United States Patent [19]

Iellie

[11] **3,882,625**

[45] **May 13, 1975**

[54] **BREECH MECHANISM FOR GUNS**

[76] Inventor: **Paul Emile Francois Tellie,** 20, rue, Bergson, 42000 Saint Entenne, France

[22] Filed: **Jan. 23, 1974**

[21] Appl. No.: **435,994**

[30] **Foreign Application Priority Data**

Jan. 29, 1973 France 73.02966

[52] **U.S. Cl.** **42/25**

[51] **Int. Cl.** **F41c 15/00**

[58] **Field of Search** 42/25, 16

[56] **References Cited**

UNITED STATES PATENTS

747,675	12/1903	Bennett	42/25
3,341,963	9/1967	Seiderman	42/16
3,791,060	2/1974	Weaver	42/25

Primary Examiner—Robert F. Stahl
Assistant Examiner—C. T. Jordan
Attorney, Agent, or Firm—Waters, Schwartz & Nissen

[57] **ABSTRACT**

A breech mechanism for a gun having an extractor which can engage an ammunition casing to effect withdrawal of the casing and ejection of the casing laterally of the gun. To provide for rightwards or leftwards ejection of a casing from the gun as desired, the mechanism is provided with two housings to form a pair of locations in which the extractor can be positioned. One location provides for ejection of the casing to one side of the gun and the other location provides for ejection to the other side of the gun when the extractor is positioned in the one or the other location. In one embodiment, the extractor is mounted in a part of the breech mechanism and is rotated between the two locations; and in other embodiments the extractor can be removed manually from one housing and inserted in another housing.

