July 3, 1923. 1,461,013

H. D. HODGE

RIM FIRE AMMUNITION

Filed July 13, 1920

Fig. 1.

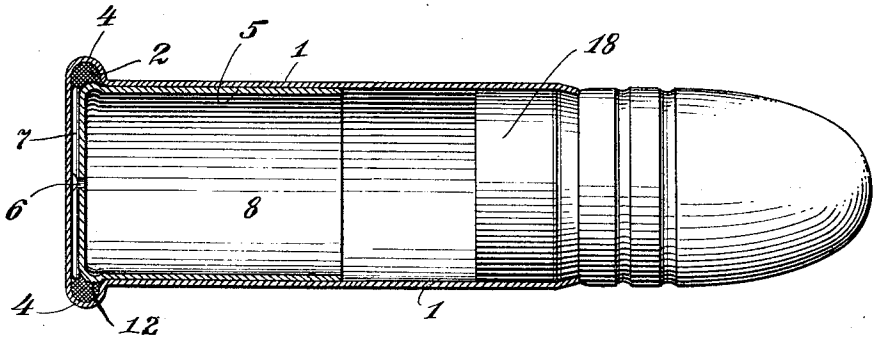


Fig. 2.

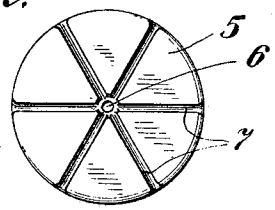


Fig. 3.

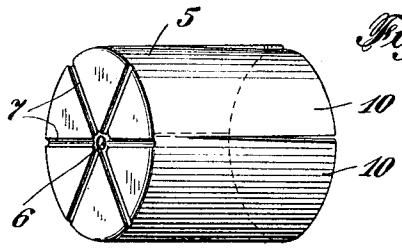


Fig. 4.

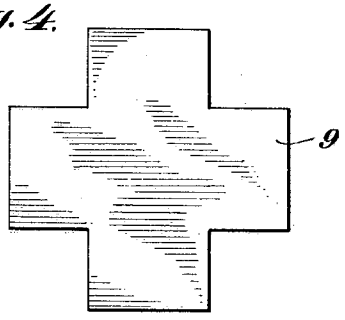


Fig. 5.

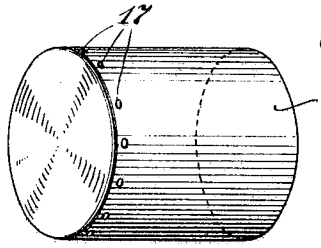


Fig. 6.

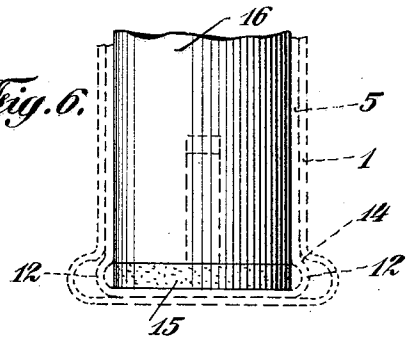
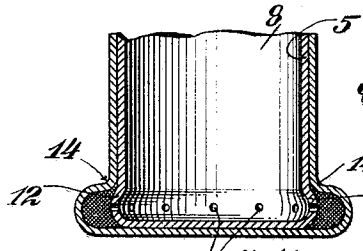


Fig. 7.



Inventor

Howard D. Hodge

By George Ramsey

Attorney

Patented July 3, 1923. 1,461,013

UNITED STATES PATENT OFFICE.

HOWARD D. HODGE, OF NEW YORK, N. Y., ASSIGNOR TO GEORGE RAMSEY, OF NEW YORK, N. Y.

RIM-FIRE AMMUNITION.

Application filed July 13, 1920. Serial No. 395,898.

To all whom it may concern:

Be it known that I, HOWARD D. HODGE, a citizen of the United States, and a resident of the city of New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Rim-Fire Ammunition, of which the following is a specification.

This invention relates broadly to ammunition and more specifically to rim fire cartridges.

The principal object of the present invention is to provide reinforcements for a rim fire or similar cartridge to permit use of such cartridges with high pressure powder in existing weapons of standard types.

Another object of the present invention is to provide reinforcements for a standard rim fire cartridge, without changing the compressibility of the rim carrying the priming whereby the cartridge may be used with powder having high ballistic efficiency, and which use is impossible under present conditions and methods of construction.

A further object of the present invention is to provide reinforcement for a rim fire cartridge to obviate bursting of the rim under high powder pressures, and wherein the reinforcement does not affect the sensitiveness of the rim to the striker or firing pin of the ordinary firearm.

