

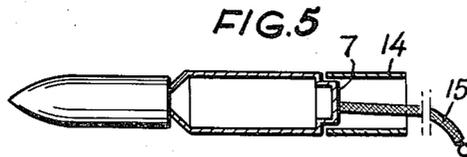
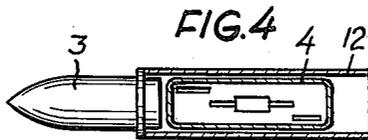
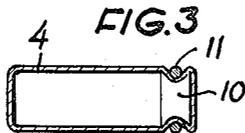
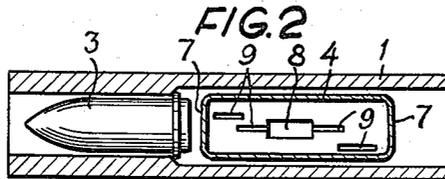
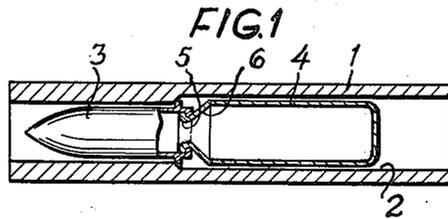
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POWDER CASES FOR USE IN BREECHLESS ANTI-RECOIL ARMS

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**POWDER CASES FOR USE IN BREECHLESS ANTI-RECOIL ARMS**

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2 Claims. (Cl. 89—1.7)

The anti-recoil guns, that is to say guns wherein a portion of a powder gas is used to neutralize the recoil, entirely or in part, become comparatively expensive in manufacture.

The invention herein described of a special charge-containing shell for such fire-arms renders possible the use of very simple arms of this type without a breech. The rapidity of firing may also be increased, inasmuch as the shell can be formed in such manner as to be automatically ejected by the powder gases upon firing, no ejecting mechanism being needed.

The distinguishing feature of the invention is that the shell, which is intended to be introduced into the chamber of the fire-arm behind the projectile, is dimensioned and formed in such manner that on firing, the shell is expanded when the pressure of the combustion gases rises to a predetermined value and is jammed fast in the combustion chamber and is momentarily maintained therein in spite of the absence of a breech, but contracts upon a drop in the gas pressure and is thereby released from the chamber wall. To obtain anti-recoil firing it is desirable that the shell be formed in such manner as to open or break at its inner end to develop a gas pressure both forwardly toward the projectile proper and rearwardly towards the outer end of the shell. The wall of the shell may, at least over that portion thereof which in firing expands to become jammed against the chamber, be elastically deformable so as to contract somewhat again, as soon as the pressure is reduced, whereby the shell becomes loosened from the chamber to be readily removed or entrained by the powder gases, so that it will be automatically ejected.

A few examples of the application of the invention will be described in the following with reference to the accompanying drawing, wherein Figs. 1 and 2 each show an axial section through a portion of the barrel of a fire-arm with a projectile arranged therein and with a shell according to two different embodiments of the invention. Fig. 3 shows a longitudinal section through a shell according to a further embodiment, and Figs. 4 and 5 show, partly in longitudinal section, other embodiments in which the shell is attached to the projectile.

In the drawing, 1 designates the barrel of a gun or other fire-arm having a projectile and a shell according to the invention arranged therein. 2 denotes the rear portion of the chamber, that is to say the explosion chamber. 3 designates the projectile proper, and 4 the shell containing the propulsive agent (the powder charge) for the projectile, said shell forming the primary object of the invention.

In the embodiment shown in Fig. 1, the shell is secured with its fore-end to the projectile 3 proper. This securing may be brought about in a number of different ways. In Fig. 1, the rear end of the projectile is shown as being provided with a circumferentially extending turned portion 5, into which the fore-edge of the mouth of the shell 4 is pressed. According to the invention, the wall of the shell is made from such material, for in-

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stance aluminum, brass or iron, and of such dimension and configuration that the central portion thereof cannot withstand the internal pressure produced in the shell at the ignition of powder therein, but will expand so as to become jammed fast in the chamber 2. The securing of the shell to the projectile is so strong that this jamming effect sets in before the projectile can be released from the shell. The thickness of the peripheral wall of the shell is such as to prevent rupture thereof under the longitudinal stress exerted thereon before the end of the shell breaks, the projectile being at the same time or approximately at the same time jerked loose from the front portion of the shell to be propelled forwardly with an accelerated movement. It is to be noted that the pressure existing in the interior of the shell before the end wall breaks must be so high as to allow a stable predetermined rate of ignition of the powder.

The shell material is advantageously elastic in such manner as to be capable of reassuming its original shape, entirely or in part, when it is relieved of pressure. When the pressure in the shell has dropped sufficiently, the shell comes loose from the chamber, the remaining powder gases then ejecting the shell rearwardly through the free breechless rear portion of the barrel.

