Oct. 20, 1936. C. F. OSGOOD 2,058,099

BLASTING CARTRIDGE

Filed June 27, 1933

Fig. 1.

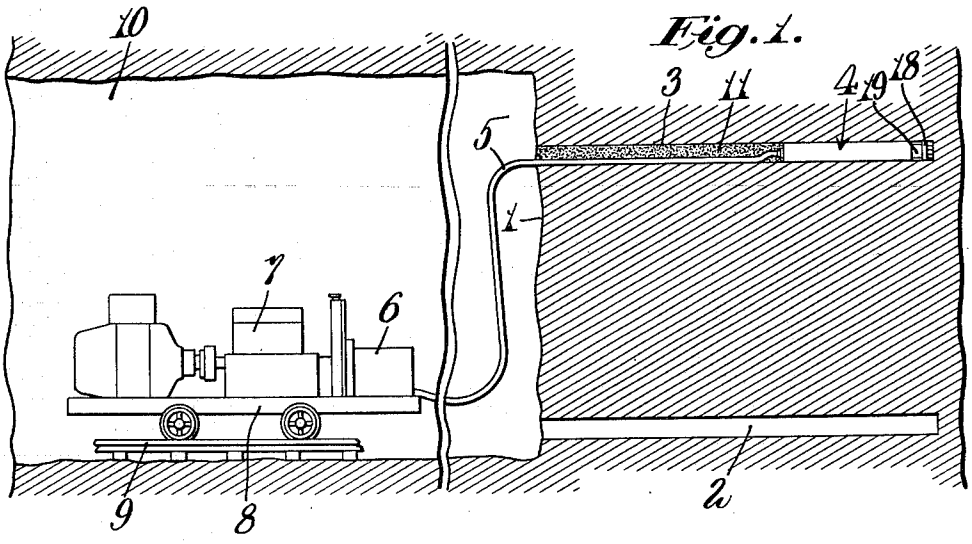


Fig. 2.

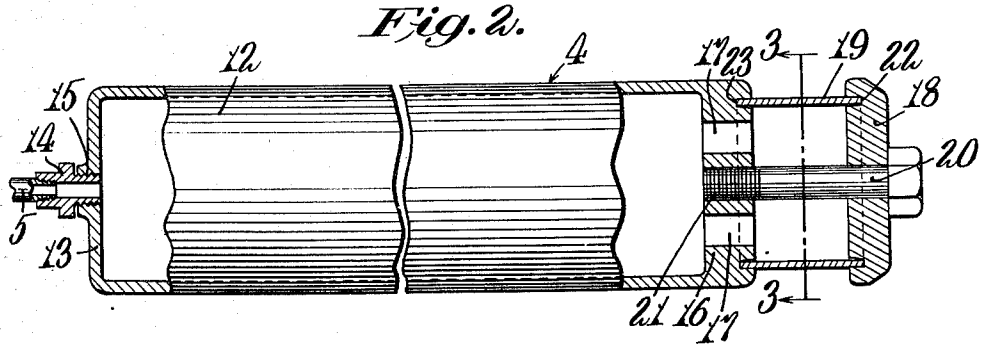
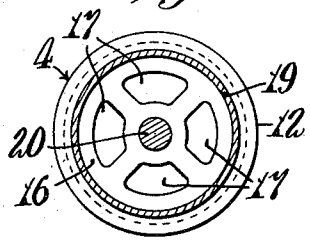


Fig. 3.



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BLASTING CARTRIDGE

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Application June 27, 1933, Serial No. 677,872

19 Claims. (Cl. 102—6)

This invention relates to blasting cartridges, and more particularly to improvements in blasting cartridges of the pressure fluid ruptured type especially adapted to use in the "air shooting" of coal or similar material.

An object of this invention is to provide an improved blasting cartridge. Another object is to provide improved pressure releasing means for a blasting cartridge of the pressure fluid "exploded" type. A further object is to provide an improved blasting cartridge of the pressure fluid ruptured type wherein the cartridge is burst by a relatively high pressure built up within the cartridge by mechanical means. Still another object is to provide an improved cartridge having a rupturable portion of less strength than the cartridge casing whereby when a relatively high blasting pressure is built up within the cartridge, the said portion ruptures to release the blasting pressure. Yet another object is to provide in a cartridge of the above character an improved pressure releasing means in the form of a rupturable sleeve whereby when a relatively high blasting pressure is built up within the cartridge the sleeve walls rupture to release the blasting pressure in a direction transversely of the cartridge, thereby to render more effective the blasting "explosion" on the material blasted thereby. These and other objects and advantages of the invention will, however, subsequently more fully appear.

In the accompanying drawing there is shown for purposes of illustration one form which the invention may assume in practice.

In this drawing,—

Fig. 1 is a diagrammatic view illustrating the association of the blasting cartridge with the wall of the material to be blasted.

