

[54] **ROTARY SWITCH WITH PARTICULAR FEEDER CONTACT**

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[51] Int. Cl. **H01h 19/50**

[58] Field of Search **200/11 R, 166 CT, 200/6 R, 6 C, 11 G, 155 R, 155 A, 11 C, 11 A, 11 TC, 63 R**

[56] **References Cited**

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[57]

ABSTRACT

A rotary switch is disclosed comprising a housing having a plurality of wire receiving apertures therein. A rotatable contactor having a peripheral edge of preselected configuration is mounted within the housing for rotation about an axis. A plurality of mutually spaced contacts is positioned within the housing radially about the axis for contact with portions of the contactor peripheral edge in rotatably selected contactor positions. A feeder contact is also positioned within the housing. The feeder contact has an annular portion positioned in pressure contact with the contactor in all rotatably selectable contactor positions, a pressure locking tongue portion overlaying at least a portion of one of the wire receiving apertures in the housing for locking engagement with a wire inserted through the one wire receiving aperture, and a linking portion electrically and mechanically linking the annular portion with the pressure locking tongue portion.

11 Claims, 13 Drawing Figures

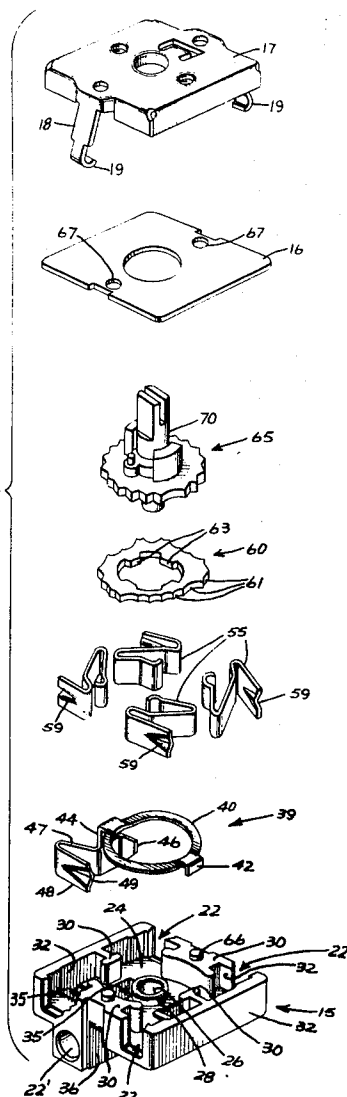


FIG.1

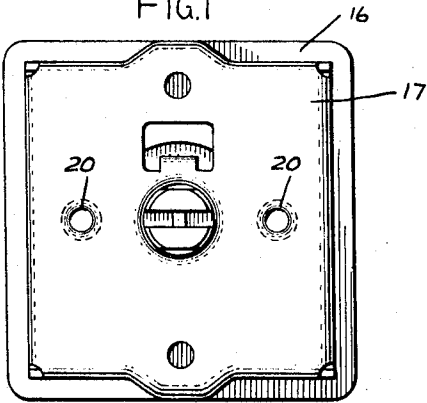


FIG.2

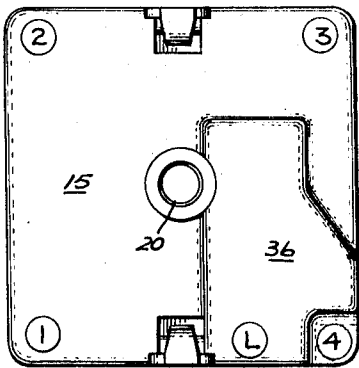


FIG.3

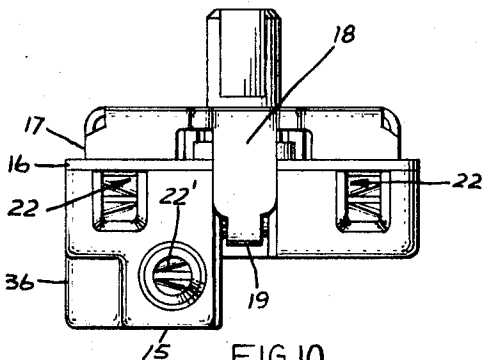


FIG.4

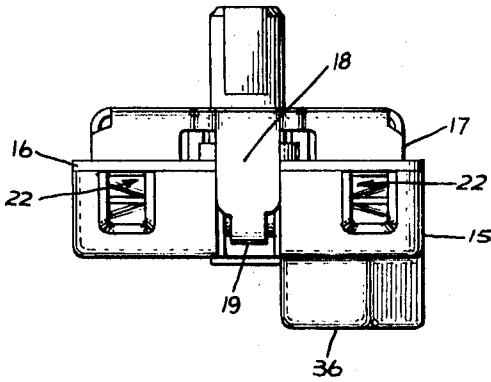


FIG.10

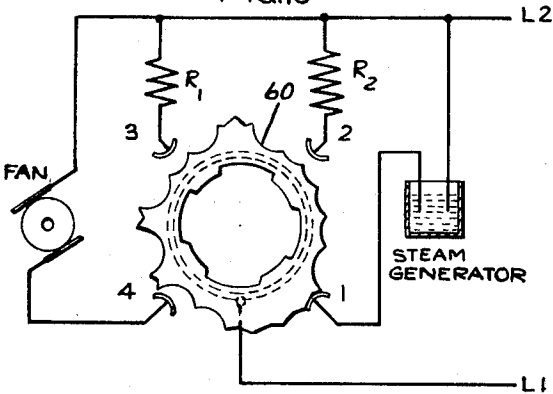


FIG.11

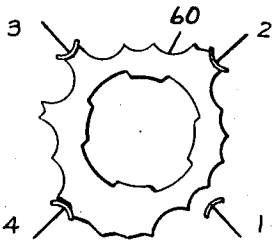


FIG.12

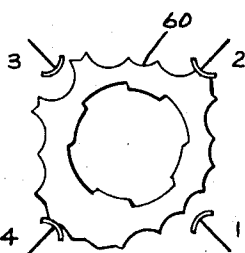


FIG.13

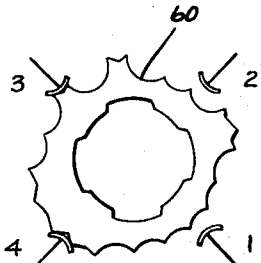
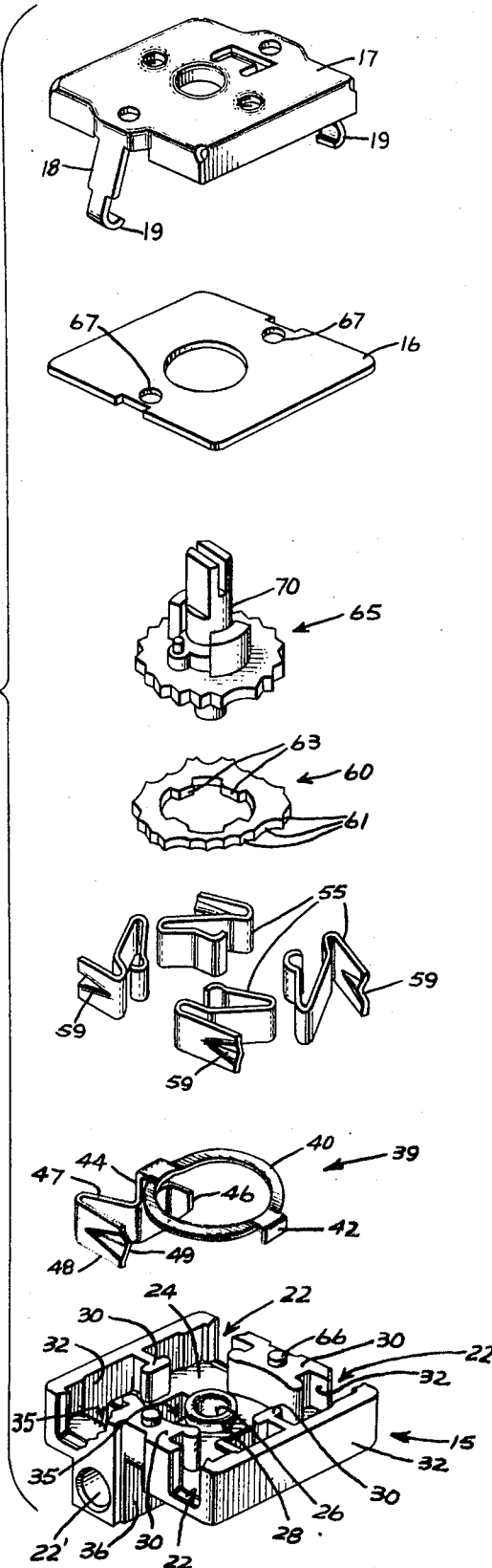
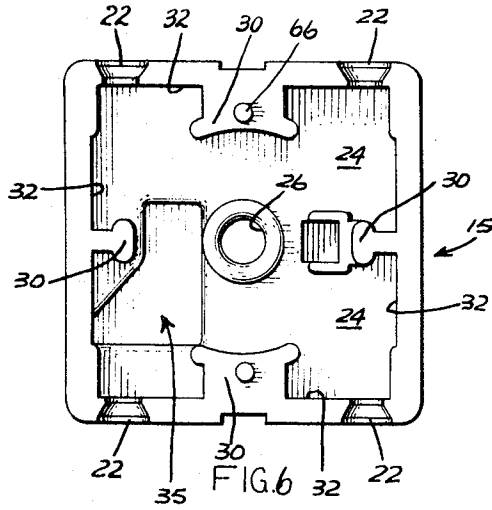
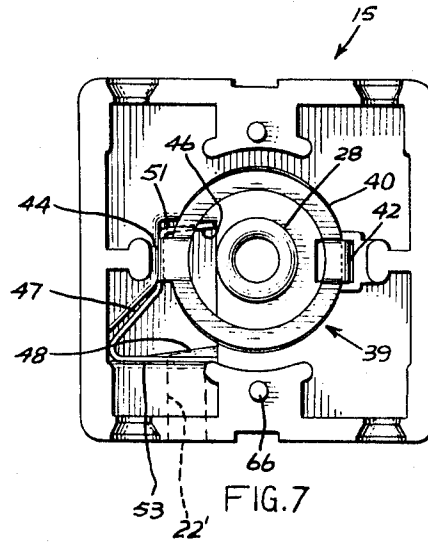
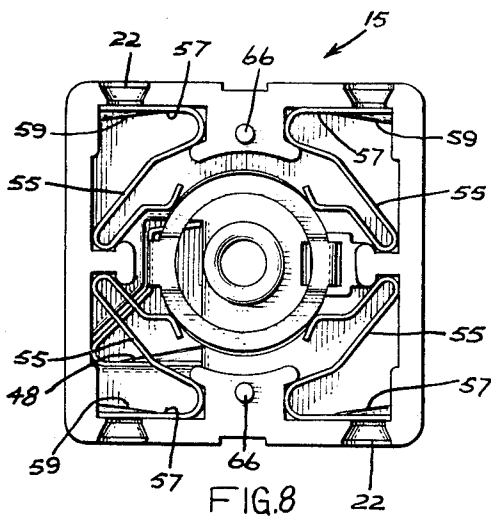
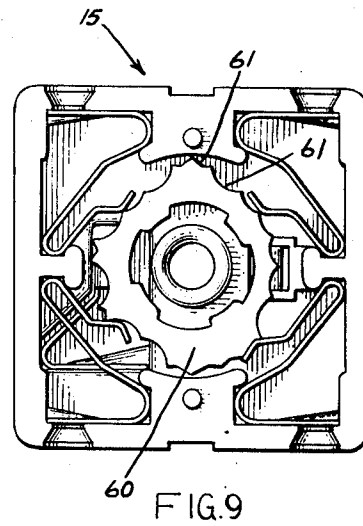


