

July 22, 1930.

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1,771,132

DEVICE FOR REDUCING THE RATE OF FIRE OF AUTOMATIC FIREARMS

Filed May 14, 1928

2 Sheets-Sheet 1

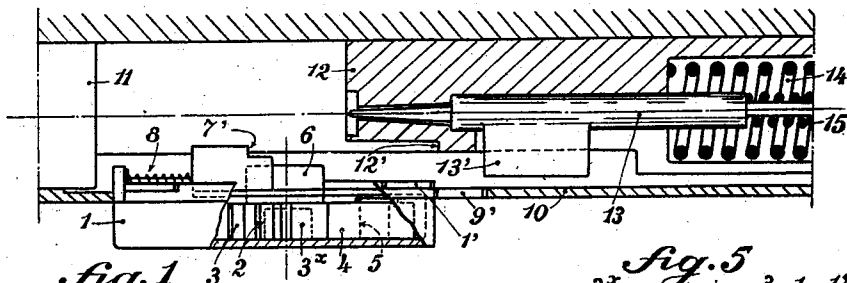


Fig. 1

Fig. 2

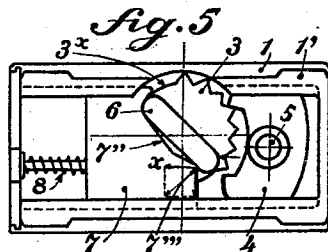
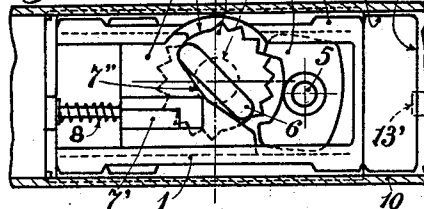


Fig. 5

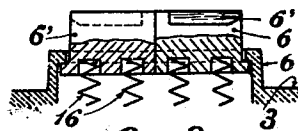


Fig. 8

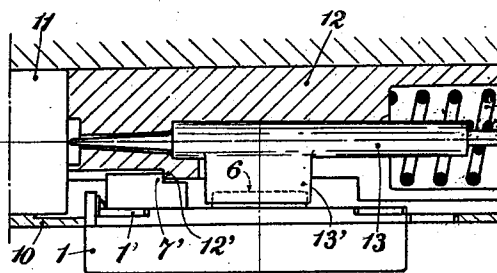


Fig. 3

Fig. 4

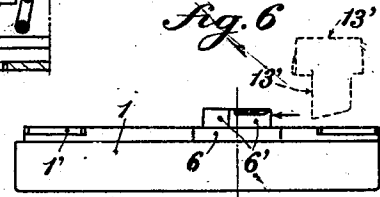
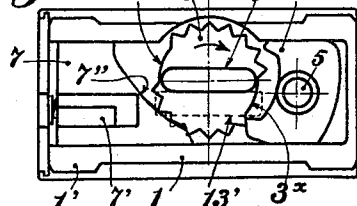


