

H. DORN.
AUTOMATIC LOADING FIREARM.
APPLICATION FILED DEC. 2, 1910.

1,041,046.

Patented Oct. 15, 1912.

2 SHEETS—SHEET 1.

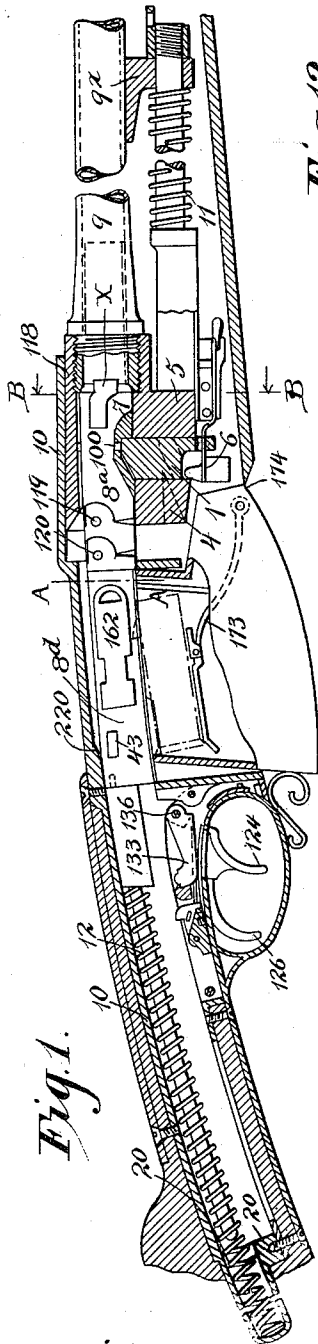


Fig. 1.

Fig. 12.

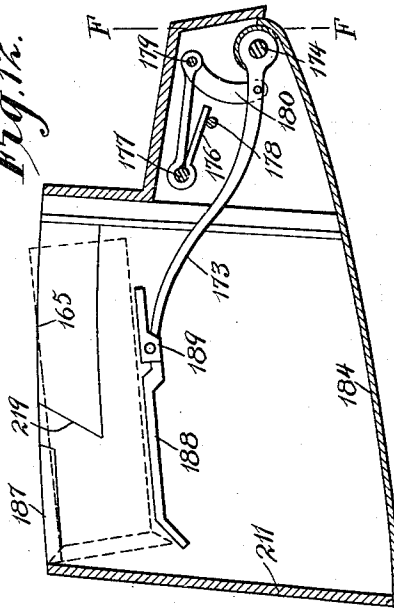


Fig. 2.

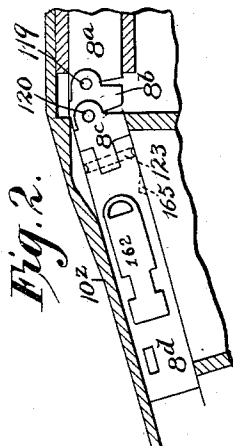


Fig. 13.

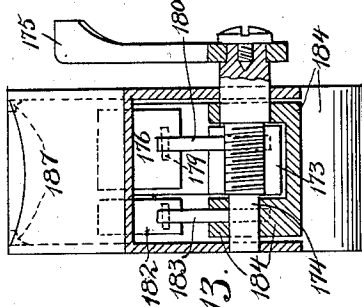


Fig. 4.

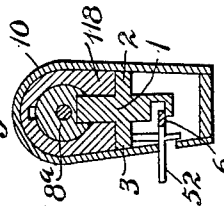
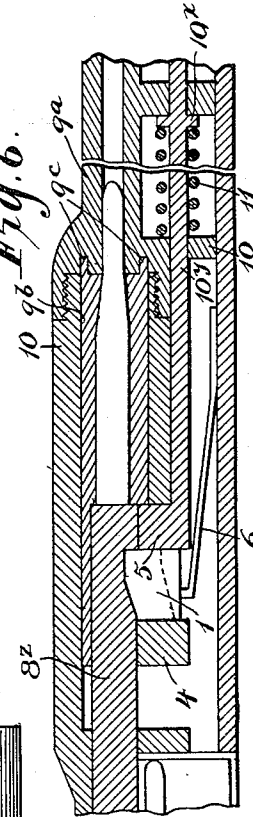


Fig. 6.



Witnesses:
John G. ...
Eugene W. ...

