Sept. 9, 1958 H. M. PERNINI 2,850,947

CAM ACTUATED WINGS FOR REVOLVER-TYPE GUNS

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Fig. 1

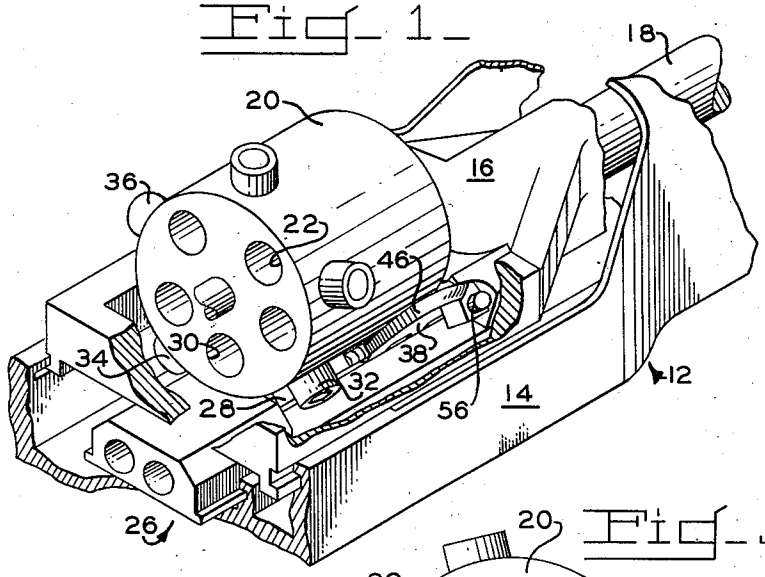


Fig. 2

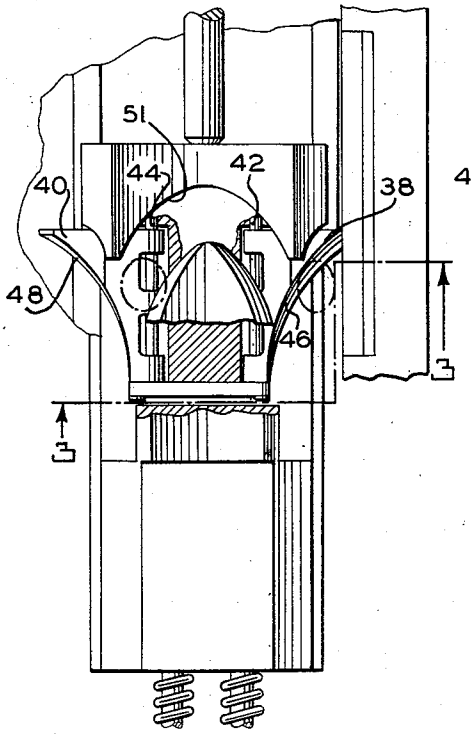


Fig. 3

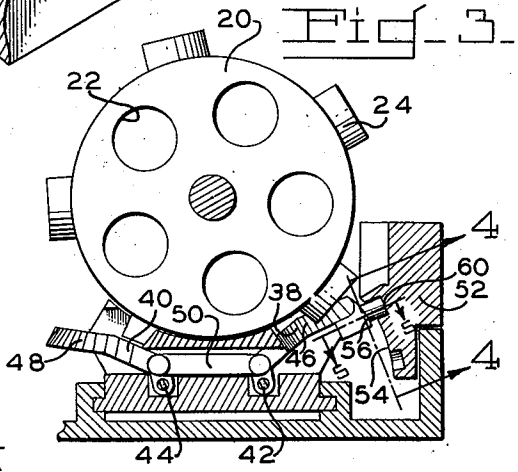
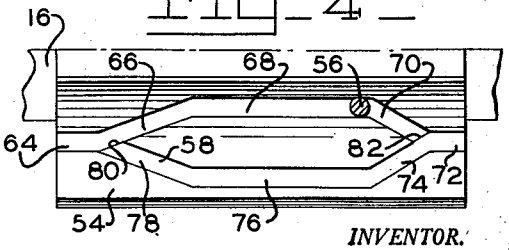


