United States Patent [19]

Robinson

[11] **3,766,825**

[45] **Oct. 23, 1973**

[54] **CARTRIDGE FEEDER**

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[22] Filed: **July 31, 1972**

[21] Appl. No.: **276,555**

[52] **U.S. Cl.** ..... **89/33 SF,** 89/33 CA

[51] **Int. Cl.** **F41d 9/02**

[58] **Field of Search** ..... 89/33 R, 33 SF, 33 BA, 89/33 BC, 33 CA

[56] **References Cited**

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Primary Examiner—Stephen C. Bentley

Attorney—John M. Prutzman et al.

[57] **ABSTRACT**

A dual cartridge feeder with alternatively operable sprocket drive and ramming tray assemblies each having a one-way escapement device for effecting two-step cartridge feed responsive to reciprocating motion of a recoiling member of the weapon between recoiled and runout (counter-recoiled) positions.

21 Claims, 6 Drawing Figures

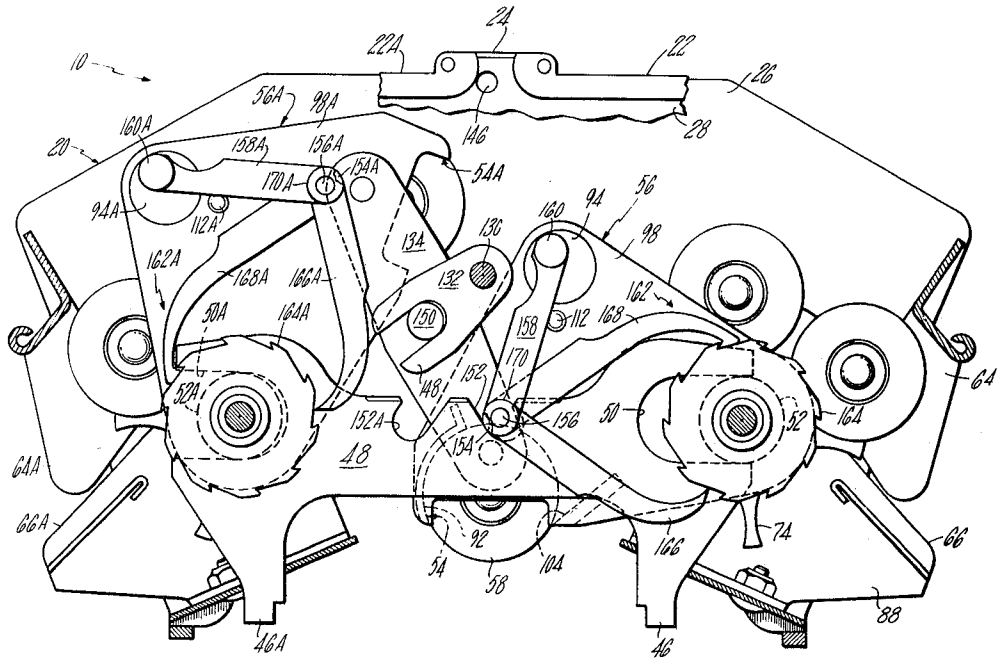


FIG. 1

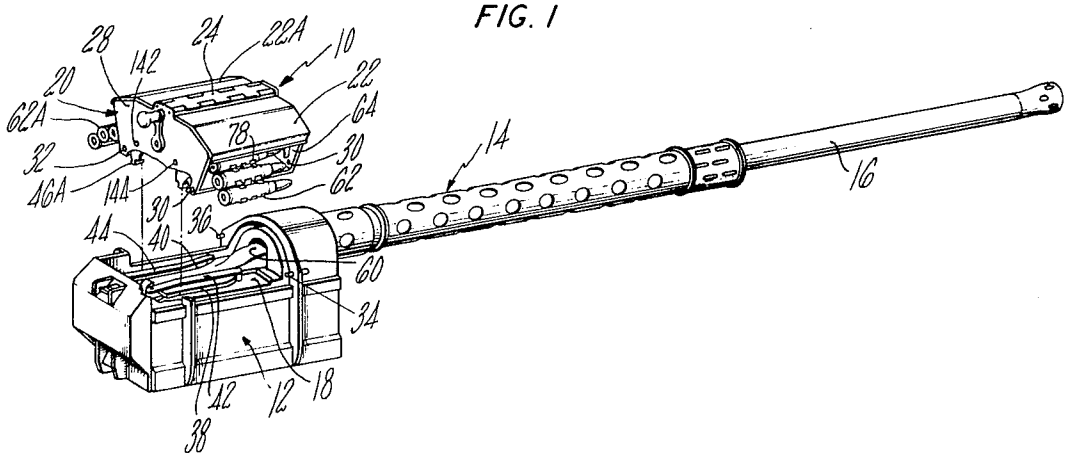


FIG. 3

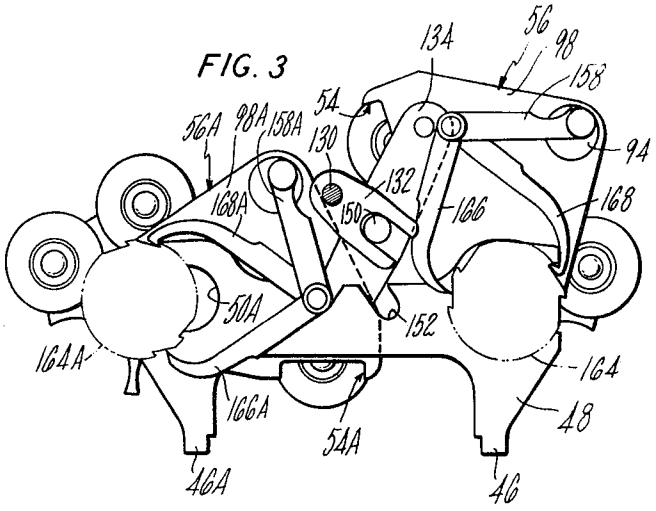
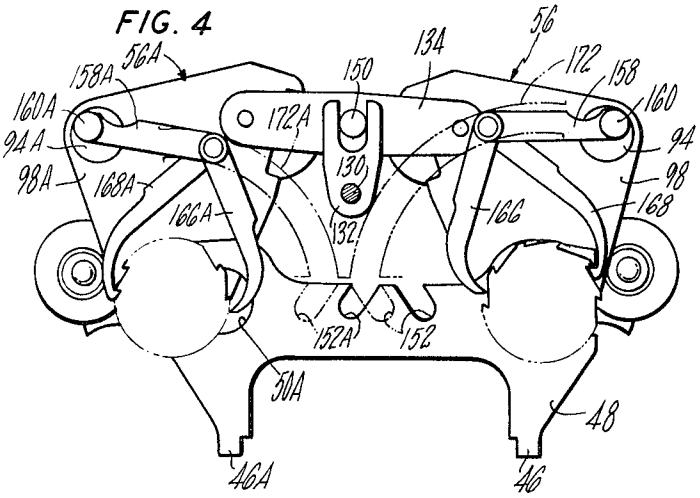


FIG. 4



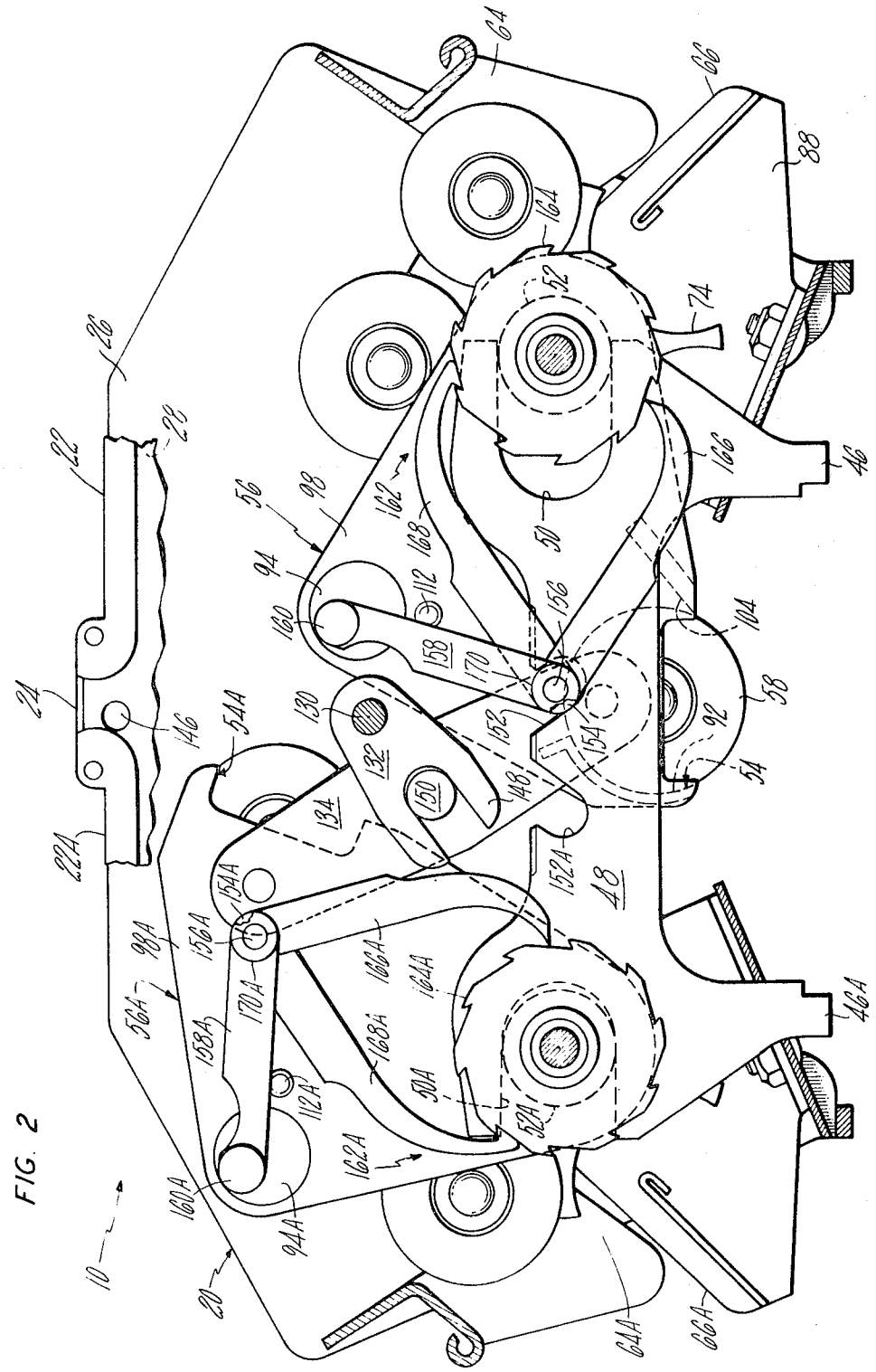

64
66
88
164
52
74
126
22
28
56
98
94
162
168
50
112
160
158
170
156
104
166
46
24
146
54A
130
132
152
154
92
58
54
134
150
148
22A
152A
48
154A
156A
98A
56A
166A
164A
170A
168A
158A
112A
50A
52A
46A
162A
160A
94A
10
20
64A
66A

