March 2, 1937. T. E. BERGMANN 2,072,197

AUTOMATIC FIREARM

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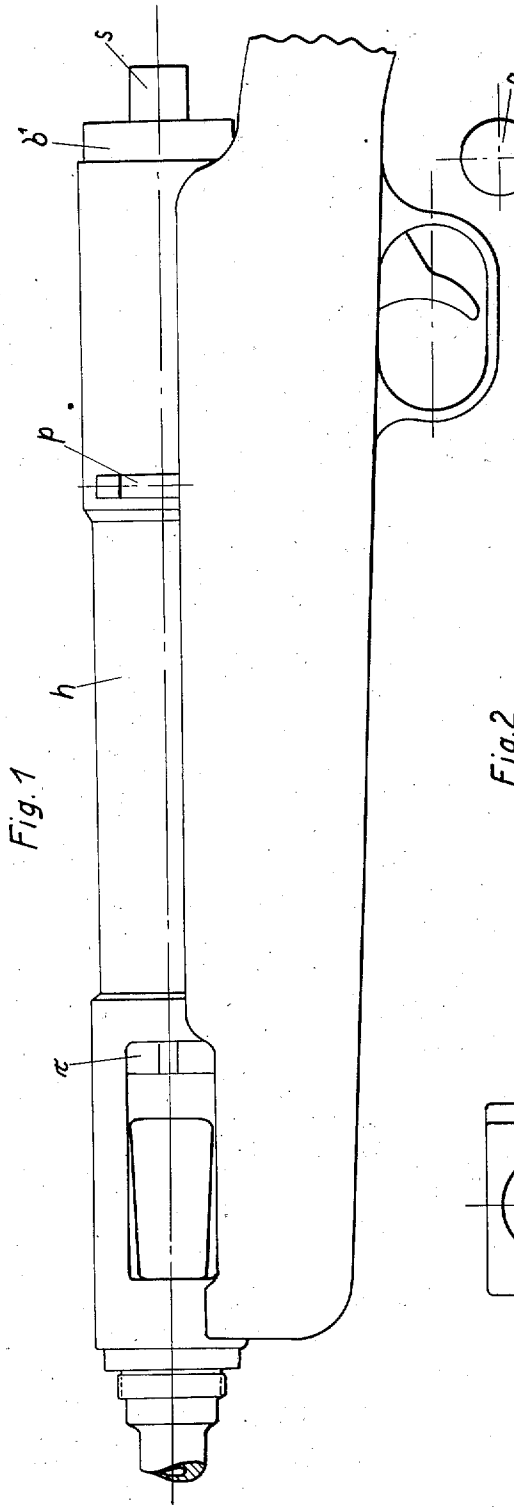

