

May 26, 1959

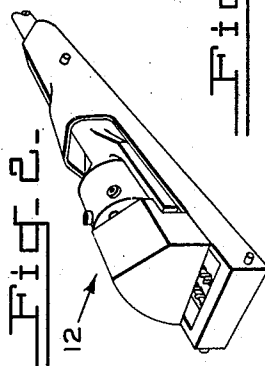
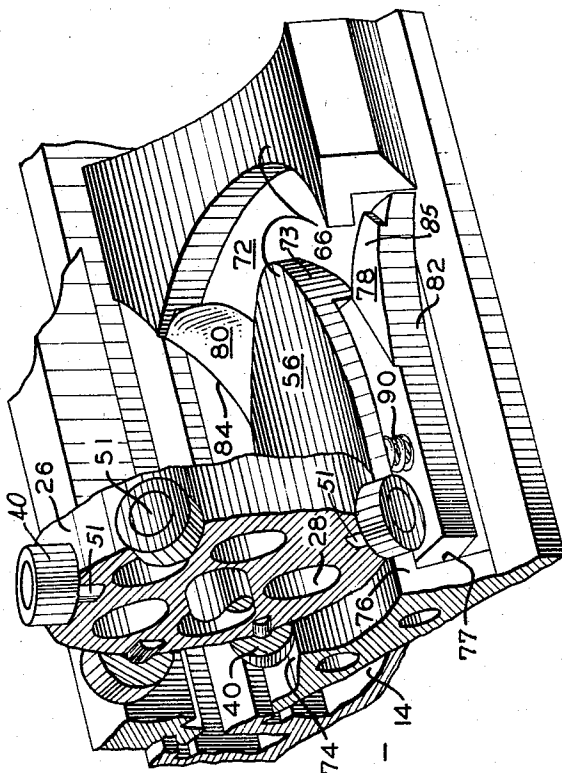
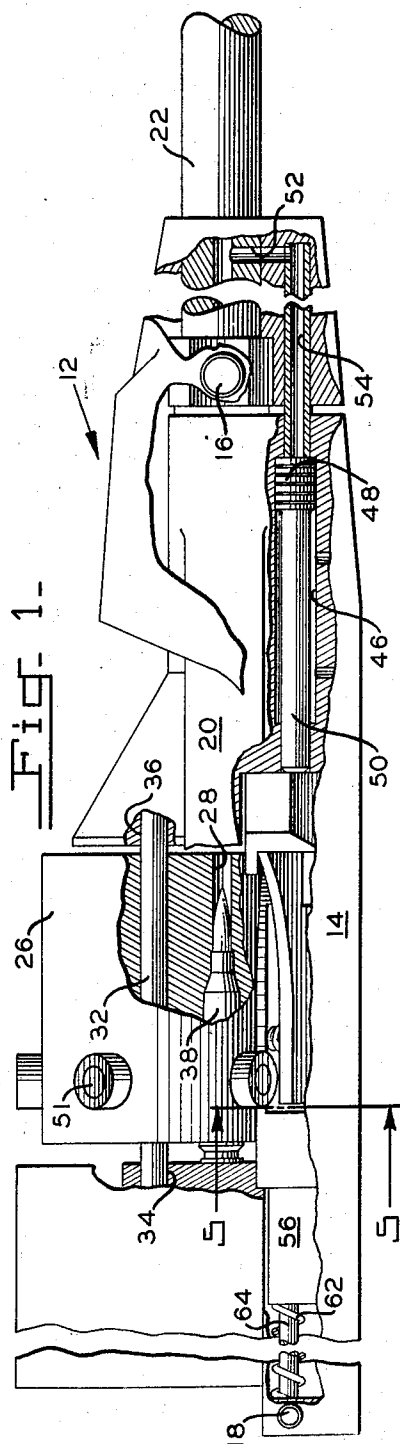
E. A. KAMP ET AL

2,887,931

DRUM ACTUATING CAM FOR REVOLVER-TYPE GUN

Filed Dec. 15, 1954

2 Sheets-Sheet 1



INVENTOR.
Ewald A. Kamp
BY Eugene S. Wassel
W. E. Thibodeau + A. W. Dew
ATTORNEYS

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2 Sheets-Sheet 2

Fig. 4.