FIG. 2

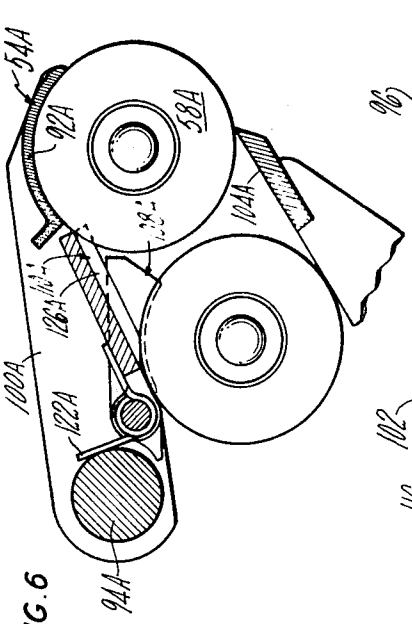

54A
92A
58A
104A
100A
122A
94A

FIG. 6

10
20
28
172
136
138
140
160
132
158
168
142
164
134
130
56
98
124
110
122
100
118
94
70
108
72
120
116
114
112
102
106
96
26
82
80
84
86
88
90
92
54
76
68
66
74
126
104
50
52
46
48
162

FIG. 5

CARTRIDGE FEEDER

This invention generally relates to firearms and particularly concerns a cartridge feeder for selective feeding of different types of ammunition to a firearm.

A primary object of this invention is to provide a new and improved cartridge feeder permitting selective interchange in the type of ammunition to be fed to a weapon without requiring removal, replacement or readjustment of ammunition type. Included in this object is the aim of providing such a feeder which, upon changeover in the type of ammunition selected, ensures that the first shot fired is of a desired alternative ammunition type.

Another object of this invention is to provide a new and improved dual cartridge feeder which feeds cartridges substantially in line with a barrel chamber of the associated weapon to minimize undesired "level jumping," "backbreaking" of cartridges etc. (conducive to malfunctions, e.g., misloading stoppages).

A further object of this invention is to provide a cartridge feeder of the above described type having a new and improved operating linkage for alternatively operable sprocket drive and ramming tray assemblies to effect a two-step cartridge feeding movement in timed relation to reciprocation of the most smoothly operating recoiling member of the associated weapon.

A still further object of this invention is the provision of a dual cartridge feeder of the type described having a new and improved changeover control which virtually precludes inadvertent changeover of ammunition and which is particularly suited to desirably lock its sprocket drive and ramming tray assemblies in a "safe" position with both ramming trays inactivated.

Another object of this invention is to provide a new and improved dual cartridge feeder particularly suited to accommodate two different types of ammunition to be fed into opposite sides of the feeder for feeding a selected type of ammunition into a barrel chamber of the associated weapon. Included in this object is the aim of providing such a cartridge feeder which is readily modified for use with a variety of different types of single chamber weapons.

A further object of this invention is to provide a cartridge feeder of the above described type which is quick and easy to mount and disassemble either in part or in its entirety as an integral unit relative to its associated weapon for facile inspection, field stripping, maintenance and other desired requirements.

Other objects will be in part obvious and in part pointed out in more detail hereinafter.

A better understanding of the objects, advantages, features, properties and relationships of the invention will be obtained from the following detailed description and accompanying drawings which set forth in illustrative embodiment and is indicative of the way in which the principle of this invention is employed.

In the drawings:

FIG. 1 is an exploded isometric view of a gun embodying a cartridge feeder of this invention;

FIG. 2 is an enlarged transverse view, partly broken away and partly in section, of the cartridge feeder of FIG. 1 shown in one operative condition;

FIG. 3 is a view similar to FIG. 2 but on a reduced scale, and with certain parts removed for clarity of illustration, showing the cartridge feeder in a second operative condition;

FIG. 4 is a view similar to FIG. 3 showing the cartridge feeder in an inactivated "safe" position;

FIG. 5 is an enlarged longitudinal view, partly broken away and partly in section, of the cartridge feeder of FIG. 1; and

FIG. 6 is an end view, partly broken away and partly in section, showing a detail of a ramming tray of the cartridge feeder.

Referring to the drawings in detail, a cartridge feed mechanism **10** is shown in FIG. 1 as a separate module bodily removable and attachable as an integral unit in relation to a receiver **12** of a gun **14**. The gun **14** has a barrel assembly **16** reciprocably mounted for recoiling and counter-recoiling movement along its longitudinal axis relative to the receiver **12** between a forward battery or runout position and a rearward charged or recoiled position. Specific details concerning the mounting and positions of the recoiling member are neither shown nor fully explained as such details are of conventional construction well known in the art. In explanation of this invention, it will be sufficient to understand that operation of the weapon results in reciprocating forward and rearward movements of a recoiling member and that such motion imparts the energy required to effect operation of the feed mechanism **10** via the most smoothly operating recoiling member. For purposes of illustration, this recoiling member will be understood to be a barrel extension **18** of the barrel assembly **16**.

