

Nov. 10, 1959

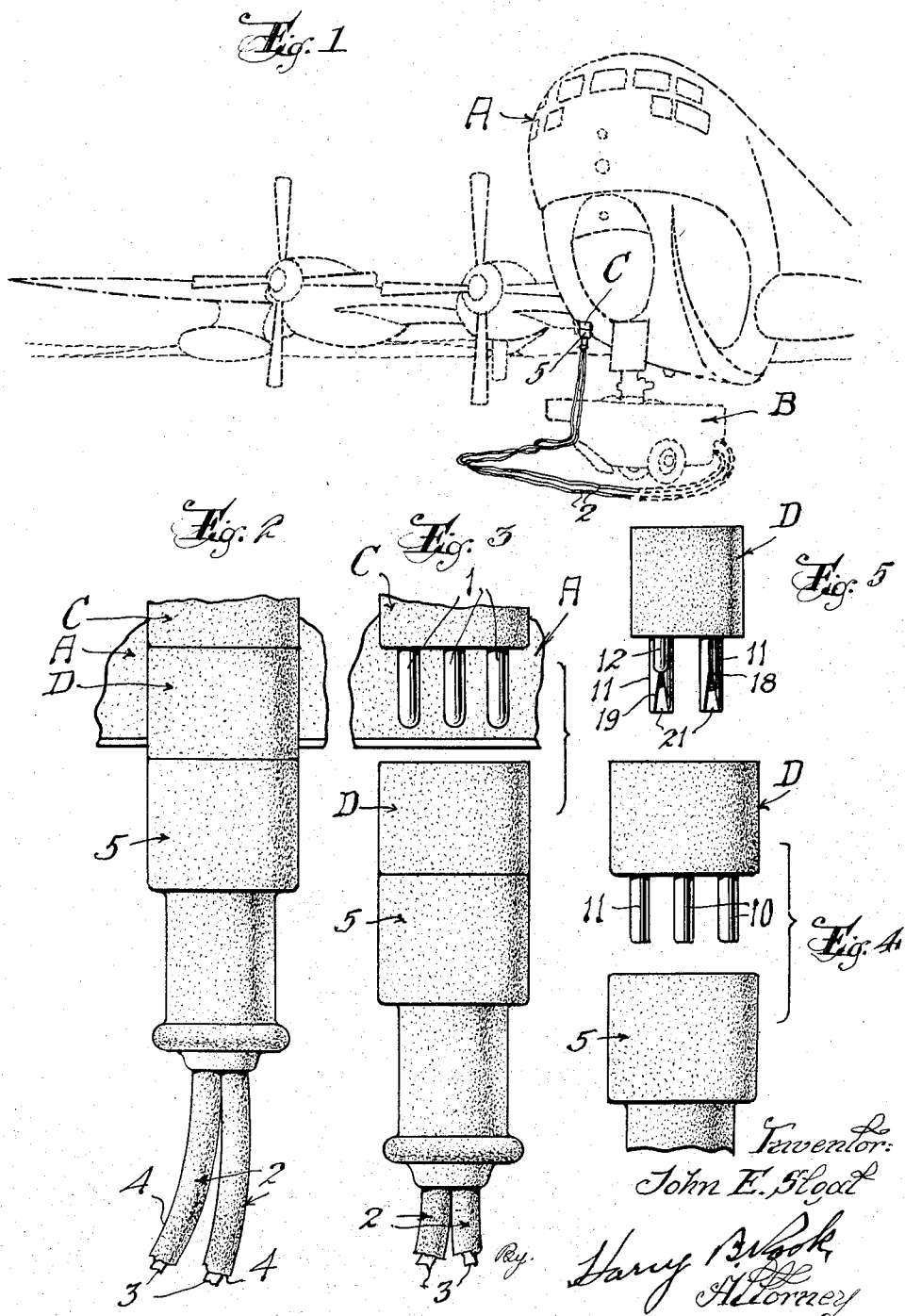
J. E. SLOAT

2,912,667

CORD SET WITH A QUICK-REPLACEABLE AUXILIARY TERMINAL BLOCK

Filed Nov. 4, 1957

2 Sheets-Sheet 1



Nov. 10, 1959

J. E. SLOAT

2,912,667

CORD SET WITH A QUICK-REPLACEABLE AUXILIARY TERMINAL BLOCK

