Fig. 1

Fig. 2

Fig. 3

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ELECTRIC PLUG-IN CONNECTOR

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Filed July 24, 1967, Ser. No. 667,018

Claims priority, application Germany, July 22, 1966, I. 54,137

Int. Cl. H01r 13/04, 13/46; H02k 11/00

U.S. Cl. 339—59

6 Claims

ABSTRACT OF THE DISCLOSURE

A multiple-pole electric plug-in connector for connecting an electric motor to a power supply. A casing mounted on the motor housing holds the stationary contacts. The means for holding the stationary contacts as well as at least part of the means for securing the casing to the motor housing are parts of the casing itself.

Background of the Invention

The present invention relates to plug-in means for connecting an electric motor to a power supply; and, in particular, to plug-in connectors of the type comprising movable and fixed contacts mounted in male and female connector casings which can be plugged together to electrically connect the contacts.

Electrical plug-in connectors of the prior art have been constructed with the fixed contact female portion fitted against and attached to an electric motor enclosure. This portion has principally consisted of a rectangular-shaped casing surrounding either one or more insulating members which hold and insulate the fixed contacts of the plug-in connector. In one known type of connector the contacts have been inserted through the insulating member and gripped in a fixed position with a barb. The rectangular-shaped casing, made large enough to permit the motor power leads to be connected to the contacts, is usually attached to the motor housing by means of screws passed either through specially provided holes in the casing or through brackets which hold the casing down. The casing has been mounted to receive the male member of the plug-in connector in a direction either parallel or radial to the motor axis.

The plug-in connectors of the type having a separate connector casing require a number of individual parts which must be manufactured from different materials and assembled together by hand. Because of the number of parts which must be accommodated in the casing, the casing must be relatively large in size and must project far out beyond the circumference of the motor housing. Thus, especially in cases where the casing plug opening has to be directed radially away from the motor, the female portion of the connector is exposed to damage and requires an unnecessary amount of space when the motor is packed or when it is built into an appliance. This radial arrangement also leaves the motor power leads exposed; since they are neither guarded by the connector casing nor by the motor itself, they can be easily bent or broken off.

Summary of the Invention

An object of the present invention, therefore, is to design a plug-in connector which is simpler and more practical than the connectors known in the prior art.

Another object of the present invention is to design a plug-in connector suitable for mounting on an electric motor for which manufacturing and mounting costs are considerably reduced.

These and other objects are achieved according to the present invention by providing a plug-in connector which includes a casing mounted on the motor housing and stationary contacts arranged and held fixed within the casing and connected to the motor winding. The casing is adapted to receive a plug holding movable contacts which cooperate with the stationary contacts to connect the motor winding with the source of electrical power. The casing is secured to the motor housing by a flexible projection forming the lower edge of the front side of the casing and by a hinged flap, on the back side of the casing, carrying two deflector plates overlapping the respective sides of the casing. The lower edge of the flexible projection is provided with a holding catch while the lower edge of the back side is bent at an angle to form an attachment collar.

Brief description of the drawings

FIGURE 1 is a cross-sectional view of part of an electric motor housing and the female portion of a power lead plug-in connector according to one embodiment of the present invention.

FIGURE 2 is a cross-sectional view of a part of an electric motor housing and the female portion of a power lead plug-in connector according to another embodiment of the present invention.

FIGURE 3 is a cross-sectional view taken through section 3—3 of the motor housing and female portion of the connector shown in FIGURE 1.

Description of the preferred embodiment

Referring now to FIGURE 1 there is shown a casing 17 containing contacts 18 and 19 connected to the electric motor windings, which is secured in an opening 24 in the motor housing 23. The casing 17 consists of a single unit made of insulating material, of thermoplastic in particular, which includes the receptacles for the contacts 18 and 19. The contacts 18 and 19 are designed to be inserted into the receptacles of the casing 17 from the back of the casing. Although the flexible leads may be attached to the contacts prior to insertion, the insertion itself requires that the back side of the casing 17 be open.

If it is necessary, as is often the case, to seal the motor against dust and moisture, both the back side of the connector casing as well as the motor housing openings must be covered. The casing 17 may be provided in this instance with a simply constructed back side 42 which requires little in the way of additional material cost and may be easily snapped closed without increasing the time of construction of the connector.

The back side 42 is hinged at the top with respect to the casing 17 by means of a thin web 21 of casing material. The back side 42 thus forms an integral part of the casing and can be opened upwardly to permit the insertion of the stationary contacts 18 and 19 into their respective receptacles. The back side 42 is also provided with deflector plates 43 which overlap the outside walls of the casing 17. The back side itself is the same width as the opening in the motor enclosure 24. The lower portion of the back side extends beyond the opening 24 and is bent outwardly to form an attachment collar 20 to fasten the back of casing 17 to the motor housing 23.

