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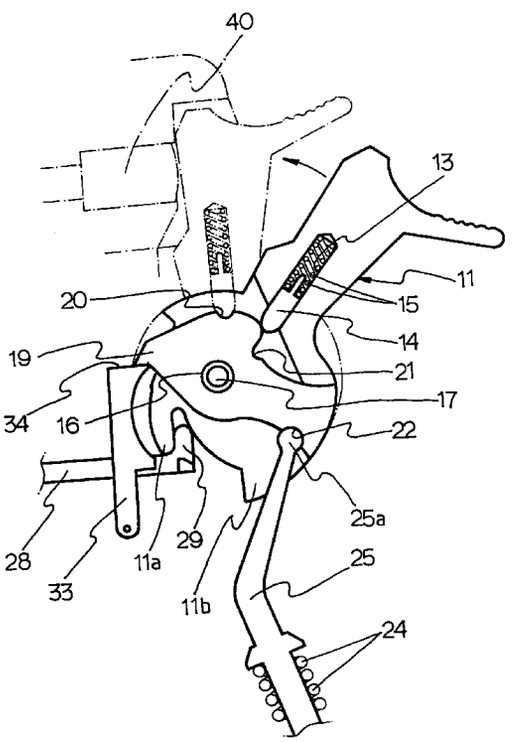
(54) Firing mechanism with hammer lowering lever for fast shooting pistols

(57) A firing mechanism with a hammer lowering lever for fast shooting pistols is disclosed. The mechanism has a hammer, a plunger received in the recess of the hammer, a hammer cam installed in the actuation slot of the hammer, a sear elastically supported by a spring in the front of the hammer cam, and a hammer push rod installed elastically under the hammer cam. The hammer lowering lever rapidly moves the hammer forward while carrying the pistol. The hammer lowering lever has a guide hole for receiving a pin to guide the movement of the lever. A thumb-operable portion is formed on the front end portion of the lever. A bent stop is formed on the rear end portion of the lever. The bent stop comes into contact with the second engaging step of the hammer when the hammer is fully withdrawn.

FIG. 4



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a firing mechanism for fast shooting pistols and, more particularly, to a structural improvement in such a pistol firing mechanism for improving the hitting probability of an initial bullet and for rapidly advancing the hammer and thereby causing the pistol to be convenient to the user.

Description of the Prior Art

The firing mechanisms for automatic pistols, that are developed by and are being used in many different countries, are largely classified into two types, that is, single-acting and double-acting mechanisms.

The single-acting mechanism fires a bullet through two steps, i.e., a step of pulling back the hammer manually and a step of pulling the trigger to effect a shooting.

To describe it in more detail, if the hammer is pulled back by hand, a trigger connecting rod, which is interlocked with the hammer by being connected to the lower end of the hammer, is also pulled simultaneously.

In this case, an engaging piece engages with the engaging step of the hammer, thereby bringing the mechanism into a loaded state.

Under this loaded state, if the trigger is pulled, the trigger connecting rod pulls the engaging piece, so that the engaged state between the hammer and the engaging piece is released.

The hammer in the above state is rotated by the restoring force of a hammer spring, with the result that the hammer strikes the firing pin, thereby causing a bullet fired.

However, in the double-acting mechanism, a single step operation effects the loading and firing.

That is, if the trigger is pulled, the hammer which is connected to the trigger connecting rod is withdrawn.

If the trigger in the above state is pulled further, the engaging piece is pulled by the engaging step of the trigger connecting rod, thus releasing the trigger connecting rod from the engagement with the engaging step of the hammer and thereby firing the bullet.

The user of the pistol may carry the pistol with a bullet loaded in the firing room and may suddenly fire the bullet when an emergency situation is encountered. Under such a circumstance, in the case of the single-acting mechanism, e.g., in the case of the 45-dia pistol M1911A1 of the Colt company of the United States, if a shooting is to be effected, the pistol should be carried with a user in a state with the hammer withdrawn, of the pulling-back of the hammer should be precedingly carried out, before pulling the trigger.

However, if the pistol is to be carried with a user in the state with the hammer withdrawn, its handling is extremely inconvenient, and an ambidextrous safety device has to be provided for preventing an accidental firing.

On the other hand, if the withdrawing of the hammer is to be carried out separately, an inconvenience is accompanied, and the pistol becomes unfit for an emergency shooting.

Particularly, after continued shooting, if any further firing becomes impossible due to such as the incapacitation of the detonator striking function, then the firing can be carried out only by manually pulling back the hammer as in the case of the double-acting mechanism.

In an improved double-acting mechanism in which an attempt is made to overcome the above-described disadvantages, the withdrawing of the hammer and the firing of a bullet are performed almost simultaneously only by pulling the trigger, with the advantages that any problem can be speedily remedied during the initial shooting or during an incapacitation of the striking function of the hammer.

However, this has the disadvantage that too much force is required to pull the trigger, thereby deteriorating the hitting probability.

SUMMARY OF THE INVENTION

The present invention is intended to overcome the above-described disadvantages of the conventional mechanisms.

