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R. W. DAVIS
GUN FEED MECHANISM

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3 Sheets-Sheet 1

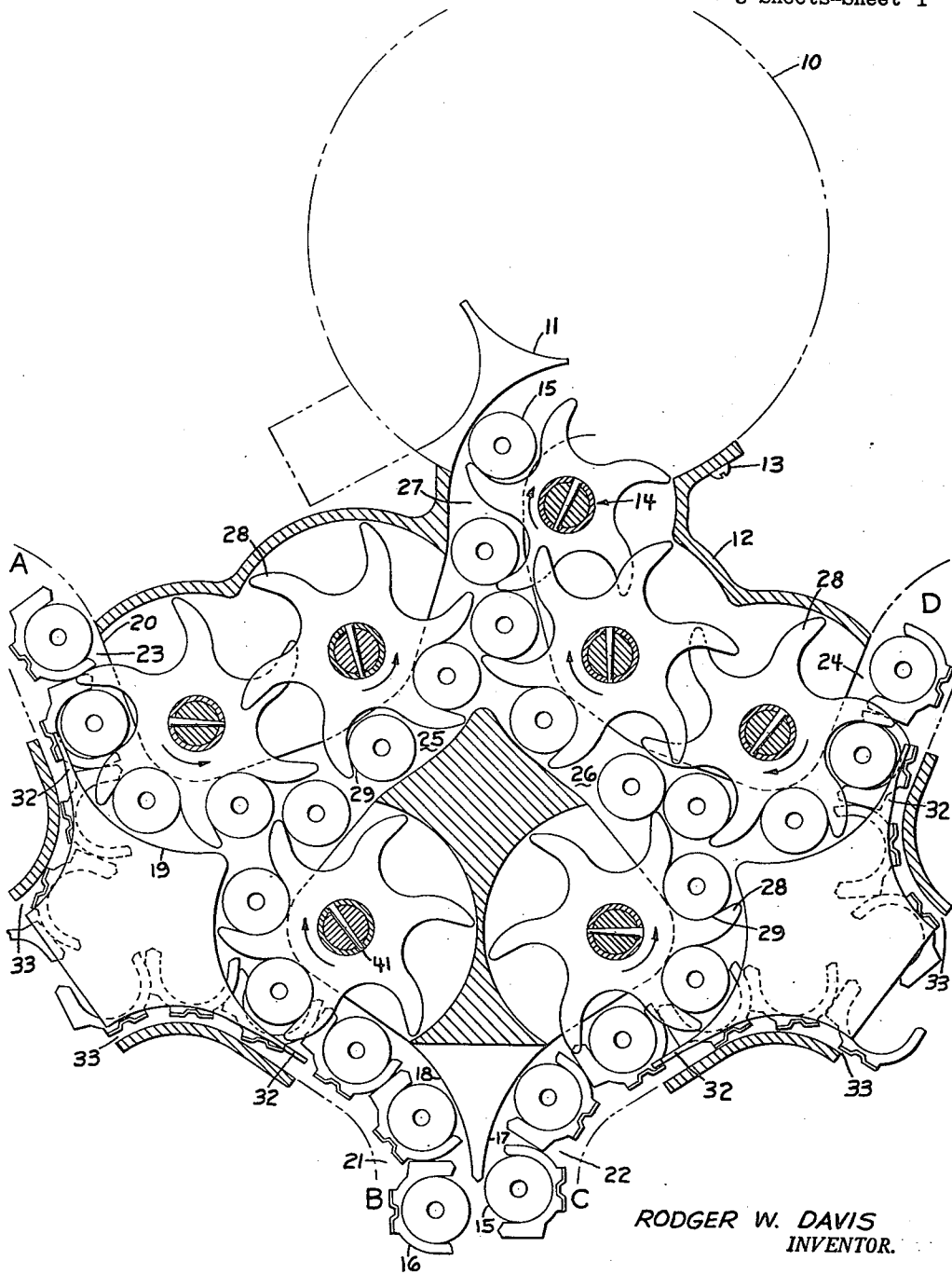


Fig. 1

RODGER W. DAVIS
INVENTOR.