Fig. 1

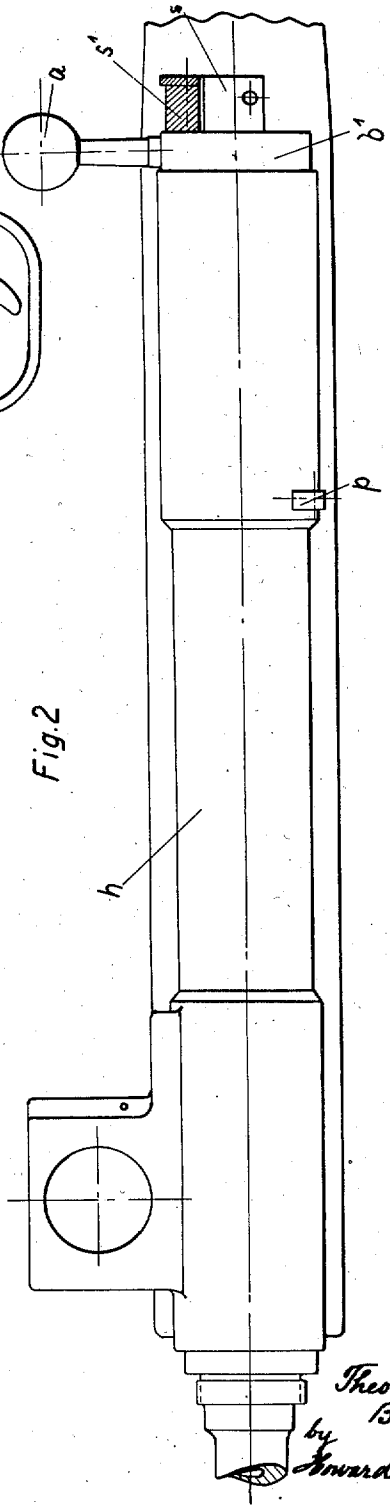

Fig. 2

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AUTOMATIC FIREARM

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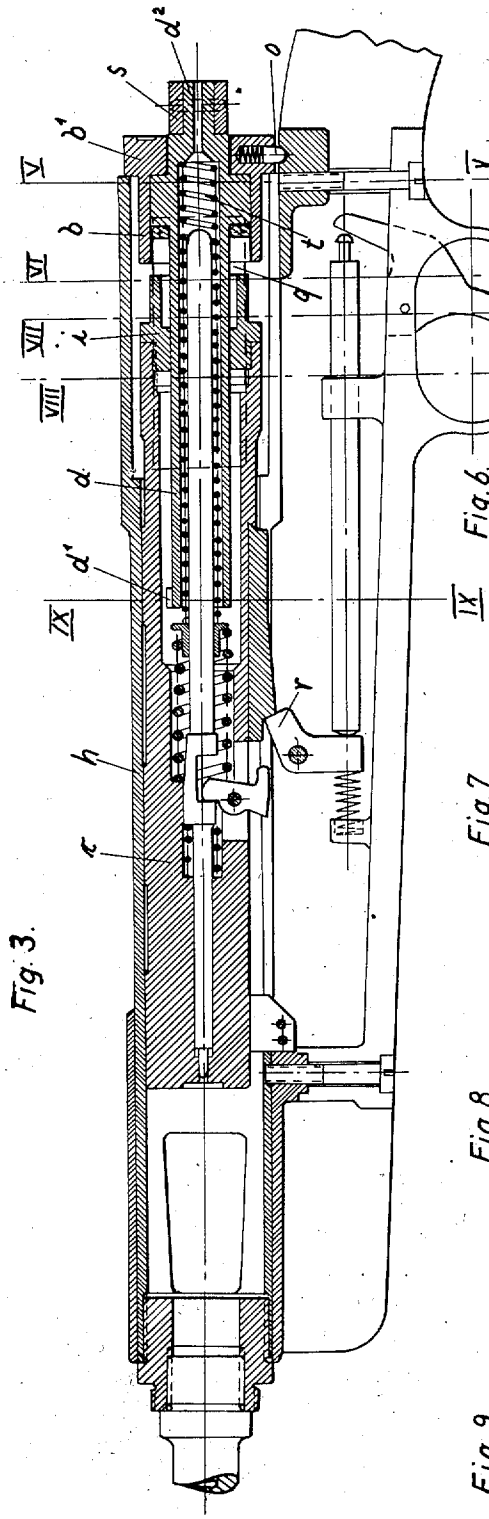

Fig. 3.

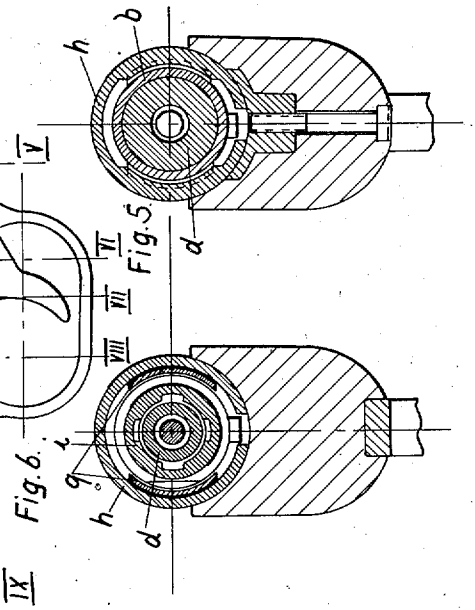

Fig. 5.

