Sept. 28, 1965 R. E. FREATHY ETAL 3,209,091

ELECTRICAL CONNECTOR-SWITCH MECHANISM

Filed Feb. 9, 1962 2 Sheets-Sheet 1

Fig. 1

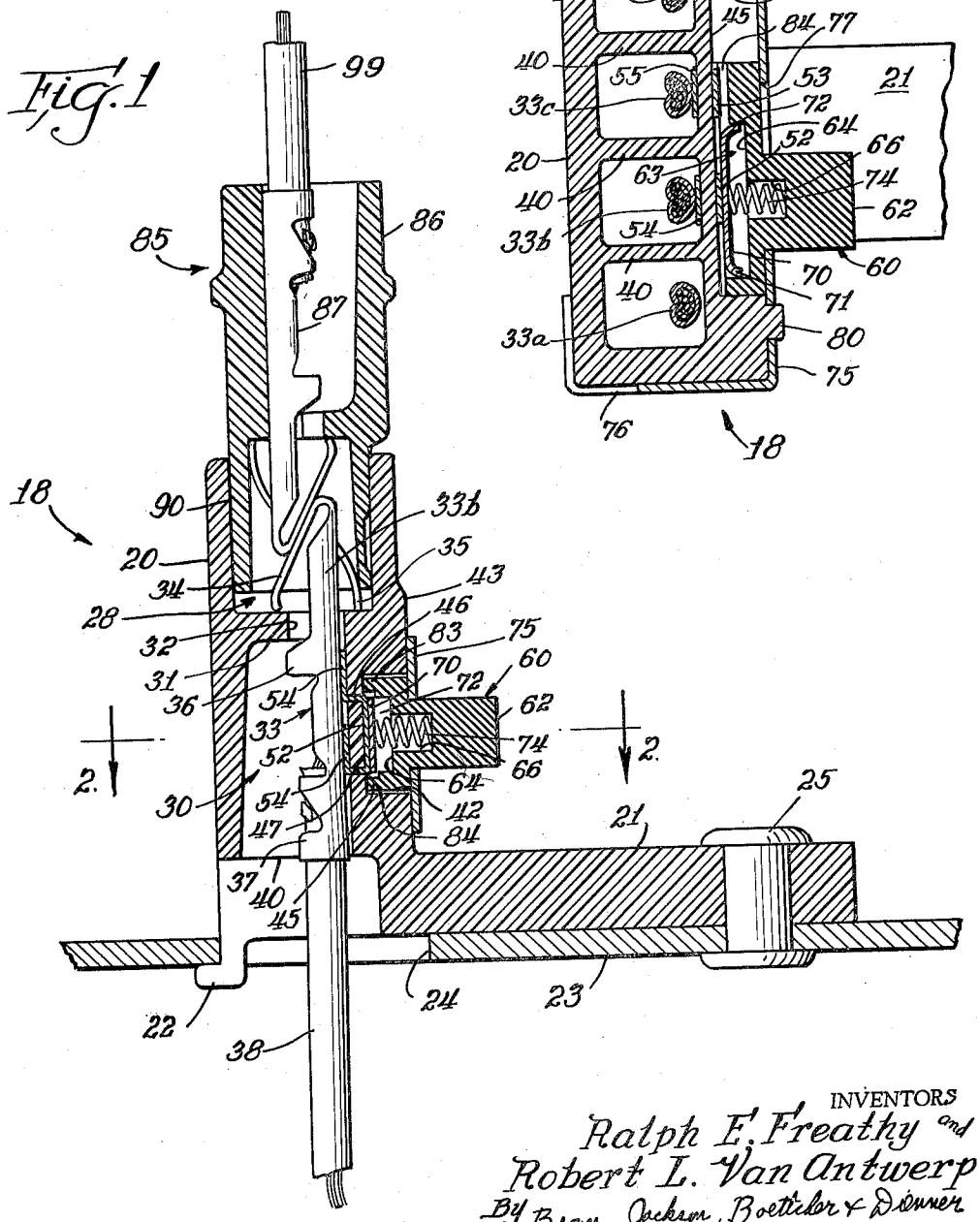


Fig. 2

INVENTORS
Ralph E. Freathy and
Robert L. Van Antwerp
By Brown, Jackson, Boettcher & Dienner
Attys.

