housing elongated axially of the motor forming a handle for grasping and maneuvering the appliance, a rigid tubular conduit stationary with one end of said housing in end-to-end relation to said motor, a ring-like switch handle mounted for turning movement about said conduit relatively to said housing, electrical connections for the motor including circuit switching elements, at least one of said elements being impellable to different circuit switching positions by turning movement of said ring handle and having exposed to the outboard side of said ring handle an electrically conductive surface, a retainer for said ring handle on said conduit at the outboard side of said ring handle stationed by said conduit against turning movement relative to said housing, and a circuit connected current carrying member located between said retainer and said ring handle contacting conductively with said exposed surface of the impellable circuit switching element in various of the latter's said positions for feeding motor energizing current thereto.

21. A portable electrical appliance as defined in claim 20, in which the said circuit switching elements comprise balls rollable in an orbit about the said conduit, and the said current carrying member comprises a plate in broadside relation to said orbit bearing simultaneously and conductively against a plurality of said balls, and the said retainer is shaped and disposed to complete the enclosure of a hollow space in outboard relation to the said ring handle said space being occupied by said current carrying member.

22. A portable electrical appliance as defined in claim 20, in which the said circuit switching elements comprise balls rollable in a common orbit about the said conduit, and the said current carrying member comprises a plate free to rotate presenting an annular flat surface into conductive contact simultaneously with a plurality of said balls.

23. A portable electrical appliance as defined in claim 20, in which the said stationary retainer is

shaped and disposed to complete the enclosure of a hollow space in outboard relation to the said ring handle, together with a spring arranged under tension in said space between the said current carrying member and the said retainer in a manner to thrust the former axially against the said circuit switching element.

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