Fig. 6.

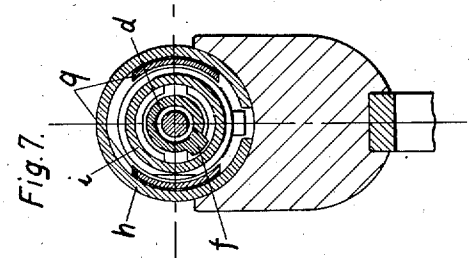

Fig. 7.

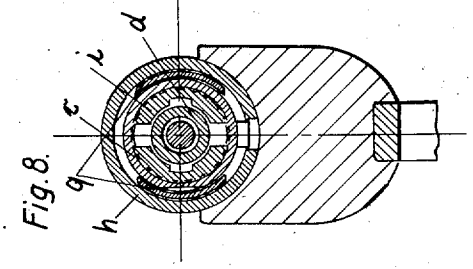

Fig. 8.

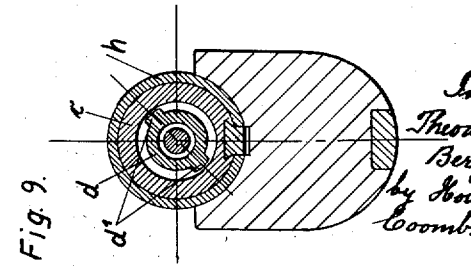

Fig. 9.

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AUTOMATIC FIREARM

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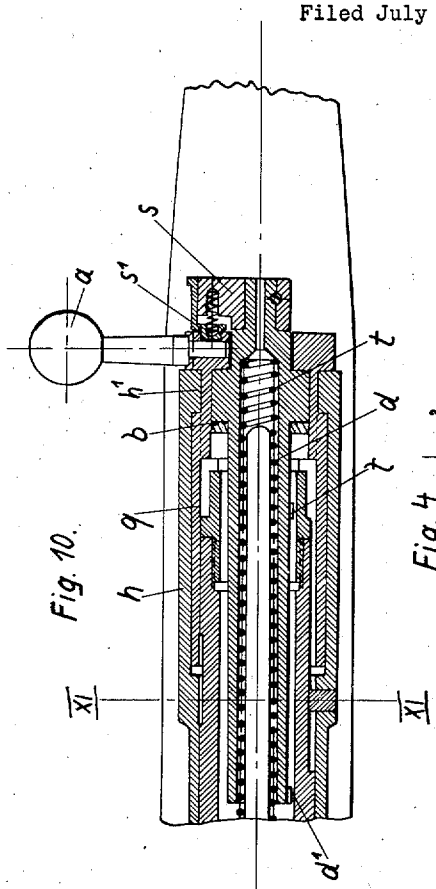

Fig. 10.

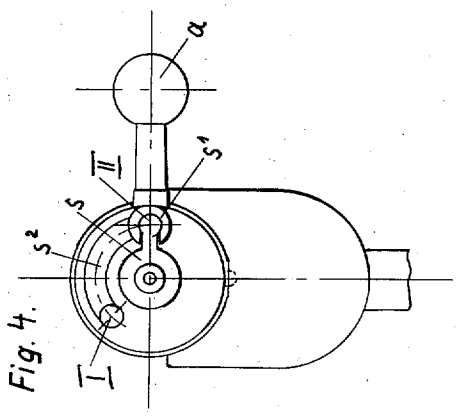

Fig. 4.

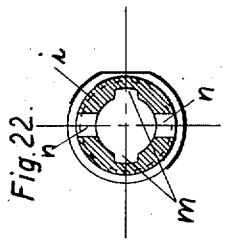

Fig. 22.

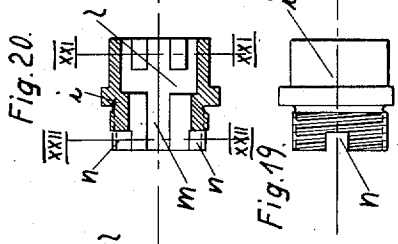

Fig. 20.