Therefore it is the object of the present invention to provide a firing mechanism with a hammer lowering lever for fast shooting pistols, in which a plunger is elastically supported by a spring within a hammer, the rounded and portion of the plunger is let to advance and withdraw in contact with the outer upper surface of a cam revolving within the hammer, so that the trigger can be pulled with a slight force during the initial shooting, thereby improving the hitting probability of an initial bullet. In the above firing mechanism, the hammer can be kept in an advanced state after loading a bullet in the cartridge, so that the pistol is convenient to be carried with a user and is convenient in an emergency shooting.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a sectional view of a pistol with the firing mechanism according to a preferred embodiment of the present invention;

Fig. 2 is an exploded perspective view showing the construction of the firing mechanism of this invention;

Fig. 3 is a perspective view showing the assembled firing mechanism of this invention;

Fig. 4 shows the bullet loading motion of the hammer of the above firing mechanism for loading an initial bullet in the cartridge;

Fig. 5 shows a normal state of the above firing mechanism with no bullet loaded in the cartridge;

Figs. 6A and 6B show the operation of the above firing mechanism in the case of fast shooting, in which:

Fig. 6A shows the firing mechanism in a locked state where the hammer retracts and advances by a hammer lowering lever, thereby locking the hammer with a hammer cam to a sear while carrying the pistol;

Fig. 6B shows the firing mechanism in a firing state where the sear advances at the shooting moment, thus rotating the hammer to strike the firing pin; and

Fig. 7 is a perspective view showing the configuration of the hammer of the above firing mechanism; and

Fig. 8 illustrates the advancing angle of a plunger of the above firing mechanism, the plunger advancing while contacting with the outer upper surface of the hammer cam.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Figs. 1 to 3, the pistol firing mechanism according to a preferred embodiment of the present invention includes first and second engaging step 11a and 11b formed in the lower portion of a hammer 11. A recess 13 is formed in the interior of the hammer 11. An actuation slot 12 is formed in the lower front portion of the hammer 11. The hammer 11 also includes an engaging end 11c formed in the second engaging step 11b.

Within the above recess 13, a plunger 14 is elastically installed. The plunger 14 is biased by a spring 15. The above plunger 14 has a rounded end portion.

The hammer 11 is mounted to the pistol body P by a bushing 16 and shaft 17. A hammer cam 18 is installed inside the actuation slot 12.

The hammer cam 18, that is cast into a single body, is provided with an engaging step 19 on its front portion, and is also provided with a front plunger recess 20 on its front upper portion. The above front plunger recess 20 has a gently-curved surface. The hammer cam 18 is further provided with a rear plunger recess 21 on its rear upper portion. A securing hole 22 is formed on the lower right portion of the hammer cam 18. The hammer cam 18 also includes a sectoral tab 23 on its rear portion.

The above hammer cam 18 is mounted to the hammer 11 inside the actuation slot 12 by the shaft 17.

The hammer cam 18 advances or retracts in accordance with either a pivot motion of the hammer 11 between the front plunger recess 20 and the rear plunger recess 21 or a rotating motion of the hammer cam 18.

A hammer push rod 25, that is elastically supported by a spring 24, is installed within a handle H of the pistol body P. A rounded end portion 25a of the hammer push rod 25 is movably seated in the securing hole 22 of the cam 18. The securing hole 22 is formed on the lower right portion of the cam 18 as described above.

Further, a trigger connecting rod 28 is connected to a trigger 27. One end of the above connecting rod 28 is installed within the pistol body P by a shaft 17a and spring 26. The other end of the above connecting rod 28 is provided with an engaging protuberance 29 and engaging piece 30.

Therefore, the other end of the trigger connecting rod 28 engages with the first engaging step 11a that is formed on the front lower portion of the hammer 11. If the trigger connecting rod 28 moves forward by pulling the trigger 27, the engaging piece 30 of the rod 28 moves forward while slipping over the engaging step 11a, thus pushing the hammer 11 upward.

An elastic sear 33 is installed within pistol body P by a pin 32 and elastically supported by a spring 31.

The above elastic sear 33 is provided with an engaging flat portion 34 on its top portion. A gentle arcuate portion 35 is formed on an outer portion of the sear 33.

In a normal state where any bullet is not loaded in the cartridge, the sear 33 is biased by the spring 31 such that the arcuate Portion 35 of the sear 33 is brought into contact with the engaging step 19 of the hammer cam 18 as shown in Fig. 5. When the hammer 11 is withdrawn to load the bullet in the cartridge, the cam 18 rotates about the shaft 17 to be separated from the arcuate portion 35 of the sear 33. The sear 33 in the above state is elastically rotated rearward about the pin 32 by the spring force of the spring 31, thus being maintained in its vertical position. The hammer cam 18 in the above state rotates by the spring 24 of the hammer push rod 25, thus bringing its engaging piece 19 into engagement with the flat portion 34 of the sear 33 and thereby initially loading the bullet in the cartridge.

In the above bullet loading state or the state with the hammer 11 fully withdrawn, the hammer 11 has to advance for being convenient while being carried with a user and for fast shooting. In order to advance the hammer in the above state, the firing mechanism of this invention includes a hammer lowering lever 36.

The above hammer lowering lever 36 is provided with a longitudinal guide hole 36a on its central portion, The lever 36 is mounted in the pistol body P by a pin 37. The pin 37 is fixed to the body P and received in the hole 36a, thus guide the movement of the lever 36. The above lever 36 is biased by a spring 38 forward. One end of the spring 38 is fixed to the lever 36 at a portion before the hole 36a, while the other end of the spring 38 is fitted over the pin 37.