BY

E. B. Batchelder
Attorney

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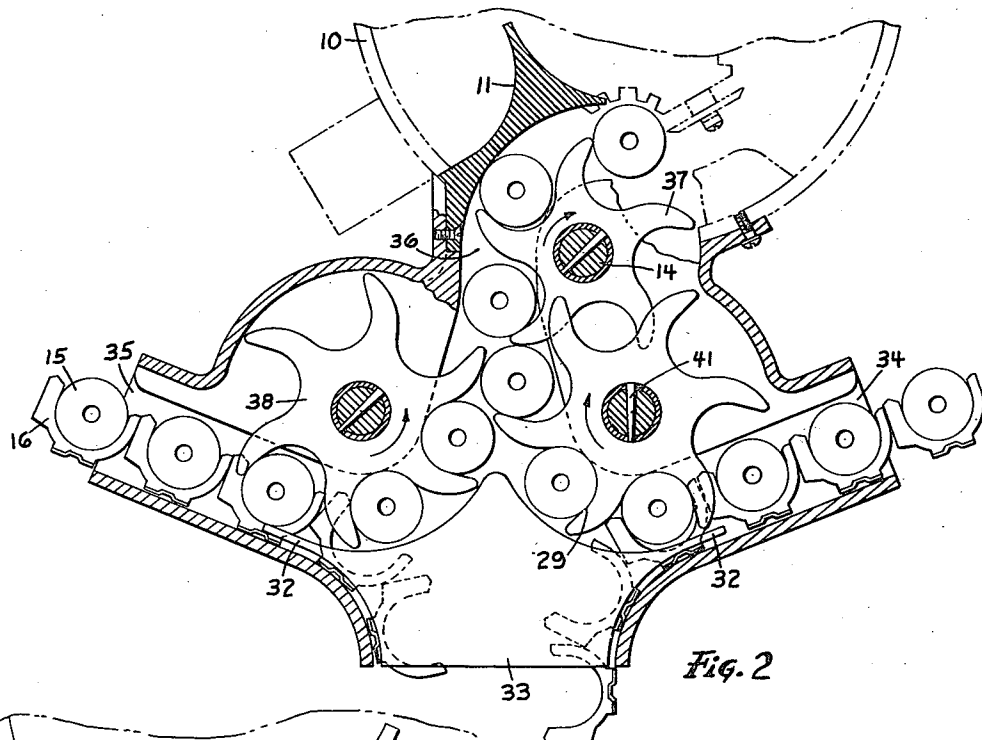


Fig. 2

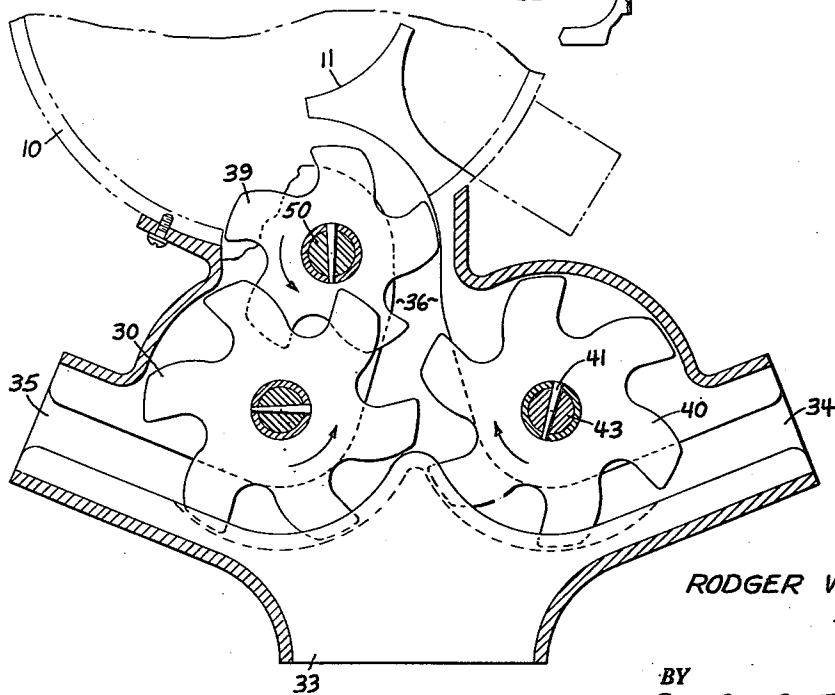


Fig. 3

RODGER W. DAVIS
INVENTOR.

