

UNITED STATES PATENT OFFICE.

JOHN D. PEDERSEN, OF JACKSON, WYOMING.

GUN-OPERATING CARTRIDGE.

1,062,604.

Specification of Letters Patent.

Patented May 27, 1913.

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To all whom it may concern:

Be it known that I, JOHN D. PEDERSEN, a citizen of the United States, residing in Jackson, in the county of Tinta and State of Wyoming, have invented certain new and useful Improvements in Gun-Operating Cartridges, of which the following is a specification.

My present improvements relate to cartridges especially intended for use in that class of automatic or self-loading fire-arms in which it is desired to operate the loading mechanism by the power of the explosive transmitted backward to that mechanism through some member actuated from the cartridge.

The present improvements are adapted for use in guns having a uniform diameter of bore throughout the length of the barrel, and are equally adapted for use in the more usual chambered form of bore, in which the rearward part of the bore of the barrel is enlarged or chambered for receiving a cartridge having its shell of a diameter greater than that of the bullet, as generally practised in the manufacture of fire arms for using fixed ammunition.

In the drawings accompanying and forming a part of the specification, Figure 1 is a longitudinal sectional view representing a shell or cartridge located in the chambered bore of a gun in position ready for firing. Fig. 2 is a similar view drawn in alignment with Fig. 1 for illustrating the operation of my improvement as a result of the firing of the cartridge.

Similar characters designate like parts in all of the figures.

For illustrating my present invention, I have shown the cartridge shell S located within the bore of a gun barrel, L, of which, however, only a fragmentary portion is shown in the drawing. The cartridge at its point end is shown as having the shell S reduced in diameter, as indicated at 9, for receiving a bullet T. In some cases the reduced portion 9 of the shell S may be omitted, and the bullet located in the forward end of the main portion 2 of the shell, in a manner well understood. For this reason I do not regard the portion 9 of the shell as being in any way involved with my present improvement. The forward portion 2 of the shell is represented of a relatively thin formation corresponding to the usual construction of this portion of the metal

shells of fixed ammunition. This forward portion of such shells, it will be remembered, when the charge is fired are necessarily somewhat expanded so that normally this portion of the shell will be expanded by the gas pressure sufficiently to bring the same into firm contact on the inside of the bore. This action of the shell I designate the gripping contact, since the sliding of this portion of the shell in the bore of the gun would, of course, be resisted by whatever frictional engagement may be produced by the gas pressure.

The head or rearward portion H of the cartridge (which portion I have shown of a conventional kind and form), should, of course, be made of sufficient stability to effectively resist deformation by the firing of the cartridge, and should also be sufficiently resistant to the gas pressure,—and should be made of such a diameter relatively to the bore in which the cartridge is to be used,—that notwithstanding the gas pressure said head portion will slide backwardly in the rear end of the bore with comparative freedom. This rearward movement of the head portion of the cartridge would only be produced in cartridges of the usual form by the separation of the shell at some point between the bullet and cartridge head (which sometimes occurs in practice by accident) or by the bodily sliding backward of the entire shell, but this latter mode of action is subject to disadvantages which it is one of the objects of my present improvement to overcome. One of those objections to the sliding of the entire cartridge shell while under the gas pressure, is the erosion and wearing away of the forward end of the chamber so that the bore soon becomes enlarged to the extent of permitting the gas pressure to form permanent enlargements in a shell, which would resist the extraction of the same by the loading mechanism, and thus in a short time render that mechanism ineffective and the fire-arm inoperative.

In Fig. 1 the head portion, H, of the cartridge shell is shown extending from A to B. The forward tubular portion extends from C to D and when in the bore of the gun this portion is expansible into gripping contact therewith by the gas pressure. Those two parts of the cartridge shell, the head portion A—B and the forward portion C—D, are integrally connected together

