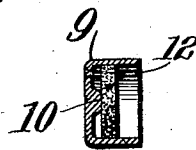
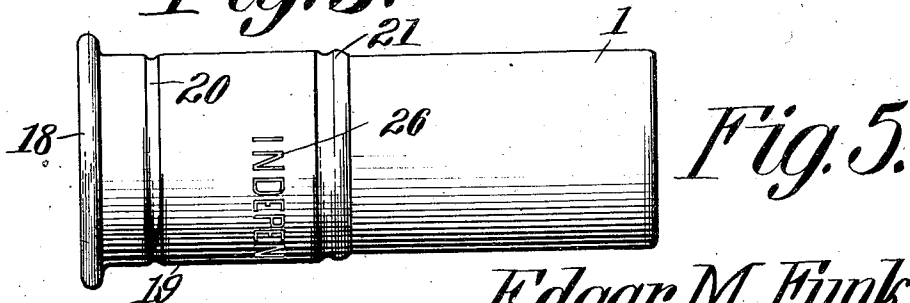
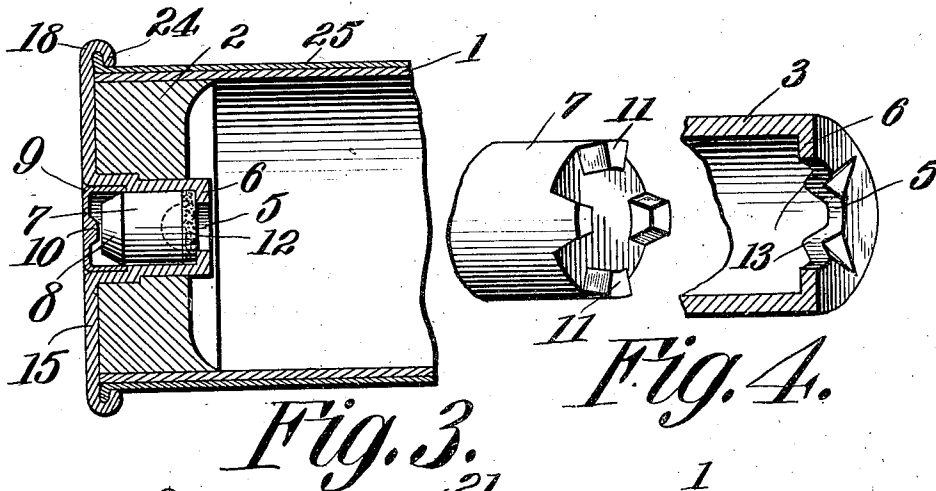
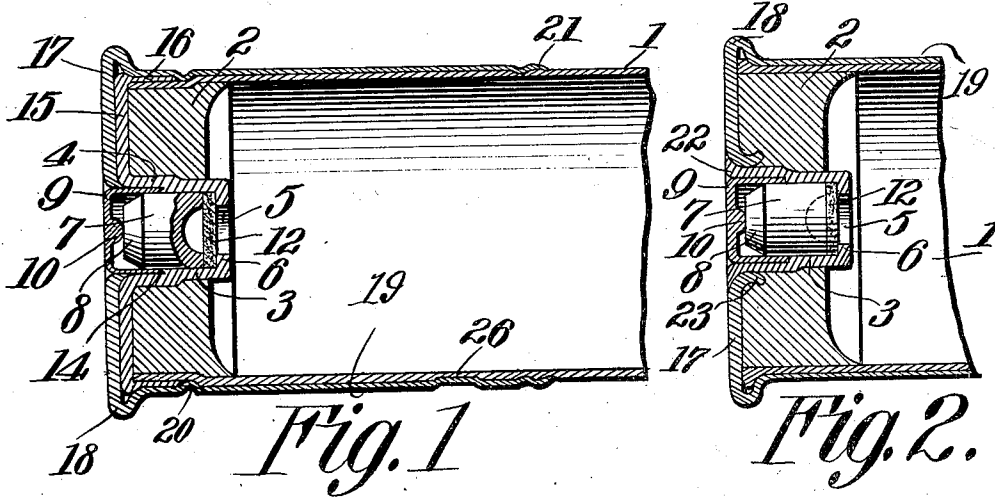


E. M. FUNK.
SHELL PRIMER FOR BREECH LOADING GUNS.
APPLICATION FILED JUNE 15, 1908.

933,030.

