C. H. ALLISON.

EXPLOSIVE CAP PROTECTION.

APPLICATION FILED APR. 20, 1916.

1,215,329. Patented Feb. 13, 1917.

Fig. 1.

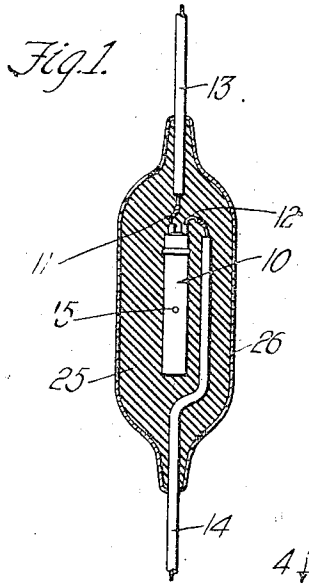


Fig. 3.

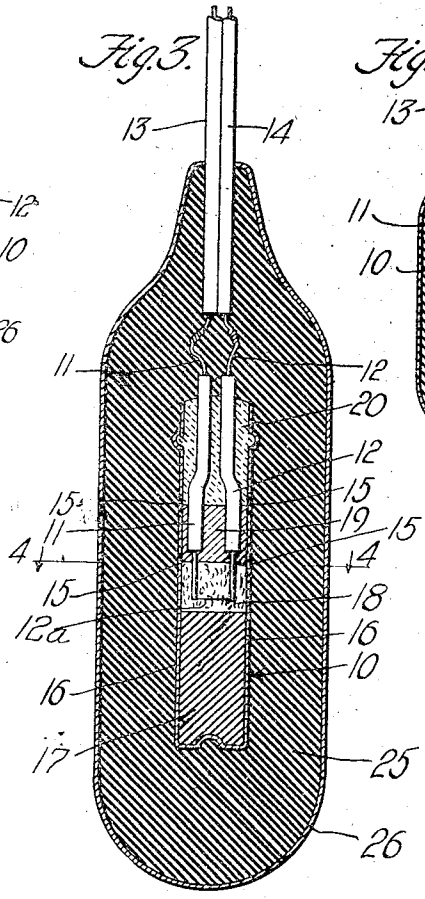


Fig. 2.

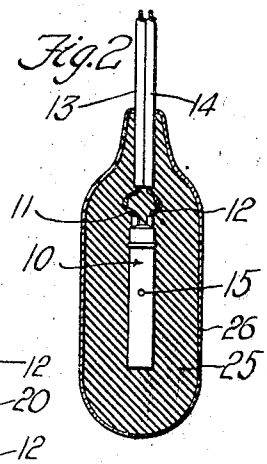
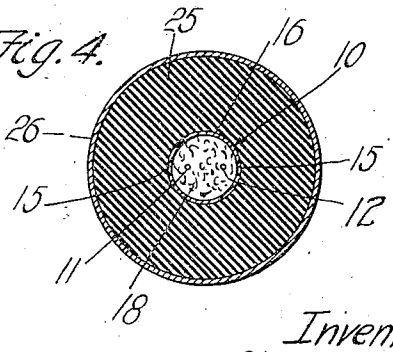


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES H. ALLISON, OF GLENDALE, CALIFORNIA.

EXPLOSIVE-CAP PROTECTION.

1,215,329. Specification of Letters Patent. Patented Feb. 13, 1917.

Application filed April 20, 1916. Serial No. 92,433.

To all whom it may concern:

Be it known that I, CHARLES H. ALLISON, a citizen of the United States, residing at Glendale, in the county of Los Angeles, State of California, have invented new and useful Improvements in Explosive-Cap Protection, of which the following is a specification.

This invention relates to protection for explosive caps and relates particularly to improvements upon my explosive cap protections for which Patents Nos. 1,094,693 and 1,163,965 were granted to me on April 28th, 1914, and December 14th, 1915, respectively; and the said improvements consist particularly in the provision of a simple and effective form of protection which will give effective protection against extremely high fluid pressure.