11 Claims, 11 Drawing Figures

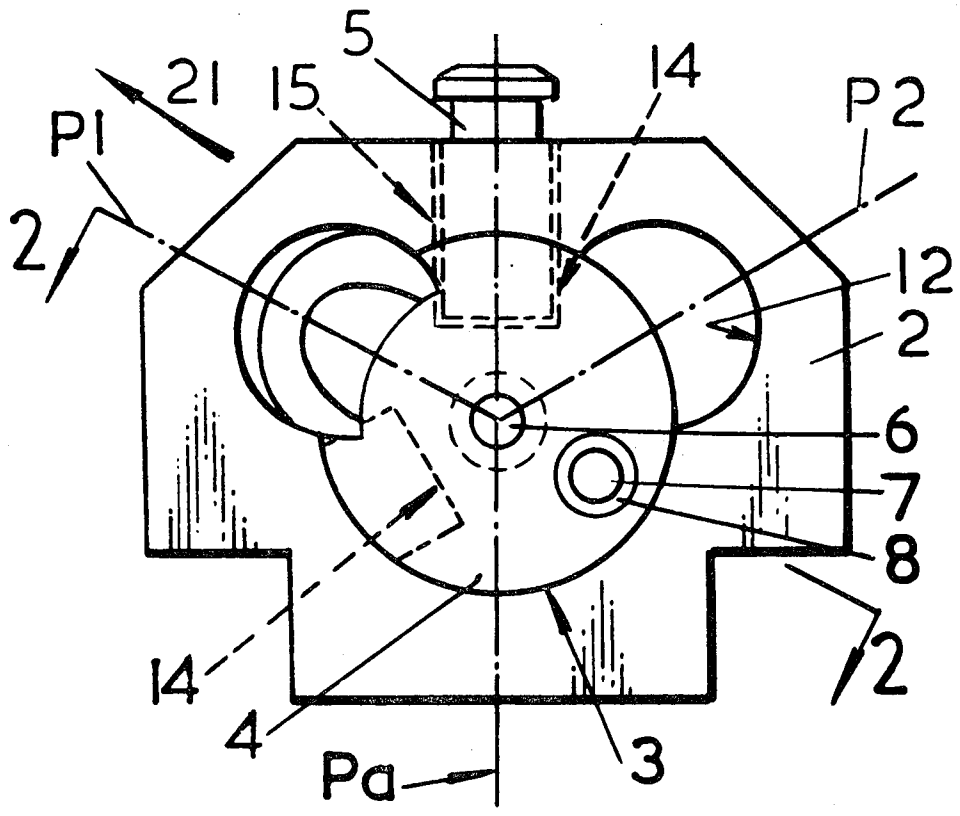


FIG. 1

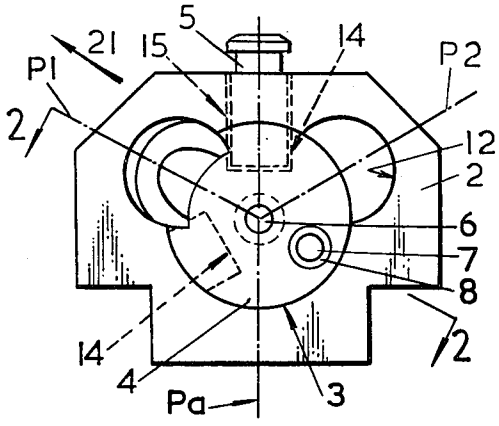


FIG. 3

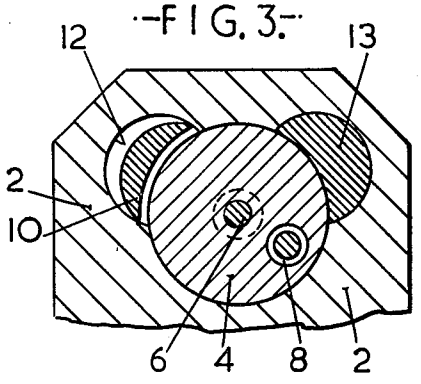


FIG. 2

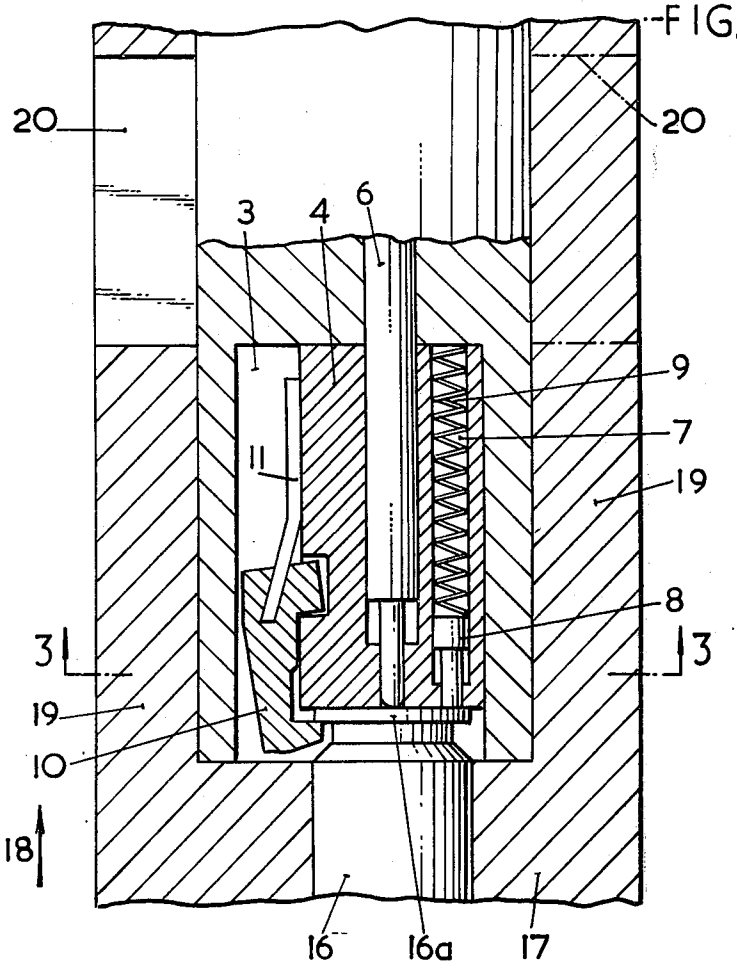


FIG. 4

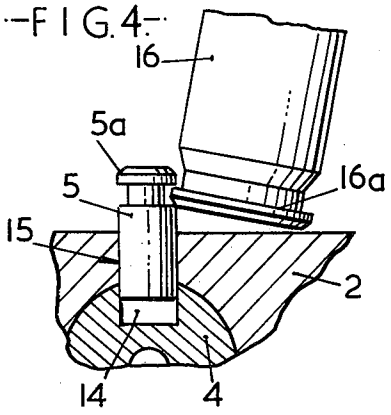