Fig. 4



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Fig. 5

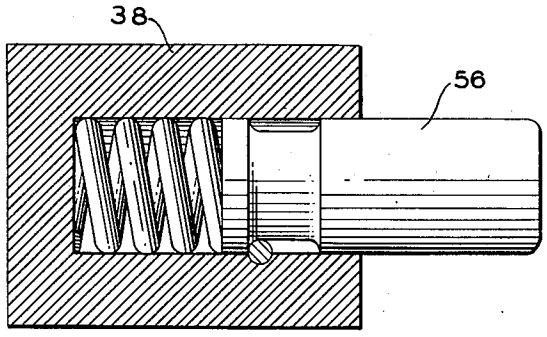
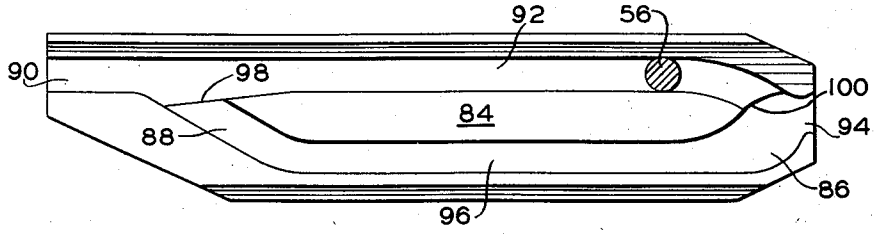


Fig. 6



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CAM ACTUATED WINGS FOR REVOLVER-TYPE GUNS

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Application November 17, 1954, Serial No. 469,565

5 Claims. (Cl. 89—155)

My invention relates to a revolver-type automatic weapon having a barrel and a cartridge drum rotatably disposed for conveying cartridges to a position in axial alignment with the barrel, and more particularly to an actuator for rotating the drum responsive to discharge of the weapon.

One such drum includes index rollers projecting therefrom intermediate the chambers of the drum and the six o'clock chamber position is aligned with the barrel. An actuator is slidably disposed on the receiver and biased to a battery position adjacent the six o'clock chamber position for engagement with a pair of the rollers for axial alignment of the chamber therebetween with the barrel. The actuator is operable in a recoil cycle responsive to discharge of a cartridge in the six o'clock position and the drum is rotated by lead and trail wings symmetrically pivoted on the actuator for engagement with the rollers. A forwardly curving groove in the actuator extends between the wings. As the actuator traverses the recoil cycle, the lead and trail wings successively engage the leading one of the pair of rollers adjacent the six o'clock position and the next-but-one following roller to gradually accelerate the drum in rotation, while the intermediate roller traverses the groove.

The wings are spring-biased to the position for roller engagement of the lead wing while the link retains the trail wing in the position thereof out of engagement with the rollers. During rotation of the drum, the intermediate roller engages the lead wing and passes thereover to rotate the trail wing into the path of the following roller for gradual deceleration of the drum.

This method of operation proved unsatisfactory since the wings are operable responsive to a spring rather than being directly coordinated with the recoil cycle. Thus, the action was not sufficiently positive and led to impact failures.

It is an object of my invention, therefore, to provide a simple and effective device for operating the wings responsive to rotation of the drum.

An additional object of my invention is to provide a device for positive operation of the wings responsive to rotation of the drum.

Other aims and objects of my invention will appear from the following explanation thereof.

In carrying out my invention, the recoil unit of the weapon described above is provided with a cam concentric with the axis of one of the wings and a continuous track is formed in the cam for engagement with the roller follower provided on the one wing for engagement with the track to guide the wings responsive to operation of the actuator.

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

Fig. 1 is a partly cut-away perspective view of a weapon incorporating my invention in battery position thereof;

Fig. 2 is a partly broken-away top view of the weapon shown in Fig. 1 with the drum removed and with the actuator in an intermediate position in the cycle thereof;

Fig. 3 is a view along line 3—3 of Fig. 2;

Fig. 4 is a view along line 4—4 of Fig. 3;

Fig. 5 is a view along line 5—5 of Fig. 3; and

Fig. 6 is a view along line 4—4 of Fig. 3 with an alternate wing cam.

According to the drawings, an automatic weapon 12 includes a receiver 14 with a recoil unit 16 slidably disposed thereon. The recoil unit includes a barrel 18 and a drum 20 rotatable thereon including cartridge chambers 22 and index rollers 24 projecting therebetween.

An actuator 26 is slidably disposed in receiver 14 and biased to a battery position thereof. The actuator is provided with surfaces 28 for battery position engagement with a pair of rollers 24 to retain the chamber therebetween in the drum position nearest receiver 14, denoted the six o'clock position. In the six o'clock position, the chambers are in axial alignment with barrel 18. In Fig. 1 drum 20 rotates counterclockwise. The six o'clock chamber is designated as 30, the lead and follow rollers adjacent chamber 30 are respectively designated as 32 and 34 and the succeeding roller is designated as 36. Weapon 12 is fired by discharge of a cartridge in the chamber 30 in the six o'clock position and actuator 26 is operable in a recoil cycle responsive to the discharge.

Similar wings 38 and 40 pivoted on symmetrically disposed axial shafts 42 and 44, respectively, include guide surfaces 46 and 48. The wings are connected by a link 50 pivoted therebetween to permit engagement of the guide surfaces of one of the wings with rollers 24 while the other of the wings is positioned out of such engagement. A forwardly curved groove 51 is provided in actuator 26 for the passage therethrough of rollers 24. The groove extends between wings 38 and 40.