Fig. 19.

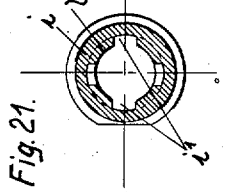

Fig. 21.

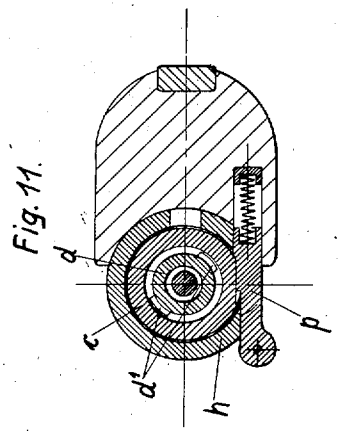

Fig. 11.

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AUTOMATIC FIREARM

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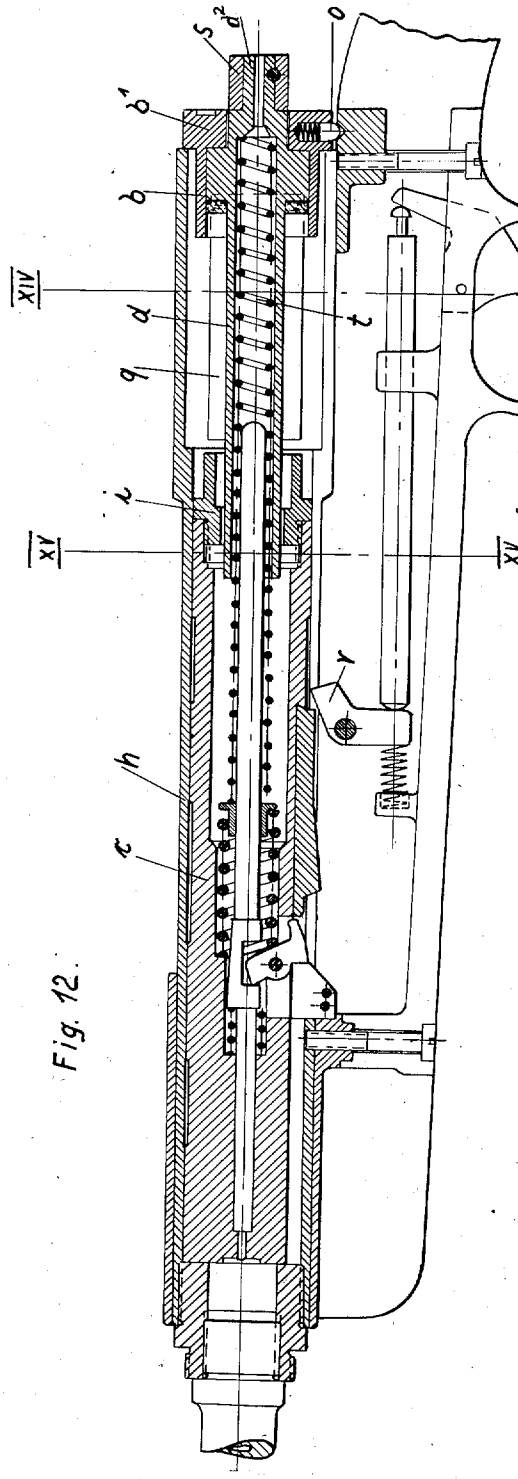

Fig. 12.

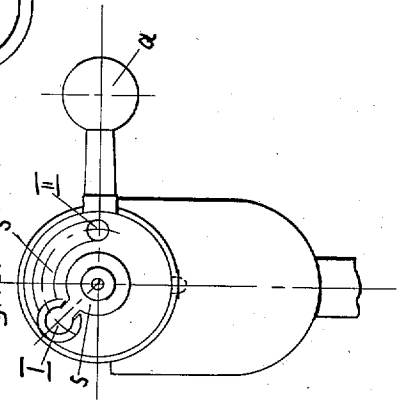

Fig. 13.

