Dec. 29, 1925. 1,567,631

R. L. WHEELER

FLEXIBLE END SEAL CARTRIDGE AND AMMUNITION

Filed Nov. 25, 1924

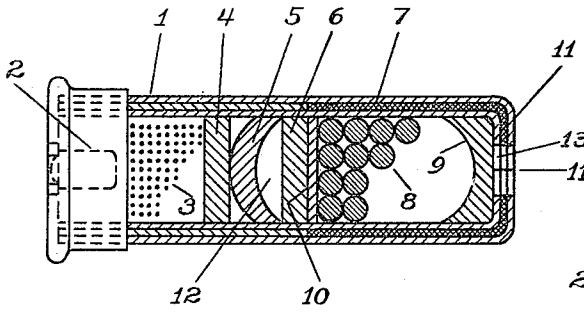


Fig. 1

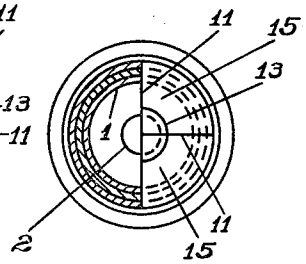


Fig. 2

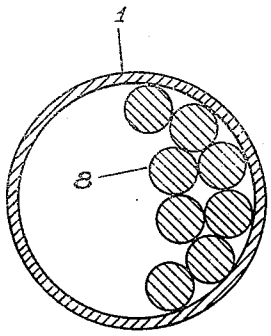


Fig. 4

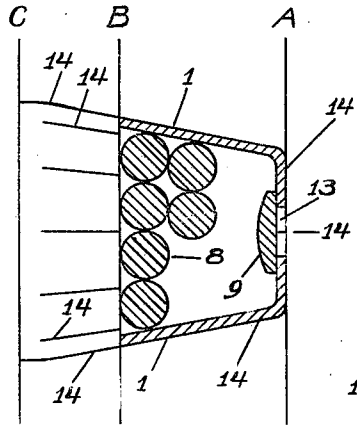


Fig. 3

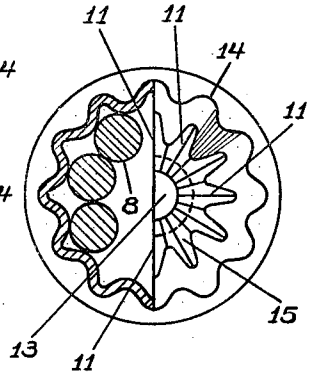


Fig. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

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FLEXIBLE-END-SEAL CARTRIDGE AND AMMUNITION.

Application filed November 25, 1924. Serial No. 752,224.

To all whom it may concern:

Be it known that I, ROBERT L. WHEELER, a citizen of the United States, residing at Plentywood, in the county of Sheridan and State of Montana, have invented a certain new and useful Flexible-End-Seal Cartridge and Ammunition, of which the following is a specification.

My invention relates to improvements in cartridges and ammunition; and the objects of my improvements are, first, to insure maximum penetration; second, to insure minimum recoil; third, to reduce the quantity of ineffective gas due to leakage to a minimum; fourth, to insure a wider adaptability of cartridges and ammunition to different types of guns and ordnance and to a larger variety of service conditions; fifth, to increase the velocity of the shot; sixth, to increase the accuracy and uniformity of the discharge, and to reduce the wear on the gun or ordnance barrel.

I attain these objects by the arrangement and form of the devices and parts illustrated in the accompanying drawings, in which—

Figure 1 is a partial longitudinal sectional view of a typical flexible end seal cartridge; Fig. 2 is an end view showing a method of flexibly sealing the end of my cartridge; Fig. 3 is a combination side view and longitudinal section of a portion of the shot chamber in a modified form of my cartridge, in which the segment between planes CC and BB represents a side view and the segment between planes BB and AA illustrates a section through the longitudinal axis of my cartridge. In the sectional segment BB to AA the interior view of the corrugations have been omitted for the sake of simplification of the drawing; Fig. 4 is a transverse section along the plane CC of Fig. 3, taken perpendicularly to the longitudinal axis of my cartridge; and Fig. 5 is essentially an end view between the transverse planes AA and BB.

Similar numerals refer to similar parts throughout the several views.

The cartridge shell 1, Fig. 1, made of any suitable material has imbedded between its component material layers a cylindrical layer 7 of any suitable soft and flexible metal extending along the shot chamber. Metallic layer 7 may be extended over the end of the cartridge, as shown in Figures 1 and 2, thus partially increasing the rigidity of the end seal without totally destroying its flexibility. Metallic layer 7 may be perforated in order to reduce its natural rigidity and it may also be made out of any suitable metallic wire mesh fabric. All these forms, suitable for the metallic layer 7, and all other modifications thereof, are within the scope of my invention.

