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R. J. BENNETT

3,129,047

BATTERY CONNECTOR

Filed Oct. 23, 1961

FIG. 1.

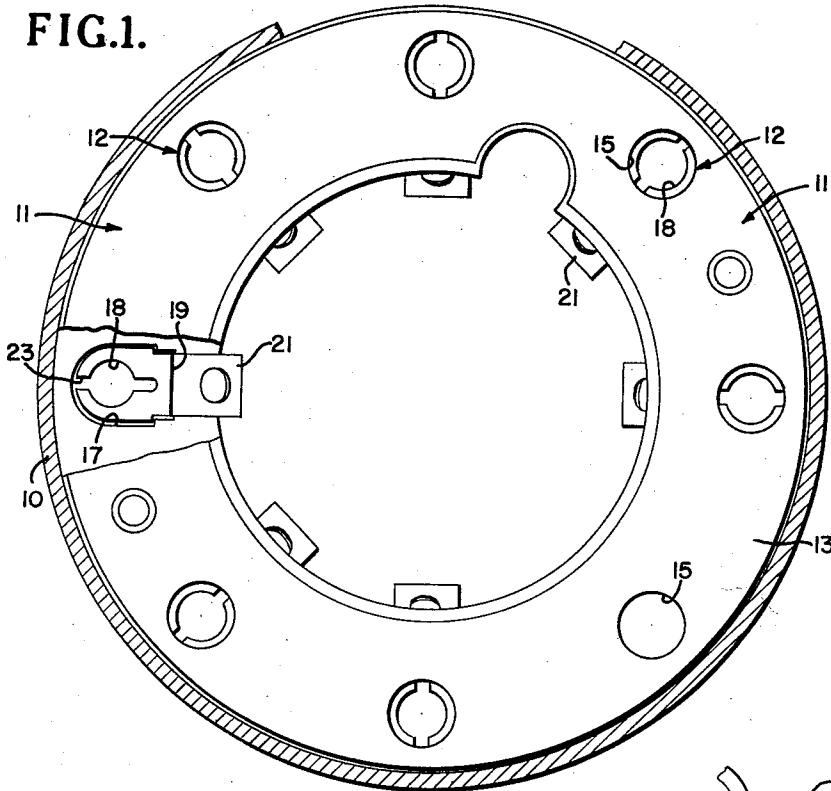


FIG. 2.

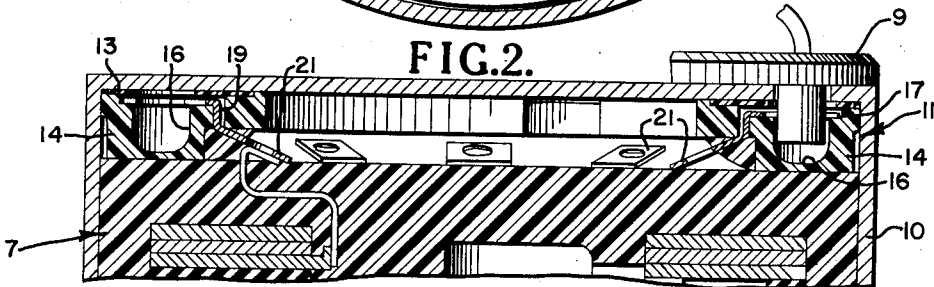


FIG. 3.

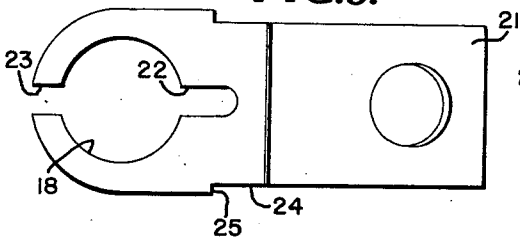
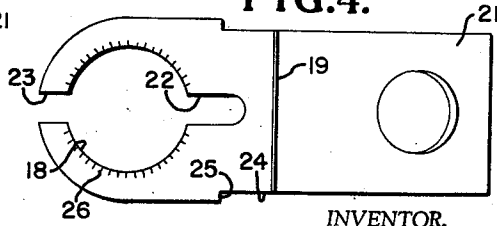


FIG. 4.



