April 4, 1961 E. S. WASSEL ET AL 2,977,854

SINGLE-SPROCKET TWIN-BARREL GUN

Filed May 29, 1957 3 Sheets-Sheet 1

Fig. 1

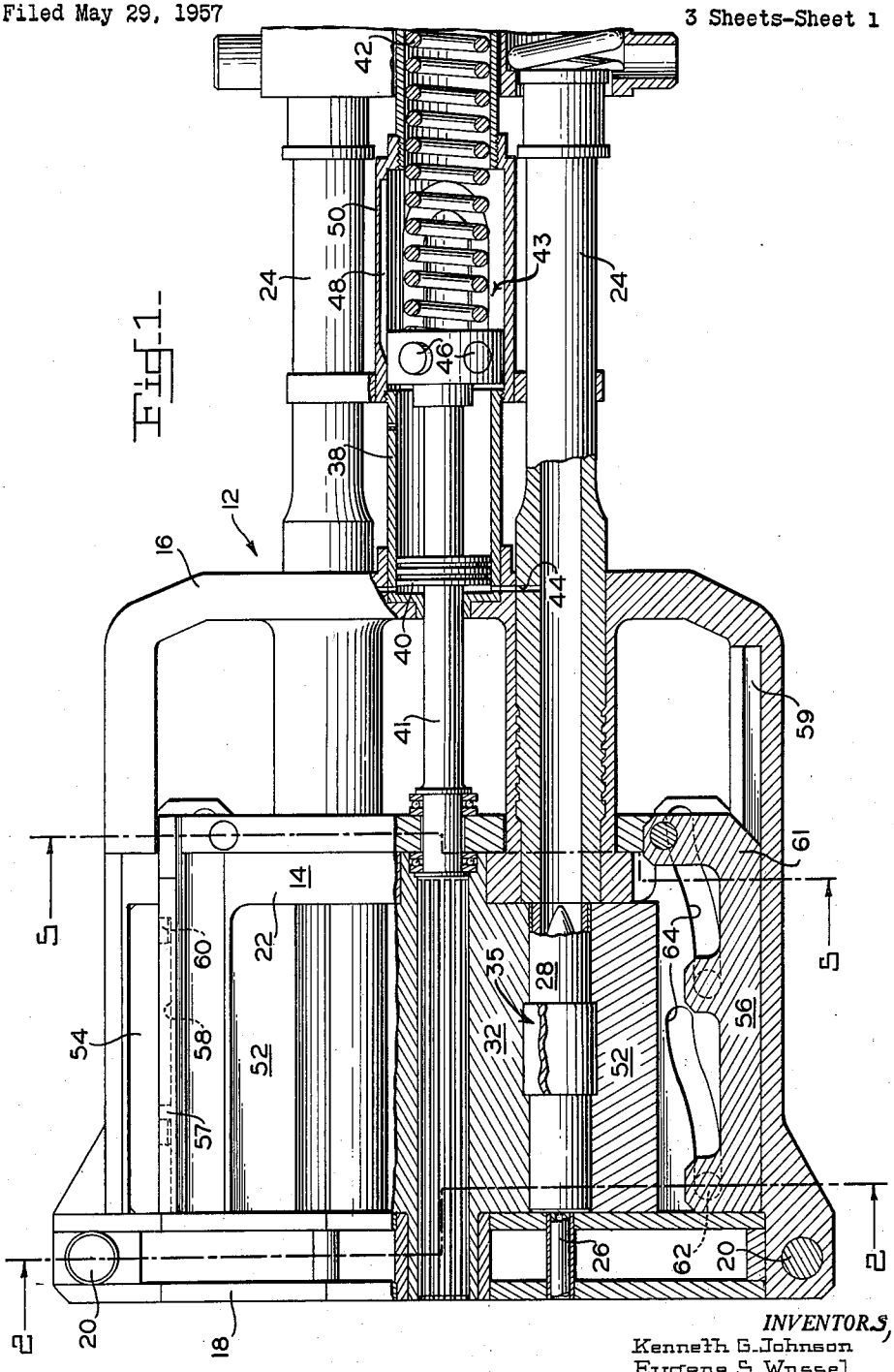

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Fig. 2.