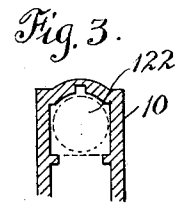
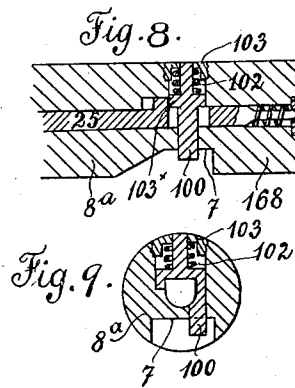
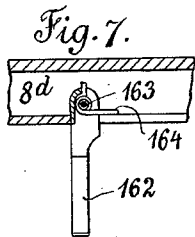
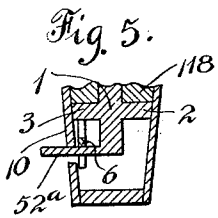
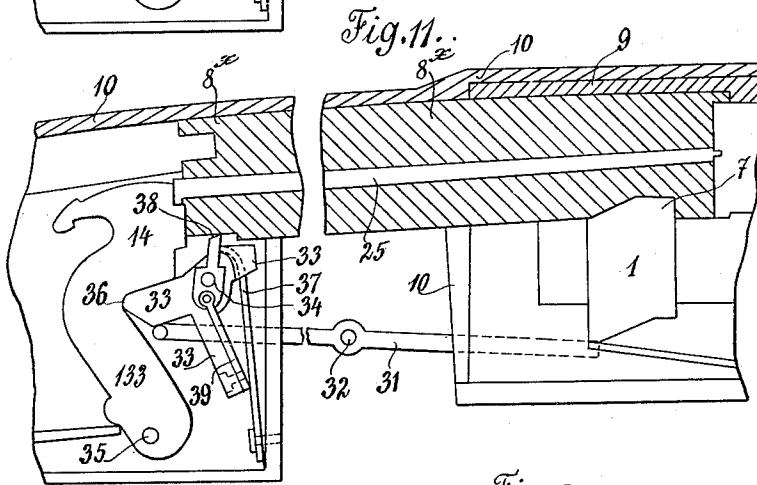
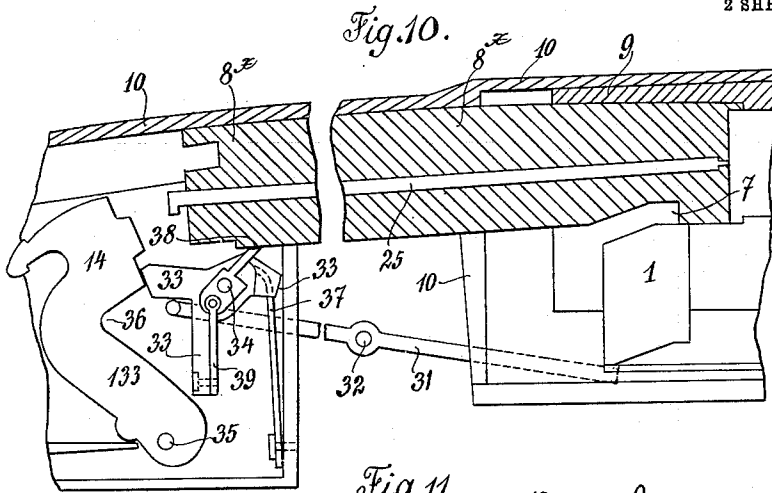
Inventor:
Hans Dorn
by ...
his attorney

H. DORN.
 AUTOMATIC LOADING FIREARM.
 APPLICATION FILED DEC. 2, 1910.

1,041,046.

Patented Oct. 15, 1912.

2 SHEETS—SHEET 2.



Witnesses:
 Clarence L. Lane R
 Edw. S. Devois

Inventor
 Hans Dorn
 by *[Signature]*
 his Attorney

UNITED STATES PATENT OFFICE.

HANS DORN, OF SUHL, GERMANY.

AUTOMATIC-LOADING FIREARM.

1,041,046.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed December 2, 1910. Serial No. 595,189.

To all whom it may concern:

Be it known that I, HANS DORN, subject of the German Emperor, residing at No. 12 Sandstrasse, Suhl, Germany, have invented certain new and useful Improvements in Automatic-Loading Firearms, of which the following is a specification.

This invention relates to improvements in connection with recoil loading fire arms having a sliding barrel or a sliding cartridge chamber arranged behind a fixed barrel.