The front of the casing 17 is fastened to the motor housing by projection 22 on the front side which serves as a spring catch. This projection is also made as wide as the motor housing opening 24 to guard against dust and moisture. The entire casing 17 can therefore be mounted by placing the collar 20 under the motor housing 23 and pressing down the casing front until the spring catch 22 snaps into place.

Since the width of the motor housing opening 24 is less than that of the casing 17, the side walls 44 and 45 of the casing 17 may make direct contact with the housing.
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23; this ensures that the connector is immovably attached to and that it seals the opening of the housing 23. The fixed contacts 18 and 19 are provided with springed stops 25 which hold the contacts in place after their insertion into the casing 17.

FIGURE 2 shows another embodiment of the connector according to the present invention having a mount suitable for sealing out moisture from the electric motor. The connector casing, in this case, consists of two parts 26 and 27; the part 27 holds the contacts in place, and part 26, inserted as a sleeve over part 27, forms the back of the connector casing. To comply with various codes governing the sealing of electric motors it is advantageous to make non-elastic the insulating material which forms the casing.

The casing mounts shown in FIGURE 2 for this embodiment of the present invention are different than those of the embodiment shown in FIGURE 1. Although the rear of the connector casing is held by an attachment collar 20 in an identical manner to that shown in FIGURE 1, casing part 27 is provided with a recess 28 which receives a metal hold-down clamp or bracket 29. The metal bracket 29 may simultaneously serve as a ground terminal.

It is also within the scope of the invention to mount the casing to the motor housing by means of two such metal brackets, one on each side of the casing. This mounting arrangement may also, of course, be used with the embodiment shown in FIGURE 1 with appropriate modifications of the casing 17.

The plug-in connector shown in FIGURE 2 is manufactured first by inserting the fixed contacts into the receptacles of part 27, sliding the back part 26 as a sleeve over part 27, hooking the attachment collar 20 beneath the motor enclosure 23 and tightening down the metal bracket 29 by means of screw 30.

FIGURE 3 is a diagram showing cross section 3—3 taken through the casing 17 shown in FIGURE 1. The casing 17 sits with its side walls 44 and 45 in direct contact with the motor housing 23 and with its back side 42 projecting through the motor housing opening 24. The side walls 44 and 45 are partly overlapped by deflectors 43. The bottom edges of the casing are shaped to exactly follow the contours of the motor housing.

The opening 24 in the motor housing 23 is completely covered by the casing 17 in FIGURE 1 and casing parts 26 and 27 in FIGURE 2. The flexible leads connecting the electric motor windings to the terminals 18 and 19 are therefore completely enclosed and shielded from possible damage.

The connector casing serving to hold the stationary contacts according to the present invention is advantageously small compared to the connector casings of the prior art. It may be made in a single unit, or, if necessary, two units interlocked; it completely encloses and protects the motor power leads as well as the opening in the motor housing. The casing according to the present invention is simple and durable, and is inexpensive to manufacture. It is easy to mount on an electric motor housing, in most cases even without the use of tools.

It will be understood that the above description of the present invention is susceptible to various modifications, changes, and adaptations, and the same are intended to be comprehended within the meaning and range of equivalents of the appended claims.

We claim:

1. In a multiple-pole electrical plug-in connector for connecting an electric motor to a power supply, which connector includes a casing mounted on the motor housing and stationary contacts arranged within said casing and connected to the motor winding, said casing being adapted to receive a plug holding movable contacts which cooperate with said stationary contacts, and comprising means for holding said stationary contacts and means for securing said casing to said motor housing, said holding means and at least part of said securing means being parts of said casing, the improvement wherein said securing means include a flexible projection forming the lower edge of the front side of said casing, said projection having a holding catch, said casing having a hinged back side carrying two deflector plates overlapping the respective sides of said casing; the edge of said back side which is directed toward the motor being bent at an angle to form an attachment collar.

2. The improvement defined in claim 1, wherein said holding catch and said attachment collar are arranged to project inside an opening in said motor housing.

3. The improvement defined in claim 1 wherein said back side is hinged to said casing by means of a thin web of casing material.

4. The improvement defined in claim 1 wherein said motor housing has an opening the width of which is equal to the width of said projection and said attachment collar but less than the width of said casing.

5. The improvement defined in claim 1 wherein the lower edges of the sides of said casing are shaped to follow the contours of said motor housing.

6. The improvement defined in claim 1 wherein said casing consists of a single member made of insulating material.

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U.S. Cl. X.R.

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