

Nov. 5, 1940.

D. BELCHER ET AL

2,220,073

MECHANISM FOR FEEDING BLANKS

Filed April 28, 1938

10 Sheets-Sheet 1

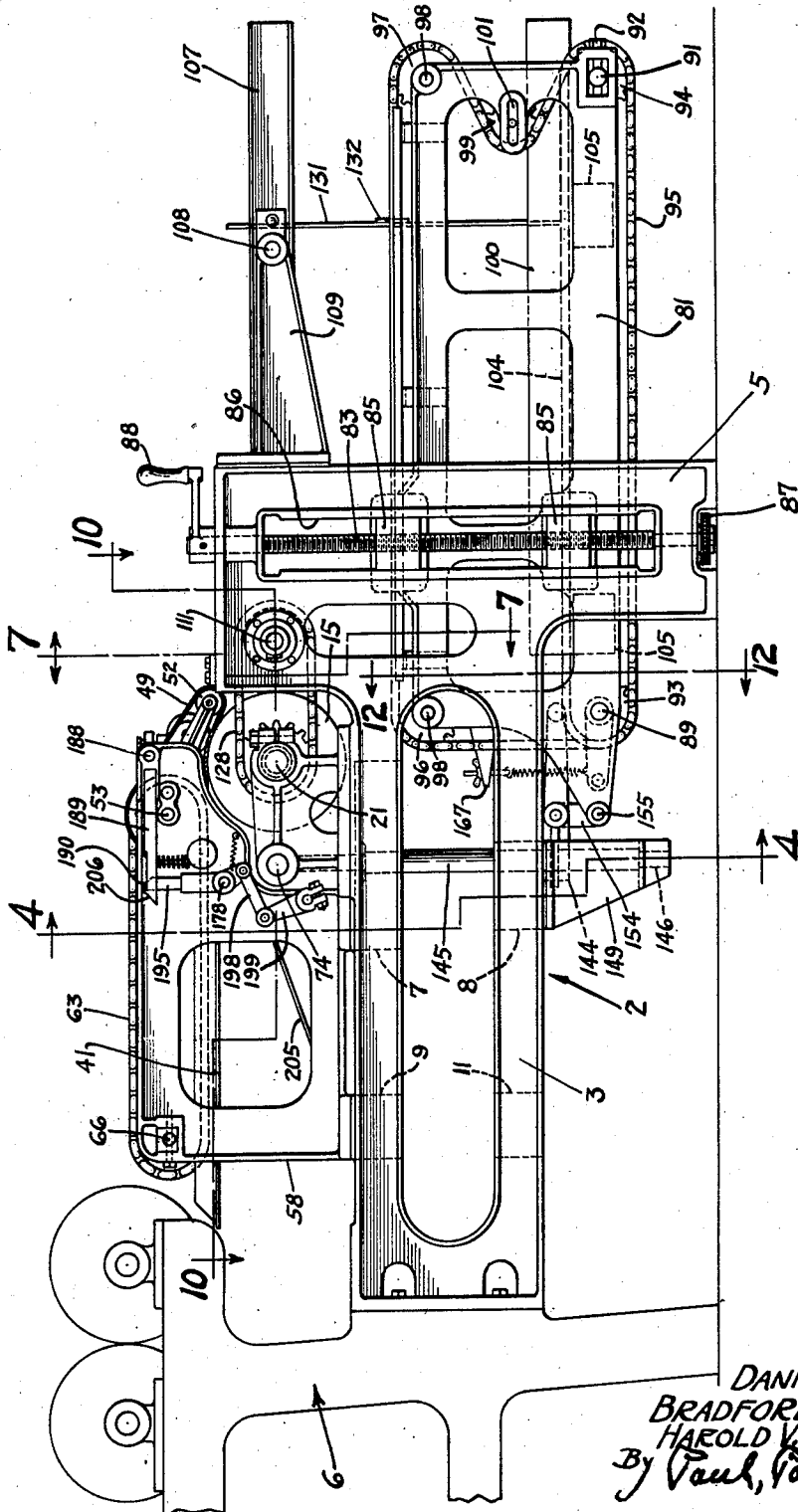


FIG. 1