Fig. 6

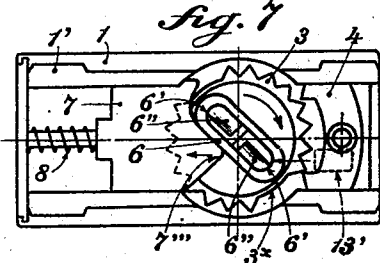


Fig. 7

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DEVICE FOR REDUCING THE RATE OF FIRE OF AUTOMATIC FIREARMS

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2 Sheets-Sheet 2

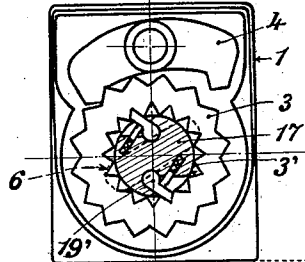
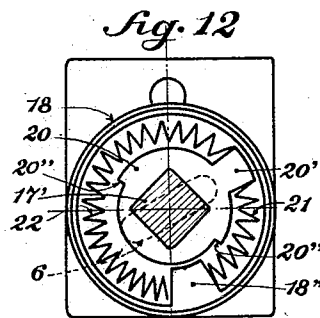
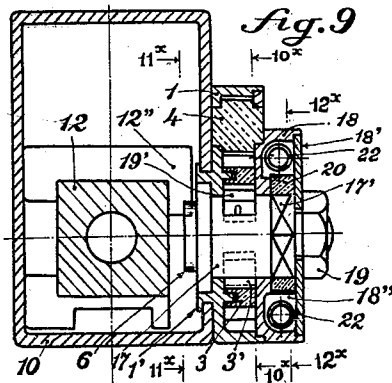
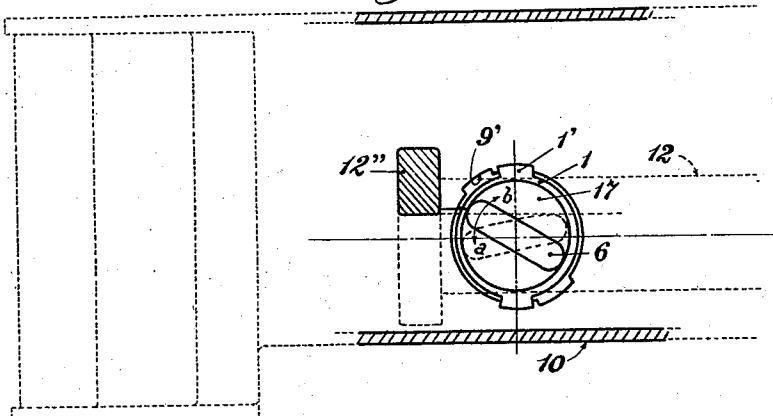


Fig. 10

Fig. 11



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UNITED STATES PATENT OFFICE

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DEVICE FOR REDUCING THE RATE OF FIRE OF AUTOMATIC FIREARMS

Application filed May 14, 1928, Serial No. 277,701, and in Italy May 20, 1927.

The subject of the present invention is a device for reducing the rate of fire in automatic firearm, of the type in which the reduction is obtained by means of an escapement mechanism comprising a toothed wheel adapted to be put into rotation intermittently by a recoiling part of the mechanism of the firearm, and an oscillating anchor adapted to be actuated by the said wheel and to determine, by inertia, a braking or retarding action upon the movement of the said recoiling part.

form of the rate of fire reducing device fitted upon an automatic firearm.

Figs. 10, 11, and 12 are vertical sections taken along the lines 10*-10*, 11*-11* and 12*-12* in Fig. 9, respectively.

According to the first embodiment (Figs. 1-4) the device for reducing the rate of fire comprises a parallelepiped shaped box 1 open at the top, in which are mounted the toothed escapement wheel 3 adapted to turn upon the pivot 2 and the corresponding anchor 4 oscillating upon the pivot 5.

The wheel 3, for the purposes hereinafter stated, is bare of teeth over two diametrically opposed arcs, 3*, of suitable length. This wheel is further provided with a diametral controlling cam 6 projecting from the box, in which latter is mounted so that it can slide longitudinally, a slide block 7 provided with a tappet 7' also projecting from the box.

The slide block 7, under the action of a spring 8 is compelled to press, by means of its inclined shoulder 7'' against the cam 6 which is thus normally maintained in an inclined position relative to the longitudinal axis of the box 1, as shown in Fig. 2.

The whole of the box 1 is removably mounted in place through a suitable aperture 9 in one of the walls of the frame of the automatic firearm, which may be of any type, in the interior of which frame the obturator 12 and the corresponding striker 13 slide longitudinally under the action of the recoil.

This assembly is preferably effected by means of a kind of bayonet joint formed by tongues 1' projecting laterally from the body of the box 1 and passing through the notches 9' in the aperture 9 in order to engage from the inside, by means of an axial displacement of the box, upon the corresponding wall of the frame 10.

