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1,656,845

COMBINED LOADER EJECTOR AND SAFETY MECHANISM FOR AUTOMATIC FIREARMS

Filed June 21, 1927

4 Sheets-Sheet 1

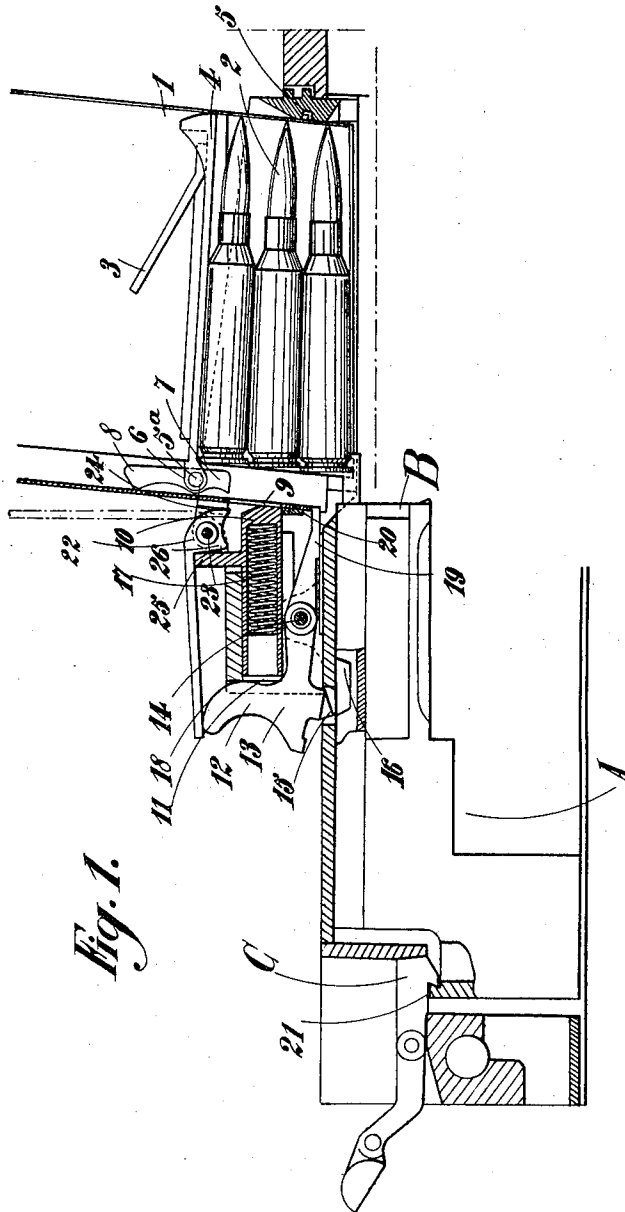


Fig. 1.