Patented Aug. 31, 1909.



Witnesses,
W. H. H. H. H.
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Fig. 6. by C. A. Snow & Co.
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UNITED STATES PATENT OFFICE.

EDGAR M. FUNK, OF WYTHEVILLE, VIRGINIA, ASSIGNOR TO LIBERTY CARTRIDGE COMPANY, INC.,
A CORPORATION OF VIRGINIA.

SHELL-PRIMER FOR BREECH-LOADING GUNS.

933,030.

Specification of Letters Patent.

Patented Aug. 31, 1909.

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To all whom it may concern:

Be it known that I, EDGAR M. FUNK, a citizen of the United States, residing at Wytheville, in the county of Wythe and State of Virginia, have invented a new and useful Shell-Primer for Breech-Loading Guns, of which the following is a specification.

This invention has reference to improvements in shells and primers for breech loading guns, being designed more particularly for the shells of shot guns.

The shells of shot guns are customarily made of a paper body with a heavy base in the center of which is inserted the primer or cap and, furthermore, the base or primer end of the shell is reinforced by an outer metal sheath. In certain types of paper shells the cap or primer is provided with a small perforation on the powder end and contains a small block or anvil against which the fulminate carrying cap proper is forced by the firing pin of the gun and the ignited gases caused by the explosion of the fulminate must pass around the block or anvil and ultimately find their way through the opening or perforation at the powder end of the primer into the powder chamber of the shell to cause the ignition of the powder. In the practical use of such primers the thin copper plate or fulminate carrier is forced by the firing pin against the pointed end of the anvil within the primer, and is oftentimes perforated, permitting the gases generated by the explosion to find their way outward through such perforated cap. Furthermore, the primer is separate from the metal covering over the base of the shell and the gases of explosion sometimes find their way between the outer walls of the primer and the adjacent walls of the base of the shell in which the primer is seated and escape through the breech of the gun.

It is the object of the present invention to avoid these defects in shells as heretofore constructed and not only to retain all the advantages of the prior constructions, but to provide other advantages not found in shells of the character to which this invention relates, as heretofore made.

In accordance with the present invention the anvil within the primer is retained, but instead of being actively fixed or rigid in the primer, it is in the form of a movable

block. Furthermore, the anvil is under the control of a cap which, however, does not carry the fulminate and which is so constructed as to avoid danger of being perforated by the impact of the firing pin of the gun. Certainty of the ignition of a charge of powder without danger of a flare back is insured by placing the fulminate at the powder end of the primer and exploding the same by the movement of the anvil or block within the primer under the impact of the firing pin transmitted through the reinforced cap, which latter is so firmly seated in the primer as to prevent any escape around the same of the high pressure gases of explosion. This enables me to provide the fulminate in the form of separate charges, preferably of disk shape, which may be placed within the primer at the powder end thereof with the anvil or firing block upon said fulminate, and by this means the perforation provided for the passage of the gases of explosion to the powder in the shell may be larger than usual, thus insuring a large area of action of the flame produced by the explosion of the fulminate upon the powder constituting the explosive charge of the shell and doing away with the necessity of the flame passing through long, tortuous passages before reaching the powder. This construction, also, facilitates the re-loading of the shells and permits the use of the fulminate in small disks or blocks which are brought into the closest possible relation to the powder charge in the shell.

In order to prevent the escape of the gases of explosion between the outer walls of the primer and the walls of the base of the shell in which the primer is seated, the present invention contemplates the formation of the primer casing and the metal end plate at the base of the shell all in one piece although in some forms of the invention the primer case may be made separate from the back plate of the shell, as is customary in constructions heretofore proposed.

