

(No Model.)

3 Sheets—Sheet 1.

W. LORENZ.

PERCUSSION CAP FOR GUN CARTRIDGES.

No. 387,723.

Patented Aug. 14, 1888.

Fig. 1.

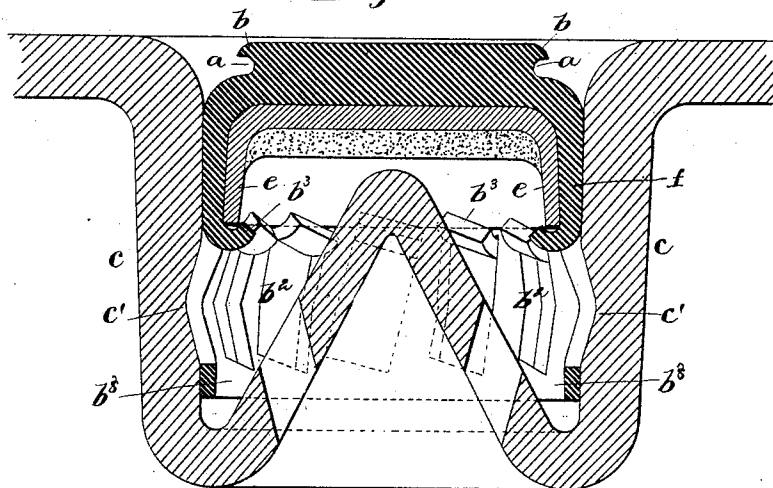
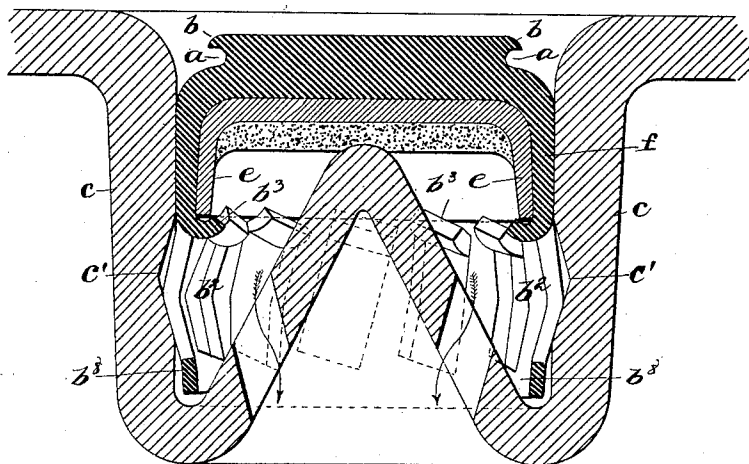


Fig. 2.



Witnesses:

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Inventor:

