Sept. 11, 1928. 1,683,900

E. KAROLLUS

SAFETY DEVICE FOR BLASTING OR EXPLOSIVE CARTRIDGES

Filed July 26, 1927

Fig. 1

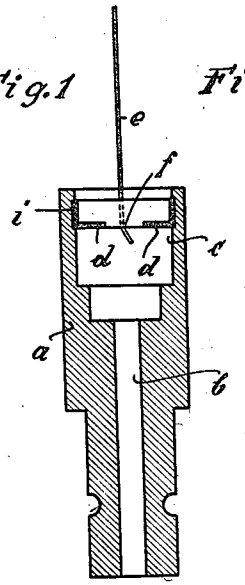


Fig. 3

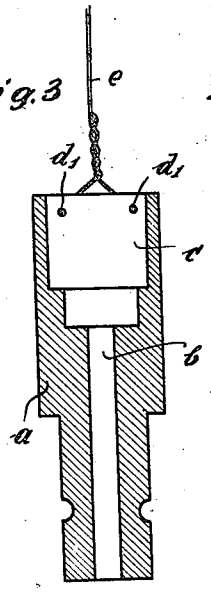


Fig. 5

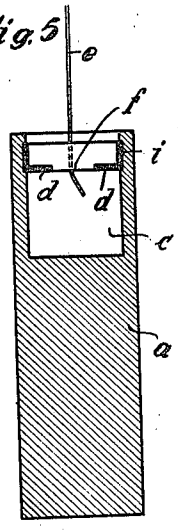


Fig. 2

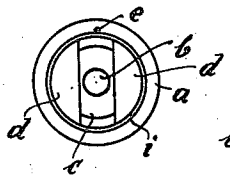


Fig. 4

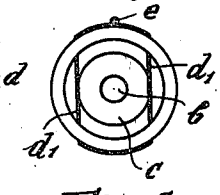


Fig. 6

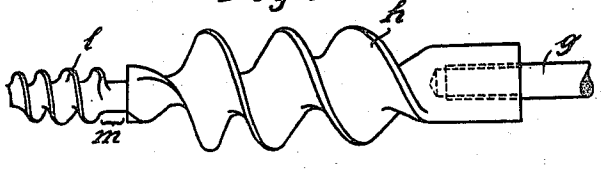
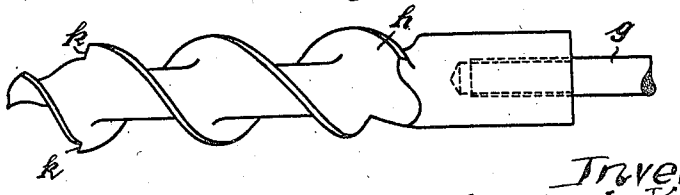


Fig. 7



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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR BLASTING OR EXPLOSIVE CARTRIDGES.

Application filed July 26, 1927, Serial No. 208,598, and in Austria February 24, 1925.

This invention relates to improvements in or modifications of the safety device for blasting or explosive cartridges as described and claimed in my Patent No. 1,588,427.

It has been proved by practice that the drag-line used in connection with the safety device according to my patent above mentioned is not necessary in all cases and that sometimes it is of advantage to dispense with it. It has also been found that the central bore of the plug may in some cases be omitted.

According to the present invention the drag-line is dispensed with, and within the end of the plug or on the top of the same are arranged projections or depressions or excavations for the application of a tool, by which the plug may be pulled out of the bore- or blast-hole.

Further the present invention relates to the particular construction of the tool for withdrawing the plug and to the application of solid plugs instead of plugs provided with a longitudinal channel.

Several modes of carrying out the present invention are illustrated by way of example on the accompying sheet of drawings in which—

Figs. 1 and 2 show a plug constructed according to the present invention in longitudinal section and plan view respectively.

Figs. 3 and 4 illustrate a modified plug in longitudinal section and plan view respectively.

Fig. 5 shows in longitudinal section a plug constructed without a longitudinal bore.

Figs. 6 and 7 illustrate two different plug-lifters constructed according to the present invention.

The plug *a*, which according to my Patent 1,588,427 is provided with a bore or channel *b* for the passage of the electric current wires or of the fuse-cord, is furnished with an arrangement for engaging the lifting tool, this arrangement being illustrated by way of example in Figs. 1 to 4. For this object towards the top end of the plug, that is, the end removed from the blasting or explosive cartridge, the bore *b* terminates in an enlarged hollow compartment *c* of such a size, that the plug-lifter can penetrate into it to a certain depth.