Sept. 28, 1965 R. E. FREATHY ETAL 3,209,091

ELECTRICAL CONNECTOR-SWITCH MECHANISM

Filed Feb. 9, 1962 2 Sheets-Sheet 2

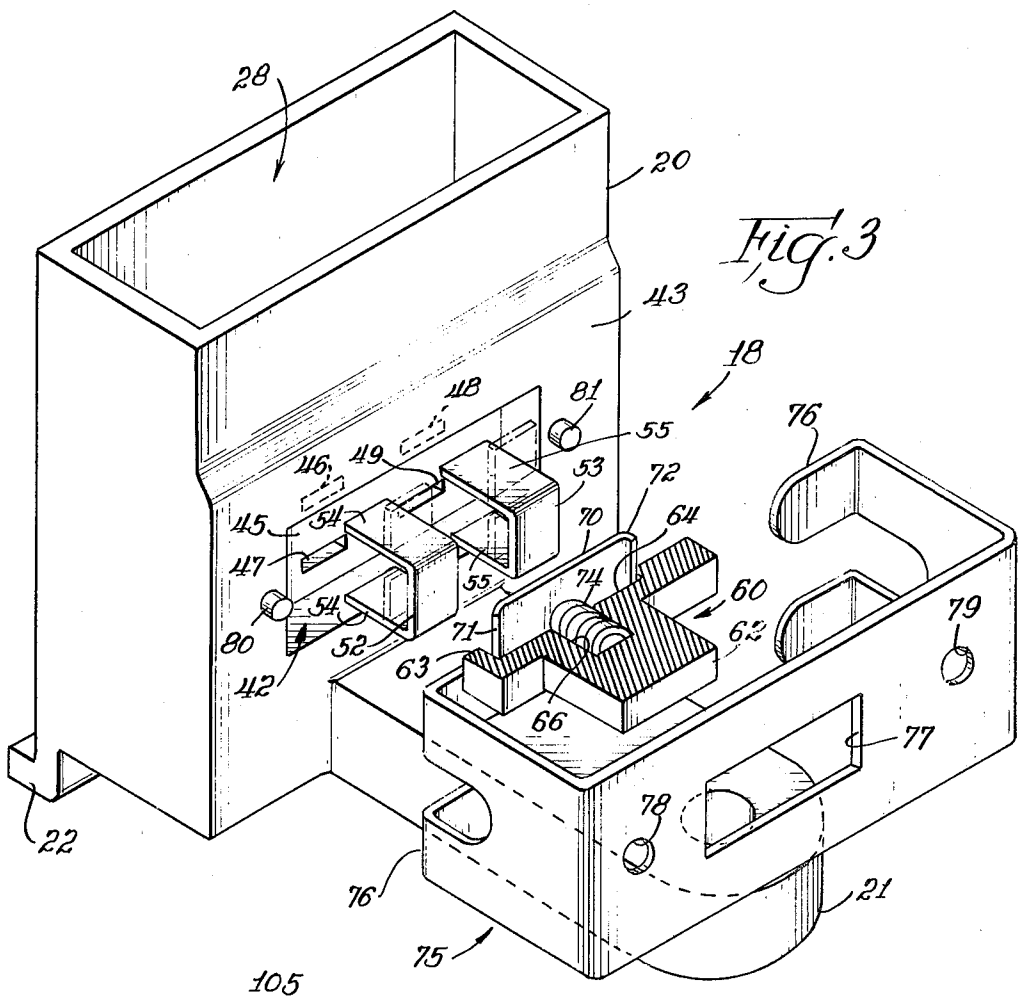


Fig. 3

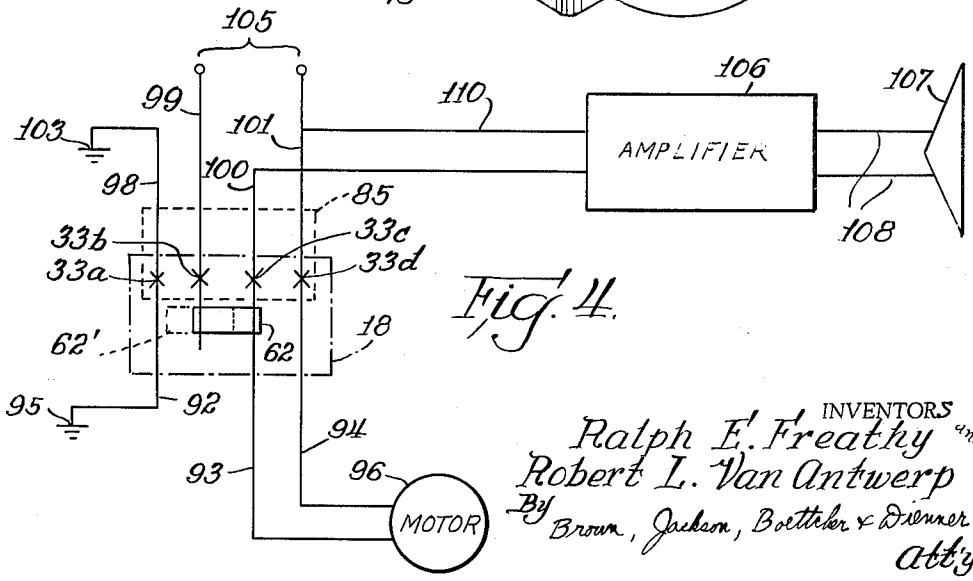


Fig. 4

INVENTORS

Ralph E. Freathy and

Robert L. Van Antwerp

By Brown, Jackson, Boettcher & Dienner

Att'ys.

United States Patent Office 3,209,091 Patented Sept. 28, 1965

3,209,091

ELECTRICAL CONNECTOR-SWITCH MECHANISM

Ralph E. Freathy, Stevensville, and Robert L. Van Antwerp, Benton Harbor, Mich., assignors to V-M Corporation, Benton Harbor, Mich., a corporation of Michigan

Filed Feb. 9, 1962, Ser. No. 172,141
1 Claim. (Cl. 200—51)

The present invention relates to a combination electrical connector and switch device which is compactly mounted in a single housing member.

More specifically, the invention relates to a connecting block which has incorporated therein a pair of switch contact members and a slide button so as to form an on-off switch with the slide button being movable so as to selectively engage one or both of the contacts.

The connector-switch mechanism of this invention is suited to a number of varied applications, as will be recognized more fully from the description hereinafter, but such mechanism is particularly well adapted for use in photographs where heretofore it has been common to provide an electrical connector and an on-off switch as separate components, thus necessitating additional wiring therebetween.

Accordingly, the principal object of the invention is to provide a compact on-off switch which is incorporated directly into the housing of a connecting block so as to eliminate the need for wiring between the connector and the switch.