The front end portion of the above lever 36 is provided with a knurled thumb-operable portion 36b which

is exposed outside the pistol body P when the firing mechanism is installed in the body P. The rear end portion of the lever 36 is provided with a bent stop 36c. The above bent stop 36c comes into contact with the engaging step 11b of the hammer 11 when the hammer is fully withdrawn.

The operational effect of the above firing mechanism in the case of loading and firing an initial bullet will be described with reference to Figs. 4 and 5.

When the hammer 11 is turned about the shaft 17 to be withdrawn and to load an initial bullet in the cartridge as shown in Fig. 4, the hammer cam 18 rotates at the same time. The hammer 18 in the above state retracts the hammer push rod 15, that has been secured in the securing hole 22 of the cam 18, while compressing the compression spring 24. The elastic sear 23 in the above state rotates about the pin 32 while being biased by the spring 31.

When the hammer 11 in the above state is fully withdrawn, the engaging step 19 of the hammer cam 18 engages with the engaging flat portion 34 of the sear 33. The sear 33 in the above state is fixed in its upright posture, while the compression spring 34 is compressed by the hammer push rod 25.

When the trigger 27 in the above state is pulled as shown in Fig. 5, the trigger connecting rod 28 advances. In addition, the engaging piece 30 which is secured to the end of the trigger connecting rod 28 is slipped out from the engaging step 11a of the hammer 11, thus rotating the elastic sear 33 forward.

The engaging step 19 of the hammer cam 18 in the above state is released from the engagement with the elastic sear 33, while the hammer push rod 25 is pushed upward by the restoring force of the compression spring 24.

The hammer push rod 25 in the above state pushes upward the sectoral tab 23 of the hammer cam 18 which is secured to the rounded end portion 25a. The sectoral tab 23 thus pushes the engaging end 11c formed on the lower rear portion of the hammer 11. The hammer 11 rotates about the shaft 17 forward to strike the firing pin 40, thereby firing a bullet.

Hereinbelow, an emergency shooting with the pistol in a loaded state will be described referring to Figs. 6A and 6B.

The loading of a bullet in the cartridge may be carried out as illustrated in Fig. 4. The pistol after the loading may be carried with a user in a state with the hammer pushed forward.

In the firing mechanism of this invention, the hammer 11 can advance by handling the hammer lowering lever 36. That is, when the knurled thumb-operable portion 36b of the lever 36 is pushed backward by a thumb while gripping the handle H of the pistol body P, the bent stop 36c of the lever 36 pushes the second engaging step 11b of the hammer 11, thus moving the hammer 11 forward. The pistol is thus brought into the loaded state.

If an emergency situation is encountered, and thus if a shooting is to be performed suddenly, such an emergency shooting may be performed based on the illustration of Fig. 5.

That is, if the trigger 27 is pulled in the state with the hammer 11 moved forward, the trigger connecting rod 28 moves forward, and at the same time, the engaging piece 30 pushes the first engaging step 11a of the hammer 11. The hammer 11 thus rotates rearward.

The engaging piece 30 in the above state further moves toward the elastically sear 33, thereby rotating the sear 33 forward. Therefore, the engaging step 19 of the hammer cam 18 is released from the flat portion 34 of the elastic sear 33. The hammer push rod 25 in the above state is lifted up by the restoring force of the compression spring 24, thus lifting the sectoral tap 23 of the cam 18.

In turn, the sectoral tab 23 of the hammer cam 18 pushes the engaging end 11c of the hammer 11, so that the hammer 11 ultimately strikes the firing pin 40, thereby firing a bullet 41.

Meanwhile, during the above loading or firing process, the plunger 14 moves between the rear plunger recess 21 and the front plunger recess 20 of the hammer cam 18. The plunger 14 in the above state presses down the hammer cam 18 due to the restoring force of the spring 15.

The above hammer cam is shown in Fig. 7. As shown in Fig. 8, the angular interval of the operation of the plunger 14 is about 60°.

According to the above firing mechanism, when the pistol with a cartridge loaded with a bullet is to be carried with a user, the hammer 11 is pulled back prior to being restored. Therefore, the pistol is convenient to the user while being carried with the user.

Further, when the plunger 14 moves along the circumferential surface of the hammer cam 18, it presses the above surface by the elastic force of the spring 5. Therefore, the pressure of the trigger 27 is reduced, thereby improving the hitting probability.

The firing mechanism of the present invention can be applied not only on a pistol, but also to a revolver, and rather, the scope of the application of the present invention should not be restricted in any way. Therefore, the application of the present invention not only on a pistol and revolver but also on other guns should come within the scope of the present invention.

Claims

1. A firing mechanism for a fast shooting pistol, comprising:

   a rotatable hammer mounted to a pistol body by a shaft, said hammer having first and second engaging steps on its lower front and rear portions respectively, an actuation slot formed therein, a recess extending upward from said slot, and an engaging end formed in said second engaging step;

   a plunger received within said recess and

biased downward by a spring;

a hammer cam mounted within said actuation slot by a shaft, said hammer cam being compressed by said plunger on its circumferential surface;

a sear elastically supported by a spring in the front of said hammer cam; and

a hammer push rod placed under said hammer cam and biased toward said hammer cam by a spring.