BY
E. B. Batchelder
attorney

Dec. 10, 1957

R. W. DAVIS
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3 Sheets-Sheet 3

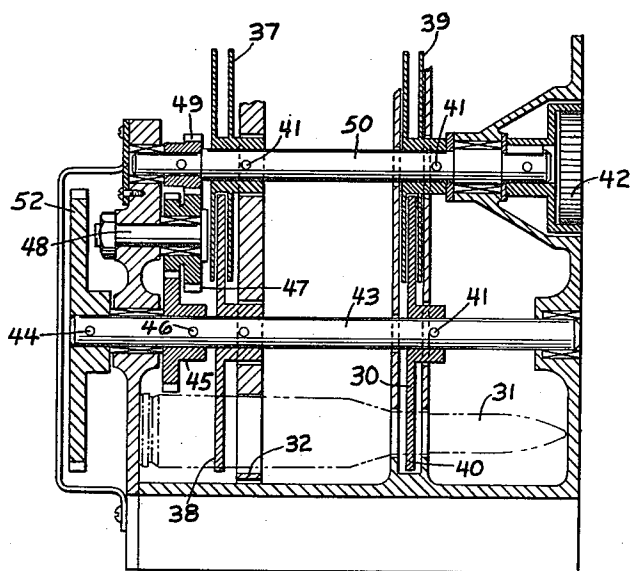


Fig. 4

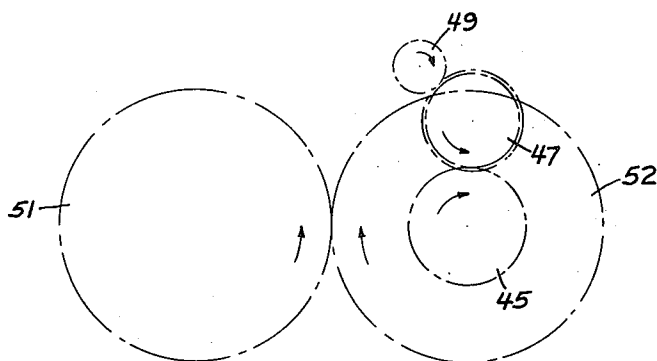


Fig. 5

RODGER W. DAVIS
INVENTOR.

BY
E. B. Balchelder
attorney

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2,815,699

GUN FEED MECHANISM

Rodger W. Davis, Washington, D. C., assignor, by mesne assignments, to Republic Aviation Corporation, near Farmingdale, N. Y., a corporation of Delaware

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7 Claims. (Cl. 89—33)

This invention relates generally to a gun feed mechanism and more specifically to a feeder and stripper mechanism for feeding ammunition to high speed guns.

Modern high speed guns operate at a very high rate of fire and it has been found that current ammunition feeding and stripping mechanism present inherent difficulties in the delivery of linked ammunition for example such as link separation at the folds in a storage box as the belted ammunition is removed therefrom. The inertia in the belt travelling at high speed tends to spring the links at the folds releasing a round of ammunition and separating the belt with consequent disastrous effects under actual combat conditions.

Heretofore the extremely high rate of ammunition feed has not been entirely satisfactorily obtained even under the most ideal test conditions and under actual combat conditions it would appear impossible to in any way closely approach the rate of fire obtained under the ideal test conditions. One of the main drawbacks encountered appears to be the impracticability of feeding the firing mechanism from a single belt by existing systems so as to give the desired rate of rounds per minute.