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10 Sheets-Sheet 3

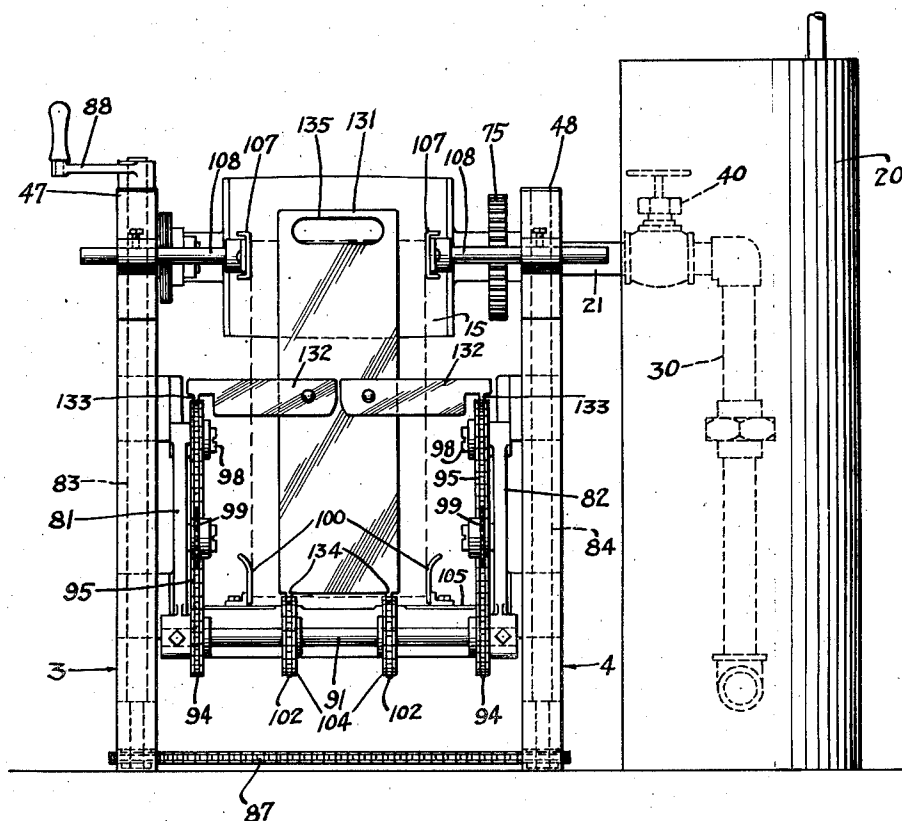


FIG. 3

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10 Sheets-Sheet 4