Filed Nov. 4, 1957

2 Sheets-Sheet 2

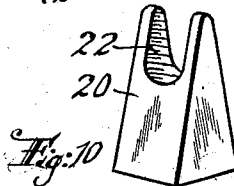
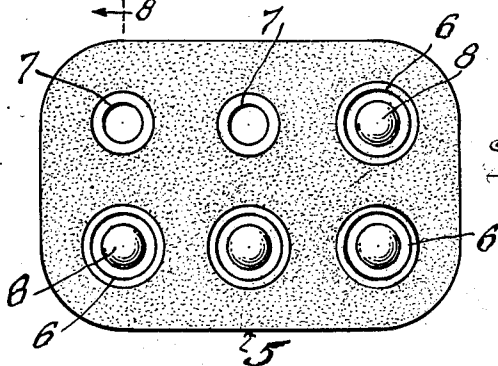
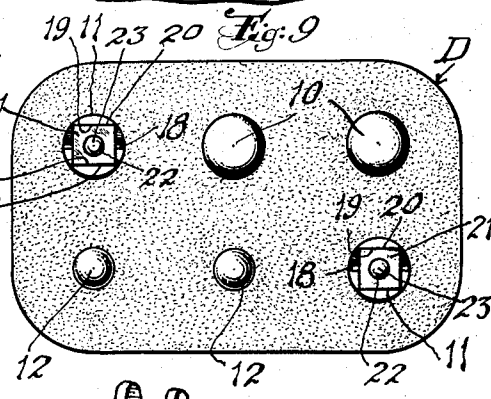
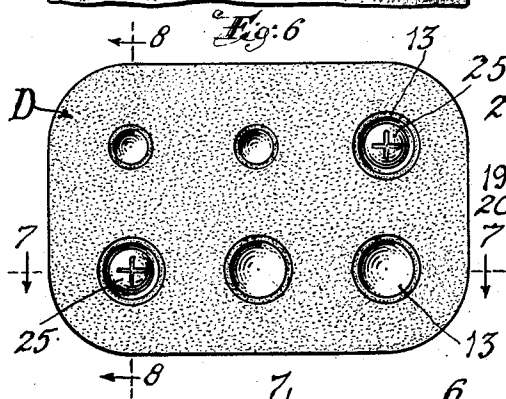
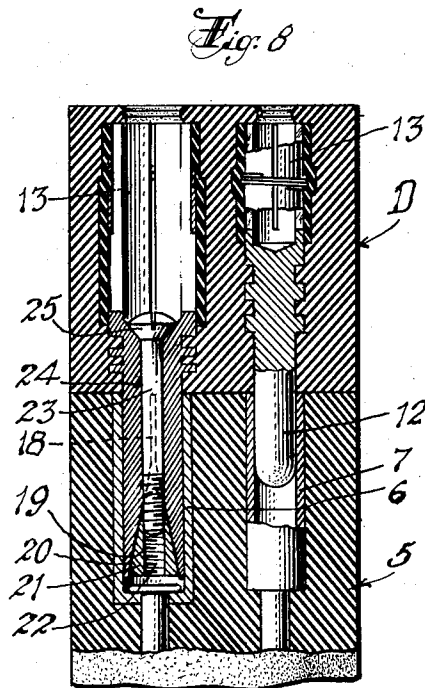
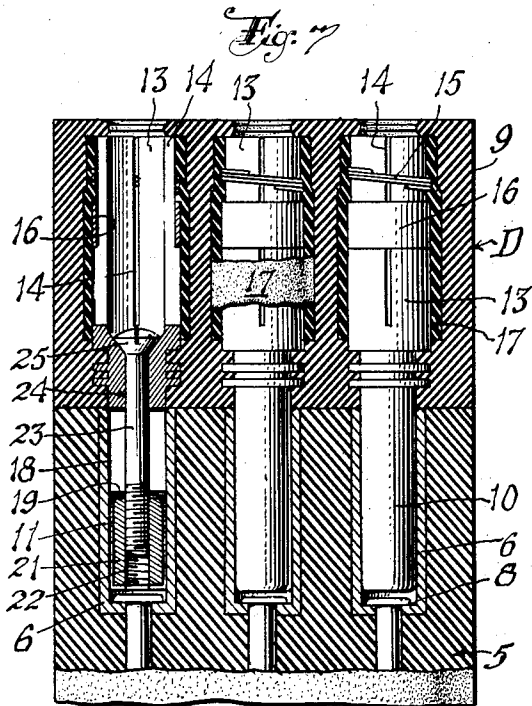


