June 16, 1936. J. BARAB 2,044,345

BLASTING CARTRIDGE

Filed Jan. 16, 1932

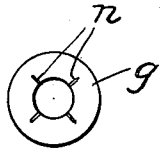


FIG. 6.

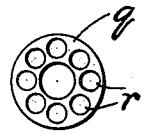


FIG. 7.



FIG. 4.

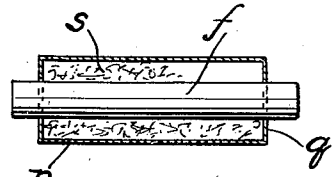


FIG. 5.

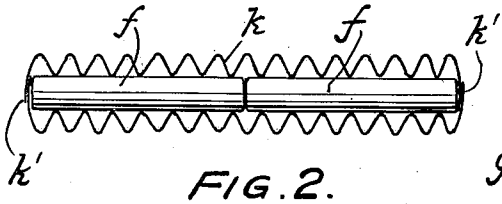


FIG. 2.

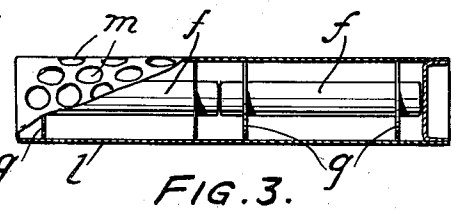


FIG. 3.

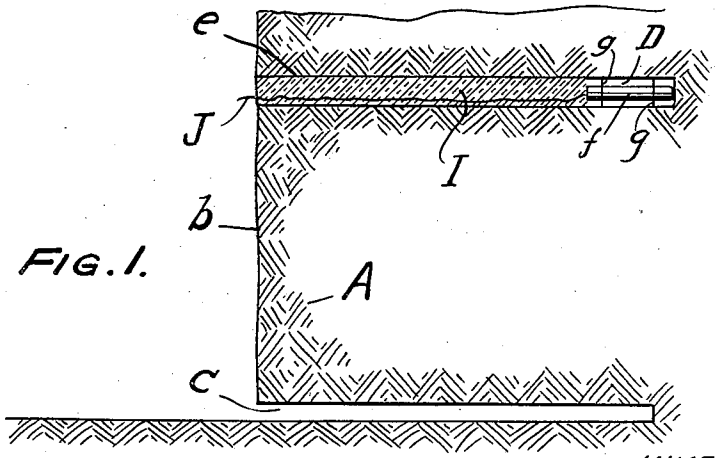


FIG. 1.

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WITNESS:

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Patented June 16, 1936 2,044,345

UNITED STATES PATENT OFFICE

2,044,345

BLASTING CARTRIDGE

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Application January 16, 1932, Serial No. 587,007

2 Claims. (Cl. 102—6)

This invention relates to an improvement in blasting cartridges, and in method of blasting. More particularly, the cartridge and method in accordance with this invention will be found especially advantageous in connection with the mining of coal.

Heretofore in the mining of coal, it has been customary to fire the explosive, as a dynamite, in contact with the coal with the result that the coal is excessively broken or, in other words, an undesirable amount of fines as compared with lump are produced. According to certain practice, and as required in certain States, the explosive is placed in a drilled hole and the hole in front of the explosive filled with tamping or stemming material. According to such practice, since the explosive is in contact with the coal, the coal receives the full force of the explosive and is undesirably shattered, especially where the explosive is a dynamite. According to another practice, where permissible, the explosive is placed at the bottom of the hole and an air space is left between the stemming and the explosive. Such an air space, known as air cushioning, is provided by, for example, placing empty cartridges, or a wire bent at both ends, as a spacer, between the explosive and the tamping. The provision of an air space between the explosive and the tamping has the effect of somewhat distributing the explosive force and hence reducing the shattering of the coal. However, the air space as provided in this manner is prohibited in some States, and in that the explosive per se is in direct contact with the coal, which causes it to have a large shattering effect.

Now, in accordance with this invention, there is provided a blasting cartridge and a method of blasting by which the advantages of air cushioning may be obtained in connection with the necessary stemming and hence without any prohibition, and by which contact of the explosive with coal to be blasted will be avoided.

In accordance with this invention there is provided a container for the explosive charge which will limit definitely the amount of explosives used and make it possible to use a predetermined amount of cushioning. By employing the method of my invention this can be predetermined, and the special cartridges made up before beginning to load the hole. All methods used heretofore require that the user loading the hole use his judgment, or carry out instructions, with no assurance that instructions are being followed accurately. The importance of this point is obvious when it is considered that to a large extent excessive shattering of coal is due to overloading of the borehole with explosives, and that it is difficult or impossible to get the miner to load a hole with just the proper amount of explosive, in order to produce the maximum percentage of lump coal.

In accordance with this invention the explosive when positioned in the hole will be spaced from the wall of the hole in any convenient manner, an air space will be provided circumferentially about the explosive and consequently the explosive will be out of contact with the coal, the hole beyond the explosive will be filled with tamping and consequently will comply with State laws.

