

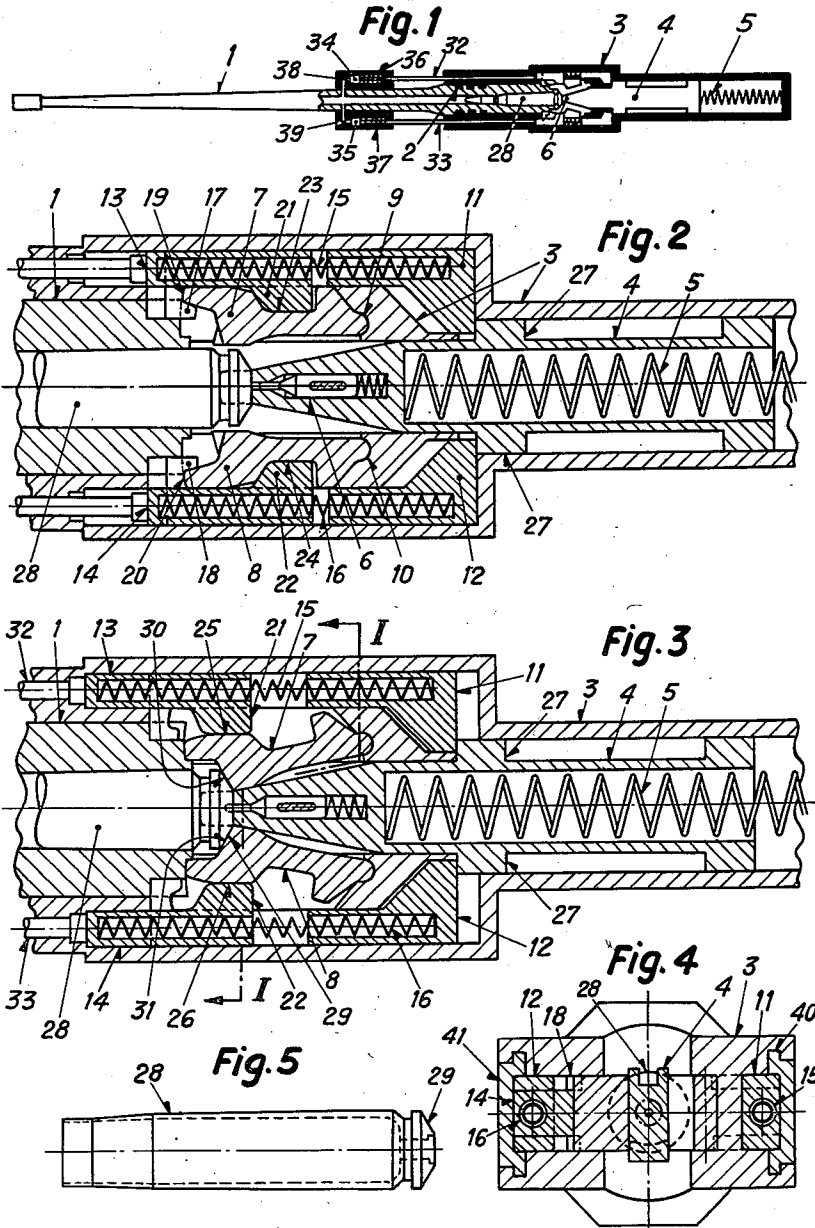
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PIVOTED BREECH CLOSURE AND LOCK MEMBER

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PIVOTED BREECH CLOSURE AND LOCK
MEMBER

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The present application is an improvement of my co-pending application, Serial No. 713,958, now Patent No. 2,536,997.

In anti-aircraft defence with automatic anti-aircraft guns there is a tendency to increase the rate of fire with a view to increasing the certainty of scoring hits and thus the probability of shooting down the attacking aircraft. With the same objective in view larger calibres, hitherto used as non-automatic weapons, are now being automatized. There have hitherto been technical limits to any increase in the rate of fire on the one hand and to the automatization of guns of larger calibre, for instance 75 mm. and more, on the other. The weight of the breech block necessary for locking the cartridge cannot exceed a certain value. But the breech blocks of guns of the size category of the calibres mentioned are very heavy, so that in the rhythm of feeding the cartridges they can only move relatively slowly.

