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SHOTGUN CARTRIDGE

Filed Oct. 31, 1949

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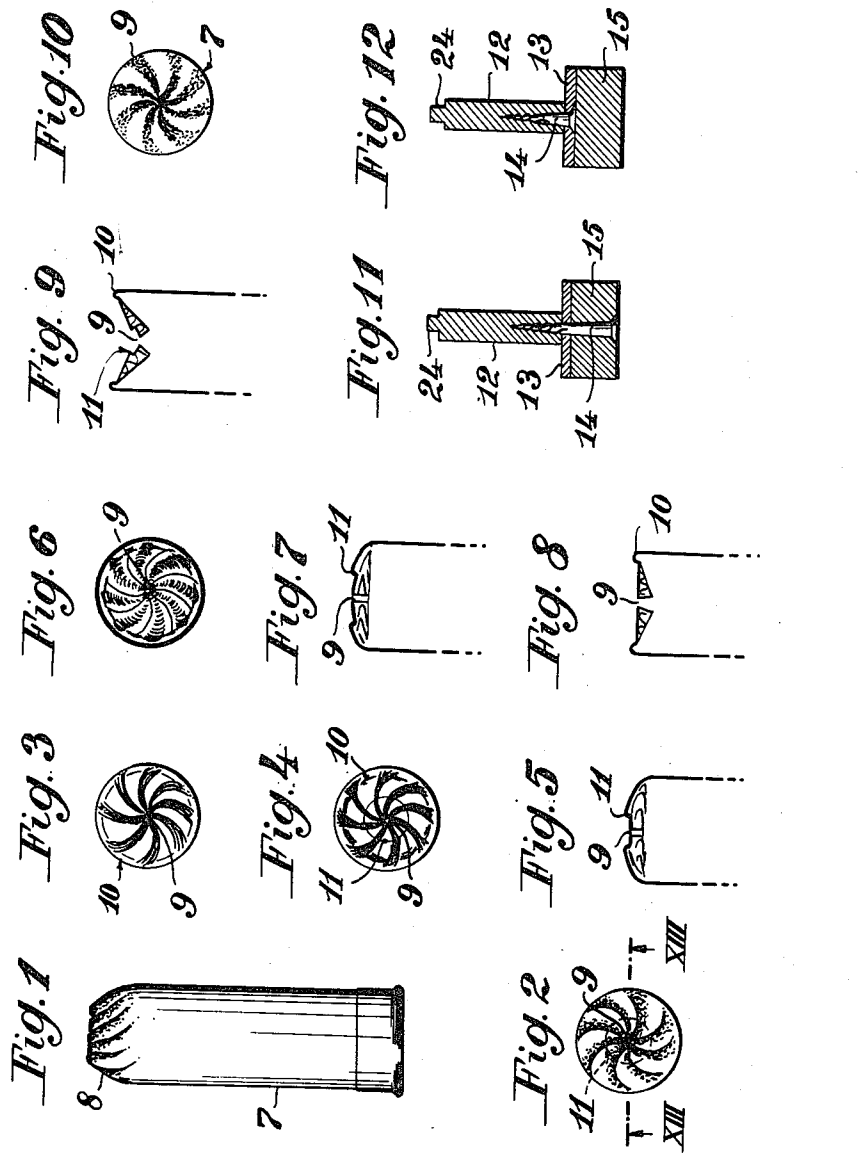

