

Dec. 24, 1957

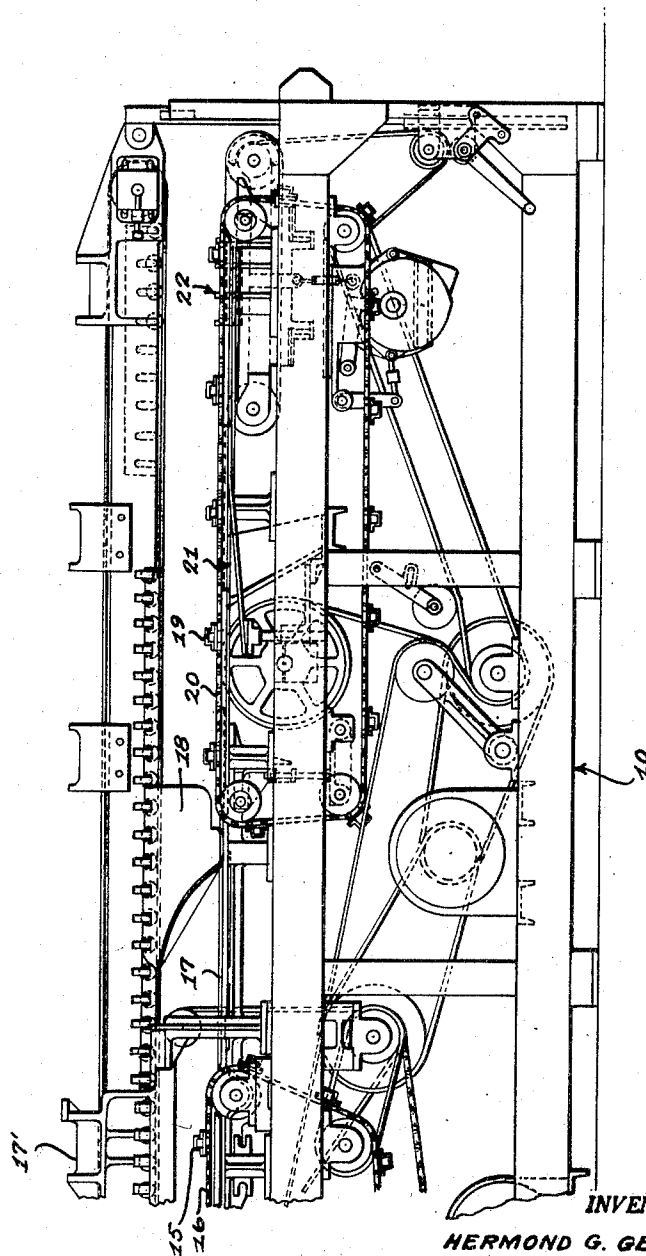
H. G. GENTRY
BLANK FEEDING MEANS

2,817,520

Filed June 25, 1956

6 Sheets-Sheet 2

Fig. 2



INVENTOR.
HERMOND G. GENTRY
BY
Panott & Richards
ATTORNEYS

Dec. 24, 1957

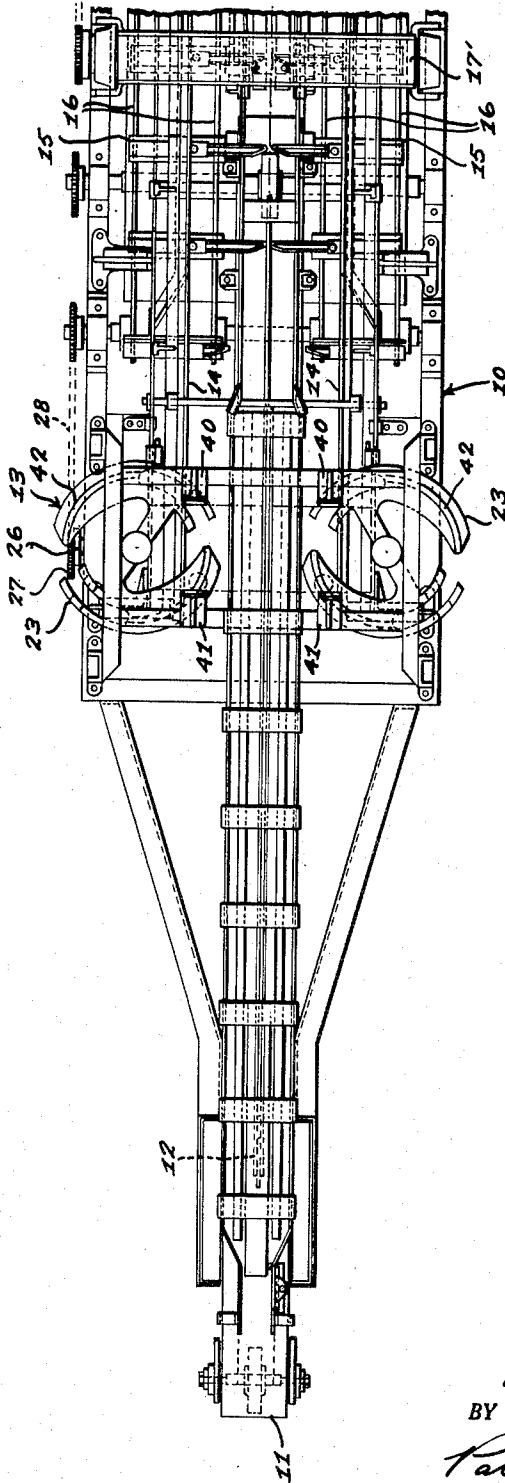
H. G. GENTRY
BLANK FEEDING MEANS

