No. 813,694. PATENTED FEB. 27, 1906.

T. A. FIDJELAND.

AUTOMATIC RIFLE.

APPLICATION FILED FEB. 24, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

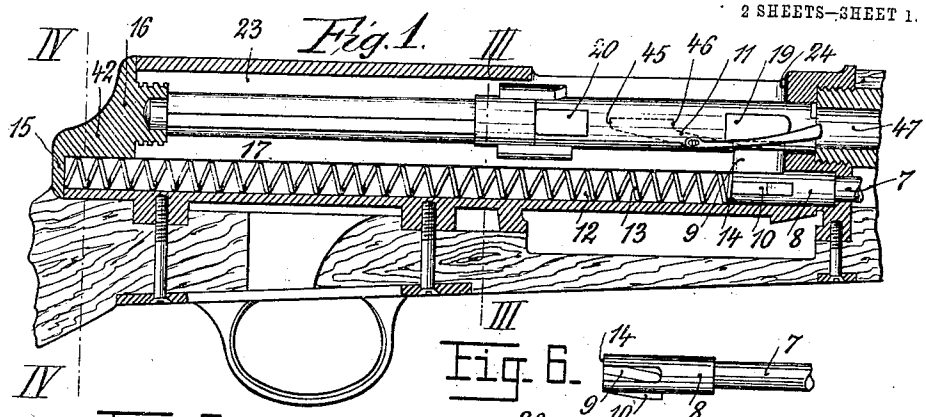


Fig. 6.

Fig. 7.

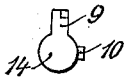


Fig. 5.

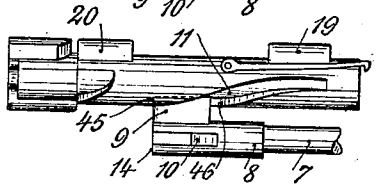


Fig. 4.

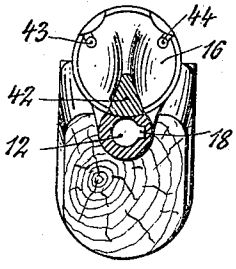


Fig. 3.

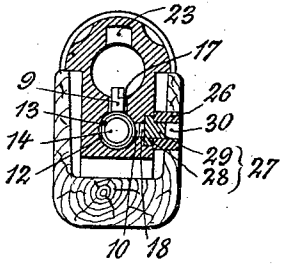
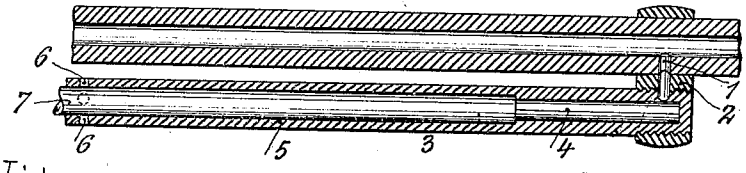


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 8.

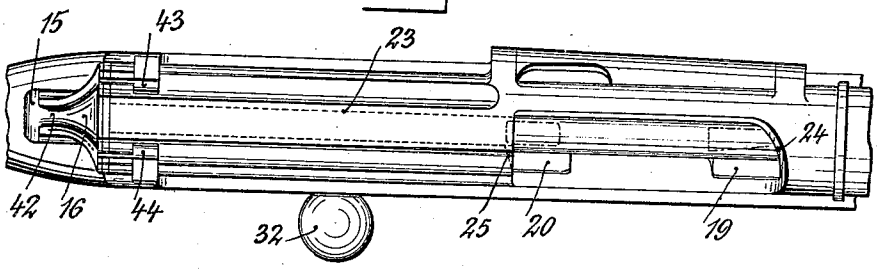


Fig. 9.

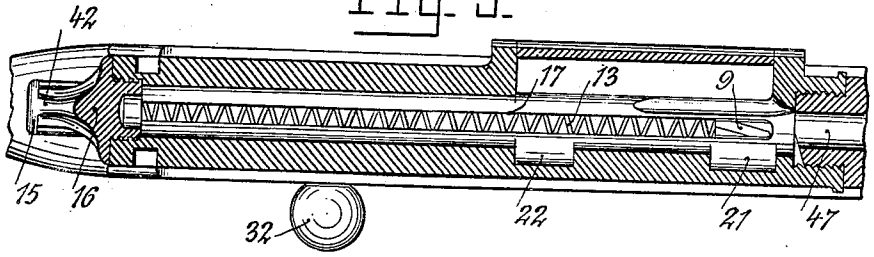


Fig. 10.

