Sept. 3, 1957 C. H. STEVENS 2,804,810

RECEIVER CAM

Filed June 10, 1953 2 Sheets-Sheet 1

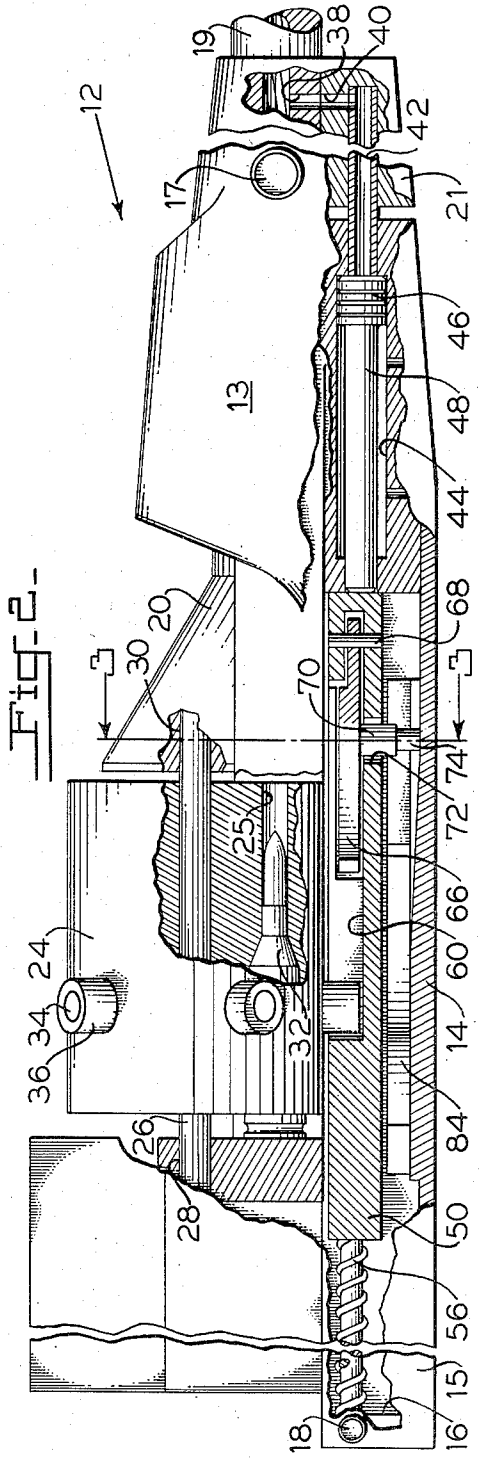


Fig-2-

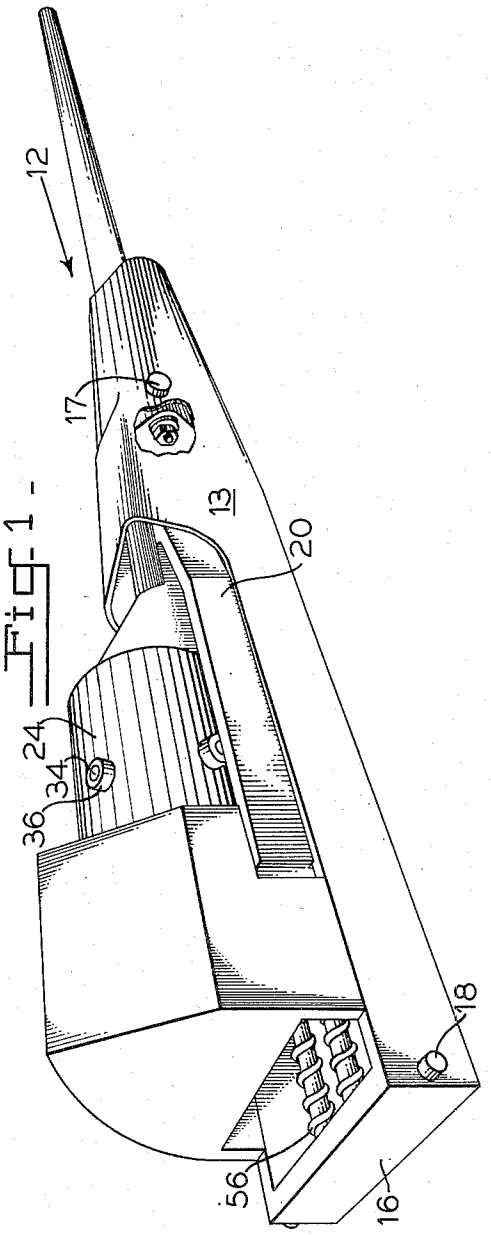


Fig-1-

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Fig. 3.

