Jan. 28, 1958 O. SCHWAGER ET AL 2,821,116

COCKING DEVICE FOR AUTOMATIC FIREARMS

Filed Dec. 17, 1952

Fig.1

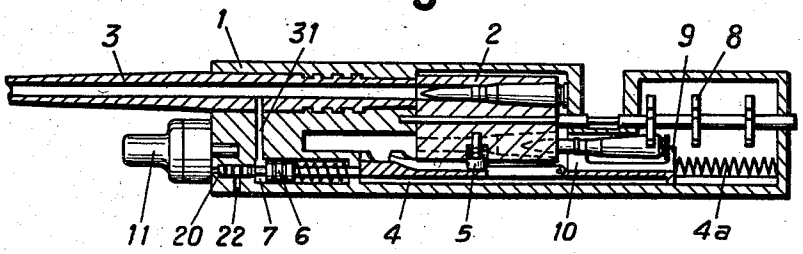


Fig.2

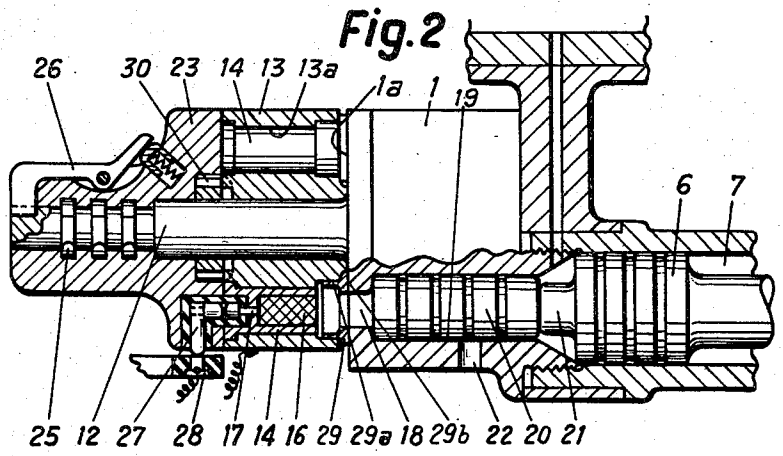


Fig.3

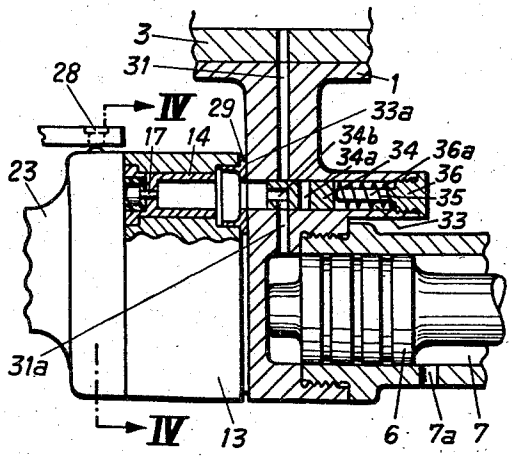
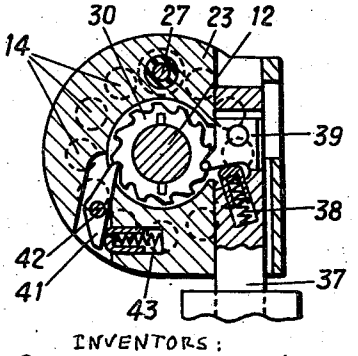


Fig.4



INVENTORS:
O. Schwager and F. Herlach
BY
Richards & Geier
ATTORNEYS

United States Patent Office 2,821,116
Patented Jan. 28, 1958

2,821,116

COCKING DEVICE FOR AUTOMATIC FIREARMS

Oskar Schwager and Fritz Herlach, Zurich, Switzerland, assignors to Machine Tool Works Oerlikon, Administration Company, Zurich-Oerlikon, Switzerland, a company of Switzerland

Application December 17, 1952, Serial No. 326,398

3 Claims. (Cl. 89—1)

The present invention relates to a cocking device for automatic firearms of the kind having a breech block actuated by a gas-operated piston. One of the objects of the present invention is the provision of a device of the described type wherein at least one propelling charge is provided which communicates with the piston in such a manner that the gases produced on firing the propelling charge actuate the piston.

