

April 10, 1945.

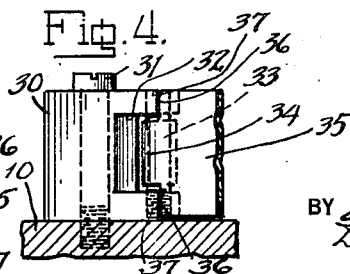
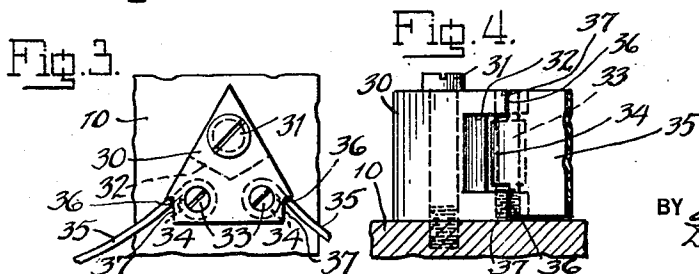
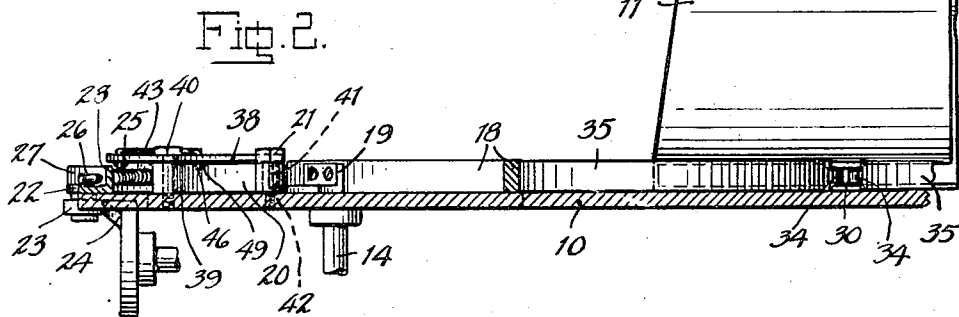
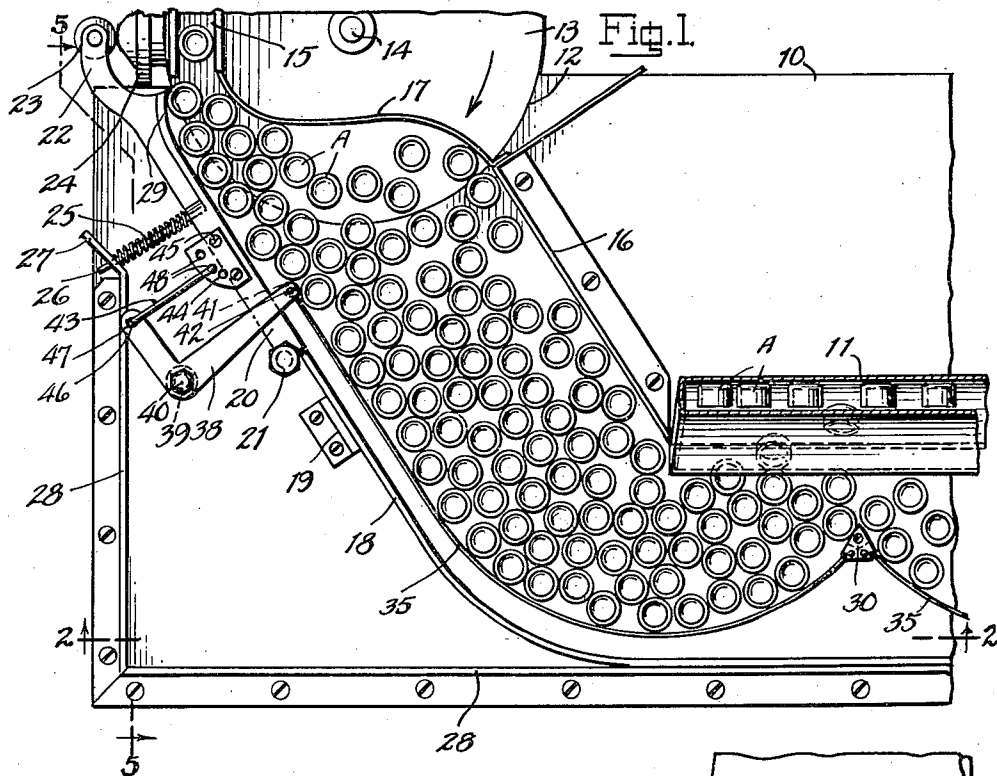
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2,373,600

FEEDING DEVICE

Filed April 13, 1944

2 Sheets-Sheet 1



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Fig. 5.