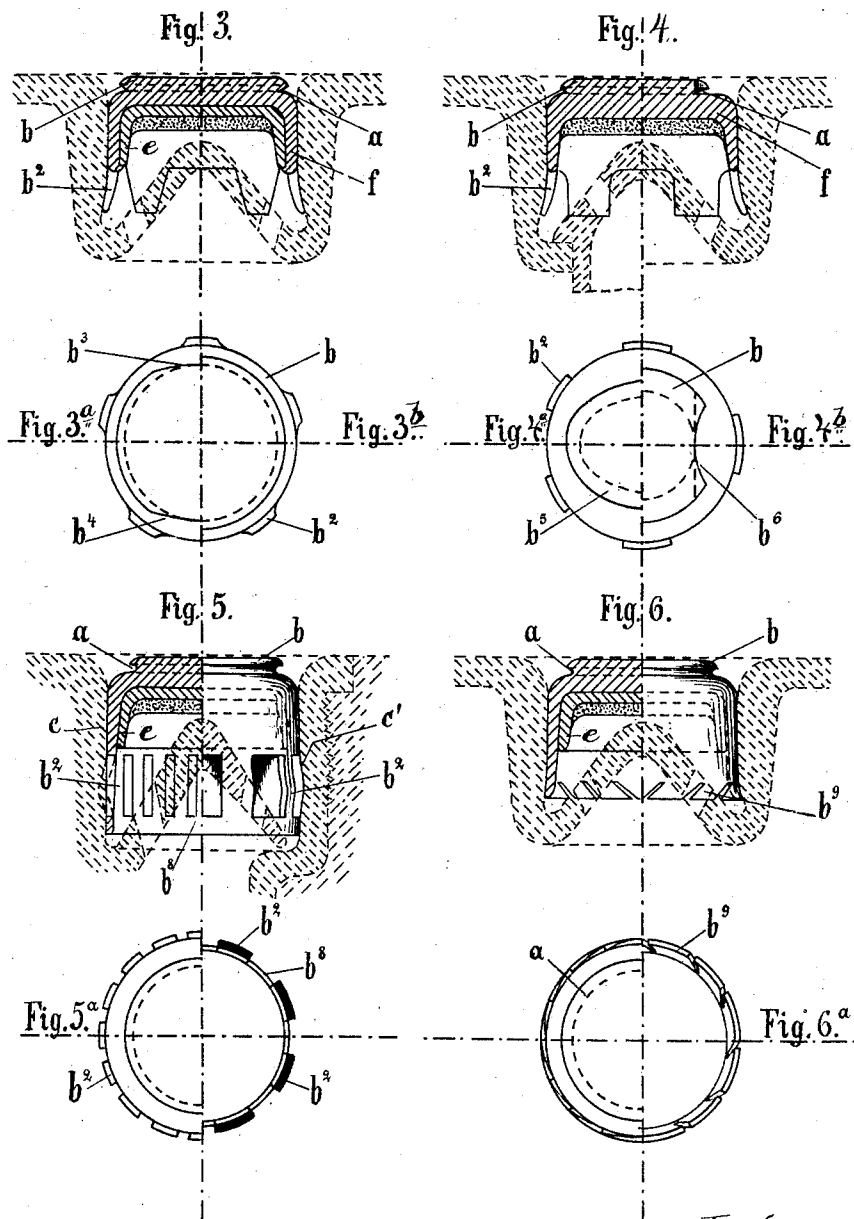
Wilhelm Lorenz
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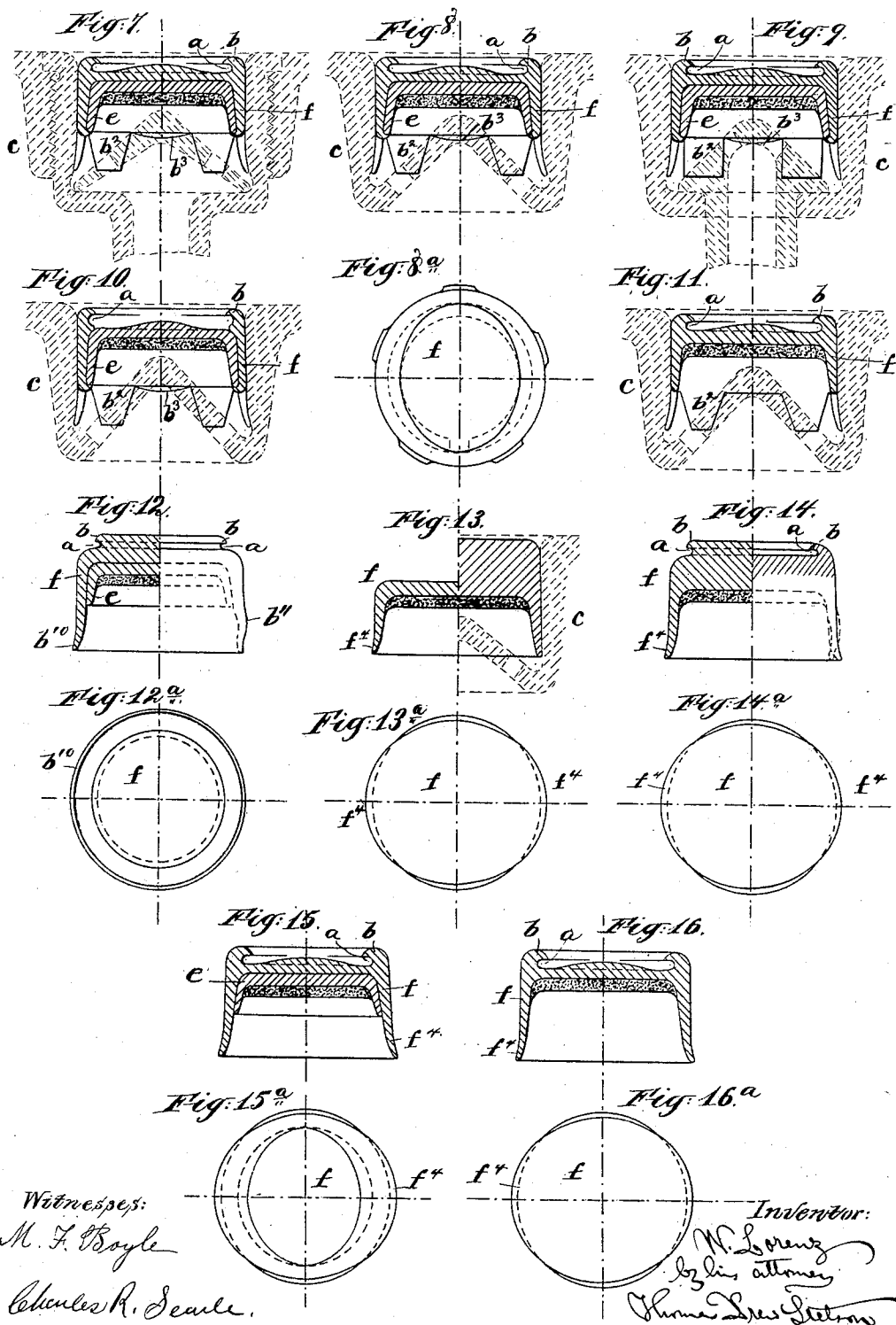
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UNITED STATES PATENT OFFICE.

