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SHIELDING ASSEMBLY AND CONNECTER THEREFOR

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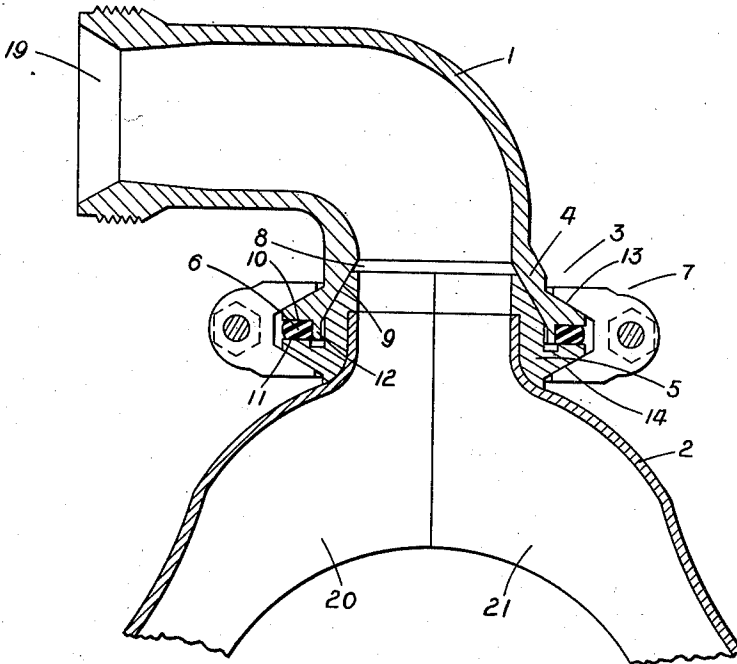


Fig. 1

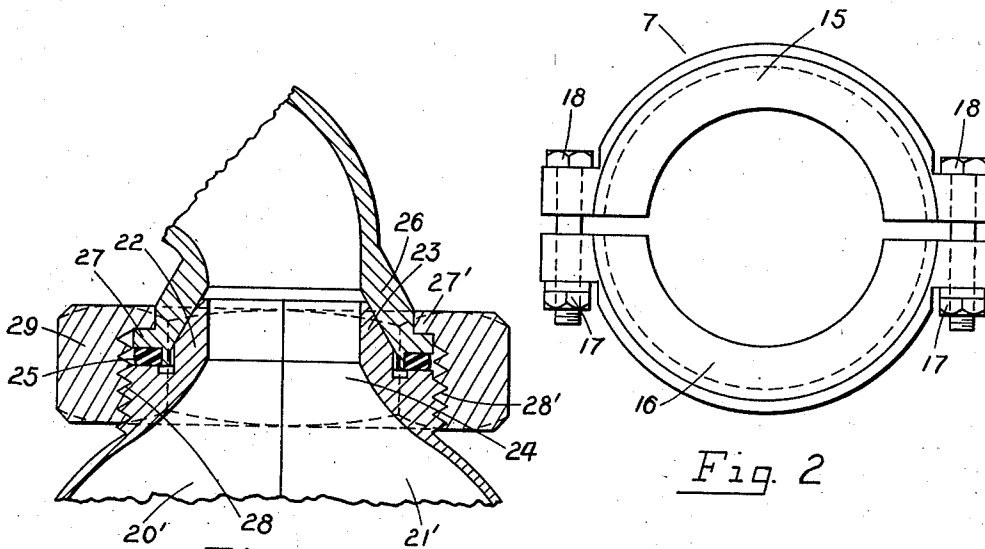


Fig. 2

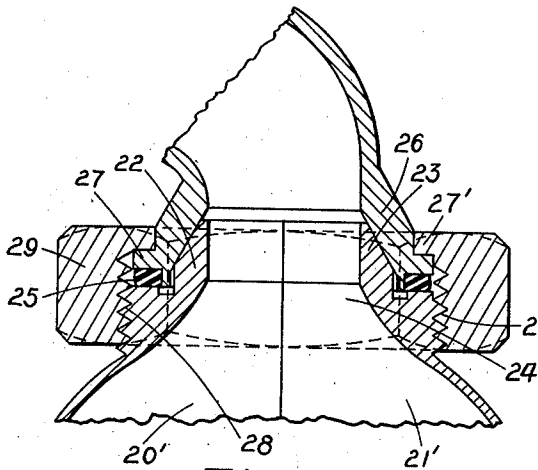


Fig. 3

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SHIELDING ASSEMBLY AND CONNECTER
THEREFOR

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Application September 14, 1936, Serial No. 100,688

2 Claims. (Cl. 247—18)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

My invention relates to an electrically continuous and efficient shielding assembly and to a connector forming part thereof for connecting together undivided and divided electrically conductive casing elements of said shielding assembly and for insuring electrical continuity therebetween as well as electrical contact between the sections of the divided casing element.