An object of the present invention is to provide a solution to the existing problem of feeding a gun at a very high rate while at the same time eliminating drawbacks and failures of prior known devices. Broadly the present invention provides a device for feeding the firing mechanism of the gun from two or more belts of ammunition wherein the rate of travel of the belted ammunition is reduced in proportion until a rate of speed consistent with known satisfactory delivery is obtained both from the standpoint of the channels and the storage boxes.

Accordingly, an object of the invention is to provide a multiple feeder and stripper utilizing a series of two or more specially designed and formed sprockets mechanically connected and intermeshing in a manner to provide both a constant flow to input and output units. The mechanism is applicable to free, linked, belted or otherwise connected ammunition and is adapted for installation in and connection to existing gun mechanisms.

A further object of the invention is to provide a multiple feeder and stripper with an external feed or booster mechanism which can be interconnected with the driving mechanism of the gun to provide ammunition feed.

A still further object of the invention is to provide a mechanism in which link ejection can be incorporated at any desired position commensurate with the gun design.

Other and further objects and advantages of the present invention will be apparent from the following detailed discussion of embodiments of the invention taken together with the accompanying drawings, in which:

Figure 1 is a partial elevational view, partly in section, of a multiple feeder and stripper mechanism having four supply sources feeding a common firing mechanism;

Figure 2 is a partial view of an embodiment having two feed sources looking forward just aft of the feed sprockets;

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Figure 3 is a view similar to Figure 2 looking aft just forward of the feed sprockets;

Figure 4 is a partial sectional view through the feed mechanism showing a cartridge therein and the double contact therewith, and

Figure 5 is a schematic diagram of the gear train shown in Figure 4.

In the drawings, the existing gun firing mechanism is diagrammatically illustrated at 10 in Figures 1, 2 and 3, as shown in Figure 1, comprises a casing 12 adapted to be secured to the existing mechanism 10 by any existing securing means such as screws 13 or the like. The existing feed sprocket center is shown at 14.

The ammunition as shown in the drawings at 15 is presumed to be linked Cal. .60 ammunition of a standard type carried by link belts 16 also of standard construction.

In Figure 1, four supply sources designated A, B, C, and D are shown leading from standard ammunition storage boxes. The casing 12 accordingly is provided with ammunition inlets at each of the four points A, B, C and D and with feed channels leading therefrom established by cam guide surfaces such as at 17, 18, 19, 20 which in conjunction one with another provide guide channels for the ammunition. In Figure 1 there are four initial guide channels 21, 22, 23 and 24. Guide channel 21 merges with guide channel 23 to form guide channel 25 and guide channel 22 merges with guide channel 24 to form guide channel 26. Guide channel 25 and 26 then merge into a single final guide channel 27 which then feeds into the gun firing mechanism.

As can be seen in Figure 1, the ammunition feeding from the four supply sources simultaneously is brought to a single output feeding into the firing mechanism. In order to feed the ammunition, a plurality of sprocket wheels having cammed spokes thereon are provided and which are driven from a single source by a gear train as will be set forth hereinafter. Sprocket wheels are provided of two types for contacting the cartridges at two spaced points as can be seen from Figures 2, 3 and 4. Sprocket wheels 28 have the spokes thereof shaped to contact with the rearward portion 29 of the cartridge and sprocket wheels 30 have the spokes thereof shaped for contacting the forward end 31 of the cartridge. The shapes and dimensions of the sprocket wheels are such as to provide proper contact with the cartridges and also for proper spacing in conjunction with the cammed surface forming the guide channels for the cartridge.

Also provided in the device are stripper cams 32 which act to strip the belt from the cartridges as soon as the cartridges enter the guide channels and the belts are thereafter discharged from link ejection channels 33.

In Figures 2 and 3 as set forth hereinbefore only two ammunition supply sources are utilized which feed into two guide channels 34 and 35 which subsequently merge into a single output channel 36. As seen from Figures 2, 3 and 4 the sprocket wheels intermesh with one another. For example, sprocket wheel 37 is formed of two spaced plates having the spokes thereon, whereas sprocket wheel 38 is a single member which fits into the space between the plates of sprocket 37. In like manner, the sprocket wheels 39 and 40 for the forward end of the cartridges are formed in like manner. The individual sprocket wheels are keyed on their shafts by means of pins as shown at 41. The individual shafts are rotatably journaled in bearings.