In my last issued patent I explain a construction by which I efficiently protect an explosive cap or caps against excessively high water pressure; and I have found that the protection therein described does efficiently protect the cap or caps. Said construction includes a casing of vitreous or similar material (such as glass) surrounding the asphalt or other envelopment which immediately surrounds the cap or caps. It is an object of the present improvement to simplify the construction described in my last issued patent; and, more specifically to simplify the construction by the doing away with the vitreous casing; and, at the same time, to provide a cap protection which efficiently protects the cap against excessive hydrostatic pressure.

My present improved form of cap protection has many advantages, among which I may specifically name its simplicity and inexpensiveness, and also its small size. It is one of the particular advantages of my improved cap protection that it can be made of small enough diameter to pass through a comparatively small opening.

I have shown my improved cap protection in preferred form in the accompanying drawings, in which Figure 1 is a longitudinal section, approximately full size, showing a cap with my improved protection applied thereto, Fig. 2 is a similar section showing a different arrangement of the wires leading to the cap, Fig. 3 is an enlarged section of the cap and of the protecting envelop, and Fig. 4 is a cross section taken on line 4—4 of Fig. 3.

In the drawings I show a cap 10; this cap, of course, may be of any of the standard varieties and of any size and proportions. For the purpose of passing the caps through a small opening, as is required in operations in wells being drilled by rotary drilling rigs, I may use a long slender cap and the whole mass of the enveloping protection may be made more long and slender than is shown in the drawings. I may, as heretofore explained in my issued patent, put one or more caps in a bundle within a single protecting envelop. In Fig. 1 I have shown the two wires 11 and 12 leading out from the cap and connected one to a wire 13 which leads out of the surrounding envelop at its top and the other connected with the wire 14 which leads out of the surrounding envelop at its bottom. In Fig. 2 I have shown the wires 11 and 12 connected to the two wires 13 and 14 which lead out of the surrounding envelop at its top.

I refer now particularly to Figs. 3 and 4 for a detailed showing of the cap and its enveloping protection. As the first element in providing my cap with an improved protection I provide one or more apertures 15 leading through the shell 16 of the cap and communicating with its interior. It will be understood that the apertures may communicate with the interior of the shell at any point; and the apertures may be formed in any convenient manner. I prefer to place the apertures at a point where they will communicate with that part of the shell interior which holds the explosive or detonating materials. In the form of cap illustrated in the drawings the shell 16 has a charge of fulminate of mercury 17 at its bottom surmounted by a charge of loose gun-cotton 18. Above the gun-cotton is a sulfur plug 19 through which the wires 11 and 12 pass; and above the sulfur plug there is a plug 20 formed by pouring liquid sulfur into the shell 16 on top the sulfur plug 19. I prefer to place the apertures 15 at the upper part of the gun-cotton charge 18; but it will be seen, from consideration of the following description, that the apertures 15 may be in any position where the exterior pressure, which is communicated through the plastic material of the enveloping protection, can be communicated to the interior of the shell. In the form of cap illustrated I prefer to make openings 15 above and below the sulfur plug 19 so that the pressure

will equalize on the ends of the plug and will not move the plug and the wires, which are set in it, and will thus not move and break the heating wire 12^a at the ends of the wires 11 and 12.

I have said that the apertures 15 may be formed in any suitable manner. They may be formed when the caps are originally made; or they may be drilled or cut or filled in the caps after the caps are completed in their usual and ordinary form. At present I am using the latter method, the operator being protected by a suitable shield against accidental detonation of the cap.

The next element of my improved cap protection is the surrounding envelop of plastic material 25. This envelop of plastic material is preferably made in a uniform and solid and voidless mass about the cap or caps and is carefully kneaded about the parts of the wire 13 and 14 close to the caps. I prefer to use a material, such as asphalt, which may be made kneadable and plastic by a temperature not sufficiently high to cause detonation of the cap. This mass of then plastic material is kneaded carefully about the cap or caps so as to avoid any air bubbles or voids; and the whole mass is then preferably covered by a protective covering 26 preferably formed of rubber taping.

