

April 19, 1949.

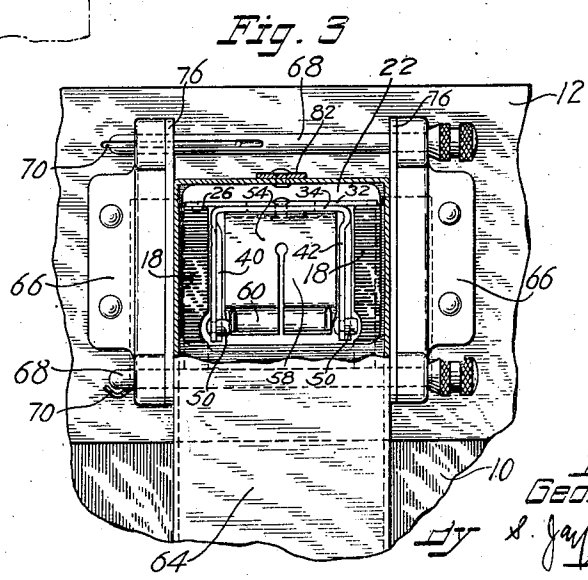
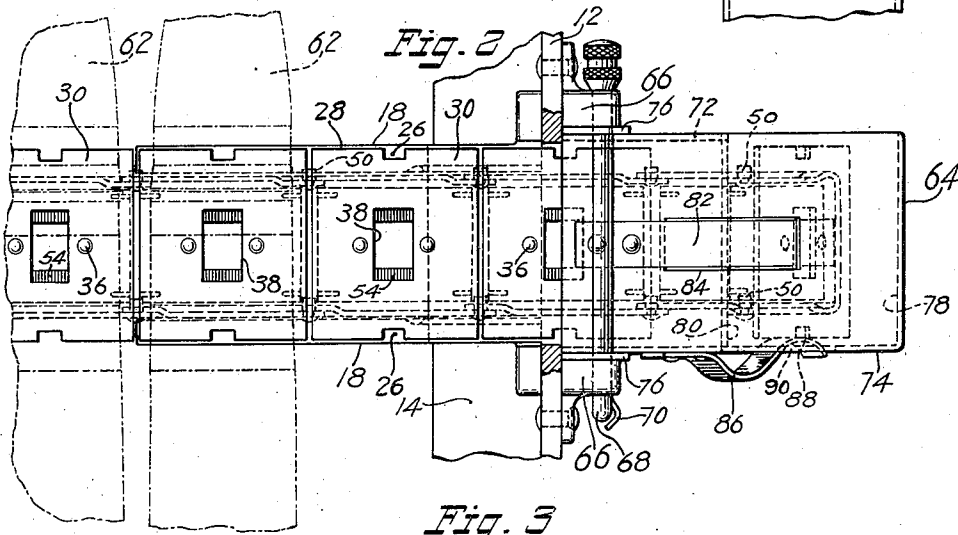
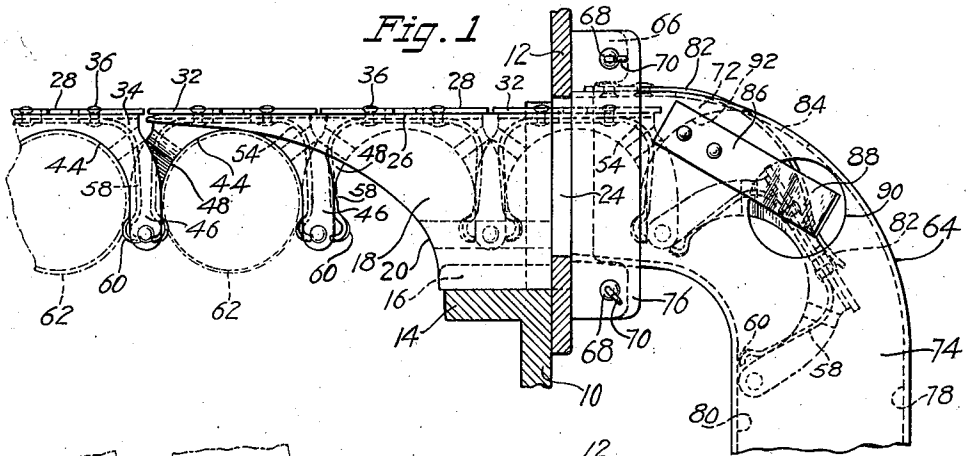
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2,467,571