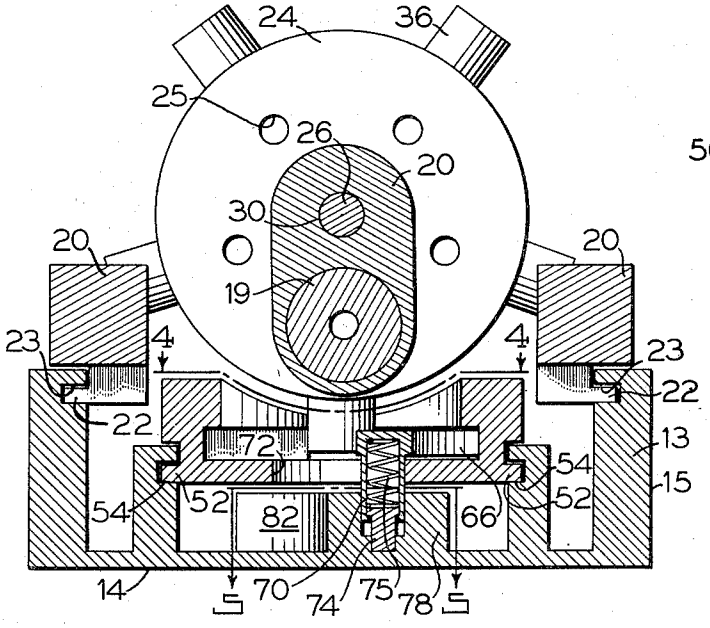


Fig. 4.

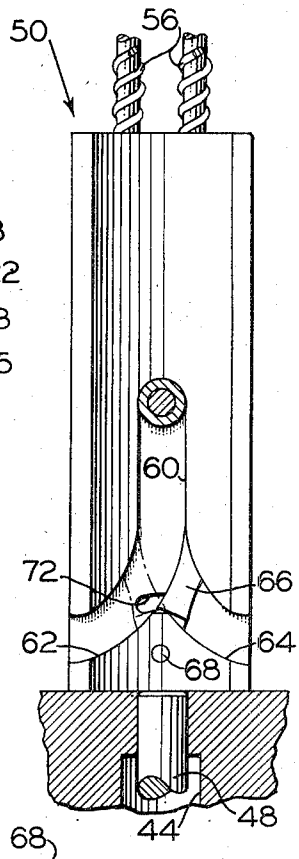


Fig. 5.

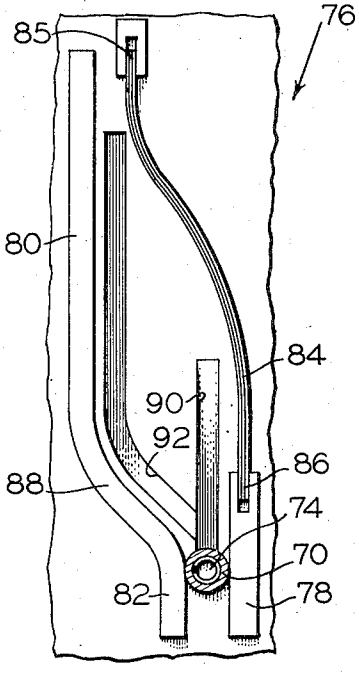
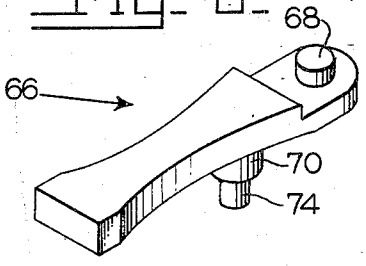


Fig. 6.



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2,804,810

RECEIVER CAM

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Application June 10, 1953, Serial No. 360,853

6 Claims. (Cl. 89—155)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment of any royalty thereon.

My invention relates to a revolver-type automatic weapon having a cartridge drum guided and rotated by an actuator including a pivoted switch tongue, and more particularly to the cam for rotating the switch tongue.

