

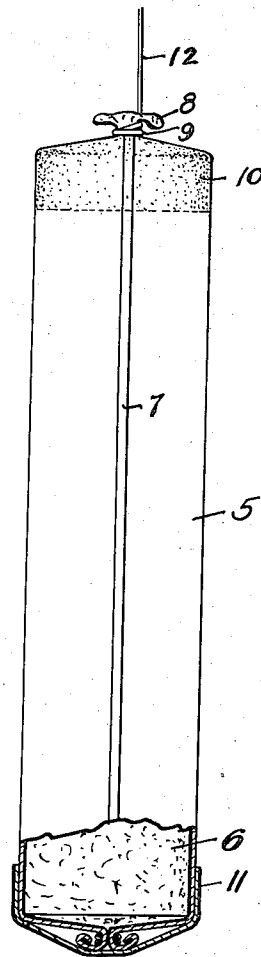
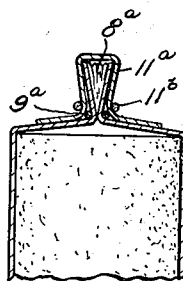
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WATER TIGHT EXPLOSIVE CARTRIDGE

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WATER-TIGHT EXPLOSIVE CARTRIDGE

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This invention relates to an explosive assembly, and it has for its object the provision of a method of and means for packaging explosives in cartridge form, so that they will be thoroughly protected against considerable water pressures, over desirable lengths of time. In blasting under wet conditions with explosives in stick formation, as is the present general practice, primary consideration frequently has to be given to the question of whether the explosive is sufficiently resistant to the water likely to be encountered rather than to whether the explosive is the most efficient or the most economical. For instance, there are frequent cases where expensive gelatin dynamites are used for work which definitely demands black powder or low density ammonium nitrate dynamites, and where the most marked economy could be effected by the substitution of the latter for the said gelatin dynamites.

As is well known, the explosives commonly employed for blasting are in the form of sticks composed of fairly heavy paper wrappers, filled with the explosive and waterproofed to a limited extent by being dipped in paraffin after the paper wrappers have been closed. As the result of extensive experiments, I have evolved the hereinafter described method of assembling explosives in cartridge form by packaging them in a specially prepared flexible wrapper, which takes the place of the paper wrapper heretofore used, and which yields a cartridge capable of resisting the entry of water, even in the presence of decided external pressures.

Broadly stated, the invention resides in utilizing as the wrapper of an explosive cartridge, a rubberized fabric, such as cloth, of a suitable thickness, strength, flexibility and texture. This fabric may be rubberized on either one or both sides. If rubberized on only one side, the uncoated side should be disposed toward the outside of the cartridge, so that water may not be carried to the explosive by capillarity. Any suitable way may be resorted to to form the rubberized sheeting into tubes of the desired diameter and length. For example, the sheeting may be brought into tube form by merely cementing or stitch-

ing an ordinary lap joint, but it is within the purview of the invention to form these tubes by spirally wrapping the rubberized sheeting in a manner quite common in the formation of mailing tubes, for example, and many other tubular articles. If the sheeting is coated on only one side, and a stitched seam is employed, the seam must be such that no uncoated sheeting or uncoated thread extends to the inside of the cartridge since entrance of moisture or water, by capillarity would result, if such were the case. Therefore, I contemplate the further waterproofing of all seams, whether stitched or cemented, and whether straight or spiral, after the tube is formed. For example, I may dip or otherwise coat the seams with tar, or other suitable waterproofing composition, or I may paste waterproofing and adhesive tape over the seams. Where tar is used, I may place paper tape over the tar to avoid soiled hands in subsequent handling of the assembling.

The next step is the closure of the ends of the tubes, one end, of course, being closed before the loading of the tube with the explosive composition, and the other end being closed afterward. I have found it very effective to merely tie the ends with cord or rubber strips. Rubber strips in the form of rubber bands are very effective in that they hold the tied sheeting more tightly than mere, non-flexible cord. I have found tied ends prepared in this manner to be water tight under ten pounds per square inch pressure for several hours, without any further treatment.

