

April 26, 1949.

J. E. RILEY
EXPLOSIVE DEVICE

2,468,274

Filed July 29, 1944

2 Sheets-Sheet 1

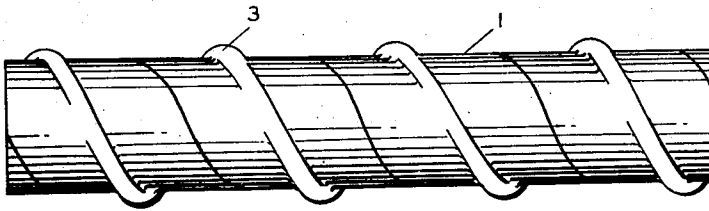


FIG. 1

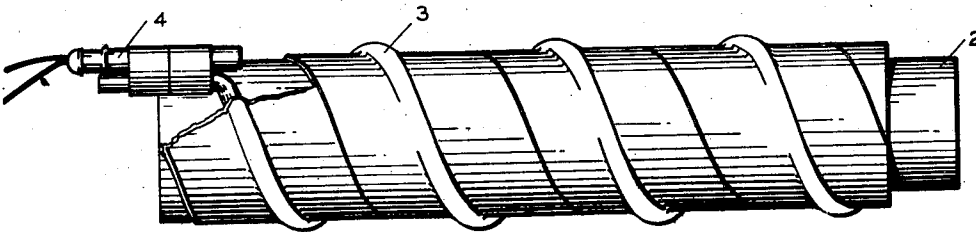


FIG. 2

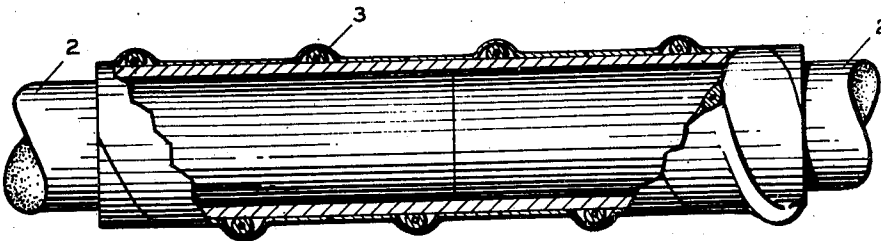


FIG. 3

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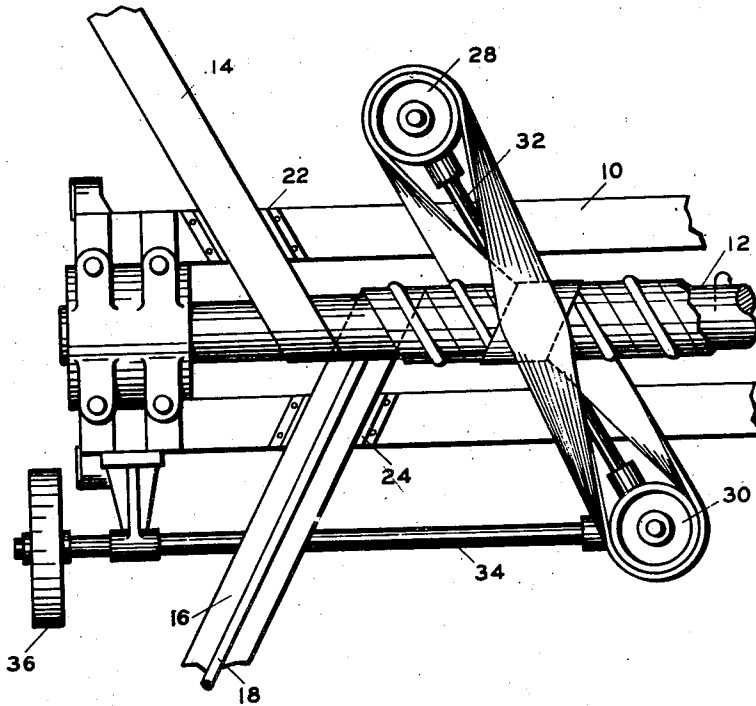
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UNITED STATES PATENT OFFICE

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EXPLOSIVE DEVICE

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3 Claims. (Cl. 102—22)

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This invention relates to an improvement in the explosive art, and more particularly, to an improved means for priming an explosive device.