at the points B and C by the intermediate portion extending from B to C. This intermediate portion I designate as the head-sliding connecting member of the cartridge, and I have shown it comprising a plurality of expansible cartridge-lengthening elements, as 3 and 5, which are themselves connected by an intermediate bearing ring N which, on the firing of the cartridge, will naturally expand into contact and bear against the bore of the gun. In the present instance I have shown, by way of illustration, a plurality of only two of said cartridge-lengthening elements, but it will sometimes be desirable to use a series of three or more. The thickness of the metal at the point C is shown relatively small, and may in practice correspond to the usual thickness of such shells as at present manufactured. At the rearward end, B, of the connecting member B—C, the thickness of the metal is shown considerably increased to properly join with the forward end portion 7 of the head H. The thickness of the metal in the expansible element 3 being less than in the more rearward expansible element 5, it naturally follows that on the firing of the cartridge the increasing gas pressure will operate first to expand and therefore elongate the member 3, with the result of thereby forcibly pushing backward the head H of the shell; and on the further increase of the gas pressure the more resistant element 5 will be outwardly expanded and thereby elongated for still further pushing backward the head H, which will thus be slid outwardly in the bore of the gun; as will be clearly understood from a comparison of the several portions of the cartridge, as shown in Figs. 1 and 2. Owing to the varying resistances of the several successive elements, as 3 and 5, the operation of these elements proceeds progressively from the forward part of said head-sliding connecting member B—C toward the rearward end or head of the cartridge and thereby said head portion, as will now be evident, will be slid rearwardly in the bore of the gun during the firing of the charge of powder within the shell. This operation is illustrated by Fig. 2 in which the head H is shown slid out of the bore of the gun barrel L, toward the left-hand from the line at A, Fig. 1; to the line A', Fig. 2, for actuating the member M of a suitable gun mechanism, whereby the power thus furnished from the piston-like rearward movement of the cartridge head, may be at once used for extracting the shell of the cartridge by and from which that power is supplied.

When the elongatable elements 3 and 5 are expanded outwardly the intermediate connecting member N, which extends in Fig. 1 from B to C, is thereby elongated, as shown in Fig. 2, until it extends from the

line B' to C, and then forms a continuation of the shell of the cartridge between the relatively thick portion at 7 and the thinner portion 2, so that when the extractor is forcibly applied for drawing the shell out of the barrel, the connecting member N will have assumed the straight, tubular form indicated at N', Fig. 2. Thus the reformable portion or member N which is of reduced diameter and is preliminarily shaped for simultaneous elongation and diametrical expansion by the charge when this is fired, becomes a direct rearward continuation of the forward portion 2 of the shell, whereby this portion is united with the head H.

When the charge is fired, the forward tubular portion 2 of the shell S, (which normally fits closely in the bore,) although not materially enlarged in diameter by the gas pressure, is slightly but forcibly expanded into gripping contact with the barrel L, so that the shell (when of usual length and quality of metal) does not readily slide backwardly during the continuance of the gas pressure.

When the elongatable member N (see Fig. 1) is composed of diametrically reduced portions, such as illustrated at 3 and 5, respectively, the firing of the charge in the shell S operates as in ordinary practice to very slightly enlarge the forward portion 2 of the shell into a firm or gripping engagement which, for the moment, holds said member 2 firmly within the interior of the bore of the barrel L, and at the same time the gas pressure exerts a rearward pressure against the inside of the head H; this latter pressure tends to elongate the shell at the same time that the gas pressure tends to enlarge the said reduced portions 3 and 5. The effect of these tendencies and forces is to subject the curved walls at 3 and 5 to outward pressure and to tensile or lengthwise strain at the same moment, and owing to the ductility of the metal of which the shell S is made, to thereby elongate the member N by and during the diametrical enlarging of the said elements composing this member.

Having thus described my invention, I claim:—

1. The herein described improvement in gun-operating cartridges, which consists in the combination in the cartridge shell, of three integrally joined component members, the forward tubular portion expansible into gripping contact with the bore of a gun by the gas pressure, the head portion slidable in the chamber of the gun while under the gas pressure, and the intermediate expansible connecting portion comprising a plurality of adjoining extensible members having, respectively, increasing resistances from said forward tubular portion of the shell rearwardly thereof, and elongatable by the reformation thereof by the gas pressure,

whereby on the firing of the charge the said head portion will be slid rearwardly in the bore of the gun.

2. The herein described improvement in gun-operating cartridges, which consists in the combination in the cartridge shell, of a forward tubular portion, the head portion slidable in the bore of the gun while under the gas pressure, and the intermediate head-sliding connecting portion comprising a plurality of reformable cartridge-lengthening elements each elongatable by the expansion thereof, and having successively increasing widths and depths for obtaining successively increasing resistances, respectively, whereby on the firing of the charge the operation of these elements proceeds progressively, thereby to slide the said head portion rearwardly in the bore of the gun during the continuance of the gas pressure, substantially as described.