A still further object of the present invention is to provide a rim fire cartridge with a pressure sustaining member adapted to prevent excessive pressure from reaching the ductile portion of the rim carrying the priming.

A still further and more specific object of the present invention is to provide a pressure sustaining cup adapted to be seated in the head of a rim fire cartridge to prevent excessive powder pressure reaching the priming rim, and also to efficiently direct the flame from the priming composition into the powder charge.

Other and further objects of the present invention will in part be obvious and will in part be pointed out hereinafter in the specification by reference to the accompanying drawings forming a part of the specification and wherein like parts are represented by like characters throughout the several figures thereof.

Figure 1 is a section through a rim fire shell illustrating one form of reinforcement in accordance with my invention.

Figure 2 is an end view of the reinforcing cup illustrated in Figure 1 and showing the flash-conveying grooves.

Figure 3 is a perspective view of the same type of reinforcing cup.

Figure 4 illustrates a blank from which the reinforcing cups may be formed.

Figure 5 is a view showing a modification having a series of openings through which the priming is adapted to fire directly into the powder chamber.

Figure 6 illustrates the preferred method of securing the cup in position in a shell.

Figure 7 illustrates a cup of the type shown in Figure 5 secured by the method illustrated in Figure 6.

The rim fire type of shell is particularly adapted for cartridges of small diameter or caliber for the reason that the heads of such shells are so small as to render the adoption and use of separate center fire primers inexpedient and expensive. In small calibers the powder space is small and it is therefore desirable that powder of high ballistic efficiency be used in this type of ammunition where any considerable range is desired. Experience has shown that where powder pressures in rim fire cartridges have been increased beyond that attained by black powder the rims burst under such powder pressure long prior to the attaining of pressures that would be most effective and efficient. Copper is commonly utilized as the most satisfactory material for rim fire cartridges for two reasons—first: the easily controlled ductility of the copper enables the maker to select his method so that the firing pin or striker will crush the primer rim without severing the crushed portion from the surrounding metal. Second: because other metals have been found to cause deterioration in the most commonly used and most satisfactory priming compositions, namely, those using fulminate of mercury as one of the constituent ingredients. Attempts to reinforce rim fire cartridges have heretofore been made by thickening the metal. This led to misfires due to the tendency of the thicker metal to flow the fulminate priming inwardly without detonat-

ing the same when the rim was struck by the firing pin, and also due to the fact that the firearms in use are equipped with firing mechanism capable of crushing, without cutting or breaking, the sensitive soft rim in common use, but not capable of crushing the heavier rim. The same troubles have been encountered by use of stronger metals—such as brass—and as previously set forth, and furthermore brass is one of the metals which causes rapid deterioration of fulminate of mercury.

The present invention overcomes the foregoing difficulties by leaving the sensitiveness of the priming rim entirely undisturbed and by providing means to prevent the excessive powder pressure from reaching the weak sensitive rim. This invention is preferably carried out by providing the base of the standard rim fire shell with an interior pressure cup constructed to permit the priming to fire the powder charge and to receive and support the gas pressures developed by the burning powder and prevent such pressures from reaching the rim. In practice the pressure receiving members may be formed of suitable cups, preferably copper, which are inserted in the shells, after the rim is filled with priming composition and which are maintained in position by slightly distorting the reinforcing cup to expand a very slight portion thereof under the shoulder of the primer rim. This construction obviates any possibility of the reinforcing cup leaving the shell when the shell is fired. The reinforcing cup and the shell are preferably formed by drawing the cup from a sheet of metal so as to provide spring segments on the side of the cup, which spring segments exert an outward pressure against the inside wall of the shell when the cup is in position. It has been found in practice with central fire cartridges that the opening leading from the primer to the powder chamber may be so proportioned, and in practice is, as to be large enough to permit the flame from the primer to penetrate and suitably ignite the powder charge at the same time to be small enough to prevent the combustion gas pressure from bursting the primer cup. I desire to utilize this principle in connection with my invention so that the openings leading from the primer will be sufficiently large to insure efficient operation of the priming at the same time be sufficiently small to prevent the passage of sufficient gas pressure to unduly increase back pressure in the priming rim during the normal firing of the cartridge.

