

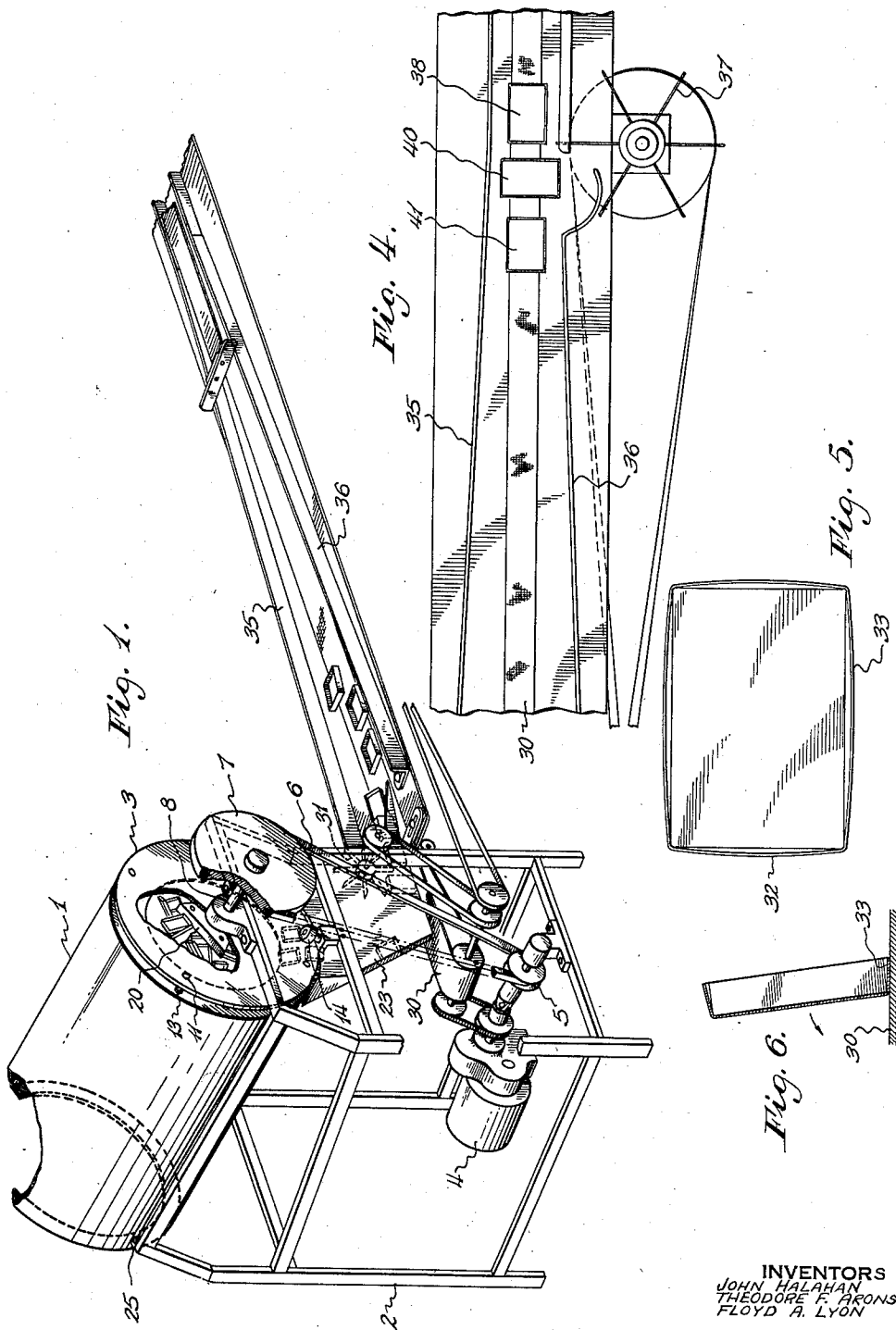
Aug. 26, 1958

J. HALAHAN ET AL
ARTICLE HANDLING MEANS

2,849,099

Filed March 17, 1955

2 Sheets-Sheet 1