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4 Sheets-Sheet 2

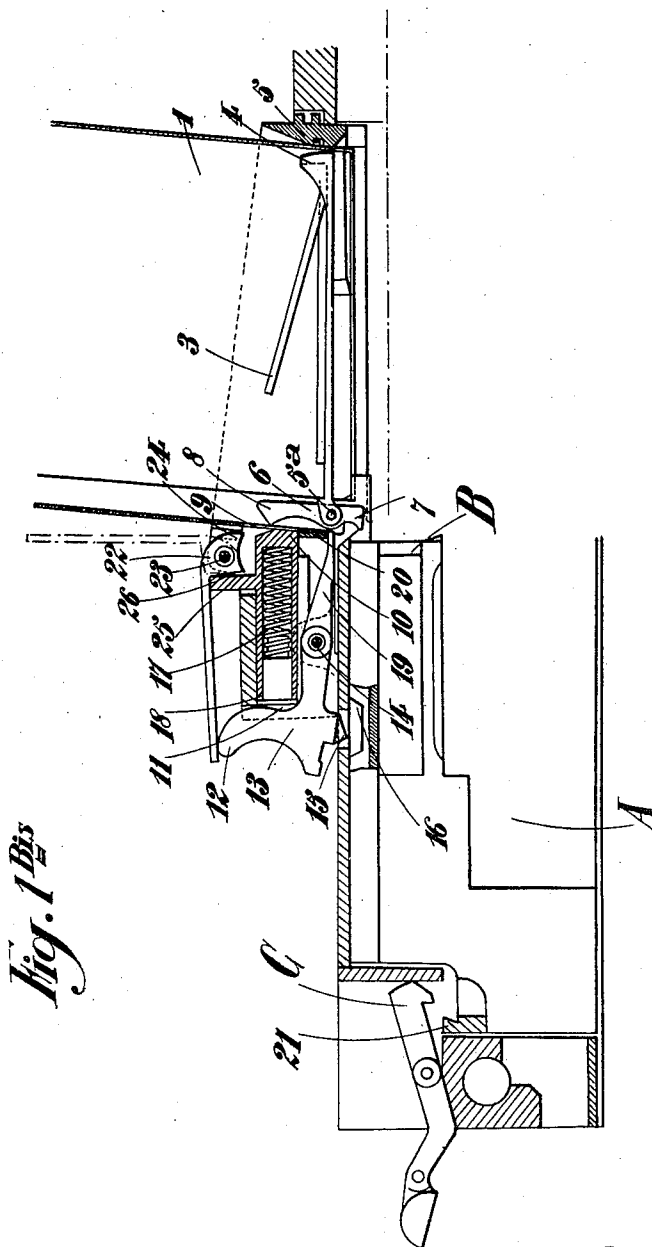


Fig. 1 Bys

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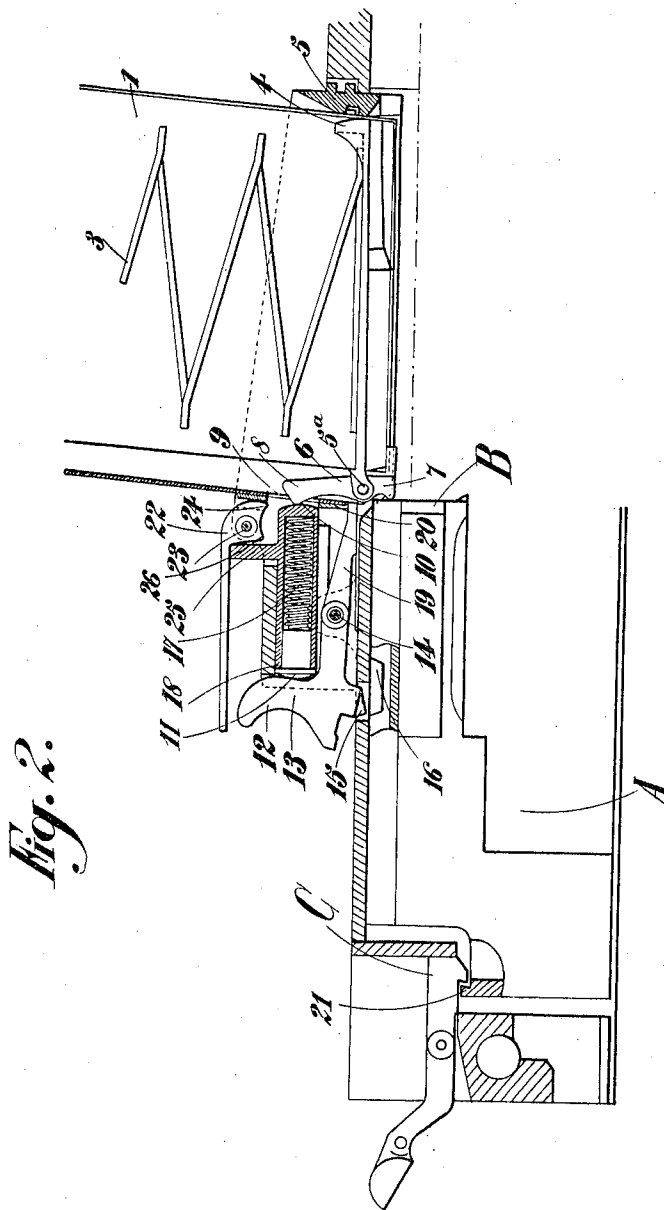
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4 Sheets-Sheet 4