In order to more certainly insure the explosion of the fulminate, that portion of the movable block or anvil engaging said fulminate may be roughened or made irregular in contour in any suitable way, or the seat for the fulminate at the powder end of the primer case may be roughened or provided with spurs or projections.

The invention, also, contemplates certain improvements in the manner of attaching the metal reinforcement surrounding the base of the paper body on the shell which improvements will be more particularly described hereinafter.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, in which—

Figure 1 is a longitudinal section of the base end of a shell constructed in accordance with the present invention. Fig. 2 is a similar section showing a slightly modified form. Fig. 3 is a similar section showing another slight modification. Fig. 4 is a detail section on a larger scale than the other figures, showing the fulminate end of the block or anvil and the fulminate seat in the primer case. Fig. 5 is an exterior view of a cartridge shell constructed in accordance with the present invention. Fig. 6 is a section of an improved fulminate carrying cap.

Referring to the drawings, there is shown a shell 1 which may be considered as constructed of compressed paper or paper pulp after the common practice of manufacturing paper shells for breech loading shot guns. This shell is provided with the usual compressed paper base 2 at the primer end as is customary. Seated centrally in and extending through the base 2 is a cylindrical casing 3 constituting the casing of the primer, and in the particular form shown in the drawings, this primer casing is expanded both internally and externally toward the outer end, as shown at 4. At the powder end the primer is provided with a central passage way 5 around which there is formed an interior ledge 6 for a purpose which will presently appear.

Within the primer casing there is housed a block 7 snugly but freely fitting the interior of the casing and capable of free longitudinal movement therein. The end of the block 7 remote from the powder end of the primer casing may be reduced in diameter to form a frusto-conical extension 8. The expanded end of the primer casing 3 is designed to receive a cap 9 snugly fitting the interior of the casing and firmly held therein by frictional contact. The interior diameter of this cap is such as to permit it to pass freely over the corresponding end of the block or anvil 7. The end wall of the cap 9 is, when the cartridge is in the gun, in the path of the firing pin of the gun, and the center of the end wall of the cap 9 where subjected to the impact of the firing pin is thickened, as by the formation of a button 10 on the inner face of the end wall of the cap, or in any other suitable manner, and this button is designed to engage the corresponding end of the block or anvil 7. It is

to be observed that the frusto-conical end or the block 7 presents a broad engaging face for the button 10 and there is therefore no danger of perforating or rupturing the end wall of the cap as is the case in the structures heretofore used, where the active end of the block was pointed, and the cap carried the fulminate. That end of the block 7 adjacent to the powder end of the primer casing may be formed with an annular series of projections or teeth 11, or be otherwise of irregular shape, or may, if desired, be simply finished smooth, although the action of the block upon the fulminate is more certain when the block is roughened or irregular at its active end than when smooth.

In the drawings, the fulminate is indicated at 12, and is preferably in the form of a disk of appropriate size and thickness designed to be confined between the active end of the block 7 and the ledge 6 on the inner face of the powder end of the primer casing 3. The ledge 6 may either be finished smooth in the form of a plain annular flange, or the ledge may be formed with inwardly projecting teeth or irregularities 13 upon which the fulminate disk is seated, and these teeth or irregularities 13 may face the smooth end constituting the active face of the block 7, or any arrangement of parts may be provided. It will be understood that the active end of the block 7 may be either smooth or roughened or irregular, or the active face of the ledge 6 may be smooth or irregular, but both these parts where they are designed to engage the fulminate disk are not so formed, since this is unnecessary.