Fig. 11
Inventor:
John E. Sloat

By *Larry B. Cook*
Attorney

1

2,912,667

CORD SET WITH A QUICK-REPLACEABLE AUXILIARY TERMINAL BLOCK

John E. Sloat, Williamstown, Mass., assignor to Cornish Wire Company Incorporated, New York, N.Y., a corporation of New York

Application November 4, 1957, Serial No. 694,360

1 Claim. (Cl. 339-166)

This invention relates in general to electrical cord sets of the type that comprise a plurality of insulated wires or cables that are connected to a terminal block which carries contact elements, either pins or sockets, which are complementary to sockets and pins, respectively, on a piece of other electrical apparatus, and more particularly, the invention contemplates such a cord set one end of which is to be connected to a source of electrical power, such as a motor-generator set, on the ground, and the other end of which is adapted to be separably connected to the circuit in an airplane for starting the airplane engine.

In the use of such cord sets, the contact elements of the terminal block are frequently connected and disconnected to and from contact elements of the electrical apparatus such as the engine starting circuit in an airplane, and the contact elements of the cord quickly are destroyed as a result of arcing that occurs when the contact elements of the cord set are disconnected from the contact elements of the other apparatus.

According to common practice, the terminal blocks are molded integrally with the insulated cords or cables and when the contact elements become useless as a result of such arcing, either the whole cord set must be discarded and replaced with a new one, or a new terminal block must be molded on the cords, which is wasteful practice.

Therefore, a prime object of the invention is to provide novel and improved means which shall prolong the life of the contact elements in the terminal block of a cord set, and another object of the invention is to provide an adaptor or quick-replaceable auxiliary terminal block which shall comprise a block of insulating material carrying a set of contact elements complementary to the contact elements of the terminal block of the cord set and also carrying another set of contact elements that are complementary to the contact elements of the other electrical apparatus such as the contact elements forming a part of the motor-starting circuit in an airplane, whereby an arcing incident to connection and disconnection of the cord set from the electrical apparatus shall occur in the adaptor and the adaptor can be economically discarded and replaced with another adaptor, when necessary.

Another object is to provide an adaptor or auxiliary terminal block of this character which shall include novel and improved contact elements and means for firmly but releasably securing said contact elements in electrical conducting relation to the contact elements of the cord set terminal block.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawings in which

Fig. 1 is a schematic perspective view of a portion of an airplane and a motor-generator set, both shown in dotted lines, and a cord set having an adaptor embodying the invention shown in solid lines;

Fig. 2 is a front elevational view of the cord set and

2

adaptor shown connected to the contact elements of an airplane;

Fig. 3 is a composite front elevation of the cord set and adaptor separated from the contact elements of the airplane;

Fig. 4 is a composite front elevation of the terminal block of the cord set and the adaptor in separated relation;

Fig. 5 is an elevation of one side of the adaptor;

Fig. 6 is a top plan view of the adaptor;

Fig. 7 is a vertical sectional view through the adaptor and through a portion of the terminal block of the cord set taken approximately on the plane of the line 7-7 of Fig. 6;

Fig. 8 is a similar view on the plane of the line 8-8 of Fig. 6;

Fig. 9 is a bottom plan of the adaptor;

Fig. 10 is a top plan of the terminal block of the cord set; and

Fig. 11 is a detached enlarged perspective view of the locking wedge for releasably securing one of the contact pin elements of the adaptor in the contact socket element of the terminal block.