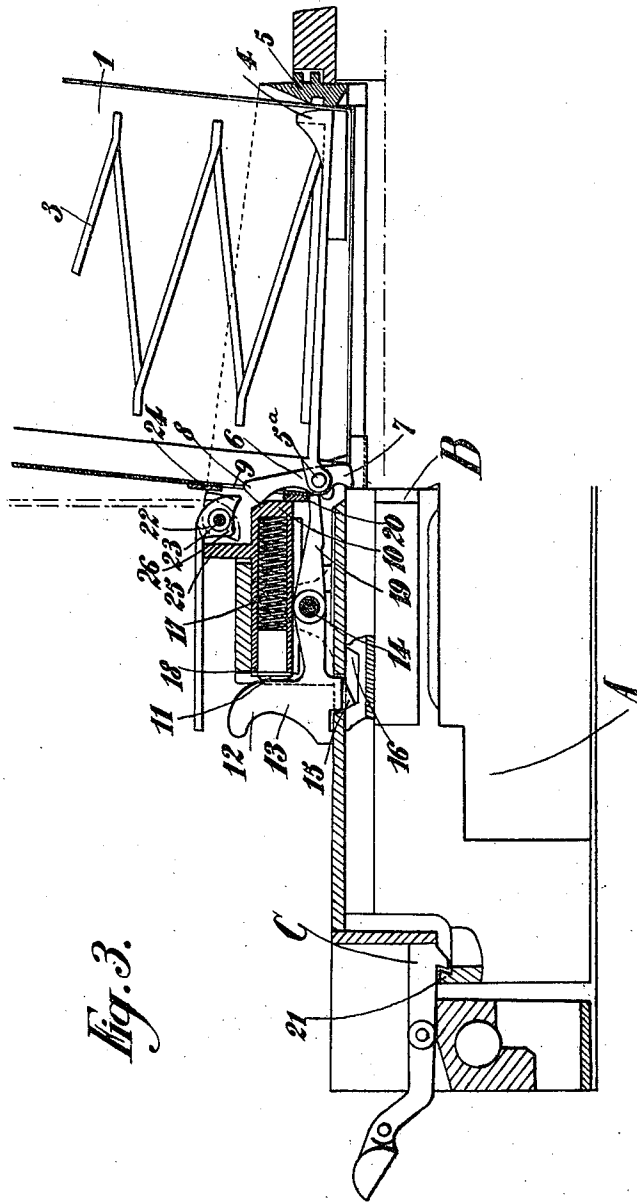


Fig. 3.

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UNITED STATES PATENT OFFICE.

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COMBINED LOADER EJECTOR AND SAFETY MECHANISM FOR AUTOMATIC FIREARMS.

Application filed June 21, 1927, Serial No. 200,402, and in France February 23, 1927.

The present invention concerns certain improvements in automatic fire-arms and relates more particularly to improvements in the mechanism permitting the stoppage of the fire-arm after the cartridges contained therein have been used up.

The idea has already been conceived in the case of certain automatic fire-arms using as feed means loading cases in which an internal spring brings the cartridges successively before the breech-block, of utilizing the loading tray (or push piece), interposed between the cartridges and the spring, to stop the fire-arm after the cartridges have been used up, said tray taking the place of the final cartridge and forming, in a way, a stop by means of which the breech-block is arrested. In other devices a checking sear is used, the nose of which is held outside the path of the breech block by the cartridges themselves, said sear stopping said block when the cartridges are used up.

These various devices have several drawbacks; in the first case, the tray is subjected to repeated blows from the breech block and a rapid deformation ensues therefrom, either in the tray or in the loading case, which produces defective progression of the cartridges through the loader and risks of jamming owing to the cartridge being defectively presented before the block; in the second case, the sear must be actuated by a comparatively weak spring so as not to hinder the descent of the cartridges and, in consequence, its arresting action is only more or less efficacious, besides, a sear of this kind can only be used in connection with loaders in which the cartridges are arranged in a single line and not in quincunx.