A feeder frame or housing **20** with a pair of "gull wing" cover plates **22, 22A** is hinged along opposite longitudinal edges of an upper center plate **24** fixed to and interconnecting top edges of front and rear housing walls **26** and **28**. If desired, openings may be formed in the lower left and right hand corners of the housing walls **26, 28** (such as at **30** and **32** in FIG. 1) for receipt of spring loaded bayonet type locking studs mounted in the receiver as at **34** and **36**. Such construction permits facile removal and reassembly of mechanism **10** as an integral unit in its entirety relative to receiver **12** or will permit the housing **20** to be uncoupled on only one side and pivotally rocked about its opposite side, desirably permitting access to the interior of the weapon and bottom of the feed mechanism **10**.

The feed mechanism **10** of this invention is accordingly removably fixed in symmetrical overlying relation to a pair of contoured cam tracks **38** and **40** (FIG. 1) formed in the upper surface of barrel extension **18**. It will be understood that a pair of cam follower levers **42** and **44** are suitably mounted adjacent their rear end portions for pivotal movement on the receiver **12** about vertical axes for following movements along the contoured cam tracks **38** and **40** in the barrel extension **18** (shown in rear charged position) responsive to its reciprocation.

Cooperating with the cam follower levers **42** and **44** are a pair of depending extensions **46** and **46A** projecting from a vertically disposed shuttel **48** in the feed mechanism **10**. Bifurcated portions are formed on opposite lateral sides of the shuttle **48** providing generally U-shaped openings **50, 50A** such that the shuttle **48** is supported on a pair of sprocket shafts **52** and **52A**. As seen in FIGS. **2** and **5**, sprocket shafts **52** and **52A** are journaled in parallel relation to one another on the front and rear housing walls **26, 28**, whereby shuttle **48** is laterally reciprocated transversely of the axis of

movement of the barrel extension 18 responsive to its longitudinal reciprocation.

In the specifically illustrated embodiment of this invention, two different types of ammunition may be fed into the feed mechanism 10 respectively from its opposite sides to permit selective ammunition interchange in the weapon. High explosive rounds (which are normally used) may be fed into one side of mechanism 10, and its opposite side may be supplied with other ammunition types, e.g., a belt of flechette cartridges or armor piercing rounds.

For this purpose, a pair of cartridge ramming trays, generally designated 54 and 54A, are pivotally supported on sprocket shafts 52 and 52A for independent rocking movements. The construction of each feeder or sprocket drive and ramming tray assembly 56 and 56A is substantially identical, and only one will be hereinafter described in detail.

The trays 54, 54A of the assemblies 56, 56A are alternatively rocked into a common operative position, wherein one ramming tray such as at 54 in FIG. 2 is in a low central position in the feed mechanism 10 to present a cartridge such as shown at 58 contained in the tray 54 in a ramming position in front of a charged bolt, not shown, and in substantial alignment with the bolt and barrel chamber 60 of the weapon 14. With tray 54 in operative position, the other tray 54A will be inactivated and disposed in a raised position remotely located from the path of bolt movement.

Belts 62, 62A of conventionally linked cartridges (such as shown in FIG. 1) may be fed through side openings 64, 64A of the housing 20 onto upwardly sloping ramps 66, 66A and along linear cartridge link guides such as at 68 in FIG. 5. Upon entering the housing 20, each cartridge is received in nesting engagement with spaced, aligned, annular surfaces between adjacent radial projections on each of a plurality of feed sprockets. In the illustrated embodiment, as best seen in FIG. 5, two identical sprockets 70, 72 are rotatably mounted on shaft 52 intermediate a rear sprocket 74 and a forward sprocket 76. The latter has its cartridge receiving surfaces in relatively radially outwardly disposed relation to sprocket shaft 52 for receiving and engaging a reduced nose portion of each cartridge fed into the feeder 56, with each of the sprockets 70, 72, 74, 76 mounted for simultaneous rotation with their shaft 52. As the cartridges are fed into the feeder 56, the cartridge links (at 78 in FIG. 1) are interposed between the cartridge case and ramp 66. As each cartridge is engaged by the sprockets, forwardly and rearwardly projecting conventional tangs (not shown) of the cartridge links 78 are driven under projecting lips 80, 82 of link stripping chutes 84, 86. The chutes 84, 86 are formed on rear and front end plates 88, 90 of the ramp 66 for capturing and stripping the links and guiding the stripped links around the shaft 52 in radially outwardly spaced relation thereto and back out the housing opening 64 along a downstream portion of the chutes 84, 86 underlying the cartridge ramp 66 to discharge empty links out of the feeder 56 under incoming ammunition belt 62.