CARTRIDGE FEEDING MEANS FOR AUTOMATIC FIREARMS

Filed Aug. 14, 1943

3 Sheets-Sheet 1



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Fig. 4

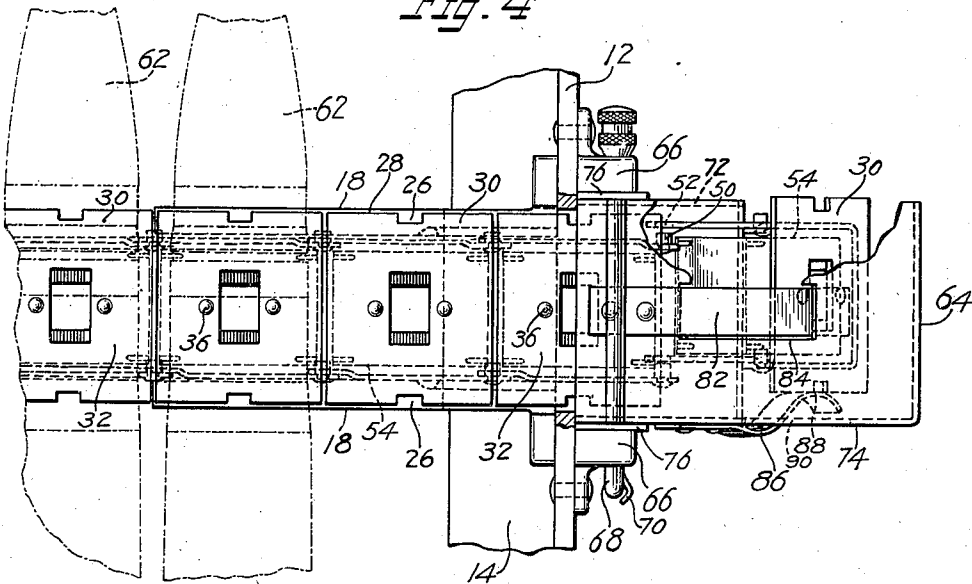


Fig. 5

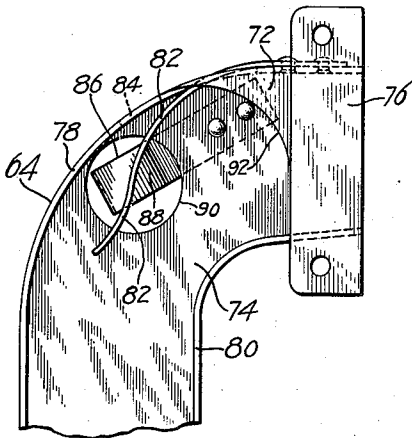
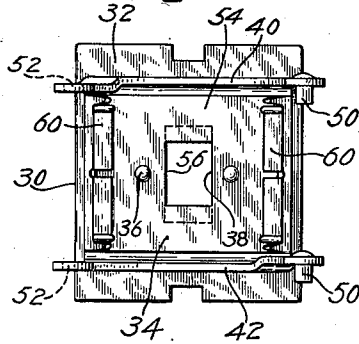


