

[54] SAFETY DETONATING APPARATUS

3,486,410 12/1969 Drexelius et al. 102/24 R

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[22] Filed: Aug. 23, 1971

[21] Appl. No.: 173,878

[57] ABSTRACT

[52] U.S. Cl. 102/28 R

[51] Int. Cl. F42c 19/12

[58] Field of Search 102/24 R, 27 R, 28 A,
102/28 R, 70 R

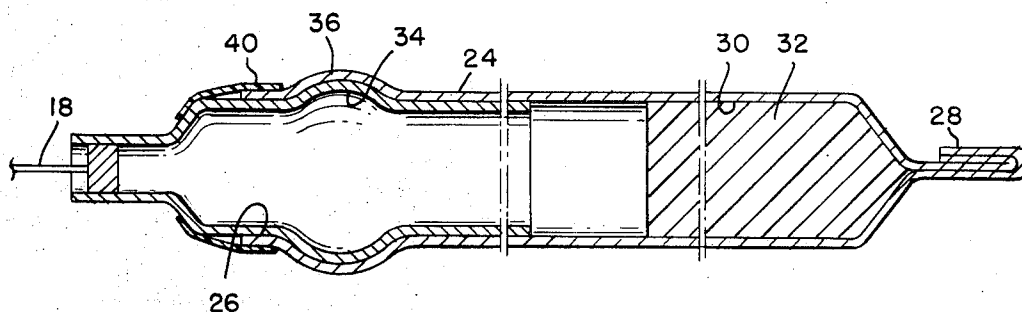
A primacord detonator having a protective containing sleeve removably mounted thereon. The rear portion of the sleeve encloses the detonator, and a forward portion of the sleeve forms an explosive energy absorbing chamber with energy absorbing material therein. Upon accidental explosion the wall of the detonator adjacent the charge therein deforms outwardly to interlock with the sleeve wall and hold the sleeve onto the detonator to absorb the explosive charge.

[56] References Cited

UNITED STATES PATENTS

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5 Claims, 3 Drawing Figures



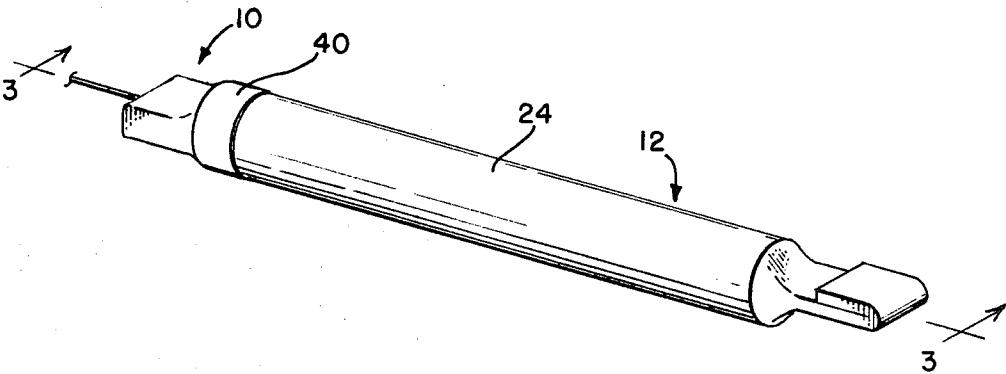


FIG. 1

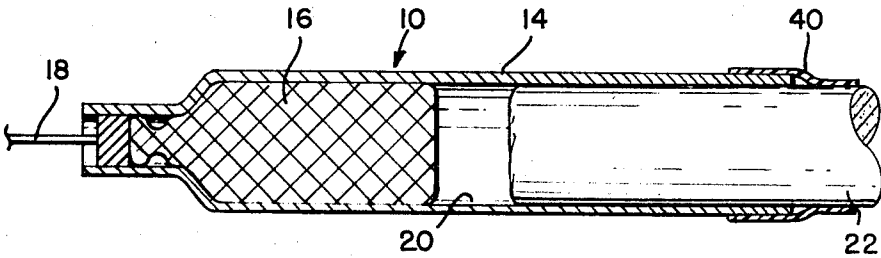


FIG. 2

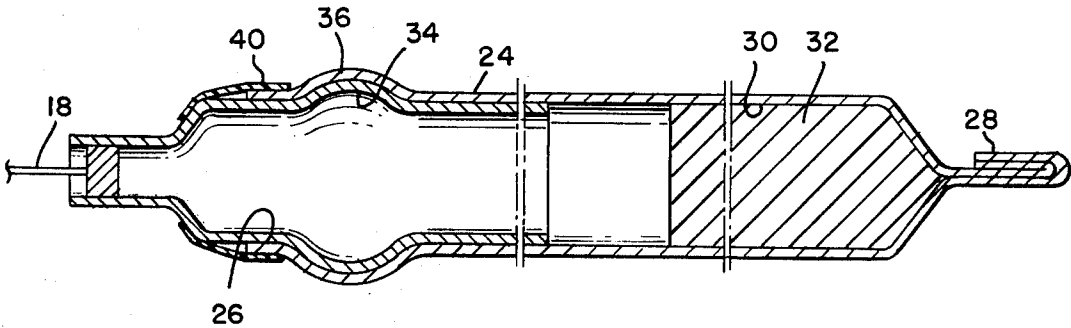


FIG. 3

SAFETY DETONATING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to detonating devices, and more particularly to a safety assembly for the same.