For the purpose of illustrating the principles of the invention, it has been shown in connection with a cord set for use in separably connecting the electrical starting circuit of an airplane with a source of electrical power on the ground, and in Fig. 1 of the drawings, the airplane A is fragmentarily illustrated in perspective by broken lines, and a service truck B carrying a motor-generator set is shown beneath the airplane on the ground. The airplane has an electrical connector section C from which project a plurality of connector elements in the forms of pins or prongs 1 that are complementary to and separably connectable with socket connector elements on the cord set. It is immaterial to the invention how many or what arrangement of connector elements there may be.

The cord set is shown as including two cords or cables 2 that comprise conducting wires 3 having a covering 4 of insulation; and the cords are connected together at one end at least by a main terminal block 5 formed of insulating material which may be molded on the cords. Embedded in the terminal block 5 are socket connector elements of a number, type and arrangement to slidably receive the pins 1 of the connector C. As shown in Fig. 10, there are four identical contact socket elements 6 and two identical contact elements 7 of another type which are connected in circuit with the wires 3 of the cord in any known way, for example, as by upsetting and soldering of the wires at 8 in the bottoms of the socket members. As will be understood by those skilled in the art, each of the socket members 6 and 7 will cooperate with one of the pins 1 on the connector C.

According to present practice, the socket contact elements 6 and 7 are frequently connected to and disconnected from the pins 1 of the connector on the airplane or other electrical apparatus and the metal of which the socket members are formed is quickly damaged or destroyed by the frequent arcing incident to repeated disconnection of the socket members from the pins 1, and heretofore, when such damage or destruction has occurred, it has been necessary to either completely replace the cord set or to mold a new terminal block with new socket members on the cord 2, both of which procedures are expensive and wasteful.

The invention provides means to prolong the life of the cord set and to reduce the cost and waste incident to the destruction of the socket members. In accordance with the invention, an adaptor quick-replaceable auxiliary terminal block D is provided and has a plurality of contact elements, for example, pins, to cooperate with the contact socket elements of the cord set terminal block,

which are electrically connected to connector elements such as sockets to cooperate with the connector elements or pins 1 on the airplane or other electrical apparatus.

Also, means is provided for firmly but releasably connecting the adaptor to the terminal block so that the adaptor may be manipulated with the terminal block for connecting and disconnecting the adaptor to and from the connector elements on the airplane or other apparatus.

As shown, the adaptor comprises a block 9 of insulating material from one end of which extends a plurality of simple connector pins 10 of generally known construction and a plurality of connector pins 11 that include means for releasably locking the pins in the corresponding sockets of the cord set terminal block. Also there are shown connector pins 12 of another known type, it being understood as indicated above, that each of the pins is complementary to one of the sockets 6 and 7 of the terminal block which is in turn complementary to one of the pins 1 of the connector C. The pins 10 and 11 are molded into the block 9 in known manner and have integral conducting socket elements 13 that open through the end of the block 9 opposite the end from which the pins 10, 11 and 12 project. The socket elements 13 may be of any suitable construction but are shown as being longitudinally slitted as indicated at 14 for resiliency and being encircled by helical springs 15 and seamless brass sleeves 16. Also, the socket elements are encircled by rubber sleeves 17 that are molded into the block 9 which may also be formed of rubber or a Buna compound, or any other suitable insulating material. As will be understood, each of the socket members 13 is complementary to one of the pins 1 of the connector C.

Each of the pins 11 which serves the dual function of a contact element and means for releasably holding the adaptor D firmly connected to the terminal block 5, is shown as being bifurcated by a diametric longitudinal slot 18 opening through the outer end of the pin providing two spring arms with the side walls of the slot or inner surfaces of the arms at the outer end of the pin diverging outwardly as indicated at 19 to cooperate with the converging or beveled side surfaces 20 of a wedge 21 that is approximately square in cross section and has a longitudinal screw-threaded opening 22 in which is threaded a screw thread 23 which is rotatably mounted in an axial bore 24 in the pin which in turn opens through the bottom of the corresponding socket member 13 so that the head 25 of the screw abuts the bottom of the socket member as best shown in Figures 7 and 8.