Furthermore, in both cases, the firer is never sure that the stoppage in the action of his fire-arm is due to the loader being exhausted and is not due to his fire-arm being jammed, owing for example to the fact that a cartridge is faultily engaged or wedged. If, on the stoppage of the fire-arm and under the impression that all the cartridges have been fired, the marksman removes the loader, this may result in the shot going off and, consequently, in a serious accident. The fire-arms equipped with the above devices therefore make for only very restricted safety.

The object of the present invention is to remedy these defects and the mechanism to which it applies, not only stops the fire-arm after the cartridges have been used up, but also automatically ejects the loader, so that, if the fire-arm stops for any other reason than that the cartridge supply is exhausted, the loader not being ejected, the firer will immediately realize that the loader still contains cartridges and that, consequently, the breech block must be brought back to full cocked position before this fire-arm is handled in any way.

The mechanism according to the invention is essentially characterized by the combination of a checking sear capable of engaging in a corresponding recess of the fire-arm's breech block in order to arrest it, and of an oscillator hinged to the loading tray (or push piece) of the loader and the lower arm of which, after the cartridges have been used up, takes the place of the last cartridge fired, and is then acted on by the breech block, in such wise that, through any suitable means, the upper arm causes the sear to engage with the breech block, means being provided for holding the loader in place during fire and for automatically ejecting it after the cartridges have been used up, whilst at the same time effecting the stoppage of the fire-arm.

According to a form of construction, the means through the medium of which the oscillator actuates the checking sear which is hinged to a pin fixed on the receiver, consist in a slide on which the oscillator acts and which itself acts on an arm of the sear through the medium of a spring push button, a certain amount of play being provided between said slide and a stop of the push button to allow eventually a slight displacement of the slide without a corresponding displacement of the sear.

According to a characteristic of the invention, in order to permit the upper arm of the oscillator, which is hinged to the end of the loading tray and is located within the loader, to act on the displaceable slide which is located outside the loader, a port of suitable shape is made in the wall of the loader facing said upper arm and said slide and through which the said arm can pass.

According to the invention, the means enabling the loader to be kept in place during

fire and to be automatically ejected after the cartridges have been used up, consist in a shoulder carried externally by the lower rear wall of the loading case the front part of which is mounted according to any known arrangement, the said shoulder being held in position at its upper part, by the front end of the aforesaid slide and, at its lower part, by the end of a toe carried by the checking sear, the automatic ejection of the loader following from the fact that, after the cartridges have been exhausted, the oscillator causes the slide to shift longitudinally, said slide being thereby freed from the shoulder, whilst, during the ensuing pivoting of the checking sear, the aforesaid toe raises the said shoulder and ejects the loader.

According to the invention, the front part of the slide is suitably profiled so that, on the loader being placed in position, the aforesaid shoulder may itself displace said slide (corresponding to the play provided between the slide and the push button) which, as soon as the shoulder takes up its normal position, will return, under the action of its spring, into its forward position in which it holds said shoulder in place. The forward movement of said slide is checked by a fixed or adjustable stop.

According to a characteristic of the invention, means are provided for enabling the loader to be removed even though it still contains cartridges, these means comprising, for example, a pivoting lever having a nose which, by cooperating with a tail carried by the slide, shifts said slide longitudinally to a sufficient extent to free it from the shoulder.

Other characteristics and peculiarities of the invention will be gathered from the description which is about to be made thereof in conjunction with the accompanying drawings in which:

Fig. 1 shows the fire-arm in firing position, cartridges being contained in the loading case.

Fig. 1^{bis} shows the position of the various parts of the mechanism according to the invention after the cartridge supply has been exhausted.

Fig. 2 shows the same mechanism at the instant when the breech block has come into contact with the oscillator.

Fig. 3 shows the same mechanism after the loader has been ejected.

