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METHOD AND APPARATUS FOR RECLAIMING EXPLOSIVES

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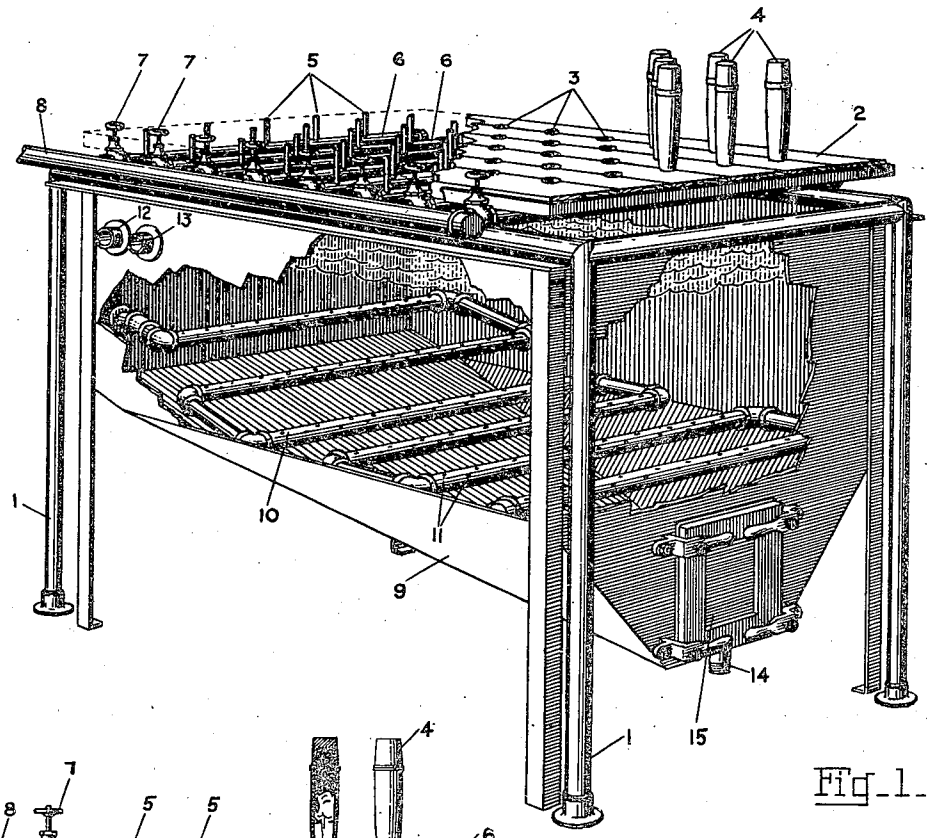


Fig. 1.

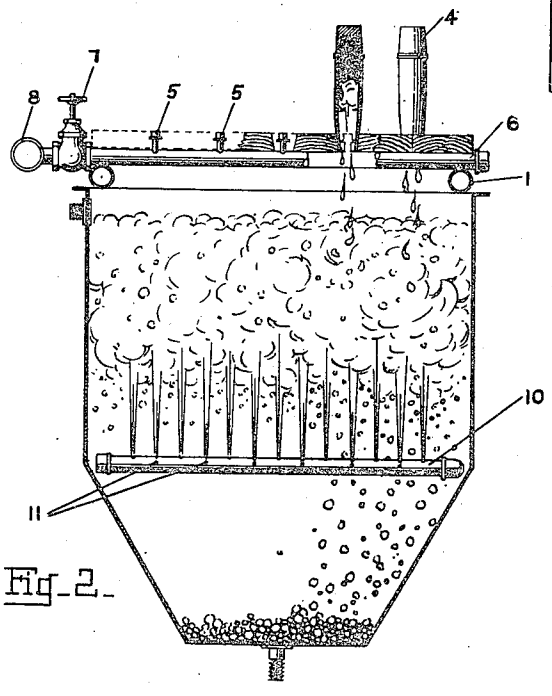


Fig. 2.

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METHOD AND APPARATUS FOR RECLAIMING EXPLOSIVES

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9 Claims. (Cl. 86—1.5)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates to a method and apparatus for the recovery and reclaiming of explosives from the cartridge cases within which the packed explosive is contained.

During the course of disassembly of loaded ammunition the requirement arises for the removal of the packed explosive charge contained within the cartridge case. Conventional methods utilized the introduction of a jet of steam and hot water into each shell and permitting the molten explosive to flow into a tub. Within a few moments crystallization was effected and the mass of explosive solidified in the tub. Brass hammers and bars were then used to break and reduce the solid mass of explosive into smaller sized and useable portions. With the above described method, considerable time and labor was exhausted in the reclaiming of explosives. In addition there was considerable wastage of explosive due to the adherence of remnants of explosive to the sides of the tub.

The present invention has as its primary object, a new method and apparatus for the recovery of explosives whereby the explosive will be reclaimed in form ready for use.

An important feature of the invention is that all of the explosive contained within the shell can be recovered without any loss of explosive as heretofore accomplished.

The invention can best be understood from the following description to be read in view of the accompanying sheet of drawing in which:

Figure 1 is a view in perspective of the preferred embodiment of the invention, and

Figure 2 is a cross sectional view of the apparatus.

Referring to the drawing, 1 indicates a frame serving as a supporting means for a platform 2. The platform 2 has a series of openings 3 spaced equidistantly and uniformly over the surface of the platform. The shells 4, whose explosive composition it is desired to reclaim, fit into each of the openings 3. A series of jets 5 are located in alignment with each opening 3 and extend sufficiently high into the opening so as to permit the jet to extend into shell. Each of the jets 5 extend from the steam and hot water lines 6 having control valves 7 for controlling the flow of steam and water into the lines. A line 8, furnishing the steam and water supply to the system, is connected to a convenient source of supply.