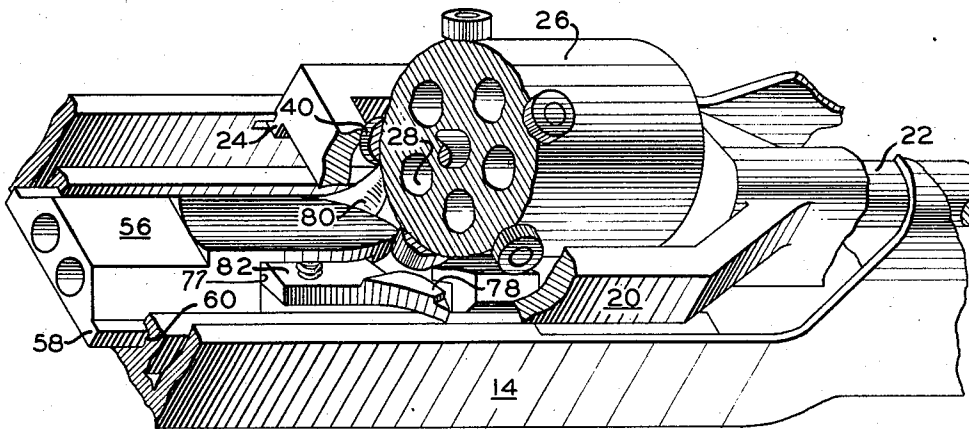


Fig. 5.

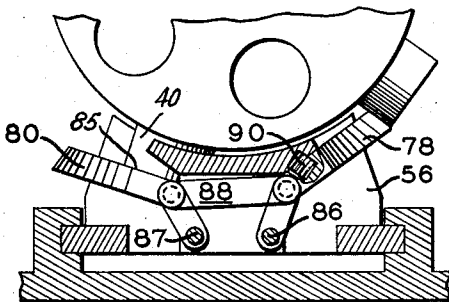


Fig. 7.

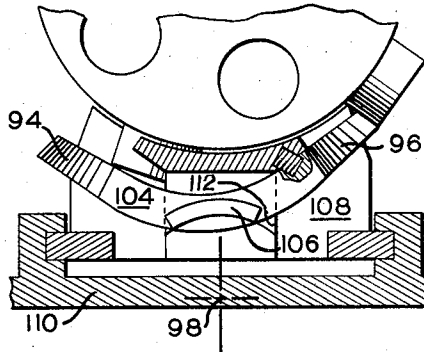


Fig. 6.

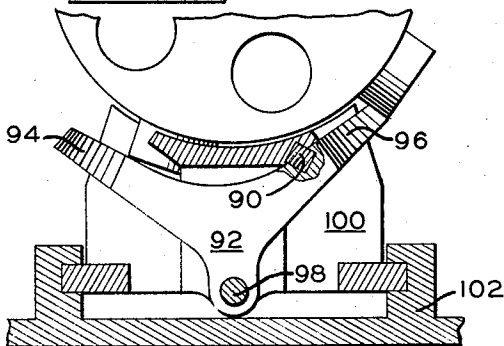
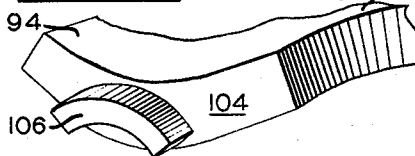


Fig. 8.



INVENTOR.
Ewald A. Kamp
BY Eugene S. Wassel
W. E. Thibodeau & A. W. Dew
ATTORNEYS

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DRUM ACTUATING CAM FOR REVOLVER-TYPE GUN

Ewald A. Kamp, Chicago, and Eugene S. Wassel, Cicero, Ill., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Army

Application December 15, 1954, Serial No. 475,593

4 Claims. (Cl. 89—155)

Our invention relates to a revolver-type automatic weapon having a drum with cartridge chambers, and more particularly to an actuator for rotating the drum to successively convey the chambers to a firing position in alignment with the barrel of the weapon.