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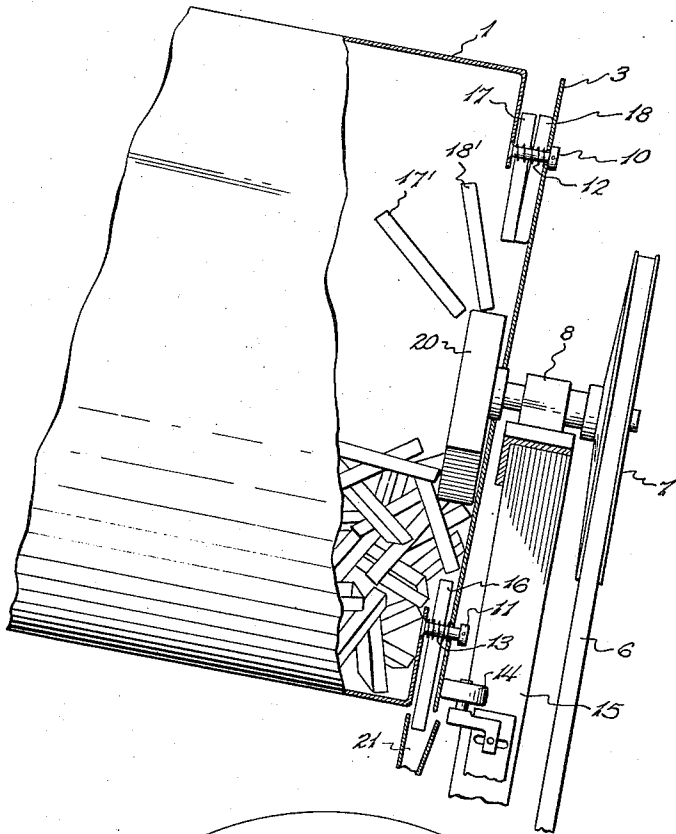


Fig. 2.

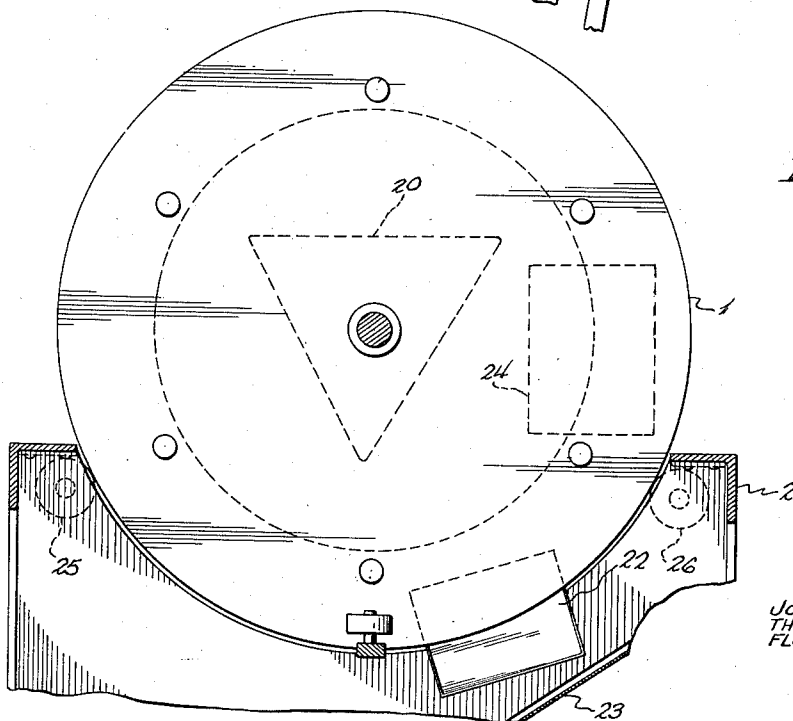


Fig. 3.

