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P. P. SMITH

2,679,783

SHIELDED, EXPLOSIVELY RELEASED FASTENER

Filed June 15, 1951

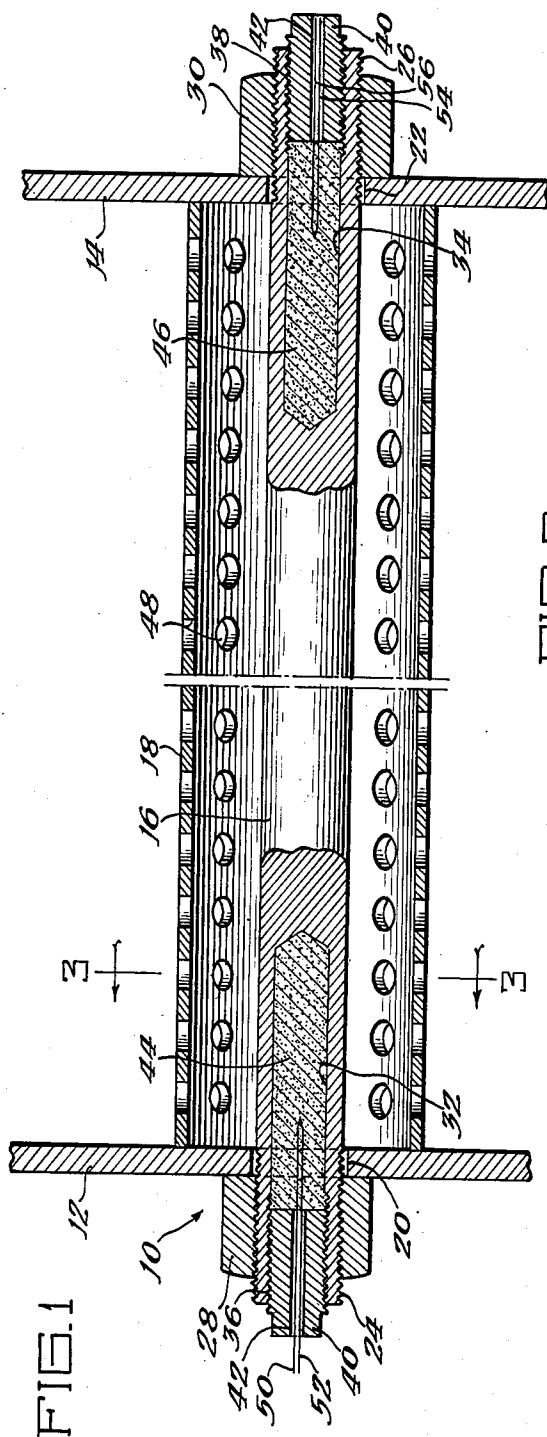


FIG. 1

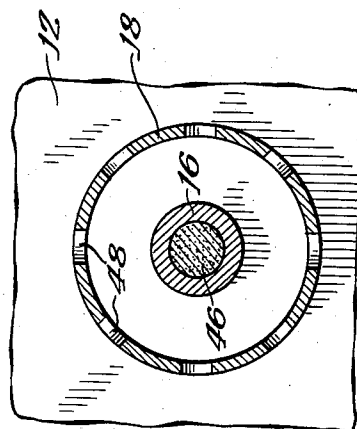


FIG. 3

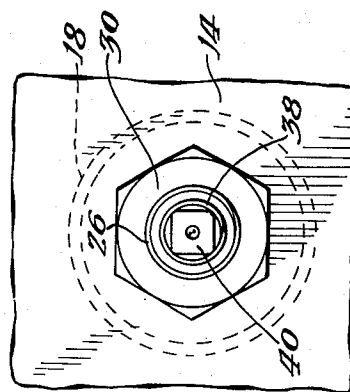


FIG. 2

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UNITED STATES PATENT OFFICE

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SHIELDED, EXPLOSIVELY RELEASED
FASTENER

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the United States of America as represented
by the United States Atomic Energy Commis-
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1 Claim. (Cl. 85—1.5)

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This invention pertains to a jettisonable fastening device and more particularly it refers to explosive bolts and tie rods.

At times it is expedient to attach one body to another in such a manner that subsequent detachment is possible by remote means. One example is where equipment is temporarily attached to a radioactive body. The radioactive contamination of the equipment precludes the possibility of personnel later approaching the equipment with impunity. In such circumstances, it has been found that an explosive bolt may be used for attachment which may be detonated by remote means such as by electric current applied to the charges through permanently connected wires.

It is an object of this invention then to provide an explosive bolt that serves as an effective fastening means but, when exploded, effectively releases the equipment or body it has been securing so that the latter can readily be removed.

Other objects will appear from the following description together with the figures, in which:

Figure 1 is a longitudinal sectional view, partly in elevation, of a device embodying the invention;

Figure 2 is an end view of the device; and

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

The device is generally indicated at 10 in Figure 1, disposed between two bodies or plates 12 and 14. Being variously termed a jettisonable fastening device or simply an unfastening device, it comprises a bolt, strut, or tie rod 16 and a shield or spacer 18.

The bolt or tie rod 16 is mounted between the plates 12 and 14 through which it extends in apertures 20 and 22, respectively. Each end of the tie rod 16 is threaded externally at 24 and 26 on which are disposed nuts 28 and 30, respectively. Extending from each end of the rod 16 is a bore or chamber 32 and 34, the external ends of which are internally threaded at 36 and 38, respectively. Within these threaded ends is disposed a plug 40 which is identical for each chamber 32 and 34. The plug 40 has a central passage 42 disposed on the longitudinal axis of the rod 16 which is adapted to pass permanent electric wires (not shown in the drawing) for detonating purposes.

The chambers 32 and 34 are adapted to contain explosive charges indicated at 44 and 46, respectively. When it is desired to rupture the bolt 16 one or both of the explosive charges 32 and 34 are detonated by energizing the appropriate electric wires 50 and 52 or 54 and 56 passing into the charges.

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It may be desirable to detonate only one charge of explosive first and employ the second charge only in the event the first charge fails to rupture the bolt 16. Under these circumstances, the second charge may be more powerful than the first so as to insure complete rupture of the bolt.

Though the bolt 16 is shown with removable nuts on both ends, obviously one of the nuts 28 or 30 may be integral with the bolt to provide a head.

The spacer or shield 18 is provided to hold the plates 12 and 14 at predesigned distances from each other. In addition, the spacer 18 serves as a shield for flying fragments resulting from the explosions, for which reason it is cylindrical and disposed about the bolt 16. A plurality of apertures 48 are disposed over the surface of the shield 18 in order to permit the escape of expanding gases due to the explosion. These apertures are small enough to serve this purpose while blocking the passage of explosion fragments.

It will be understood that the invention is not limited to the specific embodiment disclosed, inasmuch as other embodiments thereof will be readily apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claim.

What is claimed is:

In combination, two members spaced from each other, a tie rod located between the members and having an explosive charge in each end thereof, means for separately detonating each charge, a shield surrounding the rod and engaging the members and having an internal diameter greater than the outer diameter of the tie rod so as to cause the shield to be spaced from the rod on all sides, the shield having a plurality of apertures disposed over its entire surface, and means on each end of the rod for attaching the rod to each member and for maintaining the members in engagement with the shield so as to support it in spaced relation to the rod.

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