

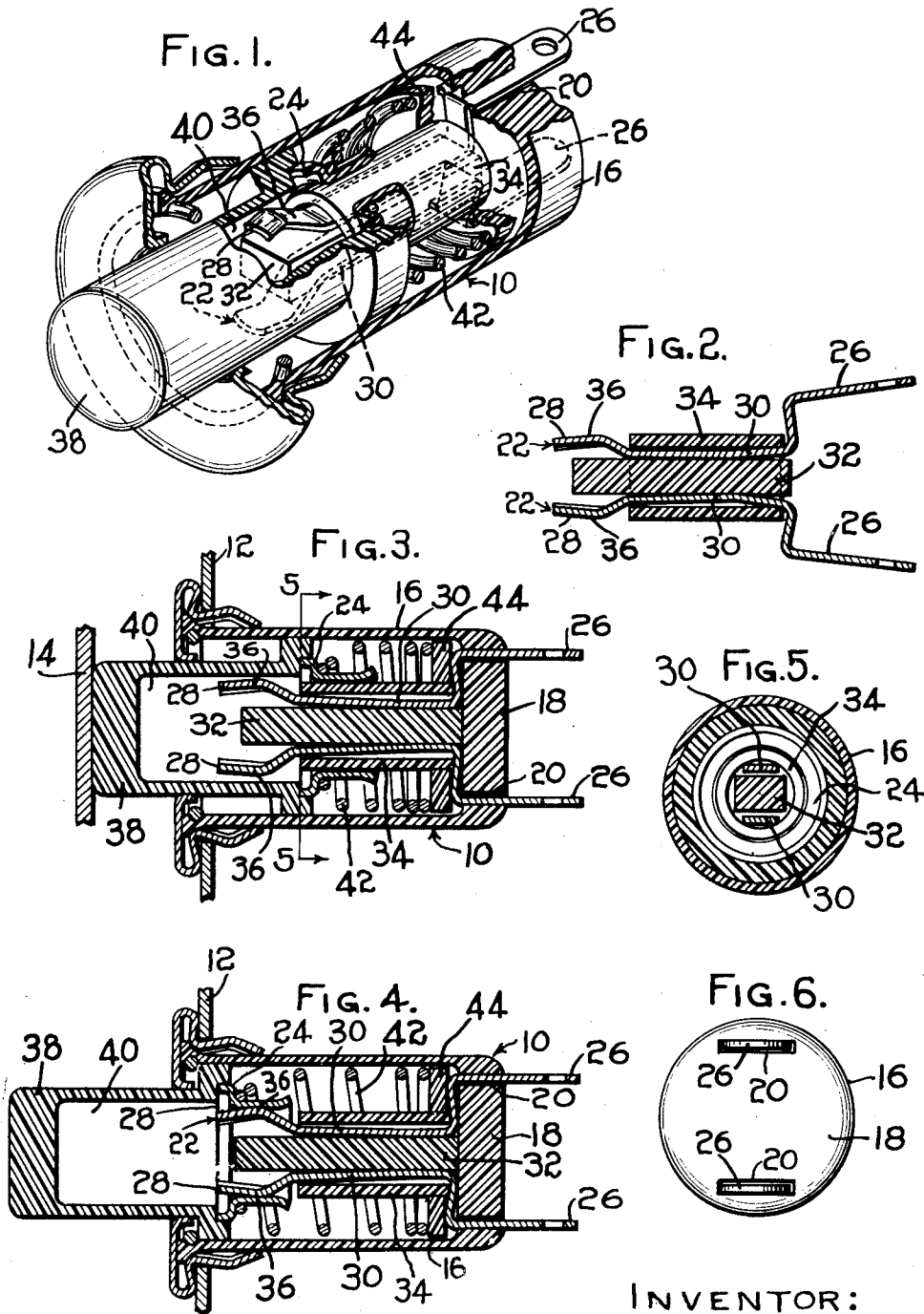
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C. A. WOODWARD

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ELECTRIC SWITCH

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INVENTOR:
CLEMENT A. WOODWARD,
By Philip E. Parker
ATTORNEY.

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ELECTRIC SWITCH

Clement A. Woodward, Wellesley, Mass., assignor
to the United-Carr Fastener Corporation, Cam-
bridge, Mass., a corporation of Massachusetts

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This invention relates generally to electrical switches, and has particular reference to a switch adapted to be contained in a housing and operated by a plunger extending therefrom.