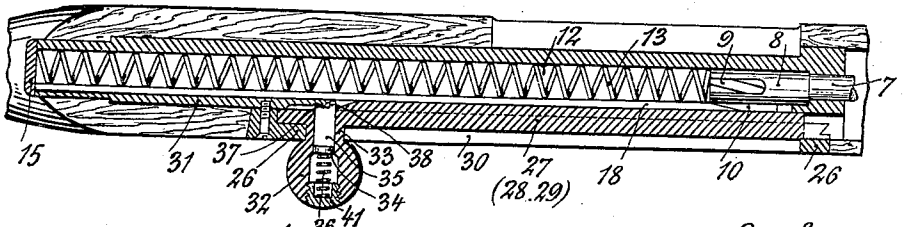


Fig. 11.

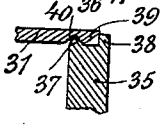
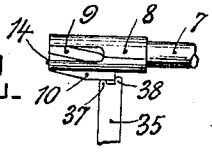


Fig. 12.



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UNITED STATES PATENT OFFICE.

TERJE AANENSEN FIDJELAND, OF FOSTVEDT, IVELAND, NORWAY.

AUTOMATIC RIFLE.

No. 813,694. Specification of Letters Patent. Patented Feb. 27, 1906.

Application filed February 24, 1904. Serial No. 195,108.

To all whom it may concern:

Be it known that I, TERJE AANENSEN FIDJELAND, gunmaker, a subject of the King of Norway and Sweden, residing at Fostvedt, Iveland, Province of Christiansand, S. Norway, have invented certain new and useful Improvements in Automatic Rifles, of which the following is a specification.

This invention relates to a rifle in which the reloading is effected automatically by means of the pressure of the powder-gases, the rifle being principally characterized by a very simple construction having a minimum of separate parts and by a reliable manner of operation of the automatic reloading mechanism. As the number of parts in the latter is reduced to two, only one of which is movable, I have produced an automatic rifle which as to size is not larger than an ordinary magazine-rifle and as to weight is even more advantageous than rifles of this kind as now usually employed.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a central longitudinal section through the frame of a rifle constructed according to my invention. Fig. 2 is a central longitudinal section through a part of the gun-barrel and gas-pipe. Fig. 3 is a section on the line III III of Fig. 1, the breech-block being removed. Fig. 4 is a section on the line IV IV of Fig. 1. Fig. 5 is a side view of the breech-block and piston-rod in the position occupied when the breech-block has been turned upward and is ready to begin its backward movement. Fig. 6 is a plan of the rear end of the piston-rod. Fig. 7 is an end view of the piston-rod. Fig. 8 is a plan of the frame. Fig. 9 is a central horizontal section through the frame, and Fig. 10 is a horizontal section through the axis of the piston-passage. Figs. 11 and 12 are views of details.

In the magazine-rifles as are almost universally accepted for army use the breech-block when loading has to execute two different kinds of motions—first, a turning motion by which the block is carried from its locked position to its position of free right-lined motion, or vice versa, and then a right-lined motion by which the breech-block effects the throwing out of the cartridges and the feeding of new cartridges into the chamber. In the usual magazine-rifles these motions are effected by hand and in automatic guns either by means of the recoil or by means of the pressure of the powder-gases. The present construction is based on the latter principle. For this purpose the gun-barrel is at a distance of about a third of the length of the barrel from the rear end of the cartridge-chamber provided with a hole 1, Fig. 2, passing through a hoop 2, surrounding the barrel at this place, and into the interior of the gas-pipe 3, screwed into the hoop. This pipe has at its forward end a part 4 of a length of about two inches connected at its rear end with another part 5 of a diameter a little larger than the part 4. The part 5 extends backward for a length of about six inches and is at its rear end provided with a number of lateral holes 6. The part 5 of the pipe fits accurately around the front end 7 of the piston-rod, the front end face of which in its normal position bears against the shoulder where the part 5 joins the part 4 of smaller diameter. The rear thickened part 8 of the piston-rod bears at the same time with its front annular face against a stop-face on the frame, Fig. 1. The part 8 of the rod is provided at its rear end with a cam 9, extending upward and with a lug 10 on one side. The cam 9 engages with a helical groove 11 in the breech-block and in order to fit the slope of the groove at its upper end and on both sides is formed as shown in Fig. 6. The part 8 is located and can move in a passage 12 directly beneath the frame and is acted upon by a spiral spring 13, located in the said passage. The front end of the spring bears against the rear end face 14, and the rear end of the spring bears against a nose 15 on a piece 16, which forms the bottom of the frame-casing. In order to allow the motion of the piston-rod, the passage 12 is at its upper part open to the frame-casing through a longitudinal slot 17, in which the cam 9 can move. The passage 12 is also on one side provided with a slot 18, in which the lug 10 can travel during the motion of the piston-rod. (See Figs. 1, 3, 4, and 10.)