In the accompanying drawings, the mechanism according to the invention is supposed to be applied to an automatic fire-arm of any type whatsoever A, which is essentially characterized by a breech block comprehensively denoted by B and which a sear C can retain in the usual manner in the rear position (full-cocked). This breech block performs a reciprocating motion and is driven,

from rear to front, by its return spring and, from front to rear, by the gas pressure resulting from the explosion of the cartridge fired off. The fire-arm A is fed with cartridges by means of a loading case 1 through which the cartridges 2, which may be arranged, either in a single vertical row, or in quineux, or in any other way, are progressed by a spring 3, a tray 4 known under the name of "loading tray" being interposed between the spring 3 and these cartridges 2 and acting on these latter. In the usual manner, the front part of the loader 1 is mounted by any suitable means comprehensively designated by 5. On the fire-arm coming into action, the cartridges 2 successively come into place opposite the path of the breech block B which pushes them into the barrel and fires them off.

According to the invention, an oscillator 6 is hinged at 5^a to the rear end of the loading tray 4, said oscillator having an upper arm 8 and a lower arm 7 which, after the cartridges 2, have been completely used up, and as may be seen in particular in Fig. 2, can take up the position of the final cartridge fire, i. e. the position in which it is in the path of the breech block B. The upper arm 8 of the oscillator 6 is located facing a port 9 made in the rear wall of the loader 1, which enables this arm 8 to come into contact with the end of a slide 10, on pivoting of the oscillator 6 (brought about as will be explained later) which slide may in its turn, through the medium of a push button 11, act on the arm 12 of a checking sear 13 hinged at 14 on the receiver and the nose 15 of which can engage in a recess 16 of the breech block B. A spring 17 lodged in a recess of the slide 10 and inserted between the bottom of this recess and the push button 11 applies this push button and said slide respectively against the arm 12 of the sear 13 and against a stop 26 of which more will be said hereafter; this stop limits the forward movement of the slide 10. A certain amount of play as seen at 18, is provided between the head of the push button 11 and the slide 10, so as to allow this slide to be displaced eventually without a corresponding pivot movement of the sear 13 taking place. This latter has moreover a toe 19 the front end of which may be actuated by the lower edge of a shoulder 20 carried externally by the rear wall of the loader 1, slightly below the port 9. This shoulder 20 may be held in place at its upper end by the slide 10 itself, as seen in Fig. 1, and the breadth of this shoulder is such that when the slide 10 is displaced through a distance equal to the play 18 which exists between said slide and the push button 11, this slide 10 is completely disengaged from the shoulder 20 so as to free this latter.

The relative position of the recess 16 and

of the usual stop notch 21 of the block B is such that when this block is maintained in the full cocked position by the sear C (as shown in Fig. 1), the nose 15 is slightly to the rear of the recess 16, and, conversely, when the breech block B is kept stationary by the nose 15 (as shown in Fig. 3), this block has still a slight distance to traverse, after the nose 15 has been freed, before being arrested by the sear C.

With the above described device, the loader is mounted in the following manner: The front part is first of all mounted in the usual manner as at 5. It is then swivelled round 5. The shoulder 20 then comes into contact with the slide 10 the profile of the corresponding end of which is such that this shoulder 20 automatically thrusts back the slide 10, i. e. shifts it longitudinally through a distance equal to the play 18. The loader can then be lowered completely and brought into the position shown in Fig. 1. As soon as it attains this position, under the action of the spring 17, the slide 10 returns into its forward position in which it bears against the upper part of the shoulder 20. As moreover this shoulder abuts at its lower part against the toe 19 of the sear 13, the loader is firmly held in position. It will be noticed that the shoulder 20 can be mounted whatever the position of the sear 13 may be. For if, as shown in Fig. 1, the breech block is in the full cocked position, that is to say the sear 13 raised and its toe 19 lowered, the shoulder 20 will simply bear against the end of this sear. On the contrary if, as shown in Fig. 3, the breech block is kept stationary by the nose 15, that is to say if the sear is in its lowered position and the toe 19 in its raised position, on the loader being set in place, the shoulder 20 will bear against the end of this toe and will cause the sear 13 to pivot. The nose 15 will then be disengaged from the recess 16 and the breech block B will be displaced slightly forward so as to come into the full cocked position. The shoulder 20 by lowering the toe 19 will come into the position shown in Fig. 1 in which, as described above, it is held both by the toe 19 and the slide 10.