Such a weapon usually includes a recoil member having a cradle and a barrel secured together and slidable on a receiver. A cartridge drum is rotatably disposed on the cradle and provided with radial stub shafts projecting from the periphery thereof with the axes of the shafts respectively intersecting the axes of the cartridge chambers of the drum and corresponding rollers rotatably disposed on the shafts. An actuator slidably disposed with respect to the drum is biased toward a battery position and a central straight groove is provided in the actuator for engagement in the battery position with the roller in the six o'clock position of the drum for aligning the corresponding chamber with the barrel of the weapon. The actuator moves in an indexing cycle rearwardly from the battery position and forwardly to the battery position responsive to discharge of a projectile in the six o'clock drum position chamber. The actuator is also provided with a pair of oppositely extending outlet and inlet grooves for guiding the rollers to and from the straight groove and a pivoted switch tongue for connecting the curved grooves with the straight groove.

The curvature of the outlet and inlet grooves is equal and the order of connection of the grooves of the actuator to the straight groove depends upon the direction of rotation of the drum. The tongue is in outlet position connecting the corresponding groove to the straight groove when the actuator is in battery position.

The roller restrained by the straight groove is consecutively engaged by the tongue and the outlet groove as the actuator moves in the indexing stroke to impart kinetic energy of rotation to the drum. As the drum rotates, the switch tongue is pivoted to the inlet position and the next succeeding roller is guided into the straight groove by the inlet groove. A pin on the switch tongue projects through the actuator to engage a cam secured to the drum support or to the receiver of the weapon to rotate the switch tongue.

Weapons provided with receiver cams obviously require one less sliding part, but rigid receiver cams heretofore provided, failed and caused failures in tongue pins, due to variations in period of the actuator resulting from allowable variations in cartridge charges. It is, therefore, an object of my invention to provide a receiver cam for a revolver-type automatic weapon that is capable of rotating the drum thereof responsive to the discharge of variably charged cartridges.

An additional object of my invention is to provide such a cam constructed to attenuate the high values of actuator thrust resulting from maximum cartridge charges.

A further object of my invention is to provide a receiver

cam with a resilient guide portion for absorbing maximum indexing thrust.

A still further object of my invention is to provide a receiver cam having portions for guiding the switch tongue of the weapon described, including a resilient portion for absorbing thrusts from the discharge of variable cartridge charges.

Additional aims and objects of my invention will appear from the accompanying drawing and description thereof.

In carrying out my invention, the switch tongue pin of the weapon is provided with a tip, spring-biased from the tongue, and a cam secured to the receiver is recessed to receive the tongue pin with the sides of the recess constructed to guide the pin. A baffle is spaced from a rigid portion of one of the sides and the pin is restrained in a dwell position therebetween corresponding to the outlet position of the tongue when the actuator is in battery position. A resilient device extends from the rigid portion to retain the switch tongue in the outlet position as the actuator moves in the rearward direction from battery position. This device is curved forming one end of the cam to absorb a portion of the momentum of the actuator and to project the pin towards the opposite side and to pivot the tongue towards the inlet position thereof as the actuator continues moving away from battery position.

The opposite side of the recess is constructed parallel to the stroke direction to retain the tongue in the inlet position as the actuator returns towards battery position and the cam is provided with an opposite curved end to return the pin to the dwell position and rotate the switch tongue back to outlet position.

The floor of the recess is provided with a pair of indentations including an indentation disposed along the one side for guiding the tip during the indexing cycle. The other indentation is disposed along the opposite side and opposite end to intersect the one indentation at a point adjacent the swell position. The free and connected ends of the respective indentations are faded out, and the steps remaining engage the tip for progress of the pin in the recess in a single sense. The bottom of the recess is ramped towards the opposite side to impede rotation of the tongue.

For a better understanding of my invention, reference is made to the following description and the accompanying drawing in which:

Fig. 1 is a perspective view of a weapon incorporating a particular embodiment of my invention;

Fig. 2 is a partly cutaway side elevation view of the weapon;

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 perspective view of the switch tongue.