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ARTICLE HANDLING MEANS

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Application March 17, 1955, Serial No. 494,966

9 Claims. (Cl. 198—33)

This invention relates to article handling means, and, more particularly, to means for feeding fragile articles, such as cardboard boxes, from a hopper.

In the handling of fragile articles, such as cardboard boxes and the like with automatic machinery, one of the greatest problems is to prevent crushing of the articles. When a number of articles are put into a hopper in random fashion, a certain amount of agitation is required to separate them so that they may be fed singly to a chute and then to loading or wrapping machines. Conventional apparatus of this type generally have a rotatable hopper of which the axis of rotation is at an angle to the horizontal and a slot or other opening is generally provided for dropping the articles singly into a chute, or other receiving means. The great difficulty with machines of this type is that two or more articles get jammed in the outgoing slot. The conventional practice is to knock these pieces out with rotatable wheels and the like. However, with fragile articles, it is generally impossible to break up the jammed condition without damaging the articles with these methods.

The present invention comprises a rotatable hopper or barrel having an opening at each end and a rotatable disc member with said barrel mounted adjacent the opened end to provide the exit opening. The disc is mounted for rotation at a different axis of rotation than that of the barrel, and is arranged so that the spacing at the lower end is slightly greater than the width of one article so that only single articles will fall through. However, if articles become jammed in the exit opening, they will be carried to the top as the barrel and disc rotate in fixed relation and as the articles approach the top, the opening between the barrel and the disc increases the spacing at the top being greater than two articles so that jammed articles will fall back into the barrel. The disc rotates with the barrel so that there is no relative rotation between them which would injure the articles and the disc "wobbles" or "breathes" relative the barrel, always maintaining the desired spacing at the bottom and a greater spacing at the top. The disc may be mounted on studs attached to the barrel and spring-loaded away and the lower spacing fixed by a roller, or, alternatively, the disc may be separately mounted at a separate cocked or slightly different axis of rotation.

Accordingly, a principal object of the invention is to provide new and improved article handling means.

Another object of the invention is to provide new and improved article feeding means.

Another object of the invention is to provide new and improved feeding means for fragile articles.

Another object of the invention is to provide feeding means for paper boxes.

Another object of the invention is to provide means for feeding fragile articles from a rotatable hopper comprising a restraining disc having an axis of rotation different from that of the hopper whereby single articles may fall between said hopper and said disc, but jammed

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articles will be gently carried to the top and dropped back into said hopper.

Another object of the invention is to provide new and improved means for feeding boxes comprising a rotatable barrel member, a disc rotatable with said barrel, but having a different or cocked axis of rotation whereby single articles may fall between said barrel and said disc, but jammed articles will be carried to the top and dropped back into said barrel.

Another object of the invention is to provide a rotatable barrel open at one end, a restraining disc rotatable with said barrel, but adapted to oscillate with respect thereto, always maintaining a predetermined spacing at the bottom and a larger spacing at the top.

Another object of the invention is to provide means for feeding boxes from a hopper onto a chute, including means for providing that the boxes fall on said chute with a predetermined side up.

These and other objects of the invention will be apparent from the following specification and drawings, of which:

Figure 1 is a perspective view of the embodiment of the invention.

Figures 2 and 3 are detail views of the embodiment of Figure 1.

Figure 4 is a detail view of the chute of Figure 1.

Figures 5 and 6 are views of typical boxes adapted to be fed by the apparatus.

Referring now to Figure 1, there is shown a rotatable barrel 1, which is rotatably mounted on a stand 2. The axis of rotation of the barrel is at an angle to the horizontal and the lower end of the barrel is substantially open. A disc 3 is mounted on the barrel at the lower open end for the purpose of providing a variable spacing for the articles inside the barrel to fall through, as will be more fully explained. The barrel and disc are adapted to be rotated by means of the motor 4, which is connected to drive the pulley 5, belt 6 and pulley 7, which is mounted on the shaft 8, the other end of which is connected to the disc member 3, whereby the disc and barrel will be rotated together.