It would seem, however, hardly possible to overcome the difficulties set out above by means of the breech systems so far known. The present invention relates therefore to an entirely new method and discloses an automatic weapon whose breech system is constructed in an entirely new manner. The new breech system, as will be shown hereunder, eliminates all the difficulties enumerated above and makes it possible in firearms manufacture to automatize the heaviest calibres and to raise the rate of fire to the highest figures conceivable.

The automatic firearm in accordance with the present invention is characterized by at least one bolt bearing against the casing of the firearm and mounted pivotally in such fashion that, in order to absorb the forces generated by gas pressure, it engages immediately behind a projecting cap provided on the cartridge case.

The invention thus departs from the usual principle in fire arm manufacture whereby a breech block is provided which at the same time takes care of the forward feed of the cartridges and must therefore travel a relatively large distance. Only bolts bearing against the weapon housing are now provided, which are pivotable into a position behind a projecting cap provided on the cartridge case and are therefore not called upon to perform any reciprocal motion. The breech block hitherto customary merely retains, therefore, the function of a cartridge slide, and can therefore be constructed so as to be extremely light, taking for instance the form of a sheet metal sleeve. By this means the masses

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requiring to be accelerated, which as is known are the cause of the relatively low limit to the rate of fire of automatic firearms of larger calibre, are reduced to a minimum.

A particularly advantageous construction is achieved when at least two bolts, bearing against the firearm casing and capable of being pivoted behind a conical projection provided on the cartridge case, are provided, which are brought into the cartridge-locking position by a power accumulator placed under tension by the cartridge slide in its forward course. A breech system of this kind is, as will be shown, extremely simple in its construction and sets no limits either to the calibre or to the rate of fire, at least from a constructional point of view.

In the enclosed drawing, Figs. 1 to 5 illustrate a typical embodiment of the invention, in which:

Fig. 1 is a section through an automatic firearm, drawn diagrammatically;

Fig. 2 is an enlarged section through the locking mechanism during the insertion of a cartridge;

Fig. 3 shows the subject of Fig. 2 in the position in which the cartridge is locked;

Fig. 4 is a section along the line I—I in Fig. 3;

Fig. 5 is an elevation of a cartridge-case especially designed for use in the firearm illustrated.

In Fig. 1, 1 is the barrel, which is inserted in the firearm casing 3 in the known manner by means of a bayonet joint 2. The reciprocally moving cartridge slide 4 is acted upon by a recuperating spring 5 and is provided in its fore portion with the percussion mechanism 6, as seen in Figs. 2 and 3. The two bolts 7 and 8 are mounted in bowl-shaped recesses 9 and 10 in the firearm casing 3. The bolts 7 and 8 are operated by power accumulators, consisting of the rear portions 11 and 12 and the fore portions 13 and 14. The two power accumulators are operatively connected through the springs 15 and 16. The rear accumulator portions 11 and 12 are of forked shape and guided along the fore portions 13 and 14 of the accumulators. By means of projections 17 and 18 they engage below the noses 19 and 20 of the bolts 7 and 8. The fore portions 13 and 14 of the accumulators are provided with bosses 21 and 22 which engage, in the unlocked position, in corresponding recesses 23 and 24 in the bolts 7 and 8. In the locked position, on the other hand, they come to lie on the surfaces 25 and 26 of the bolts 7 and 8, thus acting as wedges. The rear portions 11 and 12 of the accumulator project into the path of

