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TERMINAL AND CONTACT CONSTRUCTION FOR ELECTRIC SWITCHES

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5 Claims. (Cl. 200-166)

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This invention relates to electric switches and refers more particularly to a terminal and contact construction for switches of the type forming the subject matter of the copending application of Edward N. Jacobi, Serial No. 123,709, filed October 26, 1949.

One of the objects of this invention is to provide a simple, inexpensive contact and terminal construction for such switches by which a conductor can be directly connected to the terminal portion in a manner facilitating the use of armored protection for the conductors.

Another object of this invention is to provide an improved contact and terminal member wherein the terminal portion has a part arranged to be clamped and clinched to the bared end portion of a conductor and another part similarly engageable with the insulated portion of the conductor to firmly anchor and electrically connect the contact and terminal member to the conductor in a manner which permits the entire connection to be received in a hole or pocket in the terminal head leaving the back of the terminal head free for the attachment of an armor sheath for the conductor.

Still another object of this invention is to provide a contact and terminal member of the character described which is so designed that upon its assembly with the terminal head it retains its position frictionally and thus facilitates assembly of the parts.

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 side elevational view of a portion of a switch of the type to which this invention pertains having a part thereof broken away to illustrate the details of the combined contact and terminal member per se;

Figure 2 is a fragmentary cross sectional view through Figure 1 on the plane of the line 2-2 which is directly ahead of the disc in which the stationary contacts of the switch are mounted, part of said disc being broken away;

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Figure 3 is a detail sectional view taken through Figure 1 on the plane of the line 3-3; and

Figure 4 is a perspective view of the combined contact and terminal member per se.

Referring now particularly to the accompanying drawing the numeral 4 designates the case or housing of the switch which, as more fully described in the aforesaid copending application, houses a rotary contactor 5, part of which is shown in Figure 1, a lock (not shown) and a coupling (also not shown) through which rotation of the lock cylinder is transmitted to the rotary contactor 5.

The contactor 5 has a plurality of contacts arranged to slide across the stationary contact face provided by a flat disc 6 of insulating material which overlies the flat front face of a terminal head 7. The terminal head 7 is molded from suitable insulating material while the disc 6 is stamped from sheet stock having better wearing qualities than the molded terminal head.

In the assembled condition of the switch shown in Figure 1 the disc 6 is clamped between the flat front face of the terminal head and a shoulder 8 formed in the case or housing 4, the terminal head being held in place by clinching over the marginal edge of the case or housing.

Though the terminal head mounts a number of stationary contacts the present invention concerns only one of these, and when the switch is used as an ignition switch for automobiles this contact is the ignition contact and is connected with the ignition coil through an armored conductor 9. The armored conductor, of course, includes a conductor wire 10 covered with insulation 11 and a metal sheath 12.

It is, of course, important that the overall size of the switch be held to a minimum and that the connection between the conductor 9 and its contact be protected as well as the conductor. The present invention achieves this objective in a simple and expeditious manner and to this end provides a combined contact and terminal member 13 stamped and formed from suitable sheet metal and designed to be mounted entirely within the terminal head. To accommodate the combined contact and terminal member the terminal head has a cavity 14 opening to its flat front face and a hole 15 leading from the bottom of the cavity and extending through the terminal head to the back thereof; and the disc 6 has a hole 16 in line with but smaller than the mouth of the cavity. Portions of the cavity are thus covered by the disc.

The contact portion 17 of the member 13 is

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flat and fits within the hole 16 in the disc. At one side edge thereof the contact portion 17 has two locating lugs or ears 18 projecting therefrom. These lugs are offset rearwardly an amount such that their flat front faces are spaced from the plane of the outer front face of the contact portion 17 a distance equal to the thickness of the disc 6.

The opposite side edge of the contact portion 17 has an offset part 19 extended therefrom, the extent of its offset, however, being less than that of the lugs 18 so that the part 19 lies between the faces of the disc 6 in a bay 20 in one side of the hole 16. The part 19 is bent perpendicularly as at 21 and then again at right angles to form a portion 22 parallel to and overlying the part 19 and the contact portion 17. The portions 19, 21 and 22 thus together define substantially a U-shaped or channel-like structure with the portion 21 serving as the web thereof.