The breech-block, Figs. 1 and 5, is provided with two stops 19 and 20, which in the locked position project into corresponding recesses or grooves 21 and 22, Figs. 8 and 9, in the side of the frame, so that the backward motion of the breech-block is prevented. When the turning of the breech-block is completed, both stops 19 and 20 project vertically upward, Fig. 5, so that when moving backward they can enter the upper passage 23 in the rear half of the frame, Figs. 1, 3, and 8. During the turning of the breech-block the front face of the stop 19 will bear

against an inclined face 24 in the front side of the frame, Figs. 1 and 8, the rear face of the stop 20 bearing at the same time against a fixed inclined face 25, so that the breech-block during the turning will not only be held quite steady, but will also slightly move in a longitudinal direction for a purpose which will be hereinafter described.

The helical groove 11 in the breech-block forms about a fourth of a complete convolution, so that the breech-block by the motion of the piston-rod will be turned about a fourth of a revolution.

On the same side of the rifle as the stud 10 on the piston-rod (on the right side of the gun) there is fixed a guide 26, Figs. 3 and 10, provided with a longitudinally-movable slide 27, approximately of T shape in cross-section. The broad part or top 28 of the T engages in a corresponding groove in the side of the frame symmetrical to the groove 18, and the web or stem 29 of the T is guided by the slot 30 in the guide. The part 28 of the slide covers the front part of the slot 18, which is here open to the side, but which is at its rear part closed by the wall 31, Fig. 10. At the rear end of the slide 27 is fixed a ball 32, by means of which the slide can be moved. The ball is connected to the slide by means of two flat arms 33, which can pass into the guide and between which there is a pawl which is movable perpendicularly to the guide. The outer part 34 of this pawl is cylindrical and enters the cavity of the ball 32. The part 34 is acted upon by a spiral spring 36, arranged within the ball. The inner part 35 of the said pawl is flat and terminates in two noses, the rear nose 37 being short and rounded and the front nose 38 being sharp and projecting farther in. The wall 31 extends so far forward that its front edge is immediately behind the nose 38 and is on the outside provided with a short inclined plane 39, behind which there is a notch 40, Fig. 11, in which the nose 37 normally engages in order to hold the slide in this position by means of the spring 36. When the slide moves slightly forward, the pawl at 37 will be released from the wall 31 and under the action of the spring 36 will project into the slot 18 until the pawl is stopped by the cylindrical part 34 being stopped against an inner face in the ball 32. The outer end of the spring 36 bears against a hollow screw in the ball.

The passage 12 is open at the top at its rear end, Fig. 4, but is there covered by the arm 42 of the bottom piece 16, which arm extends backward and the lower side face of which is circular, so that the whole bottom piece can be screwed in from the end and in its position of rest will form the bottom of the frame-casing as well as the bottom of the passage 12. The turning of the bottom piece is prevented by the locking-pins 43 for the magazine and 44 for the firing-pin, so that the turning can only be effected when these pins are taken out.

The operation of the automatic mechanism is as follows: After the magazine has been filled with cartridges one of the latter must be introduced into the barrel-chamber 47. This is effected by means of the slide mechanism arranged on the side. The ball 32 is grasped and the slide 27 carried quite forward and then quite back. By the forward motion the rounded tooth 37 of the pawl 35 will be moved out of the notch 40 in passing the nose, which is formed at the upper part of the plane 39, and at last sliding down the plane, permitting the nose 38 to enter the slot 18. Here the nose 38 will meet the rear inclined side of the stud 10 on the piston-rod and slide up the same, and finally the nose 38 in the end position of the forward motion will under the action of the spring 36 come in front of the stud 10, as shown in Fig. 12. When now the ball 32, with the slide 27, is carried back, the whole piston-rod 7 8 will be taken along with it. During this the cam 9 will by means of the helical groove 11 force the breech-block to turn about a fourth of a revolution, the hammer being thereby cocked in the usual manner, and the cam 9, which has then reached the back end of the groove 11, will bear with its rear face against the end face 45 of the helical groove, Figs. 1 and 5. At this moment the stops 19 and 20 occupy the position which is shown by dotted lines in Fig. 8. The stop 19 has then traveled in close contact with the plane 24, and the stop 20 has just been released from the bearing-face 25. The breech-block can therefore now perform its right-lined motion. This is also effected by the cam 9 during the last part of the motion of the piston-rod. During the whole backward motion the spring 13 will be compressed, and when the piston-rod is near its end position the cartridge-feeder forces in usual manner cartridge up from the magazine before the breech-block and the rounded rear nose 37 of the pawl 35 will travel up the plane 39 in order to release the stud 10 from the nose 38. The piston-rod thereby becomes free, and the spring 13, which is now completely compressed, will force the piston-rod forward to its front position. The front face of the cam 9 will consequently first meet with the flat face 46, Figs. 1 and 5, at the rear part of the groove. Then the breech-block is carried forward until the stop 19 meets the inclined plane 24. Here the turning back of the breech-block will begin and this be still performed by means of the piston-rod. The cam 9 must therefore be carried away from the face 46 and down into the helical groove 11, which is effected by the plane 24. When the stop 19 meets the plane 24, the breech-block will be turned a little in the desired direction, so that the cam 9 is carried into the groove 11. During the last part of the mo-