The pins are formed of resilient metal and normally are of a diameter to freely frictionally and slidably engage the corresponding socket members 6 in the terminal block 5 to permit the adaptor to be connected to the terminal block with the pins of the adaptor in electrical conducting contact with the socket members of the terminal block. After the pins 11 have been inserted into their sockets, the screws 23 should be rotated so as to draw the wedges 21 inwardly from the free ends of the pins so that the beveled surfaces 20 of the wedges slidably engaging the beveled walls 19 of the slots 18 will spread the end portions of the pins at opposite sides of the slots 18 outwardly into tight frictional contact with the corresponding socket elements 6 and thereby firmly and rigidly connect the adaptor to the terminal block. Obviously the pins may be released by rotating the screws in the opposite directions for loosening the wedges so that the pins can be pulled out of the socket elements and thus permit the adaptor to be disconnected from the terminal block.

With this construction, it will be understood that normally the adaptor will be connected to the terminal block and the adaptor will be interposed between the terminal block 5 and the connector C so that the pins 1

of the connector will enter the socket elements of the adaptor instead of entering the socket elements 16 of the terminal block as has been the practice heretofore. Therefore, when the socket elements of the adaptor become damaged or destroyed as a result of the arcing due to frequent connection and disconnection of the socket elements to and from the pins, the whole adaptor may be disconnected from the terminal block, thrown away and replaced by a new adaptor. This is much more economical than the molding of a new terminal block on the cords 2 or the complete replacement of the cord set.

It will be observed that when the adaptor D is rigidly connected to the terminal block 5, the assembly, in effect, constitutes a cord set having a terminal block formed in two separably connected complementary sections the outer of which may be readily replaced. The terminal block 5 and the adaptor D constitute the main section and an adaptor section of an electrical connector, the main section having connector elements, and means for connecting them in an electrical circuit, while the adaptor section includes connector elements at one side thereof complementary to the connector elements of the main section, and other connector elements at another side of the adaptor section complementary to connector elements on another electrical apparatus.

While the invention has been shown and described as embodied in certain structural details, it will be understood that this is for the purpose of illustrating the principles of the invention, that many modifications and changes can be made in the construction of the terminal block and the adaptor, and that the adaptor may be made to cooperate with the different types of connectors C on the airplane or other electrical apparatus, all within the spirit and scope of the invention.

What I claim is:

An electrical cord set having a quick-replaceable terminal block, comprising a cord having a plurality of insulated electrical wires and a main terminal block rigidly connected thereto at one end thereof, said terminal block comprising electrical insulating material having electrical conductor elements therein connected in circuit with said wires, and an auxiliary terminal block of insulating material having therein electrical connector elements complementary and separably connectable to said connector elements of the main terminal block, said auxiliary terminal block also having other connector elements which are mechanically integral with and electrically connected to the first-mentioned connector elements of the auxiliary terminal block and are complementary and separably connectable to electrical connector elements carried by other electrical apparatus, and releasable means for rigidly and separably connecting said auxiliary terminal block to said main terminal block providing for easy and quick connection and disconnection of the auxiliary terminal block to and from the main terminal block, discard of the auxiliary terminal block, and replacement thereof by a similar auxiliary terminal block, said connector elements of the main terminal block being sockets, the first-mentioned and second-mentioned connector elements of the auxiliary terminal block being pins and sockets respectively, each pin integrally connected to one socket, and the last-named means including at least one of said pins which is bifurcated at its free end into two spring arms, a wedge between said arms, and a part that has a screw-threaded connection with said wedge and is rotatable but longitudinally immovable in one direction in said pin, said part having an operating head disposed in the corresponding second-mentioned socket, whereby upon rotation of said part in one direction said wedge will be slid in the direction between said arms to force the arms into tight frictional contact with the walls of the corresponding socket connector element.

References Cited in the file of this patent

UNITED STATES PATENTS

1,284,424	Morrison	Nov. 12, 1918
2,031,914	Veysey et al.	Feb. 25, 1936
2,343,675	Kenyon	Mar. 7, 1944
2,383,109	Conlan	Aug. 21, 1945

5

FOREIGN PATENTS

258,622	Great Britain	Feb. 24, 1927
565,811	Great Britain	Nov. 29, 1944
573,514	France	Mar. 12, 1924