The general operation of the embodiment of Figure 1 is that as the barrel and disc are rotated, the articles will fall against the inside surface of the disc and fall down between the opening between the disc and the barrel. Referring also to Figure 2, the disc 3 is mounted on the barrel 1 by means of a plurality of studs 10, 11, the disc being spring-loaded away from the barrel by the springs 12, 13. A roller 14 is adjustably mounted on the frame so as to maintain a predetermined spacing between disc 3 and the edge of the barrel 1, this spacing being slightly greater than the width of one of the articles 16. Note that at the top position the spring 12 has forced the disc away from the barrel 1 so that the spacing is greater. This spacing is generally greater than two article widths, so that if two articles become jammed, they will be carried to the top and dropped out due to the larger spacing whereupon they will fall as shown at 17' and 18' upon the triangular member 20 where the chances are they will break apart due to the fall and fall back into the hopper.

Note that the disc 3 has a different axis of rotation than the barrel, due to the restraining action of the roller. The roller construction is not the only way to provide this condition, for instance, the disc could be mounted on a separate shaft on a different axis, if desired. The important thing is that a predetermined spacing sufficient for one article is maintained at the bottom over the exit chute 21 and gradually increasing spacing is achieved as the disc and barrel rotate toward the top. In other words, the disc "wobbles" relative the end of the barrel, that is, it oscillates or breathes relative the barrel. Note that

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there is no relative rotation between the disc and the barrel so that jammed articles will not be torn, or otherwise damaged. The action is such that jammed articles are gently carried to the top and then released due to the increase in spacing. There are no rotatable wheels or spring fingers to knock the jammed pieces out and thereby possibly damage them. The operation of the triangular piece 20 is conventional in that articles will generally fall upon it and then slide off its three sides towards the bottom exit chute against the inside surface of the disc. Figure 3 shows a box 22 falling through the exit spacing onto the chute 23. Note article 24 has just fallen off the triangular member 23 and is about to fall through the exit slot. Figure 3 also shows the barrel 1 mounted on rollers 25 and 26, which are rotatably mounted on the frame 2.

Referring back to Figure 1, as the boxes slide down the narrow chute 23, on one of their sides, they fall onto a moving belt 30, which is adapted to be driven by the motor 4. A paddle wheel 31 is mounted above the moving belt 30 so as to tip the boxes over so they lay on their longer side edges as shown in Figure 6.

The construction of cardboard boxes as illustrated in Figure 5 is such that the edges are generally bowed as at 32 and 33. This is because the boxes are stamped out of one piece and the edges folded up. Therefore, when a box is placed on one edge as shown in Figure 6 due to the bow in the portion 33, the box leans to one side as shown by the arrow, and if placed on a flat surface or belt 30, it will always fall in the same direction. Advantage is taken of this construction of the boxes for insuring that they all fall on the belt 30 with a predetermined side up, in this case, the open side. The paddle wheel 31 is also belt driven from the common motor drive.

Flanged boxes such as face powder boxes will also fall in a predetermined direction depending on the size of the flanges at each end.

Figure 4 shows a detail of the exit chute showing the belt 30 and a pair of side guide rails 35 and 36. A paddle wheel 37 is provided to knock the boxes into alignment so that the longer sides are all facing in one direction. The boxes are supposed to line up in the manner shown by the boxes 41 and 38, but the box 40 has assumed the other position. Therefore, it will be contacted by one of the wires on the paddle wheel 37 and knocked back into alignment with the boxes 41 and 38.

Therefore, all the boxes will be in single file lined up properly and all with their open sides up ready for a filling or wrapping operation.

The chute is constructed so that boxes will slide through it balanced on one of their edges and will be deposited on the flat horizontal belt. As the chute widens the boxes will tend to fall in a predetermined direction depending upon the construction of the boxes. Generally, boxes will fall with the open side up, since that will be the lighter side. However, if it is essential that they fall in a predetermined manner, it is preferable that the boxes be constructed with flanges bowed on both sides to insure that they will fall in the right direction.