The head of my cartridge is equipped with any suitable primer 2. Cartridge shell 1 also contains the powder charge 3, located in the powder chamber; wads 4, 5, and 6; and the shot chamber end seals 9 and 10; together with the shot containing chamber and its load of shots 8. Wads 4 and 6, made of any suitable material, are preferably hard-faced on the sides adjacent to the flexible wad 5 which is not hard-faced. Wad 5 is made of strong but flexible material. It is preferable that neither face of wad 5 is hard faced. An air chamber 12 is provided between wads 5 and 6 by suitably deforming wad 5 in such a manner that its principal bounding surfaces shall not be geometrical planes. In practice, I, preferably, deform wad 5 in any suitable manner which will provide an opening between the most adjacent surfaces of wads 5 and 6. This deformation of wad 5, in my invention, is preferably of such form that, during expansion, it will automatically establish and maintain air and gas-tight contact with the interior walls of cartridge shell 1. By means of this design and construction of wad 5 the quantity of escaping gas is reduced to a minimum. This innovation in the design of wad 5, when taken in conjunction with the form, type, and relative placement of wads 4 and 6 and in cooperation with the operative functions of air chamber 12, insure the reduction, to a minimum, of all the dependent deleterious effects prevalent in present types of cartridges. Air chamber 12 acts as an elastic cushion during discharge and thereby aids in minimizing the detrimental effect of recoil. By varying the type of metal layer or wire fabric 7, I am enabled to construct cartridges which conform with practically all types of service conditions and requirements.

One method of producing my flexible end seal is shown in Fig. 2, where the radial cuts 11 permit the sectors 15 to be folded

over the end of shot chamber. The folded or crimped sectors 15, in conjunction with the shot-seal 9, which closes aperture 13, produce a flexible cartridge end seal which reduces, to a minimum, the loss of power which is inevitable in rigidly sealed cartridges. With a relative increase in power, due to the cooperative functions of my design, I secure an increase in both penetration and velocity.

A modified form of my flexible end seal is shown in Fig. 5 which pertains to a form of my invention in which the shell 1 is corrugated along a portion of its length. The radial cuts 11, in Fig. 5, permit the sectors 15 to be crimped or folded, thus partially closing the end of the cartridge. Aperture 13 is closed by the shot-seal 9.

It should be clearly evident that flexible end seals may readily be produced by other modifications of the methods shown in accompanying drawings. All such modifications are within the fundamental principle of my invention.

Corrugations 14, Figures 3 and 5, permit the gradual expansion of the shell 1 thus obviating all those detrimental effects, in the present types of cartridges, which are due to premature liberation and contact of the shots with the inside surface of the gun or ordnance barrel. By this construction I not only reduce the wear on the barrel but secure greater accuracy and uniformity in the discharged shot load. Corrugations 14 permit the shot load to be released with greater ease and also prevent the expansile gas from reaching the shot with the result that some are melted. Moreover, the full driving power of the expansile gas is realized by means of the shell flexibility due to these corrugations. Wherever it is found desirable a suitably formed metallic layer 7 may be imbedded within the corrugated and deformed cartridge shell 1.

I do not wish to limit myself to the particular forms shown for the shot-seals 9 and 10 in Figures 1 and 3. Any form which is useful and required by the service conditions is within the scope of my invention.

Having thus described my invention, I claim:

1. A cartridge shell having a wall comprising a plurality of layers, one of which layers in that portion of the shell corresponding to the shot chamber is of soft and flexible metal which extends along the length of said shot chamber, a shot seal in the front end of said cartridge shell and the front portion of the wall of said cartridge shell comprising inwardly bent sectors which bear against said shot seal.

2. A cartridge shell having a wall, at the shot chamber portion of said shell tapered forwardly, said tapered portion of said wall being provided with longitudinal corrugations, said corrugations strengthening said portion of said wall and permitting gradual expansion of said tapered portion of said wall and preventing premature liberation of the shots and also preventing the gas of the charge from reaching the shot.

3. A cartridge shell having a wall, at the shot chamber portion of said shell tapered forwardly, said tapered portion of said wall being provided with longitudinal corrugations, said corrugations strengthening said portion of said wall and permitting gradual expansion of said tapered portion of said wall, the extreme front end portion of said wall being formed with radial inwardly folded sectors and the said shot chamber of said shell having a shot seal which bears against the inner sides of said sectors.

In testimony whereof I have, this 18th day of November, 1924, affixed my signature.

ROBERT L. WHEELER.