WILHELM LORENZ, OF CARLSRUHE, BADEN, GERMANY.

PERCUSSION-CAP FOR GUN-CARTRIDGES.

SPECIFICATION forming part of Letters Patent No. 387,723, dated August 14, 1888.

Application filed June 24, 1887. Serial No. 242,342. (No model.)

To all whom it may concern:

Be it known that I, WILHELM LORENZ, a subject of the Emperor of Germany, and a resident of Carlsruhe, in the Grand Duchy of Baden, Germany, have invented a certain new and useful Improvement in Percussion Caps or Primers for Gun-Cartridges, of which the following is a specification.

The present improvements refer to the formation of the cap-base and cap sides of percussion-caps or of the protection-caps inclosing the percussion-caps. The cap-bases, made of extra thickness, are each provided with a notch and flange on the base of less diameter than the body, so that a hooked instrument may be engaged with the flange when desired without requiring any enlargement of the cavity in the cartridge and the cap quickly and easily extracted from the cartridge. The external notch on the cap-base and the covering-plate formed thereby may be circular, polygonal, or oval, or the covering-plate may be cut away or cut out on a portion of its circumference.

With oval or with clipped covering-plates the extracting-instrument, having its hooks directed inward, is applied by thrusting its forward part over the smaller portion of the covering-plate into the notch and then turned sidewise beneath the remaining portions, and, applying a proper pulling force, the cap will be extracted.

With circular or polygonal covering-plates and notches the extracting of a cap from its seat may be effected by an instrument with branches springing elastically outward and having its hooks directed inward. These branches slide easily over the rim of the covering-plate and catch into the notch, thus seizing the cap, so that it may be extracted. The groove and flange may be made by turning or bending up a portion of the rim. The groove so formed, as well as the covering-rim, may be of a circular, polygonal, or an oval form; or the covering-rim may be provided with gaps which are cut out of the same. With a reversed portion of the flange and with oval or with cut-out covering-rims an extracting-instrument provided with hooks directed outward may be introduced through the larger portion or through the gaps of the

covering-rim into the groove, then being turned beneath the narrower remaining portion of the rim, so as to seize the cap and to extract it. With circular or polygonal covering-rims and grooves thus reversed the extraction of a cap from its seat may be effected by an instrument which is provided with arms springing elastically together and having the hooks directed outward, which will slide easily over the covering-rim and snap into the groove, seizing the cap, so that it may be extracted.