2. Description of the Prior Art

Prima cord detonators are common in the prior art. However, to the best knowledge of the applicant, explosive containing safety devices for such detonators have not been devised in the prior art.

SUMMARY OF THE INVENTION

There is a conventional Primacord detonator having an explosive detonating charge therein. A containing sleeve slides removably onto the detonator. When the detonator is to be used, the sleeve is slid off the detonator, and the Primacord is inserted in the detonator in a conventional manner.

Upon accidental explosion of the explosive charge in the detonator, the wall of the detonator deforms outwardly in an annular bulge to engage the proximate sidewall of the containing sleeve and deform it outwardly in a similar manner to form an interlock between the sleeve and the detonator. With the sleeve so locked to the detonator, the explosive energy of the detonating charge is dissipated in a forward chamber of the containing sleeve. This chamber is a closed chamber with an energy absorbent material positioned forwardly of the detonator.

DESCRIPTION OF THE DRAWING

FIG. 1 is an isometric view of the assembly of the present invention in its stored condition;

FIG. 2 is a side elevational view of the detonator in its condition of use; and

FIG. 3 is a view similar to FIG. 2, but showing the configuration of the assembly in its stored condition after an accidental explosion.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The assembly of the present invention comprises two components: (a) a Primacord detonator 10 which is or may be similar in configuration to prior art detonators, and (b) a protective containing sleeve 12 which fits slidably onto the detonator 10.

The detonator 10 comprises a cylindrical tube or casing 14 at the rear end of which is a squib 16 (i.e., detonating charge) having lead wires 18 connected thereto. The forward end of the casing 14 defines a receptacle 20 into which one end of a Primacord (as shown at 22 in FIG. 2) can be inserted. In this circumstance, the detonator 10 functions in a conventional manner with detonation of the squib 16 causing detonation of the Primacord 22.

The containing sleeve 12 comprises a cylindrical tube 24 having a rear opening 26 and having its front end crimped, as at 28, to close the front end. The casing 24 is about twice the length of the detonator 10, and has its interior dimension just slightly larger than the outside of the detonator 10 so that it can be removably slipped onto and off the detonator 10. The forward end of the casing 24 defines an energy absorbing chamber 30 in which there is an energy absorbing material 32, such as crushed aluminum foil.

In the non-use or stored condition, the containing sleeve 12 is slipped onto the detonator 10, as shown in FIG. 1, so that the rear portion of the sleeve is circumjacent the rear portion of the detonator 10 containing the squib 16. Upon accidental explosion of the squib 16, the detonator wall portion surrounding the squib 16 bulges outwardly, as shown at 34 in FIG. 3, in an annular bulge. This bulge 34 deforms the circumjacent portion of the sleeve 24 in a mating outward annular bulge 36 so as to form an interlock between the two bulges 34 and 36. The detonator wall 14 and the sleeve wall 24 are made of a material (e.g., a yielding metal alloy) sufficiently yieldable to deform outwardly, but having sufficient strength to contain the laterally outward explosive force.

With the sleeve 12 and the detonator 10 so interlocked, the explosive energy of the squib 16 proceeds out the forward end of the detonator 10 and is dissipated in the crushed foil in the forward chamber 30 of the containing sleeve 12.

For convenience, in the stored condition, a piece of adhesive tape 40 holds the sleeve 12 onto the detonator 10, as shown in FIG. 1. When the detonator 10 is used to detonate the prima cord 22, the same piece of adhesive tape 40 is wrapped around the front end of the detonator 10 to hold the Primacord 22 in the detonator 10.

What is claimed is:

1. In a safety detonating apparatus which is adapted to confine accidental detonation and comprises:

a. a detonator, and

b. a containing means adapted to fit removably over said detonator,

the improvement comprising:

a. said detonator having a first outwardly deformable side wall,

b. said containing means having a second outwardly deformable side wall in overlapping relationship with the first wall, with overlap of the two walls being at the area of the detonator, whereby an accidental explosion of said detonator causes said two walls to deform outwardly into a safety interlock to retain the containing means over said detonator and confine the explosion in the containing means.

2. The apparatus as recited in claim 1 wherein said detonator is a Primacord type detonator, and said containing means comprises an elongate sleeve slidable onto the detonator.

3. The apparatus as recited in claim 2, wherein said containing means further comprises a forward energy absorbing portion to dissipate explosive energy of said detonator.

4. The apparatus as recited in claim 3, wherein said forward energy absorbing portion has an energy absorbing chamber with energy absorbing material therein to dissipate the explosive energy of the detonator.

5. The apparatus as recited in claim 3, wherein the detonator is arranged so that upon accidental detonation it deforms into an outward annular bulge, and said sleeve deforms similarly in an outward annular mating bulge, whereby said two bulges form an annular interlock between the sleeve and the detonator, so that the explosive energy is dissipated into the energy absorbing portion, while said sleeve and detonator are held in interlocking relationship.

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