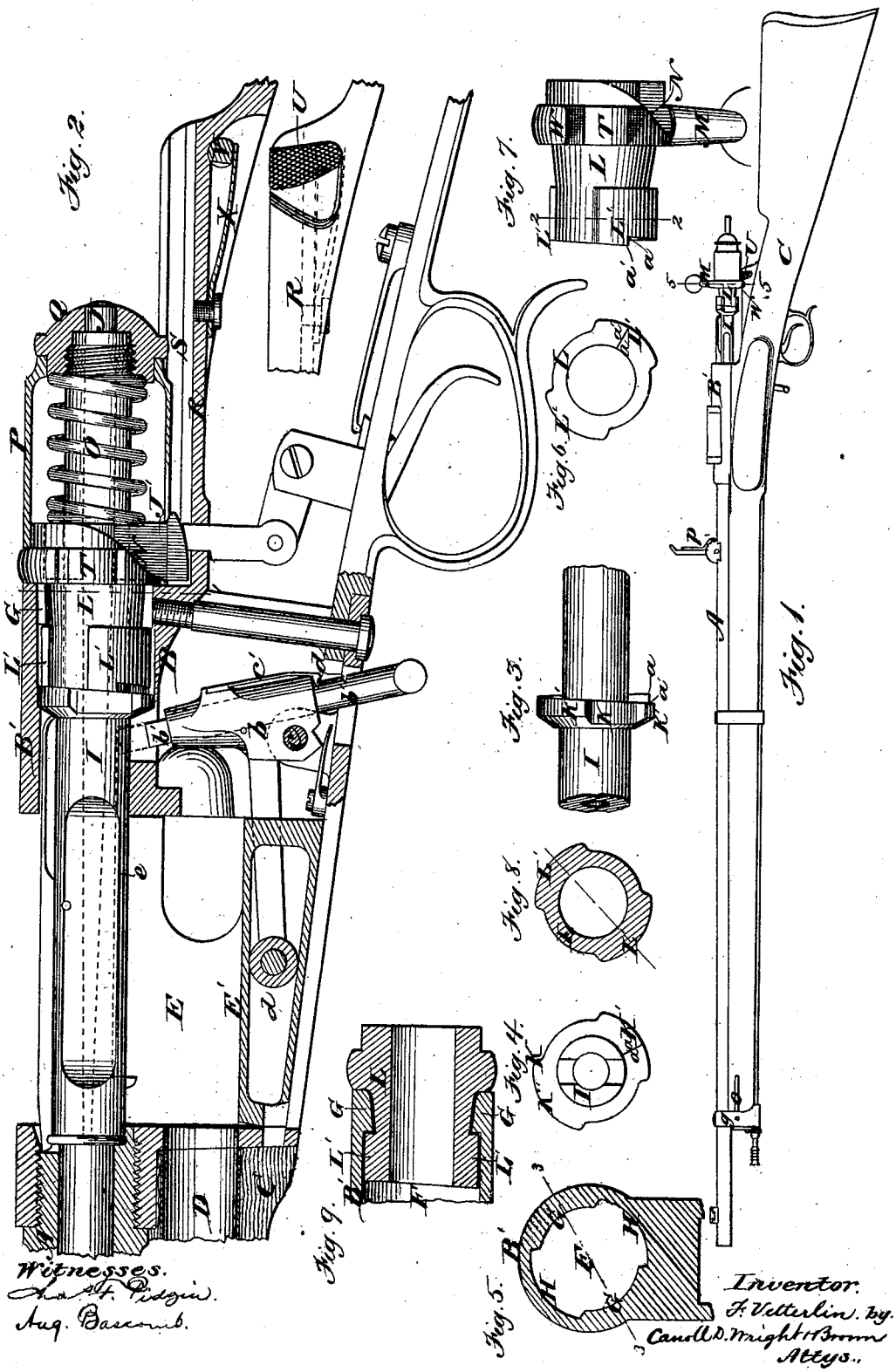
2 Sheets—Sheet 1.

F. VETTERLIN.

MAGAZINE FIRE-ARM.

No. 185,599. Patented Dec. 19, 1876.



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2 Sheets—Sheet 2.