tion of the piston-rod the cam 9 therefore, under the action of the spring 13, will turn the breech-block down to the locking position, Figs. 1 and 8, in which the stops 19 and 20 have moved down into their grooves 21 and 22. During the forward motion of the breech-block the cartridge is carried into the cartridge-chamber 47, and the rifle is therefore loaded with its hammer cocked and its breech-block locked. The slide 27 also is in its end position, Fig. 10, with its nose 37 forced into the notch 40. When the rifle is fired by means of the usual trigger, the powder-gas will as soon as the ball has passed the hole 1 be forced down through this hole and into the cavity 4 and cause pressure against the front face of the piston-rod 7. The whole piston-rod 7 8 is therefore thrown back and will thereby turn the breech-block up to the position, Fig. 5, the cartridge being meanwhile, on account of the slight longitudinal motion of the breech-block which takes place at the same time as the turning, pulled a little distance out of the chamber 47 by means of the extractor, so that the cartridge is loosened. The piston-rod will then carry the breech-block back to its end position, whereby the empty cartridge is thrown out in the known manner and a new loaded cartridge from the magazine-feeder is carried up into position before the breech-block. In this end position the front face of the part 7 of the piston-rod is behind the holes 6 in the pipe 5, so that the powder-gases can now escape about the same time as the ball leaves the barrel. Consequently the compressed spring 13 will come into action and in the manner shown force the piston-rod forward to its front position, so that the breech-block is carried forward together with the new cartridge and turned to its locked position with the hammer cocked. When now the fresh cartridge is fired in the usual manner, the same action will take place, the powder-gas forcing the piston back and the spring forcing it forward, so that a fresh cartridge is again carried into firing position in the chamber 47. If the magazine contains, for example, six cartridges, it will be advisable after having carried one of these cartridges into the chamber by pulling the ball 32 forward and back again to refill the magazine, so that this contains its six cartridges when one cartridge is in the chamber 47. Then six shots are fired, after which there will be one cartridge in the chamber and none left in the magazine. This is again filled, and the operation can be continued in this manner, the magazine being filled after the firing of six shots. The reloading will thereby always be effected automatically, so that the ball 32 and slide 27 are only operated after the first filling of the magazine in order to carry the first cartridge into the barrel-chamber 47. The rifle can also be used as a single-loader. In this case the rifle is manipulated in the following manner: The magazine is filled and the ball 32 carried forward and backward again in order to carry a cartridge into the chamber 47. Then the magazine is locked and shot fired. The locking-pin 43 for the magazine is turned back again to its opening position, and the ball 32 is carried forward and back again. Then the magazine is again locked and the shot fired, and so on. It will be seen that the whole automatical action is effected by the piston-rod 7 8 9, groove 11, spring 13, and inclined plane 24, and besides the breech-block only the piston-rod is movable, the spring 13 being only compressed and then again expanded. As will be seen, the construction can scarcely be more simple.

Experiments have proved that the mechanism acts very exactly and that the reloading is performed as quickly as a man is able to pull the trigger. If the rifle be fired as rapidly as possible, three cartridges will be in the air at the same time, as the first will not have reached the ground before the third has been thrown out.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic rifle, the combination with the barrel and the breech-block, a pipe in communication with the barrel, a spring-pressed piston-rod therein upon which the powder-gases act, a cam on said rod, a substantially helical groove on the outer side of the breech-block which groove said cam engages, locking-stops on the breech-block, a longitudinal guiding-passage in the frame, into which passage said stops travel during the reciprocating movement of the breech-block thereby preventing the block to be turned during such movement, an end face 45 of the helical groove against which face the cam bears during the rearward movement of the breech-block, a flat face 46 in the rear part of the helical groove against which face 46 the front end of the cam bears during the forward movement of the breech-block without causing any turning action on the same, and an inclined plane 24 provided on the frame of the rifle and located in the path of the foremost locking-stop and acting on the same at the last part of the forward movement of the breech-block, which is thereby turned sufficiently to remove the flat face 46 from the cam and enable the latter to re-enter the helical groove in order to lock the breech-block.