Continued rotation of shaft 52 in a cartridge feeding direction (counterclockwise as viewed in FIG. 2) causes the cartridge sprocket drive of feeder 56 to rotate the cartridges carried thereby sequentially along a cartridge feed path into captured engagement in the ramming tray 54 in ramming position shown occupied by cartridge 58. Trays 54 and 54A are shown as elongated parti-circular members 92 and 92A (FIGS. 5 and 6) supported in offset fixed relation to tray support shafts 94 and 94A secured in parallel spaced relation to the adjacent sprocket shaft 52 and 52A. Opposite ends of the tray support shaft 94, 94A are fixed to swinging ends of a front plate (only one shown at 96) and a triangular back plate 98, 98A respectively mounted for pivotal or rocking movements on its associated sprocket shaft 52, 52A. As seen in FIG. 5, each tray member such as 92 is supported by back plate 98 and a pair of radial arms 100 and 102 fixed to each tray support shaft such as 94 to rigidly position tray member 92 in an overcenter position relative to a central vertical plane of the feed mechanism 10 as seen in FIG. 2 when tray 54 is in operative position.

As each cartridge is successively fed by the sprocket drives of feeder 56 toward its tray 54, each cartridge is pushed onto a heel positioning plate 104 (as best seen at 104A in the tray 54A of FIG. 6) mounted in forwardly disposed relation to its back plate 98 downstream of its sprocket drive, and passes under a set of contoured spring biased guides 106, 108 and 110. The cartridge 58 will temporarily cam guides 106, 108, 110 out of position as the cartridge 58 moves into engagement with its tray 54 and in disengaged relation to its sprockets 70, 72, 74, 76. As best seen in FIG. 5, guides 106, 108 and 110 are shown mounted for pivotal movement on an auxiliary support shaft 112 secured in parallel spaced relation to the tray support shaft 94 by the above noted tray support arms 98, 100 and 102.

For positively engaging each cartridge 58 to block even any partial cartridge withdrawal from its ramming position, the forwardmost guide 106 serves as a cartridge nose depressor and is shown having a relatively short tapered surface for engaging the reduced contoured nose portion of a cartridge 58 once it is disposed in its ramming tray 54. Nose depressor guide 106 is urged toward a normal cartridge blocking position by a torsion spring 114 coiled about guide support shaft 112 with the blocking position being established by interference between tongue 116, projecting from guide 106, and tray support shaft 94.

Similar tongues 118 are provided on ends of center guide 108 for establishing its normal blocking position toward which the guide 108 is urged by a second torsion spring 120 also coiled about guide support shaft 112. Guide 108 is of relatively extended length for positioning and effectively blocking undesired withdrawal of cartridge 58 from its ramming position along a substantial portion of its case.

To prevent both unintended withdrawal along the cartridge feed path and forward displacement of a cartridge 58 in ramming position, rim locator guide 110 is pivotally mounted on the guide support shaft 112 forwardly of back plate 98 with torsion spring 122 urging guide 110 toward a normal position wherein its projecting tongue 124 engages tray support shaft 94 while permitting passage of a cartridge 58 into ramming position within the tray 54. As with guides 106 and 108, cartridge feeding into the ramming tray 54 cams the locator guide 110 angularly against the bias of its torsion spring 122 which then returns the locator guide 110 into normal blocking position with a V-shaped projection (shown in broken lines at 126 in FIG. 5) disposed in a cannelure at the breech end of the cartridge 58. This axial blocking arrangement may best be seen in

FIG. 6 wherein projection 126A effectively prevents forward displacement of a cartridge 58A in tray 54A while yet permitting cartridge 58A to be positively thrust into the chamber 60 by the bolt upon sear release. The disclosed V-shaped configuration of the rim locator guide 110 and the resilient bias established by its spring 122 have been found to be satisfactory in preventing such unintended axial displacement regardless of the position of its feeder 56 while yet permitting positive cartridge feeding under the driving force of the bolt when in ramming position.

To effect a substantially constant-speed cartridge feeding action for smooth, reliable operation during both recoil and runout which also desirably permits use of relatively inexpensive, lightweight aluminum alloy ammunition cases and links, an improved one-way, two-step feeder drive is provided in accordance with this invention. This feeder drive alternately activates the independently operated sprocket drive and ramming tray assemblies or feeder 56, 56A for feeding a selected type of ammunition responsive to reciprocating motion of the barrel extension 18 between its charged and battery positions, while additionally providing a highly desirably "safe" condition wherein the feeders 56, 56A are both locked with their ramming trays 54, 54A in inoperative neutral positions.

The feeder drive includes a changeover control shaft 130 drivingly connected to both feeders 56, 56A via a selector crank 132 and a feeder control link or tiebeam 134 with the control shaft 130 supported for rotation in a central portion of rear housing wall 28 and coupled directly to an external operating handle 136.

The operating handle 136 has a knob 138 housing a a spring loaded plunger 140 which is releasably self-locking within apertures 142, 144 and 146 in the rear housing wall 28. The tiebeam 134 provides a common driving link between the feeders 56 and 56A with opposite end portions of the tiebeam 134 pivotally secured to the back plates 98 and 98A of feeders 56 and 56A for selectively rocking one or the other of the trays 54, 54A alternatively into operative and inoperative positions responsive to angular positioning of the selector crank 132.

For this purpose, selector crank 132 is provided with a bifurcated free swinging end 148 drivingly connected to a projecting boss 150 fixed on the tiebeam 134 and received in captured relation within the slotted swinging end 148 of crank 132. By virtue of this construction, a drive coupling is provided which is continuously maintained between the selector crank 132 and the tiebeam 134 regardless of their relative angular position while also permitting limited freedom of linear movement of the tiebeam boss 150 within its crank slot to accommodate pivotal movements of the drive components during changeover.