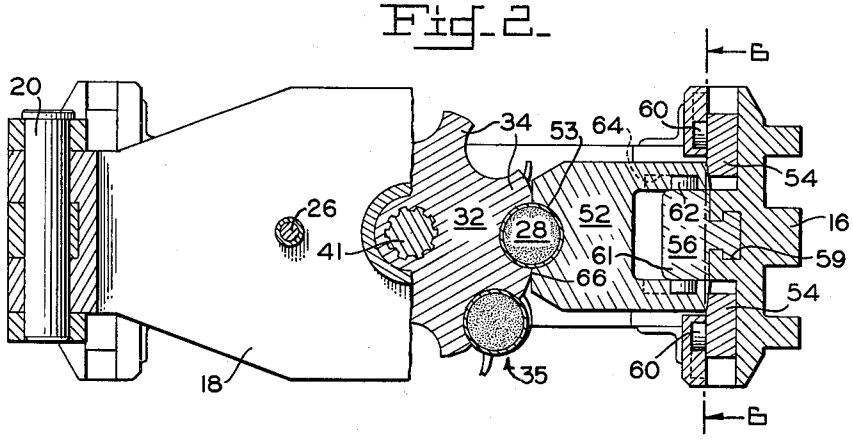

Fig. 3.

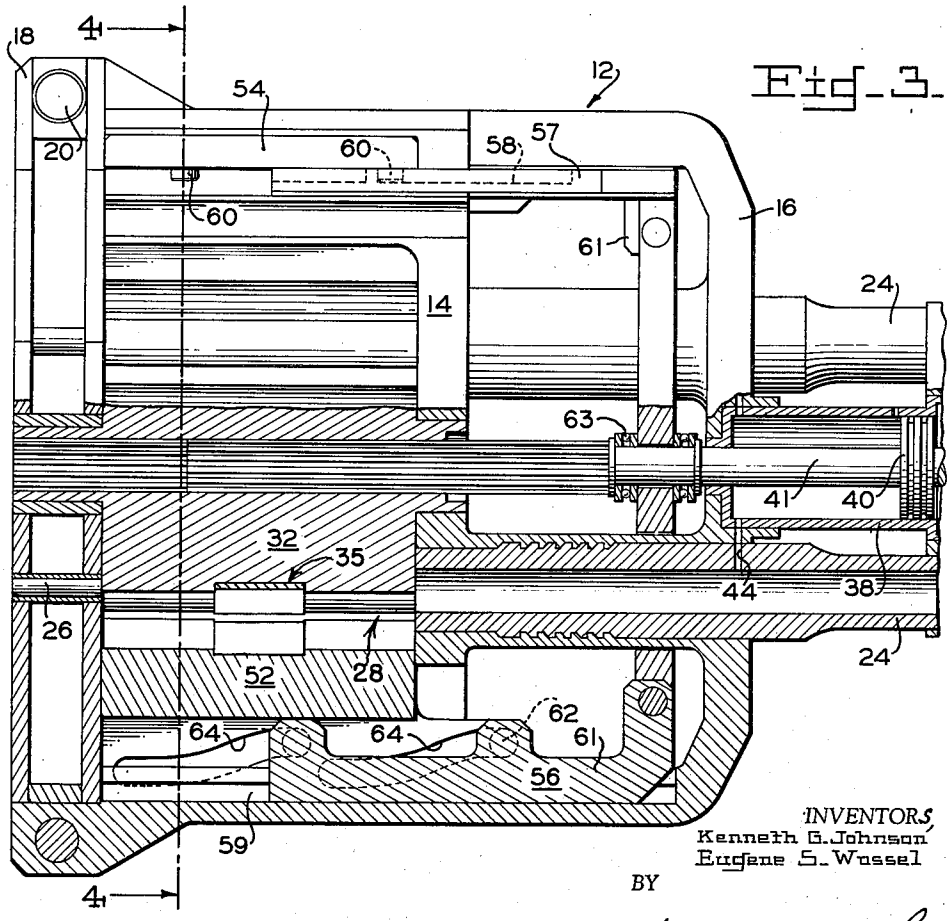

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Fig. 4.