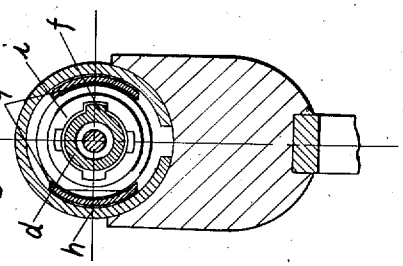

Fig. 14.

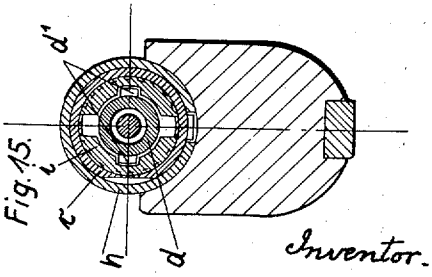

Fig. 15.

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AUTOMATIC FIREARM

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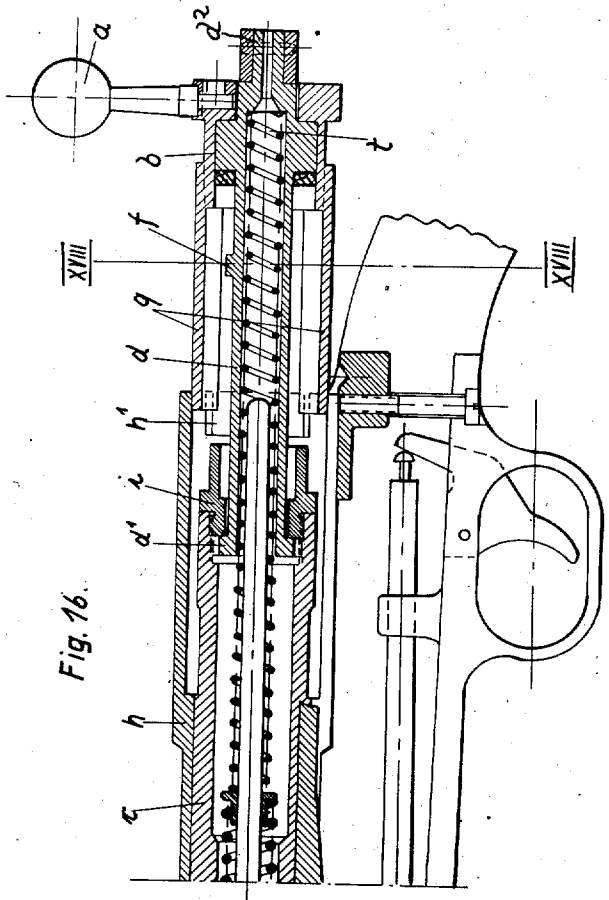

Fig. 16.

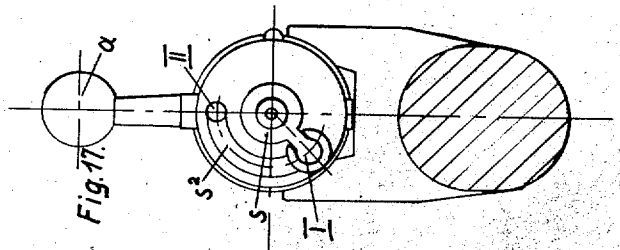

Fig. 17.

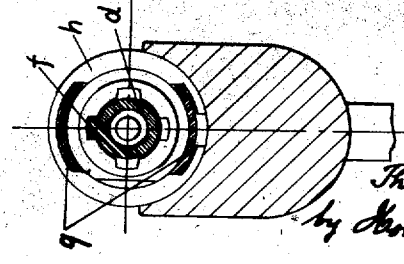

Fig. 18.