To operate the feeders 56 and 56A, the shuttle 48 has a pair of drive slots 152, 152A shown extending downwardly from an upper edge of the shuttle. Slots 152 and 152A are in diverging relation to one another for respectively receiving rollers 154 and 154A mounted on rocker pins 156 and 156A extending through swinging ends of rocker arms or rockers 158 and 158A rotatably supported on pivot pins 160 and 160A. Pivot pins 160 and 160A are secured to the back plate 98, 98A of each feeder 56, 56A in approximately aligned but slightly offset relation to the axis of its respective tray support shaft 94, 94A.

To transmit rotary motion to the sprocket drive and ramming tray assemblies of feeders 56, 56A responsive to reciprocating motion of shuttle 48, an escapement device 162, 162A is provided for each feeder. More specifically, a ratchet drive wheel 164, 164A is fixed on each sprocket shaft 52, 52A adjacent the rear housing wall 28, and a cooperating pair of advancing pawls 166, 168 and 166A, 168A are pivotally mounted on the rocker pins 156 and 156A in diametrically spaced relation to their respective ratchet wheels 164 and 164A. Accordingly, upon roller 154 of feeder 56 engaging its respective slot 152 in the shuttle 48, one of the pawls 166 rotates the ratchet wheel 164 in an angular feeding direction during movement of the shuttle 48 in one lateral direction to an extreme limit position. The other pawl 168 continues rotation of the ratchet drive wheel 164 in the same feeding direction during return movement of the shuttle 48 in the opposite lateral direction to its other extreme position. For guiding each of the rollers 154 and 154A into and out of engagement with its respective slot 152 and 152A in shuttle 48 to selectively operate one or the other of the feeders 56, 56A, the rocker pins 156, 156A each also carry rollers 170 and 170A on rear end portions of the pins 156, 156A for receipt in curved guide slots 172, 172A suitably formed on the inside surface of the rear housing wall 28 (FIGS. 4 and 5). The ratchet engaging ends of each set of pawls 166, 168 and 166A, 168A are suitably formed such that the inactive pawl rides over the surface of its respective ratchet wheel 164, 164A as it is being driven by the active pawl and, if desired, the pawls of each set may be biased toward one another by a spring, e.g., not shown, to ensure continued driving engagement between the pawls and their ratchet wheels.

In accordance with still another feature of this invention, the changeover control shaft 130 may be selectively positioned in a vertical position (FIG. 1) wherein plunger 140 within knob 138 is located in central housing aperture 146 (FIG. 2) to positively lock control shaft 130 against inadvertent displacement and disposing tiebeam 134 in a generally horizontal position (FIG. 4) to locate both feeders 56, 56A in the illustrated intermediate "safe" position. The geometrical relationship of the drive linkage, guide slots, and ratchet wheels is designed to ensure that at least one pawl of each set of pawls actively engages a tooth of its respective ratchet wheel in "safe" position to prevent undesired reverse rotation when the feed mechanism 10 is rendered inoperative, due to the "no-back" action of the engaging pawl, preferably the "puller" pawl 168, 168A in each escapement device 162, 162A. Thus, when one feeder 56, 56A is in operative position, the other feeder will be deactivated and located in its inoperative position (as best seen in FIGS. 2 and 3) with one of its pawls, preferably its "puller" pawl such as at 168, 168A actively engaging and serving as a no-back for its respective ratchet wheel 164, 164A.

In operation, the operating handle knob 138 must be intentionally and positively withdrawn to displace its spring actuated plunger 140 from locking engagement within aperture 146 before operating handle 136 may be turned from "safe" position in either angular direction to activate a selected feeder 56, 56A. The weapon must also be in its charged position whereby the shuttle 48 will be disposed at one extreme lateral limit position with its drive slots 152, 152A registering with guide slots 172 and 172A respectively in rear housing wall 28

(as shown in broken lines in FIG. 4). Movement of selector crank 132 counterclockwise from "safe" position (FIG. 4) into the operating condition shown in FIG. 2 rocks the left hand feeder 56A into a remote inactive position, while the selector crank 132 and the common tie-beam 134 simultaneously drive right hand feeder 56 into its illustrated operative position with rocker pin roller 154 in captured engagement with slot 152. Release of knob 138 effects spring actuation of plunger 140 into aperture 142 which serves as a detent to lock feeder 56 in operative condition. Shuttle 48 is accordingly coupled to the right hand sprocket shaft 52 via its escapement device 162 whereby pawls 166 and 168 may effect a two-step drive responsive to shuttle reciprocation causing a pendulum motion of rocket 158 about its pivot pin 160 which serves as a fulcrum for the escapement device 162. A cartridge 58 contained in the ramming tray 54 accordingly is approximately aligned with the barrel axis and chamber bore for virtually straight line ramming cleanly into the chamber 60. Upon bolt release, incoming round 58 is thrust forwardly from its tray 54 into chamber 60 with minimal "level-jumping" which may otherwise cause "backbreaking" of the cartridge 58, and the barrel extension cam surfaces 38, 40 actuate the follower levers 42, 44 to engage and move the depending extensions 46, 46A of shuttle 48 to the right hand limit position. This linear lateral movement of shuttle 48 causes "puller" pawl 168 to slip over two ratchet teeth during barrel runout into battery as "pusher" pawl 166 positively drives ratchet wheel 164 in a counterclockwise feeding direction. After firing and during recoil, shuttle 48 is driven toward its illustrated left hand limit position. This return movement causes "puller" pawl 168 to actively engage a tooth of ratchet wheel 164 to continue its movement in a counterclockwise direction. "Pusher" pawl 166 simultaneously slips over two teeth during the last increment of the two-step driving action whereby the sprockets 70, 72, 74, 76 move an incoming round smoothly under the spring biased guides 106, 108, 110 and into ramming position in the tray 54 upon barrel extension return to changed position.