the noses 27 of the cartridge slide 4. The cartridge case 28 is provided with a conical cap 29 on which the conically designed surfaces 30 and 31 of the bolts 7 and 8 come to bear. The angle of inclination of these surfaces is so selected, however, that when the forces arising from gas pressure act on the cartridge case after a round has been fired, an opening force is exerted on the bolts. The fore parts 13 and 14 of the accumulators are connected to rods 32 and 33 which, as shown in Fig. 1, carry pistons 34 and 35. The pistons 34 and 35 slide in cylinders 36 and 37, into which open the gas ducts 38 and 39 communicating with the barrel. Under the action of the gas pressure forces the pistons 34 and 35 and the rods 32 and 33 are accordingly moved rearwards, this resulting in a corresponding motion on the part of the fore portions 13 and 14 of the accumulators.

Finally, plates 40 and 41, capable of being slidably inserted in the firearm casing, are provided, which form a seal when the bolts and the accumulators have been inserted.

The manner in which the automatic firearm illustrated functions is as follows:

The cartridge slide 4 feeds, at each cycle, a cartridge into the cartridge chamber and in the course of that operation, shortly before the cartridge has been completely inserted into the chamber, strikes with its noses 27 against the rear portions 11 and 12 of the accumulators. In consequence, therefore, there will first be produced a tensioning of the springs 15 and 16 until the rear portions 11 and 12 of the accumulators contact the fore portions 13 and 14 of the accumulators.

Meanwhile the cartridge has been inserted so far that its conical cap 29 no longer lies between the bolts 7 and 8. The projections 17 and 18 will now, through the forward motion of the rear portions 11 and 12 of the accumulators, also release the noses 19 and 20 of the bolts 7 and 8, so that, as soon as the rear portions 11 and 12 of the accumulators strike hard against the fore portions 13 and 14 of the accumulators, the inwardly pivoting motion of the bolts 7 and 8 is initiated by the bosses 21 and 22 of the fore portions 13 and 14 of the accumulators. The bolts are pivoted into the position shown in Fig. 3, in which they engage behind the cap 29 of the cartridges, the accumulator springs 15 and 16 being thereby tensioned, these springs also causing the bosses 21 and 22 to take up a position below the surfaces 25 and 26 of the bolts 7 and 8, thus wedging the two bolts 7 and 8.

In the position shown in Fig. 3 the cartridge is locked and the striking mechanism 6, which is operated in a manner known to those expert in the art and therefore not here represented in greater detail, can perform its function. The bolts 7 and 8 absorb the gas pressure forces exerted on the cartridge when the round is fired, the unlocking process being however initiated, in the manner described hereunder, as soon as the round has been fired.

The gases extracted from the barrel through the ducts 38 and 39 force the pistons 34 and 35 in the cylinders 36 and 37 towards the rear, whereby the fore portions 13 and 14 are likewise forced rearwardly through the rods 32 and 33. The springs 15 and 16 are thereby again placed under tension and the bosses 21 and 22 withdrawn from the position in which they wedge the bolts 7 and 8. Since, as has been mentioned, the conical surfaces 30 and 31, by which the bolts bear

on the conical cap 29 of the cartridge 28, are so designed that when gas pressure forces act on the cartridge case a force tending towards opening is exerted on them, the bolts are pivoted outwardly. The cartridge slide 4, also forced back under the action of the remaining gas pressure forces, now also releases the rear portions 11 and 12 of the accumulators, so that these, under the action of the springs 15 and 16, are likewise enabled to resume their initial position as shown in Fig. 2, the projections 17 and 18 engaging above the noses 19 and 20 of the bolts 7 and 8 and thus securing the bolts. Thereby the initial position shown in Fig. 2 is reached, and a new cartridge can be inserted after the first cartridge has been ejected.

It should be added that the ejection of the cartridge can take place, for instance, in a downward direction (cf. Fig. 4).

The embodiment shown is, it need hardly be said, only a typical example of a manner in which the invention, which is new in principle, can be performed. Numerous further alternative embodiments of the principle in accordance with the invention could be adduced.