2. The firing mechanism as claimed in claim 1, wherein said hammer cam includes: an engaging step formed on a front portion of the cam; a gently-curved front plunger recess formed on the upper front portion of the cam; a rear plunger recess formed on the upper rear portion of the cam; a securing hole formed on the lower right portion of said cam and adapted for receiving a rounded end portion of said hammer push rod; and a sectoral tab formed on the rear portion of said cam.

3. The firing mechanism as claimed in claim 2, wherein said plunger is urged upward within an actuating angular range and lies between said front and rear plunger recesses of the hammer cam.

4. The firing mechanism as claimed in claim 3, wherein the actuating angular range of said plunger is about 60° between said front and rear plunger recesses of the hammer cam.

5. The firing mechanism as claimed in claim 2, wherein said sear is rotatably mounted to a pin and provided with an arcuate support formed on a side thereof, and a flat portion formed on an upper portion thereof to engage with said engaging step of the hammer cam.

6. The firing mechanism as claimed in claim 1, further comprising a hammer lowering lever for rapidly moving said hammer forward while said pistol is carried with a user.

7. The firing mechanism as claimed in claim 6, wherein said hammer lowering lever includes: a longitudinal guide hole formed on a central portion thereof, said guide hole receiving a pin to guide the movement of said lowering lever; a spring biasing said lever forward; a thumb-operable portion formed on a front end portion thereof; and a bent stop formed on a rear end portion thereof, said bent stop coming into contact with said second engaging step of the hammer when the hammer is fully withdrawn.