During both runout and recoil barrel movements, continuous engagement of the cooperating advancing pawls with their ratchet drive wheel precludes any possibility of the sprocket shafts 52, 52A being rotated in a direction other than a cartridge feeding direction. Continued firing automatically cycles feeder 56 as described above to effect smooth sequential feeding of incoming rounds in automatically timed relation to the operation of the weapon.

To select a different ammunition to be fed from the left hand side of feed mechanism 10 (FIG. 2), changeover is performed by simply turning the single control member, i.e., the selector crank 132 to its opposite operating position. Operating knob 136 must be pulled rearwardly to displace plunger 140 from its locking aperture 142 (minimizing any possibility of inadvertent changeover under high stress combat conditions) whereby, with the weapon charged, operating handle 136 may then be rotated clockwise to lock plunger 140 in the right hand locking aperture 144 (FIG. 1). This action causes the right hand feeder 56 to be automatically driven into its remote inactive position shown in FIG. 3 and the left hand feeder 56A will be disposed in operative position. The left hand feeder 56A will then be coupled in driving engagement with the shuttle 48 for feeding ammunition from the left hand side of housing 20 substantially as described above but with the sprocket shaft 52A being rotated in a clockwise feeding direction in two-step increments during reciprocation of the recoiling mass between battery and charged positions.

A dual cartridge feeder of the above described construction not only provides selective interchange of the ramming trays 54, 54A so that it is not necessary to first fire one or two residual rounds of a particular type of ammunition before different ammunition can be used, as frequently encountered in conventional feeders, but also presents ammunition in each feeder 56, 56A as close as possible to the center line of the chamber bore. Such construction ensures incoming rounds will be delivered without undesired "backbreaking" tendencies or frequent misloading stoppages normally associated with dual feeder mechanisms. The single selector control minimizes inadvertent changeover of ammunition type, and the disclosed drive linkage permits the feeder mechanism 10 to be rendered entirely inoperative in its "safe" position wherein both feeders 56, 56A are rocked out of their common operative position precluding any possibility of inadvertent ramming of ammunition from either feeder. The unitary nature of the mechanism additionally facilitates quick and easy access to the interior of the weapon 14 and the bottom of the feed mechanism 10 by simply unlocking the housing 20 on one side from the receiver 12 and then rocking the feed mechanism 10 about its opposite side or, if desired, the mechanism 10 may be readily removed in its entirety and later reassembled in a facile manner relative to its receiver. Finally, it will be appreciated that a feed mechanism of the disclosed type may be modified for a variety of new or existing weapons having dual feed requirements while ensuring reliable performance with few service requirements over an extended period of time under demanding field conditions due to its relatively compact construction incorporating a minimum number of operating components.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

I claim:

1. A mechanism for interchangeably feeding cartridges of different types to a firearm and comprising a frame, two cartridge feeders each having a rotary sprocket drive and associated ramming tray, the rotary sprocket drives being supported in parallel spaced relation on the frame, the ramming trays being pivotable about rotational axes of their respective rotary sprocket drive for independent rocking movements toward and away from a common operative position intermediate said sprocket drive axes, and a selector control operably connected to the cartridge feeders for alternatively locating the ramming trays in said common operative position.

2. The mechanism of claim 1 wherein said common operative position of the ramming trays is located midway between the rotational axes of their respective rotary sprocket drives but in a position located below a plane containing said sprocket drive axes and in operative alignment with a chamber of the firearm.

3. The mechanism of claim 1 wherein the selector control is manually operable and drivingly interconnects the ramming trays for locating one of the ram-

ming trays in operative position during withdrawal of the other ramming tray therefrom to effect immediate interchange in the ammunition selected.

4. The mechanism of claim 1 wherein the selector control includes a feeder control link pivotally mounted on and drivingly interconnecting the ramming trays of the cartridge feeders, and a selectively operable changeover control shaft rotatably supported on the frame intermediate said sprocket drive axes and drivingly coupled to the feeder control link for alternatively moving the ramming trays toward and away from said common operative position.

5. The mechanism of claim 4 wherein the changeover control shaft has a manual operating handle extending radially outwardly thereof and disposed externally of the frame, the operating handle being rotatable in opposite angular directions between first and second limit positions for locating the ramming trays alternatively in said operative position, selective movement of the operating handle into said first and second limit positions alternatively locating one of the ramming trays in said operative position with the other tray being automatically moved by the changeover control shaft and the feeder control link into a remote inactive position.

6. The mechanism of claim 5 wherein the operating handle is movable into a "safe" position intermediate said first and second limit positions, and wherein movement of the operating handle into said "safe" position drives the changeover control shaft and feeder control link to pivot each of the ramming trays into an inoperative position intermediate their common operative position and their respective remote inactive positions.

7. The mechanism of claim 6 further including a releasable locking device carried on the operating handle, a plurality of detent means on the frame establishing said first and second limit positions and said "safe" position for the operating handle, the detent means providing locking engagement of the releasable locking device with the frame upon movement of the operating handle into positions corresponding to said first and second limit positions and said "safe" position, and spring means normally biasing the locking device into positive locking engagement with the detent means, whereby the locking device must be positively and intentionally released for precluding inadvertent changeover.