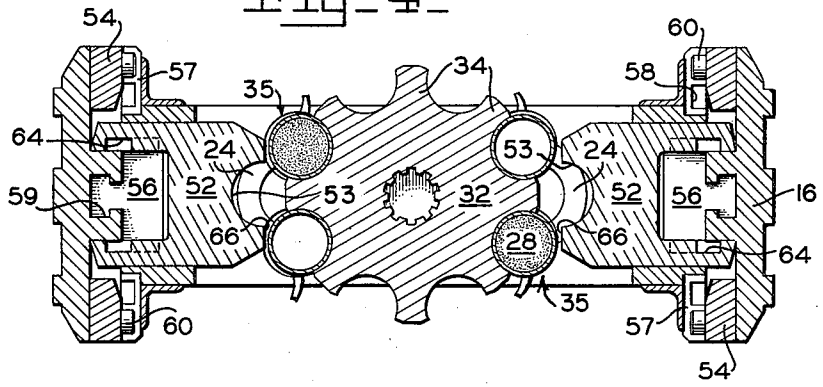


Fig. 5.

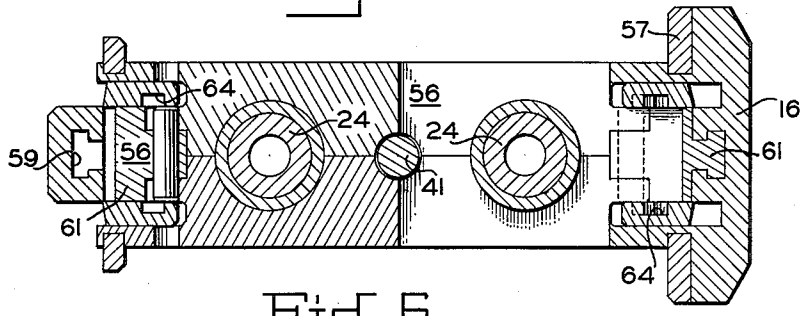
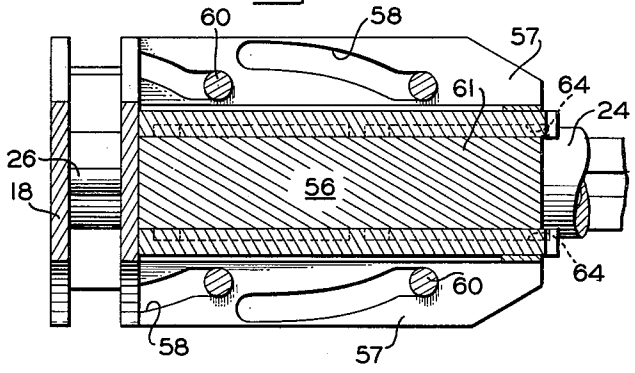


Fig. 6.



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United States Patent Office 2,977,854 Patented Apr. 4, 1961

2,977,854

SINGLE-SPROCKET TWIN-BARREL GUN

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Filed May 29, 1957, Ser. No. 662,551

2 Claims. (Cl. 89—13)

Our invention relates to automatic guns with twin barrels and more particularly to such a gun having a feed sprocket and a pair of shuttles disposed for respective engagement therewith to retain a pair of cartridges in a pair of firing stations in axial alignment with the barrels for simultaneous discharge therethrough.

Conventional automatic guns include receivers with considerable structure projecting rearwardly from the firing station of the cartridges. It is an object of our invention to provide a twin-barrel automatic gun, in which the length thereof is considerably reduced by providing a feeding mechanism having a sprocket for supplying cartridges to firing stations in axial alignment with the respective barrels for simultaneous discharge of the cartridges therethrough.