If it be assumed that there is confined a disk or block 12 of fulminate between the anvil 7 and the ledge 6 and that within the cartridge shell there is a powder charge and that the shell be placed in the gun and the cap 9 be subjected to the impact of the firing pin under the usual action of the hammer, then the force of the blow of the firing pin is transmitted by the button 10 to the corresponding end of the block 7, and this block is moved longitudinally in the primer casing 3 and imparts a hammer blow to the fulminate 12, thus causing the ignition of the latter and the flame generated by the explosion of the fulminate passes at once through the perforation 5 in the powder end of the casing 3 and into contact with the powder charge. Because of the close relation of the fulminate to the powder charge the flame produced by the explosion is communicated at once to the powder, and will act thereon over a comparatively large area, thus inflaming a large proportion of the powder charge at once, and thereby causing a very rapid ignition of the powder charge throughout this mass. The cap 9 may be forced into the corresponding end of the primer casing 3 as tightly as may be desired, thus prevent-

ing any escape of the gases of explosion between the outer walls of the cap 9 and the inner walls of its seat in the primer casing 3. To further prevent any chance of escape of the exploded gases, the shoulder formed at the junction of the enlarged portion of the primer casing and the portion of smaller internal diameter toward the powder end, which portion is designed to receive the block 7, may be under-cut as indicated at 14, to receive the edge of the free end of the cap 9, and thus aid in sealing such edge of the cap against passage of the gases of explosion. The reinforcement of the closed end of the cap 9 by the button 10 or otherwise effectually prevents the perforation of the end of the cap by the impact of the firing pin, while the slight giving of the closed end of the cap 9 is permitted by the thinner walls of the cap outside the button 10.

When it is desired to reload the cartridge the block 7 and cap 9 are readily forced out of the primer casing 3 when another disk or block 12 of fulminate is introduced into the casing 3 and the block 7 is then returned to the casing and finally the cap 9 is again forced into its seat, without danger of causing the explosion of the fulminate because its movement into the casing 3 is limited by the shoulder 14.

As shown in Fig. 1, the outer or cap end of the primer casing 3 is formed into an annular plate 15 designed to form the metal covering for the base end of the cartridge shell, and this plate 15 is formed with a tubular flange 16 designed to receive the corresponding end of the cartridge shell 1. Overlying the end plate 15 is another plate 17 having a central perforation of sufficient size to permit the passage of the cap 9 and this plate 17 is formed with a peripheral bead 18 constituting a shoulder for limiting the introduction of the cartridge shell into the breech of the gun. The end plate 17 is formed with an annular tubular extension 19 on one face closely embracing the corresponding end of the cartridge shell and sufficiently extensive to reinforce the powder chamber of the shell. This extension 19 is beaded into the body 1 of the shell immediately adjacent to the free end of the flange 16, as indicated at 20, and at its extreme end this extension 19 is crimped into the body 1 of the shell, as indicated at 21, thus insuring close and proper contact of the outer lining or reinforcement 19 with the body of the paper shell.

In Fig. 2 the plate 15, with its reinforcement 16 is omitted and the primer casing 3 terminates at its outer end in an annular flange 22 seated on an turned annular flange 23 formed on the plate 17 and upset into the base 2. Otherwise the structure is the same as shown in Fig. 1.

In Fig. 3 the structure is similar to that

shown in Fig. 1, except that the extra plate 17 is omitted and the plate 15 is beaded over at the edges as shown at 24 and interlocked into a reinforcing sleeve 25 corresponding to the outer lining or reinforcement 19 of the structure of Fig. 1.

The several modifications which have been described may be taken as illustrative of various modifications of which the invention is capable, and it is to be therefore understood that other modifications of the structure may be made while still retaining the salient points of the invention.

In the foregoing description the word fulminate has been used to designate the percussion element of the primer, but it will be understood that this term is illustrative or typical only and is designed to include any suitable percussion explosive and is not limited to the use of fulminate only, and this interpretation is to be given to the term fulminate wherever used in the description and claims.

It is customary to indent the metal of the reinforcing sleeve 19 into the paper body of the shell to hold the said sleeve from rotation. I accomplish the same object by stamping a trade name or trade mark or any lettering or wording into the sleeve 19 so as to force the metal into the paper body of the shell to a sufficient extent to prevent the turning or moving of the sleeve and to firmly anchor it to the said shell body. This is shown at 26, Figs. 1 and 5.

