PRIMER HAVING CLOSED FLASH HOLE MEANS

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This invention relates to an improved primer having a closed flash hole which keeps the propellant powder out of the battery cup for ballistics reasons and provides a closed primer which is less susceptible to mass detonation for improved safety.

More specifically, the invention relates to an improved primer in which a hinged flash hole cover is provided wherein the priming mixture, enclosed in the primer, is effectively sealed from propellant powder and other foreign objects which must be kept out of the primer as well as prevent the priming mixture from dusting out of the primer.

There have been various attempts to provide hermetically sealed primers including various patents which have issued in the past. The reasons why such hermetically sealed primers have been thought desirable have been discussed in various patents and need not be discussed fully here. It must be pointed out that the present invention does not contemplate a perfectly sealed primer which is impervious to air flow or moisture flow although such a primer can be achieved under the present invention. Instead, it has been discovered that a slight leakage in the primer is desirable for at least two reasons. First, in electroplating battery cups, in order to achieve good results, it is desirable that the plating bath make contact with the inner surfaces of the battery cup. When the battery cup bottom is completely airtight, air becomes trapped in the bottom of the battery cup and the plating bath cannot reach all portions of the cup consistently. With a slight leak present, air can leak out and the bath can flow into the cup to fill the bottom more consistently.

Secondly, present procedure calls for the insertion of the charged primer into the battery cup while the primer cup is still wet with shellac. This a safety precaution but it is imperative that the alcohol vapors be removed from within the battery cup during the drying cycle. The slight leak in the bottom wall of the battery cup will permit the drying of the primer even though the drying cycle may be longer.

If there can be one primary advantage attributed to the improved primer of the present invention, it must be considered to be “safety.” Thus, the ability of the present improved primer to prevent or eliminate mass detonation of primers when packed in bulk has been proven by experiment. The absence of primer flash holes through which the flame of an accidentally ignited primer can enter to set off adjacent primers results in a very real safety feature. This obviously results in safer primer manufacturing as well as permitting bulk packing of primers to facilitate inter-plant and commercial shipping and storing of primers.

Another advantage in the present primer is that the closed flash hole prevents explosive priming mix from dusting out of the primer after it has been charged as well as eliminate static electricity hazards.

An important advantage is that the closed flash hole construction permits the use of fine grain propellant powder without the fine powders settling into the battery cup and causing the primer cups to set back or fall out of the battery cup on firing. This advantage is particularly important in the design of magnum shotgun loads where very fine propellant powder is desirable but which heretofore has not been possible because of the problem of the powder settling back through the flash holes into the battery cup.

It is an object of this invention to provide an improved primer which is economical to make and safe to use.

It is another object of this invention to provide a hinged flash hole cover which maintains the necessary cover for the flash hole before firing and which remains in one piece with the battery cup after firing.

It is another object of this invention to provide a primer having a partially blanked flash hole which ruptures upon predetermined explosive pressure within the primer to hinge outwardly and form the primer flash hole.

It is another object of this invention to provide an improved primer having a controllable flash hole and cover relationship which permits more or less “breathing” of air through the closed flash hole means while still retaining the safety feature or preventing primer mass detonation.

Other objects will be apparent from the following description taken in connection with the accompanying drawings in which:

FIGURE 1 shows a cross-sectional view of a shotgun cartridge with the improved primer.

FIGURE 2 is a perspective view of the improved battery cup showing a cutaway view of the invention.

FIGURE 3 shows the battery cup after firing.

FIGURE 4 shows a cross-sectional view of a center-fire type primer utilizing the present invention.

FIGURE 5 shows a top view of the modification shown in FIGURE 4.

Referring now to the drawings, FIGURE 1 shows the general environment in which the improved primer 10 is found. It can be seen that the primer 10 is of the conventional type, i.e., of the type that is charged or loaded independently of the shotgun shell. Present practice includes the knocking out of a used primer of this type and the substitution of a new one for reloading of the shell.

Shotshell 12 can be seen to include a body casing 14 made preferably of plastic, although paper or metal or any other suitable material may be used. The preferred embodiment, as shown in FIGURE 1 also shows a metal head 16 surrounding the breech end of the shotshell and a plastic overlay 18 which effectively surrounds and seals a bazewad 20. The head 16, overlay 18, and bazewad 20 are adapted to receive primer 10 which can be seen to be positioned adjacent to propellant powder 22.

Primer 10 includes a battery cup 24, a primer cup 26, priming mix 28 in the primer cup, and an anvil 30. The battery cup 24 in turn includes an elongated tubular body portion 32 which is open at the breech end and closed off at the opposite end by a transverse flash end member 34. The breech end of the battery cup includes an out-
wardly extending flange 36 to facilitate positioning the battery cup in the head of the shotshell. The traverse flash end member 34 can be stamped, blanked, punched, etc. to displace and partially sever a segment of the end member 34 thus forming in effect a flash hole 38 and a flash hole cover 40 which is maintained integral with said battery cup by an unsevered and undisplaced hinge portion 42. Although FIGURE 2 shows the flash hole cover 40 displaced longitudinally from the transverse flash end member 34, it must be obvious that the cover 40 could be pushed back until it is flush with the end member 34, the amount of displacement depending, obviously, on the desired amount of primer "breathing" and the amount of air and moisture leakage permissible or desired.

