United States Patent

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[33] **Czechoslovakia**
[31] PV2234

[54] CARTRIDGE CHAMBER AND BREECH UNIT FOR RIFLES

7 Claims, 5 Drawing Figs.

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[51] Int. Cl. F41c 11/00, A22b 3/02
[50] Field of Search ..... 42/1, 1 M, 2, 12, 13, 26, 32, 33; 17/1 B

[56] **References Cited**

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ABSTRACT: A rifle adapted to be used, for example, in the driving of an anesthetizing instrument into an animal in connection with the slaughtering thereof. The rifle has a cartridge chamber having a flange and groove at its rear end. A breech unit is formed with a front end flange and groove extending, complementing, and interlocking with the groove and flange of the cartridge chamber to provide a secure connection between the cartridge chamber and breech unit. In its closed position the breech unit closes the bore of the cartridge chamber and is swingable transversely to the axis of the rifle between a closed position closing the cartridge chamber and an open position opening the latter.

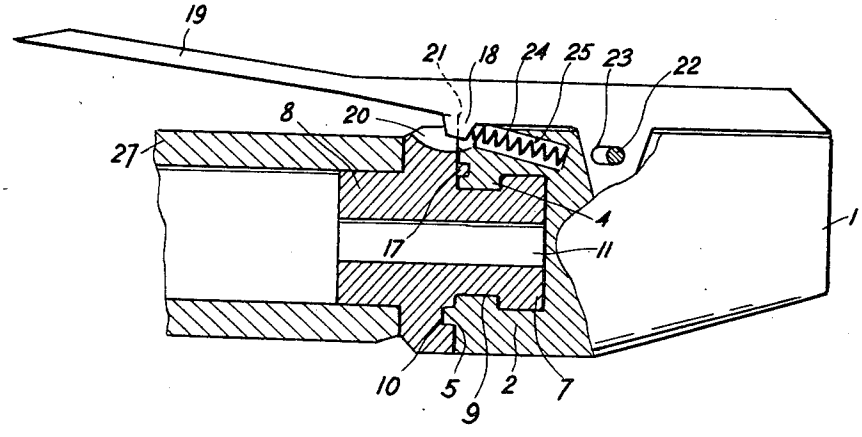


Fig. 1

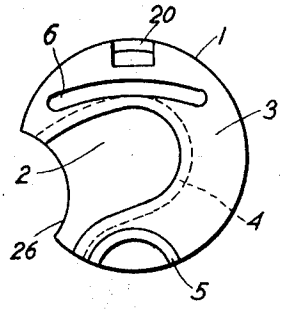


Fig. 2

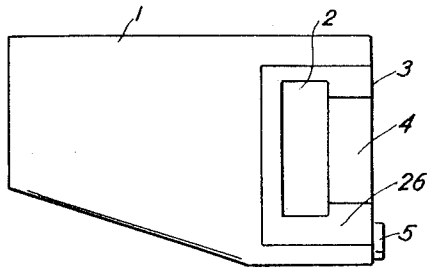


Fig. 3

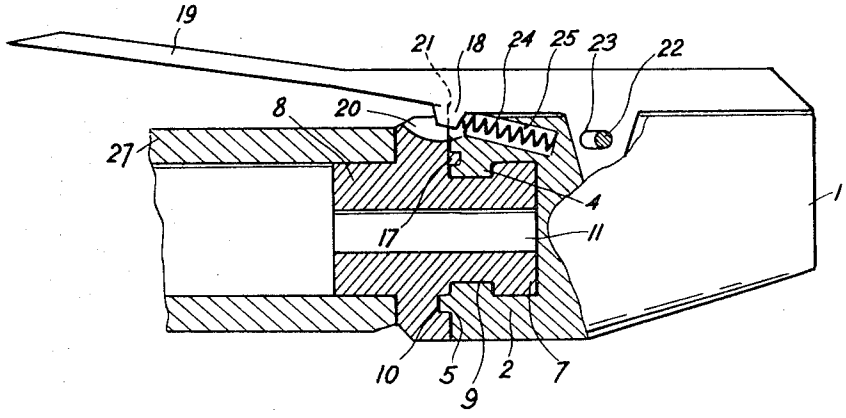


Fig. 4

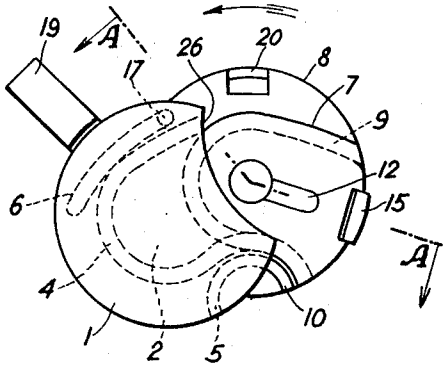
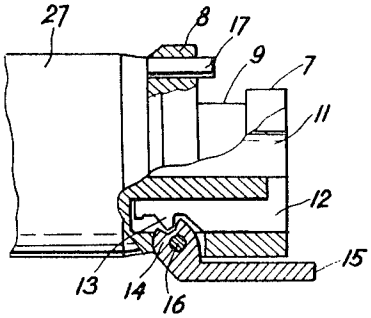