From Figures 4 and 5, the drive for a device such as shown in Figure 2 is set forth. A gear 42 is operatively connected to the drive mechanism for example of the firing mechanism. Gear 52 is secured to shaft 43 by means of pin 44. This shaft 43 carries a gear 45 se-

cured thereon by pin 46 as also sprocket wheels 38 and 40. Gear 45 intermeshes with an idler gear 47 rotatably journaled on bolt 48. Idler gear 47 engages with a further gear 49 secured on shaft 50 which is rotatably journaled and to which the sprockets 37 and 39 are secured by pins 41. Upon rotation, therefore, of gear 42, the shafts 43 and 50 are synchronously driven with respect to one another and therewith the various sprocket wheels.

The direction of rotation of the various sprocket wheels are shown by the arrows in the various figures of the drawing. The gear train for driving the various sprocket wheels is shown in Figure 5, wherein there is also shown the sprocket drive means 51 and 52.

The arrangement of coacting adjacent sprocket wheels as seen from the drawings provides that a tooth or spoke of one sprocket wheel is interposed between adjacent teeth or spokes of the coacting sprocket wheel and the spacing of these teeth or spokes is arranged to allow each of the sprocket wheels to coact with the cartridges being fed to it in the synchronous arrangement and to clear cartridges and teeth of adjoining sprocket wheels as will be apparent.

From the foregoing discussion of the figures, it is believed that the operation of the multiple feeder and stripper mechanism will be readily apparent. Due to this arrangement, the cartridges can be fed from a plurality of sources to a single firing mechanism with a commensurate decrease in the speed of movement of the ammunition belts thereby overcoming drawbacks and failures of known devices and insuring proper and adequate rate of feed to the gun to fulfill the requirements of the modern high speed firing mechanisms.

Obviously modifications will be apparent to those skilled in the art to which the present invention pertains without departing from the scope and spirit of the invention as defined in the appended claims.

I claim:

1. A gun feed mechanism comprising a casing, a pair of cartridge inlets in said casing, a single cartridge outlet from said casing disposed centrally relative to said inlets, guide surfaces in said casing forming continuous cartridge channels interconnecting each of said cartridge inlets with said outlet, and a plurality of sprockets disposed for rotation adjacent each of the channels organized and arranged to project their teeth transversely across said channels during rotation to individually and successively engage each cartridge in the channels to move them through said channels and transfer them into engagement by a tooth of the next adjoining sprocket for delivery to said outlet whereby each cartridge is always engaged and propelled by a tooth of a sprocket in its movement through the casing.

2. A gun feed mechanism comprising a casing, a pair of cartridge inlets in said casing, a single cartridge outlet from said casing disposed centrally relative to said inlets, guide surfaces in said casing combining to form channels leading from said inlets and merging adjacent the outlet, a plurality of sprockets mounted for rotation adjacent each channel to project its teeth over and across said channels during rotation, one sprocket being situated adjoining each inlet and one sprocket being disposed adjoining the outlet, and means for driving said sprockets in unison whereby cartridges entering through the inlets may be individually engaged by one of the teeth of the sprockets adjoining the inlets and propelled through the channels and successively and alternately transferred directly to the sprocket adjoining the outlet for engagement by a tooth thereof and discharged through the outlet whereby each cartridge is always engaged by a tooth of a sprocket during its progress through said channels from inlet to outlet.

3. A gun feed mechanism comprising a casing, a pair of cartridge feed inlets to said casing, a single cartridge outlet from said casing common to both of said inlets, a

cartridge guide extending from each said inlet and merging into the single outlet, a plurality of toothed sprocket wheels disposed adjacent and along the guides with their spokes projecting across said guides, the spokes of all of said sprockets cooperating one with the next to form a substantially continuous row of equally spaced pockets each conforming in size and shape to that of the cartridges to receive and engage individually each cartridge, and means for synchronously rotating said sprocket wheels whereby each cartridge is passed from pocket to pocket of the sprockets from each of the inlets aforesaid along said guides and out said outlet.

