May 17, 1938. J. HÁSEK 2,117,885

FIREARM

Filed Dec. 4, 1935

Fig. 1

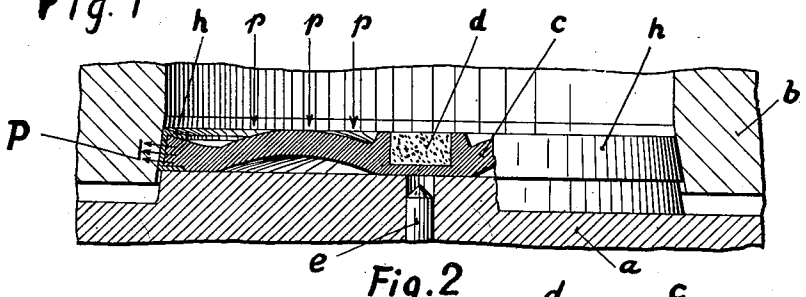


Fig. 2

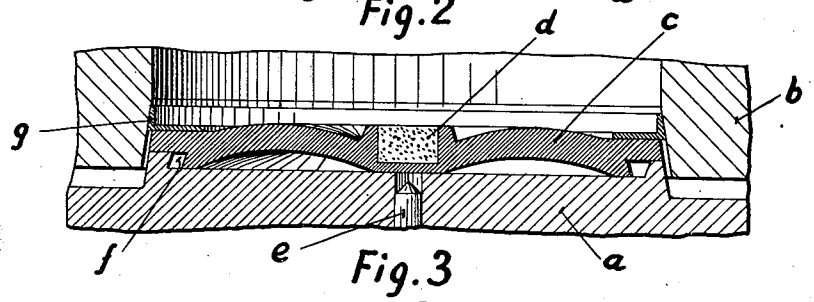


Fig. 3

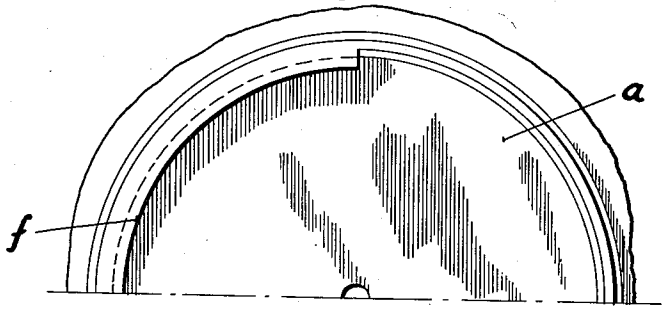
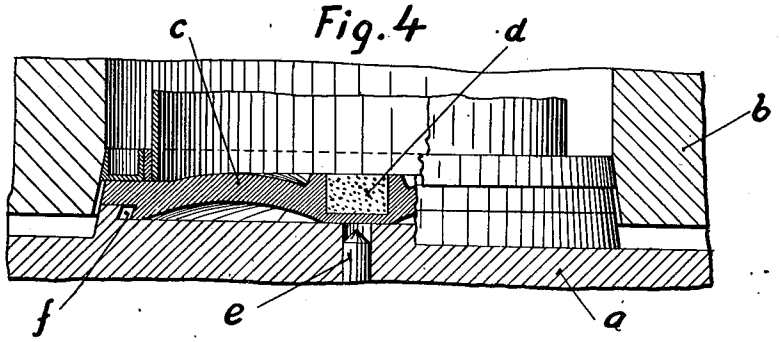


Fig. 4



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FIREARM

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7 Claims. (Cl. 89—26)

This invention relates to the packing of the breech of fire-arms, and has for its object to provide a packing device of this nature which is particularly simple and reliable in use as compared with the known packing by means of the cartridge- or shell-case, and as compared with the so-called plastic packing.

As is well known, breech packing by means of the cartridge-case has the advantage over a plastic packing in that there is inserted in the cartridge-case the percussion cap and, if desired, all other elements concerned with the ignition of the explosive charge, whereas with the plastic packing a special primer is required, which entails additional operations in connection with the firing of each round.

Breech packing by means of the cartridge- or shell-case, however, is accompanied by a number of disadvantages, such as for example those involved in the length and weight of the case, and in the consumption of great quantities of high quality metals or other materials required in its manufacture. The most serious fault resides in the length of the case, and the consequent difficulties involved in its removal from the fire-arm after each discharge.