FIG. 1

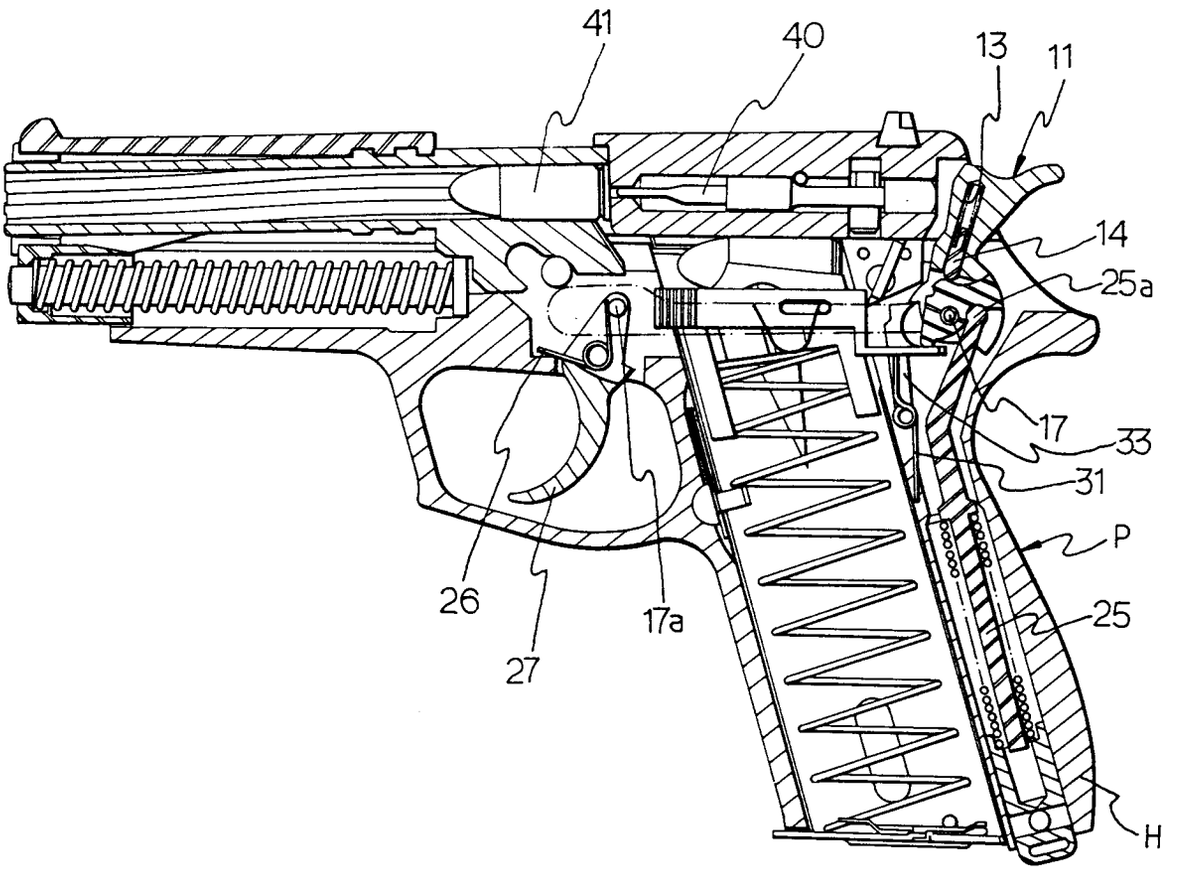
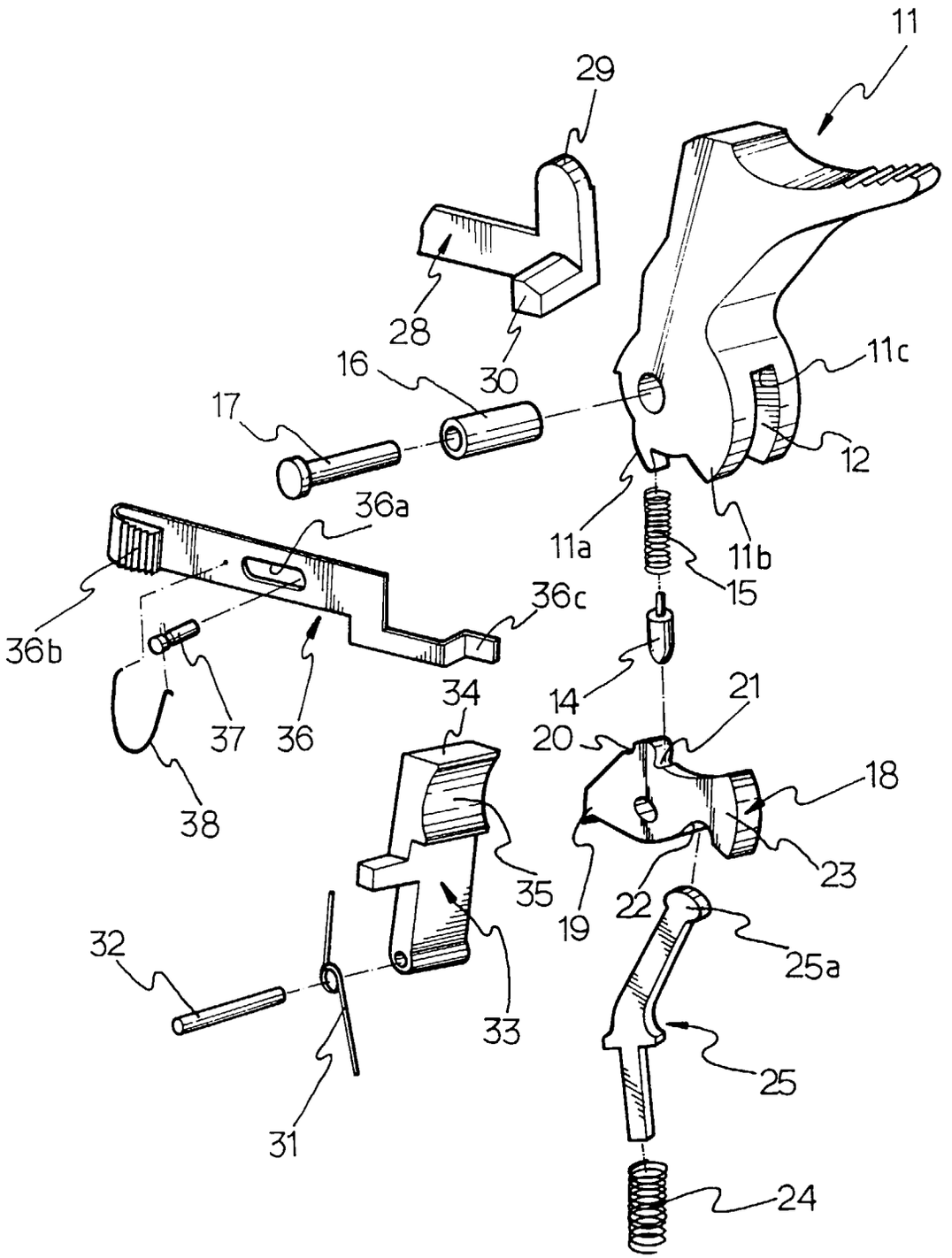


FIG. 2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17
11c
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11b
15
36b
36c
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FIG. 3