2,817,520

Filed June 25, 1956

6 Sheets-Sheet 3

Fig. 3



INVENTOR.
HERMOND G. GENTRY
BY
Parrott & Richards
ATTORNEYS

Dec. 24, 1957

H. G. GENTRY
BLANK FEEDING MEANS

2,817,520

Filed June 25, 1956

6 Sheets-Sheet 4

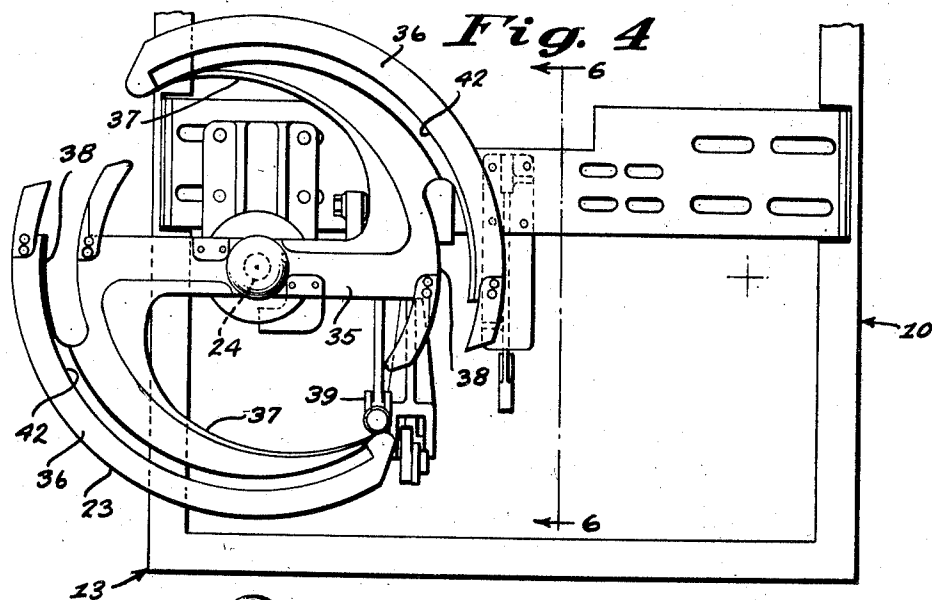
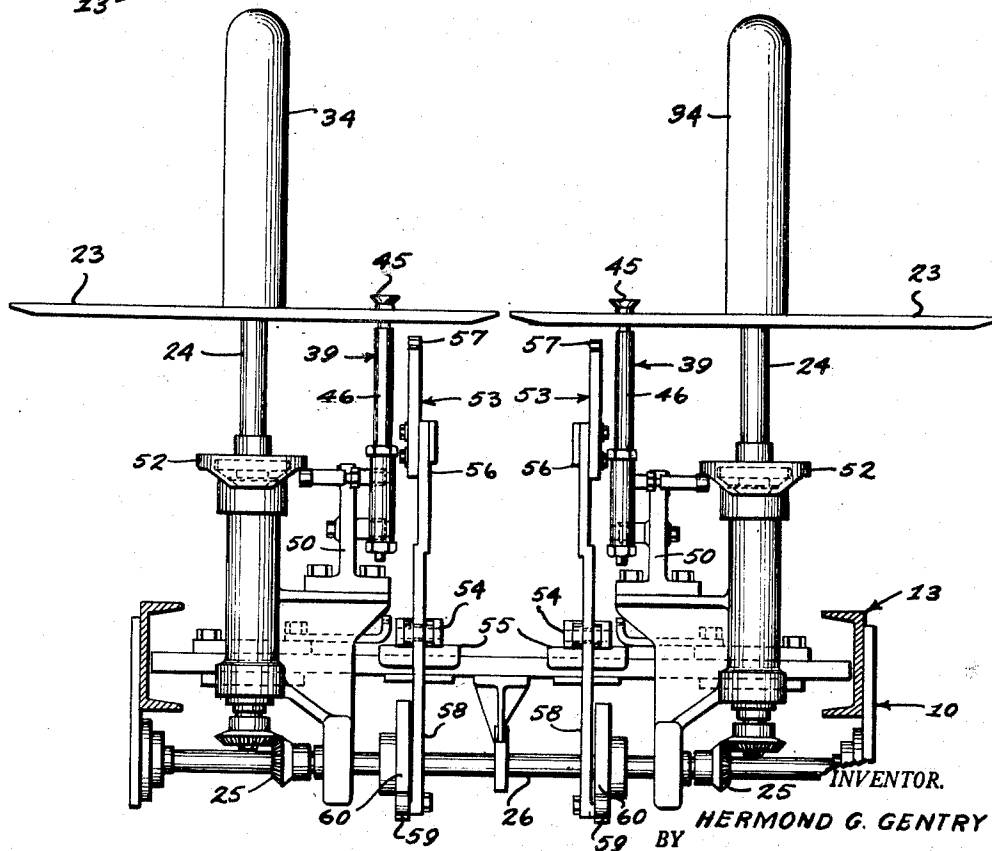