2. In an automatic firearm, the breech-block having a substantially helical groove therein and locking-stops thereon, the pipe in communication with the barrel, a piston-rod in the pipe having a cam thereon, a passage 12 in the rear of the rifle-casing forming an extension of the pipe, said passage opening into the casing containing the breech-

block, a spring in said passage acting upon the piston-rod, the said cam engaging with the slot in the breech-block when the piston-rod operates, an end face 45 of the helical groove against which face the cam bears during the rearward movement of the breech-block, a flat face 46 in the rear part of the helical groove against which face 46 the front end of the cam bears during the forward movement of the breech-block, without causing any turning action on the same, and an inclined plane 24 provided on the frame of the rifle and located in the path of the foremost locking-stop and acting on the same at the last part of the forward movement of the breech-block, which is thereby turned sufficiently to remove the flat face 46 from the cam and enable the latter to reënter the helical groove in order to lock the breech-block.

3. In an automatic firearm, the breech-block having a substantially helical groove therein and locking-stops thereon, the pipe in communication with the barrel, a piston-rod in the pipe having a cam thereon, a passage 12 in the rear of the rifle-casing forming an extension of the pipe, said passage opening into the casing containing the breech-block, a spring in said passage acting upon the piston-rod, the said cam engaging with the slot in the breech-block when the piston-rod operates, a longitudinal guiding-passage in the frame, into which passage said stops travel during the reciprocating movement of the breech-block thereby preventing the block to be turned during such movement, an end face 45 of the helical groove against which face the cam bears during the rearward movement of the breech-block, a flat face 46 in the rear part of the helical groove against which face 46 the front end of the cam bears during the forward movement of the breech-block, without causing any turning action on the same, and an inclined plane 24 provided on the frame of the rifle and located in the path of the foremost locking-stop and acting on the same at the last part of the forward movement of the breech-block, which is thereby turned sufficiently to remove the flat face 46 from the cam and enable the latter to reenter the helical groove in order to lock the breech-block.

4. In an automatic firearm the breech-block having a groove therein and working in a passage forming an extension of the barrel, a pipe in communication with the barrel, a piston-rod in the pipe having a cam thereon projecting into said groove, a passage 12 in the rear of the rifle-casing forming an extension of the pipe, and a rear piece 16 screwed into the rear of the rifle-frame in order to close the end of said breech-block passage and having a nose 15 forming an extension of said rear piece and closing the rear end of said piston-rod passage 12.

5. In an automatic firearm the breech-block having a substantially helical groove therein and locking-stops thereon and working in a passage forming an extension of the barrel, the pipe in communication with the barrel, a piston-rod in the pipe having a cam thereon, a passage 12 in the rear of the rifle-casing forming an extension of the pipe, said passage 12 opening into the passage containing the breech-block, a rear piece 16 screwed into the rear of the rifle-frame in order to close the end of said breech-block passage and having a nose 15 forming an extension of said rear piece and closing the rear end of said passage 12, two removable pins, securing said rear piece 16 in position, a spring in the passage 12 acting upon the piston-rod, the said cam engaging with the slot in the breech-block when the piston-rod operates, an end face 45 of the helical groove against which face the cam bears during the rearward movement of the breech-block, a flat face 46 in the rear part of the helical groove against which face 46 the front end of the cam bears during the forward movement of the breech-block without causing any turning action on the same, and an inclined plane 24 provided on the frame of the rifle and located in the path of the foremost locking-stop and acting on the same at the last part of the forward movement of the breech-block, which is thereby turned sufficiently to remove the flat face 46 from the cam and enable the latter to reënter the helical groove in order to lock the breech-block.

6. In an automatic firearm, the barrel, the breech-block having the groove therein, the pipe in communication with the barrel, the spring-pressed piston-rod in the pipe having the cam thereon engaging with the groove, said rod also having the stud on one side thereof, a casing forming a continuation of the pipe, a slide moving longitudinally in said casing, a nose on said slide, said nose engaging with the stud on the piston-rod so that the rod will move with the slide and means for releasing said nose from the stud.

In witness whereof I have hereunto set my hand in presence of two witnesses.

TERJE AANENSEN FIDJELAND.

Witnesses:
A. MAAVETSON.
HANS AANENSEN.