The fundamental idea of the invention is based on the fact, that in addition to the breech closing spring acting in the usual manner and the brake (air, liquid, friction brake or the like) acting on the sliding barrel or on the sliding cartridge chamber, a separate spring is employed, which brings the locking member with locking faces, disposed perpendicularly against the barrel core, into the engaging or locking position, and by means of a handle provided for this purpose, the said locking member may, at will, be moved out of engagement against the action of the spring without a rearward movement of the rearwardly braked barrel or cartridge chamber. The combination of these elements is applicable to different kinds of breech bolts, such as slide operated breech bolts and rotatable breech bolts.

In the construction of the breech mechanism according to the present invention, there is provided a safety means, hereinafter fully described, which prevents premature firing when the locking is incomplete, and also special packing means for insuring a gas tight closure between the casing and the movable cartridge chamber, and finally the division of the breech bolt into several articulated sections for permitting different paths for the breech bolt head and the rear part of the breech bolt, which with change of direction can slide in a guide of the gun-stock and has a foldable handle for withdrawing the breech bolt. The mechanism of the firearm also includes an improved form of magazine, hereinafter described.

In the accompanying drawings, the subject matter of the invention is shown by way of example.

Figure 1 is a longitudinal section of a small-arm with sliding breech bolt and sliding barrel, wherein the details of the invention, including the magazine equipment are

fully shown. To this figure belongs the sliding packing means according to Fig. 6, which, for the sake of clearness, is not shown in Fig. 1. Fig. 2 is a sectional view of a modification of Fig. 1 referring to the sectional breech bolt. Fig. 3 is a cross-section through the casing for guiding the breech bolt taken on the line A—A of Fig. 1. Fig. 4 is a cross-section taken on the line B—B of Fig. 1 as seen toward the left. Fig. 5 shows a modification of Fig. 4. Fig. 6 is a section showing packing means in connection with a sliding breech bolt, wherein there is employed a sliding cartridge chamber in combination with a fixed barrel. Fig. 7 is a sectional detail showing the arrangement of the foldable handle on the rear part of the breech bolt. Fig. 8 is a longitudinal section through the breech bolt head and Fig. 9 is a cross-section thereof at that part where the automatic safety device is provided on the firing pin. Figs. 10 and 11 are longitudinal sectional views of another safety device in combination with the spring controlled latch for the purpose of making the safety position of the cocked hammer independent of the actual position of the latch and the position of the breech bolt. Fig. 12 is a sectional elevation of the magazine (Fig. 1) on an enlarged scale and Fig. 13 is a cross-section through the magazine on the scale of Fig. 12 taken on the line F—F of Fig. 12.

In Fig. 1, 10 is the casing for guiding the breech-bolt of the fire arm which casing extends rearwardly into the gunstock, 9 is the sliding barrel and 8^a is the breech bolt consisting of several pieces and provided in the usual manner with extractor X. The breech bolt 8^a is normally pressed forward by the breech closing spring 12 provided in the neck of the gunstock and moves into the locking position as shown, whereupon the top cartridge is pushed out of the magazine into the cartridge chamber. An extension 118 called a barrel extension is secured to the sliding barrel and so arranged that it can slide back with the breech bolt 8^a within the casing 10. By the pressure of a strong brake-spring 11, which extends between a lug 9^x of the barrel 9 and the casing 10 the sliding barrel 9 with extension 118 is held forward.

The locking member of the sliding breech bolt as shown consists, for example, of a prismatic-shaped latch 1; this latch is

adapted to slide up and down perpendicularly in a prismatic recess between the barrel lugs 4 5 of the extension 118 with locking faces perpendicular to the barrel core; the said latch has side shoulders 2 and 3 (Figs. 4 and 5) with inclines and is under the action of a spring 6, which has the tendency to force latch 1 into the recess 7 of the breech bolt 8^a. The said side shoulders 2 and 3 are adapted to effect, at the proper time, by running against fixed inclines 17 of the casing 10 a positive downward movement of the latch 1 against the action of the spring. Moreover, by the provision of an outwardly extending handle or grip 52, which, according to Fig. 4, may be formed as a part of the spring 6, the latch 1 may be brought out of engagement by hand. As shown in the modification according to Fig. 5, the handle 52^a may also be formed as a lateral projection or extension of the latch 1.

With regard to the firing means, a hammer 133 is provided, which is adapted to rotate on a stud 136 and is controlled by a hair trigger 124, 126. When pulling the trigger, the hammer advances against a firing pin (Fig. 4), which is not shown in Fig. 1, so as not to render the breech bolt arrangement indistinct.