Fig. 5 Parrott & Richards
ATTORNEYS

Dec. 24, 1957

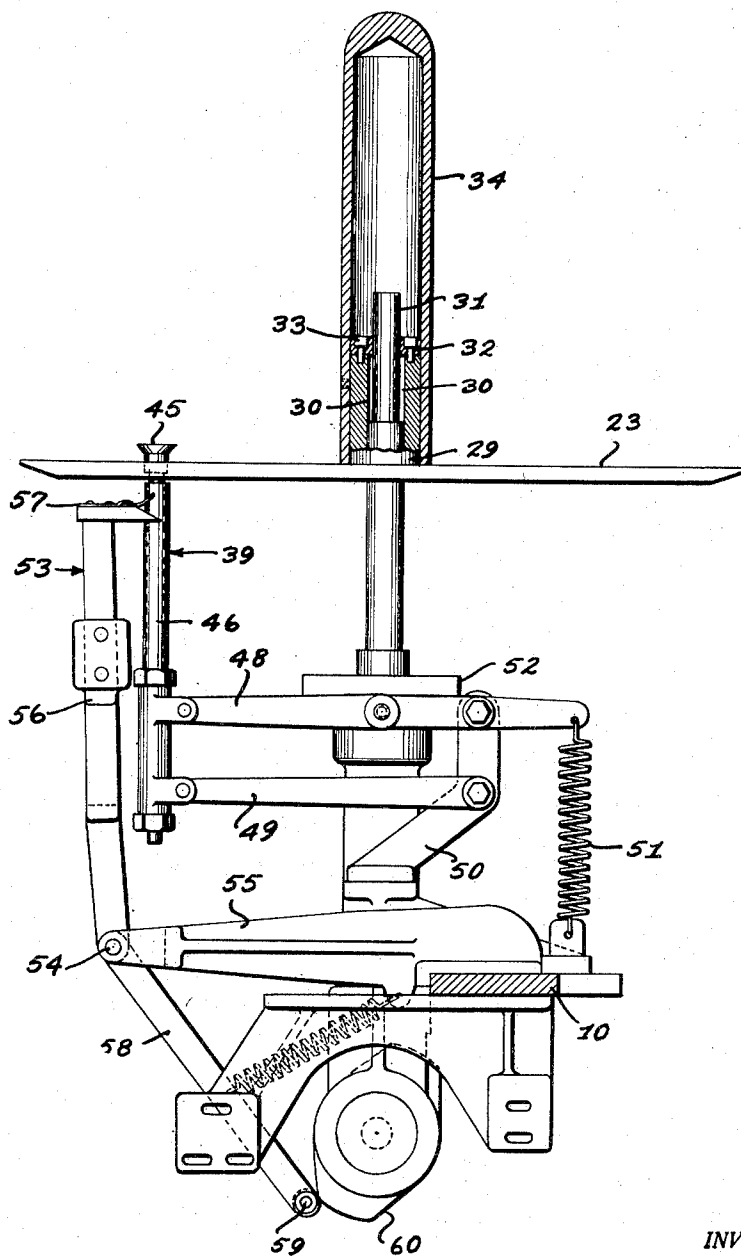
H. G. GENTRY
BLANK FEEDING MEANS

2,817,520

Filed June 25, 1956

6 Sheets-Sheet 5

Fig. 6



INVENTOR.
HERMOND G. GENTRY

BY

Parrott & Richards
ATTORNEYS

Dec. 24, 1957

H. G. GENTRY