FIG. 5

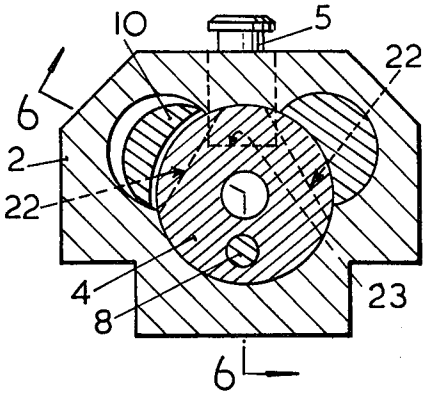


FIG. 7

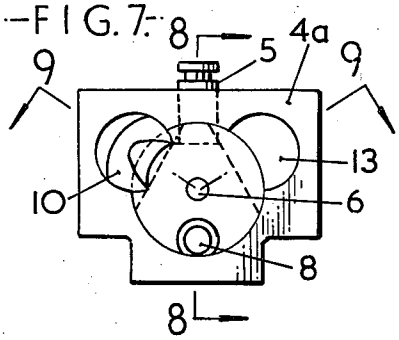
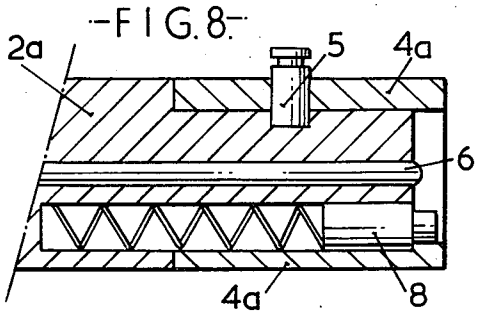


FIG. 8



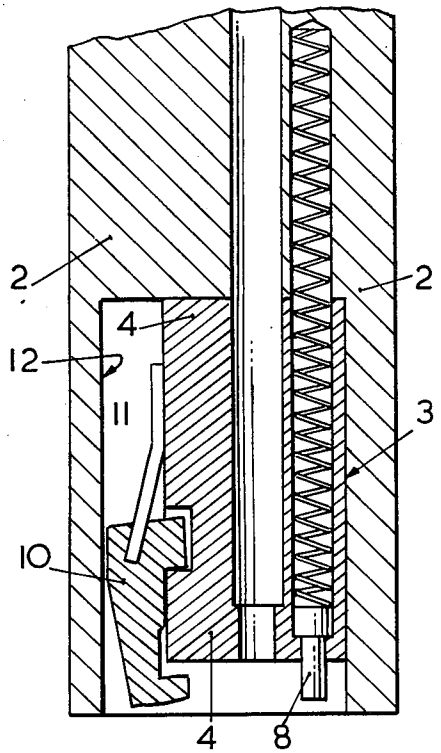
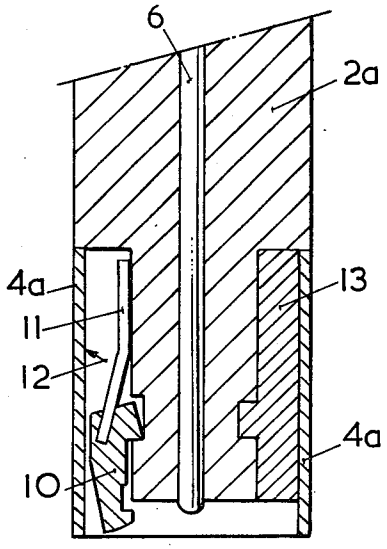
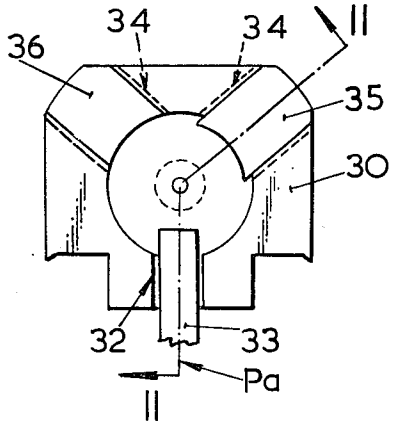