8. The mechanism of claim 1 wherein the firearm has a recoiling member linearly reciprocable between a recoiled position and a runout position, a shuttle mounted for reciprocating motion transversely of the axis of movement of the recoiling member responsive to its linear reciprocating movements, and a one-way, two-step feeder drive coupling the shuttle to each cartridge feeder alternatively upon movement of its respective ramming tray into operative position.

9. The mechanism of claim 8 wherein cam path means are formed on one of the shuttle and firearm recoiling members, and wherein cam follower means are formed on the other of the shuttle and firearm recoiling members for following engagement with the cam path means to effect said transverse reciprocating motion of the shuttle responsive to linear reciprocating movement of the recoiling member.

10. The mechanism of claim 8 wherein the feeder drive includes an escapement device for each cartridge feeder, the escapement devices each having feed pawl means and a ratchet wheel, the ratchet wheel being coaxially fixed to its respective rotary sprocket drive and rotatable by the feed pawl means in one angular direction, the feed pawl means being mounted for pivotal movement with its respective ramming tray into and out of driving connection with the shuttle responsive to movement of its ramming tray respectively into and away from said operative position, the feed pawl means effecting rotation of its ratchet wheel and rotary sprocket drive in said one angular feeding direction when its ramming tray is in said operative position with said feed pawl means drivingly connected with the shuttle, for effecting said two-step cartridge feed responsive to recoil and counterrecoil movements of the recoiling member between recoiled and runout positions.

11. The mechanism of claim 8 wherein a ratchet wheel is coaxially fixed on each rotary sprocket drive, wherein a rocket arm is supported for pivotal movement on the ramming tray of each cartridge feeder about an axis parallel to its sprocket drive axis, wherein a pivot pin is supported on a swinging end of each rocket arm, wherein a pair of pawls are mounted for pivotal movement on the pivot pin of each cartridge feeder and extend therefrom for engagement with its ratchet wheel in diametrically spaced relation thereon, and wherein the pivot pin of each cartridge feeder is drivingly engageable with the shuttle upon movement of its associated ramming tray into said operative position.

12. The mechanism of claim 11 wherein one of the pawls of each escapement device is engageable in driving relation to its ratchet wheel during movement of the shuttle in one linear direction for rotating its sprocket drive a predetermined angular increment in a feeding direction, and wherein the other of the pawls of each escapement device is engageable in driving relation to its ratchet wheel during movement of the shuttle in an opposite linear direction for rotating its sprocket drive an additional predetermined angular increment in the same feeding direction.

13. The mechanism of claim 12 wherein at least one of the pawls of each escapement device is engageable with its ratchet wheel regardless of the position of its associated ramming tray and serve as a no-back pawl to maintain its sprocket drive against undesired angular rotation in a direction opposite said feeding direction.

14. The mechanism of claim 11 wherein the pawl pivot pin of each escapement device is disengaged from the shuttle upon movement of its ramming tray away from said operative position.

15. The mechanism of claim 11 wherein the frame includes a wall member having a pair of pivot pin guide slots formed thereon, and wherein the pawl pivot pin of each cartridge feeder is movable along one of said guide slots during rocking movements of its ramming tray toward and away from said operative position.

16. The mechanism of claim 15 wherein the shuttle is movable into first and second limit positions when the recoiling member is in recoiled and runout positions respectively, wherein the shuttle is formed with a pair of drive slots for respectively receiving the pawl pivot pins of the cartridge feeders, and wherein the shuttle drive slots are registrable with the frame guide slots when the shuttle is in said first limit position.

17. The mechanism of claim 1 wherein the ramming trays each include cartridge guide means pivotable between a normal position, disposed in interfering rela-

tion to withdrawal of a cartridge in its respective ramming tray along a cartridge feed path, and a second position in angularly displaced relation to its normal position for permitting passage of an incoming cartridge along the cartridge feed path into its ramming tray under the driving force of its rotary sprocket drive, and a spring mounted on each ramming tray urging its cartridge guide means toward its normal position.

18. The mechanism of claim **17** wherein the cartridge guide means includes a ram guide having a projection insertable into a cannelure of a cartridge positioned within its ramming tray for positively maintaining that cartridge against unintended axial displacement.

19. The mechanism of claim **1** wherein the cartridges fed to the cartridge feeders are connected by disintegrating link belts, wherein the frame has cartridge receiving openings on opposite longitudinal sides of the firearm in operative alignment with the rotary sprocket drives for receiving different types of disintegrating link belt fed cartridges respectively, and wherein the cartridge feeders each include a cartridge stripping chute adjacent its respective opening for receiving cartridge links in captured relation as the cartridges are fed into the cartridge feeders by their respective rotary sprocket drives.

20. The mechanism of claim **1** wherein the mechanism is of an integral modular construction releasably attachable as a unit on the firearm.

21. The mechanism of claim **20** wherein the firearm includes a receiver, wherein a releasable pivotal mounting connection is made between the firearm receiver and the frame of the feed mechanism on opposite sides of the firearm receiver, the mounting connection on both sides of the frame being independently releasable for rocking the modular feed mechanism selectively about its opposite sides to permit access to the interior of the firearm and the bottom of the feed mechanism without removing the feed mechanism in its entirety from the firearm.

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