FIG. 5





ROTARY SWITCH WITH PARTICULAR FEEDER CONTACT

BACKGROUND OF THE INVENTION

This invention relates to rotary type electric switches of the slow make and break type adapted to control alternating current circuits.

It is an object of the invention to provide a rotary switch of the type having a rotatable contactor with improved means for electrically coupling the rotatable contactor with an extrinsic wire inserted into the switch housing.

Another object of the invention is to provide a rotary switch of the type having a contactor mounted for rotation within the switch housing with a feeder contact for feeding electric energy from an extrinsic wire inserted into the switch housing to the contactor in all rotatable contactor positions.

Another object of the invention is to provide a rotary switch of the type having a rotatable contactor and a feeder contact electrically coupled with the rotatable contactor in all contactor positions with improved means for electrically and mechanically connecting the feeder contact with an extrinsic wire inserted into the switch housing.

Yet another object of the invention is to provide a feeder contact of the type just described which feeder contact may easily and inexpensively be formed, positioned, and held within the housing of a rotary switch.

SUMMARY OF THE INVENTION

In one form of the present invention a rotary switch is provided comprising a housing having a plurality of wire receiving apertures therein. A rotatable contactor having a peripheral edge of preselected configuration is mounted within the housing for rotation about an axis. A plurality of mutually spaced contacts is positioned within the housing radially about the axis for contact with portions of the contactor peripheral edge in rotatably selected contactor positions. A feeder contact is also positioned within the housing. The feeder contact has an annular portion positioned in pressure contact with the contactor in all rotatably selectable contactor positions, a pressure locking tongue portion overlaying at least a portion of one of the wire receiving apertures in the housing for locking engagement with a wire inserted through the one wire receiving aperture, and a linking portion electrically and mechanically linking the annular portions with the pressure locking tongue portion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of an assembled rotary switch embodying the present invention in one form;

FIG. 2 is a plan view of the bottom of the rotary switch shown in FIG. 1;

FIG. 3 is a front view in elevation of the rotary switch shown in FIG. 1;

FIG. 4 is a rear view in elevation of the rotary switch shown in FIG. 1;

FIG. 5 is an exploded view of the rotary switch shown in FIG. 1 illustrating internal parts thereof in disassembled condition;

FIGS. 6-9 are top plan views of the housing base of the rotary switch shown in FIG. 1 which views sequentially illustrate selected assembly stages of selected internal parts shown in FIG. 5 into the housing base;

FIG. 10 is a diagram of a circuit employing the rotary switch of FIG. 1 with the switch contactor disposed in a first rotary position; and

FIGS. 11-13 are plan views of the switch contactor of FIG. 10 shown in second, third, and fourth rotary positions, respectively, in controlling the circuit of FIG. 10.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now in more detail to the drawings there is shown in FIGS. 1-4 the housing for a rotary switch embodying the present invention which housing comprises a hollow base 15 of molded phenolic or other suitable dielectric material, and an insulating cover 16 of sheet material that is fitted over the base. A metallic mounting plate 17 having two arms 18 integral therewith is secured to the base by catches 19 which project from arms 18 thereby sandwiching insulating cover 16 between the base and mounting plate. Mounting plate 17 also has two threaded holes 20 by which the switch may be mounted to extrinsic matter. Base 15 has five apertures 22 and 22' in the sides thereof through which electric wires may be inserted into the housing.