In the embodiment shown in Figs. 1 and 2, in order to secure a firm grasping of the plug by means of the plug-lifter, the enlarged compartment *c* is provided with a sheet-metal plate, which is furnished with an opening *f* in its middle, for instance a rectangular opening, so that parts *d* extend inwardly from two sides. In order to secure the plate in the enlarged compartment *c*, the rim of the said plate is turned upwards, so that a cylindric annular member *i* is formed, which is firmly secured to the inner wall of the said compartment *c* for instance by strong pressure. In this manner two sheet-metal arms are formed in the hollow compartment *c*, which are separated from each other by the rectangular opening *f*. The plug together with the cartridge is withdrawn by engaging the end of the plug-lifter with the said arms in a suitable manner.

The plug-lifter consists in a known manner, of a long spiral-shaped member *h*, which is provided with an operating bar *g*. In order to provide for a safe and good co-operation with the inwardly extending parts *d*, the plug-lifter is furnished according to my invention with a spiral-shaped extension *l* (Fig. 6). However, the construction is such, that the turns of the member *h* of the plug-lifter do not uninterruptedly pass into the turns of the extension *l*, but a short length *m* is not screw threaded or spiral-shaped in any way.

In case the forward end of the plug-lifter is introduced into the enlargement *c* in the head of the plug by means of rotation, the turns of the extension *l* engage with the inwardly projecting members *d* and by pulling the lifter, the plug together with the cartridge, which is secured at the bottom end of the bore *b*, as described in my Patent No. 1588427, can be pulled out. When turning-in the extension *l* to such an extent, that all the turns of the latter have passed through the opening *f* below the arms *d*, a continued rotation of the lifter will not cause any further penetration of the forward end of the extension *l* into the head of the plug, because in that case the arms *d* are already between the screw-threaded members *h* and *l*, so that a further rotation of the lifter is ineffective and does not cause a further penetration of the lifter into the plug. This is of importance, because in the event of a too deep penetration of the lifter into the plug the latter would burst.

In the illustrated constructions of the safety-device, a short wire *e* is provided, which can be fixed between the annular

member *i* and the inner wall of the enlargement *c* for instance by means of clamping or pinching. The wire *e* serves for guiding the ignition-line or the fuse by winding the latter a few times around the wire. This wire does not extend beyond the bore-hole as in the arrangement according to my Patent No. 1,588,427, because it is not used for removing the plug. The wire and the ignition-line or fuse do not impede the operation of the forward end of the lifter, because they are pushed aside by the rotating movement of the lifter.

As illustrated in Figs. 3 and 4 the solid arms *d* may be replaced by wire-arms d^1. In this case it is of advantage to make the wire-arms d^1 and the wire *e* of a single length of wire.

The lifter may be also of a more simple construction as illustrated in Fig. 7. In this construction the screw-threaded part *h* is provided with extensions *k*, which are adapted to rest on the arms *d* or the wires d^1 and thereby prevent the forward end of the lifter to penetrate too deep into the plug.

If it is desired to employ a plug as safety device which is not provided with a longitudinal bore, it is of advantage to construct the same as illustrated in Fig. 5 of the drawings.

In use this plug is placed on top of the primer-cartridge located in the bore-hole. In this case the detonating cap can be arranged for instance in the primer-cartridge and the ignition-line or fuse passes from the cap upward into the intermediate space between the solid plug and the wall of the bore-hole. In case of miss-fire, the bore-hole is cleared and the plug is pulled out of the same by means of the lifter in exactly the same way as described with reference to the other constructions. Now a cartridge with a fresh detonating cap is introduced and the charge may be exploded by a new ignition.

I claim—

1. An attachment for blasting or explosive cartridges comprising a substantially solid plug and members mounted thereon for extracting the plug from the bore-hole, the said members being formed to engage with the end of an extracting tool.

2. A safety device for blasting or explosive cartridges comprising a substantially solid plug provided with a bore and projections arranged in the said bore, said projections being formed to engage with the end of an extracting tool.

3. A safety device for blasting or explosive cartridges comprising a substantially solid plug provided with a bore which is enlarged at one of its ends, and an annular member provided with inwardly extending arms secured in the enlarged part of the bore.

4. A safety device for blasting or explosive cartridges comprising a substantially solid plug, an excavation in the latter, and projections arranged in the excavation, said projections being formed to engage with the end of an extracting tool.

5. In a device as defined in claim 4, a wire secured to the plug to act as a fuse-guiding means.

6. A tool for extracting the plug of a safety device for blasting or explosive cartridges, comprising a lifting portion, a smooth neck at the forward end of the latter, and an auger-shaped extension of larger diameter than the neck arranged at the forward end of the latter.

In testimony whereof I affix my signature.

EDMUND KAROLLUS.