According to the drawing a weapon **12** includes a receiver **13** having a flat bottom **14** with sides **15** and end **16** substantially perpendicular thereto. Mounting trunnions **17** and **18** are secured to sides **15**. A recoil unit slidable on receiver **13** includes a barrel **19** secured to a cradle **20**. Barrel **19** is slidably disposed in a support **21** of receiver **13** and cradle **20** includes feet **22** slidable in grooves **23** of receiver **13**. A cartridge drum **24** including chambers **25** is rotatably mounted on a shaft **26** journaled at **28** and **30** in cradle **20**. Weapon **12** is shown in battery in Fig. 1 with the chamber **25** in the six o'clock position of drum **24** in alignment with barrel **19**. A cartridge **32** is shown in position in the chamber.

Drum **24** is provided with radial stub shafts **34** projecting from the surface thereof and intersecting the axes of chambers **25**. Rollers **36** are rotatably disposed on shafts **34**.

Barrel **19** and receiver **13** respectively include passages

38 and 40 communicating between the bore of barrel 19 and a tube 42 slidably disposed between receiver 13 and a cylinder 44 of cradle 20. Cylinder 44 encloses a piston 46 secured to a plunger 48 projecting rearwardly from cylinder 44.

An actuator 50, slidably disposed on receiver 13 by means of projections 52 extending into channels 54, is biased to a battery position in engagement with plunger 48 by buffer springs 56 engaging end 16.

Actuator 50 is provided with a central straight groove 60 for engaging a roller 36 to retain the chamber 25 corresponding thereto in alignment with barrel 19 in the battery position of actuator 50. Outlet and inlet grooves 62 and 64 in actuator 50 curve from groove 60 in opposite directions. A tongue 66 is pivoted on actuator 50 by pivot pin 68 between outlet and inlet positions respectively to connect grooves 62 and 64 to straight groove 60.

Tongue 66 is provided with a pin follower 70 projecting through an arcuate slot 72 in actuator 50. Follower 70 is provided with a tip 74 biased by a spring 75.

A cam 76 secured to receiver 13 includes a rigid side portion 78 and a side 80 parallel to the direction of the indexing stroke for engaging follower 70 to respectively retain switch tongue 66 in the outlet and inlet positions thereof. A baffle 82 is disposed parallel to side portion 78 to restrain roller 36 therebetween in a dwell position corresponding to the outlet position of tongue 66 when actuator 50 is in battery position. As shown in the drawing, rotation of drum 24 is counterclockwise as seen from the rear thereof. The direction of rotation may be reversed by reversing the position of the guide elements of cam 76.

Weapon 12 is electrically fired and gases from the discharge of a cartridge in the six o'clock drum position escape from barrel 19 through passages 38 and 40 and tube 42 to force piston 46, plunger 48 and consequently, actuator 50, rearwardly. As actuator 50 moves in the indexing stroke against springs 56, tongue 66 and groove 62 successively engage roller 36. The tongue and groove are curved to accelerate roller 36 and thereby to impart rotation to drum 24.

Side portion 78 guides tongue 66 in the outlet position as the actuator continues in the rearward stroke. A switch spring 84 is slidably secured at terminals 85 and 86 thereof for cooperation with portion 78 to complete the outlet position side and is curved to form the rearward end of cam 76. As shown in Fig. 5, switch spring 84 is disposed to engage follower 70 in the rearward stroke thereof to rotate switch tongue 66 to the inlet position with follower 70 engaging side 80. Switch tongue 66 remains in the inlet position as actuator 50 is forced forwardly by reaction of buffer springs 56. The momentum of drum 24 increases the forward velocity of actuator 50.

An end wall 88 joining side 80 and baffle 82 is curved across the forward path of follower 70 to guide roller 36 back to the dwell position.

Cam 76 includes indentations 90 and 92 adjacent side portion 78 and side 80 respectively for engaging tip 74 to aid in guiding tongue 66. Indentation 92 extends along end wall 88 and joins indentation 90 adjacent the dwell position. The floors of the indentations respectively curve upward at the free and joined ends thereof to provide a pair of steps at the respective opposite ends and permit but one sense of progression of pin 70 in cam 76.

Cam 76 slopes upwards towards opposite side 80 to provide opposition to rotation of switch tongue 66.