In all the cases instruments may be employed that have only one arm; but it will naturally be more suitable always to employ instruments with double or even more sided hooks, because with the same the straining and pinching will be avoided, which is almost inseparably connected with the one-sided seizing of the caps, and a straight and therefore easy extracting of the caps will thus be insured.

The cap sides are provided with elastic projections, which, by their spring force, serve to fasten the cap in the cap-chamber of the cartridge. The elastic portions of the cap sides, which serve for fastening by pinching such caps on their place, are best made by slittings or cuttings, so that a remaining ring connects together all these strips. These strips go elastically together when the cap is forced into the cap-chamber, causing thus a stretching of the cap sides and an advancing of the said connecting-ring, and they may now be fastened in a straight seat-room by their elasticity only, or may be pinched fast by entering a correspondingly-formed hollow in the seat place. Those strips, being connected together on both ends by rings, are not easily liable to be spoiled by bending. Moreover, the connecting-ring insures their entering together into the cap-chamber. One may also do without such slitting or cutting of the cap-mouth bent outward, or of a bellied part of the cap sides, by making the cap-mouth, which is turned outward, or the bellied part of the cap sides of a little larger diameter than that of the seat place, so that the cap sides when forced into the seat place must in the whole contract elastically together.

Instead of making the cap bellied it may be

tapered, the form being such as would be protected by cutting off the ring at the mouth of the cap. This may be done by a cutting out of the cap-mouth, which is somewhat conically pressed outward, or the flaps are, after being cut out, bent a little outward. When the cap is forced into its seat, these flaps will go elastically together, thus by the friction produced by the elasticity of the flaps pinching fast the cap to its seat. The seat may have a straight surface, so that only by the friction the cap is retained in its place. These elastic plates may be formed on the circumference of the cap-mouth in any desired number by straight or by oblique indents of more or less width, so as to form large or small, straight or oblique, triangular or rectangular, or trapezoidal flaps.

A further modification of the means for holding the caps for the greatest simplification of their fabrication consists in pressing to an almost oval form the circular protection-cap rim or percussion-cap rim, which rims are of approximately the same diameter as the cap-chamber, so that the longest axis of the so-formed oval will be larger than the diameter of the cap-chamber. If, now, this oval will be forced with a certain pressure into the cap-chamber, whereby the rim of the oval as well as that of the cap-chamber must have a corresponding large rounding off, the oval by working of the circular form of the cap-chamber will elastically move back approximately into its primary circular form, and then, by the sufficiently strong friction between the elastically-pressed-together portions of the oval and the cap-chamber, the cap will be held fast there, sufficiently secure. I have provided for employing with a lining caps serving for better receiving the fulminate. The lining-caps after being placed in the main or protection caps may be retained there by means of turning inward portions of the rim which are left between the flaps. All these different means may also be employed for pinching fast the percussion-caps of the ordinary form—that is to say, such caps are not provided with a specially-formed rim of their base for the seizing and extracting—it being indifferent whether those caps are to be forced directly into the cap-chambers or into protection-caps or other constructive parts of primers, which parts are pinched fast, screwed, or otherwise suitably secured, as the friction between the percussion cap and seat necessary for retaining securely the cap may be reduced to a very small degree, so that only a slight pressure or pulling by hand will be sufficient to withdraw the percussion-cap from its place.

The improvements referring to the construction of the base of the protection-caps, or of the percussion-caps themselves, consist in making this base so strong that the same cannot be bossed or perforated even by the strongest action of the retiring bolt. Such a percussion-cap is not pinched fast immovably in its seat place, but is, on the whole, driven forward by