Fig. 6



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3 Sheets-Sheet 3

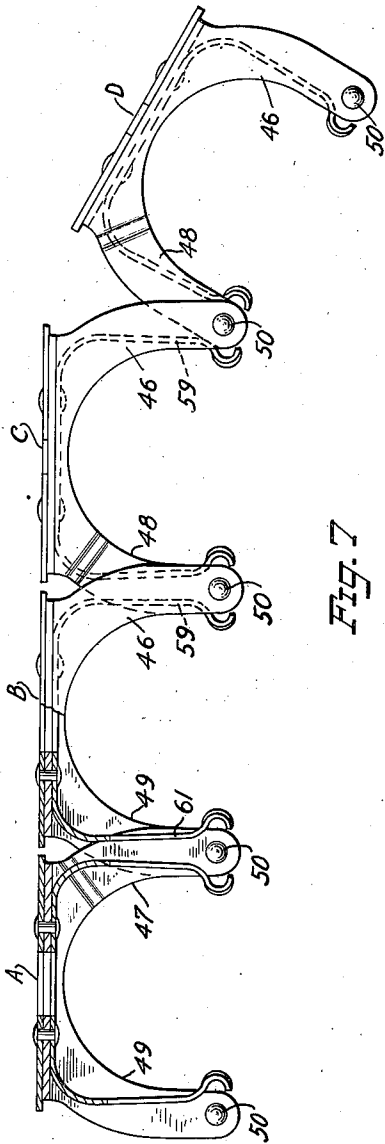


Fig. 7

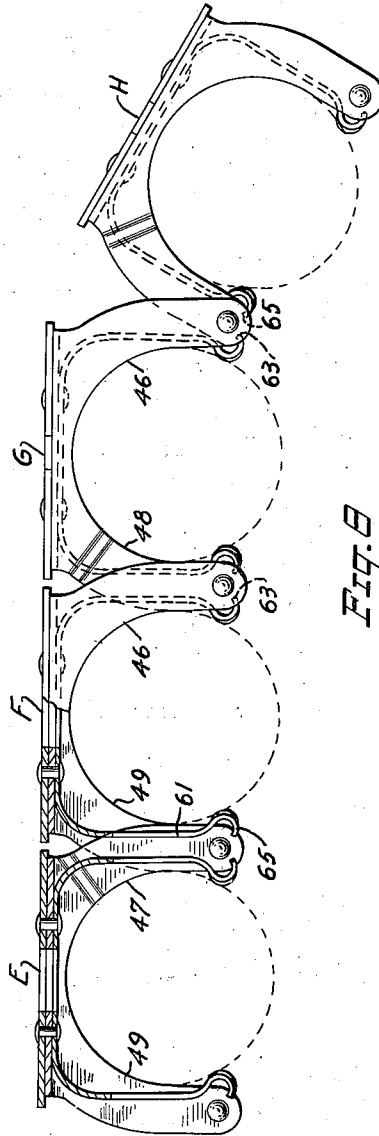


Fig. 8

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2,467,571

CARTRIDGE FEEDING MEANS FOR AUTOMATIC FIREARMS

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11 Claims. (Cl. 89—35)

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This invention relates to a cartridge feeding mechanism for an automatic firearm and more particularly to a feeder and a guide means for the feeder, the feeder being of the type commonly termed "disintegrating."

It is an object of the invention to provide a flexible articulated-link feeder provided with means whereby the component links of the feeder may be separated after said feeder has passed through the feed channel of the firearm.

It is another object of the invention to provide means on the feeder to prevent separation of the component links thereof when said links contain cartridges or when said links are disposed in certain positions relative to each other.

It is a still further object of the invention to provide means to positively disengage the foremost link of said feeder from the next adjoining link as said feeder emerges from the exit end of the feed channel of the firearm.

It is still another object of the invention to provide guide means for the feeder adjacent the exit end of the feed channel of the firearm and to include mechanism in said guide means to first partially and then completely separately the foremost link of the feeder from the next succeeding link.

Incident to the last object, it is another object to provide clearance in said guide means whereby said foremost link, upon detachment from the next succeeding link of the feeder, will not jam or clog said guide means.

The details and other objects of the invention will be found in the following specification and the accompanying drawings forming a part thereof.

The accompanying drawings show the embodiment of the invention which is deemed preferable, but it will be understood that the drawings are intended for illustrative purposes only and are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

In the drawings, Fig. 1 is a fragmentary rear elevation illustrating portions of the firearm and also a portion of a flexible articulated-link feeder as it appears while moving through the feed channel of the firearm and the exit guide or chute comprising a part of the present invention.

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Fig. 2 is a top plan view illustrating the mechanism shown in Fig. 1.

Fig. 3 is a fragmentary side elevation of the mechanism illustrated in Figs. 1 and 2, the view in Fig. 3 being from the right side of the construction shown in said preceding figures.

Fig. 4 is a view similar to Fig. 2 but showing the feeder advanced slightly further toward the right, in which position the foremost link is detached from the next succeeding link.

Fig. 5 is a fragmentary front elevation of the exit guide or chute per se.

Fig. 6 is a bottom plan view of one link of the feeder.

Fig. 7 is a rear view, partly in central longitudinal section, of a group of feeder links without cartridges therein.

Fig. 8 is a view similar to Fig. 7, but showing a group of feeder links with cartridges therein.