The possibility of breech packing by means of the cartridge- or shell-case depends upon a certain definite length of the latter, since the pressing of the packing means against the walls of the combustion chamber is effected by the direct pressure of the gases without any multiplication. In contrast thereto, the fundamental advantage of the plastic packing consists in the multiplication of the pressure. The cartridge- or shell-case is only used once, and any damage incurred in firing is of no serious consequence, since a new case is used for the next discharge. On the other hand the plastic packing must be so reliable that it will withstand a large number of shots without incurring the slightest damage.

The present invention solves the problem of breech packing in such a manner that all the defects and disadvantages of the hitherto employed methods of packing are obviated, while at the same time perfect reliability and simplicity of operation in use are ensured, without structural complication. The essence of the invention consists in the fact that there is employed for the packing a disc of deformable material, which is fitted loosely on the breech head, the pressure of the gases after the discharge effecting an enlargement of the diameter of this disc, and consequent fitting of this disc against the wall of the barrel with high specific pressure between the contacting surfaces. Further features of this arrangement will become apparent in the course of the ensuing description, reference being had to the accompanying drawing forming part of this specification, in which

Fig. 1 shows the rear end of a barrel with an inserted breech block and an obturating disk according to one embodiment of the present invention, before firing of the shot, the left half of the figure showing all elements in section, the right half of Fig. 1 illustrating the upper portion of the breech block and the obturating disk in elevation.

Fig. 2 shows the rear end of a barrel with breech block and obturating disk according to a second embodiment of the invention. In Fig. 2 all parts are shown in section.

Fig. 3 shows half of the breech block of Fig. 2 seen from above.

Fig. 4 illustrates still another embodiment of the invention partly in section (left half of Fig. 4) and partly in elevation (right half of Fig. 4) in a view similar to that of Fig. 1.

In all the figures of the drawing *a* denotes the breech of the fire-arm, in which the striking pin *e* is supported, while *b* denotes the rear end of the barrel. The packing proper is effected by means of a disc *c* which suitably adjoins the explosive charge in such a manner that the loading of these two elements is effected simultaneously. The disc *c* is bowed upwardly from the plane surface on a circumference intermediate the periphery and the center of the disk, and becomes so deformed on the firing of the shot that the bowed portion is flattened, whereby the packing is effected. Fig. 1 shows the obturating disk in bowed form, that is to say before the shot has been fired. The pressure *p* of the gases generated in firing is transmitted, with appropriate multiplication, to the periphery of the disc where it is effective as the force P acting in a radial direction. This multiplication of the pressure is conditioned by the fact that on the flattening out of the bowed portion of the disc this latter becomes increased in diameter and thereby pressed with very considerable force against its bearing surface or seating in the barrel of the fire-arm.

In accordance with the invention the obturating disc at the same time constitutes a carrier for the percussion cap *d* and/or for further parts necessary for effecting faultless ignition of the explosive charge. Since compared with the usual cartridge- or shell-case the longitudinal dimension of this disc is very small, the latter can

easily be removed from the fire-arm after the discharge, for it is in principle intended to be used but once. For this reason the packing device according to the invention must be simple to manufacture and require but little material (metal or the like). In the present instance these conditions are fully met.

The obturating disk according to the present invention is preferably made of inexpensive material such as for example sheet iron, and can be provided at its periphery, as shown in Fig. 1 with a border *h*, made from copper, brass, or other soft material, for the purpose of improving the fit against the bearing surfaces and of ensuring a better protection for the seating in the barrel of the fire-arm than for the surface of the obturating disk.

According to Figs. 2 to 4, the rear of the obturating ring *c* is provided with a suitably shaped overhanging rim *f* which, on firing, comes into engagement with a similar overhanging rim on the head of the breech block. As can be seen from Figs. 2 and 3, the last-mentioned overhanging rim extends only over half the circumference of the head of the breech block, while the other half circumference has an outwardly tapered elevated rim, whereby the flattened disk and the breech block are coupled for axial withdrawal of the obturating disc *c* from its seating while the disk can be disconnected from the breech block by radial displacement with respect to the latter, as soon as disk and breech block have been withdrawn from the barrel.