Referring now to FIG. 5 the interior of base 15 is seen to comprise a floor 24 through a central portion of which bearing 27 passes which bearing terminates within an annular boss 28 upon floor 24. Four partitions 30 project inwardly from base walls 32 towards the annular boss. Floor 24 gives way to a recess 35 to which aperture 22' communicates. Recess 35 is located within "doghouse" 36 which is an integral extension of housing base 15.

With reference next to FIGS. 6-9, the sequence by which conductive parts are assembled within the housing base may be clearly understood. In FIG. 6 base 15 is shown prior to insertion of conductive parts. Firstly, a feeder contact 39 is positioned within the base as shown in FIG. 7. As may more clearly be seen by cross reference to FIG. 5, the feeder contact comprises an annular portion 40 from the periphery of which a locating tab 42 and a linking portion strip segment 44 extend. Tab 46 projects from one side of strip segment 44 while continuation segment 47 of the linking portion of the feeder contact extends from the other side thereof. To the end of the continuation segment projects locking tongue portion 48. The locking tongue is provided with a longitudinal V-shaped groove 49. The entire feeder contact is unitary and is preferably stamped from a sheet of resilient, conductive metal of uniform thickness.

With continued reference to FIG. 7, annular portion 40 of the feeder contact is seen to be positioned about bearing boss 28 overlaying base floor 24 with locating tab 42 disposed within an indentation in the base floor. Strip segment 44 projects downwardly, as viewed in this FIG. 7, into recess 35 closely adjacent a recess wall. Tab 46 extends from strip segment 44 along recess wall 51 while locking tongue portion 48 having a longitudinal V-shaped groove 49 extends along recess wall 53 to overlay aperture 22'. It will be noted that annular portion 40, locking tongue portion 48, and linking portion strip segment 44 of the feeder contact respectively lie in three planes which intersect at substantially right angles whereby movement of the feeder contact is substantially restricted.

Following insertion of the feeder contact into base 15, four Z-shaped contacts 55 are inserted, as shown in

FIG. 8, with one of these contacts overlaying portions of the feeder contact positioned within recess 35. Each Z-shaped contact is braced against two adjacent partitions 30 in the base and includes a locking tongue portion 57 which overlays a housing aperture 22. Each of the locking tongues includes a longitudinally extending V-shaped groove 59. Upon insertion of a wire through apertures 22 and 22' into pressure contact with the locking tongues, the tongues flex away from the aperture permitting the wire to pass between the end of the tongue and the adjacent wall. Once wire insertion pressure is terminated, the locking tongue holds the inserted wire tightly in place by squeezing it between the end of the locking tongue and the adjacent wall. This, in turn, provides good electrical contact between the inserted wire and the Z-shaped contact. In the locked position, lateral movement of the wires is inhibited by the presence of the longitudinal grooves.

After the four Z-shaped contacts have been positioned in place, a conductive, rotatable contactor 60 is inserted into the housing. The peripheral edge of the contactor is irregular having a succession of detent notches 61. The center of the contactor is apertured into which aperture four keys 63 extend. These keys are press fitted to dielectric assembly 65, shown above contactor 60 in FIG. 5, thereby securing the contactor to the assembly. The periphery of assembly 65 is serrated which serrations project out over selected portions of contactor 60. Thus, with the contactor inserted into the housing while mounted to assembly 65, all of the Z-shaped contacts are not actually in engagement with the periphery of the contactor as they are depicted in FIG. 9. After insertion of assembly 65, insulating cover is placed over base 15 with base pins 66 passing through cover holes 67, and with shaft 70 formed integrally with assembly 65 passing through central openings in cover 16 and mounting plate 17. Finally, the mounting plate is placed upon cover 16, and catches 19 are formed around the base.