When the asphalt or other suitable mass cools, it is, to all ordinary intents and purposes, a solid mass; but it is plastic under high pressure. When I say that the enveloping protective mass is formed of plastic material I do not necessarily mean that it is plastic under all circumstances, or under ordinary circumstances; but I do mean that it is plastic under such fluid pressures where its plasticity is needed (that is, under such fluid pressures as would ordinarily crush or deform the caps within the protective envelop, were the openings 15 not provided). The protecting envelop being plastic under such pressures, when the protected cap is lowered to a great depth in water, then the pressure forces the flow of the plastic material through the openings 15 to the cap interior; communicating the exterior pressure to the interior of the cap. The interior materials of the cap are compressed under the same pressure as that under which the exterior of the cap is compressed. The interior and exterior pressure being thus equalized, there is no tendency whatever to deform or crush the cap; and, consequently, my protected cap may be lowered to excessive depths in water or otherwise subjected to excessive pressures, without deformation, and without being prevented from performing its proper functions. The cap is kept in perfect condition at all times, ready for detonation; and its explosive action is very little damped off for the reason that the material of the envelop is of low disruptive strength.

Having described a preferred form of my invention, I claim:

1. In combination, an explosive cap having an opening through its shell communicating with its interior, and a plastic envelop about the cap.

2. In combination, an explosive cap having an opening through its shell communicating with its interior, and a plastic envelop completely surrounding the cap.

3. In combination, an explosive cap having an opening through its shell communicating with its interior, and an envelop of solid water proof material about the cap, said material being plastic when subjected to high fluid pressure.

4. In combination, an explosive cap having an opening through its shell communicating with its interior, and an envelop of solid water proof material about the cap, said material being plastic when subjected to high fluid pressure and capable of being rendered plastic and kneadable by heat.

5. In combination, an explosive cap having an opening through its shell communicating with its interior, and a plastic envelop about the cap, the material of the envelop being of relatively low disruptive strength.

6. In combination, an explosive cap having an opening through its shell communicating with its interior, and a plastic envelop about the cap, and a protective taping around the envelop.

7. In combination, an explosive cap having an opening through its shell communicating with its interior, and an envelop of bituminous substance about the cap plastic when subjected to high fluid pressure.

8. In combination, an explosive cap having an opening through its shell, and an envelop of asphalt kneaded about the cap.

9. In combination, an explosive cap having an opening through its shell, and an envelop of asphalt kneaded about the cap, and a protective taping around the envelop.

10. In combination, an explosive cap having an opening through its shell communicating with that part of the interior containing the explosive substance, and an envelop of plastic material about the cap.

11. In combination, an explosive cap having an opening through its shell communicating with that part of the interior containing the explosive substance, and an envelop completely surrounding the cap, said envelop being composed of a mass of water proof material plastic under high fluid pressure.

12. In combination, an explosive cap having an opening through its shell communicating with that part of the interior containing the explosive substance, and an envelop completely surrounding the cap, said envelop being composed of a mass of water

proof material plastic under high fluid pressure, capable of being rendered plastic by heat, and kneaded into form about the cap.

13. In combination, an explosive cap having an opening through its shell communicating with that part of the interior containing the explosive substance, and an envelop of bituminous substance kneaded completely around the cap and plastic at high fluid pressure.

14. In combination, an explosive cap having an opening through its shell communicating with that part of the interior containing the explosive substance, and an envelop completely surrounding the cap, said envelop being composed of a mass of water proof material plastic under high fluid pressure, capable of being rendered plastic by heat, and kneaded into form about the cap, and a protective taping around the envelop.

In witness that I claim the foregoing I have hereunto subscribed my name this 14th day of April 1916.

CHARLES H. ALLISON.

Witnesses:
JAMES T. BARKELEW,
ELWOOD H. BARKELEW.