One constructional form of the invention is described hereinafter wherein the propelling charge is directly connected with the gas-operated piston by a passage.

A modified construction is also described hereinafter wherein the propelling charge communicates through a passage in the gun casing with the cylinder of an auxiliary piston disposed in front of the gas-operated piston.

The accompanying drawing shows, by way of example, two embodiments of the present invention. In the drawing:

Figure 1 is a diagrammatic longitudinal sectional view of an automatic firearm with the cocking device constructed in accordance with the present invention;

Figure 2 is a longitudinal sectional view of one constructional embodiment of the cocking device;

Figure 3 is a longitudinal sectional view of a modified cocking device, and

Figure 4 is a cross-sectional view of the cocking device on the line I—I in Figure 3.

Referring first to Figures 1 and 2:

The automatic gun shown diagrammatically in Figure 1, is based on the cartridge-carrying revolver principle. The gun comprises a casing **1** in which a revolver cylinder for cartridges **2** is rotatably arranged on a shaft which is parallel to the axis of the gun barrel **3**. The cylinder **2** is formed with a number of cartridge chambers which, on the rotation of the cylinder, are successively aligned with the barrel **3**, so that a cartridge in the chamber aligned with the barrel is fired. The cylinder **2** is rotated by a longitudinally movable spring loaded slide **4** which acts on rollers **5** on the cylinder **2** by means of curved cam surfaces. The spring loaded slide **4** is actuated by a gas-operated piston **6** slidable in a gas-receiving cylinder **7**, see Figure 2. Arranged coaxially with the cylinder **2** there is a cartridge feed sprocket **8** which is operatively coupled to the cylinder **2**. The cartridges are moved from the sprocket into the cartridge chambers in the cylinder **2** in two stages by means of projections **9, 10** on the slide **4**.

In order to cock the gun, the slide **4** has to be pushed to the rear and this is done by means of a cocking device **11**, Figure 1, arranged at the front end of the gun casing.

In the constructional embodiment of the cocking device which is shown in detail in Figure 2, an annular casing **13** is rotatably arranged on a cylindrical stub shaft **12** on the casing **1**. The casing **13** is formed with a number of bores **13***a* adapted for propelling charge cartridges **14** and the bores **13***a* are disposed on a circle and are parallel to the axis of the annular casing **13**. Each

cartridge **14** contains a propelling charge **16** (Figure 2) and an electric firing device **17** (which is not shown in detail). On the rotation of the casing **13** the cartridges **14** are successively aligned with a bore **18** in the front wall of the casing **1**, and which leads to a cylindrical space **19** in whcih a cocking piston **20** is movably arranged. The piston **20** abuts against a projection **21** on the gas piston **6**. A venting hole **22** communicating with the atmosphere is formed in the wall of the cylindrical space **19**.

The charge casing **13** bears against a cap **23**, which is removably attached to the stub shaft **12** and is secured against rotation by a spring loaded lever **26** engaging in a groove in the stub shaft. The cap **23** is provided with an insulated firing current conductor **27** which leads the firing current from a contact member **28** on the gun to the electric firing device **17** in the cartridge **14** aligned with the bore **18**.

Each of the bores **13***a* in which the cartridges **14** are arranged, contains a sealing ring **29**, which is disposed in an enlarged portion of the bore and abuts against the wall **1***a* of the casing **1**. The portion of the sealing ring **29** which is opposite to the propelling charge has a thin wall **29***a* which is pressed against the wall of the enlarged bore by the pressure of the propelling gases to form a seal. Towards the opposite end of the ring the thin wall becomes thicker and forms a shoulder **29***b*. The gas pressure acting against the shoulder **29***b* presses the sealing ring forcibly against the wall **1***a* of the casing **1** during the burning of the propelling charge so that a gas-tight seal is formed.

Th casing **13** may be fitted with driving mechanism acting upon a spur wheel **30** in the casing and mechanism of this kind is described below with reference to a modified embodiment of the invention.

