

UNITED STATES PATENT OFFICE

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BLASTING CARTRIDGE

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This invention relates to blasting cartridges for use in mining and like operations.

An object of the invention is to provide cartridges for use in mines constructed and arranged so that high explosives producing unconfined forces may be used and the explosive forces directed in such a way as to obtain best results. To obtain this object I provide a shell having a rigid body that will withstand the explosive forces of the high explosives, said shell being constructed and arranged to receive the explosives along one side and to direct most of the explosive forces radially from the shell.

Another object of the invention is to provide a shell designed and adapted for use in mining operations and the like capable of obtaining all of the advantages herein disclosed, reference being made to the drawings in which

Figs. 1 and 2 are end and side elevations of the shell, a part of Fig. 2 being in section.

Figs. 3 and 4 are end and side elevations of a shell of alternative construction, a part of Fig. 4 being in section.

Fig. 5 is a side elevation of another form of shell with parts in section.

Figs. 6 to 11, inclusive, are cross sectional views of shells of different form for use of high explosives.

The shell shown in Figs. 1 and 2 comprises a rigid metallic body 1 of appropriate cross and longitudinal dimensions so as to withstand the explosive forces of high explosives which produce forces that cannot be confined within cylindrical shells of practical size. This metallic body is provided with a longitudinal cavity 2 which may be in the form of a groove or channel, as shown in Figs. 1 and 2 and 6 to 8, inclusive. This groove or channel may be formed with walls flaring to intersection with the periphery of the body at an angle of about ninety degrees, as shown in Figs. 1 and 6; or flaring to intersection with the periphery of the body at an angle between ninety degrees and one hundred eighty degrees, as shown in Fig. 7; or the side walls of the groove or channel may extend approximately parallel from the bottom wall to intersection with the periphery of the body

of the shell, as shown in Fig. 8. This channel or groove is designed and adapted to receive and contain the high explosives and to direct the explosive forces through the open side of the channel or groove while the body of the shell receives the opposing forces of the explosives. In this type of shell the greater part of the explosive forces are received by the body of the shell, since the walls of the channel or groove partly enclose the explosives.

The inner end of the channel or groove terminates at an end wall 3 which prevents the explosive forces from being directed inwardly in a direction longitudinally of the body of the shell; while the outer end of the shell is provided with an end wall 4 for the same purpose. The wall 4 is formed with a hole 5 opening into the groove or channel 2 and arranged to receive a fuse or wire to cause explosion of the explosives in the shell. The outer end wall 4 of the shell is formed with means for engagement with a tool or implement whereby the shell may be turned to place the open groove or channel 2 in any direction so that the explosive forces may be directed in any direction against the substance or mineral in which the shell is embedded. As illustrative, a groove 6 is shown.

The shell shown in Figs. 3 and 4 is of the same construction as that above described, except that the wall closing one end of the groove or channel 2 is omitted. Like reference characters are applied to features of the shell shown in Figs. 3 and 4 as are applied to the same features shown in Figs. 1 and 2.

The shell shown in Fig. 5 is the same as that shown in Figs. 1 and 2, except that a partition wall 7 extends transversely of the groove or channel 2 intermediate of the ends thereof and is provided with a hole 8 for connecting the explosives in the groove or channel 2 at opposite sides of said partition. Thus, it may be said that this shell body 1 shown in Fig. 5 contains two grooves or channels 2 formed in longitudinal alinement and separated by the partition 7 across which communication from one groove or channel 2 to the other is obtained through the hole 8. To the remaining features of this shell, which

have their counterparts in the shell of Figs. 1 and 2, the same reference characters are applied. Either half of the shell of Fig. 5 can be substituted for the form of shell of Fig. 1, or the shell of Fig. 3. Also the shell of Fig. 5 may be provided with more than one partition wall, if desired.

The groove 6 in the outer end wall of each of these shells cooperates with the hole 5 to indicate to the workman the lateral direction to which the open side of the shell is turned. For the hole 5 is closer to the open side of the shell and the groove 6 extends diametrically from the open side of the shell to the opposite side. The workman, knowing this arrangement, is informed thereby to which lateral direction the open side of the shell is turned. Thus the groove 6 constitutes means in connection with the closed outer end of the shell for engagement with the inner end of a device extended longitudinally into the hole in which the shell is mounted for turning the shell to adjusted positions in the hole and permitting outward longitudinal withdrawal of said device from engagement with said shell and from the hole in which the shell is mounted.