We claim:

1. In an automatic firearm, in combination with a percussion mechanism for inserting a cartridge case into a firing position, two swingable bolts located on opposite sides of said percussion mechanism and two movable accumulators having bosses engaging said bolts and swinging them inwardly from an unlocked position to a locking position, and vice versa, said bolts engaging said percussion mechanism and the rear end of the cartridge case in said locking position, said accumulators having rearwardly directed projections and said bolts having noses engaging behind said projections in the unlocked position of said bolts.

2. In an automatic firearm, in combination with a percussion mechanism for inserting a cartridge case into a firing position, said percussion mechanism including a cartridge slide, said cartridge case having a rear conical projection, two swingable bolts located on opposite sides of said percussion mechanism, two movable accumulators having bosses engaging said bolts, and springs engaging said accumulators, said cartridge slide engaging said accumulators and moving them forwardly while tensioning said springs, said bosses of the accumulators swinging said bolts from an unlocked position to a locked position when said accumulators are moved forwardly, said bolts engaging said percussion mechanism and said rear conical projection of the cartridge case in said locking position, said accumulators having rearwardly directed projections and said bolts having noses engaging behind said projections in the unlocked position of said bolts.

3. In an automatic firearm, in combination with a percussion mechanism for inserting a cartridge case into a firing position, said cartridge case having a rear conical projection, two swingable bolts located on opposite sides of said percussion mechanism, two movable accumulators having bosses engaging said bolts and swinging them inwardly from an unlocked position to a locking position and vice versa, said bolts having conical surfaces engaging said rear conical projection of the cartridge case in said locking position, the angle of said conical surfaces of the bolts being selected so that an opening force is exerted on the bolts when gas pressure after firing acts on said cartridge case, said accumulators having

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rearwardly directed projections and said bolts having noses engaging behind said projections in the unlocked position of said bolts.

4. In an automatic firearm, in combination with a percussion mechanism for inserting a cartridge case into a firing position, two swingable bolts located on opposite sides of said percussion mechanism, two movable accumulators, each of said accumulators having a fore portion and a rear portion, and separate springs interconnecting the fore and rear portions of each accumulator, the rear portion of each accumulator being forked and adapted to move relatively to its fore portion, the fore portions of said accumulators having bosses engaging said bolts and swinging them inwardly from an unlocked position to a locking position, and vice versa, said bolts engaging said percussion mechanism and the rear end of the cartridge case in said locking position, said fore portions having rearwardly directed projections and said bolts having noses engaging behind said projections in the unlocked position of said bolts.

5. In an automatic firearm, in combination with a percussion mechanism for inserting a cartridge case into a firing position, two swingable bolts located on opposite sides of said percussion mechanism, two movable accumulators, each of said accumulators having a fore portion and a rear portion, and separate springs interconnecting the fore and rear portions of each accumulator, the rear portion of each accumulator being forked and adapted to move relatively to its fore portion, the fore portions of said accumulators having bosses extending into recesses formed in said bolts in an unlocked position of said bolts, said bosses moving out of said recesses and swinging said bolts into a locking position during a forward movement of said accumulators, said bolts

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engaging said percussion mechanism and the rear end of the cartridge case and said bosses wedging said bolts in said locking position, said fore portions having rearwardly directed projections and said bolts having noses engaging behind said projections in the unlocked position of said bolts.

6. In an automatic firearm, in combination with a percussion mechanism for inserting a cartridge case into a firing position, two swingable bolts located on opposite sides of said percussion mechanism, two movable accumulators, each of said accumulators having a fore portion and a rear portion, separate springs interconnecting the fore and rear portions of each accumulator, separate pistons connected to the fore portions of said accumulators, and means transmitting gas pressure after firing to said pistons to cause said pistons and said fore portions to move rearwardly, said fore portions having bosses engaging said bolts and swinging them inwardly from an unlocked position to a locking position during a forward movement of said fore portions, said fore portions further having rearwardly directed projections and said bolts having noses engaging behind said projections in the unlocked position of said bolts.

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