Nov. 29, 1938. N. G. JOHNSON 2,138,603

EXPLOSIVE PACKAGE

Filed Oct. 6, 1936

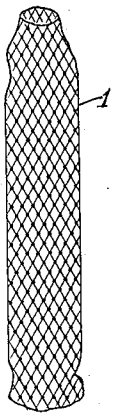


Fig. 1

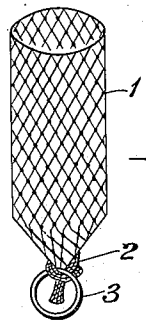


Fig. 2

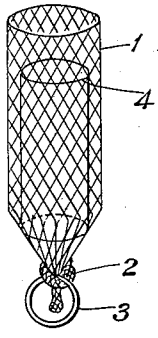


Fig. 3

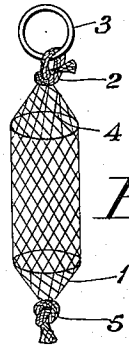


Fig. 4

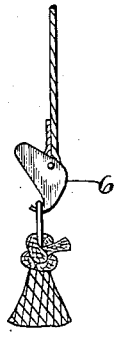


Fig. 5

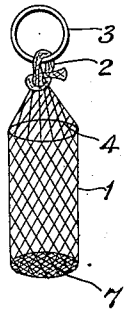


Fig. 6

Norman G. Johnson INVENTOR.

BY Thos A. Wilson

ATTORNEY

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EXPLOSIVE PACKAGE

Norman G. Johnson, Wenonah, N. J., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware

Application October 6, 1936, Serial No. 104,195

5 Claims. (Cl. 102—6)

The present invention relates to a new and improved explosive package, and more particularly to such a package whereby efficiency and safety in charging substantially vertical bore holes are assured.

Although unusual precautions are necessary in any form of activity in which explosives are handled, safety considerations are of particular importance in the art of quarrying. In the blasting down of rock for use in cement manufacture, road construction and other such purposes, and in stripping operations generally, it is customary to employ very large amounts of high strength explosives in one blast. It is common, for example, to shoot as much as 10,000 to 20,000 pounds of explosive at one time in quarry blasting. The explosive is loaded into vertical bore holes, generally known as well drill holes. Under such conditions of blasting, where very large amounts of explosive must be on hand during the loading operations, it is especially desirable that every safety precaution be observed.

It is a common practice in the art to tie the explosive cartridge with twine, in much the same fashion that a store clerk ties a parcel. The lowering rope is then attached to said twine, and the package lowered into the bore hole, which is commonly from 30 to 100 feet deep. Frequently, the package becomes untied, or the loop slips off, allowing the cartridge to fall to the bottom of the hole. Since the cartridges commonly used in quarry blasting may be in sizes up to 7 x 24 inches, weighing perhaps 50 pounds, the undesirability of dropping such cartridges will be very apparent. If such a slip occurs near the top of the hole the drop is sometimes sufficient to initiate whatever explosive is already in the hole, as well as that on the surface near the mouth of the hole in preparation for charging. If such premature explosion occurs, a major disaster may result.

Even if an explosive less sensitive to shock is employed, it is undesirable to drop the cartridge, for the wrapper will be broken, and the powder scattered about the bottom of the hole, which is usually damp and often partially filled with water. Since the type of explosive commonly used for blasting has little water resistance, a misfire with attendant dangers may result. In addition, jagged projections often occur in the hole, which obstruct the passage of the falling cartridge before it has reached the bottom. In such a situation it is especially desirable to have the cartridge under sure control, in order that it may be withdrawn to permit safe introduction of tools for clearing away the obstruction.

A further attempt at controlled lowering is involved in the well known practice of driving a wooden peg into the end of the cartridge, attaching the rope to the end of the peg, and suspending the cartridge in the hole, withdrawing the peg with a sharp pull when the cartridge reaches the bottom of the hole. It is recognized that this practice is likewise unsafe, for the peg may pull out prematurely, if the friction is not sufficient to hold it in the explosive.

The chief object of the present invention is a new and improved explosive package. A further object is such an explosive package that safety in charging vertical holes is assured. Another object is a safe method for charging vertical holes with blasting explosive. Additional objects will be disclosed as the invention is further described.