In the form of construction shown in Fig. 2 the obturating disc *c* is provided on its upper side with a special packing rim *g* which is preferably so dimensioned that it is closely fitted into its seating in the barrel during the loading operation, if desired with deformation, so that the first phase of packing is effected before the obturating disc *c* is seated under great pressure upon firing of the shot. Both the obturating disc and also the packing rim can be suitably shaped for the purpose of fitting closely against the explosive charge, as can be seen from Fig. 4, which shows a packing ring with U-shaped profile.

As will be clear from the foregoing, the obturating element according to the present invention can be used either by itself or in combination with a packing rim similar to that of a cartridge- or shell-case, or in combination with a plastic packing, or, finally, in combination with both types of packing. These combinations are contemplated for use more particularly in the case of very expensive projectiles for fire-arms of large bore.

I claim:

1. In a firearm including a barrel and a breech block having a plane surface directed toward the interior of the barrel, the combination therewith of a packing disk seated loosely on said plane surface, said disk consisting of a single layer of deformable non-resilient material bowed upwardly from the plane surface on a circumference intermediate the periphery and the center of the disk in the direction of the barrel and provided at substantially its center with a chamber for reception of a percussion cap, said disk adapted to flatten and have its periphery intimately engage the walls of the barrel, during discharge of said firearm and means on said breech block and disk engaging each other when the disk flattens to connect the breech block and the disk for axial withdrawal of the latter from the barrel, said means being adapted to be disengaged from each other by radial displacement of the disk with respect to the breech block.

2. In a firearm including a barrel and a breech block provided with a plane surface directed toward the interior of the barrel, the combination therewith of a packing disk seated loosely on said plane surface, said disk consisting of a layer of deformable non-resilient material bowed upwardly from the plane surface on a circumference intermediate the periphery and the center of the disk in the direction of the barrel and adapted to flatten and expand into intimate engagement with the walls of the barrel under pressure from within the latter, said breech block having on said plane surface an elevated inwardly overhanging rim portion occupying not more than one half of the periphery of said surface and said disk being provided on its adjacent side with a peripheral groove complemental to said overhanging rim portion and of a length at least that of the latter, the lower edge of said groove being spaced peripherally from said rim when said disk and breech are initially inserted into the barrel.

3. In a firearm including a barrel and a breech block provided with a plane surface directed towards the interior of the barrel the combination therewith of a packing disk seated loosely on said plane surface, said disk consisting of a layer of deformable non-resilient material bowed upwardly from the plane surface on a circumference intermediate the periphery and the center of the disk in the direction of the barrel and adapted to flatten and expand into intimate engagement with the walls of the barrel under pressure from within the latter, said breech block having on said plane surface an elevated annular rim comprising a portion with inwardly inclined inner wall forming an angular groove and occupying not more than one half of the periphery of said surface and a portion with outwardly inclined inner wall occupying at least the other half of the periphery of said surface, and said disk being provided on its adjacent side with a peripheral groove complemental to said angular groove and of a length at least that of the latter, the lower edge of said complemental groove being spaced peripherally from said angular groove when said disk and breech are initially inserted into the barrel.

4. In a firearm including a barrel and a breech block provided with a plane surface directed toward the interior of the barrel, the combination therewith of a packing disk seated loosely on said plane surface, said disk consisting of a layer of deformable non-resilient material bowed upwardly from the plane surface on a circumference intermediate the periphery and the center of the disk in the direction of the barrel and adapted to flatten and expand into intimate engagement with the walls of the barrel under pressure from within the latter, said breech block having on said plane surface an elevated inwardly overhanging rim portion occupying not more than one half of the periphery of said surface and said disk being provided on its adjacent side with an annular peripheral groove complemental to said overhanging rim portion, the lower edge of said groove being spaced peripherally from said rim when said disk and breech are initially inserted into the barrel.

5. A firearm, as claimed in claim 1, in which said disk is provided on its upper side with an additional packing ring fitting closely into the barrel and adapted to form a provisory packing

when said disk and breech are initially inserted into the barrel.

6. A firearm as claimed in claim 1, in which said disk is provided on its upper side with an additional U-profiled packing ring, the outer leg of said ring fitting closely into the barrel to form a provisory packing when said disk and breech are initially inserted into the barrel and the inner leg of said ring being adapted to closely embrace a cartridge.

7. A firearm, as claimed in claim 1, in which the peripheral wall of said disk is provided with a border of relatively soft metal.

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