BLANK FEEDING MEANS

2,817,520

Filed June 25, 1956

6 Sheets-Sheet 6.

Fig. 7

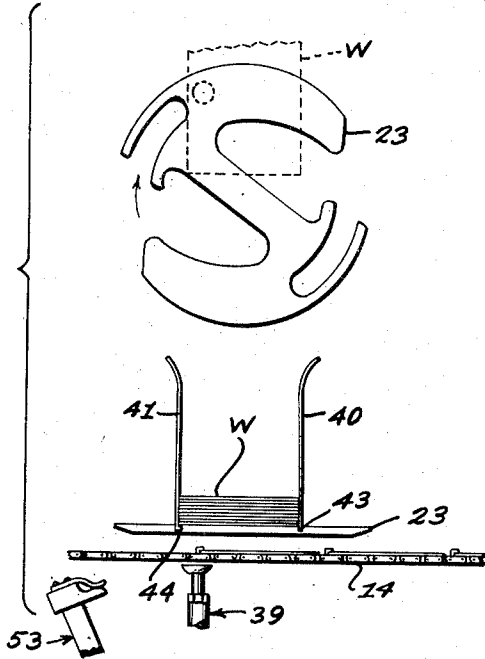


Fig. 8

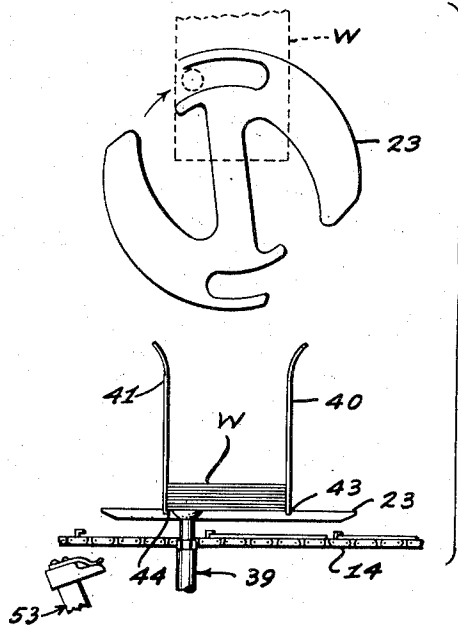


Fig. 9

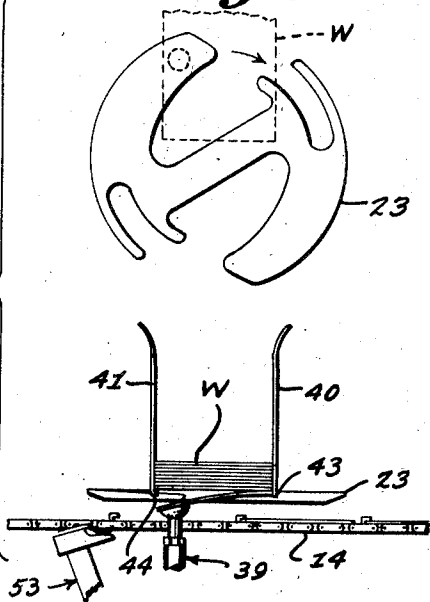
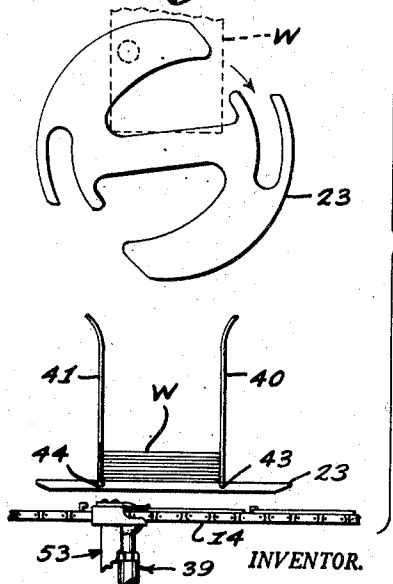