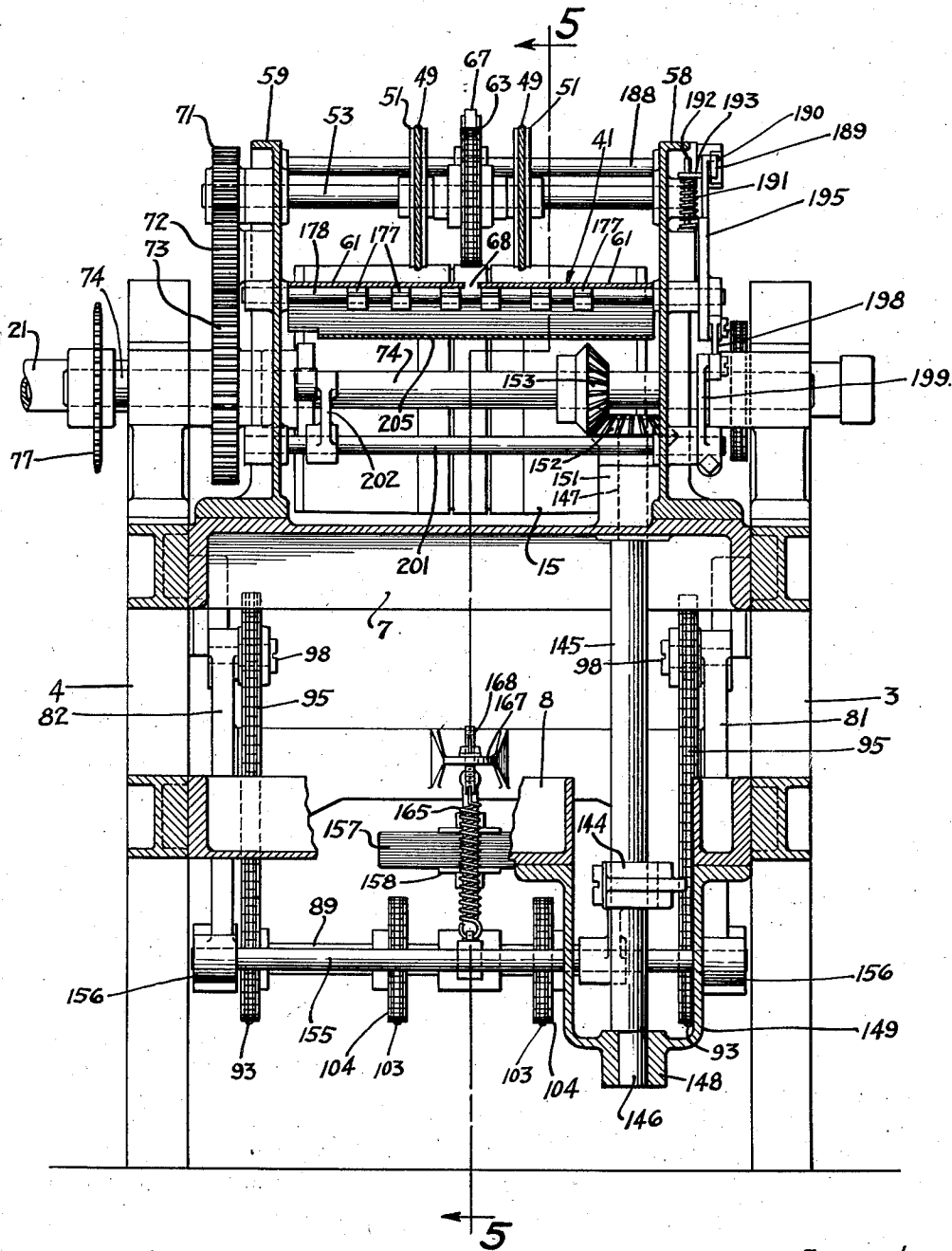


FIG. 4

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10 Sheets-Sheet 5

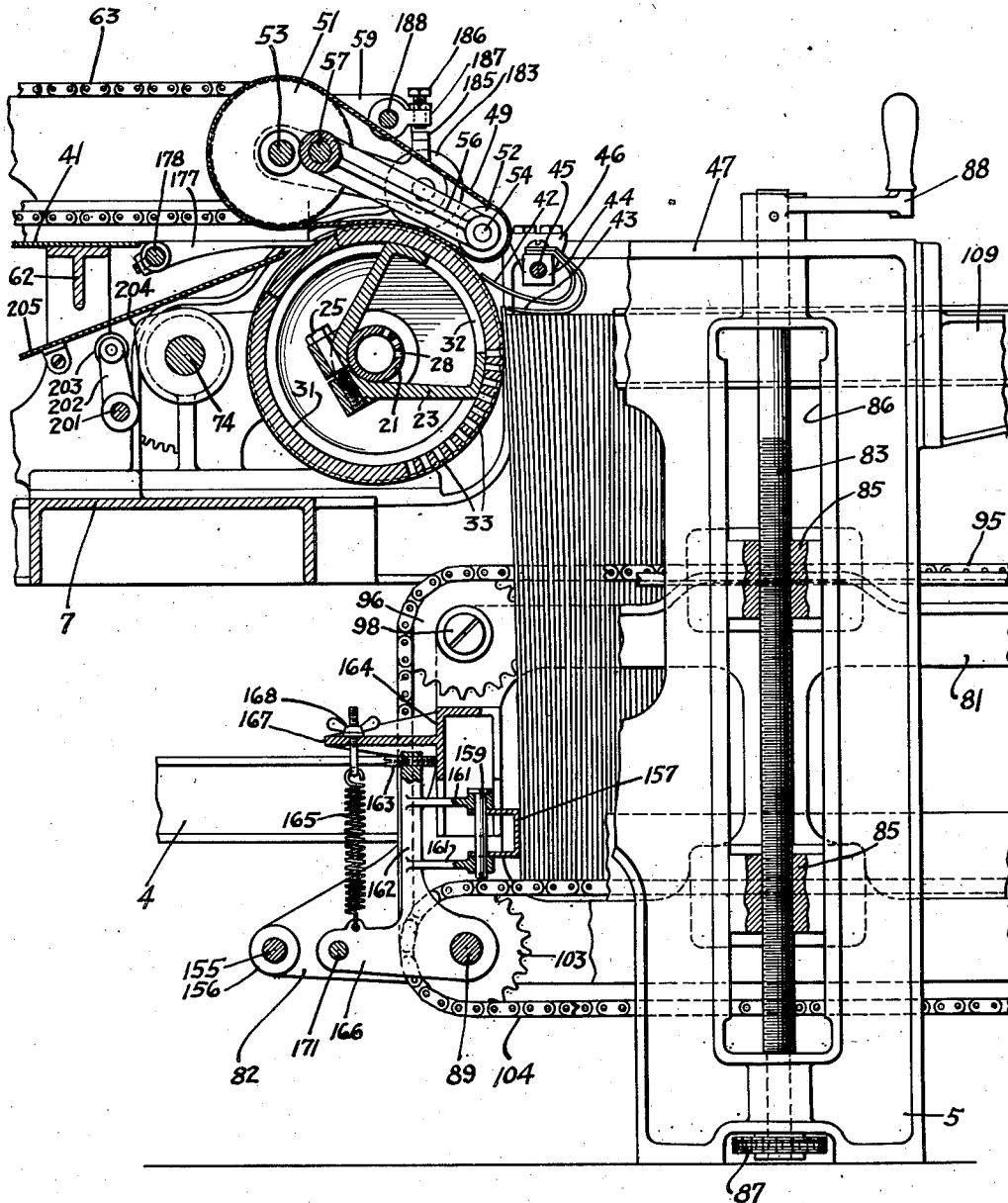


FIG. 5