In order to effectively shield extraneous apparatus against the electrical disturbance caused by ignition circuits of an internal combustion engine it is essential that the ignition circuit be completely encased by a metallic surface; and that the enveloping metallic surface be grounded at its ends and be electrically continuous throughout its length. In the case of the enveloping metallic surface associated with that portion of an aircraft ignition circuit extending from the magneto to the ring manifold, features of design in addition to those previously enumerated must be observed if an efficient shielding assembly for this portion of the ignition circuit is to be provided.

The electrically conductive casing element which is associated with the magneto end of the ignition circuit and which forms a part of the shielding assembly extending from the magneto to the ring manifold must be divided or sectionalized so as to permit easy disassembly and hence ready access to the instrumentalities housed and shielded thereby. It is essential, however, that when the divided casing element is assembled that the sections thereof fit together as closely as possible and that they be in intimate, low resistance, electrical contact. This feature of design is of great importance for if the sections of the divided casing element when assembled are not in intimate, electrical contact, the shielding properties of the divided casing element will be materially impaired and harmful extraneous material such as, for example, oil, dirt, or water will have access to the interior of the casing element with attendant detriment to the instrumentalities housed therein. Since the divided casing element associated with the magneto end of the ignition circuit and forming part of the shielding assembly extending from the magneto to the ring manifold is detachably connected with an undivided electrically conductive casing element, it is necessary that the connection therefor provide electrical continuity between the casing elements as well as electrical contact between the sections of the divided casing element in conformity with the design requirements previously set forth herein.

With the foregoing preliminary discussion in view it is an object of my invention to provide an electrically continuous and efficient shielding assembly comprised of detachably connected undivided and divided casing elements which when assembled are electrically continuous and maintain their electrical continuity unimpaired and wherein the sections of the divided casing element when assembled are in electrical contact.

It is another object of my invention to provide a connector for connecting an electrically conductive, undivided casing element to an electrically conductive, divided casing element wherein the juncture between the connector parts is sealed against the connector exterior whereby electrical continuity through the connector is insured.

It is another and still further object of my invention to provide a connector for connecting an electrically conductive, undivided casing element to an electrically conductive, divided casing element wherein the juncture between the connector parts is maintained by direct and intimate, wedging, metallic contact, the said juncture being sealed against the connector exterior to thus preserve unaltered the resistance through the connector and thereby insure an optimum of shielding effect by the shielding casing elements.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawing wherein:

Fig. 1 is an assembled view in section of one embodiment of my invention;

Fig. 2 is a view in plan of the adjustably connected clamping segments adapted to be used with the embodiment of Fig. 1; and

Fig. 3 is an assembled view in section of an alternative embodiment of my invention.

My invention seeks to provide an efficient shielding assembly comprised of detachably connected undivided and divided, electrically conductive casing elements which is not only electrically continuous but whose resistance is preserved substantially unaltered, this being accomplished by maintaining electrical contact between the sections of the divided casing element and a direct and intimate metallic contact between an undivided female and divided male connector parts formed integrally with or otherwise suitably secured to the respective undivided and divided casing elements by causing a wedging action between the contacting surfaces of the connector parts through the medium of a suit-

able coupling means. The contact or juncture between the connector parts occurs within the confines of a compressible, fluid impervious means to thus effectively seal the juncture against the shielding exterior and hence, against the introduction of any extraneous matter such as, for example, oil, gasoline, water or moisture, which would have a tendency to increase the resistance through the shielding assembly or to destroy its electrical continuity.

The shielding assembly of my invention and the connector forming a part thereof are intended primarily for use with aircraft ignition circuits and are so described in their specific applications hereinafter. It is to be emphasized, however, that my shielding assembly and the connector forming a part thereof are not restricted to the aforementioned use but may be used wherever and whenever an electrically continuous and efficient shielding assembly and connector are desired, as well as an assembly and connector whose resistance is to be preserved substantially unaltered.