The feeder illustrated in the present drawings and comprising the instant invention is similar to the flexible articulated-link feeder illustrated in the applicant's co-pending application, Serial No. 325,405, filed March 22, 1940, which has matured into Patent No. 2,375,452 dated May 8, 1945, and in applicant's copending application, Serial No. 437,853, filed April 6, 1942 which has now matured into Patent No. 2,388,453 dated November 6, 1945. The latter application is a division of the former and is directed to feeder mechanism per se. The former application is directed to the firearm with which said feeder is adapted to be used. However, the feeder shown in the said patent and application, is not adapted to be disintegrated inasmuch as the pivots for the component links are not of a separable type.

It has been found that when a feeder of the type illustrated in said patents is used, suitable means must be provided for accommodating the empty portion of the feeder as it emerges from the exit end of the feed channel. In order that the movement of said feeder from the feed channel may not be impeded or obstructed, said means must not only accommodate the empty portion of the feeder but said means must also suitably guide said portion of the feeder to prevent undesirable twisting and kinking of the same and thus also prevent consequent possible jamming of the movement of the feeder in the feed channel. In

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order that these ends may be accomplished, rather bulky mechanism of relatively large dimensions is generally required.

It is therefore an object of the present invention to provide a feeder which will not require elaborate means of relatively great dimensions to accommodate the links comprising the empty portion of the feeder as it passes from the feed channel of the firearm. To attain the desired end, a feeder has been devised wherein the component links are pivotally connected by means which will permit separation of the adjoining links substantially as they emerge from the exit end of the feed channel. Thus it will only be necessary to provide a suitable compartment to accommodate the separated links and no mechanism will have to be embodied therein to guide or maintain said separated links in any particular order.

The instant invention also includes mechanism to positively and successively disengage the foremost link of the feeder from the next adjoining link after each foremost link passes from the exit end of the feed channel.

Inasmuch as the firearm with which the present invention is used comprises no particular part thereof other than to provide a support and guide means for the feeder and the guide chute attached to the firearm adjacent the exit end of the feed channel, only a small fragmentary portion of the firearm is illustrated in the present drawings and described hereinafter. For a more detailed description and illustration of the firearm, attention is directed to applicant's above-mentioned patents and particularly Patent No. 2,375,452. It will be understood that feeding is from left to right.

In the drawings, a fragmentary portion of a side plate 10 of the breech casing of the firearm supports one side wall 12 of a feed box. An inward directed flange 14 carried by the upper edge of side plate 10 of the feed box supports a bracket 16, to the opposite ends of which two parallel stripper cams 18 are secured. Said stripper cams are respectively provided on their under surfaces with curved cam surfaces 20 which are successively engaged by cartridges and strip said cartridges from the feeder carrying the same as the feeder moves past said cams. The stripper cams thus constitute automatic means for releasing successive cartridges from the feeder when the cartridges reach a predetermined position in the feed channel.

Stripper cams 18 are disposed within a feed channel 22 (see Fig. 3) which extends transversely through the feed box. Wall 12 of the feed box is provided with an opening 24 which defines the exit end of the feed channel. The upper surfaces of the stripper cams 18 comprise guide surfaces 26 adapted to support the feeder in moving through the feed channel 22.

A feeder, designated 28 in its entirety, is flexible and comprises longitudinal series of separable links 30 which are separably and preferably pivotally connected by means to be described. As best shown in Fig. 3, each link is composed of a top plate 32 which may be also termed a body member or portion. To the underside of each top plate a U-shaped member 34 (best shown in Figs. 3 and 6) is secured by any suitable means such as rivets 36. The connecting portion of the U-shaped member 34 and the top plate 32 of each link are provided with a pair of aligned apertures 38 which are adapted to accommodate a claw or finger carried by the feed

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slide of the firearm and illustrated in detail in the aforesaid patent and application.

The several separable links 30 of the feeder are provided with means which normally connect them, and each of the said means comprises two elements one of which is movable relatively to the other to effect disconnection. Preferably and as shown, each link is movable bodily with respect to the next adjacent link to effect disconnection and the preferred construction will now be described in detail.