Referring next to FIGS. 10-13, a manner by which the rotary switch just described may be used in controlling an electric hair dryer circuit, is illustrated. The hair dryer circuit comprises a fan, a relatively low level energy dissipating heater element R_1 , a relatively high level energy dissipating heater element R_2 , and a steam generator. Each of the Z-shaped contacts 55 is connected to alternating current voltage line L2 through one of the just recited dryer circuit elements, while contactor 60 is connected to voltage line L1 in all rotatable contactor positions through feeder contact 39. The Z-shaped contacts are designated 1 through 4 on base 15 as seen in FIG. 2 as well as in the circuit diagrams to facilitate cross reference.

In FIG. 10 contact 1 is detented by the peripheral edge of contactor 60 thereby placing the steam generator across voltage lines L1 and L2. By rotating the contactor to the position shown in FIG. 11, as by twisting a knob secured to shaft 70, voltage across the steam generator is removed and voltage is applied to the fan and to the two heaters with the contactor positioned as schematically shown in FIG. 11. By rotating the contactor to the position shown in FIG. 12, heater R_1 is disconnected from across lines L1 and L2 leaving heater R_2 and the fan coupled thereto. Finally, by rotating the contactor to the position shown in FIG. 13, heater R_2 is removed from the circuit while heater R_1 is energized along with the fan.

Advantages offered by the just described embodiment are numerous. Each of the five accessible contacts, including the feeder contact, is provided with integral, quick connect and disconnect means whereby extrinsic electric wires may be mechanically and electrically connected thereto in an expeditious manner. Location of the wire receiving aperture to the feeder contact within the doghouse off the plane in which the other wire receiving apertures are located facilitates ease of recognition of the line voltage switch terminal. This offset location also facilitates design alterations where more or less than four coplanar contacts are employed. In addition, the position of feeder contact is well maintained within the housing at least partially by the interior walls of the doghouse itself. Furthermore, manufacture of the feeder contact is simplified in that it may be punched for a unitary sheet of conductive material of substantially uniform thickness. The feeder contact may, of course, assume many configurations other than the specific one shown in the illustrated embodiment. Many other modifications may, of course, also be made to the rotary switch without departure from the spirit and scope of the invention as set forth in the following claims.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A rotary switch comprising a housing having a plurality of wire receiving apertures therein; a rotatable electrically conductive contactor having a peripheral edge of preselected configuration mounted within said housing for rotation about an axis; a plurality of mutually spaced contacts positioned within said housing radially about said axis for contact with portions of said contactor peripheral edge in rotatably selected contactor positions; and a unitary feeder contact positioned within said housing, said unitary feeder contact having an annular portion positioned in pressure contact with said contactor in all rotatably selectable contactor positions, a pressure locking tongue portion overlaying at least a portion of one of said wire receiving apertures in said housing for locking engagement with a wire inserted through said one wire receiving aperture, and a linking portion electrically and mechanically linking said annular portion with said pressure locking tongue portion.

2. A rotary switch in accordance with claim 1 wherein the thickness of said unitary feeder contact annular portion, of said locking tongue portion, and of said linking portion is substantially the same whereby the feeder contact may be formed from a sheet of material of substantially uniform thickness.

3. A rotary switch in accordance with claim 1 comprising a shaft rotatably disposed along said axis to which shaft said contactor is mounted, and wherein said annular portion of said unitary feeder contact is disposed about said shaft in pressure contact with said contactor.

4. A rotary switch in accordance with claim 1 wherein said annular portion of said unitary feeder contact is disposed substantially along a plane, said locking tongue portion of said unitary feeder contact is disposed of said plane, and said plurality of contacts is positioned radially about said unitary feeder contact annular portion.

5. A rotary switch in accordance with claim 4 wherein each of said mutually spaced contacts is Z-shaped and includes a locking tongue portion which

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overlays at least a portion of another of said wire receiving apertures in said housing.

6. A rotary switch in accordance with claim 4 wherein said linking portion of said unitary feeder contact includes a linking strip segment which extends substantially normally said plane from the periphery of said annular portion of said unitary feeder contact.