Another object of the invention is to provide a connector-switch device which is particularly efficient and durable in its operation, and which is simple and inexpensive to manufacture.

Other advantages and uses of the invention will be apparent, or become so, as we describe the invention in greater detail in conjunction with the accompanying drawings in which:

FIGURE 1 is a vertical sectional view showing mounted on a base plate or the like a lower connecting block which in accordance with the invention has an on-off switch incorporated therein, and further showing a complementary connecting block of known form operatively plugged into the upper end of the lower block;

FIGURE 2 is a horizontal section taken along the line 2—2 of FIGURE 1, a mounting lug being partly broken away;

FIGURE 3 is an exploded perspective view of the device of FIGURE 1 with the upper connecting block removed, the slide button being shown in section to more fully illustrate the interior thereof; and

FIGURE 4 is a wiring diagram illustrating the manner in which the connector-switch combination may be incorporated in the circuit of a phonograph to control the operation thereof.

Referring now to FIGURES 1–3, there is shown a connector block **18** comprising a housing **20** having at its lower end an integral mounting lug **21** which extends forwardly from its front wall, and a pair of dogs or hooks **22** which project rearwardly from the rear housing wall. The housing **20** is secured to a base plate **23** by positioning it so that the dogs **22** project through an aperture **24** in the plate and engage under the edge of the latter, the lug **21** then being affixed to the base plate by a rivet **25** or other suitable fastening means such as a self-tapping screw.