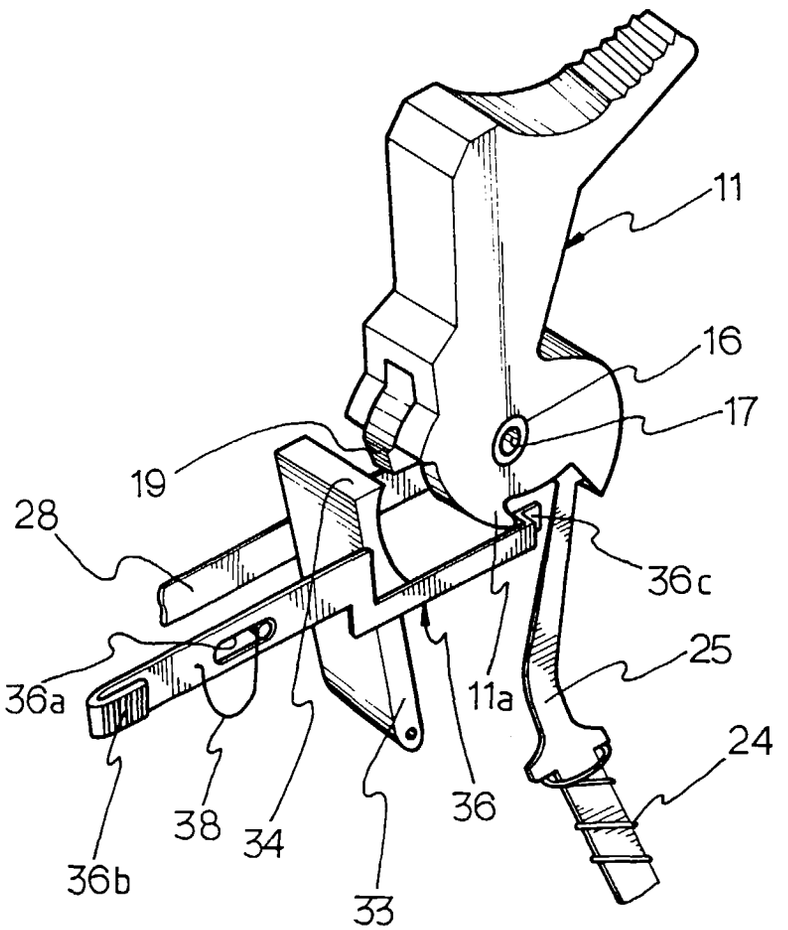


FIG. 4

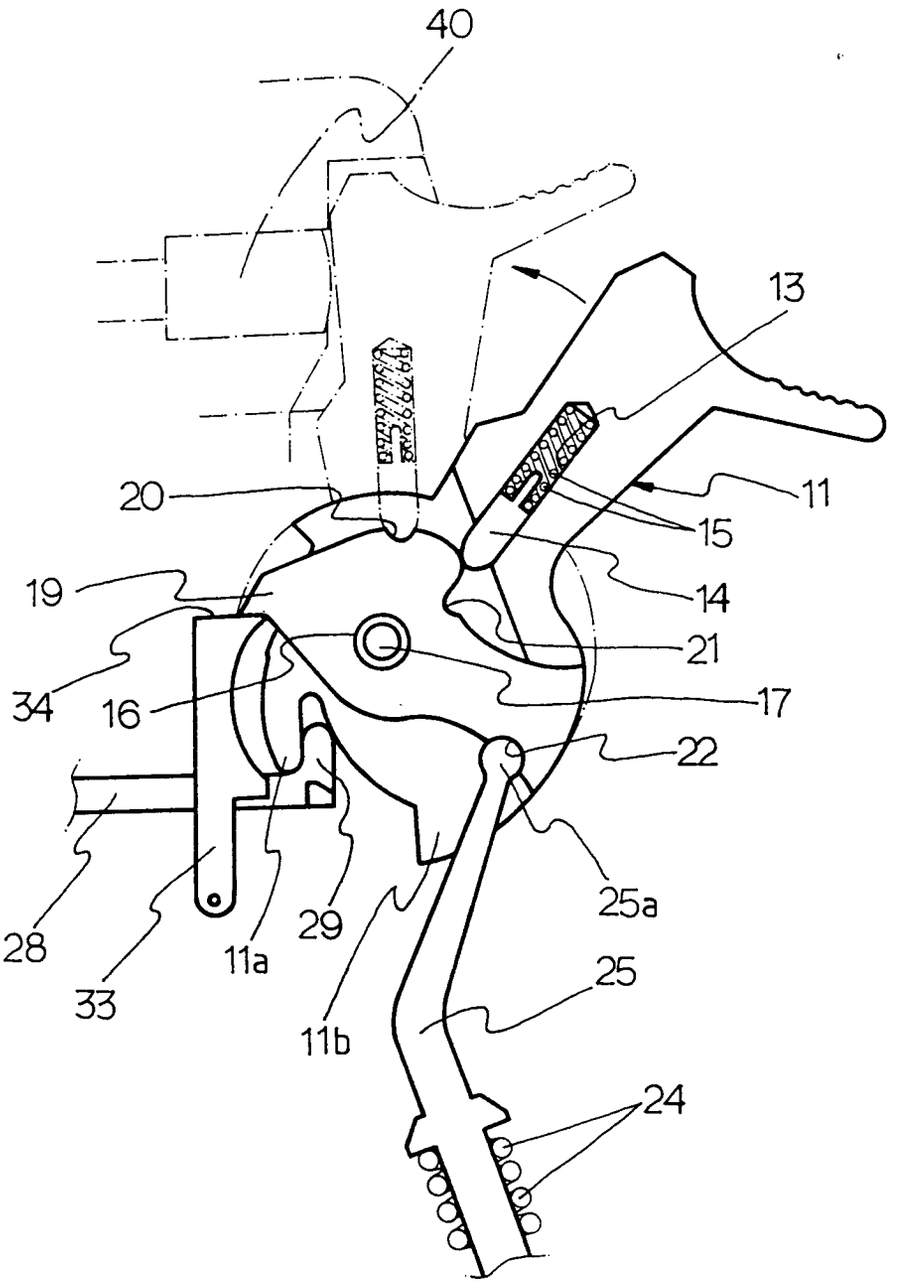