Once in place, the box lies in the longitudinal direction of the firearm with the cam 6 and the tappet 7' projecting towards the inside of the frame 10 and over the path of the obturator 12 and the corresponding striker 13. The obturator 12 is provided with a stop shoulder 12' adapted to act upon

The device for reducing the rate of fire according to the present invention is characterized by the feature that the escapement wheel is provided with a diametral controlling cam disposed upon the path of a recoiling part of the mechanism of the firearm in such a way as to be struck eccentrically by the said recoiling part during its travel, for the purpose of producing a partial rotation always in the same direction, of the escapement wheel, means being provided for returning the said cam automatically into the working position for being struck after each actuation, while the whole of the rate of fire reducing device is removably mounted upon the firearm so that it can be removed if desired in order to cut out its operation.

Some embodiments of the subject of the invention are illustrated, simply by way of example, in the accompanying drawing, in which:

Fig. 1 shows an application of a first form of the rate of fire reducing device to an automatic firearm, shown in vertical longitudinal section.

Fig. 2 shows the rate of fire reducing device in plan.

Figs. 3 and 4, which are similar to the two preceding figures show the members in another working position.

Fig. 5 is a plan view of a modification of this first form of the rate of fire reducing device.

Figs. 6 and 7 show in elevation and plan respectively another modification of the said first form of the rate of fire reducing device.

Fig. 8 is a detail to a larger scale.

Fig. 9 is a vertical section through a second

the tappet 7' upon the return stroke under the action of the recoiling spring 14.

Similarly the striker 13 is provided with an impact tooth 13' adapted to act eccentrically upon the cam 6 when the striker, left free by the detent tooth, is projected into the firing position by its spring 15.

The operation is as follows:

In the position of recoil of the obturator and the striker (Fig. 1) the slide block 7, under the action of the spring 8, presses by means of its shoulder 7'' upon the cam 6 which is thus held in the position shown in Figs. 1 and 2. During the return stroke of the obturator 12 and consequent cocking of the striker 13 the shoulder 12' of the obturator strikes against the tappet 7' so that the slide block is moved forward and the cam 6 remains free (Figs. 3 and 4). When the obturator is locked in the firing position and the mechanism of the firearm produces the disengagement of the detent tooth of the striker 13, the latter advances under the action of the spring 14; but, before striking the cartridge, the striker strikes the cam 6 eccentrically by means of its tooth 13' and moves it from the inclined position shown in Fig. 2 into the axial position shown in Fig. 4, in which the cam 6 is retained as it presses against the tooth 13', of sufficient length of the striker.

The rotation imparted to the cam is transmitted to the escapement wheel 3 and the latter then imparts a rapid movement of oscillation to the anchor 4, which on account of its inertia, tends to prevent this, thus reducing the velocity of the striker and consequently retarding the moment when it reaches the firing position. In this way a reduction in the normal rate of firing of the firearm is obtained.

When the obturator again recoils, the slide block 7 is free to return into the position shown in Figs. 1 and 2 and, by means of its shoulder 7'', it acts upon the cam 6, the pressure exerted upon it by the tooth 13' has in the meantime been removed, and completes the rotation for half a turn as far as to bring it into the inclined position shown in Figs. 1 and 2.

This last part of the rotation of the cam is completed in a rapid manner as it is not restrained by the anchor 4, since, the teeth of the wheel 3, in the zones 3*, passing below the anchor during this stage of operation, have been removed.

The preliminary displacement of the slide block 7, effected by the obturator 12 by means of its impact shoulder 12', for the purpose of liberating the cam 6 is not essential. This displacement may be effected automatically by the same cam by suitably modifying the shape of the shoulder 7'' of the slide block, that is to say by reducing it in amplitude and terminating it in a connection 7''' as shown

in the modification illustrated in Fig. 5, against which the cam presses. When the impact against the cam takes place, in the point 7''' of support of the latter upon the slide block 7, there is then a sufficient axial component $-x-$ to produce the displacement of the slide block.