The action of this device is as follows: In normal firing position, as shown in Fig. 1, the breech block B reciprocates and, at each forward stroke, causes a cartridge 2 to be introduced into the fire-arm and exploded. The above described mechanism is then idle. On the other hand, as soon as the last cartridge has been fired, under the action of its spring 3, the loading tray 4 comes into the position shown in Fig. 1^{bis} in which the arm 7 of the oscillator 6 occupies the position of the final cartridge fired. In consequence, when the breech block B enters on its forward stroke, it acts on the arm 7 and causes the oscillator 6 to pivot, the arm 8 of which

thereby causes the slide 10 to be shifted longitudinally towards the rear (Fig. 2). During this displacement, the slide 10, through the medium of the spring 17 and the push button 11 acting on the arm 12, will cause the sear 13 to pivot, the nose 15 of which will sink and will engage in the recess 16, thereby arresting the breech block B and, consequently, stopping the fire-arm. Simultaneously, the ejection of the loader will follow from the fact that the toe 19, on rising, will lift the shoulder 20 which is no longer held in place at its upper part by the slide 10 (Fig. 3). Hence stoppage of the fire-arm and ejection of the loader will take place simultaneously and the firer will realize immediately that this stoppage is really caused by the cartridge supply being completely exhausted and he will then be able to proceed to remove and replace the loader with absolute safety. On the contrary, if the fire-arm is stopped for one reason or another, for example owing to a faulty insertion of the cartridges, the loader will not be ejected and, consequently, the firer will be sure that there are still cartridges in the loader and that, consequently, before handling the fire-arm in any manner, the breech block must be brought back into the full cocked position and that, possibly, this fire-arm must even be brought into the safety position. In this manner, all risks of accidents, which might result from dismounting the loader when it still contains cartridges unknown to the firer, will be avoided.

Another advantage of the device according to the invention lies in the fact that the spring 17 may be of considerable strength without the descending movement of the cartridge being hindered thereby. For the spring 17 acts on the slide 10 the forward movement of which, that is to say the sole movement which might interfere with the movement of the cartridges, is checked by the stop 26. The comparatively great strength of this spring 17 will enable it, on acting on the arm 12 of the sear 13 through the medium of the push button 11, to cause the nose 15 to sink rapidly and, in consequence, to effect a definite stoppage of the breech block B. It is only necessary to preserve a certain ratio between the force of the spring 17 and that of the fire-arm's return spring, which ratio is a function of the ratio of the length of the arms 7 and 8 of the oscillator 6, and this in order that the forward movement of the block B, under the action of its return spring may take place smoothly.

According to the invention, means are provided for enabling the loader to be dismounted although still containing cartridges, these means enabling a slight displacement of the slide 10 to be effected, corresponding to the play 18, and sufficient to

disengage this slide from the shoulder 20. It is then only necessary to act on the loader itself in order to withdraw it with ease. According to the form of embodiment illustrated, these means comprise a lever 22 pivoting about a fixed pin 23 and having a nose 24 which, when the lever 22 is brought into the position shown in dotted lines in Fig. 1, acts on a toe 25 in one piece with the slide 10. This device might be replaced by an ordinary hook in one piece with the toe 25 and directly controllable by hand.

Owing to the play 18, the slide is displaced without a corresponding displacement of the sear 13. It is the lever 22 which carries the stop 26 which, as has been explained above, checks the forward movement of the slide 10.

It is moreover self-evident that the invention has only been described and represented here in a merely explanatory but by no means limitative manner and that it could be subjected to various modifications of detail without departing from the spirit thereof.

I claim—

1. In a fire-arm of the cartridge loader feeding type, having a reciprocating breech block, a combined loader ejector and safety mechanism comprising oscillating means adapted to replace the final cartridge fired and to be oscillated by said breech block, means for simultaneously arresting said breech block and ejecting the loader, and a member through the medium of which said oscillating means on being actuated by said breech block move said block arresting and loader ejecting means into operative position.