The operation of the cocking device is as follows:

In order to cock the gun the charge casing **13** is rotated until a cartridge **14** is aligned with the passage **18**. A firing current is then passed through the contact piece **28** and the firing current conductor **27** to the firing device of the cartridge **14** and the propelling charge **16** is fired. The gases produced by the burning charge leave the cartridge **14** under high pressure and act on the sealing ring **29** which is pressed against the wall **1***a* of the casing by the pressure acting on the shoulder **29***b*, while at the same time the thin wall **29***a* of the sealing ring is pressed against the wall of the enlarged portion of the bore, so that the gap between the charge casing and the wall **1***a* is completely sealed.

The propelling gases then flow through the passage **18** into the space **19** and force the cocking piston **20** to the rear. The piston acts upon a projection **21** on the gas-operated piston **6** and thus pushes the slide **4** to its rear position. Eventually, the cooking piston passes the venting hole **22** and the propelling gases can escape to the atmosphere, which causes a quick drop of the pressure on the cocking piston. The slide **4** is then moved back to its initial position by its springs **4***a* and forces the gas piston **6** and the cocking piston **20** back to their original position. By this reciprocating movement of the slide **4** the cartridge-containing revolver cylinder is rotated through one pitch.

Since several cocking movements are necessary to get the gun ready for firing if the cartridge drum **2** is empty at the beginning, the charge casing **13** is rotated and the next cartridge is fired. This action is repeated until a cartridge is aligned with the barrel of the gun and the gun is ready to fire.

In order to replace the cocking cartridges the lever **26** is actuated, whereupon the cap **23** may be rotated and withdrawn from a bayonet-type catch **25**. The empty

cases 14 can then be removed and replaced by new cartridges.

In the construction shown in Figures 3 and 4 the propelling gases act directly on the gas-operated piston of the gun instead of through a cocking piston. For this purpose a gas passage 31 leading from the bore of the barrel 3 to the gas cylinder 7 must be closed during the cocking operation since otherwise part of the propelling gases would escape to the barrel bore. In a bore 33 in the casing 1 running transversally to the gas passage 31 a slide 34 is movably arranged and is subjected to the action of a spring 35. The spring 35 bears against a screw 36, a projection 36*a* on which limits the travel of the slide in one direction. In the other direction the travel of the slide is limited by a shoulder 33*a* on the ring 29. The slide comprises a passage 34*a* and if the slide is in its normal position, i. e. if it is pressed against the shoulder 33*a* by the action of the spring 35, the passage 34*a* is aligned with the gas passage 31. An angled passage 34*b* leads from the front wall of the slide 34 facing the propelling charge to the side of the slide which faces the gas-operated piston 6. The passage 34*b* is arranged in such a manner, that when the slide 34 is in the closing position, i. e. when it rests against the projection 36*a* on the screw 36, the passage leads into the lower portion 31*a* of the gas passage leading to the gas piston 6, whereby the upper portion of the gas passage 31 leading to the barrel bore is closed. A port 7*a* in the gas cylinder 7 serves to vent the propelling gases to the atmosphere after the gas piston has been accelerated through a certain distance. Otherwise, the construction of the cocking device is similar to that described above with reference to Figures 1 and 2.

The driving mechanism for the charge casing, shown in Figure 4, consists of a slide 37 actuated by means (not shown), which comprises a pawl 39 bearing against a spring 38 and engaging a gear 30 fastened to the charge carrier 13. The number of teeth of the gear 30 is the same as the number of cartridges in the charge casing. Therefore, the latter is rotated by one charge bore pitch with every reciprocating movement of the slide 37. A pawl 41 is rotatably arranged on a pin 42 in a recess in the body 23 and is held in engagement with the gear 30 by a spring 43 and prevents movement of the gear in one direction.