The U-shaped member 34 provides a pair of parallelly spaced side flanges 40 and 42 which are respectively provided in their lower edges with inward extending curved notches 44, said notches respectively being aligned in a direction transverse to the path of movement of the feeder through the feed channel and comprising a cartridge receiving seat. The formation of the notches in said flanges results in a pair of curved spaced legs 46 and 48 at the right or rear side and in a pair of similar spaced legs 47 and 49 at the left or front side. The legs 47 and 49 are shown in Figs. 7 and 8. The outer ends of the legs 46 and 47 at one end of each link respectively support a pair of fixed forward projecting pintles 50 and the outer ends of the legs 48 and 49 at the other end of said link are respectively provided with aligned apertures 52 which comprise bearings detachably engageable by the pintles 50 of the next adjoining link. Thus there are two elements on each two adjacent links, one of which is movable relatively to the other to effect disconnection. The pintles 50, 50 collectively constitute one such element and the legs with the apertures 52, 52 collectively constitute the other element. Sufficient clearance is provided between the pintles 50 and the apertures 52 that the links may be readily separated when relatively moved in a direction transverse to the longitudinal axis of the feeder and the path of the feeder when moving through the feed channel. When moving through the feed channel, flanges 40 and 42 pass between cams 18.

It will be observed particularly from Fig. 6 that the outer end of one leg of each of the side flanges 40 and 42 is offset inward a distance substantially equal to the thickness of said side flanges. Said offset arrangement permits the connecting of adjoining links with the major portions of the corresponding side flanges of said links arranged in planar alignment, whereby the assembled U-shaped members of the connected links will resemble a continuous U-shaped channel.

Each link 30 is provided with a relatively wide U-shaped spring 54 disposed between the side flanges 40 and 42 and secured thereto by the rivets 36 which also join the top plate 32 to the U-shaped member 34. Spring 54 is likewise provided with an aperture 56 aligned with the pair of apertures 38 formed in the other adjoining members of the link and for the same purpose. The sides of the legs 58 of each spring are substantially parallel and respectively lie in planes transverse to side flanges 40 and 42 of U-shaped member 34. The outer ends of sides 58 of said spring are respectively provided with inward directed and rounded protuberances 60 adapted to respectively engage opposite sides of a cartridge 62 when inserted in the notches 44 of the side flanges, whereby the spring firmly but detachably holds a cartridge within the notches or seat of each link.

As the feeder is moved toward the right when

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viewed in Figs. 1 and 2, the cartridges contained in said links successively engage the innermost ends of stripper cams 18 and continued movement thereof in said direction will serve to successively strip each cartridge from the link carrying same. Such stripping function will obviously overcome the restraining force of the springs 54.

From Figs. 3 and 6 particularly, it is apparent that the opposite edges of the sides 58 of spring 54 are respectively disposed closely adjacent and substantially parallel to the side flanges 40 and 42. The outer ends of the sides 58 of the spring are spread apart from their normal position upon the insertion of a cartridge in the link. This is evident by comparison in Fig. 1 wherein the second link from the left contains a cartridge and the third link from the left has been stripped of its cartridge. When the links are disposed in a substantially straight line and contain no cartridges, the opposite edges of sides 58 of the springs slightly overlap the legs 46, 48 and 47, 49 of the adjacent ends of the side flanges of the next adjoining links, whereby separation of said adjoining links is prevented. This will be apparent from an examination of Fig. 7 wherein the several links are designated respectively as A, B, C and D. With the links in a straight line, the leading side of the cartridge holding spring of each link, as for instance the link B, is in front of the trailing leg 48 of the next adjacent link C at 59 and prevents the said link C from being moved transversely in the forward direction to disengage the bearings 52, 52 in the legs 46 and 47 from the pintles 50, 50 carried by the legs 48 and 49. Furthermore, the leading leg 47 of each link, as for instance the link A, is in front of the trailing side of the cartridge holding spring of the next adjacent link B at 61 and this prevents the said link B from being moved transversely in the forward direction. Thus there are two simultaneously acting means at 59 and 61 for preventing each link from being moved transversely in the forward or disengaging direction with respect to the next following link.

However, when one of said links is slightly relatively moved from its straight line position, the legs 48 and 49 of the said link will be moved sufficiently from their relative positions with respect to the sides of the spring of the next following link to permit relative movement of the first said link in a direction transverse to the planes of said side flanges and thus effect separation. Referring again to Fig. 7, it will be seen that link D has been moved to such an extent that the leading side of the cartridge holding spring of the link C at 59 is no longer in front of the trailing leg 48 of the link D and that the leading leg 47 of the link C is no longer in front of the trailing side of the cartridge holding spring of the link D. Thus the link D is free to be moved transversely, that is, forwardly, for disconnection.