The method embodying this invention may be carried out with any desired form of explosive, but will be found most useful in connection with, for example, permissible dynamites of various types, the shattering effect of which when fired in contact with coal and fully tamped, or even with air tamping, is undesirable. The cartridge in accordance with this invention will be so constructed or combined with means whereby when it is in place in a hole of larger diameter than the cartridge, it will be spaced from the walls of the hole. The means for spacing the surfaces of the cartridge from the wall of the hole may be of various types and may be a part of the cartridge or separate for assembly therewith on loading of the cartridge into the hole.

Having now indicated in a general way the nature and purpose of my invention, I will proceed to a more detailed description thereof with reference to the accompanying drawing in which:

Figure 1 shows diagrammatically a bore hole loaded with a cartridge embodying this invention and arranged for blasting in accordance with the method embodying this invention.

Figures 2–5 show respectively cartridges embodying modifications of this invention.

Figure 6 shows a detail of the structure shown in Figure 4.

Figure 7 is an end view of the casing shown in Figure 5.

Referring more particularly to Figure 1, A indicates a seam of coal having a face *b* and undercut as at *c*. Near the top of the seam a hole *e* is provided of larger diameter than the explosive cartridge, at the inner end or bottom of which is a dynamite cartridge, or cartridges *f*. At intervals about the dynamite cartridge, which is smaller in diameter than the hole *e*, are placed spacing members, as washers *g*, having a central hole through which the cartridge extends. The

spacers or washers *g* are of about the diameter of the hole *e* and serve to position the cartridge in spaced relation to the wall of the hole so that an air space D is provided all around the cartridge. I indicates tamping or wadding material with which the hole *e* is filled from the cartridge out. J indicates lead wires or a fuse for firing the cap with which the cartridge is primed.

On the firing of the cartridge *f*, which it will be noted is not in contact with the coal throughout its length, the explosive face will be cushioned by the air space *h* surrounding the cartridge with avoidance of undesirable shattering of the coal. At the same time, as will be noted, a blow out will be avoided since the cartridge is fully tamped.

Referring now to Figures 2–7, in all of which *f* indicates a dynamite cartridge or cartridges, in Figure 2 the cartridge *f* is surrounded by a frame *k* the members of which, of wavy form, extend lengthwise of the cartridge and are secured to the cartridge by connecting portions *k'*, which extend over the ends of the cartridge. The frame may be attached to the cartridge when it is prepared for loading and will operate to position the cartridge in spaced relation to the walls of the bore hole.

In Figure 3 the cartridge or cartridges *f* are positioned within an outer casing *l* and spaced from the walls thereof by means of washers *g*. The cartridge when loaded into a hole with the outer casing *l* in place will be spaced from the walls of the hole throughout its length. The casing *l* may be perforated as at *m*.

In Figure 4 the cartridge *f* is provided at intervals with washers *g*, as in Figure 1, the washers *g* being provided with a central hole and may be slitted radially from the hole, as shown at *n*, Figure 6, in order to insure a frictionally tight fit of the washers on the cartridge.

In Figure 5 the cartridge is slipped through holes in the end members *q* of a carton or casing *p*, being spaced from the walls thereof by the end member *q* and hence when loaded into the casing will be spaced from the walls of the hole. Figure 7 shows an end view of the casing *p* from which it will be noted that the end members *q* thereof may be perforated with holes *r*.

If desired the space between the surface of the cartridge and the wall of the hole may be filled with a flame quenching material, as for example, sodium chloride, ammonium chloride, borax, or the like. Thus, as shown in Figure 5, the casing *p* may be filled around the cartridge with a flame quenching material *s*.

The several forms of spacers described above and various other forms which will be within the skill of the art to devise, may be made of any desired material as thin metal, heavy, paper or cardboard, etc. When the spacer is made of paper or cardboard, such will desirably be fireproofed, as for example, by treatment with silicate of soda, magnesium sulphate, ammonium chloride, sodium chloride, borax, etc., in order to avoid the carrying of flame or glow into the mine atmosphere should the spacer or portions thereof be blown into the mine and desirably also perforated.

It will be appreciated that this invention from the broad standpoint contemplates the provision of an air space between the explosive and the wall of the hole, however, it will be understood that the embodiments and practical application of the invention as described herein are illustrative only, it being contemplated that various modifications in structure and procedure may be made over those described without departing from the invention.

What I claim and desire to protect by Letters Patent is:

1. In combination, a blasting cartridge and means for uniformly spacing the surface of the cartridge from the wall of a bore hole of larger diameter than the cartridge, said means comprising a cylindrical body adapted to enclose said cartridge and having corrugated side walls.

2. In combination, a blasting cartridge and means for uniformly spacing the surface of the cartridge from the wall of a bore hole of larger diameter than the cartridge, said means comprising a cylindrical container having substantially the diameter of the bore hole for said cartridge and means for centrally positioning the cartridge in said container, the side walls of said container being perforated at a plurality of points.

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