3. The herein described improvement in gun-operating cartridges, which consists in the combination in the cartridge shell, of three integrally joined component members, the full-sized forward portion adapted to be held in gripping contact with the bore of the gun by the gas pressure, the head portion slidable in the bore of the gun while under the gas pressure, and the intermediate reduced portion shaped into a plurality of members of progressively increasing resistances respectively, and for simultaneous elongation and diametrical expansion by the gas pressure therein, whereby on the firing of the charge the said head portion will be slid

rearwardly in the bore of the gun and said reduced portion of the shell will be made a full-sized rearward extension of the said full-sized forward portion, substantially as set forth.

4. The herein described improvement in gun-operating cartridges which consists in the combination in the cartridge shell, of three integrally-joined component members, the forward tubular portion expansible into gripping contact with the bore of the gun by the gas pressure, the head portion slidable in the chamber of the gun while under the gas pressure, and the intermediate head-sliding connecting portion comprising a plurality of expansible cartridge-lengthening elements having increasing widths, respectively, longitudinally of the cartridge and connected by a bearing ring, each of said expansible elements being elongatable by the expansion thereof, and the forward one of said elements having a lesser resistance than the element or elements rearward thereof, whereby on the firing of the charge the operation of these elements proceeds progressively from the forward part of said head-sliding connecting member of the cartridge toward the head of the cartridge, thereby to slide the said head portion rearwardly in the bore of the gun during the firing of the charge, substantially as and for the purpose set forth.

JOHN D. PEDERSEN.

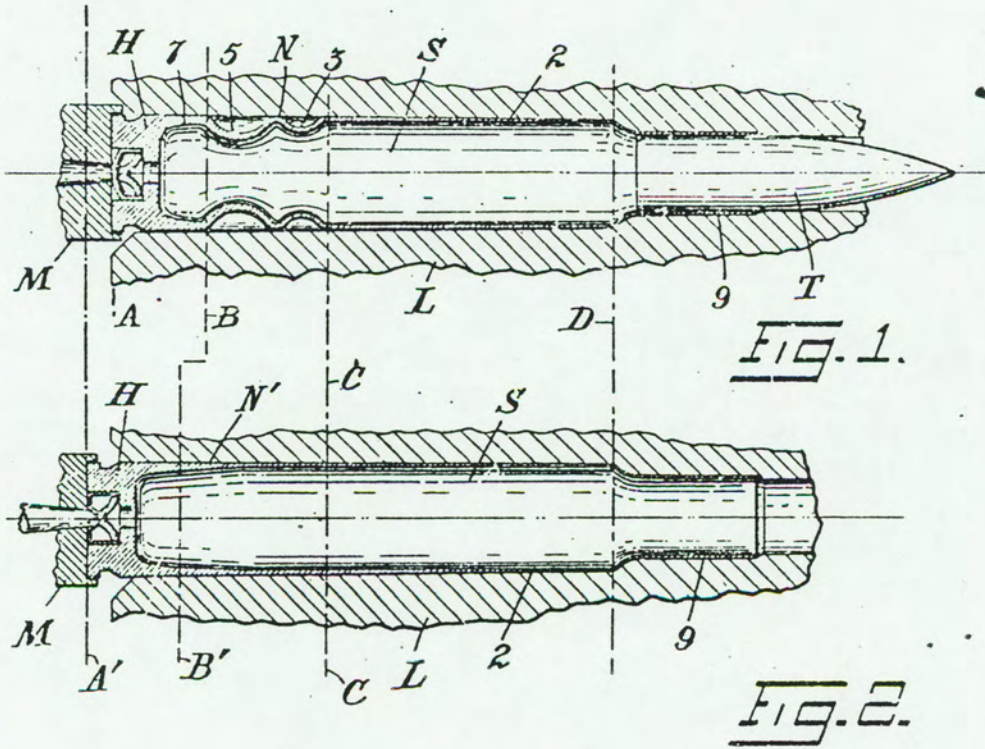
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