Neither is it essential for the impact tooth 13' of the striker to be of such amplitude as to maintain the cam aligned in the axial position as shown in Fig. 4, after the impact and the partial rotation.

This tooth 13' may have a limited amplitude as shown in Figs. 6 and 7, so as to pass beyond the cam after having actuated it. In such a case, however, it is necessary, in order to permit the successive recoil of the obturator and of the striker, for the cam to be adapted to yield elastically.

For this purpose the cam, as shown in Figs. 6, 7 and in detail in Fig. 8, is formed at the top with two sliding teeth 6', 6'' pushed upwards by elastic means 16 and each provided with a bevel 6''' with which engages the tooth 13' of the striker during the return stroke, producing the momentary lowering of the corresponding tooth 6' and then passing beyond it.

The device for reducing the rate of fire according to the second embodiment, shown in Figs. 9 to 12 instead of exerting its retaining action upon the striker, as in the form described above, exerts it on the contrary upon the obturator always during the return stroke.

In this case, the device for reducing the rate of fire is still composed of a box 1 in which is rotatably mounted the escapement wheel 3 engaging with the oscillating anchor 4. The cam 6 controlling the wheel 3 is rigid with a pin 17 passing axially through the wheel 3, rotatably mounted in suitable holes in the end of the box 1 and the end of the other superposed box 18 closed by the cover 18' secured in place by the nut 19 screwed upon the said pivot 17.

The said pin 17 is positively secured to the wheel 3 for one direction of rotation only, by means of a free wheel device, while it is free to rotate in the opposite direction. This free wheel device is formed, for example, by spring pawls 19' rigid with the pin 17 and in engagement with the internal toothed crown 3' of the wheel 3.

Upon the prismatic portion 17' of the pin 17, situated in the interior of the box 18, is keyed the disc 20 on the opposite sides of the radial tooth 20' of which disc bear the springs 21, 22 bearing at the other end upon the radial projection 18'' of the box 18 and serving for establishing by means of their opposing action, a determined position of rest for the radial tooth 20' and consequently for the pin 17 and the cam 6.

The whole of the device is removably

mounted from the side through a suitable aperture in one of the walls of the frame 10 of the firearm, preferably by means of a bayonet joint formed by tongues 1' on the box passing through the notches 9' of the aperture in the wall. Once the box 1 has been fitted in place, the cam 6, the position of rest of which is established by the opposed springs 21, 22, is arranged in an inclined position as shown in full lines in Fig. 11 and in dotted lines in Figs. 10 and 12, and on the path of an impact shoulder 12'' of the obturator 12.

The operation is as follows:

When the cam recoils, its impact shoulder 12 passes over the cam 6 and lowers it, making it turn in the direction of the arrow —a— in Fig. 11, against the action of the spring 21 which returns it immediately into the position shown in Fig. 11. During this rotation of the cam 6, the wheel 3 is not actuated, on account of the free wheel connection between the latter and the pin 17.

When the obturator completes its return stroke the shoulder 12' strikes the cam 6 and makes it turn in the direction of the arrow —b— (Fig. 11) as far as to bring it into the position shown in dotted lines in the same Fig. 11, against the action of the spring 22 which is compressed. During this rotation of the cam 6 the wheel 3 is actuated and the anchor 4, put into rapid rotation, exerts its retaining action upon the movement of the obturator, thus reducing the normal rate of fire of the firearm.

When the shoulder 12' leaves the cam 6 the latter returns into its normal position shown in Fig. 11, under the action of the spring 22 without actuating the wheel 3. Stop teeth 20'' adapted to press against the projection 18'' are provided upon the disc 20 in order to prevent excessive compression of the springs 21 and 22.

The device for reducing the rate of fire described above, whatever be its form of construction, is, as hereinbefore stated, removably mounted upon the frame of the firearm so that it can be removed when desired for the purpose of cutting out its operation and, as it does not interfere in any way with the mechanism of the firearm itself, the latter can then work at its normal rate of fire.