The interior of the housing **20** is substantially hollow at its upper end as indicated at **28**, and at its lower end as indicated at **30**, the upper and lower interior portions of the housing being separated by a divider wall **31** which is provided with four laterally spaced apertures **32** (one

of which is seen in FIGURE 1). A plurality of clip members **33** (in this instance four such members **33***a*, **33***b*, **33***c* and **33***d* being shown) are positioned in the housing **20** so that their contact portions **34** extend upwardly through respective apertures **32**, the clips being held in position by dogs **35** and **36** which are adapted to seat against the top and bottom surfaces, respectively, of the divider wall **31**. The lower ends **37** of the clip members are adapted to be clamped about respective lead wires, one such lead being shown at **38** in FIGURE 1.

The lower housing interior **30** is divided into four compartments by means of three parallel vertical walls **40** (shown best in FIGURE 2) which separate the lower portions of the clips **33** from one another. It should be understood that the structure of the housing **20** insofar as described hereinabove, and the clip members **33**, are known in the art, and the present invention resides in incorporating therewith a novel on-off switch mechanism to be described hereinafter.

In accordance with the invention, we form a generally rectangular recess **42** (shown best in FIGURE 3) in a front face **43** of the housing **20**. The base of the recess **42** comprises a substantially flat surface **45** which is provided with a first pair of vertically spaced slots **46** and **47** in alignment with the clip **33***b* of FIGURE 2, and a second pair of vertically spaced slots **48** and **49** in alignment with the clip **33***c*.

FIGURE 3 shows a pair of U-shaped contacts **52** and **53** which are adapted to be mounted in the recess **42**. Thus, the contact **52** is assembled by positioning it with its legs **54** projecting through the respective slots **46** and **47**, after which the legs are bent upwardly as shown in FIGURE 1 so as to bear against the interior wall of the housing **20**. The contact **53** having leg portions **55** is similarly mounted with respect to the slots **48** and **49**. It will be understood that the clips **33** are inserted in the housing **20** after mounting of the contacts **52** and **53**, and that in assembled position the legs **54** of contact **52** will engage the clip **33***b*, whereas the legs **55** of contact **53** will engage the clip **33***c*.

A slide button **60** having an integral knob **62** projecting from its front face, is provided with a generally rectangular recess **63** in its rear portion. The recess **63** terminates at a wall **64** which is provided with a small diameter hole **66** extending partially into the interior of the knob portion **62**. A slide **70** comprises a thin rectangular strip of conductive material which is bent at its opposite ends to form short leg portions **71** and **72**. The slide **70** is positioned in the recess **63** with the legs **71** and **72** disposed toward the wall **64** so as to limit the extent to which the slide may be urged into the recess before being seated therein. A compression spring **74** is mounted in the hole **66** whereby one end of the spring is seated at the base of the hole and the other end engages the slide **70** so as to yieldingly urge the latter outwardly of the recess **63**.

A retainer **75** is provided to maintain the slide button **60** and slide **70** in proper position within the rectangular recess **42** in the housing **20**, and to guide the button while permitting the latter to be moved laterally to selectively bring the slide **70** into engagement with one of the contacts **52** and **53**, or both of said contacts, as desired. A rectangular aperture **77** (shown best in FIGURE 3) is formed in the front face of the retainer **75** so as to permit the button knob **62** to project therethrough, the aperture **77** being of a height only slightly greater than the knob so as to be adapted to guide the same, and being of a width sufficient to permit the desired sliding movement of the knob.

The retainer **75** is further provided with a pair of apertures **78** and **79** to accommodate a corresponding pair of

locating bosses **80** and **81** on the housing face **43**. In the assembly of the retainer **75**, the ends **76** thereof are bent around the sides of the housing **20**, and preferably are further bent around a portion of the rear of said housing (as shown in FIGURE 2), whereby the retainer is firmly mounted on the housing and the slide button **60** and slide **70** are held in proper position.