A bracket 52 secured to recoil unit 16 includes a cam 54 concentric with wing 38. A roller follower 56 is disposed on wing 38 for engagement with a double track 58 in cam 54 to pivot wings 38 and 40 for successive engagement of guide surfaces 46 and 48 with rollers 32 and 36 responsive to the discharge to accelerate and decelerate rotation of drum 20. As drum 20 rotates, roller 34 passes through groove 51 to become the lead roller of the succeeding cycle. Track 58 includes a bottom 60 and follower 56 is spring-biased to engage bottom 60.

In battery position of actuator 26, follower 56 is engaged in a portion 64 of cam track 58 to position wings 38 and 40 midway between their relative upper and lower limits while rollers 32 and 34 are engaged by surfaces 28 to retain the included chamber in firing position. As actuator 26 proceeds rearwardly, follower 56 traverses a portion 66 to raise wing 38 for engagement with lead roller 32 and to lower wing 40 out of the path of follow roller 34. As actuator 26 continues rearwardly, as shown in Fig. 2, follower 56 is directed through a portion 68 while roller 32 engages guide surface 46 to accelerate drum 20. In Fig. 2, rollers 32 and 34 are shown in phantom in positions in the rearward stroke. As actuator 26 still continues rearwardly, roller 32 leaves guide surface 46 while roller 34 traverses groove 51 and follower 56 engages a section 70 to depress wing 38 out of the path of roller 34 and to raise wing 40 to the midway position. Follower 56 engages a section 72 at the end of the rearward stroke.

On the forward stroke of actuator 26, follower 56 successively engages portions 74, 76, and 78 of the cam to return to engagement with section 64. Portion 74 guides follower 56 to depress wing 38 and to pivot wing 40 into position for engagement with succeeding roller 36. As follower 56 engages portion 76, roller 36 engages

guide surface 48 to decelerate drum 20, and as follower 56 engages portion 78, wing 40 is lowered from roller engagement and wing 38 is raised to the midway position. Steps are provided in bottom 60 at 80 and 82 for engagement with spring-biased follower 56 to insure progression of follower 56 through track 58 in a single direction sense.

During the rearward and forward strokes, roller 34 traverses groove 51 and passes over wing 38 and when actuator 26 again arrives at battery position, rollers 34 and 36 are engaged by surfaces 28 to retain the included chamber 30 in the firing position.

In an alternate embodiment of my invention shown in Fig. 6, a cam 84 is constructed to eliminate switching of the wings at the beginning of rearward motion of actuator 26. Switching is accomplished at the end of rearward travel and at the beginning of forward travel of the actuator 26, in continuous motion by the U shape of the track at portion 86 and switching is again accomplished in one continuous motion at the end of forward motion of actuator 26, by portion 88 of cam track 84. It can be seen that with this method of switching the wings are accelerated and decelerated only once at each end of the actuator stroke while cam track 58 in Fig. 4 causes the wings to be accelerated and decelerated twice at each end of actuator stroke.

In the battery position of actuator 26, of a weapon 12 provided with the alternate embodiment, surfaces 28 engage rollers 32 and 34 to maintain the chamber 30 therebetween in firing position, and follower 56 is engaged in a portion 90 of cam track 84. Wings 38 and 40 are positioned as shown in Fig. 3, respectively, in positions of engagement and disengagement with rollers 24. As actuator 26 proceeds rearwardly, follower 56 engages a portion 92 of cam track 84 while roller 32 engages guide surface 46 to accelerate drum 20 and then leaves guide surface 46. In Fig. 2, rollers 32 and 34 are shown in relative positions in the rearward stroke. At the end of the rearward stroke, follower 56 engages section 86 to switch wings 40 and 38 into positions of respective engagement and disengagement with rollers 24 while roller 34 traverses groove 51 and passes over wing 38. Intermediately of section 86 a run-out section 94 is provided to allow for differences in stroke of actuator 26. On the forward stroke of actuator 26, follower 56 engages a portion 96 with wing 38 in the disengagement position and with wing 40 engaged with roller 36 to decelerate drum 20. As actuator 26 returns to battery position, follower 56 traverses portion 88 to return wings 38 and 40 to respective positions of engagement and disengagement with rollers 24, as shown in Fig. 3. The cycle ends with follower 56 engaged in portion 90 of cam track 84. Steps are provided in bottom 60 at 98 and 100 for engagement with spring-biased follower 56 to insure progression of follower 56 through cam track 84 in a single direction sense.

During the rearward and forward strokes of actuator 26, roller 34 traverses groove 51 and passes over wing 38 and when actuator 26 returns to battery position, surfaces 28 engage rollers 34 and 36 to retain the chamber therebetween in the firing position.