Fig. 10



INVENTOR.
HERMOND G. GENTRY
BY

Panott & Richards
ATTORNEYS

1

2,817,520

BLANK FEEDING MEANS

Hermond G. Gentry, Atlanta, Ga., assignor, by mesne assignments, to Atlanta Paper Company, a corporation of Ohio

Application June 25, 1956, Serial No. 593,605

7 Claims. (Cl. 271—32)

This invention relates to means for feeding paperboard blanks, and more particularly to an improved means of this sort arranged for supporting a stacked supply of paperboard blanks and for separating successively from this supply the succeeding lowermost blanks for separate serial feeding.

The blank feeding means of the present invention is generally characterized by an arrangement incorporating a pair of discs that are rotated synchronously in opposite directions about vertical axes spaced to allow stacking of the blank supply on the discs between their axes, and by vertically reciprocated suction means that are disposed beneath each of the discs and timed in relation to the disc rotation for rising to grip the lowermost blank in the stack supply adjacent the edge thereof facing oppositely with respect to the direction of disc rotation and to draw down this blank edge within a notch formation in the disc so that the lowermost blank is stripped and separated from the blank supply as the discs are rotated while the remaining stacked blanks of said supply remain supported by the discs. With this arrangement the action of the feeding means is characterized by the rotating motion of the discs which can be actuated smoothly and which allows operation of the feeding means of the present invention to good advantage at high speeds and continuously.

The blank feeding means of the present invention is adapted particularly for use in packaging means of the type disclosed in copending application Serial No. 476,650, filed December 21, 1954, now U. S. Patent No. 2,751,730, in which the means disclosed is arranged for continuous packaging of groups of articles in an open-ended paperboard wrapper; and, as the packaging means disclosed in that application is characterized by continuous packaging operation, the blank feeding means of the present invention can be used to particular advantage therein because of its continuous feeding operation. Accordingly, the present invention is described in further detail below in relation to a representative embodiment arranged for use in packaging means of the type disclosed in the above noted copending application, as illustrated in the accompanying drawings, in which:

Fig. 1 is a partial side elevation, largely diagrammatic, of a packaging apparatus in which the blank feeding means of the present invention may be employed;

Fig. 2 is a corresponding side elevation of the remainder of the apparatus shown in Fig. 1;

Fig. 3 is a plan view corresponding to Fig. 1;

Fig. 4 is an enlarged detail in plan of the blank feeding means;

Fig. 5 is a side elevation corresponding generally to Fig. 4;

Fig. 6 is a sectional detail taken substantially on the line 6—6 in Fig. 4;

Fig. 7 is a schematic illustration including related plan and side elevational representations indicating the relation of the blank feeding discs to the supply of wrapper blanks W stacked thereon at the commencement of an operating

2

cycle for stripping the lowermost blank from the stacked supply;

Fig. 8 is a related schematic illustration showing the feeding discs rotated to the point where the suction cups have been raised and are ready to draw down the trailing edge of the lowermost wrapper blank for stripping from the stacked supply by the feeding discs;

Fig. 9 is a further related schematic illustration showing the lowermost blank being stripped upon further rotation of the feeding discs; and

Fig. 10 is a still further related schematic illustration showing the stripped wrapper blank being held in the path of feeder chains while the stacked blank supply remains supported on the rotating feeder discs in preparation for subsequent stripping of the next lowermost wrapper blank.

Referring now in detail to the drawings, Figs. 1 and 2 illustrate a packaging means of the type disclosed by the above noted copending application Serial No. 476,650, in which a frame structure 10 is arranged to carry means for: receiving at one end thereof the articles, such as cans, to be packaged; separating these articles into package groups; associating paperboard wrapper blanks with each of these package groups; and folding and securing each wrapper blank about its related package group; all while the articles being packaged are maintained traveling continuously toward the other end of the frame structure 10 at which the completed packages are discharged.

The articles to be packaged are received at the left hand end of the frame structure 10, as seen in Fig. 1, on a conveyor 11, preferably of the chain type, arranged to present a flat smooth surface at its upper reach on which the articles may slide when caused to but on which the articles will otherwise follow the conveyor movement so as to be fed into the packaging operation. The conveyor 11 is preferably driven at a rate faster than the rate at which the articles travel subsequently during packaging, so as to maintain a continuous supply of articles feeding thereon to the subsequent packaging means; and a separating means, as indicated at 12, and as disclosed in copending application Serial No. 488,291 filed February 15, 1955, now U. S. Patent No. 2,752,027, may be arranged in relation to the conveyor 11 for separating the articles being fed thereon into two rows if desired.