We claim:

1. Means for feeding boxes comprising a rotatable barrel member substantially open at one end, a rotatable disc mounted adjacent said open end at a different axis of rotation than said barrel, said disc being spaced so that there is just sufficient spacing at the bottom between said barrel and said disc for single boxes to fall out, whereby the opening at the top of the barrel is wider and jammed pieces will be gently carried to the top and dropped back into the barrel.

2. Means for feeding boxes comprising a rotatable barrel member substantially open at one end, a rotatable disc mounted adjacent said open end at a different axis of rotation than said barrel, said disc being spaced so that there is just sufficient spacing at the bottom between

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said barrel and said disc for single boxes to fall out, whereby the opening at the top of the barrel is wider and jammed pieces will be gently carried to the top and dropped back into the barrel, and a chute located underneath said opening between said disc and said barrel for receiving single pieces.

3. Means for feeding fragile articles comprising a rotatable barrel open at one end, a disc mounted on studs set around the open end of said barrel, springs on said studs between said disc and said barrel, a roller located adjacent the bottom of said disc for forcing said disc against said springs to provide a spacing between said disc and said barrel slightly greater than one width of said articles being fed, whereby as said barrel rotates said disc oscillates relative thereto, the spacing at the bottom being set by said roller and the spacing at the top being greater than said bottom spacing, whereby pieces jammed at the bottom will be gently carried to the top and dropped back into said barrel.

4. Means for feeding fragile articles comprising a rotatable barrel open at one end, a disc mounted on studs set around the open end of said barrel, springs on said studs between said disc and said barrel, a roller located adjacent the bottom of said disc for forcing said disc against said springs to provide a spacing between said disc and said barrel slightly greater than one width of said articles being fed, whereby as said barrel rotates said disc oscillates relative thereto, the spacing at the bottom being set by said roller and the spacing at the top being greater than said bottom spacing, whereby pieces jammed at the bottom will be gently carried to the top and dropped back into said barrel, and a chute located underneath said opening between said disc and said barrel for receiving single pieces.

5. Means for feeding boxes comprising a rotatable barrel member substantially open at one end, a rotatable disc mounted adjacent said open end at a different axis of rotation than said barrel, said disc being spaced so that there is just sufficient spacing at the bottom between said barrel and said disc for single boxes to fall out, whereby the opening at the top of the barrel is wider and jammed pieces will be gently carried to the top and dropped back into the barrel, and a triangular member mounted on the inside surface of said disc facing into said barrel, whereby jammed pieces dropped from the top spacing will fall on said triangular disc.

6. Means for feeding fragile articles comprising a rotatable hopper barrel having an opening at one end, restraining means rotatable with said hopper which limits said opening to slightly greater than the width of one article, said restraining means being relaxed and said opening widening as said barrel rotates to the top whereby articles jammed between said barrel and said restraining member will be gently carried up and released back into said barrel.

7. Means for feeding boxes comprising a rotatable barrel member substantially open at one end, a disc rotatable with said barrel mounted adjacent said open end along the axis of rotation of said barrel, means connected to oscillate the plane of said disc, whereby there is just sufficient spacing at the bottom between said barrel and said disc for single boxes to fall out and a wider spacing at the top whereby jammed pieces will be gently carried to the top and dropped back into the barrel.

8. Means for feeding fragile articles comprising a rotatable hopper having an opening at one end, restraining means rotatable with said hopper which limits said opening at the bottom to slightly greater than the width of one article, said restraining means being relaxed and said opening widening as said hopper rotates to the top whereby articles jammed between said hopper and said restraining member will be gently carried up and released back into said hopper, a chute located under said bottom opening to receive said articles on their edges, said

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chute being widened to permit said articles to fall flat with a predetermined side up.

9. Means for feeding boxes or articles comprising a rotatable barrel member with aperture means at one end thereof, means for varying the width of said aperture whereby only single boxes on edge may fall out at the low side, including means to widen said aperture on the

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top side to let any jammed boxes fall back into said barrel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,476,222 Salfisberg ----- Dec. 4, 1923