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10 Sheets-Sheet 6

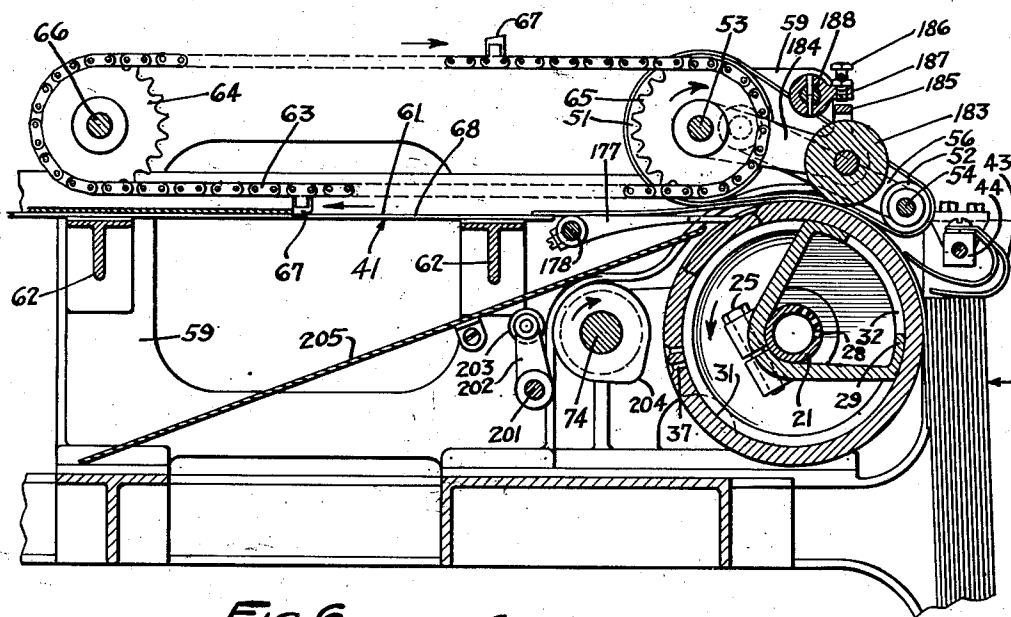


FIG. 6

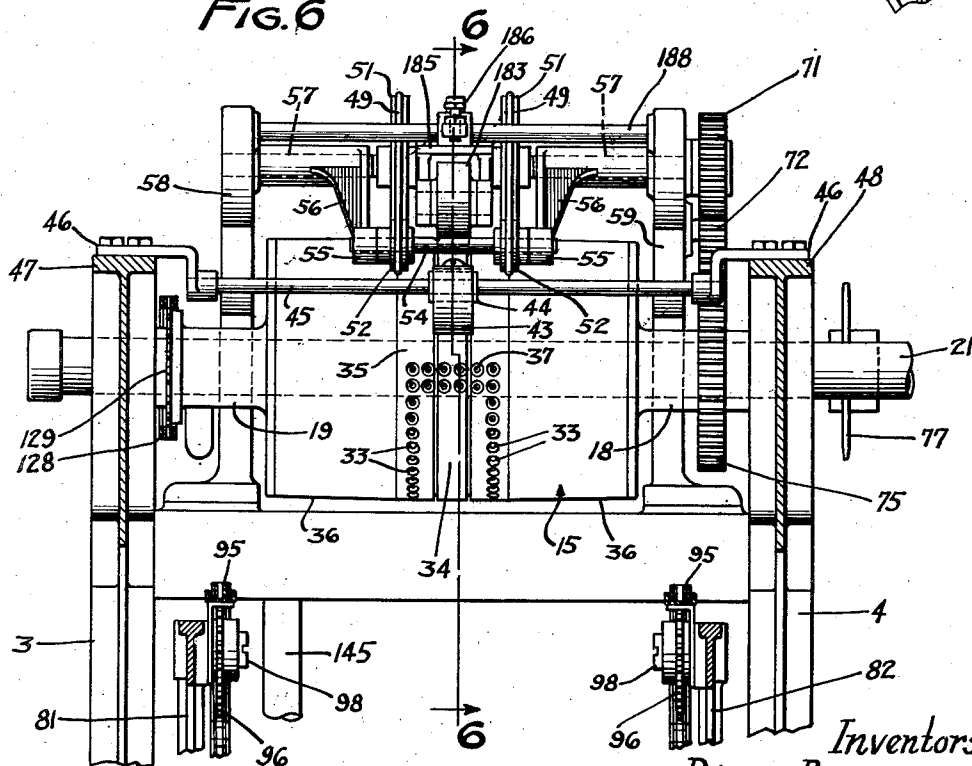


FIG. 7