The feature just described is beneficial, particularly while loading an empty feeder with cartridges. Loading a feeder is preferably accomplished by first joining the pivotal connecting means of a plurality of links and disposing them with their plates 32 resting on an appropriate substantially flat surface with the flanges and cartridge receiving notches disposed uppermost and adapted to readily receive cartridges. In this position, the component links of the feeder will be disposed in a substantially straight line and, unless removed from said straight line

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position, accidental separation such as by hitting one or the other side flanges will not occur. The term "alignment" and its variants, when used hereinafter, has reference to this substantially straight line position of successive links.

After the feeder has been loaded with cartridges it is desirable that the component links of the feeder will not become separated regardless of the position to which they may be ultimately relatively moved. This is particularly advantageous while the loaded feeder is being preliminarily handled, and while it is in the magazine or container attached to or associated with the firearm and is being withdrawn from such magazine or container for entry into the feed channel of the firearm. Accordingly, when a cartridge is inserted between the sides 58 of the spring of a link, said sides are spread sufficiently apart that they will occupy a position wherein they will engage other portions of the adjacent ends of the side flanges of the adjoining link and, should separation of said adjoining links be attempted, said springs will obstruct separative movement of the side flanges of said adjoining links, whereby the pivotal connections of said links may not be separated regardless of how much said adjoining links are relatively moved. This will be more readily apparent from an examination of Fig. 8 wherein the several links are designated respectively as E, F, G and H. With the links in a straight line, the leading side of the cartridge holding spring of each link, as for instance the link F, is in front of the trailing leg 48 of the next adjacent link G at 59 and the end of the spring is in front of the said leg 48 at 63, and therefore the link G cannot be moved in the transverse disengaging direction. Furthermore, the leading leg 47 of each link, as for instance the link E, is in front of the trailing side of the cartridge holding spring of the next adjacent link F at 61 and the said leg 47 is also in front of the end of the spring at 65, and therefore the link F cannot be moved in the transverse disengaging direction. If one of the links, as for instance the link H is moved out of its straight line position the interengagements between the links at 59 and 61 are eliminated, but the interengagements at 63 and 65 are maintained and the links cannot be disconnected.

Before the loaded links are inserted in the firearm they cannot be separated, but after the cartridges are successively stripped from the links while passing through the feed channel, they can then be separated as explained with reference to Fig. 7.

To accomplish the separation of the stripped links in accordance with the present invention, means is provided for successively moving the movable element legs 48 and 49 with apertures 52, 52 of each of the several connected links to disconnect the successive leading links from the next following links when the said leading links reach a position beyond the position at which the cartridges are released. With the described construction the entire leading link is moved transversely for this purpose. For so moving the leading links a combined guide chute and link disengaging means 64 is provided, said means being secured to the firearm adjacent the exit end of the feed channel in any suitable manner but preferably by mechanism including a pair of spaced brackets 66 respectively secured to the side 12 of the feed box adjacent the top and bottom of the feed channel. Said brackets are

respectively provided with aligned apertures adapted to accommodate a pin 68 extending between the apertures in said brackets and detachably held in said position by detachable locking means comprising spring fingers 70 carried by said pins. Guide chute 64 comprises spaced side plates 72 and 74 the edges of which are preferably respectively curved, as illustrated in Figs. 1 and 5. Said side plates 72 and 74 are respectively provided with plates 76 which are secured thereto adjacent one end thereof, plates 76 extending above and below the side plates, as clearly shown in Figs. 1, 3 and 5. Said plates 76 are provided with apertures which are adapted to align with the apertures in brackets 66 and receive therethrough pins 68 to thus detachably secure said guide to the feed box.

Side plates 72 and 74 of guide chute 64 are joined at their edges by additional plates 78 and 80. Side plates 72 and 74, in conjunction with plates 78 and 80 thus form a partially curved guide chute adapted to accommodate the foremost end of the feeder as it emerges from the exit end of the feed channel and the curved configuration of said guide chute will serve to move the foremost link of the feeder about its pivotal connection with respect to the next succeeding link to separate the upper portions of said links, as shown in Fig. 1. To insure that said movement of the foremost link will take place, a biasing means, illustrated as a leaf spring 82 in the preferred embodiment, is secured to plate 78 and projects through a suitable opening 84 formed in plate 78. Spring 82 will thus cause the foremost link of the feeder to engage or substantially engage wall 80 of the guide when moving there-through.