the striking-bolt against the anvil. For this purpose the percussion-cap in its seat place will in the ordinary way be so disposed as to offer only a small friction, or to be retained in place by means of one of the above described pinching methods, or by other resistances which are easy to overcome. This retaining of the cap must take place in such way that the cap-mouth will be left yet a certain distance from the bottom of the cap-chamber, so that the priming material at the advancing of the primer reaches the anvil while the cap-mouth does not yet reach the bottom of the cap-chamber.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a central longitudinal section through the primer and the adjacent portion of a metallic cartridge for cannons constructed according to my invention. It shows the primer in place ready for use, but not yet acted on to effect the explosion. Fig. 2 is a corresponding section through the same at the moment when the cap has been violently struck and moved by the firing-pin to bring its fulminate into contact with the anvil and explode the primer, and consequently the cartridge. The remaining figures show modifications, all in the condition ready for firing. Fig. 3 is a central longitudinal section through a primer. A corresponding section through the adjacent parts of the cartridge is shown in dotted lines. Fig. 3^a and 3^b are joined together, Fig. 3^a being the left side and Fig. 3^b the right side of the figure. Each is a rear end view of half of a primer. Each corresponds with Fig. 3. Fig. 4 is a central longitudinal section through a primer with a corresponding section through adjacent parts in dotted lines. Figs. 4^a and 4^b are rear views corresponding. Fig. 5 is on the left side a central longitudinal section through half of a primer, and on the right side a side view of the same modification. Fig. 5^a is on the left side a rear view of a primer corresponding to Fig. 5, and on the right side a cross-section through the same. Fig. 6 is a central longitudinal section on the left, and on the right a side view of the same. Fig. 6^a is on the left side a rear view and on the right side a front view of the modification shown in Fig. 6. Figs. 7, 8, 9, 10, 11, and 12 are central longitudinal sections differing in the construction of the primers or the adjacent parts of the cartridge, the latter being in all the figures shown in dotted lines. Fig. 8^a is a rear view of the primer shown in Fig. 8. Fig. 12^a is a rear view of the primer shown in Fig. 12. Fig. 13 is on the left a central longitudinal section through an ordinary primer and on the right a corresponding section showing a much greater thickness of the metal. Each form has the rear face circular and the front face elliptical. Fig. 13^a is an end view of Fig. 13, showing an ellipse corresponding to the front and a circle correspond-

ing to the rear. Fig. 14 is on the left a central longitudinal section of one form and on the right a side elevation, partly in central longitudinal section, showing another form. The right side shows in strong lines a trumpet-mouth rim and in dotted lines a section of another, which I will term a "bellied" form of rim. Fig. 14^a is an end view corresponding to Fig. 14. Fig. 15 is a central longitudinal section. Fig. 15^a is a rear view of the same modification. Fig. 16 is a central longitudinal section, and Fig. 16^a a rear view of the same.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

In the drawings, Figs. 3 to 6^a, 12 and 12^a, 14 and 14^a show each a flange, *b*, extending outward on the face of the cap-base. Fig. 3^a shows at the left side such flange *b* cut away or recessed at two places, *b*³ *b*⁴. A rigid hooked instrument (not shown) may be introduced from the rear, and after the hooks have passed through these recesses may be engaged under the flange by being turned partially around. Fig. 3^b, which may be described as the right half of the same, Fig. 3^a, shows a similar flange, except that there is no recess. The cap thus formed may be engaged by a hooked instrument with elastic branches. Figs. 12 and 12^a, 14 and 14^a show a similar construction in this respect. Fig. 4^a shows at left side an oval flange. Fig. 4^b, which may also be considered as the right half of 4^a, shows a circular flange with a round recess, *b*⁵. The straight dotted line in this figure shows another form of the recess approximating that in Fig. 3^a, which may be adopted, if preferred. These modifications all allow engaging by a rigid extractor, which is hooked therewith by a partially-turning motion.

Figs. 7 to 11 and 15 to 16^a show each a flange extending inward instead of outward. The base of the percussion-caps or of the lining-caps may be uniform, or they may be thickened more in the center and gradually reduced toward the edge, both conditions being shown.

Fig. 10 shows a cap, *f*, without base, with a lining-cap having a thick base. There are two internal flanges on the external cap, retaining thereby the capacity for its easy extraction. By this form of my invention caps of which the center of the base is perforated, or in other way made unserviceable, may by these means again be utilized by pinching out or otherwise taking away the base so far as to leave the cap in form, as shown in Fig. 10, and then setting in as my lining cap an ordinary percussion-cap, or, preferably, a cap with a stronger base specially made for the purpose.