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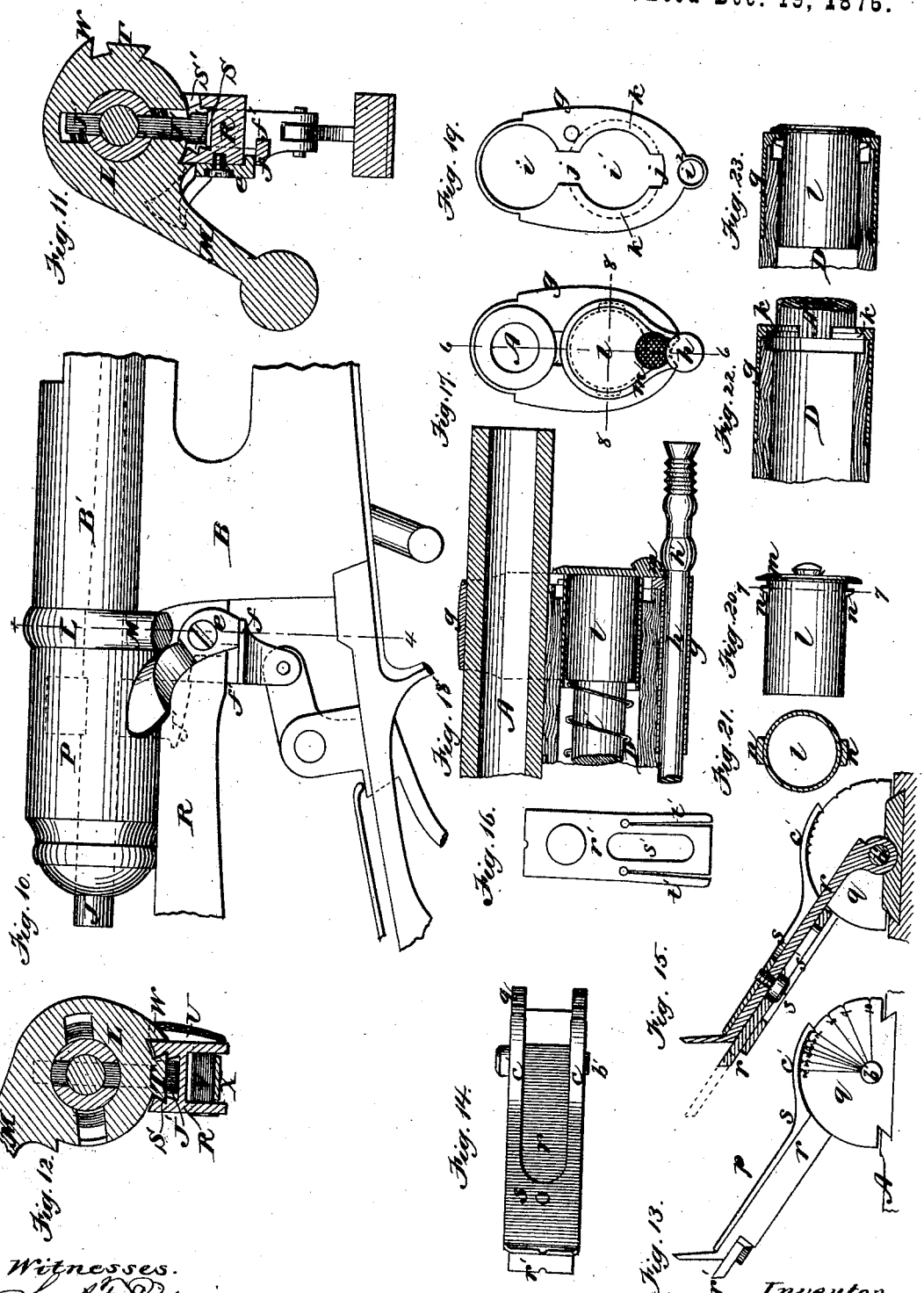

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UNITED STATES PATENT OFFICE.

FREDERIK VETTERLIN, OF NEWHAUSEN, SWITZERLAND.

IMPROVEMENT IN MAGAZINE FIRE-ARMS.

Specification forming part of Letters Patent No. **185,599**, dated December 19, 1876; application filed May 20, 1876.