Disintegration of the feeder is achieved by a separating means illustrated in the preferred embodiment of the invention in the form of a leaf spring 86 secured to the wall 74 of the guide, said spring being provided with an inward curved portion affording a cam surface 88 which projects through a suitable opening 90 formed in wall 74. Cam surface 88 is positioned to engage the foremost link of the feeder while biasing spring 82 also engages said foremost link to move the upper portion of the link about its pivot and away from the next adjoining link. After said foremost link has been pivotally moved sufficiently in the manner described for the spring 54 of said links to have been moved from obstructing position with respect to the side flanges of the next succeeding link, the cam surface 88 then causes said foremost link to be moved laterally in a direction transverse to the path of movement of the feeder through the feed channel in order to separate the foremost link from the next adjoining link of the feeder. The strength and shape of spring 86 is such that separation of said foremost link from said next adjoining link is positively assured.

In order that there will be sufficient space in the guide to accommodate the foremost link while being moved from engagement with the next adjoining link, wall 72 of the guide is provided with a clearance cut-out portion or opening 92 defined by the curved line clearly shown on side wall 72 in Fig. 5 and otherwise extending between the plates 78 and 80 of the guide. Said clearance will thus readily accommodate the foremost link in moving from the position shown in Fig. 2, wherein said link has not been separated from the next adjoining link, to its slightly advanced position shown in Fig. 4, wherein the cam surface of spring 86 has caused said fore-

most link to be moved transversely and become separated from its next adjoining link.

While not illustrated in the present drawings, a suitable container may be attached to the side and/or lower end of guide chute 64 to catch and retain the separated links as they are successively disengaged from the end of the feeder upon emerging from the exit of the feed channel. It will thus be seen that the present means for successively detaching the foremost link from the end of the feeder is such that no jamming of the feeder in the feed channel or guide 64 and the mechanism for accomplishing the disintegration of the feeder is extremely simple but highly effective.

The feeder comprising the present invention embodies construction which will permit relatively long lengths of the feeder to be fed through the feed channel without causing spreading of the legs at opposite ends of the side flanges of the links and particularly without spreading of the cartridge holding springs within the links. Thus there is substantially no possibility of cartridges being accidentally disengaged from the links due to longitudinal pull which may be imposed upon the feeder while it is being fed through the feed channel. This is due to the fact that the portions of the links which are subject to said longitudinal pull comprise the substantially flat plate-like pivotally connected side flanges of the links as distinguished from resilient spring material.

While the present invention has been described and illustrated as applicable to a feeder comprising links which are pivotally connected, it is conceivable that the principles of the invention are also applicable to feeders comprising detachably connected links embodying separable joining means which do not utilize pivots.

While the invention has been illustrated and described in its preferred embodiment and has included certain details, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways, falling within the scope of the invention as claimed.

What I claim is:

1. A flexible articulated-link cartridge feeder comprising in combination, a plurality of links each provided with a seat to receive a cartridge, interengaging means on successive links pivotally connecting the same and comprising component parts thereof, said interengaging means being disengageable upon relative movement of two successive links only in a direction parallel to the axes of the cartridge seats in said links to thereby permit separation of such links, and additional means carried by each link positioned to prevent relative separative movement of successive links when such links are in alignment and to permit relative separative movement thereof when the same are substantially misaligned without a cartridge in one of such links.

2. A flexible articulated-link cartridge feeder comprising in combination, a plurality of links each provided with a seat to receive a cartridge, interengaging means on successive links pivotally connecting the same and comprising component parts thereof, said interengaging means being disengageable upon relative movement of two successive links only in a direction parallel to the axes of the cartridge seats in said links to thereby permit separation of such links, and additional means carried by each link positioned to prevent relative separative movement of successive

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10. The combination of a firearm having a transverse feed channel through which may be fed a flexible articulated-link disintegrating cartridge feeder having cartridge receiving seats in each link, a link guide chute attached to said firearm in registry with the exit of said feed channel, and means attached to the said link guide chute engageable with the leading link of a cartridge feeder to move such link transversely of the chute in a direction parallel to the axis of the cartridge receiving seat in said link.

11. The combination of a firearm having a transverse feed channel through which may be fed a flexible articulated-link disintegrating cartridge feeder having cartridge receiving seats in each link, a link guide chute including a curved portion attached to said firearm in registry with the exit of said feed channel, and means attached to the said link guide chute engageable with the leading link of a cartridge feeder to move such link transversely of the chute in a direction parallel to the axis of the cartridge receiving seat in said link.

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