4. An ammunition feed mechanism comprising a casing, a plurality of inlets to said casing arranged in pairs each adapted to receive belted cartridges, a single cartridge outlet from said casing communicating with a gun firing mechanism, a belt discharge outlet from said casing disposed between each pair of inlets, initial guide surfaces in said casing forming individual cartridge channels extending from each of said inlets in the direction of the cartridge outlet and individual belt channels extending from each of said inlets to said belt discharge outlet, each belt channel including a stripper for the separation of each cartridge from the belt substantially as it enters the associated inlet, final guide surfaces in said casing forming a single cartridge channel extending inwardly from said outlet to create an outlet channel, intermediate guide surfaces for each pair of inlets and constituting continuations of the initial guide surfaces converging to form a single cartridge channel, the single cartridge channels coacting with the several pairs of inlets in turn converging into said outlet channel, an intake sprocket adjacent each inlet the teeth of which engage and advance each cartridge entering said inlet, a discharge sprocket adjacent the outlet, and at least one intermediate sprocket between each pair of intake sprockets and the discharge sprocket, all of said sprockets being journaled to the casing for rotation in unison, and said intermediate sprockets being organized and arranged for the teeth thereof to individually and successively receive and engage cartridges alternately and directly from the associated pair of intake sprockets and to pass such cartridges successively and alternately directly to the discharge sprocket whereby each cartridge is always engaged by a tooth of one of the sprockets during its entire progress through the casing.

5. An ammunition feed mechanism comprising a casing, a plurality of inlets to said casing each adapted to admit cartridges to the casing, a single outlet from said casing adapted to deliver cartridges successively and individually to a gun firing mechanism, an intake sprocket at each inlet, a discharge sprocket at the outlet, and an intermediate sprocket between each pair of intake sprockets and the discharge sprocket, each of the aforesaid sprockets being rotatable in said casing and disposed one adjacent the other with the teeth thereof adapted to engage and transport cartridges within the casing whereby rotation of said sprockets in unison successively advance the cartridges from one sprocket to the other through the casing from the inlets to the outlet, each cartridge being always engaged by a tooth of a sprocket during its passage through the casing.

6. A gun feed mechanism for feeding linked cartridges to a gun firing mechanism comprising a casing, a pair of opposed cartridge feed inlets, a link ejection outlet positioned between said inlet, stripper means disposed at said link ejection outlet and cooperating with both of said inlets to separate each cartridge from its link and thereafter direct the links to and through said ejection outlet, guide surfaces in said casing forming cartridge channels individual to and leading from each inlet, a single cartridge outlet in said casing disposed medially of said inlets and adapted to be connected to a gun firing mechanism, intermediate converging guide surfaces forming a single cartridge channel between said individual

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channels and said cartridge outlet, a plurality of journalled sprocket wheels disposed in axially spaced pairs, the teeth of each pair of sprocket wheels coacting with the teeth of the next adjacent pair and with said channels to engage each cartridge at two spaced points and transfer the engaged cartridge successively from one pair of sprockets to the next adjacent pair, and means for synchronously rotating said sprockets whereby each cartridge upon being separated from its link is passed from sprocket to sprocket through said channels and out said cartridge outlet.

7. A gun feed mechanism comprising a casing, a plurality of cartridge inlets in said casing, guide surfaces adjacent each of said inlets forming initial cartridge guide channels individual to and leading from each of said inlets, intermediate guide surfaces forming a secondary cartridge guide channel in alignment with each pair of adjacent initial guide channels, a single cartridge outlet from said casing, final cartridge guide surfaces forming a discharge cartridge guide channel connecting each pair

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of adjacent secondary channels with said outlet, and rotatable sprocket wheels disposed adjacent each of the aforesaid guide channels, said sprocket wheels having teeth which project transversely of said guide channels for the engagement and retention of each individual cartridge therein throughout the length of said channels, said sprocket wheels being operative to successively and alternately move each cartridge from tooth to tooth along said channels from each of the inlets aforesaid out through said outlet.

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