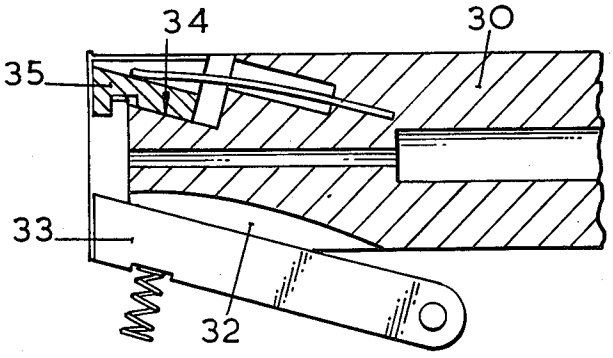
FIG. 6



-FIG. 9-



-FIG. 10-



-FIG. 11-

BREECH MECHANISM FOR GUNS

This invention relates to a breech mechanism for a gun and a gun including such a mechanism.

The breech mechanism according to the invention is particularly, though not exclusively, suitable for use in small arms weapons.

In most modern portable weapons such as small arms, a spent ammunition casing is ejected to the right (following firing of a projectile from the casing) with respect to an observer placed behind the weapon and facing the target. While this arrangement is suitable for a right-handed marksman, it can be unfavourable for a left-handed marksman as there is a risk of the ejected casing hitting him and/or at least distracting him.

It is an object of the invention to provide a breech mechanism for a gun which is capable of being adjusted to permit the direction of ejection of a spent ammunition casing to be selected as desired.

According to one aspect of the invention there is provided a breech mechanism adapted for mounting in a gun and comprising; an extractor which is engageable with an ammunition casing to effect withdrawal of the casing and to effect ejection of the casing laterally of the gun when the breech mechanism is mounted in the gun; and housing means provided by the mechanism to form a pair of locations for the extractor, the extractor being positionable in a selected location of said pair of locations, and one of said locations providing for ejection of a casing to one side of the mechanism when the extractor is positioned in said one location and the other of said locations providing for ejection of casing to the other side of the mechanism when the extractor is positioned in said other location.

The breech mechanism according to the invention is particularly suitable for use with small arms (though the invention is not limited to such use of the breech mechanism) as, in such weapons, ejection of a casing is necessarily effected on a level with the face of the marksman and, as mentioned above, this is particularly unfavourable with the known weapons for a left-handed marksman. However, the breech mechanism according to the invention can be applied to larger guns than small arms, e.g. to heavy automatic weapons.

According to another aspect of the invention there is provided a gun having a breech mechanism comprising; an extractor which is engageable with an ammunition casing to effect withdrawal of the casing and to effect ejection of the casing laterally of the gun; housing means provided by the mechanism to form a pair of locations for the ejector, the ejector being positionable in a selected location of said pair of locations and one of said locations providing for ejection of a casing to one side of the gun when the ejector is positioned in said one location and the other of said locations providing for ejection of a casing to the other side of the gun when the ejector is positioned in said other location; and a pair of ejector openings provided in the gun and each corresponding to a respective one of said locations whereby, when the ejector is positioned in a given location, the casing can be ejected laterally of the gun through the ejctor opening corresponding to said given location.

The invention will now be described in more detail, by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a front view of a first embodiment of breech mechanism according to the invention;

FIG. 2 is a sectional view taken on the line 2—2 in FIG. 1 and showing the breech mechanism mounted in the breech of a gun;

FIG. 3 is a sectional view taken on the line 3—3 in FIG. 2:

FIG. 4 is a detail sectional view of a part of the breech mechanism;

FIG. 5 is a transverse sectional view of another embodiment of breech mechanism according to the invention;

FIG. 6 is a sectional view taken on the line 6—6 in FIG. 5;

FIG. 7 is a front view, similar to FIG. 1, of a further embodiment of breech mechanism according to the invention;

FIG. 8 is a sectional view taken on the line 8—8 in FIG. 7;

FIG. 9 is a sectional view taken on the line 9—9 in FIG. 7;

FIG. 10 is a front view of a still further embodiment of breech mechanism according to the invention; and

FIG. 11 is a longitudinal sectional view taken on the line 11—11 in FIG. 10.