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Patented Mar. 2, 1937 2,072,197

UNITED STATES PATENT OFFICE

2,072,197

AUTOMATIC FIREARM

Theodor Emil Bergmann, Rotenfels (Murgtal), Baden, Germany

Application July 1, 1933, Serial No. 678,685
In Germany July 6, 1932

8 Claims. (Cl. 42—4)

The invention relates to an automatic firearm especially to an inertia type gun of the known Bergmann type, which fires pistol ammunition and which may be fired from the shoulder as a machine carbine without the use of a tripod or other stand. This machine gun has a breech block in which the firing pin is loosely mounted. Around the firing pin and in the bore of the breech bolt a main spring is provided, the rear end of which abuts against the bottom sleeve locked by means of locking ribs to the breech casing. The main spring acts as a breech closure and a firing spring to propel simultaneously both the block and the pin. Thus, the block and pin are moved forwardly together by a single spring, which simultaneously throws the block into the closing position and the firing pin into the firing position, as soon as the trigger lever, which holds the block in the loading position in front of the magazine opening, is released by the actuation of the trigger. In weapons of this type in use at the present time the breech block, in order that it may be moved for the purpose of setting or cocking the weapon by hand, is provided with a handle or grip-lever, and the casing is correspondingly slotted at the side to give the necessary freedom of movement to the said lever when the block moves to and fro in the breech casing. Both parts, the lever or handle connected to the block and consequently moving to and fro therewith, and the open slot in the casing, have certain disadvantages. Dirt can easily enter into the interior of the weapon through the slot, and the grip-lever mounted on the block has the disadvantage that it may endanger the user when the block moves to and fro. It may happen that, as a result of faulty material, the handle or grip lever may break off during firing and thus injure the user or persons adjacent to him.

The object of the present invention is to provide an automatic firearm in which the handle or grip-lever remains fixed during firing and for this purpose is separate from or located outside the breech block at the rear end thereof, thus avoiding the dangers pointed out and making it possible to provide a casing without a slot or opening for the lever by having the sides closed.

According to the invention the automatic firearm comprises a breech block adapted to lock the firearm by means of inertia, a firing or striking pin enclosed in said breech block, a main spring acting as a breech closure and firing spring to simultaneously propel both, (the said breech block and the firing pin), and two rotatable sleeves mounted into one another and adapted, when turned into one position, to engage the breech block by one of them, and when turned into another position, to engage the breech casing by the other sleeve.

In place of the cap-like member which is usually found in such automatic pistols for closing the back of the breech casing, one of the rotatable sleeves, preferably the outer one, is provided with an overlapping extension which carries the block handle or grip-lever at its outer end. This sleeve, by means of suitably formed ribs, or the like, can be held locked to the casing for the normal (automatic) functioning of the weapon, while the other sleeve, in particular cases as, for instance, when changing the magazine, or in case of breakage, the block is to be moved or set by hand, can be coupled to the block, in order that the sleeves and the block may be withdrawn and when again pushed forward the weapon may be cocked by means of the sleeves.

Further objects and advantages will appear in the following description and in the accompanying drawings it being understood, that various changes in form, proportions and minor details of construction may be resorted to within the scope of the invention and the appended claims.

In the drawings—

Fig. 1 is a side elevation of the breech mechanism and its closed casing,

Fig. 2 is a plan view thereof, showing the grip-part and the safety flange,

Fig. 3 is a part vertical sectional view of Fig. 1 in which the breech mechanism is set ready for firing and the safety flange turned in the safety position, the inner sleeve being uncoupled from the breech block and the outer sleeve being locked to the casing,

Fig. 4 is a rear view of the Fig. 3 showing the safety flange in its safety position,

Fig. 5 to Fig. 9 are cross-sections on the respective lines V—V, VI—VI, VII—VII, VIII—VIII, and IX—IX of Fig. 3, showing the internal parts in their firing and safety position,

Fig. 10 is a part horizontal sectional view of the parts shown in Fig. 3,

Fig. 11 is a cross-section taken on line XI—XI of Fig. 10,

Fig. 12 is a part vertical sectional view similar to Fig. 3 showing the breech mechanism with its parts after firing,

Fig. 13 is a rear view of Fig. 12, showing the safety flange in the non-safety position,

Figs. 14 and 15 are cross-sectional views on the respective lines XIV—XIV, and XV—XV of Fig.