It is advantageous, for the purpose of shortening the fire arm, to form the breech bolt of several sections or parts 8^a 8^b 8^c, as shown in Fig. 1. These parts are articulated at 119, 120 and only the front part 8^a of the breech bolt proper is guided rectilinearly in the axial direction of the barrel bore when during the recoil, the barrel or cartridge chamber and breech bolt 8^a are interlocked. The rear parts, and especially the part 8^c, are adapted to move in a curved guide (Fig. 1) which extends rearwardly through the gunstock neck with the necessary depression below the sighting line.

In order to prevent the hand being hurt, the handle 162 is adapted to be folded within the breech bolt 8^a, as shown in Fig. 7. The handle is pivoted at 163 on the part 8^d and is under the action of a torsional spring 164, whereby normally in the folded position, it can be kept flush with the side of the part 8^d or with the right outer wall of the casing 10. Fig. 7 shows the projecting or operative position of the handle 162 limited by means of a stop or the like.

The closing and locking means above described operate in the following manner: As soon as the breech bolt 8^a recoils, it takes with it through the medium of the latch 1 the barrel extension 118 screwed to the barrel 9. When the breech bolt 8^a with latch 1 and barrel 9 has recoiled a short distance within the casing—in which case the barrel closing and brake spring 11, the breech closing spring 12 also acting as brake spring, and the hammer 133 are tensioned—and the

gas pressure is no longer too strong, the side shoulders 2, 3 of the latch 1 run against the inclined unlocking faces 17 of the casing 10 (Fig. 1). After the recoil and a complete withdrawal of the gas, the latch 1 will be moved out of the recess or depression 7 of the breech bolt 8^a. The breech bolt 8^a continues its rearward movement alone, whereupon the closing spring 12 and the hammer are completely tensioned. As its recoil movement is limited by the stop 20 in the casing 10, the barrel 9 returns to the forward position under the pressure of the spring 11. The latch 1 sliding within the barrel lugs 4, 5 will be taken along and pressed upward by the locking spring. When the breech bolt 8^a has moved sufficiently far behind the cartridge so that the latter may have time to rise by the carrier spring, the recoil of the breech bolt will be limited by the stop 20 (Fig. 1) of the casing 10. The breech bolt 8^a, which pushes the cartridge out of the magazine into the barrel and depresses the latch 1, is brought into the firing position by the spring 12. As soon as the recess 7 of the breech bolt is opposite the latch 1, the latter springs into the recess through the power of the locking spring 6. The advantage of this locking consists in that barrel and breech bolt can advance independently of each other so that notwithstanding a retardation of the barrel or the breech bolt, the locking may still take place.

By means of the herein described locking arrangement provided with handle 52, it is possible in case of need to effect an unlocking directly by hand without the necessity of causing a rearward movement of the barrel against the powerful action of the brake spring. The handle 52 protruding from the casing (in the arrangement according to Figs. 1 and 4) does not take part in the rearward and forward movement of the latch 1 but engages in a longitudinal groove or hook of the latch. As the latch 1 is also beveled below in the same directing path, in which it moves downward obliquely during the unlocking, the handle 52 does not take part in the upward and downward movement of the latch 1 even in the unlocking movement after the shot.

The locking means, as heretofore described, must be completed by a latch arresting device, which, when the latch is not engaged locks the gun, for it would be dangerous to life, if, through lack of a positive locking, the latch does not catch through inaction of the spring, dirt or the like. In the constructional form explained with reference to Figs. 8 and 9, this latch arresting device is also constructed as firing pin arresting device.

A spiral spring 102 (Figs. 8 and 9) presses in a vertical bore downward upon the arresting bolt 100, which is adapted to slide

vertically up and down in the same bore. This bore is closed above by a screw plug 103 which serves as support for the spring. At 103^a, the arresting bolt 100 has an annular reinforcement, which is in front of a lug on the firing pin 25 and as soon as the lower end of 100 projects into the recess 7 of the breech bolt 8^a and the upper end of 100 is flush with the upper surface of 8^a the firing pin is locked against forward movement. As soon as the latch 1 enters the recess 7, it lifts the arresting bolt 100 against the spring 102 so that the lug of the firing pin 25 can freely advance under the annular reinforcement 103^a. In this unlocked position, the arresting bolt 100 projects upwardly out of the plug 103; the arresting bolt 100 also guides the spring 102 and is under the action of the cam 220 on the casing (Fig. 1) for the purpose of a positive safety, while being supported by the spring 102.