Referring now to the drawings, there are shown various embodiments of breech mechanism which are particularly suitable for employment in so-called small arms i.e. portable weapons such as rifles, pistols, shotguns, sporting guns without a crook or pistol grip, machine guns etc. However, the invention is not to be considered as limited to such uses of the breech mechanism which may be employed in other forms of larger guns including automatically loaded weapons.

Referring first to FIGS. 1 to 4 of the drawings, there is shown a breech mechanism comprising a breech member 2 which forms a housing 3 in which is mounted a detachable breech head or plug 4. The head 4 is mounted in the housing 3 in such a way that, under certain circumstances, the head 4 can move axially and can also be rotated relative to the housing 3. However, during normal use of the breech mechanism, the breech head 4 is connected fast to the breech member 2 for movement therewith. To this end, a locking pin 5 is slidably mounted in a radial bore 15 provided in the member 2 and is capable of entering into a selected one of two sockets 14 provided in the head 4. Depending on the socket 14 selected, the head 4 is connected fast with the member 2 for movement therewith and occupies a predetermined angular setting relative thereto, the member 2 and head 4 together forming a breech block of the mechanism.

In addition to the pair of sockets 14, the head 4 is also formed with an axial bore in which a firing pin 6 is reciprocable, and a longitudinal bore 7 in wich a cartridge or casing ejector 8 is slidably mounted, the ejector 8 being permanently biased in an outward direction by means of a compression spring 9 also housed within the bore 7.

In addition to the ejector 8 which assists the ejection of a spent casing (or cartridge) after firing a projectile, there is provided an extractor 10 which is mounted on the head 4. A return spring 11 is provided for the extractor 10.

The breech mechanism has a general plane of symmetry P*a* and it will be noted from FIG. 1 that the extractor 10 is located in a radial plane of symmetry P1

which passes through the longitudinal axis of the firing pin **6** and also contains the longitudinal axis of the ejector **8.** A further radial plane of symmetry P2 is illustrated in FIG. **1** and it will be noted that plane P2 makes the same angle with the vertical axis of symmetry P*a* as the angle made between plane P1 and P*a*. Furthermore, the pair of sockets **14** provided in the head **4** are angularly spaced from each other with respect to the longitudinal axis of the firing pin **6** by the same angle as is provided between the planes P1 and P2.

As referred to above, the extractor **10** is mounted on the breech head **4** for movement therewith. However, to provide for axial movement of the head **4** relative to the membeer **2** (upon release of locking pin **5**), the breech member **2** is formed with a pair of identical longitudinal housings **12** which are disposed symmetrically with respect to the plane of symmetry P*a*, one housing **12** being located in the plane P1 and the other located in the plane P2. Each housing **12** is shaped so as to receive the extractor **10** and to permit axial movement of the head **4** with the extractor **10** relative to the member **2.** In addition to each housing **12** being capable of receiving the extractor **10,** the housing **12** are also capable of receiving a detachable closing part or obturator **13** (see FIG. **3**). As shown in FIGS. **1** to **3,** the extractor **10** is located in the housing **12** in the plane P1, whereas the closing part **13** is received in the housing **12** in the plane P2.

As seen in FIG. **2,** the breech member **2** and the head **4** are mounted for slidable movement in the breech of the weapon within a breech casing **19.** Furthermore, the casing **19** is formed with a symmetrically arranged pair of ejector openings through which a spent casing can be ejected, one opening corresponding to one direction of ejection from the weapon and the other corresponding to an opposite direction of ejection. In FIG. **2,** one ejector opening **20** is shown and a further ejector opening (shown in dashed lines) is provided in the casing **19** symmetrically of the opening **20** with respect to the plane of symmetry P*a*.