Referring now to the drawings the standard rim fire shell 1 is provided with the usual composition priming 2 which is secured by adhesion with the walls of the firing rim 4. The reinforcing cup 5 fits the interior of the standard rim fire shell 1 and is seated against the head of this shell in such manner that the priming composition is confined between the walls of the rim 4 and the side wall of the reinforcing cup 5 so that when the striker or firing pin compresses the rim there is no possibility of the priming composition breaking away from the rim and thereby causing a misfire. As shown in Figures 1, 2 and 3, the reinforcing cup comprises a substantially cylindrical walled cup having the head thereof provided with a firing opening 6 from which leads a plurality of radial firing grooves 7 so that when the priming is exploded the flame and incandescent gases travel through the grooves and firing opening into the powder chamber 8 within the reinforcing cup 5. By this construction the flame of the priming is directed to the center of one end of the powder chamber along the longitudinal axis thereof so that all the advantages of a center fire cartridge are secured by this rim fire shell. The reinforcing cup may be formed from a blank 9, such as is illustrated in Figure 4, in such manner as to provide the cup with a plurality of spring segments 10 which tend to tightly grip the interior wall of the shell 1. The preferred method of securing the retaining cup within the shell is illustrated in Figures 6 and 7 and comprises an enlargement, as at 12, formed on the retaining cup and adapted to engage the shoulder 14 adjacent the firing rim 4. This enlargement may be conveniently formed by providing a compressible member 15, such as a pad of suitable rubber mounted upon the end of a suitable plunger 16, preferably metal, which may be used in seating the reinforcing cups in the shells. When such a device is inserted in the cup, with the shells seated on a firm anvil, pressure on the plunger 16 will cause the compressible member 16 to expand laterally thereby slightly stretching the reinforcing cup sufficiently to expand the same under the shoulder 14 as specified; the shell being retained in a suitable holder, not shown, during this operation. Where such interlocking constructions are provided between the reinforcing cup and the shell it may be desirable to form reinforcing cups with continuous side walls, as shown in Figure 5, and thereby omitting the spring segments. As a modification of the firing openings a series of small holes 17 may be provided in the reinforcing cup and leading from the priming directly to the powder chamber 8. In all cases it is desirable that the firing openings be so proportioned in size as to enable the priming to effectively ignite the powder charge but at the same time be sufficiently small to prevent excessive back pressure acting upon the firing rim, as has been previously specified. It is to be noted that the high pressure in the powder chamber to reach the rim must be transmitted

through the small openings and through the annular chamber which was filled by the priming composition. Before sufficient gas has passed into the priming chamber to increase the pressure therein up to the bursting point of the rim the projectile has left the muzzle of the gun and the gas in the cup is released to atmosphere.

Realizing that my invention may be embodied in structures other than the specific construction herein disclosed, it is my desire that the said disclosed construction be considered merely as illustrative and not in the limiting sense.

Having thus described my invention what I claim is:

1. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a portion extending within said rim sufficiently to interlock said cup with said shell, said cup being provided with flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited, and said openings being sufficiently small to retard the backward flow of gas pressure from the burning powder, thereby preventing excessive powder pressures from reaching the rim of the shell.

2. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a portion formed to comprise a small rim extending within said priming retaining rim sufficiently to interlock said cup with said shell, said cup being provided with flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited; and said openings being sufficiently small to retard the backward flow of gas pressure from the burning powder, thereby preventing excessive powder pressures from reaching the rim of the shell.

3. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a convex beaded portion extending within said rim sufficiently to interlock said cup with said shell, said cup being provided with flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited, said convex beaded portion being constructed to be forced tightly into said priming retaining rim by the force of the powder gases.

4. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a portion extending within said rim sufficiently to interlock said cup with said shell and allow sufficient space for the priming, said cup being provided with small flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited.

5. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a convex beaded portion formed to comprise a small rim extending within said priming retaining rim sufficiently to interlock said cup with said shell, said cup being provided with flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited, said convex beaded portion being constructed to be forced tightly into said priming retaining rim by the force of the powder gases.

6. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a portion formed to comprise a small rim extending within said priming retaining rim sufficiently to interlock said cup with said shell and allow sufficient space for the priming, said cup being provided with small flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited.

7. In a rim fire cartridge, a shell adapted to form a suitable powder chamber, a priming retaining rim of relatively soft thin material, a priming composition within said rim, and a re-inforcing cup mounted within the head of said shell and having a convex beaded portion formed to comprise a small rim extending within said priming retaining rim sufficiently to interlock said cup with said shell and allow sufficient space for the priming, said cup being provided with small flame openings to permit the priming material to fire the powder charge within the shell when the priming is ignited, said convex beaded portion being constructed to be forced tightly into said priming retaining rim by the force of the powder gases.

HOWARD D. HODGE.