May 9, 1933. H. W. BROWNSDON 1,908,314

SHOTGUN CARTRIDGE WAD

Filed Dec. 5, 1931

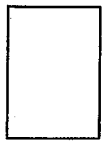


FIG. 1.

FIG. 2.

FIG. 3.

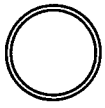


FIG. 4.

FIG. 5.

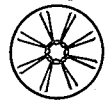


FIG. 6.

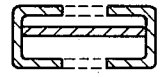


FIG. 7.

FIG. 8

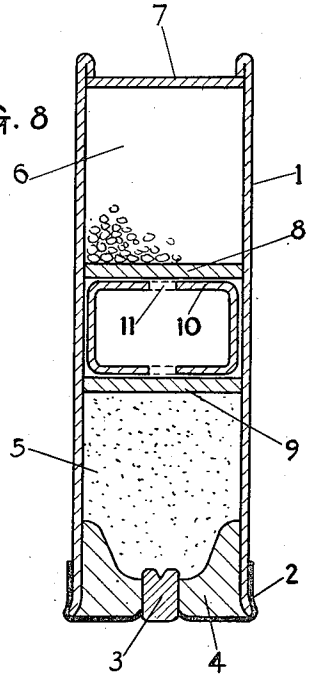
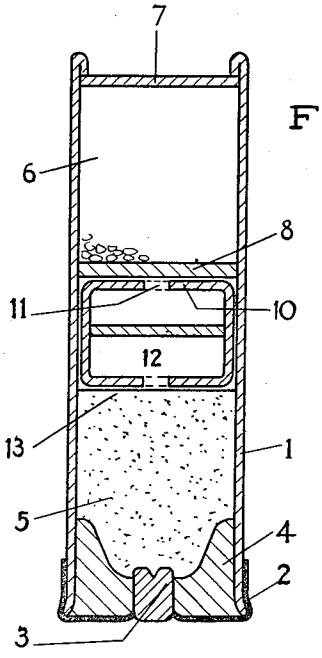


FIG. 9



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UNITED STATES PATENT OFFICE

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SHOTGUN CARTRIDGE WAD

Application filed December 5, 1931, Serial No. 579,312, and in Great Britain December 11, 1930.

The present invention relates to wads as used in shot-gun cartridges between the propellent explosive and the shot.

The desired properties hitherto sought for in wads for shot-gun cartridges are resiliency or elasticity combined with light weight, and for this reason wads as generally used consist largely of materials such as felt or cork.

The object of the present invention is to produce a wad which will give the desired ballistic results through its form and design rather than from the nature of the material from which the wad is made, although this should be capable of deformation under the conditions of use, relatively light in weight, and preferably readily obtainable and cheap in price.

According to the present invention, a wad for shot-gun cartridges consists of a short hollow cylinder made of comparatively rigid and light preferably non-metallic material, especially paper, cardboard, and the like, e. g. pasted paper tube of the kind generally used for making shot-gun cartridge cases. Preferably the edges of the cylinder are crimped or turned inwardly and at right angles to the curved surface, so as to stiffen the wad for handling, to permit its being readily placed within the cartridge case and to provide a good seating for buffer discs of cardboard or other material which are generally placed at the ends of the wad. The inward crimping of the edges of the hollow cylinder also assists in securing symmetrical collapse of the wad when it is used in conjunction with a strong over-powder disc and submitted to the pressure exerted by the powder gases on the firing of the cartridge. Such wads may conveniently be cut from a long tube of paper, cardboard or other suitable material and they may be lubricated in any desired manner, either externally only or completely, by immersion in a suitable molten lubricant, e. g. paraffin wax. The wads may be made of various sizes and strength as required; for wads for 12 bore cartridges I find that tubes about 0.730″ external diameter and rolled from pasted paper about 0.005″ thick are suitable. The wad is formed by cutting off a length of the tube and then crimping and turning over the ends so as to form a cylinder with two flat ends, a cylindrical length of $\frac{7}{16}$″ to $\frac{8}{16}$″ being suitable for most cartridges. The wads may be made strong or weak according to the number of laps of pasted paper used in rolling. When it is desired to obtain an easily collapsible wad a weak tube made from three laps of paper may be used in conjunction with a strong over-powder card say ⅛″ in thickness. If a stronger tube is used for making the wads then a stronger over-powder card may be necessary to ensure collapse of the wad.

The method of manufacture of the improved wads is illustrated in the accompanying drawing, in which Figures 1–3 are elevations of the wad at various stages of the manufacture and Figures 4–6 are the corresponding plan views. Figures 1 and 4 illustrate the initial hollow cylinder open at both ends, Figures 2 and 5 illustrate the cylinder after crimping the edges, and Figures 3 and 6 illustrate the finished wad in which the ends have been turned in at right angles, leaving a small central hole. It is not, of course, necessary that the amount of turn over should be so great as is illustrated in Figure 3.