Turning now to the drawing there is shown depicted in Fig. 1 thereof an undivided casing element 1 detachably connected to a divided casing element 2 by means of a connector identified in general by the numeral 3, the said connector consisting of a female connector part 4 integral with the casing element 1, a divided or sectionalized male connector part 5, a deformable and compressible gasket 6 which serves as a fluid impervious sealing means interposed between the connector parts and a coupling 7 for maintaining a direct and intimate metallic contact between the connector parts and for causing the connector parts to compress the gasket 6, whereby to seal the surface of contact between the connector parts against the connector exterior.

The female and male connector parts 4 and 5 are apertured as shown to permit the passage of ignition cables from one casing element to the other. In addition, the female connector part 4 is provided with a conical recessed surface 8 with which a corresponding conical surface 9 of the divided male connector part 5 is adapted to contact to thereby insure electrical continuity through the connector. While the connecting surfaces of the male and female connector parts are shown as conical in shape, I do not desire to be restricted thereto since other inclined contact surfaces may be employed within the purview of my invention and will readily suggest themselves to those skilled in the art, hemi-spherical and pyramidal surfaces being illustrative but not restrictive of such other inclined surfaces.

The female and male connector parts 4 and 5 are furthermore provided with bearing faces 10 and 11, respectively, extending outwardly of the connector from adjacent the outermost edges of the conical or inclined surfaces 8 and 9, these bearing faces being adapted to abut against the sides of the deformable, fluid impervious gasket 6 interposed therebetween to compress the same and thereby seal the surfaces of contacts 8 and 9 between the connector parts or members 4 and 5 against the connector exterior. The gasket 6 is preferably although not necessarily annular in shape and is placed about and supported by the annular projection 12 on the female connector part. This gasket or washer 6 may be fabricated from synthetic rubber, rubber, special gasket paper, or any other suitable compressible material so long as the material chosen is fluid impervious, will withstand the weather and be

reasonably resistant to fluids, such as, for example, gasoline, oil and water. In order to insure a direct and intimate metallic contact between the contacting surfaces 8 and 9 of the connector parts and a compression of the gasket 6, the female and male connector parts 4 and 5 have been provided with inclined surfaces 13 and 14 respectively which are adapted to contact with complementary recessed surfaces in a plurality of adjustably connected clamping segments 15 and 16, which constitute portions of the coupling 7. The recessed surfaces of these coupling or clamping segments are brought into intimate wedging contact with the complementary surfaces 13 and 14 of the connector parts by means of the nuts 17 and bolts 18, or other suitable means, connecting adjacent ends of the coupling segments together. The coupling 7 in addition to holding the contact surfaces 8 and 9 of the connector parts in intimate and direct metallic contact, and causing a compression of the gasket 6, serves also to furnish some protection to the sealing gasket 6 and to provide a secondary, electrically conductive path between the male and female parts of the connector.

The undivided electrically conductive casing element 1 is shown as an adaptor which is in turn adapted to be connected to the conduit through which the ignition wires or cables are carried to the ring manifold. This adaptor may be in any form necessary for the particular installation in question. In some cases it will be merely a straight connector fitting; while in others it will have an elbow shape of any required angle. The undivided casing element or adaptor is shown with one outlet at 19 but may have any desired number, each of the outlets being provided with an electrically continuous connector for connecting the adaptor to the conduit leading to the ring manifold. The connector used for this purpose is preferably that described in my application Serial No. 100,687, filed September 14, 1936. As an alternative mode in completing the shielding path to the ring manifold I may connect the shielding conduit directly to the divided casing element thus dispensing with the intervening adaptor.

The divided casing element identified in general by the reference character 2 in Fig. 1 is formed in two sections 20 and 21, which serve as magneto covers. These covers are fabricated by separately stamping each from sheet metal and then assembling the same with their respective sections of the divided male connector part, the assembling being accomplished by welding, riveting or a similar process, in order to provide electrical continuity between the sections of the divided casing element 2 and those of the divided male connector part. Normally the divided casing element will be divided into two halves as shown in Fig. 1 of the drawing with their upper ends forming an aperture through which the ignition wires or cables have their outlet. It is to be understood, however, that the divided casing element 2 may be divided into any number of sections that is desired.