Such a cartridge drum is usually provided with index rollers radially aligned with respective ones of the cartridge chambers and the weapon is provided with an actuator slidably disposed on the receiver and biased to a battery position. The actuator is provided with a central groove for engaging the one of the rollers, when disposed in the six o'clock drum position, to retain the corresponding chamber in axial alignment with the barrel for discharge of the cartridge therein.

The actuator moves from and to the battery position responsive to the discharge and a pair of curved grooves provided in the surface of the actuator are alternately connected to the central groove by a switch tongue pivoted on the actuator and operated by a cam to engage the rollers for acceleration and deceleration of the drum in rotation responsive to operation of the actuator and to allow the rollers to pass across the actuator.

The entire strain on the switch tongue caused by the acceleration and deceleration of the drum is borne by a switch pin and a pin follower secured to the switch tongue and a large number of malfunctions have been caused by failure of these members. Also, to maintain a low gun silhouette, minimum thickness of metal is provided between the drum surface and the chambers, which requires that the drum and the shafts of the index rollers be integrally formed to provide the strength required for rotation of the drum.

An object of our invention, therefore, is to provide a revolver-type automatic weapon having a cartridge drum with index rollers mounted intermediate the cartridge chambers of the drum.

Another object of our invention is to provide a weapon of the type described with an integral actuator body for controlling the drum in the battery position thereof.

An additional object of our invention is to provide an actuator for the weapon described, including pivoted wings to engage the rollers and rotate the drum between discharges of cartridges therein.

Other aims and objects of our invention will appear from the following description and drawings.

The weapon of our invention includes a drum similar to that described above except that the index rollers are disposed symmetrically intermediate the cartridge chambers. The thickness of metal in this portion of the drum is sufficient to permit the roller shafts to be attached thereto by an insertion method to eliminate the high cost of forming the drums with integral shafts.

The drum is rotated, to sequentially align successive ones of the chambers with the barrel, by a reciprocable actuator having longitudinally disposed and beveled guide surfaces simultaneously engageable by the rollers positioned on opposite sides of the particular chamber which

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is aligned with the barrel. These two surfaces sliding between the two rollers maintain alignment of such chamber with the bore of the barrel during the time the rollers are in contact therewith. The two guide surfaces are connected at the forward end by a curved passage, and on each side of the actuator where the passage joins the guide surfaces there is a pivotable piece, referred to as a cam wing, which is provided with an outwardly flaring cam surface. The two wings are mounted and joined so as to move oppositely, and the right wing is spring loaded so as to be normally depressed while the other wing is held in alignment with the corresponding one of the guide surfaces. As the actuator moves rearwardly, the cam roller on the right side thereof clears the depressed cam wing and enters the passage while the other roller follows the cam surface of the left cam wing causing the drum to rotate in a clockwise direction. As the drum continues to rotate and the actuator reverses direction, the roller in the passage crosses to the left side of the actuator to depress the left one of the cam wings. When the left cam wing is depressed, the right cam wing moves up to be engaged by the succeeding roller on the drum for deceleration of the drum. During the continued movement of the actuator to normal battery position, the two guide surfaces move between the rollers disposed on opposite sides of the following chamber to align such chamber with the barrel bore. This construction eliminates the requirement of a switch tongue and a cam for guiding the tongue.

In one form of our invention, a pair of integrated wings is pivoted on a shaft journaled in the actuator and in another form of our invention, a pair of wings are pivoted on individual shafts journaled in the actuator and connected by a pivoted link. In each case stresses due to acceleration and deceleration of the drum are borne by the pivot shafts.

For a more complete understanding of our invention, reference is made to the following description and the accompanying drawings in which:

Fig. 1 is a partly cut-away side elevational view of a weapon including one embodiment of our invention with the actuator in battery position;

Fig. 2 is a diminished perspective view of the weapon;

Fig. 3 is a partly cut-away perspective view of the cartridge drum and the actuator in the battery position thereof;

Fig. 4 is a partly cut-away perspective view of the recoil unit and the actuator as the drum is accelerated;

Fig. 5 is a view along line 5—5 of Fig. 1 but showing the left cam wing depressed by one of the rollers and the cam wings separately pivoted and pivotally linked;

Fig. 6 is a view similar to Fig. 5 but showing an alternate embodiment having a block including integral wings pivoted on the actuator;

Fig. 7 is a view similar to Fig. 5 but showing an alternate embodiment having a block including integral wings rotatable in grooves in the actuator; and

Fig. 8 is a perspective view of the body shown in Fig. 7.