The blank feeding means of the present invention, as indicated generally by the reference numeral 13, is arranged above the conveyor 11 to support a stacked supply of paperboard wrapper blanks W transversely for feeding successively across the top of the articles to be packaged as they are advanced by the conveyor 11. As the wrapper blanks W are fed from the blank feeding means 13, in a manner that is described in further detail below, each blank W is successively transferred to the control of feeder chains, as indicated at 14, that are located at each side of the conveyor 11 and on which spaced hooks (not shown) are carried to engage the trailing edges of the successively fed blanks W for separate serial feeding thereof in proper packaging alignment with the articles traveling on the conveyor 11.

The upper reaches of the feeder chains 14 are spaced above the conveyor 11 to extend substantially level with the tops of the articles being fed thereon; and, just beyond the blank feeding means 13, the articles being fed on the conveyor 11 are separated into package groups aligned with the blanks W on the feeder chains 14 by means of separating plungers 15 carried on spaced chains 16 (compare Figs. 1 and 2 with Fig. 3) at each side of the conveyor 11 for extension transversely to effect the package group separation and to maintain the separated package groups traveling continuously at the driven speed of the carrying chains 16.

The separated package groups are then transferred

3

from the conveyor 11 onto feed belts 17 arranged for supporting the respective article rows in the package groups, and the package groups and aligned wrapper blanks W pass under an overhead weighting structure 17' for maintaining the alignment thereof as the separating plungers 15 are withdrawn to allow clearance for downward folding of the wrapper blank W over the sides of the package groups at a first folding station 18.

A second series of separating plungers 19 carried on chains 20 are then extended transversely between the package groups again, with end portions of the wrapper blank W now extending downwardly below the feed belts 17 for overlapping beneath the package groups. To accomplish this overlapping, the package groups are delivered from the feed belts 17 through a second folding station at 21, which may be arranged as disclosed in copending application Serial No. 593,627, filed June 25, 1956, and then finally carried past a locking station 22 where the overlapped portions of the wrapper blanks W are secured, as disclosed in copending application Serial No. 593,604, filed June 25, 1956, to complete the packaging operation. This general arrangement of the packaging apparatus illustrated in Figs. 1, 2 and 3 is substantially similar to that disclosed in the previously mentioned copending application Serial No. 476,650, to which reference is made for further details.

The blank feeding means 14 of the present invention is illustrated in detail in Figs. 4, 5 and 6 of the drawings, in which it is seen to comprise a pair of discs 23 that are complementary in shape and that are mounted for rotation about vertical shafts 24 driven through beveled gear pairs 25 from a common drive shaft 26 so as to rotate the discs 23 synchronously. The drive shaft 26 is fitted at one end with a sprocket wheel 27 for connection as at 28 to the main drive for the packaging apparatus, so that the discs 23 are also rotated in timed relation with respect to the associated operating elements of the packaging apparatus as a whole.

Each of the discs 23 is formed with a central hub portion 29 for mounting on the vertical shafts 24 and are keyed thereto within these hub portions as indicated at 30. The upper ends of the vertical shafts 24 are reduced in diameter and are threaded as at 31 to receive a threaded leveling collar 32 for vertical adjustment on the threaded portion 31 of the vertical shafts 24 to set the discs 23 at a proper level. Upon adjustment of the leveling collars 32 they are secured to support and hold the discs 23 in place by fastening means as at 33 extended therethrough to engage the disc hub portions 29 at the end face thereof. Tubular post members 34 are then fitted over the disc hub portions 29 to serve as a cover for the upwardly extending ends of the mounting shafts 24 and also to provide for laterally positioning a stacked supply of wrapper blanks W to be fed by the discs 23, the axes of the discs 23 being spaced to allow stacking of wrapper blanks W thereon between these post members 34.

As illustrated in the drawings, the discs 23 are formed with a diametric arm portion 35 having a peripheral arm portion 36 at each end extending therefrom in circularly spaced relation with respect to the disc axis, so as to form notches 37 in each disc 23 corresponding in number to the number of peripheral arm portions 36, with the notches 37 opening in the disc periphery and extending adjacent the disc axis in an extent at least equal to the extent of the wrapper blanks W toward this axis when stacked on the discs (i. e., extending to the post members 34 in the arrangement illustrated). Each disc 23 must have at least one notch 37 of this sort formed therein for operation according to the present invention, and the illustrated arrangement to two such notches 37 is preferred because it provides for feeding of two wrapper blanks W during each revolution of the discs 23, while further providing discs 23 of appropriate size for supporting an adequate stacked supply of wrapper blanks W, although the discs 23 might be otherwise formed with

4

a different number of notches 37, if desired, and still operate in the same manner.