The special arrangement of a box magazine is shown in Figs. 12 and 13 as belonging to the constructional form according to Fig. 1. This box magazine permits the employment of various cartridges, for instance, rifle cartridges without rim, and shot cartridges with rim. The magazine is to be charged from below and is foldable; this has the advantage that in the case of a closed breech bolt 8^a and without also charging a cartridge frame either several cartridges can be charged simultaneously by means of the cartridge clip or the cartridges can be filled singly and that when filling, it is not necessary to open the breech bolt and that when opening the same, an undischarged cartridge will not be ejected. The magazine has a carrier 173 (Figs. 12, 13) which is rigidly secured to a shaft 174. This shaft is rotatably mounted in the sides of the magazine. A handle 175 is rigidly secured to the shaft outside the magazine. A bow-spring 176, which tends to spread and whose eye is placed over the stud 177 is supported by its lower arm on the stud 178. Its upper arm is articulated at 179 to the link 180, which is articulated at its lower end at 181 to the carrier 173. In this manner, the carrier 173 is always moved by the spring 176 toward the path of the breech bolt 8^a. The cover closing spring 182 (Fig. 13), which is formed, mounted and operates like 176, is located beside the carrier spring 176 and is also linked to the cover 184 by a link 183. The cover 184 turns freely on the shaft 174, because its movement must be independent of that of the carrier 173 with its rigidly secured shaft 174. In this manner, the carrier 173 may be depressed and raised silently against the action of the carrier spring 176 by means of the handle 175. If the carrier when opening from the uppermost position, bears against the cover 184, it will also take the latter with it, whereby the cover will also

be opened. In the open position, the carrier and the cover are stationary if the fulcrums 179, 181, 174 (Fig. 12) are in a straight line in the dead-point position. It is advisable when opening to go beyond the dead-point. The resulting tendency of the carrier and the cover to open still farther is limited by a stop, for instance, by the links 180 and 183 bearing against the rotating shaft 174. By pressure exerted on the cover, this cover and the carrier will be released from the dead-point position and advance into the closing position, which can be effected silently by operating the handle.

A box magazine which, by means of its upper flange can guide the rimless cartridge when it is pushed out of the magazine by the breech bolt, can only secure the rim in the case of a cartridge with rim and this cartridge tilts upwardly in front. In order to avoid this, the sides of the magazine may have suitable means, in order to secure the front rimless part of the cartridge upwardly by a flange and to permit the passage of the thicker cartridge rim. The cartridge rim may be secured behind rigidly or elastically by a flange 187 and during the forward movement by the breech bolt 8^a, the said cartridge rim may be positively guided on an incline 219 (Fig. 12) against each side of the magazine into the extractor or any other guiding means on the movable head 8^a.

Instead of arranging the herein described locking mechanism in combination with a sliding barrel, it may be arranged in combination with a sliding cartridge chamber, which is adapted to move behind the barrel end (apart therefrom). Such form of construction is shown by the longitudinal section, Fig. 6. In this case 8^a is a breech bolt made in one piece, 1 the latch, 6 the spring for operating the latch and 4 and 5 are the guide lugs. The latter do not form one piece with the barrel 9^a, which is fixed on the casing 10, but with the cartridge chamber 9^b, which is a part separable from the barrel. The brake spring 11, which is adapted to extend, is supported rearwardly on the casing 10 and forwardly on a collar 10^a, carried by a rod or bar 10^b, which is fixed to the cartridge chamber 9^b and can also guide the brake spring 11. On the recoil of the cartridge chamber 9^b, the brake spring 11 will therefore be contracted and tensioned. A peculiar packing means consisting of a hollow cylinder 9^c is provided at the part which separates the cartridge chamber 9^b and the barrel 9^a; on the recoil of the cartridge chamber 9^b, the said hollow cylinder prevents the passage of the powder gases between the cartridge chamber 9^b and casing 10. The operation of this closing and locking mechanism provided with sliding cartridge chamber is the same as the operation of the mechanism described with reference to

Fig. 1. The advantage is that the precision and advantages of a fixed barrel are maintained as well as the new locking method.