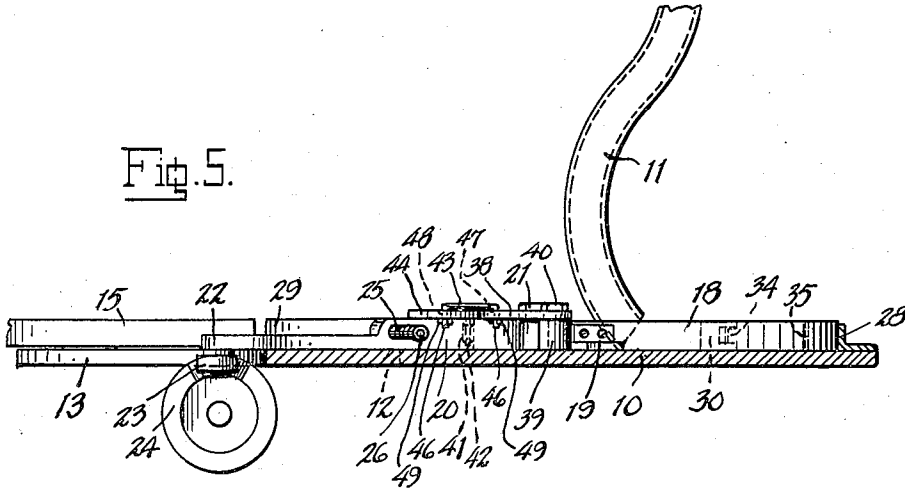
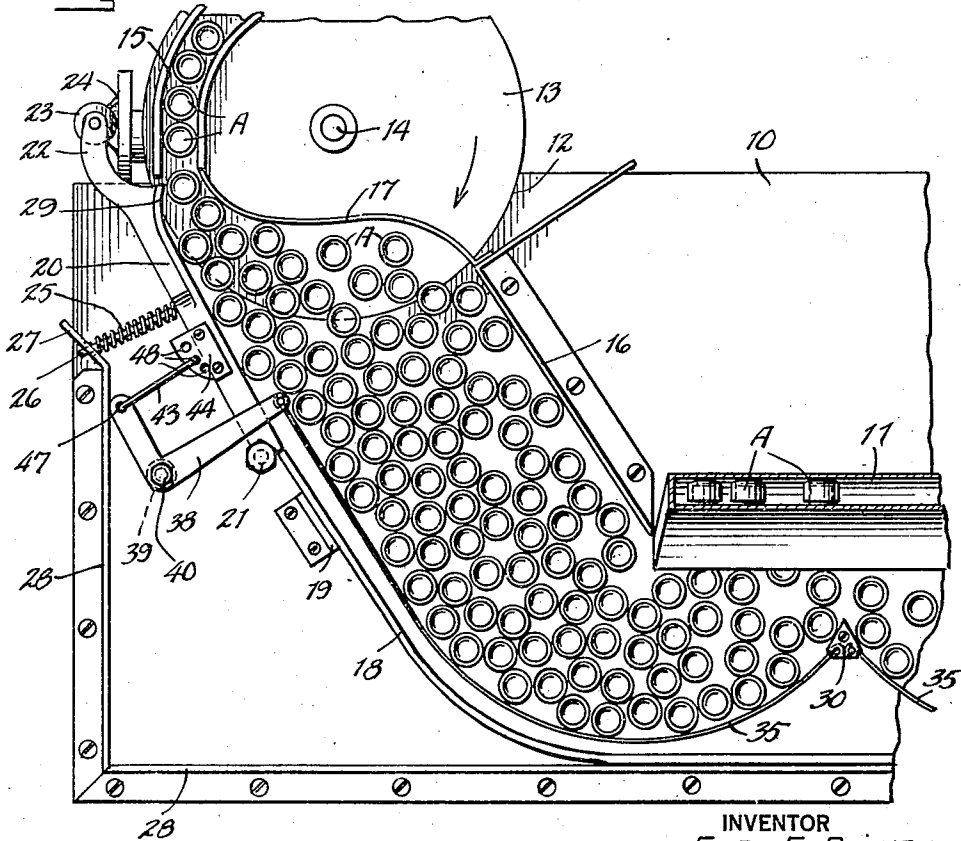


Fig. 6.