According to the drawings, a revolver-type automatic weapon 12 is provided with a receiver 14 including front and rear trunnions 16 and 18, respectively, and a recoil unit 20 including a barrel 22 slidable on rails 24 in receiver 14.

A drum 26 is mounted as by spline means on a shaft 32 which is journaled for rotation at 34 and 36 in recoil unit 20, and such drum is provided with a plurality of cartridge chambers 28 which are sequentially alignable with the bore of barrel 22. A plurality of pins 51, equal to the number of chambers 28, are fixedly mounted to drum 26 so as to project radially therefrom and are disposed symmetrically intermediate such chambers. A roller 40 is mounted on each of the pins 51.

A cylinder 46, included in recoil unit 20, incloses a piston 48 connected to a plunger 50 projecting rearwardly from recoil unit 20. A passage 52 through barrel 22 and in receiver 14 and a tube 54 projecting between receiver 14 and recoil unit 20 connects barrel 22 with cylinder 46.

An actuator 56 is slidably mounted in receiver 14 immediately below drum 26 for longitudinal reciprocation between a battery and a retracted position by means of radially projecting flange portions 58 which are slidably received in longitudinal ways 60 disposed along the inner sides of the receiver. Actuator 56 is biased to the battery position by a pair of coil springs 62 which are mounted over guide rods 64.

Actuator 56 is provided with a top surface 66 which is arcuately formed so as to be essentially coaxial with the periphery of drum 26, and such surface is interrupted by a curved passage 72 which slidably receives successive ones of the rollers 40 to provide clearance therefor across the actuator when drum 26 is rotated responsive to the reciprocation of the actuator as hereinafter explained. Passage 72 forms in actuator 56 a tongue portion 73 which is insertable between pairs of the rollers 40 during movement of the actuator to battery position. A left guide surface 74 and a right guide surface 76 extend rearwardly from the ends of passage 72 along the respective sides of tongue 73, and such guide surfaces are parallelly spaced and beveled so as to be simultaneously engageable with pairs of rollers 40 for sequentially indexing the chamber 28 therebetween into alignment with barrel 22 and blocking rotation of drum 26 when the cartridge in such chamber is fired. Provided in the lower front portions of both sides of actuator 56 are similar recesses 77 which receive, respectively, a left cam wing 80 and a right cam wing 78. Such cam wings 78 and 80 are mounted respectively on longitudinal shafts 86 and 87 for pivotal movement between a position for engaging ones of the rollers 40 and a depressed position clear of engagement with such rollers, and such wings are joined by a link 88 so as to move oppositely between such engaging and depressed positions. Provided respectively on the outer sides of the wings 78 and 80 are arcuate cam surfaces 82 and 84 which flare outwardly from actuator 56. Also, provided on each of the cam wings 78 and 80 is a follower surface 85 which surfaces are disposed to releasably block the ends of the passage 72 and be engageable by successive ones of the rollers 40 when leaving such passage to actuate the corresponding cam wing from the engaging to the depressed position. When either one of the wings 78 or 80 is in the engaged position, the respective cam surface 82 or 84 thereon forms an extension of the corresponding one of the guide surfaces 76 or 74 and is engageable either by one of the rollers 40 to accelerate drum 26 for rotation during movement of actuator 56 to the rearward position or by one of the rollers to decelerate the drum during movement of the actuator to the battery position.

A spring 90 is selectively mounted between one of the cam wings 78 or 80 and actuator 56 to bias such selected cam wing to the depressed position. The direction in which drum 26 is to be rotated determines which of the cam wings is to be normally biased by the spring to the depressed position. In the selected embodiment, drum 26 is to be rotated in a clockwise direction for proper operation of weapon 12 whereby, as is shown in the drawings, spring 90 is mounted between actuator 56 and right cam wing 78.