Another object of our invention is to provide such a gun with laterally reciprocating shuttles for simultaneous engagement with the sprocket to retain the cartridges in the firing stations for discharge thereof.

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

In carrying out our invention, a sprocket is disposed to simultaneously convey a cartridge in each of a pair of ammunition belts to respective firing stations for engagement with firing pins disposed in respective axial alignment with the barrels for simultaneous discharge therethrough.

The gun is provided with a pair of shuttles disposed for simultaneous engagement with the sprocket to retain the cartridges in the respective firing stations for the simultaneous discharge and for reciprocation to and from the engagement positions responsive to the discharge.

For a more complete understanding, reference is directed to the following description and the accompanying drawings in which:

Fig. 1 is a plan view, partly in section, of a gun incorporating our invention with the piston in battery position;

Fig. 2 is a view along line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 1 with the piston in the forward position;

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

Fig. 5 is a view along line 5—5 of Fig. 1; and

Fig. 6 is a view along line 6—6 of Fig. 2.

Accordingly, an automatic gun 12 includes a symmetrical recoil unit 14 including a U-shaped support member 16 and an end member 18 secured between the ends thereof by pins 20. Member 16 includes an intermediate lateral brace 22. A pair of barrels 24 are laterally spaced in member 16, and are longitudinally spaced from end member 18 to provide firing stations for cartridges 28 therebetween. A pair of firing pins 26 extend through end member 18 in axial alignment with the respective barrels.

A sprocket 32 includes an even number of teeth 34 disposed so as to receive therebetween successive ones of the cartridges 28 in a pair of belts 35, which sprocket is rotatably mounted between brace 22 and end member 18 to simultaneously convey a cartridge in each of the belts to the firing station of each of the barrels 24.

Gun 12 is provided with a cylinder 38 which houses a piston 40 biased to a rearward battery position by a spring 42, and ducts 44 connect cylinder 38 to barrels 24 to actuate piston 40 forwardly responsive to gases from discharge of cartridges 28 through the barrels.

A rod 41 secured to piston 40 is splined for engagement with sprocket 32 and is connected to an indexing device 43 with rollers 46 disposed to respectively project into tracks 48 of a drum cam 50 secured to recoil unit 14 for rotation of sprocket 32 in a single direction to successively convey the cartridges 28 in the belts 35 to the firing stations responsive to the stroke operation. The indexing device is fully described and claimed in the application of Samuel Altschuler entitled "Single-Shuttle Twin-Barrel Gun," Serial No. 639,142, filed February 8, 1957.

A pair of shuttles 52 are slidingly mounted to member 16 on opposite sides of sprocket 32 for lateral reciprocation between positions of engagement with pairs of teeth 34 and open positions spaced sufficiently away from sprocket 32 to permit passage of the cartridges 28 thereby when rotated by such sprocket to and from the firing stations. A semicylindrical recess 53 is provided in the ends of the shuttles 52 which are engageable with the teeth 34 to cooperate therewith in forming a chamber for inclosing the firing station cartridges 28 during discharge thereof. The engaging ends of the shuttles 52 are also provided with curved faces 66 where engageable with the teeth 34 to increase the area of engagement therebetween so as to contain the force of explosion when the cartridges 28 are discharged.

The shuttles 52 are locked in the engagement positions thereof by a pair of wedges 54 which are slidingly mounted to member 16 so as to be movable, as hereinafter described, in a vertical plane between the outer ends of the shuttles and the adjacent sides of member 16 after the shuttles are moved to their engaged positions.

Movements of the shuttles 52 and the wedges 54 are effected by a device including an actuator 56 having a pair of arm portions 61 which are slidable along longitudinally-disposed tracks 59 provided on the inside of member 16. Actuator 36 is joined to rod 41 for longitudinal reciprocation therewith by a bearing 63. Attached to each of the arm portions 61 is a cam plate 57 which is provided with a cam groove 58 for slidingly receiving a roller 60 mounted to the corresponding ones of the wedges 54 as is best shown by Fig. 6. The cam grooves 58 are so formed that the wedges 54 are simultaneously moved downwardly to the locking positions thereof between the shuttles 52 and the sides of member 16, when piston 40 reaches battery position, and are simultaneously moved upwardly away from the locking position at the beginning of the rearward stroke of the piston.