The reinforced cap 9 is useful with primers as heretofore constructed and may carry the fulminate, as shown in Fig. 6, the reinforcement 10 preventing the piercing or rupturing of the closed end of the cap when forced against the detonating block of the prior structure.

What is claimed is:

1. In a cartridge, a primer provided with means for receiving fulminate at the powder end of said primer, means within the primer for transmitting an impact blow to the fulminate to explode the same, and means for hermetically sealing the end of the primer remote from the powder end and through which means the impact blow is transmitted to the interior impact transmission means of the primer.

2. In a cartridge, a primer having a movable member interior thereto and adapted to receive the fulminate between said movable member and the powder end of the primer, and a hermetic closure for the other end of the primer through which closure an impact blow is transmitted to the movable member in said primer.

3. In a cartridge, a primer having a longitudinally movable interior member and adapted to receive fulminate between said movable member and the powder end of the primer, and a closure for the other end of

the primer provided with a reinforcement through which a blow may be imparted to the movable member within the primer.

4. In a cartridge, a primer comprising a
5 suitable casing open at the ends and having the powder end opening reduced in diameter to form a ledge for the reception of fulminate, a block within said primer, and movable longitudinally therein, and a cap closing
10 the other end of the primer remote from the end carrying the fulminate and in operative relation to the block within the primer, whereby a blow may be transmitted through the cap to the block within the primer to
15 move the said block into operative contact with the fulminate.

5. In a cartridge, a primer comprising a casing open at each end, said casing being formed with an inwardly directed annular
20 ledge at the powder end to receive a charge of fulminate, a block within said casing and movable longitudinally therein, and a cap closing the other end of the casing, said cap being provided with a reinforcement adapted
25 to engage the block within the casing.

6. In a cartridge, a primer comprising a casing open at each end with the opening at one end contracted to form an annular ledge
30 at said end of the casing, and the other end of the casing being expanded to form a section of greater internal diameter than the powder end of the casing, a block in said casing, movable longitudinally therein and adapted to engage fulminate seated on the
35 ledge at the contracted end of the casing, and a cap adapted to snugly fit the expanded end of the casing and having its closed end in operative relation to the corresponding end of the block.

7. In a cartridge, a primer comprising a casing open at each end with the opening at one end contracted to form an annular ledge
40 at said end of the casing, and the other end of the casing being expanded to form a section of greater internal diameter than the powder end of the casing, a block in said casing, movable longitudinally therein and adapted to engage fulminate seated on the
45 ledge at the contracted end of the casing, and a cap adapted to snugly fit the expanded end of the casing and having its closed end in operative relation to the corresponding end of the block, said cap being thickened or
50 reinforced at this point to contact with the end of the block.
55

8. In a cartridge, a primer having a casing of greater internal diameter at one end than the other and provided with an undercut shoulder at the junction of the portions
60 of different diameter, said casing also being provided at its powder end with a seat or support for the reception of a charge of fulminate, a block within said casing fitting and longitudinally movable in the portion
65 of the casing adjacent to the powder end,

and a cap snugly fitting the expanded end of the casing and provided at its closed end with a thickened portion or button adapted to make contact with the corresponding end of the block.

9. In a cartridge, a primer casing having
70 formed integral therewith at one end an annular plate extending to the walls of the cartridge and against which the base end of the cartridge body abuts, said plate being
75 formed with a cylindrical reinforcing flange concentric with the primer casing and adapted to surround the corresponding end of the cartridge body, and a reinforcing sleeve exterior to the said reinforcing flange and corresponding
80 end of the cartridge body and extending along the said body beyond the free end of said reinforcing flange.