To all whom it may concern:

Be it known that I, FREDERIK VETTERLIN, of Newhausen, Switzerland, have invented certain Improvements in Breech-Loading Fire Arms, of which the following is a specification:

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a rifle containing my improvements, showing the breech-bolt withdrawn. Fig. 2 represents a longitudinal vertical section of the breech-receiver, showing the breech-bolt pushed forward and the firing-pin projected. Fig. 3 represents a side elevation of a portion of the breech-bolt, showing its spiral-faced shoulder. Fig. 4 represents an end view of the breech-bolt, looking from its rear end toward its spiral-faced shoulder. Fig. 5 represents a transverse section of the breech-receiver, taken on the plane of line 1 1, Fig. 2, the breech-bolt being removed. Fig. 6 represents a view of the spiral-faced end of the collar of the breech-bolt. Fig. 7 represents a side elevation of the same, showing it in the position it occupies when turned to lock the breech-bolt in the breech-receiver. Fig. 8 represents a transverse section of the collar, taken on the plane of line 2 2, Fig. 7. Fig. 9 represents a longitudinal section of a portion of the breech-receiver, taken on the plane of line 3 3, Fig. 5, and showing the breech-bolt collar without its bolt, in the position it occupies when locking the breech. Fig. 10 represents a side elevation of the rear end of the breech-receiver and breech bolt, showing the firing-pin retracted and ready for firing, and also showing an attachment for depressing the trigger-bolt, so as to disengage it from the arm of the firing-pin, and permit the latter to be released gradually by turning the breech-bolt collar when the gun is loaded, and it is not desirable to discharge it. Fig. 11 represents a transverse vertical section taken on the plane of line 4 4, Fig. 10, looking toward the rear end of the gun. Fig. 12 represents a similar section, taken on the plane of line 5 5, Fig. 1, looking toward the rear end of the gun. Fig. 13 represents a side view of the elevation-sight. Fig. 14 represents a top view of the elevation-sight. Fig. 15 represents a sectional view of the elevation-sight. Fig. 16 represents a view of the elevation-slide detached. Fig. 17 represents an end view of the forward end of the gun. Fig. 18 represents a section taken in the plane of line 6 6, Fig. 17. Fig. 19 represents an end view of the nose-band detached. Fig. 20 represents a top view of the magazine-plug detached. Fig. 21 represents a transverse section of the magazine-plug, taken on the plane of line 7 7, Fig. 20. Fig. 22 represents a section through the outer end of the magazine, taken in the plane of line 8 8, Fig. 17, the magazine-plug being removed; and Fig. 23 represents a similar section, showing the magazine-plug in place.

This invention, which is an improvement on my patent of December 29, 1868, No. 85,494, relates partially to that class of breech-loading magazine fire-arms in which the breech-bolt slides longitudinally in opening and closing the breech, raises and lowers a cartridge-receiver, and is operated by a handle, and fastened by a bayonet-catch when the breech is closed.

This invention has for its object to improve the construction and operation of this class of fire-arms, in such manner as, first, to enable the breech-bolt to be guided and prevented from turning during its sliding movement; secondly, to enable the backward movement of the breech-bolt to be arrested when the breech is opened sufficiently, or to enable said breech-bolt to be entirely withdrawn and detached from the breech-receiver; thirdly, to provide improved means for enabling the cartridge-elevator to be disconnected from the breech-bolt when it is desirable to make the cartridge-elevator inoperative and convert the arm into a single-loader; and, fourthly, to enable the trigger-bolt to be depressed, so as to disengage it from the transverse arm of the firing-pin, and permit the latter to be released gradually by turning the breech-bolt collar when the gun is loaded, and it is not desirable to discharge it.

The invention also has for its object to provide an improved nose-cap and plug for the mouth of the magazine, the plug being adapted to be readily removed to permit the removal of the magazine-spring and tube, this

part of the invention being applicable to any magazine fire-arm.

The invention also has for its object to provide an improved elevation back-sight, whereby the shooter can set and regulate the distance without seeing to the graduation-lines thereof, this part of the invention being applicable to any rifle or like arm.

To these ends my invention consists in the construction and combination of parts whereby the desired results are obtained, all of which I will now proceed to describe, and point out in my claims.