The breech member **2** and head **4** are shown in FIG. **2** in a position suitable for firing a projectile from the weapon. To this end, the casing **16** of a piece of ammunition e.g. a bullet, cartridge or shell, is received in a firing chamber of the barrel **17** with the breech head or plug **4** pressed against the seating of the casing **16.** The extractor **10** is shown gripping a flange **16***a* of the casing **16,** the firing pin **6** is located in engagement with the seating ready to carry out a firing operation, and the spring-pressed ejector **8** also is urged into engagement with the seating. Following axial movement of the firing pin **6** to fire a projectile from the casing **16,** the breech member **2** and the head **4** are withdrawn in the direction of the arrow **18** and, by virtue of the engagement of the extractor **10** with the flange **16***a* of the casing **16,** the casing **16** also is withdrawn. During withdrawal of the casing **16,** it will be evident that the ejector **8** applies a turning moment on the casing **16** tending to cause the casing **16** to pivot about the region of engagement of a claw end of the extractor **10** with the flange **16***a*. Furthermore, when the casing is withdrawn sufficiently that its free end is no longer located within the bore of the barrel **17,** this free end will pivot about the extractor **10** until it comes into engagement with the adjacent side wall of the casing **19** (the left hand inner edge as seen in FIG. **2.**) During still further withdrawal movement, the ejector **8** will still apply a turning movement to the casing **16** whereby the casing **16** is ejected through ejector opening **20** when the casing comes into register with the opening. A further casing can then be loaded into the bore of the barrel **17** either manually, or automatically for small arms and for larger weapons and the process repeated.

It will be apparent that the breech mechanism illustrated in FIGS. **1** to **3** is shown arranged in a position to provide for ejection of a spent casing to the right with respect to the marksman firing the weapon and this will be satisfactory when the marksman is right-handed. However, when a left-handed marksman wishes to operate the weapon, the breech mechanism can be adjusted so as to provide for ejection of a spent casing to the left with respect to the (left handed) marksman. To provide for leftwards ejection of the casing, it is necessary to remove the extractor **10** from the housing in plane P1 and to mount it in the housing **12** in the plane P2. To this end, it is necessary first to withdraw the locking pin **5** whereby the head **4** can carry out axial movement (in a direction opposite to the arrow **18**) relative to the member **2,** followed by clockwise pivoting (with respect to FIG. **1**) so as to bring the extractor **10** into register with the extension of the other housing **12.** Further, the closing part **13** can now, or previously, be withdrawn from the other housing **12** so that the other housing **12** is able to receive the extractor **10.** The housing which priviously received the extractor **10** now receives the closing part **13** and then the head **4** can be moved axially in the direction of the arrow **18** until it again takes up the axial position relative to the member **2** shown in FIG. **2.** The head is then again connected fast with the member **2** by means of the locking pin **5** which is caused to enter the other one of the pair of sockets **14** provided in the head **4.**

It will be appreciated that the clockwise pivoting of the head **4** to move the extractor **10** from the plane P1 to the plane P2 will also pivot the previously empty socket **14** shown in FIG. **1** to the position in the plane P*a* whereby it can receive the lower end of the locking pin **5.** Furthermore, the clockwise pivoting of the head **4** will also cause clockwise pivoting of the ejector **8** through a similar angle and to be located in the plane P2 whereby the ejector **8** can apply a turning moment to a casing **16** during withdrawl and to cause leftwards ejection of the spent casing through the other ejector opening (shown in dashed lines).

During rightwards ejection of a spent casing, the casing is ejected through opening **20** and in the direction of the arrow **21** shown in FIG. **1,** whereas during leftwards ejection the spent cartridge is ejected leftwards and in a direction generally parallel to the plane P2. Thus, the extractor **10** determines the direction of ejection of a spent casing, the hooked engagement of the extractor **10** with the flange **16***a* of the casing **16** effectively comprising a kind of hinge with the ejector **8** applying a turning moment tending to pivot the casing **16** about this hinge.

The purpose of the closing part **13** is to provide protection for the housing **12** which does not receive the extractor **10** so as to prevent foreign bodies such as sand, dust, mud and the like from entering what would otherwise be an empty housing.

Referring now to FIG. **4** of the drawings, there is illustrated one convenient method for extracting the locking pin **5** from the particular socket **14** in which it is located. To this end, the upper end of the locking pin

5 is provided with a shoulder 5*a* which is conveniently constructed and arranged in relation to the flange 16*a* provided on the seating of the casing 16 that the casing may be employed as shown to effect withdrawal of the locking pin 5. Thus, this provides for easy adjustment of the breech mechanism without the necessity to provide a special tool as it is assumed that a marksman will always have a ready supply of aummunition.