Fig. 2 is a longitudinal section showing the illustrative form of the improved cartridge.

Fig. 3 is a cross section taken on line 3—3 of Fig. 2.

As shown in Fig. 1 of the drawing, a wall of coal or similar material to be blasted is designated 1, an undercut kerf designated 2 and a drill hole designated 3 into which is inserted a blasting cartridge 4 of an improved design. This cartridge has connected at 2 a flexible pipe line 5 which is in turn connected to the receiver tank 6 of a high pressure compressor 7 mounted on a wheeled truck 8 adapted to run along a mine trackway 9 laid on the floor of a mine chamber 10. After the cartridge is in place at the inner end of the drill hole, the drill hole at the outer end of the cartridge is tamped at 11 and the pipe line 5 extends outwardly from the drill hole through this tamping in the manner shown. Fluid under pressure is supplied from the compressor receiver tank through the pipe line 5 to the cartridge and upon a predetermined blasting pressure built up within the cartridge, the pressure releasing element of the latter bursts, whereupon the pressure will be released from the cartridge casing and expanded in the wall of the material to be broken thereby to force down the material from the mine wall.

Now referring to the improved cartridge per se, it will be observed that the same comprises a cylindric shell or tubular casing 12 having an integral outer end wall 13. The pipe line 5 is connected to the end wall 13 by a nipple 14 threaded at 15 within a threaded boss formed integral with the end wall. The inner end wall 16 of the cartridge casing is perforated by a series of openings 17 and clamped between the inner end wall, and a clamp plate 19 is a rupturable sleeve 19. The plate 18 is held in clamping relation with respect to the sleeve by means of a central clamping bolt 20 threaded at 21 within the inner casing wall. The plate and end wall are annularly grooved at 22 and 23, respectively, to receive the ends of the rupturable sleeve, thereby to form fluid tight joints to prevent leakage of pressure fluid flowing within the sleeve from the cartridge casing through the apertures 17.

In this improved construction, when the desired rupturing pressure is reached within the cartridge casing, the sleeve 19 is ruptured, the lateral walls thereof bursting to release the blasting pressure in a direction transversely of the cartridge. When the rupturing of the sleeve 19 and the blasting operation have been completed, and it is again desired to use the cartridge for another blasting operation, the rupturable sleeve is simply replaced by a new sleeve.

It is not desired to limit the invention to the particular type of cartridge shown, and it will be evident that the improved pressure releasing means may be embodied in cartridges of various other types, for instance such as that exploded by carbon-dioxide or other gases of similar nature, and in types wherein the blasting pressure is obtained by means of an electrical heater or igniter.

As a result of this invention, it will be noted that an improved blasting cartridge is provided wherein the means for releasing the blasting pressure is in the form of a rupturable sleeve whereby the blasting effect takes place in a direction transversely of the cartridge, thereby increasing the "explosive" effect of the blasting charge. It will further be noted that the improved cartridge

is of an extremely simple design and of inexpensive construction, it being necessary only to replace a relatively inexpensive part after each blasting operation.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a blasting cartridge, a casing having a perforated end wall, a sleeve, a plate engaging said sleeve for clamping said sleeve against said end wall, and holding means for said plate.

2. In a blasting cartridge, a casing having a perforated end wall, a sleeve, a plate engaging said sleeve for clamping said sleeve against said end wall, and holding means for said plate including a holding bolt engaging said plate and threadedly connected to said end wall.

3. In a blasting cartridge, a tubular casing having an open end, and a pressure release means for directly releasing the pressure in a lateral direction from said casing when a predetermined blasting pressure is attained therein including a metallic rupturable pressure releasing sleeve, and a plate engaging said sleeve for clamping said sleeve against the end wall of said casing to form a rupturable closure for the open end of said casing.

4. In a blasting cartridge, a tubular casing having an open end, and a pressure release means for directly releasing the pressure in a lateral direction from said casing when a predetermined blasting pressure is attained therein including a metallic rupturable pressure releasing sleeve, and a plate engaging said sleeve for clamping said sleeve against the end wall of said casing to form a rupturable closure for the open end of said casing, and holding means engageable with said plate and casing for maintaining said plate in clamping position.

5. In a blasting cartridge, a tubular casing having an open end, the end wall of the casing surrounding the end opening being formed in an annular groove, an end closure member having an annular groove, and a rupturable pressure releasing sleeve seated in the grooves in said end casing wall and said closure member and clamped in position by the latter against said end wall.

6. In a blasting cartridge, a container for confining an energy storing charge, means embodied within the outer end of the cartridge for charging the container, and means embodied within the inner end of the container for suddenly discharging the charge when a predetermined blasting pressure is attained within the container, said discharge means including means providing an annular discharge orifice extending completely about the cartridge periphery and a rupturable metallic ring for sealing said orifice and adapted to burst in a lateral direction upon the attainment of a predetermined blasting pressure in the container for releasing a charge in all directions through said orifice transversely of the cartridge and of such strength as to resist the pressure of said charge until said predetermined blasting pressure is attained.