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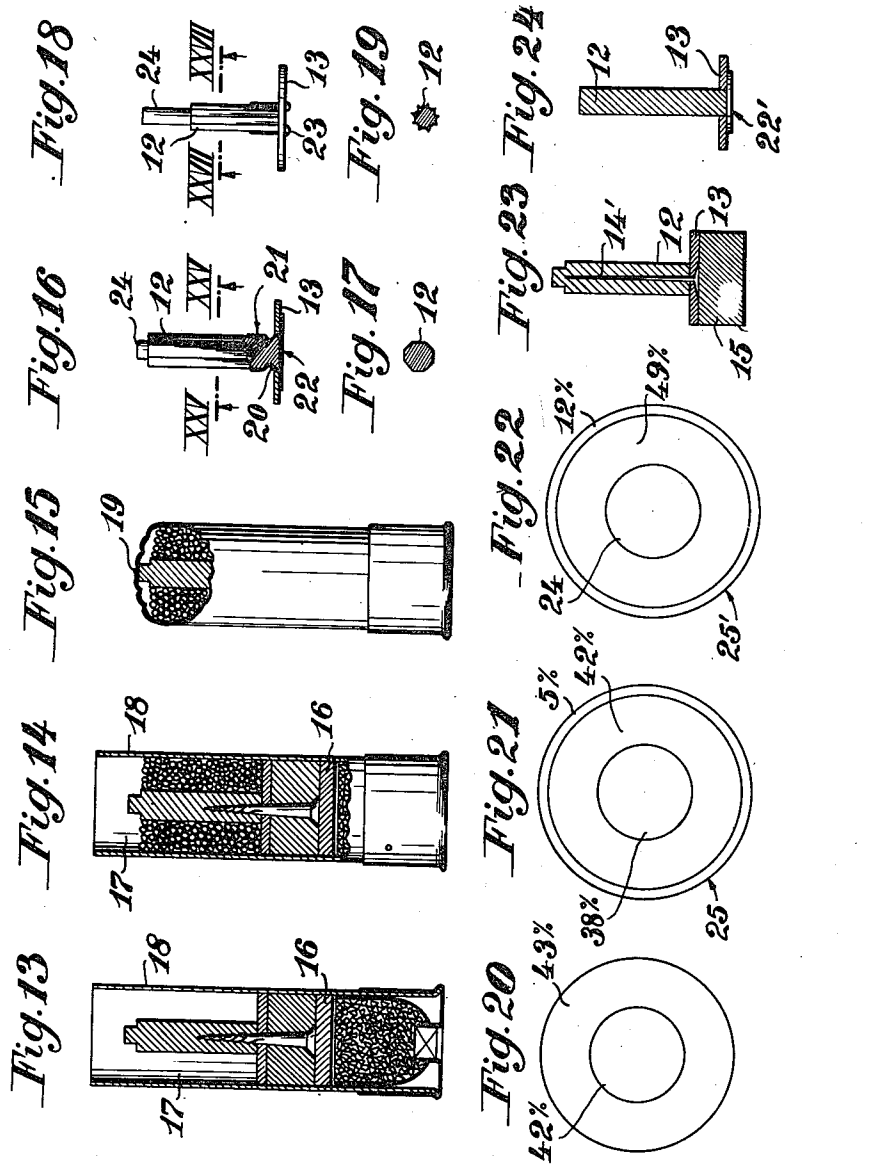
2 SHEETS—SHEET 2



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SHOTGUN CARTRIDGE

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1

This invention relates to shot gun cartridges and to a method of loading and closing the same.

It is an object of this invention to provide a cartridge in which it is possible to set the dimensions of the pattern and the density of the shot pellets therein so as to obtain, at a determined distance, patterns having different dimensions and different distribution of the shot pellets, or to obtain at different distances patterns having equal dimensions and nearly equal density of shot pellets.

Another object of this invention is to provide a shell with a spiral shaped plated closure.

A further object of this invention is to provide a device in the form of a rod positioned within the shell and within the load of shot for controlling the distribution of the shot.

Other objects will appear from the following description.

In order to facilitate an understanding of the present invention, reference is made to the accompanying drawings in which:

Figure 1 is a side view of a cartridge prearranged for a spiral shaped closure;

Figs. 2, 3, 4 and 10 are top plan views of cartridges provided with spiral shaped closures;

Fig. 5 is a cross-section along line XIII—XIII of Fig. 2;

Fig. 6 is a view from the inside of the cartridge shown in Fig. 2;

Figs. 7, 8 and 9 show schematically the section of different closures of the cartridge;

Figs. 11 and 12 are cross-sectional views of the spreader and control rod connected to the wad;

Figs. 13 and 14 illustrate a vertical section of cartridges in different steps of their loading;

Fig. 15 illustrates a loaded cartridge with the wall of the shell partially cut off;

Figs. 16, 18, 23 and 24 illustrate different embodiments of the rod provided with a base;

Fig. 17 shows a section along the line XXV—XXV of Fig. 16;

Fig. 19 is a section along the line XXVII—XXVII of Fig. 18.

Figs. 20, 21 and 22 illustrate different patterns obtained with different cartridges with equal gun-powder and shot.

It has been found that it is possible to set at will within certain limits the distribution of the shot pellets in the pattern by making use of a device for control of the density of shot located inside the cartridge and by means of a spiral shaped closure of the shell.

It is to be noted that, with the proposed spiral shaped closure the end closure of the shell may be concavely dished, flat or convex.