In the drawings, A represents the barrel of the gun, which is screwed into the forward end of the metallic frame or breech-body B, to which is suitably secured the wooden stock C. Arranged underneath the barrel, and parallel therewith, is the cartridge-magazine D, and formed vertically in the frame B is a chamber, E, in which the cartridge-carrier E′ is raised and lowered by the motion of the breech-bolt, as in my above-named patent, lifting a cartridge from the magazine to the line of the barrel every time the breech-bolt is drawn back. B′ is the breech-receiving part of the breech-body. The part B′ has a cylindrical bore, F, which is in line with the bore of the barrel. Formed within this breech-receiver, at or near the rear end thereof, are two or more shoulders or spear-wings, G G, which project into the bore, and are separated by spaces H H of equal width. The forward ends of the shoulders G constitute fixed abutments for corresponding shoulders on the breech-bolt collar, as will presently appear. I represents the breech-bolt, which passes longitudinally through the breech-body, is cylindrical in form, and has a longitudinal bore adapted to receive the firing-pin J, its rear end being slotted to allow the independent longitudinal motion of the transverse arms J′ J′ of the firing-pin. K represents a shoulder formed on the breech-bolt, in such position that when the bolt is pushed into the breech-receiver the shoulder will be forward of the shoulders G G of the breech-receiver. The shoulder K is provided with spear-wings K′ K′, which are so located as to pass through the spaces H H, between the spear-wings G of the breech-receiver, when the breech-bolt is moved in and out. The portion of the breech-bolt back of the shoulder K is somewhat reduced in size, as shown in Fig. 3, and upon the reduced portion is located the collar L, which is capable of being partially rotated, and is provided on one side with the lever M, and on its back with cams or inclines N, which, when the collar is turned from right to left, bear against the arms of the firing-pin and retract the latter, as in my former patent.

The collar L is provided with spear-wings L′ L′, which are in line with the spear-wings K′ of the breech-bolt when the collar is turned to allow the bolt to be moved in and out, and pass with the spear-wings of the breech-bolt through the spaces H H of the breech-receiver, the subsequent turning of the collar bringing its spear-wings in front of the stationary spear-wings H and locking the breech-bolt, substantially as in my former patent. Behind the collar L is the mainspring O of the firing-pin, which is inclosed by a casing, P, both of these parts being held in place against the collar by a cap, Q, which is screwed into the rear end of the breech-bolt. R represents a longitudinal rib, which projects backwardly from the breech-body B, just below and parallel with the bore of the breech-receiver. This rib has a groove, S, in its upper surface, which is so formed as to receive the end of the lower arm J′ of the firing-pin, as shown in Figs. 11 and 12, and a dovetail projection, T, on the periphery of the collar L, as shown in Fig. 12.

The projection T is so located as to enter the groove S, (through a lateral groove, S′,) when the collar is turned after firing, far enough to retract the firing-pin and unlock the breech-bolt, the groove being provided with dovetail notches in its opposite sides, which receive the beveled sides of the projection T.

It will be seen that by means of the groove S and projection T the collar is prevented from turning so as to bring its spear-wings out of line with the spaces H H when the breech-bolt is being moved in and out, and the breech-bolt is guided and given a sure and steady motion. The rear end of the groove S is open, as shown in Fig. 2, and presents no obstacle to the entire removal of the breech-bolt. To prevent this, however, I provide the side of the rib with a stud, U, located on the end of a shaft, V, which extends through, and is adapted to turn in, the lower part of the rib, immediately under the rear end of the groove S. When the shaft V is turned so as to cause the stud U to assume a nearly vertical position, the stud forms a stop, against which a projection, W, on the collar L strikes when the breech-bolt is moved backward sufficiently, as shown in Figs. 1 and 12. When it is desirable to entirely disconnect the breech-bolt from the breech-body it is only necessary to turn the stud U downwardly into a horizontal position and slide the breech-bolt back until the projection T comes out of the open rear end of the groove S. The shaft V is provided with two flat surfaces, against either of which bears a flat spring, X, the yielding pressure of which holds the shaft and its stud in either of the two positions named. The outer side of the stud U is roughened or corrugated to facilitate its change of position.