Another modification of the means for securing or arresting the latch when the breech bolt 8^x is closed and the latch is not engaged and also for securing the hammer when the breech bolt is not closed, is shown in Figs. 10 and 11 and constructed in the following manner: The latch 1, when not engaged with the breech bolt 8^x, depresses the front arm of a double-armed lever 31 (Figs. 10 and 11), which oscillates vertically on the pin 32 secured horizontally in the casing 10. With its rear end, the said lever lifts freely, by a horizontal lateral abutment, a safety member 33 as soon as the latch 1 does not engage in 7 and thus depresses its front arm. This safety member 33 oscillates on the pin 34 secured horizontally in the casing 10. When the safety member 33 occupies the position shown in Fig. 10 it cannot yield when the hammer 133 moves forward, because this hammer hits it in a line passing through its pivot 34, and consequently no turning moment tending to rotate the safety member about its pivot 34 is exercised by the hammer. The blow of the hammer is taken up by the member 33, so that the firing-pin is not driven forward. This however happens only when the non-engaged latch 1 has lifted the rear arm of the safety member 33 by means of the lever 31, for the hammer has on its front side a recess 36, which fits over the rear arm of the safety member 33 when this arm is brought by the spring 37 into its lower position when the latch is engaged. The safety member 33 is however not only under the control of the latch 1 but also under that of the breech bolt 8^x, because the safety member 33 only releases the hammer when the breech bolt 8^x has terminated its forward movement. For this purpose, there is mounted in the safety member 33 a vertically oscillating pawl 38, which, when the breech bolt 8^x recoils, positively escapes in front of the same (Fig. 11) but as soon as the breech bolt leaves the pawl rearwardly, the pawl oscillates by means of the spring 39 into the path of the breech bolt 8^x. As the pawl 38 in the safety member 33 cannot escape forwardly when it is positively forced out of the path of the advancing breech bolt, the pawl positively takes with it the safety member 33 so that the recess 36 of the hammer does not coincide therewith. But when the forward movement of the breech bolt 8^x is terminated, it releases the pawl 38 so that the safety member 33 is brought by its spring 37 in front of the recess 36 of the hammer. If the breech bolt 8^x has not advanced so far that the safety member 33 does not protrude rearwardly beyond the rear end of the breech bolt 8^x, the stroke of the hammer will be

received by the rear bottom edge of the breech bolt.

What I claim and desire to secure by Letters Patent is:

1. In an automatic small-arm, the combination of a casing, a cartridge chamber slidable therein, said chamber having an extension, a breech-bolt slidable in the casing, a latch normally locking the said breech-bolt with the said extension of the cartridge chamber, a spring normally pressing the latch into its locked position, and a handle independent of the breech-bolt and extending through the casing for releasing said latch from its position locking the breech-bolt, without moving the cartridge chamber to the rear.

2. In an automatic small-arm, the combination of a casing, a cartridge chamber slidable therein, said chamber having an extension, a breech-bolt slidable in the casing, a latch normally locking the said breech-bolt with the said extension of the slidable cartridge chamber, a spring normally pressing the latch into its locked position, a handle for releasing said latch from its position locking the breech-bolt, without moving the cartridge chamber to the rear, and a handle mounted on the breech-bolt for retracting the same.

3. In an automatic small-arm, the combination of a casing, a cartridge chamber slidable therein, said chamber having an extension, a breech-bolt slidable in the casing, a latch normally locking the said breech-bolt with the said extension of the cartridge chamber, a spring normally pressing the latch into its locked position, a handle independent of the breech-bolt and extending through the casing for releasing said latch from its position locking the breech-bolt, without moving the cartridge chamber to the rear, and a handle mounted on the breech-bolt for retracting the same.

4. In an automatic small-arm, the combination of a casing, a cartridge chamber slidable therein, said chamber having an extension, a breech-bolt slidable in the casing, said breech-bolt having a recess, a latch locking the said breech-bolt with the said extension of the cartridge chamber, a spring normally pressing the latch into said recess, and a handle independent of the breech-bolt and extending through the casing for releasing said latch from its position locking the breech-bolt, without moving the cartridge chamber to the rear.

5. In an automatic small-arm, the combination with a casing, of a breech-bolt having a recess slidable therein, a spring in the rear end of the casing tending to drive the breech-bolt to the front end thereof, a latch arranged transversely of the casing and having an upper face slanting downward from the front to the rear of the cas-

ing, a second spring normally pressing the latch into said recess, and a handle extending through the casing for releasing said latch from the breech-bolt against the action of the latter spring.