The opposite ends of this web portion 21 are extended to provide locating lugs 23 which are bent inwardly, as best shown in Figure 2, to lie in planes defining an obtuse angle between them. The purpose of this angular disposition of the lugs 23 will be brought out hereinafter. At this point it is desired to direct attention to the fact that the front edges 24 of the lugs 23 are parallel to and spaced from the front face of the contact portion 17 the same distance as are the outer faces of the lugs 18. Hence, when these edges 24 and the front faces of the lugs 18 lie flat against the underside or rear face of the disc 6, the front face of the contact portion 17 is flush with the front face of the disc.

The cavity 14 and hole 15 in the terminal head accommodate the portions of the combined contact and terminal member 13 lying beneath or rearwardly of the disc 6. One side portion of the cavity receives the lugs 18. The opposite side portion of the cavity, which is deeper, receives the channel-shaped part of the member 13, and the angularly bent lugs or ears 23 are received in pockets or lateral extensions 25 at this side of the cavity.

The pockets 25, of course, open to the flat front face of the terminal head and have opposite parallel side walls 26 perpendicular to the front face of the terminal head. The space between these side walls 26 is slightly less than the distance between the plane of the outer face of the web portion 21 and the edges of the lugs farthest removed from said plane. Hence, it will be readily apparent that with the combined contact and terminal member in place the outer face of the web portion 21 lies flat against the adjacent side of the cavity and the lugs 23 are confined between the walls 26 of the pockets 25. This necessitates slight flexing of the lugs 23 and this slight flexing or tension frictionally holds the combined contact and terminal member assembled with the terminal head during assembly of the parts.

It is to be understood that the relative sizes of the mouth of the cavity 14 including its lateral extensions or pockets 25 and the hole 16 with its bay 20 are such that the pockets 25 and those portions of the cavity in which the lugs 18 are disposed are covered by the disc, thereby enabling the lugs 18 and 23 to engage the underside of the disc and hold its contact portion 17 against outward displacement beyond a position at which its front face is flush with the front face of the disc.

Two bosses or pads 27 formed integrally with the terminal head and rising from its flat front

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face engage the back or underside of the contact portion 17 near its opposite ends to coact with the lugs 18 and 23 in holding the contact portion 17 firmly in proper position.

The terminal portion 28 of the member 13 extends perpendicularly from its part 22 and is substantially channel-shaped in cross section with the sides of the channel shaped to provide two sets of clinching arms 29 and 30, the latter being shortest and nearest to the terminal portion 17. These clinching arms 29 and 30 are adapted to be folded over the insulation and bared end portion of the conductor to thus firmly anchor the member 13 to the conductor and establish a good electrical connection between it and the contact member.

With the arms 29 and 30 folded and clinched over the conductor as described, the actual connection between the terminal and the conductor is hardly larger in diameter than the conductor itself. Hence, it may be conveniently received within the hole 15 in the terminal head leaving the back of the terminal head unobstructed for anchorage of the armored sheath 12, and while the specific manner in which the sheath is anchored forms no part of this invention it is to be noted that its reception in a ferrule 31 which in turn is secured to a stamped cap 32 allows the sheath to be secured to the back of the terminal head in a way which affords complete protection for the conductor and its connection to the contact and terminal member 13.

From the foregoing description taken with the accompanying drawing it will be readily apparent to those skilled in this art that the novel combined contact and terminal member of this invention, and the manner in which it is mounted on the terminal head and connected to its wire lead achieves remarkable simplicity and compactness in addition to many other advantages including low cost.