b represents the elbow-lever, through which the breech-bolt raises the cartridge-receiver E′. This lever is pivoted at *c* to the breech-body, one of its arms entering a slot, *d*, in the cartridge-receiver, while the other projects into a slot, *e*, in the under side of the breech-bolt, the slot being so arranged as that its forward end shall strike the arm of the lever *b* as soon as the breech-bolt is pulled back

clear of the cartridge-receiver, and tilt the lever and raise the receiver, as in my former patent. Heretofore the lever *b* has been made rigid, of one piece, so that it was only by removing it bodily from the breech-body that the cartridge-receiver could be made inoperative. I now make the lever in two parts, *b* and *b'*, the part *b'* being a bolt or rod, which is adapted to slide in a socket formed in the part *b*, and be raised so as to enter the slot in the breech-bolt, or lowered so as to be free from the same, as shown in Fig. 2. When in the latter position it will be readily seen that the cartridge-receiver will be inoperative, and the gun will be converted into a single-loader. The bolt *b'* projects below the breech-body and wooden stock far enough to be conveniently grasped by the operator, is provided with a suitable handle or knob, and is held in either of its positions by a spring-catch, *c'*, which is attached to the part *b*, and engages with notches *d d* in the bolt *b'*.

It is frequently the case when the firing-pin is retracted and ready for firing, whether the gun is loaded or not, that it is desirable to release it gradually, so as to avoid the unnecessary jar and shock, as well as the discharge of the cartridge. To this end I have provided a cam-lever, *e*, which is pivoted to the side of the breech-body, under the lever M of the collar L, and on the side over which said lever M projects. The lower part of this cam-lever bears against a laterally-projecting shoulder, *f*, on the trigger-bolt *f'*, and its upper part is curved outwardly and backwardly.

When the cam-lever occupies the position shown in Fig. 10 it is inoperative; but when turned so as to bring it into a vertical position it will depress the trigger bolt *f'*, so that the latter will no longer engage the arm J' of the firing-pin, the latter being released so far as the trigger-bolt is concerned. The location of the cam-lever *e* is such, however, that it cannot be turned, as last indicated, when the collar-lever M is turned down, and the gun is ready for firing, the collar-lever when in this position preventing the upward movement of the cam-lever, as shown in Figs. 10 and 11. The depression of the trigger-bolt by the cam-lever can, therefore, only be effected when the collar-lever M is turned up, the rear end of the collar L when in this position being in contact with and supporting the arms J' J' of the firing-pin against the tension of the mainspring, and when the collar-lever is turned down the arms J' J' follow the inclines or cams N of the collar, and the firing-pin is thus gradually released and prevented from exploding the cartridge. When the collar-lever is turned down it strikes the curved forward edge of the cam-lever, and forces it back into the position shown in Fig. 10, so that the next time the breech-bolt is withdrawn the trigger-bolt will be ready to engage with the arm J' of the firing-pin.

The forward end of the gun is provided with a cap or nose-band, *g*, which is composed of a band, which surrounds the barrel A, the magazine D, the wooden stock C, and the rammer or sweeping-rod *h* at the end of the wooden stock, and is provided at its front end with an inwardly-projecting flange or lip, in which are formed orifices *i* i^1 i^2 for the barrel, the magazine-plug, and the rammer. The orifice i^1 has two slots, *j j*, opening out of it at the top and bottom, and on the inner side of the flange is a groove, *k*, extending entirely around the orifice i^1, and opening into the slots *j j*, as shown by dotted lines in Fig. 19.

l is the magazine-plug, to which is attached the spiral spring *l'*, which forces the cartridges into the receiver *e'*. This plug is adapted to be inserted into the orifice i^1 of the nose-band, and is provided with a flange, *m*, at its outer end, and on opposite points on its periphery, near the flange *m*, with two studs, *n n*, which are adapted to pass through the slots *j j*; hence, by inserting the plug into the orifice i^1, passing the studs *n* though the slots *j*, and giving the plug a quarter-turn, the studs *n* will enter the groove *k*, and prevent the plug from being withdrawn. The usual spring-catch *o*, Fig. 1, is provided to hold the nose-band in place; and, in addition to this, the rammer or sweeping-rod is provided with an enlargement, *h'*, which, when the rod is screwed into the stock, bears against the flange *m* of the plug *l*, and not only prevents the nose-band from coming off in case of the breakage of its spring-catch, but prevents the plug *l* from being accidentally turned so as to bring its studs into line with the slots *j*, the flange *m* being extended down to the rod *h*, and provided with a notch or concavity, which bestrides the rod, as shown in Fig. 17.

p represents my improved elevation-sight, which is composed of four parts, viz: the sight-receiver or body *q*, which is secured to the barrel; the elevation-leaf *r*, which is pivoted to the sight-body; the elevation-slide *r'*, which is attached to the elevation-leaf, and the leaf-retainer *s*.