The flash hole cover 40 retains the explosive pressure within the battery cup until a predetermined pressure is attained, after which the cover 40 will be forced outwardly to open the hinge means 42 until it reaches the position shown in FIGURE 3. There are several variables which can be controlled to alter the firing conditions of this primer. The flash hole disc cover 40 can be varied and made larger or smaller. The length and strength of the hinge portion 40 can be varied to affect the pressure at which the flash flaps or flash hole cover 40 will open. The distance that the cover is displaced and the amount of space between the cover and the peripheral wall of the flash hole not only affect the ballistics but also affect the amount of air and moisture which can move through the closed flash hole. Obviously, the thickness and type material of the battery cup is a factor. As in all such designs, a proper balance must be found which will permit the proper or desirable amount of primer "breathing" and still maintain its very important mass detonation prevention characteristic.

A modification utilizing the invention in a centerfire type of primer is shown in FIGURES 4 and 5. In these figures, primer cup 44 is shown to include a transverse bight portion 46 and a continuous flange portion 48 integral with the bight portion 46.

Positioned inside the primer cup 44 in sealing engagement therewith is a cone-shaped body member 50, the upper peak of which functions as an anvil means 52. Punched, stamped, blanked, or formed by some other method in the cone-shaped member 50 are at least two flash hole blow-out portions 54. It can be seen from FIGURE 4 that the blow-out portions 54 are partially sheared, the unsheared portion being shown at 56. The unsheared portions function as hinge means when closed, the explosion force outwardly upon ignition of the primer mixture 58 thus forming flash hole means while retaining the portions 54 integral with the body member 50.

The advantages of this feature have been explained above and need not be repeated here. It is noted that the two flash holes are angularly positioned which is effective in providing a single jet type of flame which improves the efficiency of the primer.

What is claimed is:

1. A primer assembly adapted to be inserted into the head end of a cartridge in a conventional manner, said primer assembly comprising a battery cup having a tubular body wall portion which is open at its outer end and closed at its inner end by a transverse end member, an anvil positioned within said battery cup, a primer cup having priming mixture therein positioned and frictionally held in the open end of said battery cup, a controllable flash hole blow-out portion integrally formed in said transverse end member, said blow-out portion being defined by a metal flaps which has been partially severed from and moved relative to the transverse end member a distance less than the thickness of the metal flap, thus maintaining a substantially imperforate end wall member, the portion of said blow-out portion which is not severed acting as a hinge to retain the blow-out portion as an integral part of the battery cup upon ignition of the priming mixture thus preventing any metal segments from being explosively projected through the gun barrel.

2. An improved metallic battery cup, said metallic battery cup being a closed-off end member which is adapted to be positioned adjacent the propellant powder in the associated cartridge, a controllable blow-out flash hole portion integrally formed in said closed-off end member, said blow-out portion being defined by a metal disc, the major portion of which has been partially severed from and moved relative to the closed-off end member a distance less than the thickness of the metal disc, thus maintaining a substantially imperforate relationship between the blow-out portion and the closed-off end member, and hinge means integral with said end member and said metal disc to retain said metal disc as an integral part of the battery cup upon being explosively projected away from the battery cup upon firing of the cartridge.

3. In a cartridge having a battery cup which is replaceable after use, said battery cup comprising a rigid, transverse flash end member being a controllable flash hole blow-out segment, a minor portion of which is integrally formed with said rigid end member and the major portion of which is sheared from said member and moved relative to the transverse end member a distance less than the thickness of the blow-out segment, said blow-out segment being positioned relative to the adjacent portion of said rigid end member so as to be substantially imperforate therewith before firing thus preventing fine propellant powder or other foreign objects from entering into the loaded battery cup and at the same time leaving room for the blow-out segment and adjacent portion of said rigid end member to permit air and volatile vapors to move therethrough for drying purposes, said minor portion of said flash hole blow-out segment adapted to bend upon firing of the cartridge to act as a hinge thus retaining the blow-out segment as an integral part of the battery cup and preventing any metal fragments from being explosively projected through the gun barrel.

4. A primer adapted to be assembled independently of and inserted in the head end of a cartridge, said primer comprising a primer cup, a one-piece body and anvil assembly in sealing engagement with said primer cup to define a chamber therebetween, said assembly including a body element having an anvil integrally formed therewith, said anvil projecting into said chamber and spaced a predetermined distance from said primer cup, a priming mixture positioned between said anvil and said primer cup, a controllable flash hole blow-out portion integral with said anvil, said blow-out portion being defined by a metal flap, a major portion of which is severed from the body element and moved relative therefrom to a distance less than the thickness of said metal flap so that upon firing of said cartridge said blow-out portion is displaced outwardly to form a flash hole, the minor portion of the metal flap which is not severed acting as a hinge which maintains the metal flap intact with the body element, said hinge constituting a minor portion of the periphery of the resulting flash hole.

5. A primer adapted to be inserted adjacent to propellant means in the head end of a cartridge, said primer comprising an outer cup-shaped member and an inner member cooperating to define a chamber therebetween, priming mixture positioned within said outer member and separated from said propellant means by one of said members, said one of said members having a flash hole therein, a single unit flash hole cover integrally formed with and partially sheared from said one of said members, said cover being of substantially the same size and configuration as the flash hole and displaced relative to said one of said members a distance less than the thickness of said cover so that when said flash hole cover
is in its operable position the flash hole is substantially entirely closed off thus preventing entry of objectionable material into said primer chamber through the flash hole but at the same time is not airtight so that air can move through for drying purposes, said flash hole cover characterized in that a minor portion of its periphery is unshaped where upon firing of the cartridge said cover is blown out outwardly to hinge on the unshaped minor portion while remaining integral with said one of said members.

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