FIG. 5

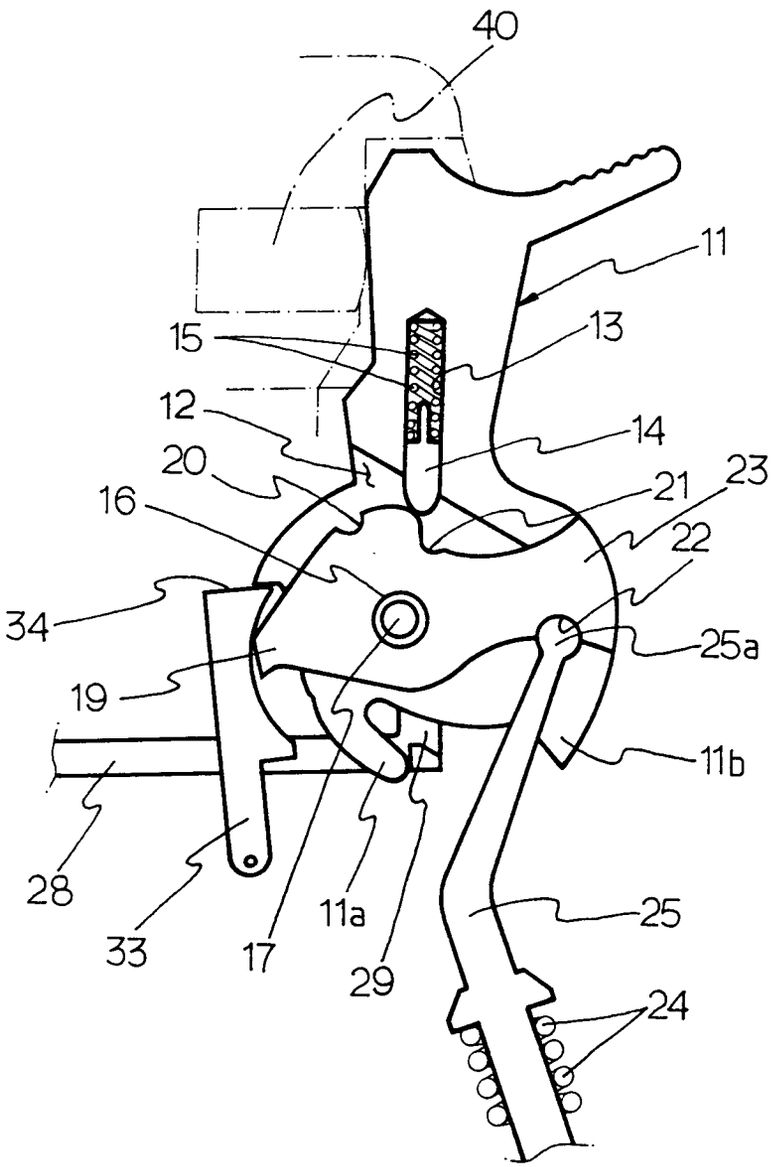
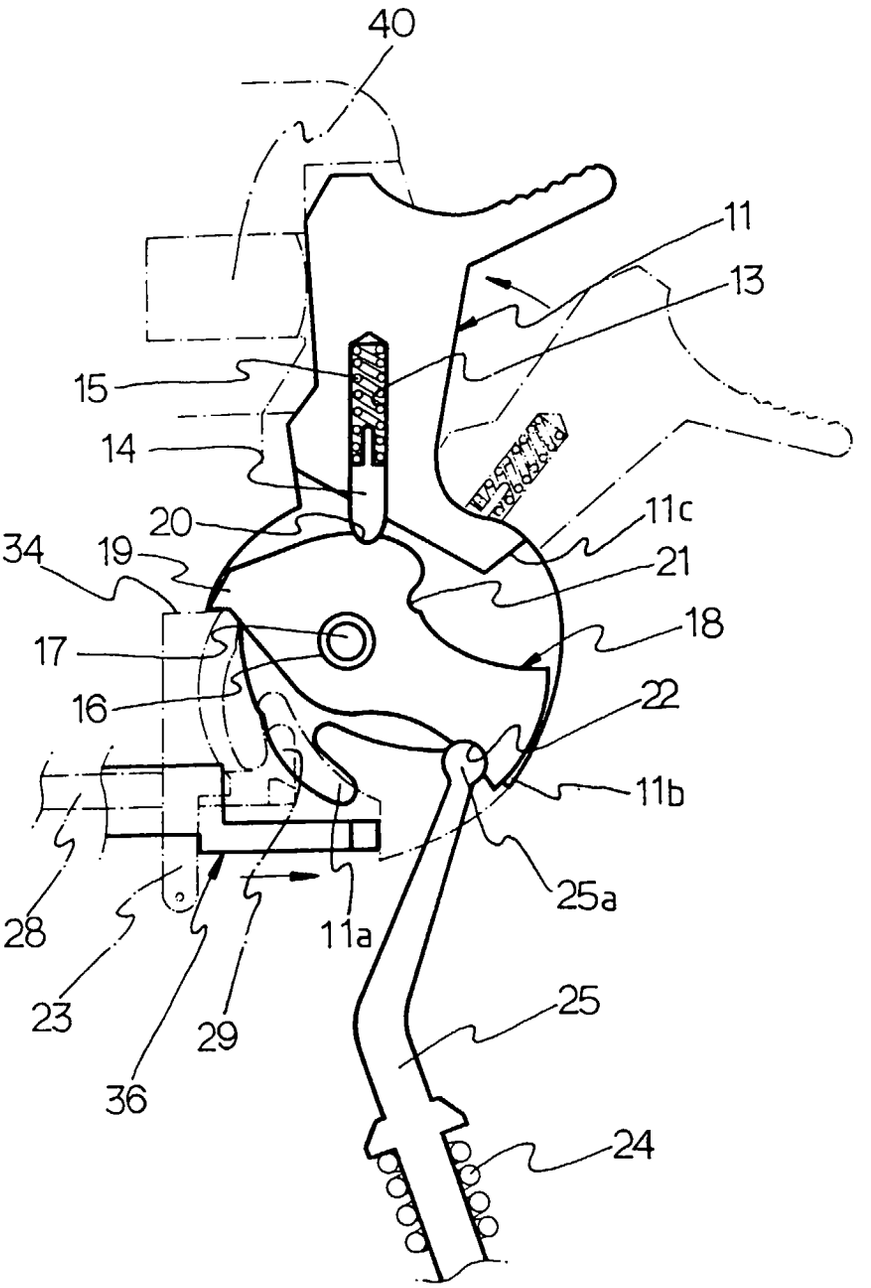