12, showing the position of the inner sleeve with its lugs,

Fig. 16 is a part vertical sectional view showing the parts withdrawn in the backward position before they are pushed forward for cocking the weapon by hand, the inner sleeve being coupled with the breech block,

Fig. 17 is a rear view of Fig. 16,

Fig. 18 is a cross-sectional view taken on line XVIII—XVIII of Fig. 16, showing the position of the outer sleeve,

Figs. 19 to 22 show the end bushing of the breech block in elevation (Fig. 19) and in three sections, two of these sections (Figs. 21 and 22) being cross-sections taken on the respective lines XXI—XXI and XXII—XXII of Fig. 20.

The block-lever or handle *a* is placed at the outer end of the outer or end sleeve *b*, which is carried in the closed casing *h* and engages with the rear end of the breech-block *c*. For the purpose of manual operation, the sleeve *b* is capable of being turned by means of the handle or lever *a* so that the coupling lugs of the inner sleeve *d* can enter into corresponding recesses in the breech-block. The outer sleeve *b*, by means of locking ribs, is adapted to be held locked to the casing *h* during firing. The inner sleeve *d*, by means of its coupling lugs, can be brought into engagement with the breech-block to enable the latter to be withdrawn and pushed forward by hand, when the weapon is to be set.

As to the details of construction the handle or lever *a* is secured on an overlapping extension b^1 of the outer or bottom sleeve *b* which, during firing, is held locked to the casing *h* by the ribs *q* abutting against inner shoulders h^1 of the casing and secured in their locking position by a locking catch *o* in the form of a spring pressed pin (Figs. 5, 10 and 12). In the sleeve *b* is mounted a second or inner sleeve *d*, having at its front end diametrical coupling lugs d^1 and at its rear portion a safety lug or cam *f*. This sleeve *d* carries a safety flange *s* on its end pin d^2 which protrudes backwards beyond the outer sleeve *b*. The connection between the outer sleeve *b* and the inner sleeve *d* is formed by the said safety flange *s* which engages with a spring pressed pin s^1 in a corresponding rest I in a circular guide groove s^2 in the end surface of extension b^1. The coupling lugs d^1 on the sleeve *d* can enter into corresponding recesses of a bush *i*, which is screwed into the rear of the breech-block and into which the front end of the sleeve *d* extends. In the bush are provided slots i^1 for the coupling lugs d^1 and a circular groove *l* for the safety lug *f*. On the inside of the bush *i* on its front end, are provided two horizontal slots *m*, which extend out into the groove *l* and in which during the hand setting (cocking) movement, the safety lug *f* can enter. At the outer side of its front end the bush *i* has two recesses *n*, into which, when the breech-block is to be drawn back, the coupling lugs d^1 of the sleeve *d* project thereby coupling the sleeve *d* with the block and preventing turning of the block and the sleeve *d* when it is withdrawn. A spring pressed slide *p* serves as a stop for the block when it is drawn back manually to its rearward position (Fig. 16). The ribs *q* prevent the sleeve *b* from rotating during setting by being guided in corresponding grooves in the casing.

When the breech-block is again pushed forward in a position in front of the magazine opening (Fig. 9), in which it is held by the trigger pawl *r*, and the breech closing and striking spring *t* is compressed, the sleeve *d* can then be turned, by means of the safety flange *s*, into the safety position, the spring loaded catch pin s^1 snapping into the safety rest II (Fig. 10). By this turning motion the safety lug *f* engages into the block so that this is firmly held against forward movement, even if the trigger is released. When setting or cocking by hand, and for this purpose the sleeves with the breech-block are drawn back, the locking and striking spring *t* is also drawn out until the breech-block strikes on the slide *p*. The parts are now again pushed forward as soon as the block is stopped in its loading position by the trigger pawl *r*. The closing and striking spring is compressed by the forward movement of the sleeves and the weapon is thus set and cocked. As soon as the sleeves have been pushed fully forward the outer one can be locked with the casing and the inner one uncoupled from the block (Fig. 9) in the manner described above, whereupon the weapon is ready for firing.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that I claim as my invention:

1. A machine gun comprising, a breech casing with unslotted wall, an inertia closed breech block slidable therein, a firing pin in the breech block, a spring for effecting the closing movement of the breech block and also driving the firing pin, a non-recoiling end sleeve slidable manually in the casing, means carried by said sleeve operative in its backward stroke to retract the breech block along with its aforesaid spring in uncocked condition to its rearmost position, said sleeve in its forward stroke cocking the said spring, a trigger pawl for holding the breech block when it is thus retracted, means for locking the end sleeve to the casing at the end of its forward stroke to hold the spring cocked, and a handle carried by said end sleeve externally of the casing.