Fig. 5



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CARTRIDGE CHAMBER AND BREECH UNIT FOR RIFLES

The present invention relates to rifles, pistols, and similar devices by means of which a projectile is forcefully driven. For example, the structure of the invention is particularly adapted for use with that type of device which is used to drive an anesthetizing instrument into an animal in connection with the slaughtering thereof.

The present invention relates particularly to the rear end region of such a device where the cartridge chamber and breech unit are located. Thus, in the case of a device for propelling an anesthetizing instrument, the breech unit serves to close and block the cartridge chamber so that the pressure of the gases developed upon ignition of the cartridge will act only to drive the projectile forwardly while the rearwardly acting pressure of the gases will not damage the firing device and will not injure the operator.

At the present time there are many known mechanisms of the above general type. The simplest and most widely known breech units are provided with a threaded connection between the cartridge chamber and breech unit, the latter carrying the firing mechanism. With such constructions it is necessary to unscrew the breech unit prior to each loading operation, and of course it is also required to eject the shell of the previously fired cartridge and to introduce a new cartridge before the breech is again threaded onto the cartridge chamber. These manipulations are inconvenient, proceed slowly, and are nonproductive. Other types of breech units are turnably supported on suitable pivot pins. In the blocked or closed position the parts are retained against opening by such structures as a cap nut, a linkage type of lock, or a bayonet type of lock, the breech unit being connected with the cartridge chamber through such structures. With these constructions also the manipulations are essentially inconvenient, time-consuming, and nonproductive. Moreover, linkage or bayonet types of locks do not assure a secure closure.

A further class of breech mechanisms are arranged in such a way that they are shiftable on suitable guides and are actuated with springs. With this type of construction before each firing the breech unit is shifted away from the cartridge chamber, and the springs are compressed at this time. Then upon ignition the structure is actuated to close the cartridge chamber and ignite the cartridge. Thus, with this type of construction the firing operations initially will result in release of the spring to drive the breech against the cartridge chamber so that it covers the latter whereupon the firing operations go forward.

Constructions of this latter type, as contrasted with the other types of constructions described above, are more compact, but on the other hand they are more complicated so that they are not as advantageous with respect to manufacturing costs, servicing, and operating life. Thus, constructions of this type are not suited for use under extremely severe operating conditions, such as those encountered in connection with the slaughtering of animals.

Of course, mechanisms of this type are also provided usually with some suitable ejecting mechanism for ejecting the shell of the fired cartridge out of the cartridge chamber. There are breech units and cartridge chambers which do not have a shell ejector. In such cases the ejection of the cartridge shell creates difficulties and it is necessary to use different types of implements such as the operating lever of the device in order to remove the empty shell of the cartridge. Other types of ejectors are in the form, for example, of springy gripping fingers which upon each firing operation snap around an edge of the cartridge shell in order to grasp the shell so that upon opening of the breech unit the cartridge shell will simultaneously be withdrawn from the cartridge chamber. However, because of the fact that springy gripping fingers must snap around the edge of the shell they easily and rapidly become worn so that after a given period of use they can no longer fulfill their required functions. This latter disadvantage is particularly present in those types of constructions where the cartridge in the cartridge chamber tends to shift as a result of the force of the gases created during firing of the cartridge.

SUMMARY OF THE INVENTION

It is accordingly a primary object of the present invention to provide a construction which will avoid the above drawbacks. In particular, it is an object of the invention to provide a solution to the above problems which is simple, easy and inexpensive to manufacture, and which will provide a breech unit which can reliably and safely coact with a cartridge chamber.

Also, it is an object of the invention to provide a construction which will include a simple and highly effective ejecting mechanism for ejecting the cartridge shell.