The object of the invention is to provide an improved electrical switch which is adapted for use in refrigerators, automobiles, and similar applications where the switch is operated by the opening and closing of a door.

A further object of the invention is to provide a switch having a pair of resilient contact arms and a shorting cylinder associated therewith to receive the contact arms internally to complete an electric circuit between the arms.

Other objects of the invention will, in part, be obvious, and will, in part, appear hereinafter. For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description, taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a perspective view of the switch of the invention with certain parts broken away;

Fig. 2 is a view in elevation, partly in section, of the contact arm assembly prior to assembly in the switch housing;

Fig. 3 is a view in elevation, partly in section, of the completely assembled switch mounted in a supporting panel, in which the switch is in the off position;

Fig. 4 is a view similar to Fig. 3, in which the switch is in the on position;

Fig. 5 is a view in section taken on line 5-5 of Fig. 3; and

Fig. 6 is a view of the right hand end of the housing with the contact arms assembled therein.

Referring to the drawing, there is illustrated a switch assembly 10, which is adapted for assembly in a supporting panel 12 for operation by a closure member 14. The switch assembly 10 comprises a cylindrical switch housing 16 having a base 18 with openings 20 disposed therein, a pair of resilient contact arms 22 disposed in the housing and insulated from one another, and a shorting cylinder 24 associated with the arms to make and break an electric circuit therebetween.

The arms 22 each comprise a fixed end portion 26 disposed through one of the openings 20, a free end portion 28 extending into the housing, and a support portion 30 intermediate the free end portion and the base. The support portion 30 of each arm extends inwardly toward the other arm for engagement with an insulating

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separating member 32 disposed between the support portions, and to provide such support portions it has been found convenient to bow the arms inwardly between the base and the free end portion. An insulating bushing 34 is assembled about the arms 22, and in the preferred form, is shaped and arranged to confine the free end portions 28 of the arms, and to compress them inwardly toward one another. The effect of such confinement is to cause the arms to be retained in a flexed condition throughout their length, which tends to force the opposite ends 26 outwardly to frictionally engage the edges of the openings 20, and causes the support portions 30 to firmly engage the separating member 32, thereby retaining the parts in assembly.

This effect is best illustrated by reference to Fig. 2, in which is illustrated the contact arms and associated insulating members prior to assembly in the housing. Before such assembly, the ends 26 are spread further apart than the distance between the openings 20 in the base, by reason of the confinement of the free ends by the bushing 34. To assemble the ends 26 in the openings, they must be squeezed together to line up the ends of the arms with the openings, and after insertion the arms are maintained in a flexed condition as illustrated in Figs. 3 and 4.

The free end portion 28 of each arm is provided with a contact portion 36, which is disposed on the arm beyond the bushing 34, and in the preferred form, is rounded outwardly so that the distance between the contact portions is greater than the diameter of the bushing. The shorting cylinder 24 is mounted about the bushing, and is adapted to slide therealong into and out of a contact position with the contact portions 36. To provide means for effecting such movement, an operating plunger 38 is provided, which engages the cylinder 24, and is slidable into and out of an opening in an end of the housing, and is provided with a cavity 40 for receiving the contact arms when the plunger is forced into the housing. To return the plunger to the extended position, an operating spring 42 is disposed between the slidable cylinder 38 and an insulating washer 44 which is assembled in the bottom of the housing.

The shorting cylinder 24 is shaped and arranged to slide over the contact portions 36, whereby the contact portions are received inside the cylinder for sliding engagement with the inner surface to complete an electric circuit between the contact arms. (See Fig. 4.) During

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such engagement, the cylinder causes inward flexing of the free end portions of the arms, which effects good electrical contact between the contact portions and the cylinder, and provides a wiping action therebetween to keep the contact surfaces free of corrosion. As a result, relatively small switches made in accordance with the teachings of the invention are able to carry high currents under inductive loads which cause arcing when the circuit is broken, since the wiping action keeps the contact members free of corrosion products and rough surfaces ordinarily caused by such arcing.

Although in the illustrated embodiment of the invention, the switch is normally in the on position, it will of course be understood that with minor modifications the switch can be constructed so as to be normally in the off position.

Similarly, the contact arms may be modified to eliminate the inwardly bowed portion, in which case the bushing may be snugly fitted about the arms to hold the parts in assembly, and the resiliency of the contact portion extending beyond the bushing will serve to provide the desired wiping action during operation of the switch.

Since certain other changes may be made in the device without departing from the scope of the invention, it is intended that all matter contained herein be interpreted in an illustrative and not in a limiting sense.