FIG. 6A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11a
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FIG. 6B

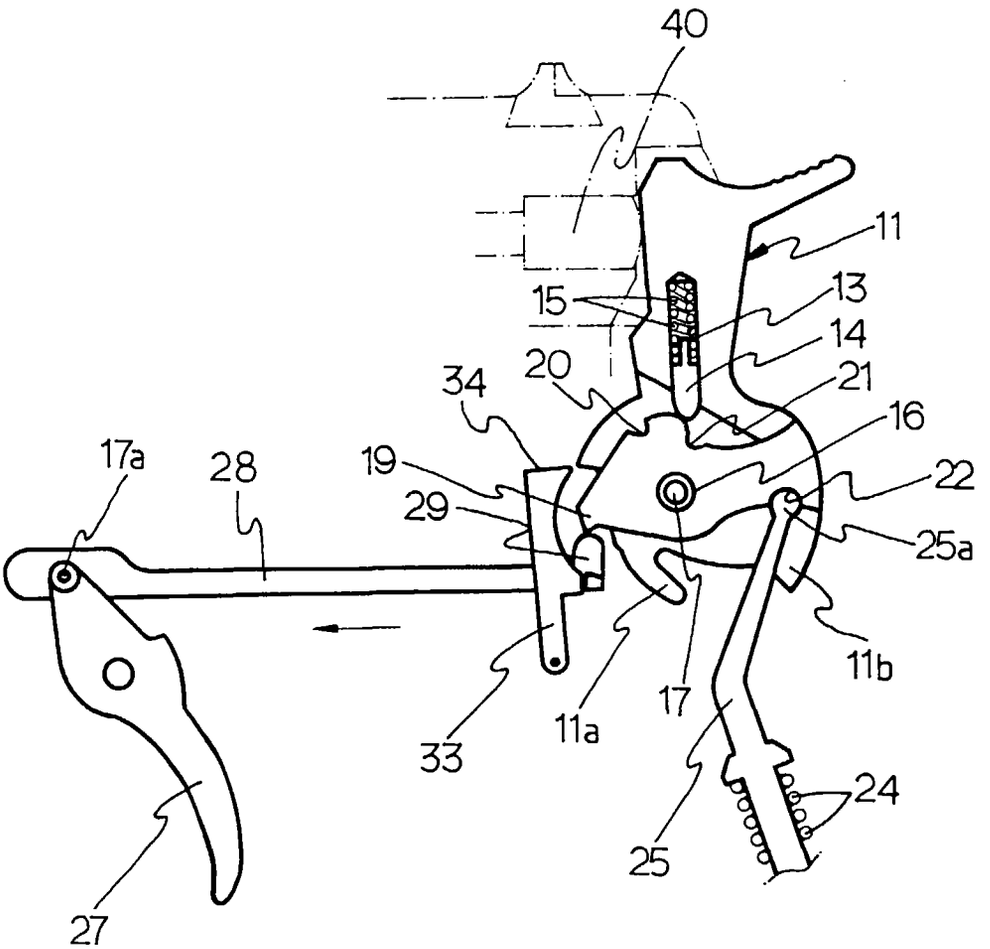

FIG. 7

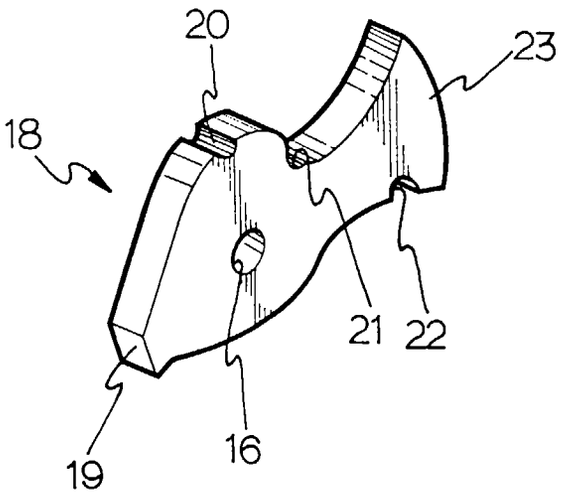

FIG. 8