7. A rotary switch comprising: a housing having a hollow, unitary, dielectric base with said base having an interior floor, a plurality of walls extending from said floor, a central bearing formed in said floor, and a recess formed in said floor to one side of said central bearing, said recess and at least one of said walls having a wire receiving aperture formed therein communicating to the exterior of said housing; a shaft journaled in said bearing for rotation about a shaft axis; an electrically conductive, rotatable contactor mounted to said shaft for rotation about said shaft axis and having a substantially planar surface; at least one contact positioned within said hollow, unitary base adjacent the periphery of said contactor, said contact having a contact locking tongue portion overlaying at least a portion of said wire receiving aperture in said one wall; and an integral conductive feeder contact positioned within said base, said integral conductive feeder contact having a planar portion disposed between said floor and said contactor in sliding engagement with said contactor planar surface, and a feeder contact locking tongue portion overlaying at least a portion of said wire receiving aperture in said recess.

8. A switch comprising: a housing having a hollow, unitary, dielectric base with said base having an interior floor, a plurality of walls extending from said floor, a central bearing formed in said floor, and a recess formed in said floor to one side of said central bearing, said recess and at least one of said walls having a wire receiving aperture formed therein communicating to the exterior of said housing; a shaft journaled in said bearing for rotation about a shaft axis; an electrically conductive, rotatable contactor mounted to said shaft for rotation about said shaft axis and having a substantially planar surface; at least one contact positioned within said hollow, unitary base adjacent the periphery of said contactor, said contact having a contact locking tongue portion overlaying at least a portion of said wire receiving aperture in said one wall; and a conductive feeder contact positioned within said base, said feeder contact having a planar portion disposed between said floor and said contactor in sliding engagement with said contactor planar surface, a feeder contact locking tongue portion overlaying at least a portion of said wire receiving aperture in said recess, and a linking portion electrically and mechanically linking said planar por-

tion with said locking tongue portion, and wherein said linking portion extends substantially normally from the periphery of said planar portion into said recess.

9. A rotary switch comprising: a housing having a hollow, unitary, dielectric base with said base having an interior floor, a plurality of walls extending from said floor, a central bearing formed in said floor, and a recess formed in said floor to one side of said central bearing, said recess and at least one of said walls having a wire receiving aperture formed therein communicating to the exterior of said housing; a shaft journaled in said bearing for rotation about a shaft axis; an electrically conductive, rotatable contactor mounted to said shaft for rotation about said shaft axis and having a substantially planar surface; at least one contact positioned within said hollow, unitary base adjacent the periphery of said contactor, said contact having a contact locking tongue portion overlaying at least a portion of said wire receiving aperture in said one wall; and a conductive feeder contact positioned within said base, said feeder contact having an annular planar portion disposed about said axis between said floor and said contactor in sliding engagement with said contactor planar surface, and a feeder contact locking tongue portion overlaying at least a portion of said wire receiving aperture in said recess.

10. A feeder contact for electrically coupling as electric contactor mounted within the housing of a rotary switch for rotation about an axis with an external wire inserted into the electric switch housing through an aperture therein, said feeder contact comprising an annular portion positioned about said axis in pressure contact with said electric contactor, a locking tongue portion overlaying at least a portion of said aperture, and a linking portion electrically and mechanically linking said annular portion with said locking tongue portion, said annular portion being disposed along a first plane and said locking tongue portion being disposed off said first plane, whereby the electric contactor may be electrically coupled in a plurality of rotational contactor positions by the feeder contact to a wire inserted into the housing through the aperture and into locking engagement with the feeder contact locking tongue portion.

11. A feeder contact in accordance with claim 10 wherein said annular portion is disposed along a first plane, said locking tongue is disposed along a second plane and at least a portion of said linking portion is disposed along a third plane, and wherein said first, second and third planes intersect each other at substantially right angles.

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