The operation of the cocking device is as follows:

In order to cock the gun, the cartridge opposite to the passage 33 is fired. The propelling gases produce the pressure necessary for sealing the sealing ring 29, as described with respect to the embodiment shown in Figures 1 and 2, and act upon the slide 34. The latter is pressed to the rear by the gas pressure until it bears against the projection 36*a* on the screw 36. In this position, shown in Figure 3, the passage 34*b* communicates with the portion 31*a* of the gas passage adjacent to the gas cylinder 7, while the other portion 31 of the gas passage leading to the barrel bore is closed. The propelling gases pass through the passage 34*b* and the portion 31*a* of the gas passage to the space 7 and actuate the gas-operated piston. When the latter has moved through a certain distance, the port 7*a* in the gas cylinder is opened and the gases can escape to the atmosphere. After the propelling pressure has dropped sufficiently the slide 34 is returned to its normal position by the spring 35 so that the two portions 31—31*a* of the gas passage are again interconnected.

In order to rotate the charge casing 13 the slide 37 must be reciprocated by a member which is not shown. On the upward movement of the slide 37 the pawl 39 rotates against the action of the spring 38 and slides over one tooth of the gear 30, which latter is prevented from rotating by the spring-loaded pawl 41. During the return movement of the slide 37 the pawl 39 engages behind the tooth on the gear 30 and rotates the latter by one pitch. Since the number of teeth of the gear 30 is the same as the number of cartridge bores in the charge casing, the succeeding cartridge is moved into the firing position.

The two constructions described above are, of course, only two out of many possibilities for the practical realization of the invention. For instance, the charge carrier might also be made flat and slidable, and thus the charges could be arranged along a straight line.

We claim:

1. In an automatic firearm having a barrel; a fluid-pressure operated cocking device comprising a cylinder, a piston slidable in said cylinder and defining an inner space within a part of said cylinder, separate sealing means movably mounted in said space and adapted to operatively connect with said piston, a cartridge-receiving charge casing; two separate passage-forming means for supplying fluid pressure to said space, said passage-forming means being connected at separate locations to said cylinder part, said sealing means separating said locations, one of said passage-forming means being connected with said barrel to operate said cocking device by fluid pressure derived from said barrel and loading said piston, the other one of said passage-forming means being connected with said charge casing to operate said cocking device by fluid pressure produced by said cartridge and loading said sealing means, whereby pressure fluid derived from said barrel is prevented from escaping into said charge casing by said sealing means.

2. In an automatic firearm having a barrel and a cocking device; a fluid-pressure driven actuating device for the cocking device, said actuating device comprising a cylinder and axially alined pistons movable in said cylinder and having adjacent end surfaces defining a space within said cylinder, one of said pistons being operatively connected with said cocking device; a cartridge-receiving charge casing; means transmitting pressure fluid developed during firing of the cartridge in the charge casing to the other one of said pistons, whereby the first-mentioned piston is actuated by the second-mentioned piston, and means transmitting pressure fluid developed in the barrel during firing of projectiles to said space, the second-mentioned piston preventing the transmission of pressure fluid from said space to said charge casing.

3. In an automatic firearm having a barrel and a cocking device; a fluid-pressure driven actuating device for the cocking device; said actuating device comprising a cylinder and axially alined pistons movable in said cylinder and having adjacent end surfaces defining a space within said cylinder, one of said pistons being operatively connected with said cocking device, a rotary charge casing having formed therein a plurality of elongated cartridge-receiving bores, each of said bores being adapted to be rotated into an operative position in which it is in alinement with said cylinder and pistons; means transmitting pressure fluid developed during firing of the cartridge in the charge casing to the other one of said pistons, whereby the first-mentioned piston is actuated by the second-mentioned piston, and means transmitting pressure fluid developed in the barrel during firing of projectiles to said space, the second-mentioned piston preventing the transmission of pressure fluid from said space to said charge casing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,772,066	Beaujard	Aug. 5, 1930
2,011,144	Coffman	Aug. 13, 1935
2,091,672	Cleereman	Aug. 31, 1937
2,221,706	Havill	Nov. 12, 1940
2,267,501	Holek	Dec. 23, 1941
2,293,043	Coffman	Aug. 18, 1942
2,356,304	Da Costa	Aug. 22, 1944
2,409,623	Grant	Oct. 22, 1946
2,590,153	Bunnell	Mar. 25, 1952

FOREIGN PATENTS

355,767	Great Britain	Feb. 21, 1930
577,987	Great Britain	June 11, 1946