6. In an automatic small-arm, the combination with a casing having a slanting unlocking face, of a breech-bolt having a recess slidable in the casing, a latch normally in front of said unlocking face, a spring normally pressing the latch into the recess, said latch having a lateral shoulder adapted to coact with the said unlocking face when the latch is driven toward the rear end of the casing whereby the breech-bolt is released, and a handle independent of the breech-bolt and extending through the casing for releasing said latch in its normal position from the breech-bolt.

7. In an automatic small-arm the combination of a casing, a cartridge chamber slidable therein, said chamber having an extension, a breech-bolt slidable in the casing, said breech-bolt having a recess, a latch locking the said breech-bolt with the said extension of the slidable cartridge chamber, a spring mounted on the casing normally pressing the latch into said recess, and a handle independent of the breech-bolt and extending through the casing for releasing said latch from its position locking the breech-bolt, without moving the cartridge chamber to the rear.

8. In an automatic small-arm the combination of a casing, a cartridge chamber slidable in the front end thereof, said chamber having an extension, a breech-bolt slidable in the casing and guided in the extension of the said chamber, the front end of the breech-bolt being normally completely surrounded by the extension of the said chamber, said breech-bolt having a recess, a latch normally projecting into said recess and a handle independent of the breech-bolt and extending through said casing for driving said spring, removing the latch from the recess and unlocking the breech-bolt from the chamber, without moving the cartridge chamber to the rear.

9. In an automatic small-arm, the combination with a casing, of a cartridge chamber having an extension slidable in the front end thereof, a breech-bolt having a recess and guided in the extension of the said chamber, the front end of the breech-bolt being normally completely surrounded by the extension of the said chamber, a spring in the rear end of the casing tending to hold the end of the breech-bolt in the extension of the said chamber, a latch arranged transversely of the casing and having an upper face slanting downward from the front to the rear of the casing said latch normally projecting into said recess and locking the breech-bolt to the chamber, a

spring normally pressing said latch into said recess, and a handle independent of the breech-bolt and extending through said casing for driving said spring, removing the latch from the recess and unlocking the breech-bolt from the chamber.

10. In an automatic small-arm, the combination with a casing, of a cartridge chamber having an extension slidable in the front end thereof, a breech-bolt having a recess and guided in the extension of the said chamber, the front end of the breech-bolt being normally completely surrounded by the said chamber, a spring in the rear end of the casing tending to hold the end of the breech-bolt in the extension of the said chamber, a latch arranged transversely of the casing and having an upper face slanting downward from the front to the rear of the casing said latch normally projecting into said recess and locking the breech-bolt to the chamber, a spring normally pressing said latch into said recess, said casing having a slanting unlocking face, said latch being normally located in front of said unlocking face and having a lateral shoulder adapted to coact with the unlocking face for releasing the breech-bolt when the latch is driven toward the rear end of the casing, and a handle mounted on the casing and extending through said casing for driving said spring, removing the latch from the recess and unlocking the breech-bolt from the chamber.

11. In an automatic small-arm, the combination with a casing, of a barrel fixed thereto, said barrel having an annular groove at the outer periphery of its rear end, a cartridge chamber slidable in said casing and having a cup-shaped front end constituted by one single annular relatively very thin projection at the outer periphery thereof normally entering into said groove of the barrel, said very thin annular projection bearing against the rear part of the barrel during the gas-pressure without being subjected to bending strain when the cartridge chamber moves to the rear, a breech-bolt normally closing the rear end of said chamber and constantly located behind the cartridge chamber, and locking means normally locking the breech-bolt to said cartridge chamber.

12. In an automatic small-arm, the combination of a casing having a rectilinear front portion and a rear portion descending to the rear below the line of sight, a cartridge chamber having an extension in said front portion, a barrel in alinement with the said chamber, a breech-bolt comprising a front rectilinear member and a rear member pivotally connected thereto, the said front member being normally located in the extension of the cartridge chamber, and the rear member being normally located behind the rear

end of the extension and in the firing position lowered to the rear below the line of sight, and locking means which lock solely the said front member of the breech-bolt with the said cartridge-chamber extension.

13. In an automatic small-arm, the combination of a casing having a rectilinear front portion and a rear portion descending to the rear below the line of sight, a cartridge chamber having an extension in the said front portion, a barrel in alinement with said chamber, a breech-bolt comprising a front rectilinear member and a rear member pivotally connected therewith, the said front member being completely surrounded in the firing position by the said extension, and the rear member being normally located behind the rear end of the extension and lowered in the firing position to the rear below the line of sight, and locking means which lock solely the said front member of the breech-bolt to the said cartridge-chamber extension.