In the devices described above the recoiling part acts upon the device for reducing the rate of fire during its return stroke, but it is obvious, however, for the same purposes and with the same effects, the recoiling part may be made to act during its recoil stroke.

It is moreover, obvious that the present invention is in no way limited to the exact arrangements described and illustrated, but that without going outside its scope all modifications may be made which circumstances or the requirements in practice may cause to be considered necessary or advantageous.

I claim:

1. A device for reducing the rate of fire of automatic firearm of the type in which the reduction in rate is obtained by means of an anchor escapement mechanism, characterized by the feature that the escapement wheel is provided with a diametral control cam arranged upon the travel of the recoiling part of the mechanism of the firearm in order to be struck eccentrically by the said recoiling part during its travel, for the purpose of producing a partial rotation always in the same direction of the said escapement wheel, means being provided for returning the said cam automatically into the working position for being struck after each actuation, while the whole of the rate of fire reducing device is removably mounted upon the firearm so that it can be removed in order to exclude its operation.

2. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, characterized by the feature that the control cam is rigid with the escapement wheel situated, together with the anchor, in a box adapted to be removably mounted upon the frame of the firearm, while a slide block, slidably mounted in the said box, is provided with an inclined shoulder by means of which it is driven under the action of elastic means against the said cam for the purpose of fixing it in an inclined position relatively to the travel of the part of the mechanism of the firearm which has to actuate it.

3. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, characterized by the feature that the control cam of the escapement wheel is adapted to be struck by striking means, rigid with the striker, during the return stroke of the latter.

4. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, characterized by the feature that the slide block serving for fixing the position of the cam is displaced by sliding from its working position, under the action of an impact shoulder on the obturator acting upon the slider before the cam has been actuated by the striker.

5. A device for reducing the rate of fire of automatic firearm as claimed in claim 1 characterized by the feature that the shoulder with which the block or slider presses against the cam is so shaped that the cam itself, when it operates, produces automatically the displacement of the slider from its effective position.

6. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, characterized by the feature that the abutment tooth of the striker, after the actuation, holds the cam aligned in the direction of the travel of the striker itself.

7. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, char-

acterized by the feature that the control cam is adapted to yield elastically in order to permit the passage of the abutment tooth of the striker above the cam itself during the movement of recoil of the said striker.

5 8. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, characterized by the feature that the escapement wheel is bare of teeth over determined zones
10 of suitable amplitude, for the purpose of cutting out the operation of the retaining anchor during the movement of return of the block.

9. A device for reducing the rate of fire of automatic firearm as claimed in claim 1, characterized by the feature that the control cam
15 is adapted to be struck by an abutment shoulder on the obturator and is rigid with a pivot which is made rigid, in one direction of rotation only, with the escapement wheel, by means of a free wheel mechanism while the
20 securing of the cam in the working position for being struck and the return to this position after it has been displaced, are secured by the action of two springs acting in opposition
25 on the two sides of a radial tooth rigid with the said pivot, the whole of the device being lodged in a box adapted to be removably mounted on the frame of the firearm.

10. A device for reducing the rate of fire of automatic firearms having a frame, an obturator and a striker; comprising a box, an escapement wheel in the box, an anchor for the wheel and pivoted in the box, a cam rigid with the wheel and projecting into the path of the
30 striker, spring-actuated slide means projecting into the path of the obturator for restoring the position of said cam and wheel, and operated by the obturator to release said cam and wheel for actuation by the striker.

40 11. A device for reducing the rate of fire of automatic firearms having a frame, an obturator and a striker; comprising a box, an escapement wheel in the box, an anchor for the wheel and pivoted in the box, a cam rigid
5 with the wheel and projecting into the path of the striker, and spring-actuated slide means projecting into the path of the obturator for restoring the position of said cam and wheel, and operated by the obturator to re-
10 lease said cam and wheel for actuation by the striker, said wheel being free of teeth at diametric zones thereof for rapid restoration of the wheel and its attached cam to initial position.

55 In testimony that I claim the foregoing as my invention, I have signed my name.

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