INVENTOR.
ROSWELL J. BENNETT

BY *W. J. Duesenberry*
R. J. Hodges

ATTYS.

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BATTERY CONNECTOR

Roswell J. Bennett, Lakewood, Ohio, assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

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1 Claim. (Cl. 339-95)

This invention relates generally to an improvement in an electrical connector and more specifically this invention relates to an electrical connector for a deferred action battery employed in a projectile. It is considered well known that the most important requirement for an electrical connection, apart from its capacity to properly transmit current, is that it maintain a continuous tightness despite vibrations or forces applied to it on the stab connectors.

In the deferred action type battery the technology has provided by use of new materials and new techniques a design that has reduced the overall height and weight of the battery over the past few years. The technology has now progressed to a point wherein a complete section of the battery could be placed in a space equivalent to that taken up by the castellated electrical connectors of the prior art devices. Since space is at a high premium in the fuze using this deferred action battery it became apparent that an electrical connector of smaller size would be very advantageous.

The prior art devices utilized a cylindrical yieldable connector for making an external connection between the battery and the energy consuming source. The general purpose of this invention is to provide an electrical contact for connecting the load device with the reserve energizer by means of an improved mechanical connector. The device of the present invention is simple and inexpensive and capable of retaining a good electrical contact with the plug connector under adverse circumstances, such as vibration, etc.

An object of the present invention is to provide a new and improved electrical contact structure between the reserve energizer and the load without the use of soldering or other heat requiring method.

Another object is to provide a new and improved resilient means cooperating with the plug connector for making a reliable electrical connection.

A further object is to provide a resilient connector that requires very little space and makes a good biting electrical connection with the cooperative plug.

Still another object is to provide a simple low cost electrical connector requiring small space that will provide a good electrical and mechanical connection to the cooperating plug.

Yet another object is to provide a new and improved simple yieldable connector that will provide a biting effect upon the cooperating electrical plug to effect a solid electrical and mechanical connection in a limited space.

Further objects and the entire scope of the invention will become further apparent in the following detailed description and in the appended claim.

The accompanying drawings display the general construction and operational principles of the invention; it is to be understood, however, that the drawings are furnished only by way of illustration and not in limitation thereof and wherein:

FIG. 1 is a plan view partially in section of a preferred embodiment of the invention;

FIG. 2 illustrates a side elevational view of the apparatus taken along line 2-2 of FIG. 1;

FIG. 3 is an exploded perspective view of the yieldable connector; and

FIG. 4 is a plan view of a modified form of the device. Referring to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a turret assembly 11 for a reserve energizer battery having a plurality of applicant's novel connectors 12 mounted therein.

The turret assembly 11 has a thin non-metallic ring cover plate 13 mounted on circular base plate 14 in an appropriate manner. The cover plate 13 has a plurality of apertures 15 circularly located in the plate. These apertures coincide with cylindrical chambers 16 in the base plate.

Referring now to FIG. 2, the electrical connector 12 is located beneath the plate 13 in an indented portion 17 in the base plate 14. The aperture 18 in the electrical connector is axially aligned with the plate member 13 and the base member 14 in such manner as to receive a cooperating plug. The drawing illustrates that the connector has a radial bend 19 in close proximity to the split section thereby providing a rigid support for the contact area of the connector. The remaining portion of the connector 21 is shaped to extend inside the circular base plate for ease in making electrical connections with the tab connectors of the battery.

Referring now to FIG. 3 on which is shown a plan view of the connector, the connector may be made from several materials suitable for the purpose such, for example, as phosphorous bronze, spring brass, and beryllium copper. It has been discovered that a hard tempered beryllium copper connector plated with silver provided the best combination, the beryllium copper being known as "Berylco 25." It is considered as somewhat obvious that a thickness of the connector may vary with the variation of the central aperture 18. The central aperture 18 in the connector is elliptical with a smaller test tube shaped aperture 22 connected thereto and extending into the body section of the connector substantially as shown. The elliptical aperture has an eccentricity approaching unity and is disposed with its major axis coincident with the longitudinal axis of the connector. A small portion 23 has been removed from the front part of the connector leaving it with a bifurcated configuration and substantially claw shaped. The portion removed from the front part of the connector may vary with the size of the connector used; however, in applicant's device it was found that the width of the removed section of about .022 inch provided the best operation. The main body of the connector necks down at 24 thereby providing shoulders 25 which are fitted into corresponding indented portions in the base plate 14.