10. In a cartridge, a primer casing having
85 formed integral therewith at one end an annular plate extending to the walls of the cartridge body and against which the base end of the cartridge body abuts, said plate being formed with a cylindrical reinforcing flange concentric with the primer casing and adapted to surround the corresponding end
90 of the cartridge body, and an annular plate for the cartridge exterior to the primer casing and provided with a reinforcing sleeve concentric with and exterior to the sleeve on the plate on the primer casing, said reinforcing
95 sleeve and the last named annular plate being integrally joined and at the junction formed into a peripheral bead or shoulder and the reinforcing sleeve extending
100 along the powder chamber of the cartridge beyond the free end of the said reinforcing flange.

11. In a cartridge, a primer casing formed with an annular plate on one end thereof
105 and extending to the exterior walls of the cartridge and against which the base end of the cartridge body abuts, said end plate being provided with a cylindrical reinforcing sleeve concentric with the primer casing and adapted to receive the corresponding end
110 of the cartridge body, and an annular end plate for the cartridge exterior to the primer structure, said end plate being provided with a reinforcing sleeve extending along
115 the powder chamber of the cartridge body exterior thereto, said sleeve having an interior bead beyond the edge of the reinforcement carried by the primer structure, and at the free end being crimped into the cartridge
120 body.

12. In a cartridge, a primer having at its powder end a seat for a charge of fulminate, said seat having an irregular active
125 face to facilitate the explosion of the fulminate.

13. In a cartridge, a primer casing having at its powder end an annular seat for a charge of fulminate, and a movable block
130 within said casing adapted to engage a ful-

minate charge on the seat in the casing and having an annular engaging face of irregular contour.

14. In a cartridge, a primer having at its powder end an annular seat for a charge of fulminate with the engaging face of the seat of irregular contour, and a movable block in said casing adapted to engage the fulminate and having its fulminate engaging portion of irregular contour.

15. In a cartridge, a primer comprising a cylindrical casing open at each end and at its powder end formed with an inwardly directed annular ledge for the reception of fulminate, a longitudinally movable block within said casing having one end adapted to engage fulminate carried by the powder end of the casing, said block having its engaging face of irregular contour and a hermetic closure for the other end of the casing comprising a cap held frictionally in said other end of the casing and provided with a button or enlargement on its closed end in operative relation to the corresponding end of the movable block in the casing.

16. A cap for cartridges having the end wall reinforced where it is designed to receive the impact of the firing pin.

17. A cap for cartridges having its end wall thickened to form a central, inwardly projecting button.

18. A cap for cartridges having the end wall locally reinforced where it is designed to receive the impact of the firing pin.

19. In a cartridge, a primer casing formed with an annular plate on one end extending to the interior walls of the cartridge body and against which the base end of the cartridge body abuts, said plate being provided with a cylindrical reinforcing sleeve concentric with the primer casing and adapted to surround the corresponding end of the cartridge body, and an annular end plate for the cartridge exterior to the primer struc-

ture and provided with a reinforcing sleeve concentric with and exterior to the sleeve on the end plate of the primer casing and beaded into the cartridge body adjacent to the free end of the sleeve on the end of the plate of the primer casing.

20. In a cartridge, a primer casing having an end plate and reinforcing sleeve thereon for housing the butt end of the cartridge body, and a reinforcing sleeve exterior to the first named sleeve and having the material thereof forced into the cartridge body adjacent to the end of the interior reinforcing sleeve remote from the end plate carrying the same.

21. In a cartridge, a primer casing having an end plate and reinforcing sleeve thereon for housing the butt end of the cartridge body, and a reinforcing sleeve exterior to the first named sleeve and having the material thereof beaded into the cartridge body adjacent to that end of the interior reinforcing sleeve remote from the end plate carrying the same.

22. In a cartridge, a primer casing having an end plate and reinforcing sleeve thereon housing the butt end of the cartridge body and a reinforcing sleeve exterior to the first named sleeve and having the material thereof forced into the cartridge body adjacent to that end of the interior reinforcing sleeve remote from the end plate carrying the same, the outer sleeve extending along the powder chamber of the cartridge beyond the forced in portion and at the end being crimped or upset into the body of the cartridge.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDGAR M. FUNK.

Witnesses:

JAS. M. WALKER,
E. STOMMEL.