In accordance with the invention the elongated axially bored tubular body which forms the cartridge chamber and the breech unit which extends rearwardly therefrom both have complementary flanges and grooves which interlock with each other to maintain the breech unit in its closed position closing the cartridge chamber. At surfaces of the cartridge chamber and breech unit which slidably engage each other there are, respectively, a rib and groove extending about an axis parallel to the rifle axis and guiding the breech unit for swinging movement transversely from its closed position to the open position uncovering the bore of the tubular body which forms the cartridge chamber. A pin and slot coact to limit the extent of the swinging of the breech unit with respect to the cartridge chamber and a lever carried by the breech unit has a tooth received in an indentation of the cartridge chamber to releasably hold the breech unit in its closed position. An ejector means is shiftable within the cartridge chamber for ejecting a shell therefrom, and a lever which is accessible at the exterior of the cartridge chamber coacts with the ejector means for actuating the latter when the breech unit has been displaced to its open position.

BRIEF DESCRIPTION OF DRAWINGS

The invention is illustrated by way of example in the accompanying drawings which form part of this application and in which:

FIG. 1 is an end elevation of the breech unit of the invention as seen when looking toward the front end thereof;

FIG. 2 is a side elevation of the breech unit of FIG. 1 as it appears on the left side of FIG. 1;

FIG. 3 is a fragmentary longitudinal section showing the rear end of a barrel together with a cartridge chamber situated between the barrel and breech unit with the latter operatively connected with the operating lever;

FIG. 4 is an end elevation looking toward the rear of the breech unit and showing the position which it takes when it opens the cartridge chamber; and

FIG. 5 is a fragmentary partly sectional elevation showing details of the cartridge chamber and the ejecting means.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, the breech unit 1 is of a generally cylindrical configuration, as is apparent from FIG. 1. It is formed with a laterally extending recess 2 of generally U-shaped configuration extending inwardly from the left side of the unit, as viewed in FIG. 1, with the inner portion of the recess 2 having a generally semicircular configuration extending coaxially around the central longitudinal axis of the breech unit. This recess 2 is situated inwardly from the front end surface 3 of the breech unit, this surface 3 being situated in a plane which is normal to the axis of the breech unit. Between the end surface 3 and the recess 2 the breech unit has a flange 4 conforming to the configuration of the side surface which defines the recess 2, or in other words the surface of the latter which extends around and is in general parallel to the axis of the breech unit. Thus, the breech unit will have extending rearwardly from its front end surface 3 the substantially U-shaped flange 4, and then immediately behind the latter the

recess 2 which is undercut with respect to the recess 4 forming a groove extending radially inwardly beyond the inner surface defined by the flange 4. It will be noted that the recess 2 is also defined by a forwardly directed surface which is parallel to the surface 3.

A guide means is provided to guide the breech unit for swinging movement between open and closed positions, and this guide means includes in the illustrated example an arcuate rib 5 which extends around an axis parallel to the axis of the breech unit and has the configuration most clearly apparent from FIGS. 1 and 2.

In addition it is to be noted at its front end surface 3 the breech unit is formed with an elongated arcuate groove 6 which extends along a circle concentric with the circle along which the rib 5 extends.

Finally, insofar as the structure of the breech unit pertains to the features of the present invention, it should be noted that the breech unit is formed at its front end surface with an indentation 20 extending inwardly from the front end surface and inwardly from an outer side surface of the breech unit.

Also, it will be noted that at its left portion, as viewed in FIG. 1, the exterior side surface of the breech unit is formed with the arcuate recess 26 for a purpose described below.

The breech unit 1 described above is adapted to coact with a cartridge chamber 8, shown in FIG. 3, having the configuration of an elongated tubular body formed with an axially extending bore 11 which passes completely therethrough and which is adapted to receive the cartridge. As is particularly apparent from FIGS. 3 and 4, the cartridge chamber 8 has at the rear end of its tubular body an outwardly directed flange 7 which extends forwardly from the rear end surface of the cartridge chamber and which has a configuration precisely matching the groove of the breech unit just 9 and the flange 7 received in and the flange 4 of the latter. Moreover, between the flange 7 and the rearwardly directed surface of the tubular body 8 which slidably engages the front end surface 3 of the breech unit, the chamber 8 is formed with a groove 9 precisely matching the configuration of the flange 4, so that the cartridge chamber and breech unit have complementary interlocking flanges and grooves with the flange 4 received in and filling the groove 9 and the flange 7 received in and filling the groove 2 when the breech unit is in its closed position, so that at this time it will be reliably held on the cartridge chamber.

The rearwardly directed surface of the cartridge chamber 8 which slidably engages the front end surface 3 is formed with an arcuate groove 10 matching the configuration of and receiving the rib 5 so that the latter can be displaced along the groove 10. Thus, the groove 10 and rib 5 coact to guide the breech unit for swinging movement in the manner clearly indicated in FIG. 4.