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Positioned directly beneath the shell supporting platform is an open top water filled tank 9 which has a sloping bottom. Contained within the tank is a perforated tubing 10, which is close to the bottom of the tank, in parallel coil position. On the upper surface of the tubing 10 are a series of perforations or openings 11. The tubing 10 is connected to an air line (not shown) whereby a continuous flow of air under pressure can be effected through the tubing. The air forced through the openings 11 will cause continuous turbulence and agitation of the water contained within the tank. As it is desired to have the water contained within the tank stay at a relatively cold temperature, a continuous stream of cold water is introduced into the tank through an inlet 12. An overflow outlet 13 is provided to permit an even level of water within the tank.

The operation of the apparatus can be briefly described as follows. The shells containing the explosives to be reclaimed are set on the platform 2 in the manner indicated. Steam is then injected through the jets 5 into the shells 4. The steam will cause a melting of the pressed explosive, causing the explosive to flow into the tank. I have found that the moment the drops of molten explosive reach the cold agitated water, they solidify into small pellets. The pellets of explosive will then fall and settle at the bottom of the tank. After the desired number of shell have been reclaimed in the manner described, the water in the tank is drawn off thru a screened outlet 14. The pellets of powder can then be scooped out through an opening at the side of the tank which is covered by a door or panel 15.

I claim:

1. The process of reclaiming explosive charges contained in shell cases having one open end, comprising the steps of forcing a jet of steam into the open end of said shell, allowing drops of molten explosive to fall into cold water, maintaining the water at a substantially uniform temperature, and agitating the water.

2. The process of reclaiming the explosive charge contained in a shell case having an open end, comprising the steps of supporting the shell with its open end pointed downward above a vessel containing a supply of continually changing cold water, maintaining the water at a substantially uniform temperature, injecting steam into said shell, allowing the melting explosive to fall into said vessel, and injecting air under pressure into said water to produce agitation thereof.

3. The process of reclaiming the explosive

charge contained in a shell case having an open end, comprising the steps of supporting the shell containing the explosive in a vertical position with the open end pointing downward above a vessel containing a supply of continually changing cold water, maintaining the water at a substantially constant temperature, injecting steam or hot water into said shell, controlling the flow of steam or hot water to produce progressive melting of said explosive, allowing the molten explosive to fall into said vessel by gravity, and injecting a continuous supply of air under pressure into said water to agitate the same whereby said molten explosive forms pellets upon hardening in the water.

4. An apparatus for reclaiming explosive charges contained in a shell having an open end, comprising a frame, means on said frame for supporting a shell with its open end pointing downward, a jet member on said frame in axial alignment with said support means and communicating with a source of live steam, the said member being constructed and arranged for insertion into the open end of said shell when supported on said support member, a vessel adapted to contain a liquid carried on said frame below said support member, and means in said vessel for agitating said liquid.

5. An apparatus for reclaiming explosives contained in a shell having an open end, comprising a frame, means on said frame adapted to support a shell in a vertical position with its open end downward, means for melting the explosive in said shell including a jet on said frame below said support means adapted to enter the open end of a said shell on said support means and controllable means on said frame connecting a supply source of steam or hot water with said jet, an open-mouthed vessel containing a quantity of cold water carried on said frame directly below said jet, said open mouth of said vessel being aligned with said jet and said support member to receive molten explosive falling by gravity from said shell, means for supplying air under pressure to said vessel, and means communicating with said air-supply means for introducing air under pressure into the water contained in said vessel to agitate said water.

6. The structure of claim 5 wherein the vessel is provided with means for withdrawing water from said vessel while retaining the reclaimed explosive in said vessel.

7. The structure of claim 5 wherein the vessel is provided with a bottom sloping uniformly downward to one end thereof whereby reclaimed explosive in said vessel may move by gravity to said lower end, and a releasable closure on said lower end for removing reclaimed explosive from said vessel.

8. An apparatus for simultaneously reclaiming solidified explosive charges contained in a plurality of shells, each said shell having an open end, comprising a frame, a platform on said frame, said platform being provided with a plurality of spaced openings, each said opening being adapted to engage the open end of a

said shell to support said shell in a vertical position with the open end downward, means on said frame for melting the explosive in said shells including a supply source of steam or hot water, a plurality of conduits for said steam or hot water attached to said supply source, a plurality of spaced jets extending from said conduits in alignment with said openings and arranged to extend into said openings to inject steam or hot water into said shells engaged on said support member, and means for controlling the flow of steam or hot water to said jets, an open-mouthed water-filled tank having a bottom uniformly sloped downward towards one of its ends on said frame below said openings, said tank being adapted to receive molten explosive dropping by gravity from said shells, air-supply means in said tank, said means communicating with a source of air under pressure to introduce air under pressure into the water contained in said tank to agitate the same, means communicating with a continuing supply source of cold water to maintain the water in said tank at a substantially uniform cold temperature, an overflow port on said tank to maintain the water level thereof, means adapted to permit withdrawal of the water from said tank while retaining reclaimed explosive therein, and a releasable closure on the lower end of said tank for removing reclaimed explosive therefrom.

9. The process for simultaneously reclaiming solidified explosive charges contained in a plurality of shells, each said shell having an open end, comprising the steps of supporting the said shells upon a rack adapted to support said shells in a vertical position with their open ends downward above a tank containing a supply of continuously changing relatively cold water, injecting steam or hot water into said shells to melt said explosive, controlling the flow of steam or hot water to said shells, allowing said molten explosive to drop into said water by gravity, maintaining said water at a substantially uniform temperature, and forcing a continuing supply of air under pressure into said water to agitate the same.

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