It will be understood that the generally rectangular recess **63** in the slide button **60** is sufficiently large in its vertical dimension that it can slide over the face of the wall **45** without interfering with the contacts **52** and **53**, the latter being adapted to project outwardly from the wall **45**. In other words, the rear face of the slide button **60** may in effect comprise horizontal and vertical rail portions which slide along the wall **45**. If desired, the vertical rail members may be relieved to avoid interference with the contacts **52** and **53** during sliding of the button, in which case the button **60** may slide on vertically spaced horizontal rails such as shown at **83** and **84** in FIGURE 1.

In operation, the slide **70** is yieldingly urged toward the contacts **52** and **53** by the compression spring **74**. When the slide button **60** is moved to its extreme right hand position, the conductive slide **70** will contact both of the contacts **52** and **53** and thereby electrically connect the corresponding clips **33***b* and **33***c* and the respective wires held thereby. When the button is moved to its extreme left hand position, the slide **70** will engage only the contact **52**, and the electrical connection between the clips **33***b* and **33***c* will be broken.

FIGURE 1 illustrates an upper connecting block **85** comprising a housing **86** and four clip members **87** (one of which is shown), each of the clips **87** having an upper end portion adapted to be clamped about a respective lead wire such as indicated at **99**. The upper connecting block housing **85** has a reduced lower end portion **90** adapted to be received within the upper end of the housing **20**, whereby the clips **87** will make electrical contact with the corresponding clips **33** in the lower connector block **18**. The connecting block **85** is of known construction and does not form a part of the present invention.

FIGURE 4 is a schematic wiring diagram illustrating the manner in which the present invention may be utilized in a phonograph to eliminate the usual wiring between a connector and an on-off switch. Lead wires **92**, **93** and **94** are secured to the lower ends of the clips **33***a*, **33***c* and **33***d*, respectively, the clip **33***b* being empty in this illustration. The wire **92** is grounded at **95**, and the leads **93** and **94** are connected to the terminals of a phonograph motor **96**.

Lead wires **98**, **99**, **100** and **101** are secured to the upper ends of corresponding clips **87** in the upper connecting block **85**. The lead **98** is grounded at **103**, and the leads **99** and **101** are connected to a standard 110 volt power source as indicated at **105**.

An amplifier **106** is connected to a speaker **107** by leads **108**, and the lead wires **100** and **101** are connected to the amplifier terminals to provide power therefor, a lead **110** being provided between the amplifier and the lead **101**.

It will be understood that when the slide button knob **62** is moved to its right hand position as indicated in solid lines, the clips **33***b* and **33***c* will be electrically connected in the manner previously described so as to complete a motor circuit comprising leads **99**, **93**, **94** and **101**, and also to complete an amplifier circuit comprising leads **99**, **100**, **110** and **101**. When the knob **62** is moved to its left hand position as indicated in dotted lines, the clips **33***b* and **33***c* will be disconnected, thereby disconnecting the motor and the amplifier from the power source **105**.

While we have illustrated our invention in a preferred form, we do not intend to be limited to that form, except insofar as the appended claims are so limited, since modifications coming within the scope of our invention will be readily suggested to others with our disclosure before them.

We claim:

A connector-switch device comprising, in combination, a housing, a plurality of clip members mounted in said housing, said clip members having contact portions and having means for securing thereto respective lead wires, a plurality of switch contacts mounted in a recess formed externally in one outer wall of the housing, each of said switch contacts being in electrical contact with a corresponding one of said clip members, a slide button slidable in said recess transversely of said slip members, a conductive slide carried by said slide button in such a manner as to contact a predetermined number of said switch contacts depending upon the selected transverse position of said slide button, and a retainer strap bent around the major portion of said housing to maintain said button and conductive slide in proper position in alignment with said switch contacts, said retainer having a slot transverse to said clip members through which a portion of said button projects to permit the selective positioning thereof.

References Cited by the Examiner

UNITED STATES PATENTS

1,801,611	4/31	Norviel	200—16
2,108,708	2/38	Foster	200—51
2,277,326	3/42	Huss	200—51
2,550,145	4/51	Geci	200—166
2,813,938	11/57	Speizman	200—42
2,891,103	6/59	Swengel	339—217
2,927,185	3/60	Bonnaire	200—51

BERNARD A. GILHEANY, *Primary Examiner.*