The shell of Fig. 11 is the same as that shown in Figs. 1 and 2 with the exception that the channel or groove is of different cross sectional form. This shell comprises a body 1 having an axial cylindrical chamber 9 into one side of which a longitudinal groove or channel 10 opens. The walls of the groove or channel 10 intersect the wall of the cylindrical chamber 9 along spaced parallel lines so that the chamber 9 and the groove or channel open into each other. The opening from the groove or channel 10 to the chamber 9 is of less width than the diameter of the chamber 9. When the explosive is placed in the chamber 9 through the groove or channel 10 slight pressure may be required to pass the explosive from said groove or channel 10 through the opening into the chamber 9; so that after the explosive is placed within the chamber 9 it will be retained therein. While the ends of the chamber 9 and the groove or channel 10 are shown as closed at the inner end of the cartridge or shell by a wall 11 to produce a shell having an inner end wall corresponding to the wall 3 (Fig. 2), it is apparent that this wall 11 may be omitted, if desired.

Fig. 10 shows a variation of the shell of Fig. 11 comprising a semi-cylindrical body 12 having a longitudinal groove or channel 13.

In Fig. 9 a further variation is shown, the shell comprising a body 14 having a recess 15 closed at one end by a wall 16. The end of the recess 15 at the wall 16 is of greater cross sectional area than the cross sectional area of the body 14.

In using these cartridges the explosives are placed in the channels or grooves or in the

cylindrical shells and the shells are then placed in the holes or bores in the mineral in locations where it is desired to fracture the mineral. The shells may be turned to different or selected adjustments, as desired, so as to direct the explosive forces in a manner to obtain the desired and the best results. These shells may be varied in other respects than as specifically disclosed without departure from the nature and principle of the invention.

I do not restrict myself unessentially, but what I claim and desire to secure by Letters Patent is:

1. A blasting cartridge comprising an elongated metallic body having a longitudinal recess in one side thereof arranged to receive explosives and closed at one end by a part of said body preventing longitudinal direction of the explosive forces, and means in connection with said closed end for engagement with the inner end of a device extended longitudinally into the hole in which the shell is mounted for turning the shell to adjusted positions in the hole and permitting outward longitudinal withdrawal of said device from engagement with said shell and from the hole in which the shell is mounted.

2. A blasting cartridge comprising an elongated metallic body having a longitudinal recess in one side thereof arranged to receive explosives to be exploded therein, a part rigid with said body forming a wall at one end of said recess and preventing longitudinal direction of said explosive forces, and means in connection with said wall for engagement with a device extended longitudinally into the hole in which the shell is mounted for turning the shell and permitting said device to be withdrawn longitudinally from the hole and from engagement with the shell.

3. A blasting cartridge comprising an elongated metallic body having a longitudinal recess in one side thereof arranged to receive explosives to be exploded therein, a part rigid with each end of said body forming a wall at each end of said recess and preventing longitudinal direction of said explosive forces in either direction, and means in connection with said wall for engagement with a device extended longitudinally into the hole in which the shell is mounted for turning the shell and permitting said device to be withdrawn longitudinally from the hole and from engagement with the shell.

4. A blasting cartridge comprising an elongated metallic body having a longitudinal recess in one side thereof arranged to receive explosives to be exploded therein, a part rigid with each end of said body forming a wall at each end of said recess and preventing longitudinal direction of said ex-

plosive forces in either direction, and a part rigid with said body forming a transverse partition between the ends of said walls and having a hole therethrough forming communication from the recess at one side of said partition to the recess at the other side of said partition.

5. A blasting cartridge comprising an elongated metallic body having a longitudinal recess in one side thereof arranged to receive explosives to be exploded, a wall rigid with said body closing one end of said recess and preventing longitudinal direction of the explosive forces, and means whereby a tool may be engaged with said body to adjust said body.

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