Explosives are often packed in waterproof containers, the container being made waterproof for the purpose of making possible the use of less expensive types of explosives; i. e., those containing large percentages of ammonium nitrate. However, the use of these waterproof containers makes it difficult to effectively initiate the explosive without destroying the waterproofness of the container.

Normally, with water resistant explosives, initiation of the explosive is brought about by punching a hole through the side of the cartridge and inserting a priming device, such as a blasting cap. In the case of metallic containers, initiation is obtained through the use of a metal cap well. This well holds a blasting cap in such a manner that most of the initiating force is available to act upon the explosive.

Now in accordance with this invention a primed explosive cartridge may be effectively and safely initiated by a cord-like detonating means, preferably disposed in an affixed and continuous spiral manner about an explosive cartridge.

The principle of this invention may be adapted for use in producing a priming device, said device comprising a sleeve and an attached cord-like detonating means preferably disposed on the sleeve in a continuous spiral manner. This pre-formed priming device may be slipped over an explosive cartridge in a sleeve-like fashion and a blasting cap assembled with one end of the detonating means to produce a cartridge assembly, which when lowered into a bore hole, may be effectively exploded. A plurality of explosive cartridges may be rigidly assembled in substantially end-to-end relationship by means of a series of the aforementioned priming devices. A single length of such a priming sleeve may also be employed for joining a plurality of explosive cartridges into a substantially rigid assembly. Such a primed assembly has the particular advantageous feature of effecting a substantially instantaneous and simultaneous explosion of the explosive cartridges disposed throughout the assembly.

The priming device and primed explosive cartridge involving the principle of this invention are each made efficiently and economically, preferably, by spirally winding material and a cord-like detonating means into a continuous tube. The tube may be cut into any desired length to form the required priming device or the primed explosive cartridge.

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In the accompanying drawing:

Fig. 1 is an elevational view of a primed explosive cartridge in which a preferred spiral of cord-like detonating means is carried by the cartridge.

Fig. 2 is an elevational view of the priming device assembled with a blasting cap and an explosive cartridge.

Fig. 3 is an elevational view showing (part in cross section) the use of the priming device of this invention as a means for combining two or more explosive cartridges into a rigid explosive assembly.

Fig. 4 is an elevational view showing one embodiment for making the priming device or the primed explosive cartridge of this invention.

The priming device of this invention may be conveniently manufactured by the use of a conventional spiral tube machine, shown in Fig. 4. A bench 10 supports a rigid mandrel 12 upon which material 14 from a stock supply (not shown) is fed to form a tube or sleeve. Simultaneously material 16 from a stock supply (not shown) and a cord-like detonating means is fed over the material 14. The detonating means is disposed underneath the layer formed by the material 16. Adjustable guide elements 22 and 24 serve to maintain the materials 14 and 16, respectively, in proper alignment so that the adjacent edges of the materials will abut each other.

The cord-like detonating means 18 is fed onto the mandrel in a continuous manner so as to form a completely primed section. However, unprimed sections in series may be readily formed during the winding operation by feeding along with material 16 predetermined lengths of the detonating means. These unprimed sections permit cutting of the priming device or primed explosive cartridge without cutting the detonating means, and thereby decreasing somewhat hazards in actual operations.

Various embodiments of the detonating means may be useful in this invention. The preferred means are of a cord-like structure such as the well-known Primacord, Cordeau, etc., however, other type structures or forms may be equally as useful.