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2,373,600

FEEDING DEVICE

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Application April 13, 1944, Serial No. 530,923

9 Claims. (Cl. 198—30)

The present invention relates to a feeding device, particularly an agitator for automatically assisting the flow of articles upon a supporting table to a rotating dial, which feeds the articles in single file into relation with means for performing a processing operation upon the articles, as for instance a draw press in the case of articles in the form of cup-shaped blanks adapted to be drawn into elongated shell form. Such cup blanks are for example those used for the manufacture of ammunition components such as cartridge cases and bullet jackets.

In the usual type of feeding device for draw presses the articles are fed to a table from a gravity feed hopper chute which delivers the articles to the table in uniform relation, that is, in the case of ammunition component forming cups, with their open ends up. The articles flow upon the table along a converging flow path to a rotating dial having its surface flush with the table, and which directs the articles singly into a guide track leading to the draw press. As the articles flow into relation with this guide track, a pivoted agitator arm moves transversely toward the mouth of the track to jog the articles one at a time into alignment with the track.

The transverse pressure of this agitator arm tends to create a back pressure upon the flow of the articles to the dial in opposition to the normal flow produced by the gravity feed of the articles from the hopper chute. It is an object of the present invention to provide agitating means, coupled with the action of the agitator arm, by means of which the back pressure upon the normal flow of the articles is relieved as the agitator arm operates inwardly, so that there is no appreciable opposition to the flow of the articles from the hopper chute, and adapted during each outward movement of the agitator arm to exert a feeding impulse upon the articles in the direction of their normal flow, thereby assisting in the flow of the articles to the dial while compensating for any back pressure or retardation created through the operation of the agitator arm.

Another object is to provide a feeding device which may be conveniently incorporated in the present type of feeding mechanism without appreciable alteration therein. A further object is to provide a feeding device wherein the agitating action may be conveniently adjusted to obtain greater or less agitating action of the supplemental agitating means in cooperation with the agitating action of the agitator arm.

With the above and other objects in view, an

embodiment of the invention is shown in the accompanying drawings, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings—

Fig. 1 is a plan view of one side of a duplex dial feeding table of a dual draw press showing the feeding device according to the exemplary embodiment of the invention incorporated therein, the agitator arm being shown in its outwardly moved or open position, and the gravity feed hopper chute being shown in horizontal section.

Fig. 2 is a vertical sectional view, taken along the line 2—2 of Fig. 1.

Fig. 3 is a plan view, on an enlarged scale, of the diverter block forming part of the invention, and showing the ends of the agitator band members secured thereto.

Fig. 4 is a side elevation thereof.

Fig. 5 is a vertical sectional view, taken along the line 5—5 of Fig. 1.

Fig. 6 is a plan view, similar to Fig. 1, and showing the agitator arm in its inwardly moved or closed position.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, the feeding device, according to the illustrated exemplary embodiment of the invention shown therein, comprises a horizontally disposed duplex feed table 10 of generally rectangular form extending across the front of a dual type draw press, this table adapted to receive articles from a gravity feed hopper chute 11 disposed centrally thereof, and from which the articles move along flow paths at each side leading to the respective units of the dual press. At the two sides of the central dividing line the duplex feeding devices are identical and in reverse arrangement to each other, so that illustration and description of one side only will suffice for a full understanding of the invention. While the invention is illustrated as applied to a dual type draw press, it will be understood that it may be applied to a single type press in which case the articles flow from the feed chute along a single flow path.

In the rear edge of the table relatively near the side edge there is provided a circumferential cut-out 12 in which is engaged a rotary feed dial 13, mounted for rotation upon a vertical shaft 14, its direction of rotation being indicated by the arrow and adapted to draw the articles flowing thereto into a single file feed track 15, ex-

tending over the dial surface near its periphery, and along which the articles are carried to the draw press. A flow path for the articles is defined at one side by means of a diagonally disposed inner rail 16, secured to the table and extending from one side of the feed chute to the edge of the dial 13, a reversely curved guide strip 17 extending therefrom over the surface of the dial to the side of the feed track 15. The other side of the flow path is defined by means of a rail 18 extending across the front of the plate forwardly of the feed chute and curved inwardly into forwardly spaced parallel relation to the rail 16, its inner end portion being secured to the table by means of an angle bracket 19.