Each of the cam plates 57 is also provided with a roller 62 which is slidingly received by a cam guide 64 in the corresponding one of the shuttles 52 so that the shuttles are moved to and from the engagement positions during the intermediate portions of the reciprocal stroke operation of piston 40.

The operation of firearm 12 is as follows:

When firearm 12 is in battery and ready to fire, a cartridge 28 is disposed in each of the two firing stations and they are chambered between sprocket 32 and the shuttles 52. When the chambered cartridges are discharged by the firing pins 26, the gases from the discharges enter cylinder 38 to force piston 40 forwardly and carry with it actuator 56. During the initial forward movement of actuator 56, the wedges 54 are moved upwardly from in back of the shuttles 52 through the cooperation of cam grooves 58 with rollers 60. When

the wedges **54** are clear of the shuttles **52**, the rollers **62** in cooperation with the cam guides **64** cause the shuttles to be moved to the open positions thereof to free sprocket **32** for rotation to the following index position and align the succeeding cartridges **28** in the pair of belts **35** to respective ones of the firing stations. During the following rearward stroke of piston **40** actuated by spring **42**, the sequences of operation noted above are reversed so that, when the piston reaches battery position, another pair of cartridges **28** are chambered in the firing stations ready for discharge.

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.

We claim:

1. In a gun provided with a pair of barrels for the discharge of cartridges therethrough, a piston actuated longitudinally from a battery to a forward position by the force of the discharge, a spring for biasing the piston to the battery position, a device for converting the longitudinal movement of the piston to sequential rotation thereof to a plurality of index positions and a member for supporting the barrels, the combination including a pair of belts for linking together a plurality of the cartridges, a sprocket connected to the piston for sequential rotation thereby to the index positions, a plurality of teeth projecting from said sprocket for sequentially engaging the cartridges in said pair of belts for delivery to firing stations respective to the pair of barrels when said sprocket is sequentially rotated to the index positions, said teeth being disposed to partially inclose the cartridges engaged thereby when in the firing stations, a pair of shuttles mounted to the support member for sliding lateral reciprocation between engaged positions wherein said shuttles are respectively engaged with pairs of said teeth and an open position for passage of the cartridges engaged by said sprocket past said pair of shuttles, semicylindrical recesses disposed respectively in said shuttles for cooperation with pairs of said teeth to form chambers for the discharge of the cartridges when

in the firing stations, portions of said shuttles on said opposite sides of said recesses curved to coincide with the engaged portions of said teeth to increase the area of engagement therebetween, a pair of wedges mounted to the support member for sliding placement between the ends of said shuttles and the adjacent sides of said support member to secure said shuttles in the engaged positions, an actuator mounted to the support member for sliding movement therein, a bearing member for connecting said actuator to the piston for longitudinal reciprocation therewith, and a cam device operationally disposed between said actuator, shuttles and wedges whereby through the operation of the piston said shuttles are actuated to the engaged positions thereof after said sprocket is rotated to an index position and said wedges are moved to block said shuttles in the engaged positions.

2. The combination of claim 1, wherein said cam device comprises a pair of cam plates secured to said actuator for reciprocation therewith respectively adjacent said shuttles and corresponding ones of said wedges, a roller disposed on each of said cam plates for sliding engagement with a cam guide in adjacent ones of said shuttles for actuation thereof to the engaged positions thereof by the piston during movement to battery position after said sprocket is rotated thereby to one of the index positions, and a roller disposed on each of said wedges for sliding engagement with a cam groove in corresponding ones of said cam plates for actuating said wedges in back of said shuttles to allow the actuation thereof to the engaged positions during the final portion of the movement of the piston to battery position.

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