The foregoing objects are attained by application of the principles of my invention, according to which the explosive cartridge is completely encased in a web of netting or similar material. Any suitable means may be employed for attaching a lowering device to the end of this explosive package, whereby an approximately vertical suspension is obtained. The lowering means will be desirably detachably fastened to the package in order to permit the former to be withdrawn after the package has reached the bottom of the hole.

The method according to my invention presents marked advantages over the practices of the art in that the cartridge will not fall and break in a wet bore hole, nor become jammed in the bore hole by falling into an obstruction therein. At all times during its descent into the hole, the cartridge will be under control, and may be readily withdrawn to permit the safe entrance of tools for the purpose of removing obstructions. A more nearly vertical suspension is possible with the netting than by the driven peg method, or by tying the cartridge like a parcel. Nor does the net consist of sufficient material to alter the oxygen balance of the cartridge, as would be the case where a thick wrapper was used for the same purpose.

Figure I of the drawing is a view in elevation of a preformed tubular web. Figure II is a similar view with a closure at one end of the web, and with means for attaching a lowering device. Figure III is a view in elevation of the package before final closure. Figure IV is an elevation of the completed package. Figure V is an elevation of the explosive package with attached lowering means. Figure VI is an elevation of the explo-

sive package including a preformed sack of netting.

Referring to Figure I, I prefer to employ a preformed tubular web 1 of the type depicted, for carrying out the principles of my invention. These tubes may be obtained many thousand feet in length, and cut into suitable lengths at the explosive plant. I then prefer to draw the web 1, to a closure at one end, as shown in Figure II, by means of the knot 2, and attach the ring 3 of a non-sparking metal. The bag is thus formed at a location apart from the dynamite area of the plant, and is then transported to the dynamite line, and the cartridge 4 is encased therein, as shown in Figure III. A final closure is made by the knot 5, as shown in Figure IV, giving a finished safe explosive package, which may be suspended detachably from a lowering means by passing the hook 6 of Figure V through the ring 3. Upon reaching the bottom of the bore hole, the hook may be freed from the ring by providing suitable slack in the lowering means. The package of Figure VI differs from that of Figure IV only in the feature that it discloses an entirely preformed sack of netting with woven closure 7 at the one end.

It is to be understood that the foregoing illustrations represent preferred embodiments of my invention, and are not intended to limit the scope thereof.

It will be seen from the foregoing description of my invention that a new and improved explosive package has been produced, which package is extremely desirable from the standpoint of safety and convenience in charging vertical drill holes, or bore holes, in quarry blasting and similar operations. With the use of this package in conjunction with suitable lowering means an approximately vertical suspension is obtained, and the cartridge is always under control during the lowering process. The use of the net offers the additional advantage over the tying method of the art, that the web of netting may be sent preformed to the dynamite line, so that, where six men were formerly necessary in the tying operation, the new packages may be formed by two men in the same quantities in a shorter time, with much less handling. As a result the number of employees present, exposed in the manufacturing operations, is greatly reduced, with corresponding increase in the safety of the operation.

Although I prefer to employ a netting material in the nature of fish net, with mesh of any suitable size, it is to be understood that the invention is not to be limited in scope thereto, for the net may be constructed of any material which may be formed into suitable strands, such as cotton, linen, hemp, twine, paper, wool and the like. Preferably a combustible material should be used. The netting may be in the nature of the material found in fish nets, orange bags, onion bags, or small mesh cotton bags. If desired, the cartridge may be enclosed in an entirely preformed sack of netting, with woven closure at one end. I intend that my invention be limited only according to the following patent claims:

I claim:

1. An explosive package comprising an explosive cartridge, a web of netting surrounding and enclosing said cartridge, and means including a portion of said netting for attaching a lowering device to said package.

2. An explosive package comprising an explosive cartridge, a web of netting surrounding and enclosing said cartridge, and a rigid eyelet attached to said netting whereby lowering means may be affixed thereto.

3. An explosive package comprising an explosive cartridge, a web of netting surrounding and enclosing said cartridge, and a metal ring attached to said netting whereby controlled lowering of said package may be effected.

4. An explosive package comprising an explosive cartridge, a preformed sack of netting surrounding and enclosing said cartridge, and means including a portion of said netting for attaching a lowering device to said package.

5. An explosive package comprising an explosive cartridge, a tubular web of netting surrounding and enclosing said cartridge, said tubular web being gathered together and knotted at each end of said cartridge, and means including one of said knotted portions of said web for attaching a lowering device to said package.

NORMAN G. JOHNSON.