As is apparent from FIG. 5, when the cartridge chamber 8 is assembled with the barrel 27, a pin 17 fixedly carried by the latter extends through an opening of the cartridge chamber 8 beyond the rearwardly directed surface thereof which slidably engages the front surface 3 of the breech unit. The right free end of the pin 17, as viewed in FIG. 5, is received within the groove 6, so that this pin 17 coacts with the opposed ends of the groove 6 to limit the extent to which the breech unit can swing from its closed to its open position shown in FIG. 4. In the open position of FIG. 4 the pin 17 is situated at the right end of the groove 6, as viewed in FIG. 4.

In addition, as is apparent from FIG. 5, the cartridge chamber is provided with a shell-ejecting means 12 in the form of an elongated member axially shiftable in a suitable guide passage formed in the cartridge chamber 8 and capable of being displaced rearwardly beyond the latter when the breech unit is in its open position shown in FIG. 4. This ejector means 12 has a tooth 13 received between teeth 14 of an operating lever 15 supported for swinging movement on the cartridge chamber 8 by way of a pivot pin 16, as is also shown most clearly in FIG. 5. Thus, when the breech unit has been displaced in the open position of FIG. 4 it is possible for the operator to swing the lever 15 in a clockwise direction, as viewed in FIG. 5, so as to actuate the ejector 12 to eject an empty cartridge in preparation for inserting a new cartridge into the chamber 11.

As is apparent from FIG. 4, the cartridge chamber 8 is formed with an indentation 20 which forms a continuation of the indentation 20 of the breech unit when the latter is in its closed position. As may be seen from FIG. 3, the breech unit pivotally carries by way of a pin 22, an operating lever 19 which is formed with an elongated slot 23 which receives the pin 22 so that the lever 19 can shift along as well as turn about the pin 22. This operating lever 19, which acts in a conventional manner in connection with the firing operations, is provided with a tooth 18 which is received in the indentation 20 formed in part in the breech unit and in part in the cartridge chamber so that through this expedient the breech unit will remain locked in its closed position.

As is apparent from FIG. 4 the breech unit actually turns about an axis displaced from the barrel axis so that it has in effect an eccentric mounting. In order to facilitate movement of the tooth 18 into the indentation 20 as the breech unit 1 swings in a clockwise direction as viewed in FIG. 4, from the illustrated open position to its closed position, the tooth 18 is provided with an inclined surface 21 forming a running-on surface providing smooth movement of the tooth 18 along the rearwardly directed surface of the cartridge chamber 8 when this tooth 18 overlaps this rear surface until the tooth reaches the indentation 20 of the cartridge chamber 8 at which time it will snap into the latter indentation to lock the breech unit in its closed position. During this operation the slot 23 permits the lever 19 to shift to the rear in opposition to a spring 24 situated in a bore 25 of the breech unit and acting upon the tooth 18 to urge the right end of the slot 23 into engagement with the pin 22, as shown in FIG. 3.

As is apparent from FIG. 4, the side recess 26 of the breech unit serves to clear the bore 11 when the breech unit is in its open position, so as to reduce the extent to which the breech unit must be swung when displaced to its open position, and also this recess 26 will clear the lever 15 so that the latter can be easily actuated. The cartridge chamber 8 is fixed in any suitable way with the barrel 27 of the device which may be used, for example, to propel an anesthetizing instrument into an animal in connection with the slaughter thereof.

The assembly of the components is carried out in such a way that the rib 5 is received in the groove 10 and of course the flanges 4 and 7 will be respectively received in the grooves 9 and 2. When the parts are initially assembled the pin 17 is still not in the position where its end is received in the groove 6. The breech unit is displaced toward its closed position on the cartridge chamber and the lever 19 will yield in opposition to the spring 24 with the slot 23 advancing to the right along the pin 22, as viewed in FIG. 3, during this initial assembly as well as during swinging of the breech unit 1 to its closed position from the open position shown in FIG. 4, as described above, so that in this way the flange 7 can be displaced into the groove 2 with the flange 4 being received in the groove 9. When the parts are then locked by the tooth 18 of the lever 19, which is displaced back to the position of FIG. 3 by the spring 24 as soon as the tooth 18 reaches the indentation 20 of the cartridge chamber, the pin 17 can be introduced to the position shown in FIG. 5 so as to be received in the groove 6, and now the parts are assembled. Thus, with the pin 17 in the groove 6 the breech unit cannot be removed from the cartridge chamber.