The switch member is resilient to compensate for differences in period of the indexing stroke of actuator 50 resulting from allowable variations in the charges of cartridges 32. Thus, these variations are merely reflected in the force with which pin 70 impinges on side 80.

Although a particular embodiment of the invention has 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. A revolver-type automatic weapon comprising a receiver, a cartridge drum, an actuator for controlling rotation of said drum slidable in rearward and forward strokes on said receiver, a switch tongue pivoted in said actuator and provided with a projecting switch pin, and a cam on said receiver for engaging said pin, including a switch portion disposed in the path of said pin in said rearward strokes to rotate said tongue between outlet and inlet positions, said switch portion being resilient to compensate for differences in charges of said cartridges.

2. A revolver-type automatic weapon comprising a receiver, a cartridge drum, an actuator for rotating said drum biased to a battery position and disposed to slide on said receiver in rearward and forward strokes from and to said battery position, a switch tongue pivoted on said actuator between outlet and inlet positions and provided with a pin projecting from said actuator, and a cam secured to said receiver having a pair of parallel sides disposed to respectively guide said switch tongue in said outlet and inlet positions during said rearward and forward strokes, and rearward and forward ends respectively secured thereto to rotate said switch tongue from and to said outlet position in the latter portions of said rearward and forward strokes, said rearward end being resilient to compensate for differences in momentum of said actuator resulting from allowable differences in charge of said cartridges.

3. A revolver-type automatic weapon comprising a receiver, a cartridge drum, an actuator for rotating said drum disposed to slide on said receiver in rearward and forward strokes from and to a battery position, a switch tongue having a projecting pin pivoted on said actuator between outlet and inlet positions, and a cam secured to said receiver having parallel sides and ends, said sides being spaced to guide said pin to respectively retain said switch tongue in said outlet and inlet positions during said rearward and the forward strokes, said ends being disposed across the rearward and forward paths of said pin for engagement therewith to respectively rotate said switch tongue from and to said outlet position, said rearward end including curved springs disposed in layers and slidably secured at the ends thereof to compensate for differences in charge of said cartridges.

4. In a revolver-type automatic weapon including a receiver, a cartridge drum, an actuator for rotating the drum biased to a battery position and disposed to slide on the receiver in rearward and forward strokes from and to the battery position, and a switch tongue pivoted on the actuator between outlet and inlet positions and provided with a pin projecting from the actuator, a cam secured to the receiver comprising parallel sides for respectively guiding the switch tongue in the outlet and inlet positions during the rearward and the forward strokes, rearward and forward ends adjoining said sides for respectively rotating the switch tongue from and to the outlet position at the ends of the rearward and forward strokes, and a baffle spaced from said outlet position side to retain the pin therebetween and secure the switch tongue in the outlet position when the actuator is in the battery position, said rearward end being resilient to compensate for differences in charge of the cartridges.

5. In a revolver-type automatic weapon including a receiver, a cartridge drum, an actuator biased to a battery position and disposed to slide on the receiver in rearward and forward strokes respectively from and to a battery position, and a switch tongue pivoted on the actuator between outlet and inlet positions thereof and provided with a pin having a spring-biased tip and projecting from the actuator, a cam secured to the receiver comprising parallel sides for engaging the pin to retain the switch tongue in the outlet and inlet position during the rearward and forward strokes respectively, rearward and for-

ward ends secured to said sides for rotating the switch tongue from and to the outlet position respectively at the expiration of the rearward and forward strokes, and a pair of steps in said cam for engagement with said tip for single sense progression of said pin in said cam said rearward end being resilient to compensate for allowable differences in charges in the cartridges.

6. A revolver-type automatic weapon comprising a receiver, a cartridge drum, an actuator for controlling rotation of said drum slidable in rearward and forward strokes on said receiver, a switch tongue pivoted in said actuator and provided with a projecting switch pin including a spring-biased tip and a cam on said receiver in-

cluding a resilient switch portion disposed in the path of the rearward stroke of said pin for compensation for differences in charges of said cartridges and for rotation of said tongue from outlet to inlet positions thereof, said cam including a sloped floor for engagement with said tip to resist said rotation.

References Cited in the file of this patent

UNITED STATES PATENTS

749,214 McClean ---------- Jan. 12, 1904

FOREIGN PATENTS

285,180 Switzerland ---------- Dec. 16, 1952