The end of the rail 18 terminates in spaced relation to the dial and the feed track, and between its terminal end and the feed track there is provided a pivoted agitator arm 20 constituting a movable continuation of the fixed rail, being pivotally mounted contiguous to the end of the rail upon a stud 21. At its outer end the agitator arm is outwardly offset, as at 22, and carries a cam roller 23 riding upon a rotary cam 24, being pressed into engagement with the cam through the action of a helical compression spring 25 disposed upon a rod 26 secured to the agitator arm and extending through an apertured stop plate 27, conveniently formed by an outwardly bent extension portion of the angle iron rail 28 secured along the forward and side marginal edges of the plate 10. The inside face of the agitator arm is straight along its major portion and, at its end adjacent the feed track 15, is curved inwardly, as at 29, so that it forms with the guide strip 17 a converging entrance to the feed track.

In the outwardly moved or open position, as shown in Fig. 1, the space between the agitator arm and the end portion of the strip 17 is slightly wider than the feed track, but is narrower than twice the diameter of the articles, so that while there is a relatively wide surface upon the dial in front of the entrance to the feed track, to provide clearance for the free flow of the articles toward the feed track, two of the articles cannot engage directly across the entrance to block inward movement of the agitator arm. In the inwardly moved or closed position of the agitator arm the foremost articles in the entrance passage are jogged toward the opposed end portion of the strip 17 into direct line with the feed track, so that the rotating dial feeds them into the feed track one at a time. During this inward movement of the agitator arm which narrows the entrance channel to the feed track to substantially the width of the single file feed track there is created a slight back pressure and a momentary retardation in the flow, due to the close packing of the articles in the flow path.

The feeding device of the invention is intended to compensate for this back pressure and to assist in the continuous flow of the articles from the feed chute to the dial. For this purpose the device further comprises a diverter block 30 of pointed wedge form secured by a screw 31 upon the center line of the table 10 forwardly of the delivery end of the feed chute, and provided in its forward side with a recess 32 defined by a V-shaped inner wall and upper and lower walls. Vertical pins 33—33 are secured between the upper and lower walls of the recess 32 and upon which are respectively engaged the forward curled ends 34 of flexible band members 35—35, one such band member being provided at each side of the duplex feed table for the dual type draw

press. The curled ends 34 of the bands are of reduced width and provide upper and lower shoulders 35 which seat in notches 37 provided in the forward corners of the upper and lower walls of the block, so that the secured ends of the bands are held against pivotal movement about the pins 33.

The band actuating mechanism is identical at each side of the machine, so that only one is illustrated and described in detail. The band 35, which is formed of a stiff flexible material such as spring steel, curves forwardly from the diverter block substantially in continuation of its inclined diverting surface at one side and then rearwardly in inwardly spaced parallel relation to the outer rail 18 to a point a short distance beyond its end, and inwardly of the agitator arm 20, where it is pivotally connected to one end of a bell crank lever 38 pivotally mounted upon a bearing bushing 39 secured to the table 10 by means of a screw 40. For this purpose the band is provided with a reduced width curled end 41, similar to its curled end 34, engaged by a vertically disposed pin 42 secured in the end of the bell crank lever. The arm of the bell crank lever to which the band is connected extends transversely over the agitator arm while the other arm extends rearwardly in substantially parallel relation to the agitator arm, and is connected by a link 43 to a plate 44 secured by screws 45 upon the agitator arm at a point intermediate its ends. The link 43 is preferably in the form of a rod bent at right angles at each of its ends, as at 46—46, one bent end being engaged in an aperture 47 in the end of the bell crank lever and the other end being engaged in one of a series of holes 48 provided in a projecting portion of the plate 44 and arranged in an arc, so that by engagement in one or the other of these holes a substantial change is produced in the relative leverage action between the agitator arm and the bell crank lever. The bent ends of the link are secured by retaining cross pins 49.

In operation the bell crank lever 38 is oscillated with every oscillation of the agitator arm 20 through the link connection 40 between them, the closing and opening movement of the agitator arm being substantially transversely of the flow path of the cup-shaped articles A toward the feed track 15, the transversely disposed arm of the bell crank lever connected to the end of the agitator band 35 being simultaneously moved substantially transversely to the direction of movement of the agitator arm, that is, substantially in the direction of the flow path of the articles. Consequently with each oscillation of the agitator arm the band 35 is moved forwardly and rearwardly with respect to its end anchored to the diverter block 29, so that there is an intermittent agitation of the articles in the flow path which in cooperation with the gravity feed of the articles being supplied from the feed chute 11 assists in moving them toward the rotating dial 13. The timing of the movement of the band 35 with respect to the agitator arm 20 is such that during the inward movement of the agitator arm to align an article with the feed track, the band is moved forwardly to produce relative slack therein with respect to the articles in the flow path, so that the back pressure created in the massed articles through the inward movement of the agitator arm is relieved through the slackening of the band and does not extend to or interrupt the flow of the gravity feed of the articles from the feed chute. Upon outward opening movement of the agitator arm, which movement increases the