Referring now to the embodiment illustrated in FIGS. 5 and 6, parts corresponding with the previous embodiment are designated by the same reference numerals and need not be described again. In this embodiment, that breech head 4 is formed with two recesses 22 which have radial planes of symmetry coincident with the planes P1 and P2 of the housings 12 of FIG. 1 provided in the breech member 2. Each recess 22 is capable of receiving the extractor 10 which is of the detachable type and is also capable of receiving the closing part 13. However, in place of the pair of sockets 14 provided in the head 4 of the first embodiment, the breech head in this embodiment is formed only with a single socket 23 which receives the lower end of the locking pin 5. Thus, in this embodiment, the breech head 4 is normally connected fast to the breech member 2 for movement therewith, but can be displaced axially relative to the breech member 2 upon withdrawal of the locking pin 5.

As shown in FIGS. 5 and 6, the breech mechanism is arranged in the position suitable for rightwards ejection of a spent casing with respect to a gunner. In order to adjust the mechanism to provide for ejection to the left, it is necessary to withdraw the locking pin 5 and to displace axially the breech head 4 relative to the breech member 2 to such an extent that both the extractor 10 and the closing part 13 can be removed from their respective recesses 22 and interchanged, the breech head 4 then being returned axially to the position shown in FIG. 6 and the locking pin 5 again engaging in the socket 23.

It will be noted from FIG. 6 that the ejector 8 is arranged in the vertical plane of symmetry of the mechanism which also passes through the firing pin, whereas the ejector 8 is always located in a plane passing through the firing pin 6 containing the extractor 10 in the previous embodiments (for both positions of the extractor 10). Thus, in this embodiment, it is the position of the extractor 10 which determines, by itself, the direction of ejection of a spent casing from the mechanism.

Referring now to the embodiment illustrated in FIGS. 7 and 9 of the drawings, parts corresponding with the previous embodiments are designated by the same reference numerals and need not be described further. This embodiment is similar to the embodiment of FIGS. 5 and 6 in that the direction of ejection can be altered by interchanging the position occupied by the extractor 10 and closing part 13, this being effected without any rotation of the breech head 4 in the embodiment of FIGS. 5 and 6. In the embodiment of FIGS. 7 to 9, there is provided a breech member 2*a* and a detachable sleeve 4*a* mounted for axial sliding movement on one end of the breech member 2*a*, the parts 2*a* and 4*a* being equivalent to the parts 2 and 4 of the previous embodiments and together forming a breech block. As seen particularly in FIG. 8, the sleeve 4*a* can be connected fast with the breech member 2*a* by means of the locking pin 5 which passes through aligned apertures provided in the sleeve 4*a* and the breech member 2*a*. The housings 12 which are shaped to receive the extractor 10 and the closing part 13 are, in this embodiment, provided in the sleeve 4*a*. In order to adjust the breech mechanism to provide for a desired direction of ejection, it is merely necessary to withdraw the locking pin 5 and to carry out axial separation of the sleeve 4*a* relative to the breech member 2*a* whereby the extractor 10 and the closing part 13 can be interchanged, the sleeve 4*a* and breech member 2*a* then being returned to the position shown in FIG. 9. During withdrawal of a spent casing, the extractor 10 effects ejection of the spent casing in similar manner to the embodiment of FIGS. 5 and 6.

Referring now to the embodiment shown in FIGS. 10 and 11, there is shown a breech block 30 which is formed in its lower part with a vertical housing 32 arranged in the vertical plane of symmetry P*a* and adapted to permit the passage therethrough of a fixed, spring biased ejector 33.

This breech mechanism, like the other embodiments, is also provided with two identical housings adapted to receive selectively both the extractor and the closing part or obturator. In this embodiment, the housings are provided by identical housings 34 disposed symmetrically with respect to the plane of symmetry P*a* and each housing being adapted to receive either an extractor 35 or a closing off part 36. It will be evident that the extractor 35 is of the detachable type so that it may be readily detached from the particular housing 34 in which it is presently received (and likewise the closing part 36) and these parts may then be interchanged, this being carried out desirably when the breech block is in a withdrawn position relative to the bore of the barrel.

Again, in this embodiment, the position selected for the extractor 35 will determine the direction of ejection of a spent casing from the gun.