It is evident from the above explanation that cam 54 could be mounted on the other side of recoil unit to achieve the same result with a follower 56 mounted on wing 40 by repositioning steps 80 and 82. For change in feed direction, cam 54 and follower 56 would be required to cooperate to raise wing 40 on the recoil stroke of the actuator cycle.

The embodiment of cam 84 shown in Fig. 6 may be adapted for engagement with either wing for a single direction of rotation of drum 20, and cam 84 may be modified for operation with either of the wings for the opposite direction of rotation of drum 20.

Although two particular embodiments of the invention have been described in detail herein, it is evident that many variations may be devised within the spirit and scope thereof and the following claims are intended to include such variations.

I claim:

1. In a weapon including a recoil unit, a drum with cartridge chambers and index rollers therebetween disposed on the recoil unit for rotation of the chambers to a firing position in the drum, an actuator biased to a battery position for selective engagement with pairs of the rollers to retain the chambers therebetween in the firing position and slidably disposed with respect to the recoil unit for operation in a recoil cycle responsive to discharge of a cartridge chambered in the firing position, and a pair of wings in linked relation respectively provided with guide surfaces and axially pivoted on the actuator between positions for alternate engagement of the guide surfaces with the rollers, means comprising a cam and a follower respectively secured to the recoil unit and to one of the wings for displacement thereof between said positions for sequential engagement of the guide surfaces and the rollers respectively for rotational acceleration and deceleration of the drum responsive to the recoil cycle.

2. In a weapon including a recoil unit, a drum with cartridge chambers and index rollers therebetween disposed on the recoil unit for rotation of the chambers to a firing position in the drum, an actuator biased to a battery position for engagement with the rollers to selectively retain the chambers in the firing position and slidably disposed with respect to the recoil unit for operation in a recoil cycle responsive to discharge of a cartridge in the firing position chamber, and a pair of wings linked together and axially pivoted on the actuator between positions for alternate engagement of guide surfaces thereof with the rollers, means comprising a follower secured to one of the wings, and a curved plate secured to the recoil unit in concentric relation with the one wing and provided with a cam engageable with said follower for displacement of the wings to said positions for sequential engagement of the guide surfaces and the rollers to accelerate and decelerate rotation of the drum responsive to the recoil cycle.

3. In a weapon including a recoil unit, a drum with cartridge chambers and index rollers therebetween disposed on the recoil unit for rotation of the chambers to a firing position in the drum, an actuator biased to a battery position for engagement with a pair of the rollers to retain the one of the chambers therebetween in the firing position and slidably disposed with respect to the recoil unit for operation in a recoil cycle responsive to the discharge of a cartridge chambered in the firing position, a pair of wings linked together respectively provided with guide surfaces and axially pivoted on the actuator between positions for alternate engagement of the guide surfaces with the rollers, means comprising a plate secured to the recoil unit including a cam path, and a follower secured to one of the wings, said plate being concentric with said one wing and constructed for engagement of said cam path with said follower for progress therein in one direction sense to displace the wings between said positions for sequential engagement of the guide surfaces and the rollers respectively to accelerate and decelerate rotation of the drum responsive to the recoil cycle.

4. A weapon comprising a recoil unit, a drum with cartridge chambers and intermediate index rollers disposed on said recoil unit for successive rotation of said chamber to a firing position in said drum, an actuator biased to a battery position for engagement with a pair of said rollers to retain the one of said chambers therebetween in the firing position, a pair of wings secured together with pivoted links pivoted on said actuator between positions for respective engagement with said rollers, and cam means disposed between one of said wings and said recoil unit, said actuator being slidably

disposed with respect to said recoil unit for recoil cycle operation responsive to discharge of a cartridge in said firing position chamber, and said cam means being constructed for rotation of said wings responsive to said recoil cycle for sequential engagement thereof with said rollers to rotationally accelerate and decelerate said drum.

5. A weapon comprising a recoil unit, a drum with cartridge chambers and index rollers therebetween disposed on said recoil unit for successive rotation of said chambers to a six o'clock firing position in said drum, an actuator biased to a battery position for selective engagement with pairs of said rollers to retain the chambers therebetween in said six o'clock position and slidably disposed with respect to said recoil unit for operation in a

recoil cycle responsive to discharge of a cartridge chambered in said firing position, a pair of wings linked together respectively provided with guide surfaces and respectively axially pivoted on said actuator between positions for alternate roller engagement of said guide surfaces, and cam means disposed between said recoil unit and one of said wings to retain said wings in one of said positions for roller engagement of the corresponding one of said wings when said actuator is in said battery position and to rotate said wings between said positions for sequential engagement of said guide surfaces and said rollers to rotationally accelerate and decelerate said drum responsive to said recoil cycle.

No references cited.