It is considered apparent that the unusual shape of applicant's connector provides a firm biting contact when the mating pin connector is inserted therein. The bifurcated connector will spread slightly when the pin is inserted therein to provide a biting contact over a substantial contact area. The connector as viewed in FIG. 2 will be able to spread only in a horizontal plane since the base plate and the face plate will not allow it to move in the vertical plane. The 90° bend 19 placed in the connector in the area just back of the test tube aperture provides additional rigidity to the claw-shaped members and thus effects a better biting contact on the connector pin. The shoulder members 25 which fit into a similar recessed area in the base plate provide additional means of allowing the contact a limited degree of movement.

Referring now to FIG. 4 on which is shown a modified form of the device, the overall shape of the connector is substantially the same as shown in FIG. 3 with the exception that a plurality of small slots 26 are provided on

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the inside of the claw-shaped contact surfaces of the connector.

The small radial slots allow the material therebetween to flex slightly as the pin is inserted into the connector. If the pin is now attempted to be removed by pulling the connector out, the connector material will become straightened biting into the pin connector and holding it firm.

With this novel device it will be readily recognized by those skilled in the art that a connector has been disclosed that is simple in construction, has a relatively low cost of manufacture and provides a reliable electrical connection with a mating pin that has not heretofore been attained in the prior art. With this connector has been provided a biting electrical contact which also has a locking effect upon the pin connectors. The biting effect provides intimate electrical contact between the connector and the connector pin. This electrical contact will be maintained even though the device is subject to considerable vibration. This electrical contact is also able to maintain a reliable connection when subjected to the forces of a projectile including high spin, high setback and other distorting forces resulting in being fired from an anti-aircraft gun. These advantages have been attained while using a connector requiring very little space for the connection. Thus, the space formerly required for making an electrical connection may now be more profitably used for other components in the fuze.

It should be understood that the foregoing disclosure relates to the preferred embodiments of the invention and that numerous modifications and/or alterations may be made therein without departing from the spirit and the scope of the invention as set forth in the appended claim.

What is claimed is:

A terminal board for a delayed action battery for use in high spin, high setback projectiles comprising:
 a circular plug-in turret,
 said turret including a base plate having a plurality of open-ended cylindrical chambers circumferentially spaced about the periphery thereof,
 said base plate being further provided with an indentation surrounding the open end of each cylindrical chamber,

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a plurality of pin connectors secured to said turret and each comprising an elongated metal strip having one end thereof bifurcated to provide a yieldable substantially claw-shaped pin receptor,
 the bifurcated end of each pin connector being disposed in one of said indentations and the other end of each connector being adapted for internal connection to said battery,
 said bifurcated ends each being defined by an elliptical opening having its major axis coincident with the longitudinal axis of said strip and an elongated slot coaxial with said strip superimposed on said elliptical opening and extending beyond the ends thereof,
 said strips each being further provided with a plurality of slits substantially radial with respect to said elliptical opening and communicating therewith to define a plurality of resilient gripping fingers on the circumference of said elliptical opening,
 and a circular cover plate fixed to said base plate and having a plurality of apertures formed therein in axial alignment with said elliptical openings to permit electrical connections with said battery by insertion of pins into said cylindrical chambers through said apertures and said elliptical openings,
 said circular cover plate serving to closely confine said bifurcated ends of said connectors within said indentations whereby electrical connection is maintained between said connectors and the inserted pins despite the forces applied thereto by high spin and high setback.

References Cited in the file of this patent

UNITED STATES PATENTS

2,206,799	Barton	July 2, 1940
2,325,070	Muldoon	July 27, 1943
2,486,285	Hurst	Oct. 25, 1949
2,514,562	Stickney	July 11, 1950
2,539,230	Craig	Jan. 23, 1951
2,748,363	Despard	May 29, 1956

FOREIGN PATENTS

241,517	Switzerland	July 16, 1946
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