Figure 7 shows a wad having a tightly fitting internal disc of cardboard or the like, the purpose of which is described below.

Figures 8 and 9 are sections of cartridges containing my improved wad. In these figures, 1 is the cartridge case, 2 the metal base and 3 the percussion cap. 4, 5 and 6 respectively are the base wad, the powder charge and the shot charge. 7 is the overshot or closing disc. 10 is the driving wad, and 11 the central hole therein formed by turning over the edges. In Figure 8 the powder charge is separated from the driving wad by the usual overpowder disc 9, and the wad in turn is separated from the shot charge by the undershot disc 8. The disc 8 is always sufficiently strong to prevent shot entering the wad when the cartridge is fired. In Figure 9 the overpowder disc is dispensed with and the wad 10 is only separated from the

powder by a thin paper membrane 13. The wad is of the type shown in Figure 7 having a tightly fitting internal disc 12 which is driven to the top of the wad when the cartridge is fired and prevents the escape of powder gases through the hole 11. It will be understood that for the purpose of clarity the clearance between the wad 10 and the cartridge case 1 has been exaggerated in the drawing, merely for purposes of illustration.

I have found that if the powder gases are given easy entry into the interior of the paper tube wad the collapse of the wad to corrugated form may not take place but that equally good obturation is obtained by the expansion of the paper tube through the internal gas pressure. In this case it is advisable to have a strong tubular wad and a weak over-powder card and the wad is made with a tightly fitting internal disc of cardboard or the like so as to make quite certain that the wad will be ejected from the gun on firing. Moreover in this case although the over-powder card is of value when used with a lubricated wad, in that it prevents contamination of the powder by the lubricant, it may be dispensed with altogether, in which case the powder is prevented from entering the wad through the central aperture by means of a thin paper disc which may be stuck over the base of the wad before the cartridge is assembled. Alternatively, the hole in the base of the wad may be filled with sealing wax or the like. An over-powder card is thus not essential to the functioning of the wad in the case where collapse of the wad does not take place, but only serves to keep the powder in position.

Inasmuch as paper and the like of itself has not the elastic properties hitherto considered necessary in material for shot-gun cartridge wads, wads made according to my invention are not resilient or elastic as solid wads of felt or cork, but they may be made to collapse under pressure to an annular corrugated form larger in diameter than the original wad or they may be expanded by internal gas pressure without collapse, thus obtaining the desired effect of obturation between powder gases and shot.

The properties of wads made according to my invention are thus capable of easy modification and control so as to obtain the most desirable ballistic results from the different propellants.

Although I have referred to the use of one wad only I wish it to be understood that if desired more than one wad may be used, in which case the wads may or may not be separated the one from the other by thin cardboard or other suitable material.

I claim:

1. A wad for use in shot-gun cartridges between the propellent explosive and the shot charge, which comprises a hollow cylinder of non-metallic material which is substantially rigid and light in weight, said cylinder having its edges crimped or turned inwardly.

2. A wad for use in shot-gun cartridges between the propellent explosive and the shot charge, which comprises a hollow cylinder of non-metallic material which is substantially rigid and light in weight, said cylinder having its edges crimped or turned inwardly and at right angles to the curved surfaces.

3. The invention of claim 2 in which the hollow cylinder is adapted to collapse under pressure to an annular corrugated form.

4. A wad for use in shot gun cartridges between the propellent explosive and the shot charge, which comprises a hollow cylinder of substantially rigid material in combination with an overpowder disc and an undershot disc, said overpowder disc being sufficiently strong relative to the said cylinder to enable the cylinder to collapse under the pressure of the powder gases produced upon firing the cartridge, and said undershot disc being sufficiently strong to prevent entry of shot into the wad when the cartridge is fired.

5. A wad for use in shot gun cartridges between the propellent explosive and the shot charge, which comprises a hollow cylinder of of substantially rigid material in combination with an overpowder disc and an undershot disc, said overpowder disc being sufficiently weak relative to the said cylinder to collapse when the cartridge is fired and thus permit the powder gases to enter the interior of the wad, and said undershot disc being sufficiently strong to prevent entry of the shot into the wad when the cartridge is fired.

6. A wad for use in shot gun cartridges between the propellent explosive and the shot charge, which comprises a hollow cylinder which is substantially rigid and light in weight, said cylinder being adapted to collapse to an annular corrugated form upon exposure to the pressure of the powder gases when the cartridge is fired.

7. A wad as set forth in claim 6, in which the hollow cylinder is made of cardboard.

8. A wad as set forth in claim 6, in which the hollow cylinder is made of pasted paper tubing of the kind generally used for making shot gun cartridge cases.

9. A wad for use in shot gun cartridges between the propellent explosive and the shot charge, which comprises a hollow cylinder which is substantially rigid and light in weight, said cylinder containing an internal disc to ensure the ejection of the wad from the gun when the cartridge is fired.

In testimony whereof I affix my signature.

HENRY WINDER BROWNSDON.