In connection with large projectiles it might be found desirable to introduce the projectile as well as the shell individually into the arm in charging. In this case, and with the use of fin projectiles, the shell is provided with a wall 7 at the fore-end as well as at the rear end thereof. One or more apertures 8 for the introduction of the charge into the shell may then be arranged in the side or sides of the shell. The shell 4 is made of such diameter as to fit more or less tightly into the chamber, so that in firing the pressure within the shell so expands it that it can be jammed into the chamber as in the preceding embodiment. After the jamming has been effected, both end walls 7 will burst, so that the gases will be released both forwardly and rearwardly, anti-recoil firing being thus rendered possible.

If the shell bottoms or end walls 7 are dimensioned and formed correctly and are made from a sufficiently tenacious material, such as ordinary sheet aluminium, they will be slitted without any fragments of the shell being hurled forwardly or rearwardly.

If the shell has a tendency to stick in the arm after the firing, this may be avoided by providing the same with one or more longitudinally extending slits or scores 9, which optionally overlap one another (see Fig. 2).

The effect of the powder may be increased by providing the shell with a rearward throttle passage. Fig. 3 shows a shell with a throttling area 10 provided by a circumferentially extending restriction of the peripheral wall of the shell at the rear end of the latter. In order that a recoil shall not occur, the fire arm may be provided with a suitably adapted expansion funnel. At the throttling area the wall of the shell may be reinforced, for instance by means of a ring 11 of wire material or the like, said ring extending round the shell in the restricted portion thereof.

To protect the explosion chamber, the shell may be surrounded by a tube or protector sleeve 12, as shown in Fig. 4. This protector sleeve will prevent the powder gas from coming into contact with the chamber of the arm, for instance through apertures or slits in the shell. If desired, the protector sleeve 12 may be provided with slits to prevent the same from sticking in the arm.

The protector sleeve may be of an elongated configuration having a front portion which serves as a holder for the projectile and a rear portion which extends rearwardly from the shell 4 to provide means for handling the cartridge.

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In Fig. 5 is illustrated the provision of an auxiliary ring or sleeve 14 connected to a projection of the rear wall 7 of the shell to provide means for handling the cartridge. The ring 14 may have such a length that its rear extremity comes approximately into alignment with the rear opening of the barrel bore and serves to locate the projectile in its proper position in the bore. The ring 14 is suitable for adaption to the cartridge structures shown in Figs. 1, 2 and 3.

The auxiliary ring or sleeve 14 may also be provided with apertures or recesses to provide means for easily removing the complete cartridge from the barrel when it is desired to empty the fire-arm. If desired, an auxiliary tool such as a hook may be used in the emptying operation.

In the situation where an electrical priming arrangement including a connecting cord 15 extends from the rear wall 7 of the shell as shown in Fig. 5, the cord may be made of such a short length that it will not reach the corresponding connecting contact of the fire-arm if the sleeve 14 projects too far beyond the barrel, and in this way additional control may be provided as to whether or not the cartridge has been introduced sufficiently far into the chamber.

What I claim is:

1. A powder case for use in an anti-recoil breechless gun having an explosion chamber constituting a part of the continuous bore extending therethrough, said powder case comprising a closed cylindrical shell of elastic metal and having a normal diameter permitting insertion and removal of the shell from the rear of the gun bore, the peripheral wall of said shell having at least one longitudinal slit therein, and a charge of explosive agent within said shell, the peripheral wall of said cylindrical shell being expansible radially under a predetermined pressure established by the firing of the charge therein to lock the shell frictionally to the wall of the explosion chamber

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of the gun and being contractible to its normal diameter when the internal explosive pressure in said shell has been partially reduced to allow automatic rearward ejection of the shell by the remaining internal explosive pressure.

2. A powder case for use in an anti-recoil breechless gun having an explosion chamber constituting a part of the continuous bore extending therethrough, said powder case comprising a closed cylindrical shell of elastic metal and having a normal diameter permitting insertion and removal of the shell from the rear of the gun bore, a cylindrical sleeve supported by the rear end of said shell for introducing the shell into the gun bore, said sleeve having such a length as to terminate approximately flush with the rear end of the gun bore when the shell is positioned within the explosion chamber and a charge of explosive agent within said shell, the peripheral wall of said cylindrical shell being expansible radially under a predetermined pressure established by the firing of the charge therein to lock the shell frictionally to the wall of the explosion chamber of the gun and being contractible to its normal diameter when the internal explosive pressure in said shell has been partially reduced to allow automatic rearward ejection of the shell by the remaining internal explosive pressure.

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