In the preferred embodiment illustrated, each peripheral arm portion 36 of the discs 23 is formed with an open ended slot 38 extending from the trailing end thereof circularly with respect to the disc axis, so that these slots 38 open at an edge of the disc notches 37 in the direction opposite the direction of disc rotation. Beneath each disc 23 vertically reciprocated suction means 39 is disposed in alignment with the slots 38 and timed in relation to the disc rotation for initially rising within the slots 38 to grip the lowermost blank W of the stack supply adjacent the edge thereof facing opposite the direction of disc rotation while this blank is still supported on the respective peripheral arm portions 36 of the discs 23. The suction means 39 thereupon acts to draw down the gripped blank edge within the adjacent disc notch 37 below the level of the leading end of the following peripheral arm portion 36 as the discs 23 are rotated so as to withdraw from beneath this blank edge the trailing end of the peripheral arm portions 36 previously supporting it. As a result, the leading end of the following peripheral arm portions 36, upon continued rotation of the discs 23 pass beneath the remaining blanks W of the stacked supply to have transferred thereto the support of this supply, while passing above the lowermost blank W whose edge has been drawn down and in this manner completes the stripping or separation of the lowermost blank W from the supply.

In addition to the tubular post members 34 that are arranged for laterally positioning the stacked supply of wrapper blanks W on the discs 23, forward and rearward vertical guide members or bars 40 and 41 (see Figs. 1 and 3) are mounted on the frame structure 10 to maintain the stacked supply of blanks in proper position between the post members 34 as the discs 23 rotate for feeding operation. In this connection, it should also be noted that the peripheral arm portions 36 of each disc 23 are further formed with grooves 42 at their top faces that extend circularly with respect to the disc axes in alignment with the blank supply guide members 40 and 41 so that ears, as indicated at 43 and 44 in Figs. 7 to 10, may be arranged at the bottom ends of the guide members 40 and 41 to extend within the grooves 42 below the level of the top faces of the rotating discs 23 to contain the stacked blanks W thereon. Further, it should be noted that the ears 44 on the rearward guide members 41, which are disposed adjacent the suction means 39, are formed with relatively short lips extending beneath the stacked blank supply to provide support for the remaining supply thereat while allowing the adjacent edge of the lowermost blank W to be drawn down by the suction means 39 in the manner already noted above.

The suction means 39 by which the blanks W are gripped and drawn down for stripping by the rotating discs 23, and which is duplicated for each disc 23, comprises a suction cup 45 fitted on a mounting tube 46, that may be connected in any suitable manner (not shown) to a source of suction, such as a vacuum pump unit indicated at 47 in Fig. 1. These mounting tubes 46 for the suction cups 45 are pivotally carried at the ends of parallel arms 48 and 49 that are in turn pivoted on brackets 50 mounted on the frame structure 10. The parallel arms 48 and 49 carry the suction cup mounting tubes 46 so as to maintain them vertical while raising and lowering the suction cups 45, and one of the parallel arms 48 is biased by a spring 51 to follow the motion of a face cam 52 mounted on each disc shaft 24 so as to time the raising and lowering of the suction cups 45. It may be noted that the suction cups 45 are shown in Figs. 5 and 6 raised above the level of the discs 23 to indicate that the cans 52 should release the full pressure of the bias springs 51 to move the suction cups 45 at raised position against the lowermost blank W to be gripped.

Upon lowering of the suction cups 45 to draw down the

5

trailing edge of the lowermost blank W and effect stripping thereof from the stacked supply, holding means 53 may also be provided according to the present invention for engaging the trailing edge of the stripped blank and maintaining it in proper position to be transferred to the feeder chains 14, while allowing release of the suction means 39 for recovery to start the next blank stripping operation. This holding means 53, as shown best in Fig. 6, comprises a lever structure pivoted at 54 on a bracket 55 carried by the frame structure 10, and having an upwardly extending, lengthwise adjustable, arm portion 56 fitted with a resilient clamping structure 57 at its extending end, and a downwardly extending arm portion 58 having a follower roll 59 at its extending end for riding a cam 60 arranged on the drive shaft 26 to oscillate the holding means 53.