7. In a blasting cartridge, a container for confining an energy storing charge, and discharge means for suddenly releasing the charge when a predetermined blasting pressure is attained in the container, said discharge means including means providing an annular discharge orifice extending completely about the cartridge periphery and a rupturable metallic sealing ring for said orifice of less strength than the container and of sufficient strength to resist the pressure of the charge until said predetermined blasting pressure is attained, said ring adapted to burst in a lateral direction to release suddenly the blasting charge in a lateral direction.

8. In a blasting cartridge, a container for receiving and holding an energy storing charge and having all of its walls of a strength to resist a predetermined blasting pressure attainable therein, said container having an opening at its inner end, and discharge means attached to the inner end of the container and normally closing said opening, said discharge means having an annular discharge opening communicating with said container and completely surrounding the inner end of the cartridge and a rupturable element for sealing said annular opening and of less strength than the container walls but of sufficient strength to resist the pressure of the charge in the container until said predetermined blasting pressure is attained, said rupturable element being in the form of a metallic annulus, and means for supporting said annulus to cause it to burst in a lateral direction to release suddenly the charge in a lateral direction.

9. In a blasting cartridge, a tubular casing adapted to receive a charge of blasting pressure and having separable portions, and discharge means for effecting release of the blasting pressure including a rupturable sleeve forming a portion of the cartridge casing and interposed between said separable portions, and means engageable with said casing portions and adjustable with respect to the latter and said sleeve for clamping said sleeve in position between said separable portions.

10. In a blasting cartridge, a tubular casing adapted to receive a charge of blasting pressure and having a pressure releasing end providing an annular discharge orifice extending completely about the cartridge periphery, and means forming a closure for the open end of said casing including a rupturable pressure releasing sleeve sealing said orifice and of such strength as to confine a relatively high pressure in the casing, and means for supporting said sleeve for causing it to rupture upon the attainment of a predetermined blasting pressure in the casing in a manner to directly release the blasting pressure in a lateral direction from said casing through said annular orifice.

11. In a blasting cartridge, a casing capable of holding a blasting charge and having a discharge orifice in a wall thereof, a hollow rupturable element having an opening and adapted to be positioned with the edge portion of the opening surrounding the orifice in and sealed with respect to the said wall of the casing so as to place the interior of the hollow element in communication with the interior of the casing, and means for clamping the hollow element in such position.

12. In a blasting cartridge, a casing capable of holding a blasting charge and having a discharge orifice in a wall thereof, a tubular rupturable element adapted to be positioned with one end surrounding the orifice in and sealed with respect to the said wall of the casing so as to place the interior of the tubular element in com-

munication with the interior of the casing, and means for sealing the remaining end of the tubular element and for clamping the element to said casing.

13. In a blasting cartridge, a casing having a discharge orifice, a charge releasing sleeve, and means for engaging one end of the sleeve and for clamping the other end of the sleeve against the casing in a position to surround said orifice.

14. In a blasting cartridge, a casing having a discharge orifice and holding a blasting charge, a tubular element arranged to close and seal said orifice and which will rupture to release the blasting charge, and means engaging and supporting the ends only of said element for holding it in sealing relation to said casing orifice.

15. In a blasting cartridge, a casing for holding a blasting charge, a wall spaced axially from one end of the casing to form between the wall and casing end an unobstructed annular discharge orifice, and means for controlling the discharge of the blasting charge through said orifice.

16. In a blasting cartridge, a blasting charge confining casing comprising two casing parts spaced axially from each other to form therebetween an annular discharge orifice, means for holding said casing parts against axial separation, and means in addition to the aforementioned means for controlling discharge through said orifice.

17. In a blasting cartridge, a container for confining an energy storing charge and having a discharge opening formed in a wall thereof, and means for releasing the charge from the container comprising a discharge chamber normally communicating with the container through said opening so as to be subjected to the pressure of the charge, said discharge chamber comprising, in part, a wall of the container and an annular wall supported at its ends only, adapted to burst in a lateral direction upon attainment of a predetermined pressure within the container.

18. In a blasting cartridge, a casing adapted to receive a charge of pressure fluid, a head secured to said casing, and an annular sealing element for maintaining the charge in said casing seating against coaxial surfaces on said head and casing and movable bodily with respect to said surfaces to release the charge while said head remains secured to said casing.

19. In a blasting cartridge, a casing comprising a plurality of members having portions secured together and cooperating to form a discharge opening and maintained in united relation during and after release of the blasting charge through said opening, and valve means seating on said members for sealing said opening.

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