Gases from the discharge of cartridge 38 flow through barrel 22, passage 52, and tube 54 into cylinder 46. Piston 48 and plunger 50 move rearwardly responsive to pressure of the gases to force actuator 56 to slide against springs 62 and as the projectile of cartridge 38 leaves barrel 22, the pressure on piston 48 is released and actuator 56 slides forwardly responsive to reaction of springs 62 and kinetic energy of drum 26. Cam sur-

faces 82 and 84 flare outwardly from actuator 56 and during the rearward stroke of the actuator, cam surface 84 engages the roller 40 aligned therewith to accelerate drum 26 in clockwise rotation. Passage 72 is curved to permit progress of the roller 40 on the right side of actuator 56 to the left side during rotation of drum 20 and reciprocation of such actuator. As such roller 40 leaves passage 72 during the forward movement of actuator 56, the follower surface 85 on left cam wing 80 is engaged by the roller to pivot such cam wing to the depressed position. Consequently, right cam wing 78 is pivoted, by means of link 88, to the engaging position in time for engagement by a succeeding one of the rollers 40 to decelerate drum 20. As actuator 56 returns to battery position at the end of the cycle, guide surfaces 74 and 76 engage the pairs of rollers 40 disposed on opposite sides of the succeeding chamber 30, now aligned with barrel 22, to retain such chamber in axial alignment with the barrel.

In the embodiment shown in Fig. 6, a body 92 having wings 94 and 96 formed thereon is pivoted at 98 in an actuator 100 slidable in a receiver 102 for alternate cam engagement of the wings with the rollers. Spring 90 is disposed between actuator 100 and wing 96 to bias wing 94 into cam contact with the rollers for operation similar to that described above for actuator 56.

In the embodiment of Fig. 7, a body 104 including wings 94 and 96 is effectively pivoted about an axial line 98 by means of forwardly and rearwardly extending curved flanges 106 disposed in corresponding curved grooves 112 in an actuator 108 slidable in a receiver 110. As shown in Fig. 7, axial line 98 may be in the base of receiver 110.

It was found that the embodiments of Figures 6 and 5, respectively, produce the highest and lowest silhouettes for weapon 12.

While the foregoing is a description of the preferred embodiment, we intend in the following claims to include those modifications and variations thereof that are within the spirit and scope of our invention.

We claim:

1. A revolver-type automatic gun including a receiver, a barrel, a drum rotatably mounted in the receiver and provided with a plurality of cartridge chambers disposed for successive alignment with said barrel, an actuator slidably mounted in said receiver adjacent said drum for reciprocation between a battery and a rearward position during cyclic operation of said gun, a plurality of rollers rotatably mounted to said drum intermediate said cartridge chambers, an integral tongue portion on said actuator insertable between pairs of said rollers during actuation of said actuator to the battery position for aligning the one of said chambers between the engaged ones of said rollers with said barrel, and a pair of longitudinally disposed guide surfaces disposed on opposite sides of said actuator for simultaneous contact with said engaged ones of said rollers when said actuator is in the battery position for blocking rotation of said drum.

2. The gun as described in claim 1 and including a pair of wing members pivotally mounted to opposite sides of said actuator for respective movement between an engaging and a depressed position, a cam surface disposed on each of said wing members for engagement by one of said rollers when the corresponding one of said wing members is in the engaged position, and means for actuating said wing members into alternate engagement with alternate ones of said rollers to successively accelerate and decelerate said drum during reciprocation of said actuator.

3. The gun as described in claim 2 and including a link connecting said wing members for simultaneously opposite movement between the engaged and depressed positions, spring means disposed between a selected one of said wing members and said actuator for biasing said selected wing member to the engaged position to predeter-

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mine the direction of rotation of said drum, and a follower surface on said selected wing member disposed for engagement by successive ones of said rollers to pivot said selected wing member to the depressed position and the other one of said wing members to the engaged position for the engagement of said cam surface thereon with one of said rollers to decelerate said drum for alignment of the succeeding one of said cartridge chambers with said barrel during movement of said actuator to the battery position.

4. The gun as described in claim 2 and including a transversal passage in said actuator to provide clearance for rotation of successive ones of said rollers across said actuator from engagement with one side of said tongue into position for engagement by the other side thereof

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during movement of said actuator to the battery position and for subsequent engagement by said cam surface on said selected wing member during movement of said actuator to the rearward position to accelerate said drum for rotation.

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