The operating relation of the elements of the blank feeding means described above is illustrated in Figs. 7 to 10 of the drawings. Fig. 7 shows the relation of the elements at the commencement of an operating cycle with the stacked supply of wrapper blanks W supported on the rotating discs 23, and with the suction means 39 lowered and the holding means 53 retracted. In Fig. 8, the discs 23 are shown rotated so as to allow raising of the suction means 39 within the slots 38 therein to grip the lowermost blank W of the stacked supply, and Fig. 9 shows the suction means 39 drawing down the trailing edge of the lowermost blank W for stripping upon continued rotation of the discs 23, while Fig. 10 shows the stripping completed with the stripped blank W engaged by the holding means 53 in position to be picked up by the feeder chains 14 and with the suction means 39 released and fully lowered in readiness for rising to strip the next blank W from the stacked supply.

The present invention has been described in detail above for purposes of illustration only and it is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. Apparatus for supporting a stacked supply of paper-board blanks and for separating successively from said supply the succeeding lowermost blanks for separate serial feeding, said apparatus comprising a pair of discs rotated synchronously in opposite directions about vertical axes that are spaced to allow stacking of said blanks on said discs between said axes, said discs being complementary in shape and each disc being formed with at least one notch that opens in its periphery and extends adjacent the axis thereof in an extent at least equal to the extent of said blanks toward said axis when stacked on said discs, each disc being further formed with a slot adjacent the disc periphery extending circularly in relation to the disc axis and opening at an edge of said notch in the direction opposite the direction of disc rotation and with a sword portion forming an edge of said notch opposite said slot and facing in the direction of disc rotation, and vertically reciprocated suction means disposed beneath each of said discs in alignment with said slots and timed in relation to said disc rotation for initially rising within said slots to grip the lowermost blank of said supply adjacent the edge thereof facing said sword portions while said blank is still supported by said discs and for subsequently drawing down said blank edge within said notch below the level of said sword portion as said discs are rotated.

6

2. Apparatus for supporting a stacked supply of paper-board blanks and for separating successively from said supply the succeeding lowermost blanks for separate serial feeding, said apparatus comprising a pair of discs rotated synchronously in opposite directions about vertical axes that are spaced to allow stacking of said blanks on said discs between said axes, said discs being complementary in shape and each disc being formed with a diametric arm portion having a peripheral arm portion at each end extending therefrom in circularly spaced relation with respect to the disc axis, each peripheral arm portion having an open-ended slot extending from the trailing end thereof circularly with respect to the disc axis, and vertically reciprocated suction means disposed beneath each of said discs in alignment with said slots and timed in relation to the speed of disc rotation for successively rising within the slots in said spaced peripheral arm portions to grip the lowermost blank of said supply adjacent the edge thereof facing opposite the direction of disc rotation while said blank is still supported on respective peripheral arm portions of said discs and for in turn drawing down said blank edge below the level of the leading end of the following peripheral arm portions as said discs are rotated to withdraw from beneath said edge the trailing end of the peripheral arm portions supporting said blank.

3. Apparatus as defined in claim 2 and further characterized in that the axes for said discs are formed by vertical shafts, said discs are formed with hub portions keyed on said shafts, a length of each vertical shaft is threaded, and a threaded leveling collar is disposed on said threaded shaft length for securing to the disc hub portion at a selected operating level.

4. Apparatus as defined in claim 2 and further characterized in that upwardly extending post members are mounted at the axes of said discs for laterally positioning blanks stacked on said discs.

5. Apparatus as defined in claim 2 and further characterized in that the peripheral arm portions of said discs have the top faces thereof grooved circularly with respect to the axes of said discs, and guide bars for said stacked blanks are disposed vertically above each of said discs with ears at the bottom ends of each of said guide bars extending downwardly below the level of the top faces of said discs in alignment with said disc grooves to pass therethrough as said discs are rotated.

6. Apparatus as defined in claim 5 and further characterized in that the guide bars disposed nearest said suction means have the ears thereof formed with relatively short lips extending beneath said blanks for retaining support of the remaining stack of said blanks while allowing the adjacent edge of the lowermost blank to be drawn down by said suction means.

7. Apparatus as defined in claim 2 and further characterized in that at least one oscillated holding means is disposed below the level of said discs adjacent said suction means and operated in timed relation to the speed of disc rotation for successively engaging the edge of each lowermost blanks when drawn down by said suction means and holding said edge in proper position for transfer to associated serial feeding means upon release of said suction means.

No references cited.