2. A machine gun comprising, a breech casing with unslotted wall, an inertia closed breech block slidable therein, a firing pin in the breech block, a spring for effecting the closing movement of the breech block and also driving the firing pin, a non-recoiling end sleeve slidable manually in the casing, means carried by said operative sleeve in its backward stroke to retract the breech block along with its aforesaid spring in uncocked condition to its rearmost position, said sleeve in its forward stroke cocking the said spring, a trigger pawl for holding the breech block when it is thus retracted, means for locking the end sleeve to the casing at the end of its forward stroke to hold the spring cocked, a handle carried by said end sleeve externally of the casing, and safety means associated with said end sleeve for holding the breech block in cocked condition independently of the trigger pawl.

3. A machine gun according to claim 2, in which the end sleeve has an inner sleeve rotatably mounted therein and said inner sleeve having a lug co-operating with a recess in the breech block for coupling the end sleeve to the breech block for retracting the same, said inner sleeve also carrying the safety means.

4. A machine gun comprising a breech casing with unslotted wall, an inertia closed breech block slidable therein, a firing pin in the breech block, a non-recoiling end sleeve slidable manually in the casing, an inner sleeve rotatably mounted in the end sleeve and having a lug movable by such rotation to engage the breech block to retract

the same to its rearmost position in the backward stroke of the end sleeve without relative rotation between the inner sleeve and the breech block during said retraction, a spring for effecting the closing movement of the breech block and also driving the firing pin, said spring being arranged to be carried in uncocked condition by the breech block in its said backward stroke and to be cocked by the next forward stroke of the manually operable end sleeve, a trigger pawl for holding the breech block when it is thus retracted, means for locking the end sleeve to the casing at the end of its forward stroke to hold the spring cocked, and a handle carried by said end sleeve externally of the casing.

5. A machine gun comprising a breech casing with unslotted wall, an inertia closed breech block slidable therein, a firing pin in the breech block, a non-recoiling end sleeve slidable manually in the casing, an inner sleeve rotatably mounted in the end sleeve and having a lug movable by such rotation to engage the breech block to retract the same to its rearmost position in the backward stroke of the end sleeve without relative rotation between the inner sleeve and the breech block during said retraction, a spring for effecting the closing movement of the breech block and also driving the firing pin, said spring being arranged to be carried in uncocked condition by the breech block in its said backward stroke and to be cocked by the next forward stroke of the manually operable end sleeve, a trigger pawl for holding the breech block when it is thus retracted, means for locking the end sleeve to the casing at the end of its forward stroke to hold the spring cocked, a handle carried by said end sleeve externally of the casing, and safety means associated with said sleeves for holding the breech block in cocked condition independently of the trigger pawl.

6. A machine gun according to claim 5, in which the safety means includes a lug on the inner sleeve which in the operative condition of the safety means engages an annular groove in the breech block to prevent its release by the trigger pawl.

7. A machine gun according to claim 1, in which the end sleeve has shouldered guide cheeks cooperating with corresponding shouldered recesses in the rear end of the casing and enabling it to be withdrawn therefrom in one position of rotation relatively to said casing.

8. In the machine gun according to claim 4, safety means comprising a lug on the inner sleeve cooperating with annular and longitudinal grooves in the breech block, and means for securing the inner sleeve selectively in two positions of rotation relatively to the end sleeve corresponding to safety and firing conditions, said lug on the inner sleeve being turned into alignment with the longitudinal groove in the breech block when the safety means is set for firing condition, and into engagement with the annular groove when the said means is set for safety condition.

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