width of the entrance opening to the feed track and provides increased free space in the converging end of the flow path contiguous to the dial, the band is pulled forwardly, thus imparting a positive forward feed impulse to the articles in the flow path. Thus, the agitation imparted to the articles through the combined action of the agitator arm and the band is in the nature of a succession of impulses tending to urge the articles forwardly in the flow path to the dial 13. At the same time, back pressure upon the articles is relieved through the slacking of the band, as shown in Fig. 6, so that there is no interruption in the gravity feed of the articles from the feed chute 11.

The form of the invention illustrated in the drawings and described herein is typical and illustrative only, and it is evident that the invention is capable of embodiments in other forms, all falling within the scope of the appended claims, which are to be broadly construed.

What is claimed is:

1. In a feeding device for articles, a stationary feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an agitator member defining one side of said flow path at its end adjacent said track means and movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time, and a second agitator member located at least partially over said feed table and movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path toward said feed dial.

2. In a feeding device for articles, a stationary feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said stationary table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an agitator band member located at least partially over said table and defining one side of said flow path, said band being movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path toward said feed dial from said stationary feed table.

3. In a feeding device for articles, a stationary feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said stationary table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an agitator band member anchored at one end at a point forwardly spaced from said delivery means and extending therefrom about the forward end over said stationary feed table and along one side of said flow path, and actuating means connected to the other end of said band member adapted to impart forward and

rearward movement thereto substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path toward said dial from said stationary feed table.

4. In a feeding device for articles, a stationary feed table, a rotary feed dial set in said table in flush relation therewith, a gravity feed article delivery chute means arranged to feed articles upon said stationary table at a point spaced from said dial, the weight of the gravity fed articles emerging from said chute means adapted to impel the articles on said table, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an agitator member defining one side of said flow path at its end adjacent said track means and movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time, and a second agitator member having at least a portion thereof located over said stationary table movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path toward said feed dial from said stationary feed table.

5. In a feeding device for articles, a feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an oscillating agitator member defining one side of said flow path at its end adjacent said track means and pivotally movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time, a second agitator member movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path, and an actuating means for said second agitator member operatively connected to said first agitator member.

6. In a feeding device for articles, a feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an oscillating agitator member defining one side of said flow path at its end adjacent said track means and pivotally movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time, a second agitator member movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path, and an actuating bell crank lever for said second agitator member operatively connected to said first agitator member whereby as said first agitator member is moved inwardly said second agitator member is moved forwardly.

7. In a feeding device for articles, a feed table a rotary feed dial set in said table in flush rela-

tion therewith, article delivery means arranged to feed articles upon said table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an oscillating agitator member defining one side of said flow path at its end adjacent said track means and pivotally movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time, a second agitator member movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path, an actuating bell crank lever for said second agitator member, and a link member connected between said bell crank lever and said first agitator member whereby as said first agitator member is moved inwardly said second agitator member is moved forwardly.

8. In a feeding device for articles, a feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an oscillating agitator member defining one side of said flow path at its end adjacent said track means and pivotally movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time,

a second agitator member movable forwardly and rearwardly substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path, an actuating bell crank lever for said second agitator member, and a link member adjustably connected between said bell crank lever and said first agitator member whereby as said first agitator member is moved inwardly said second agitator member is moved forwardly.

9. In a feeding device for articles, a feed table, a rotary feed dial set in said table in flush relation therewith, article delivery means arranged to feed articles upon said table at a point spaced from said dial, feed track means disposed over said dial adapted to receive and guide articles in single file therethrough, guide means defining a flow path for the articles from said delivery means to said guide track means and including an oscillating agitator member defining one side of said flow path at its end adjacent said track means and pivotally movable inwardly and outwardly substantially transversely of said flow path to direct articles upon said dial into alignment with said guide track means one at a time, an agitator band member anchored at one end at a point forwardly spaced from said delivery means and extending therefrom about the forward end and along one side of said flow path, and actuating means connected between the other end of said band member and said oscillating agitator member adapted to impart forward and rearward movement to said band member substantially longitudinally of said flow path to impart forward feeding impulses to the articles in said flow path.

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