In order to open the breech unit it is only necessary to press on the lever 19 so as to displace the tooth 18 thereof to the rear of the portion of the indentation 20 formed in the cartridge chamber, this movement now taking place again in opposition to the spring 24 with the slot 23 moving rearwardly along the pin 22, and now the breech unit can be displaced to its open position shown in FIG. 4. A cartridge is placed in the chamber 11 and the breech unit is returned to its closed position so that the firing can take place.

The ejecting mechanism is actuated in a known way, the operator turning the lever **15** so as to displace the ejector means **12** and thus remove an empty cartridge.

The above-described structure of the invention can be used with all types of devices where the propellant is in the form of an explosive powder which generates the propelling gas or in the form of a fluid under pressure, such as a hydraulic or pneumatic system.

Although the invention is illustrated and described with reference to one preferred embodiment thereof, it is to be expressly understood that it is in no way limited to the disclosure of such a preferred embodiment, but is capable of numerous modifications within the scope of the appended claims.

What I claim is:

1. In a rifle, cartridge chamber-forming means in the form of an elongated tubular body formed with an axial bore extending completely therethrough and terminating in a rear end face normal to the axis of said bore, said body also having forwardly of said rear end face a rearwardly directed surface surrounding the axis of said body, said body being formed with a groove extending rearwardly from said rearwardly directed surface and at least partly surrounding said axis and said body having between said groove and said rear end face an outwardly directed flange conforming to the configuration of and extending along said groove with the latter extending between and being defined at its opposed side surfaces by said rearwardly directed surface and said flange, a breech unit having a front end surface slidably engaging said rearwardly directed surface and, to the rear of said front end surface, a forwardly directed surface slidably engaging said rear end face of said tubular body, said breech unit being formed with a groove extending forwardly from said forwardly directed surface thereof and matching the configuration of said flange to receive and be filled by the latter and said breech unit having forwardly of said groove thereof an inwardly directed flange extending from said groove thereof up to said front end surface and matching the configuration of said groove of said tubular body to be received in and to fill said groove of said body, said grooves being respectively filled by said flanges when said breech unit is in a closed position closing said bore, said front end surface of said breech unit and said rearwardly directed surface of said tubular body forming a pair of surfaces slidably engaging each other and one of which is formed with an arcuate groove while the other of which carries an arcuate rib slidably received in said arcuate groove for guiding said breech unit for swinging movement transversely to the axis of said bore between said closed position and an open position uncovering said bore at said rear end thereof so that a cartridge may be inserted into said bore, and said front end surface of said breech unit and rearwardly directed surface of said tubular body also forming a pair of surfaces one of which is formed with an arcuate groove and the other of which carries a pin which is received in said last-mentioned arcuate groove to limit the swinging of said breech unit with respect to said tubular body to an extent which will uncover said bore when said breech unit is in its open position and which will close said bore when said breech unit is in it is closed position, at least said tubular body being formed at an exterior surface region thereof with an indentation and said breech unit carrying a swingable lever having a tooth received in said indentation when said breech unit is in said closed position for releasably holding the latter in said closed position until said lever is turned to a release position displacing said tooth out of said indentation to thus release said breech unit for swinging movement from said closed to said open position thereof.

2. The combination of claim **1** and wherein said first-mentioned grooves and flanges are all of a substantially U-shaped configuration and all have curved portions extending around the axis of said bore and elongated portions extending from said curved portions to outer side surface regions of said body and breech unit.

3. The combination of claim **2** and wherein said coacting rib and first-mentioned arcuate groove which guide said breech unit for swinging movement both terminate in ends situated at exterior side surfaces of said tubular body and breech unit.

4. The combination of claim **1** and wherein a shell ejector means is carried by said tubular body for axial movement with respect thereto along a shell-ejecting stroke, and operating lever means situated at the exterior of said tubular body, supported thereby for turning movement, and coacting with said shell-ejector means for actuating the latter to eject a shell from said bore when said breech unit is displaced to said open position thereof.

5. The combination of claim **1** and wherein said breech unit carries a pivot pin extending through said lever and said lever being formed with an elongated slot receiving said pivot pin, so that said lever is longitudinally shiftable as well as turnable about said pin, and said tooth of said lever having an inclined side surface guiding said tooth into said indentation during swinging of said breech unit from said open to said closed position thereof.

6. The combination of claim **4** and wherein said ejector means and said operating lever means respectively have teeth which mesh with each other for providing coaction between said operating lever means and ejector means.

7. The combination of claim **1** and wherein the coacting rib and first-mentioned arcuate groove which guide said breech unit for swinging movement both extend circumferentially around an axis parallel to the axis of said bore of said tubular body.