2

By employing a flat, concave or convex spiral shaped closure, it is possible to regulate the resistance to be opposed to the exploding means employed.

The spreader for the distribution and control of the density of the shot pellets employed in loading the cartridge is in the form of a small rod, e. g. of cardboard or hard rubber, or paper coated cork, or other suitable material.

The diameter of the rod may vary and the shape thereof is generally cylindrical but may be octagonal provided with longitudinal grooves.

In the upper part, the diameter of the rod may be reduced for a length of two or three millimeters, for the purpose not only of obstructing the central hole resulting after the closure is made, but also of keeping centered and steady the rod inside the shot along the axis of the cartridge.

The rod bears upon the wad located underneath the shot and is fixed thereto by means of wires, screw or nail, according to the material which the rod is made of. The rod may be made of hard rubber and has a base of a diameter greater than the diameter of the rod; in this case the rod is introduced in and held in place by a centrally bored cardboard disc.

The diameter of the rod may vary according to the size and the quantity of the shot and the upper part thereof projects always from the upper surface of the shot. Yet the diameter of the rod is correlated with the density of the shot pellets which it is desired to be obtained on the pattern.

For example, in a 12 gauge shot gun cartridge, the diameter of the rod may be of 4 to 6 mm. more or less.

The annular arrangement of the shot due to the presence of the rod causes, as the charge is exploded, the shot to keep along the barrel the arrangement it had inside the shell and to be pressed against the rod on account of the choking of the barrel. Upon being discharged from the muzzle, the rod and the wad connected thereto will accompany along the first portion of the trajectory the shot and upon abandoning the same, the shot goes on with a centrally formed core, i. e. arranged as an annulus. It reaches the target distributed in such a manner as to fill up prevalently the peripheral zones at the expense of the central ones, and yet these latter zones are not lacking of shot.

By making use of rods of hard material the patterns are narrower but less regular, while with less hard material the patterns are broader

and very regular at equal diameter of the rod. That is caused by the fact that the rod made of hard rubber or cork is rather compressed by the shot during the travel in the barrel and in passing through the muzzle, where the barrel is choked to the maximum. At the exit of the muzzle, owing to its elasticity, the rod enlarges the ring formed by the shot so as to cause the pellets to be preferably distributed in the peripheral zones.

It is possible to establish through experiments the diameter of the rod to obtain a desired density of the shot on the pattern. For example, at a distance of 30 m. under equal conditions (powder, wad, shot, atmospheric conditions) a cartridge having a rod of 5 mm. will give a pattern less broad and with a density at the center greater than that obtained with a rod having a diameter of 6 mm.

Referring now to Fig. 1, in the upper part of the shell **7**, a plurality of bow shaped plaits are arranged so as to form bow shaped grooves with the larger bases at the bottom and narrower base at the top spirally arranged around the axis of the cartridge. All the greater bases of the grooves **8** are at the same height of the shell, and the length of the same is greater than the radius of the shell and may vary according to the dimensions of the pattern to be obtained. After the cartridge is loaded, the plaits are made by means of a tamping member (not shown) which may accomplish two motions, respectively downward and circular so as to obtain a helicoidal motion.

The plaits **8** are then pushed toward the center and downwards, so as to obtain a shape substantially convex upward with the tops of the plaits adjacent to the axis of the shell, as shown in Figs. 2 and 5, and held in place by a circular edge **11**, giving rise to a central hole **9**.

In this way, the plaits are pressed and made adjacent to each other and cannot unplait owing to the strain generated in the material, unless a considerable pressure is exerted from inside the cartridge.

By further pressing the closure of the shell from outside, the closure is caused to assume the flat shape shown in Fig. 8, wherein also a peripheral edge **10** is provided for, or the closure may be concavely dished as shown in Fig. 9, wherein two concentric edges **10** and **11** are provided.

If the plaits are made longer by lowering their base, the said edges are no longer necessary for locking the plaits against unplaiting; such arrangement is schematically shown in Fig. 10. When the charge is exploded, the spiral shaped closure made as above disclosed, opens with a movement inverted in respect of the movement made during the closure and the shot assumes a rotation imparted by the unplaiting of the bow shaped plaits so that a regular distribution of the shot pellets on the pattern is promoted.

It has been found that by employing a rod having an average diameter together with the spiral shaped closure, it is possible to have a suitable enlargement of the pattern, for instance, a pattern having a diameter of 75 cm. at a distance of 25 meters is obtained, instead of at a distance of 35 meters as it occurs with the usual cartridges.