What I claim as my invention is:

1. In an electric switch: a terminal head having a flat front face and a cavity opening to said flat front face, said cavity having opposed pockets opening to the front face of the terminal head and each having side walls substantially perpendicular to said front face, said terminal head also having a hole therethrough leading from the bottom of the cavity; a disc of insulating material overlying the flat front face of the terminal head, said disc having a hole therethrough substantially in line with the cavity but smaller than the mouth of the cavity so that portions of the cavity including said opposed pockets are covered by the disc; a combination contact and terminal member having a flat contact portion received in the hole in the disc; lugs extended from one side edge of the contact portion and engaging the underside of the disc, said lugs being received in that portion of the cavity covered by the portion of the disc which the lugs underlie; other lugs extended from a part connected to the contact portion, said other lugs lying in planes perpendicular to the flat contact portion and being bent to define an obtuse angle therebetween, said other lugs being received in the pockets of the cavity and frictionally engaging the opposite side walls thereof; and a terminal portion extending from said part from which said other lugs project, received in the hole in the terminal head and to which a conductor may be connected.

2. The structure set forth in claim 1 further characterized by the fact that said other lugs engage the underside of the disc portions covering

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the pockets in which they are disposed, and by the fact that all of said lugs have their portions which engage the underside of the disc spaced from the plane of the flat front face of the contact portion a distance equal to the thickness of the disc; and a boss on the terminal head engaging the underside of the contact portion and of a height to hold the lugs snugly against the underside of the disc when said disc lies flat against the front face of the terminal head.

3. As an article of manufacture, a combined contact and terminal member for electric switches, comprising: a sheet metal stamping having a flat contact portion; spaced locating lugs extending from one side edge of the contact portion and having flat surfaces offset rearwardly from and lying in a plane parallel to the front face of the contact portion; a lateral projection extending from the other side edge of the contact portion also offset rearwardly from the contact portion, said projection being shaped to have a rearwardly directed portion substantially perpendicular to the plane of the contact portion, and a part extending from the rear edge of the rearwardly directed portion and overlying but spaced from the contact portion so that said projection is substantially channel-shaped, and said part, which provides the rear flange of the channel, having a terminal portion extending rearwardly therefrom; the opposite ends of the web or bottom of the channel being extended and bent inwardly at an obtuse angle to the web or bottom of the channel to provide another set of locating lugs, lying in planes perpendicular to that of the contact portion and the front edges of which lie in the same plane occupied by the flat surfaces of the first-mentioned locating lugs; and means on the terminal portion for securing a conductor thereto in good electrical contact therewith.

4. As an article of manufacture, a combined contact and terminal member for electric switches, comprising: a sheet metal stamping having a flat contact portion; a flat mounting portion extending rearwardly from one side edge of the contact portion, substantially perpendicular to the plane of the contact portion; lugs extending from said mounting portion, bent out of the plane thereof, at an obtuse angle thereto, and lying in planes perpendicular to the plane of the contact portion, said lugs having their

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front edges disposed in a common plane parallel to that of the contact portion and spaced rearwardly thereof; a terminal portion extending rearwardly from said mounting portion; and means on said terminal portion for securing a conductor thereto in good electrical contact therewith.

5. In an electric switch: a terminal head having a flat front surface and having a cavity opening to said flat surface, said cavity including an elongated pocket opening to the front surface of the terminal head, which pocket has opposed side walls perpendicular to said front surface, said terminal head also having a hole leading from the bottom of the cavity and extending through the terminal head; a disc of insulating material overlying and in flat surface-to-surface engagement with the front surface of the terminal head, said disc having a hole therethrough smaller than the mouth of the cavity and in line with the cavity so that portions of the mouth of the cavity are covered by the disc; a stamped and formed sheet metal contact and terminal member having a flat contact portion received in the hole in the disc; a mounting member extending from one side edge of the contact portion and having a flat portion perpendicular to the contact portion overlying one side wall of said pocket in the terminal head; lugs extending from said flat portion of the mounting member at obtuse angles thereto and lying in planes perpendicular to the contact portion, with a free edge of each lug frictionally engaging a side wall of said pocket opposite to that engaged by said flat portion of the mounting member to thereby hold the contact and terminal member assembled with the terminal head; and a terminal portion received in said hole through the terminal head and to which a conductor may be secured.

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