2. In a fire-arm of the cartridge loader feeding type, having a reciprocating breech block, a combined loader ejector and safety mechanism comprising a loading tray, an oscillator hinged to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, means for simultaneously arresting said breech block and ejecting said loader, and a member through the medium of which said oscillator on being actuated by said breech block moves said block arresting and loader ejecting means into operative position.

3. In a fire-arm of the cartridge loader feeding type, having a reciprocating breech block, a combined loader ejector and safety mechanism comprising a loading tray, an oscillator hinged to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, pivoted means for simultaneously arresting said breech block and ejecting said loader, and a slide through the medium of which said oscillator on being actuated by said

breech block moves said block arresting and loader ejecting means into operative position.

4. In a fire-arm of the cartridge loader feeding type, having a reciprocating breech block, a combined loader ejector and safety mechanism comprising a loading tray, an oscillator hinged to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, a second arm to said oscillator, a pivoted sear adapted to be swung into position for simultaneously arresting said breech block and ejecting said loader, and a slide through the medium of which said second arm of said oscillator moves said sear into operative position.

5. In a fire-arm of the cartridge loader feeding type having a reciprocating breech block, a combined loader ejector and safety mechanism comprising a loading tray, an oscillator hinged to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, a pivoted sear, a nose to said sear, a recess in said breech block into which said nose can descend and arrest said block, a shoulder carried by the loader, a slide, a toe to said sear, said shoulder being normally maintained in place between said slide and said toe, and a second arm to said oscillator adapted through the oscillating action of said breech block on said first arm to displace said slide out of engagement with said shoulder, said sear through the displacement of said slide pivoting into block arresting and loader ejecting position.

6. In a fire-arm of the cartridge loader feeding type having a reciprocating breech block, a combined loader ejector and safety mechanism comprising a loading tray, an oscillator hinged within the loader to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, a slide, a port made in the loader, a second arm to said oscillator adapted through the oscillating action of said breech block to pass through said port and displace said slide, and a pivoted sear moved through the displacement of said slide into position for simultaneously arresting said breech block and ejecting said loader.

7. In a fire-arm of the cartridge loader feeding type having a reciprocating breech block, a combined loader ejector and safety mechanism comprising a loading tray, an oscillator hinged within the loader to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, a slide, a port made in the loader, a second arm to said oscillator adapted through the oscillating action of said

breech block to pass through said port and displace said slide, a pivoted sear, a nose to said sear adapted to arrest said block on the pivoting of said sear, a shoulder on the
 5 loader, a toe to said sear normally cooperating with said slide to maintain said shoulder in place, said slide by its displacement becoming free of said shoulder and pivoting
 10 said sear into block arresting and loader ejecting position.

8. In a fire-arm of the cartridge loader feeding type having a reciprocating breech block, a combined loader ejector and safety mechanism, comprising a loading tray, an
 15 oscillator hinged to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech block and to be oscillated thereby, a pivoted
 20 said breech block and ejecting said loader, an arm to said sear, a slide located opposite said sear arm with slight play between, and a second arm to said oscillator adapted through the oscillating action of said breech

block to displace said slide sufficiently to
 pivot said sear into block arresting and
 loader ejecting position. 25

9. In a fire-arm of the cartridge loader feeding type having a reciprocating breech block, a combined loader ejector and safety mechanism, comprising a loading tray, an oscillator hinged to said loading tray and progressing therewith, an arm to said oscillator adapted to come into the path of said breech
 30 block and to be oscillated thereby, a pivoted
 35 sear for simultaneously arresting said breech block and ejecting said loader, an arm to said sear, a slide, a spring push button to said slide located near said gear arm with slight play between, a stop limiting the
 40 movement of said slide away from said sear arm, and a second arm to said oscillator adapted through the oscillating action of said breech block to displace said slide sufficiently to pivot said sear into operative po-
 45 sition.

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