By increasing the number of the plaits and the length thereof, and the diameter of the rod to the maximum indicated above, it would be possible, if necessary, to have patterns having greater dimensions.

The possibility of having a concave flat or convex spiral shaped closure makes it possible to suit the closure to the kind of powder employed.

The scattering of the shot with the spiral shaped closure is minimized.

The patterns shown in Figs. 20, 21 and 22 illustrate the results obtained.

Fig. 20 shows a pattern obtained at a distance of 30 m., with a cartridge having a usual concave closure; such a pattern has a diameter of 76 cm. and contains 85% of the shot pellets of which 42% is in central zone and 43% in the peripheral zone. The same cartridge at a distance of 25 m. gives also a pattern of 76 cm. which contains 90% of the shot pellets of which 58% is in the central zone and 32% in the peripheral zone.

The pattern shown in Fig. 21 is obtained at a distance of 30 m. by means of a cartridge having a spiral shaped closure without spreader rod; the pattern has a diameter of 86 cm. and contains 85% of the shot pellets of which 38% is in the central zone, 42% in the peripheral zone and 5% in the external annulus **25**.

Fig. 22 shows a pattern at a distance of 30 m. having a diameter of 86 cm., obtained with a spiral shaped closure together with the spreader rod. 85% of the shot are distributed as follows: 24% in the central zone, 49% in the peripheral zone, and 12% in the external annulus **25**. The same cartridge at a distance of 25 m. gives a pattern having a diameter of 76 cm., which contains 88% of the shot pellets of which 31% is in the central zone and 57% in the peripheral zone.

In Fig. 11 is illustrated the rod **12** connected to the cardboard disc **13** and wad **15** by means of screw **14**. This latter may connect rod **12** only to cardboard disc **13** and not to wad **15**, as shown in Fig. 12.

Rod **12** may be introduced in a metallic ring **21** to which it is connected by means of lateral punchings **20** as shown in Fig. 16.

Ring **21** is integral with the metallic disc **22** having a smaller thickness and a diameter smaller than that of the cardboard **13**. In this case cardboard **13** is centrally bored and bears on the metallic disc **22**, which is pressed between wad **15** and cardboard **13**.

The rod (Fig. 18) may be provided with vertical grooves up to two thirds of its height, while the remainder third has a diameter smaller and equal to the diameter of the hole generated by the plaits of the spiral shaped closure.

The rod may be connected to the cardboard **13** by means of headed metallic wires **23** (Fig. 18) or by means of a flat headed nail **14** (Fig. 23), which ends near the top of the rod.

The rod **12** and the disc **22'** may be made integral of rubber as shown in Fig. 24 and introduced in the central bore of the cardboard **13**.

The upper part **24** of the rod is cylindrical with a height of 2–3 mm. and a diameter of 3–4 mm. so that by penetrating in the hole generated by the plaits of the closure (Fig. 15) it is kept steady and centered inside the shell.

Having described my invention. I claim:

1. A loaded cartridge consisting of a shell provided with a charge of shot and means of exploding the cartridge, an element for the distribution of the shot pellets in a pattern, said element being in the form of a rod provided with a base having a diameter greater than the diameter of the rod, a centrally bored cardboard disc through which the rod is introduced and upon which the shot arranged around the rod bears, the top of the said rod projecting

from the upper surface of the charge of shot, a number of plaits in the upper part of the wall of the shell and said upper part of the wall being folded inwardly and downwardly so as to form a central hole through which the top of the said rod penetrates.

2. A loaded cartridge consisting of a shell provided with a charge of shot and means of exploding the cartridge, an element for the distribution of the shot pellets in a pattern, said element being in the form of a rod of rubber provided with a base having a diameter greater than the diameter of the rod. a centrally bored cardboard disc through which the rod is introduced and whereupon the shot is supported, the top of the said rod projecting from the upper surface of the charge of shot, a number of spiral shaped plaits in the upper part of the wall of the shell and said upper part of the wall being folded inwardly and downwardly for closing the cartridge so as to form a central hole through which the top of the rod penetrates.

3. A cartridge as claimed in claim 2 wherein

the spiral shaped plaits are further locked in closed position by means of at least one edge formed in the shell.

4. A cartridge as claimed in claim 1 wherein the spiral shaped plaits are longer than the radius of the shell so as to be locked against unplaiting.

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