Fig. 13 shows on the right side a percussion-cap having so strong a base that the perforating thereof by use will be absolutely impossible. The left side of Fig. 13 shows, for contrast, the thickness of base of an ordinary percussion cap. The flange for extracting is not

shown in this figure. It may be extended outward or inward, as preferred; but it may be of less diameter than the cap. Fig. 14 shows the flange extended outward on the left side and inward on the right side. In Figs. 13 and 14 and in the corresponding end views, 13^a and 14^a, the mouth is made oval. This material being elastic, such an oval-mouthed cap, being forced into a circular chamber in the cartridge, holds its place by the mouth, or a swell adjacent engaging in a suitable enlargement in the chamber, securely held against all ordinary forces, but ready to be moved bodily forward when the base of the cap is struck forcibly by the striking-bolt of a gun.

Figs. 1 to 4 and 7 to 11 show the caps and the lining-caps provided with rectangular or trapezoidal elastic flaps *b*².

Figs. 5 and 5^a show a cap having elastic strips *b*², connected at their ends by ring *b*³. These strips are formed at the left by slitting the bellied portion and pinched fast in a straight cap-chamber, *c*. They are shown at the right with larger intermediate spaces and pinched fast in a hollow, *c*¹.

Figs. 6 and 6^a represent caps with oblique slitting of the rim, by which oblique elastic flaps *b*² are formed. These slips may, if preferred, be made straight. The percussion-caps may also be provided with such oblique or straight cuttings.

Figs. 12 and 12^a show at the left a protection-cap with full rim *b*¹⁰ pressed outward, and at the right such a rim, *b*¹¹, with a full-bellied projection.

Figs. 13 to 16^a show protection percussion-caps with oval elastic sides *f*⁴.

Figs. 1 and from 7 to 10 show the manner of holding fast the interior percussion-cap, *e*, by the bent-inward rim portions *b*² of the outer cap.

By my invention missings of fire or perforating of caps are entirely avoided. Such accidents will happen with caps that are immovable in their seats; but by my invention the cap when provided with a stronger base will not be changed in form, and consequently a perforating cannot take place, while with a base less strong the same will be perforated, so that the explosion gases will be liable to escape backward.

What I claim as my improvement in primers for gun-cartridges is—

1. The cartridge-shell *c*, provided with an aperture for the cap, in combination with the herein-described cap provided with a flange, *b*, extending at right angles to the line of its longitudinal axis and forming an annular notch, *a*, the diameter of said flange being less than that of the body of the cap, as and for the purpose specified.

2. The cartridge-shell *c*, provided with an aperture for the cap, said aperture having depressions *c*¹ in its sides, in combination with the herein-described cap having elastic tongues

bent outwardly and adapted to engage said depressions for holding the cap in place, substantially as specified.

3. The cartridge-shell *c*, provided with an
5 aperture for the cap, said aperture having depressions *c'* in its sides, in combination with the herein-described cap, the same comprising
10 a base, a cylindrical body, a ring, *b³*, at the open end thereof, and longitudinal strips *b²*, connecting said body with said ring and forming
15 slits in the side of the cap between them, said strips being bent outwardly and adapted to engage said depressions in the cartridge-shell, substantially as specified.
4. The cartridge-shell *c*, provided with an
15 aperture for the cap, in combination with the cap *f*, outwardly-bent elastic tongues *b²* thereon, and inwardly-bent tongues *b³* thereon, and the fulminate *e*, the latter being retained in
20 place by said inwardly-bent tongues, substantially as specified.

5. The cartridge-shell *c*, provided with an aperture for the cap, said aperture having depressions *c'* in its sides, in combination with the herein-described cap, the same comprising 25 a base, *e*, an outwardly-projecting flange, *b*, on said base, said flange extending at right angles therefrom and forming an annular notch, *a*, the diameter of said flange being less than that of the base, and a cylindrical body the 30 mouth whereof is oval, forming elastic sides adapted to engage the depression *c'* in the wall of the aperture in the cartridge-case, as and for the purpose specified.

In testimony whereof I have hereunto set my 35 hand, at Berlin, Germany, this 24th day of November, 1886, in the presence of two subscribing witnesses.

WILHELM LORENZ.

Witnesses:

B. ROI,

C. GRONERT.