14. In an automatic small-arm, the combination of a casing having a rectilinear front portion and a rear portion lowered toward the rear under the line of sight, a cartridge chamber having an extension in said front portion, and a barrel in alinement with the said chamber; a breech-bolt comprising a front rectilinear member, an intermediate member pivotally connected therewith and a rear member pivotally connected to the intermediate member, said front member being normally located in said cartridge chamber, and said rear member being normally located behind the rear end of the said extension, and locking means normally locking the breech-bolt to said cartridge chamber.

15. In an automatic small-arm, the combination of a casing having a rectilinear front portion and a rear portion descending to the rear under the line of sight, a cartridge chamber having an extension in said front portion, and a barrel in alinement with said chamber; a breech-bolt comprising a front rectilinear member, an intermediate member pivotally connected therewith and a rear member pivotally connected to the intermediate member, the said front member being normally located at the rear of the rear end of said extension, and locking means which lock alone the said front member of the breech-bolt with said cartridge-chamber extension.

16. In an automatic small-arm, the combination of a casing having a rectilinear front portion and a rear portion descending rearwardly under the line of sight, a cartridge chamber having an extension in said front portion, a barrel in alinement with said chamber, a breech-bolt comprising a front rectilinear member and a rear member pivotally connected therewith, the said

front member being normally located in said extension, and said rear member being normally located rearwardly of the rear end of said extension, and locking means which lock alone the said front member of the breech bolt with said extension, a magazine opening into the casing, a stop on the casing for the cartridge chamber in front of the magazine, and a trigger located directly at the rear of the rear end of the magazine.

17. In an automatic small-arm, the combination with a hollow breech-bolt, of a folding handle fulcrumed therein, and a spring tending to keep the handle folded down, the outer face of the handle being in the plane of the surface of the breech-bolt in the folded-down position of the handle.

18. In an automatic small-arm, the combination with a casing, of a cartridge chamber extension therein, a breech-bolt having a recess slidable in said extension and in said casing, a spring-pressed latch normally entering into said recess and locking the breech-bolt to said chamber, a shouldered firing-pin movable in said breech-bolt, and a firing-pin safety device mounted in said breech-bolt, said device being adapted to arrest the firing-pin and prevent the same operating when the locking end of said latch is partially or wholly out of said recess.

19. In an automatic small-arm, the combination with a casing, of a cartridge chamber extension therein, a breech-bolt having a recess slidable in said extension and in said casing, a spring-pressed latch normally entering into said recess and locking the breech-bolt to said chamber, a shouldered firing-pin movable in said breech-bolt, and a downwardly spring-pressed shouldered safety pin mounted in said breech-bolt and terminating at the top side of said breech-bolt and at said recess, the shoulder of the safety pin being adapted to coact with the shoulder of the firing-pin when the end of the safety pin projects into said recess.

20. In an automatic small-arm, the combination with a casing, of a cartridge chamber extension therein, a breech-bolt having a recess slidable in said extension and in said casing, a spring-pressed latch normally entering into said recess and locking the breech-bolt to said chamber, a shouldered firing-pin movable in said breech-bolt, and a firing-pin safety device mounted in said breech-bolt, said device being adapted to arrest the firing-pin and prevent the same operating when the locking end of said latch is partially or wholly out of said recess, the said casing having a slanting face adapted positively to drive the safety pin into its locking position when the end of the safety pin projects beyond the top of the breech-bolt when passing said slanting face.

21. In an automatic small-arm, the combination of a casing having a rectilinear

front portion and a rear portion descending rearwardly to below the line of sight, a cartridge chamber in said front portion, a barrel in alinement with said chamber, a breech-bolt comprising a front rectilinear member and a rear member pivotally connected therewith, said front member being normally located in said extension, and said rear member being normally located rearwardly of the rear end of said extension, a magazine located in the firing position under the said rear member and having a spring-pressed downwardly-opening bottom, a horizontal axle mounted in the magazine,

a spring-pressed feeder mounted on the axle, 15 a handle outside the magazine rigidly connected with the feeder, said feeder being adapted to bear against said bottom and open the same, and locking means which lock alone the said front member of the 20 breech-bolt with said cartridge-chamber extension.

In testimony whereof I affix my signature in presence of two witnesses.

HANS DORN.

Witnesses:

OTTO HAHN,

RICHARD ALBRECHT.