The alternative embodiment shown in Fig. 3 of the drawing is identical with that shown in Fig. 1, except for differences in the coupling and the shielding covers employed. In this embodiment the magneto shielding covers 20' and 21' are fabricated by die casting the same integrally with the sections 22 and 23 of the divided male connector part 24. In order to insure a direct and intimate metallic contact between the contacting sur-

faces of the connector parts in this embodiment of the invention and a compression of the gasket 25, the female and male connector parts 26 and 24 have been provided with a flange 27 and screw threads 28, respectively, which are adapted to engage a complementary flange 27' and internal screw threads 28' of a coupling sleeve or nut 29. The screw threads 28 and 28' are shown as being coarse in order to allow for any irregularities of manufacture without danger of stripping the threads. It is not essential, however, that these threads be coarse. The coupling sleeve or nut 29 is hexagonally or otherwise shaped to permit the use of a wrench for tightening purposes. This nut or sleeve 29 in addition to holding the contact surfaces of the connector parts 24 and 26 in intimate and direct metallic contact, and causing a compression of the gasket 25 serves also to furnish some protection to the gasket 25 and to provide a secondary electrically conductive path between the female and male parts of the connector.

In use the fluid impervious gasket is placed about the annular projection on the female connector part and the divided male connector part brought into contact with the complementary surface of the female connector part. As the coupling associated with these connector parts is tightened the conical projection on the male connector part is wedged into the corresponding conical recess of the female connecting part, thus providing direct electrical continuity through the connector. Simultaneously with the tightening of the coupling the sides of the fluid impervious gasket are compressed between the bearing faces of the connector parts, thus sealing within its confines the surfaces of contact of the connector parts against the connector exterior and providing fluid-tight integrity against the introduction of extraneous materials such as gasoline, oil and moisture. A tightening of the coupling also forces together the several sections of the divided conical male connector parts and those of the divided casing element to thus insure mutual and low resistance electrical contact therebetween. Since there is no crevice or gap between the two halves of the magneto shielding covers the electrical shielding properties of the divided casing element are maintained unimpaired and in addition no extraneous matter such as, for example, oil, dirt and moisture, can gain access to the instrumentalities housed therein and shielded thereby. The possibility of interruption in electrical continuity between the undivided and divided casing elements is avoided by reason of the particular type of connector employed. Thus I provide an electrically continuous and efficient shielding assembly for the purposes hereinbefore described.

According to the provisions of the patent statutes I have set forth the principle and mode of operation of my invention and have illustrated

and described what I now consider to represent its best embodiments. However, I desire to have it understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically illustrated and described.

This invention may be manufactured and used by or for the Government of the United States of America for governmental purposes without payment of royalties thereon or therefor.

I claim:

1. An electrically continuous shielding assembly comprising in combination a plurality of electrically conductive casing elements one of which is undivided and the other of which is divided into a plurality of sections, a connector for connecting said elements together and for insuring continuity of passage and electrical continuity therebetween as well as electrical contact between the sections of the divided casing element, said connector including an apertured, electrically conductive member electrically continuous with said undivided casing element and in intimate electrical contact with a second apertured, electrically conductive member which is divided into a plurality of sections equal in number to those of the divided casing element and electrically continuous therewith, means for sealing the area of contact between said first and second mentioned connector members against the connector exterior and means for holding said members in engagement at their surfaces of contact and for forcing the sections of said divided casing element as well as those of the divided connector member into electrical engagement, whereby to provide an electrically continuous and efficient shielding assembly.

2. A connector for connecting an electrically conductive undivided cable housing element to an electrically conductive divided instrumentality housing element and for insuring electrical continuity and continuity of passage therebetween, comprising in combination an apertured, electrically conductive member provided with a recessed contact surface and a bearing face, a second apertured, electrically conductive, divided member provided with a contact surface and a bearing face, the surfaces of contact of said members being in intimate electrical engagement, deformable means interposed between the bearing faces of said members and adapted to be engaged thereby for sealing the area of contact at the surfaces of said members against the connector exterior, and means for holding said members in wedging engagement at the surfaces of contact and for forcing the sections of the divided member into electrical contact as well as for causing the bearing faces to abut against the deformable means whereby to insure an electrically continuous and protected juncture of said members.

THOMAS C. GREEN.