Although not shown, the breech mechanisms of FIGS. 5 and 6, FIGS. 7 to 9, and FIGS. 10 and 11 will be mountable in suitable respective breeches of guns (similar to the breech shown in FIG. 2 for the first embodiment of breech mechanisms) provided with openings arranged in correspondence with respective housings for the extractor to permit ejection of spent casings in desired directions.

It will be evident that all of the embodiments of the invention provide a breech mechanism adapted for mounting in a gun and having an extractor which is positionable in a selected one of a pair of locations provided by the mechanism, one of the locations providing for ejection of a casing to one side of the mechanism and the other of the locations providing for ejection of a casing to the other side of the mechanism when the extractor is positioned respectively in said one or said other location.

I claim:

1. A breech mechanism adapted for mounting in a gun and comprising; an extractor which is engageable with an ammunition casing to effect withdrawal of the casing and to effect ejection of the casing laterally of the gun when the breech mechanism is mounted in the gun; and housing means provided by the mechanism to form a pair of locations for the extractor, the extractor being positionable in a selected location of said pair of locations, and one of said locations providing for ejection of a casing to one side of the mechanism when the extractor is positioned in said one location and the

other of said location providing for ejection of casing to the other side of the mechanism when the extractor is positioned in said other location.

2. A breech mechanism according to claim 1, in which said locations provided by the mechanism are symmetrically arranged with respect to a vertical plane of symmetry of the mechanism.

3. A breech mechanism according to claim 1, including a detachable piece for mounting in the locating not occupied by the extractor.

4. A breech mechanism according to claim 1, having a breech block comprising a breech member and a breech head, said extractor being mounted in said breech head, said breech block being reciprocable along an axis during usual loading and unloading operations of the breech block, and said breech head being rotatable about said axis relative to the breech member in order to effect positional movement of the extractor between said locations.

5. A breech mechanism according to claim 4, including a locking pin carried by the breech member, a pair of angularly spaced sockets provided in the breech head and each adapted to receive the end of the locking pin whereby the breech head can be locked to the breech member in either one of two angular positions about said axis during reciprocation of the breech block, one angular position corresponding to positioning of the extractor in said one location and the other angular position corresponding to positioning of the extractor in said other location.

6. A breech mechanism according to claim 1, having a breech block comprising a breech member and a detachable breech head, and two housing portions provided in said breech member for receiving the extractor to provide said locations therefor, said breech block being reciprocable along an axis during usual loading and unloading operations of the breech mechanism, and said breech head being detachable from, and moveable axially relative to, the breech member to enable the extractor to be removed from one housing portion and to be positioned in the other housing portion.

7. A breech mechanism according to claim 1, having a breech block comprising a breech member and a sleeve detachably connected thereto, and two housing portions provided in said sleeve to form said locations for the extractor; said sleeve being connectible fast with the breech member for movement therewith and being detachable therefrom to permit transfer of the extractor from one housing portion of the sleeve to the other housing portion of the sleeve.

8. A breech mechanism according to claim 1, having a breech block, a casing ejector of the fixed type, two housing portions provided in the breech block to form said locations for the extractor, and a vertical passage provided in the breech block in which the ejector is receivable.

9. A gun having a breech mechanism comprising; an extractor which is engageable with an ammunition casing to effect withdrawal of the casing and to effect ejection of the casing laterally of the gun; housing means provided by the mechanism to form a pair of locations for the extractor, the extractor being positionable in a selected location of said pair of locations and one of said locations providing for ejection of a casing to one side of the gun when the extractor is positioned in said one location and the other of said locations providing for ejection of a casing to the other side of the gun when the extractor is positioned in said other location; and a pair of ejector openings provided in the gun and each corresponding to a respective one of said locations whereby, when the extractor is positioned in a given location, the casing can be ejected laterally of the gun through the ejector opening corresponding to said given location.

10. A gun according to claim 9, in which the breech mechanism comprises a breech block having a first part and a second part, a locking pin carried by the first part, and socket means provided in the second part and adapted to receive the locking pin detachably to connect together the first and second parts.

11. A gun according to claim 10, including a shoulder provided on the locking pin engageable by the collar of an ammunition casing to effect axial unlocking movement of the locking pin.

* * * * *