The body *q* is composed of two semicircular plates, united by a dovetail block, which is inserted in a corresponding mortise in the barrel. The elevation-leaf is pivoted to the body by a bolt, *b'*, the axis of which is the center of the circle of which the peripheries of the semicircular plates are arcs, the leaf *r* being adapted to turn on its axis, and to be held at any desired point by the leaf-retainer *s*, which is composed of a plate attached to one side of the leaf *r*, and provided with two curved spring-catches, *c' c'*, which engage with graduation-notches on the peripheries of the semicircular plates, as shown in Figs. 13 and 15, these notches indicating the elevation from one hundred to one thousand meters.

The front side of the elevation-leaf is provided with grooved flanges, which receive and guide the elevation-slide *r*, the latter being adapted to be moved longitudinally, and having a slot, s^1, in which is a screw, s^2, which limits its movement and prevents it from be-

ing detached from the leaf. The slide is thus adapted to practically increase the length of the elevation-leaf, and increase the sighting from one thousand to two thousand meters. The lower end of the slide is provided with two slits, which form tongues *t' t'* on the sides of the slide. These tongues are inclined outwardly and tempered, so as to constitute springs, which bear with sufficient firmness against the flanges of the elevation-leaf to prevent the slide from being moved accidentally.

I claim as my invention—

1. The rib R, rigidly attached to the breech-body, and provided with the groove S, which is located below and parallel with the breech-bolt, and is adapted to receive a projection on the collar of the breech-bolt, and guide said collar and breech-bolt in their longitudinal movements, substantially as described, for the purpose specified.

2. The combination of the rib R, having the longitudinal groove S and lateral groove S′, with the breech-bolt collar L, having the projection T, substantially as described.

3. The swiveled stud U, applied to the rib R, and adapted either to stop the breech-bolt and its collar in their backward movement, or to be depressed and allow said breech-bolt and collar to be entirely removed, substantially as described.

4. The swiveled stud U, combined with the rib R and the projection W on the collar L, substantially as and for the purpose specified.

5. The stud U, having the shaft V, on which are two flat surfaces, combined with the spring X, which is adapted to hold the shaft and stud with a yielding pressure in either of two positions, substantially as described.

6. The elbow-lever, consisting of the pivoted part *b*, having a spring-catch, *c'*, and the sliding part *b'*, having notches *d d*, combined with the breech-bolt and cartridge-receiver, substantially as described.

7. The cam-lever *e*, pivoted to the breech-body, and adapted to depress the trigger-bolt, in order that the firing-pin may be released gradually, substantially as described.

8. The cam-lever *e*, combined with the trigger-bolt *f'*, having the shoulder *f*, substantially as described.

9. The cam-lever *e*, having the curved or inclined upper portion or handle, and located in such relation to the collar-lever M as to be displaced and caused to release the trigger-bolt when the collar-lever is turned down, substantially as and for the purpose specified.

10. The detachable nose-cap *g*, adapted to inclose the barrel, the stock, the magazine, and the sweeping-rod, and be held in place, partially or wholly, by a projection, *h'*, on the sweeping-rod, substantially as described.

11. The nose-cap *g*, having the orifice i^1, slots *j j*, and groove *k*, combined with the magazine-plug *l*, having studs *n n*, substantially as described.

12. The magazine-plug *l*, having the notched projecting flange *m*, combined with the sweeping-rod *h*, having the enlargement *h'*, substantially as and for the purpose specified.

13. The pivoted elevation-leaf *r*, having the spring sight-retainer *s* and the adjustable elevation-slide *r'*, combined with the segmental sight-receiver *q*, having numbered graduations or notches, adapted to hold the spring-points of the sight-retainer, and indicate the required elevation of the leaf for firing at a given distance, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERIK VETTERLIN.

Witnesses:
HEINRICH MAY,
ROB MAY.