However, the tied ends in any case may be further protected, if desired. I have found it to be very effective to dip each end in tar or like waterproofing material to a point beyond that of tying. Over this tar I may form and tie a covering of material such, for example, as a piece of rubberized sheeting or paper. With such arrangement there is little chance of water leaking through the tied seal, even if tying is rather careless. The whole assembly is preferably completed by dipping it in some protective or waterproofing material, such as paraffin.

If there should be a few imperfections in the rubberized sheeting, this tends to close them. Further, it protects the rubber coating from deterioration through air exposure.

While I have disclosed the manner of forming a complete assembly, which will be resistant to at least ten pounds per square inch water pressure for two hours, when only ordinary care is used in making the assembly, it is to be understood that there are other ways of performing the various steps.

By the use of a fabric as the base for the rubberized composition, I am able to secure a protective wrapping which is very strong and tough, and which will yield a cartridge which may be dropped into bore holes without danger of rupture. I am aware of the fact that it has been proposed to provide cartridges having wrappers of paper protected with waterproofing compositions, but the rubberized fabric which I use is much superior to any form of paper wrapper, because the waterproofing composition or rubberized compound can penetrate the interstices of the fabric and become locked therein in such way as to provide a fabric that is wholly waterproof, while at the same time, it is much stronger than any paper wrapper could be. Further, a rubberized fabric permits of convenient and water tight end closure to an extent not possible with paper of sufficient weight to be otherwise practicable.

While I have described this fabric as being rendered waterproof, by being impregnated with a rubberized composition, it is to be understood that the invention includes within its purview the impregnation of a fabric with any kind of waterproofing composition. For example, the nitrocellulose dopes commonly employed in the manufacture of artificial leather are highly water resistant, and may be used in the relation described. Where the cartridges have to be dropped into bore holes, the seams and fabric must be strong enough to resist rupturing. When it is greater economy to do so, I may use weaker seams and fabric, but provide a cord attached to each cartridge, which cord is of sufficient strength and length to lower the cartridges into the bore holes. It is to be understood that such a modification is within the scope of the invention.

I have illustrated certain operative forms of the invention in the accompanying drawings, wherein:

Fig. 1 is a view, partly in side elevation and partly in section, of an explosive cartridge; and

Fig. 2 is a fragmentary, sectional view of a slightly modified form thereof.

In these drawings, 5 designates the wrapper of rubberized cloth or equivalent material containing the explosive 6 and may, if desired, be provided with a waterproofed seam 7. The ends 8 are secured by a rubber band

or cord 9, the whole being dipped in a coating of protective material 10. Thereafter, optionally, a paper cap 11 may be applied and the whole assembly may be dipped in tar, paraffin or other water-proofing material. 12 designates a lowering cord which may or may not be utilized.

The modification of Fig. 2 differs from the construction of Fig. 1 only in that the cap 11^a is smaller than the cap 11 and is additionally tied at 11^b outside of the tie 9^a. In this case, the end 8^a is dipped in tar, paraffin or other water-proofing material to below the point of tying 9^a, then the cap 11^a is applied and tied and the whole dipped in paraffin, tar or other waterproofing material to below the point of tying at 11^b, and in such manner as to protect the entire cap 11^a.

It is further to be understood that the invention includes within its purview whatever changes fairly come within either the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

1. A sheathing for explosive cartridges such as dynamite or blasting powder, which consists of a woven fabric coated and impregnated with a waterproofing composition which enters and is locked within the interstices of the fabric, a waterproofed side of the fabric being disposed toward the inner side of the sheath, the mouth of said fabric sheathing being gathered and tied, and means for sealing said tied and gathered portion of the sheathing.

2. A dynamite cartridge, comprising a body of explosive material, and a containing sheath for the same, of tubular formation, consisting of an impervious rubberized woven fabric sheath, means for closing the ends of said sheath having a rubberized side disposed toward the explosive, and a waterproofing composition applied to the sheath after the closing of the same.

3. An explosive cartridge comprising a body of explosive material and a containing sheath for the same of tubular formation, consisting of a rubberized fabric having an impervious rubberized side disposed toward the explosive, tying means for tightly closing the ends of said sheath, a waterproof composition which is applied to the sheath after the closing of the same, a cap of waterproof material fitted over the end of the sheath and a waterproofing composition over the cap and sheath.

In testimony whereof I affix my signature.
ROY LINDEN HILL.