Winding and advancing of the tube thus formed on the mandrel 12 is effected by an endless belt 26 which is obliquely trained around the mandrel. The belt engages a pair of pulleys 28 and 30 which are rotated in unison by suitable gearing associated with the cross shaft 32. Power is transmitted to the pulleys 28 and 30 by suitable gearing associated with the drive shaft 34 which has affixed thereto a drive-pulley 36. When the tube is ad-

vanced to a certain position, a cutter (not shown) engages the tube and advances therewith while cutting the tube at right angles to its longitudinal axis. In this way the various priming devices and primed explosive cartridges of this invention may be produced.

In the conventional manufacture of explosive cartridges, the outer portion of the container may be provided with a detonating means spirally disposed in supported relationship with the container in the manner shown, for example, in Fig. 4. Thus, a moistureproof explosive-containing device, as shown in Fig. 1, is made having a priming device 3, permanently attached to an explosive container 1, thereby eliminating the necessity of puncturing or destroying the waterproof characteristic of the container in order to prime the cartridge.

The priming device of this invention, as shown by Fig. 2, may be conveniently slipped into operating position with an explosive cartridge 2, thereby forming in effect a primed explosive cartridge, which is properly primed without the necessity of puncturing the cartridge for the purpose of inserting a detonating means.

Where two explosive cartridges are needed in a particular operation, assembly of these cartridges may be made by using the priming device as a joining means in which two adjacent ends of the cartridge 2 are slipped into the sleeve and the priming device, thereby holding the cartridges in assembled relationship to each other. Fig. 3 shows a typical section of such an assembly.

A plurality of cartridges may be assembled in this same manner by using a priming device having a greater length sleeve in which more than two cartridges may be assembled into a substantially rigid explosive column.

The priming device of Fig. 2 or the explosive cartridge of Fig. 1 may be modified to the extent of spirally disposing the detonating means on the inside of the tube and attaching it in position in any convenient manner, for example, it may be enclosed in a recess. In this manner the detonating means is held in protected relationship to the cartridge and free from injury when the assembly is lowered into a bore hole in which jagged edges might be present.

The detonating means is detonated by attaching any suitable detonator, as, for example, a blasting cap 4, to one end thereof.

The priming device or the primed explosive cartridge made after the principle of this invention is preferably constructed from strips of relatively soft waterproofed material such as wrapping paper, kraft paper, cardboard, etc. However, other materials which are not necessarily

in strip form may be used such as chip board, synthetic resins, etc.

In view of the foregoing remarks the object of this invention has been achieved by providing a priming device and a primed explosive cartridge in which a detonating means is spirally disposed thereabout.

What I claim and desire to protect by Letters Patent is:

1. An explosive device comprising a plurality of tubular explosive cartridges disposed in substantially continuous coaxially end-to-end relationship, and being in propagating contact with one another, and a connecting means for adjacent cartridges comprising a tubular sleeve and a detonating means spirally and exteriorly disposed on said sleeve, said sleeve holding said cartridges in a substantially rigid assembly with two adjacent ends of said cartridges contained therein.

2. An explosive device comprising a plurality of tubular explosive cartridges disposed in substantially continuous coaxial end to end relationship, and being in propagating contact with one another, and a connecting means for adjacent cartridges comprising a laminated tubular sleeve and a cordlike detonating means spirally disposed in a continuous manner underneath an exterior layer thereof, said sleeve holding said cartridges in a substantially rigid assembly with two adjacent ends of said cartridges contained therein.

3. An explosive device comprising a plurality of tubular explosive cartridges disposed in substantially continuous coaxial end to end relationship, and being in propagating contact with one another, and a connecting means for adjacent cartridges comprising a laminated tubular sleeve and a cordlike detonating fuse spirally disposed in a continuous manner underneath an exterior layer of substantially the full length thereof, said sleeve holding said cartridges in a substantially rigid assembly with two adjacent ends of said cartridges contained therein.

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