I claim:

1. In an electrical switch, the assembly comprising an insulating base having a pair of spaced apertures extending therethrough, a pair of elongated resilient contact arms having fixed end portions at one end extending through said apertures, free end portions at the opposite end, and supporting portions intermediate said ends, an insulating tubular bushing surrounding said supporting portions, and an insulating member disposed between said supporting portions, said supporting portions being inwardly bowed in tensioned engagement with opposite sides of said insulating member and opposite portions of the interior wall of said bushing and said fixed end portions being held in tensioned engagement by said supporting portions with the opposite outer walls of said apertures in said base, whereby said contact arms, said bushing, said insulating member, and said base are held in assembly.

2. In an electrical switch, the contact assembly in accordance with claim 1 wherein portions of the supporting portions adjacent the fixed end portions are disposed adjacent and substantially parallel to the base and directed toward but spaced from each other.

3. In an electrical switch, the contact assembly comprising an insulating base having a pair of spaced apertures extending therethrough, a pair of elongated resilient contact arms having at one end fixed end portions extending through said apertures, at the opposite end free end portions, and intermediate said ends supporting portions, an insulating tubular bushing surrounding said supporting portions, and an insulating member disposed between and spacing said supporting portions, said contact arms being in tensioned engagement with opposite portions of the interior wall of said bushing, opposite sides of said insulating member, and the walls of the apertures of said base holding said contact arms, said bushing, said

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insulating member, and said base in assembly.

4. In an electrical switch, the contact assembly comprising an insulating base having a pair of spaced apertures extending therethrough, a pair of elongated resilient contact arms having at one end fixed end portions extending through said apertures, at the opposite end free end portions and intermediate said ends supporting portions, and an insulating member disposed between and spacing said supporting portions, said contact arms being in tensioned engagement with said base and opposite sides of said insulating member holding said contact arms, said insulating member and said base in assembly.

5. In an electrical switch, the contact assembly comprising an insulating base having a pair of spaced apertures extending therethrough, a pair of elongated resilient contact arms having at one end fixed end portions extending through said apertures, and at the opposite end free end portions and intermediate said ends spaced supporting portions, and an insulating tubular bushing positioned substantially normal to said base and surrounding said supporting portions, said contact members being in tensioned engagement with said base and opposite portions of the interior wall of said bushing holding said contact arms, said bushing and said base in assembly.

6. An electrical switch comprising an insulating housing having a pair of spaced apertures extending through one end thereof, a pair of elongated resilient contact arms disposed within the housing having fixed end portions at one end extending through said apertures, free end portions at the opposite end, and supporting portions intermediate said ends, an insulating tubular bushing positioned substantially normal to said base and surrounding said supporting portions, an insulating member disposed between said supporting portions, and a tubular shorting member adapted and arranged for movement along said bushing into and out of electrical contact engagement with the free end portions of said contact arms to make and break an electric circuit therebetween, said supporting portions being inwardly bowed in tensioned engagement with the opposite sides of said insulating member and opposite portions of the interior wall of said bushing and said fixed end portions being held in tensioned engagement by said supporting portion with the opposite outer walls of said apertures in said base, whereby said contact arms, said bushing, said insulating member, and said base are held in assembly.

7. An electrical switch comprising an insulating housing having a pair of spaced apertures extending through one end thereof, a pair of elongated resilient contact arms disposed within said housing having fixed end portions at one end extending through said apertures, free end portions at the opposite end, and supporting portions intermediate said ends having portions adjacent said fixed end portions and extending inwardly toward but spaced from each other and disposed substantially parallel said one end of said housing, an insulating tubular bushing surrounding said supporting portions, an insulating member disposed between said supporting portions, and a shorting ring member adapted and arranged for movement along said bushing into and out of electrical contact engagement with said free end portions to make and break an electrical circuit therebetween, said supporting portions being inwardly bowed in tensioned en-

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gement with the opposite sides of said insulating member and opposite portions of the interior wall of said bushing, said tensioned supporting portions holding said fixed end portions in tensioned engagement in said apertures and said free end portions in spaced relation adapted for resilient engagement with said shorting ring member.

8. An electrical switch in accordance with claim 7 having spring means for urging the shorting ring member along the tubular bushing into engagement with the free end portions.

9. An electrical switch in accordance with claim 7 having spring means for urging the shorting ring member along the tubular bushing

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into engagement with the free end portions and an operating plunger extending through an opposite end of the housing operatively connected to said shorting ring member.

CLEMENT A. WOODWARD.

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