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MECHANISM FOR FEEDING BLANKS

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10 Sheets-Sheet 7

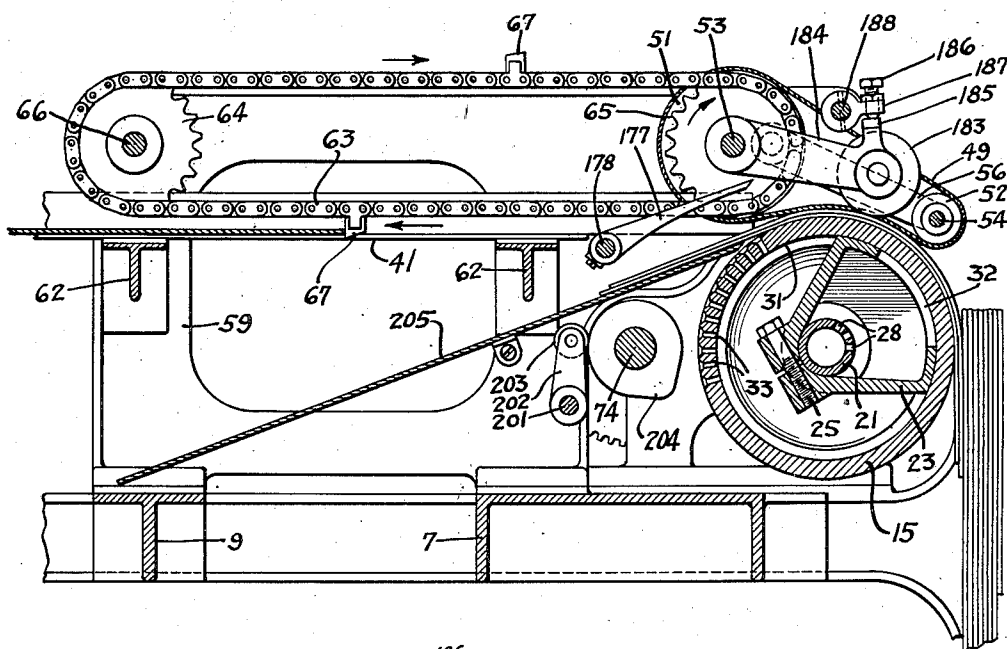


FIG. 8

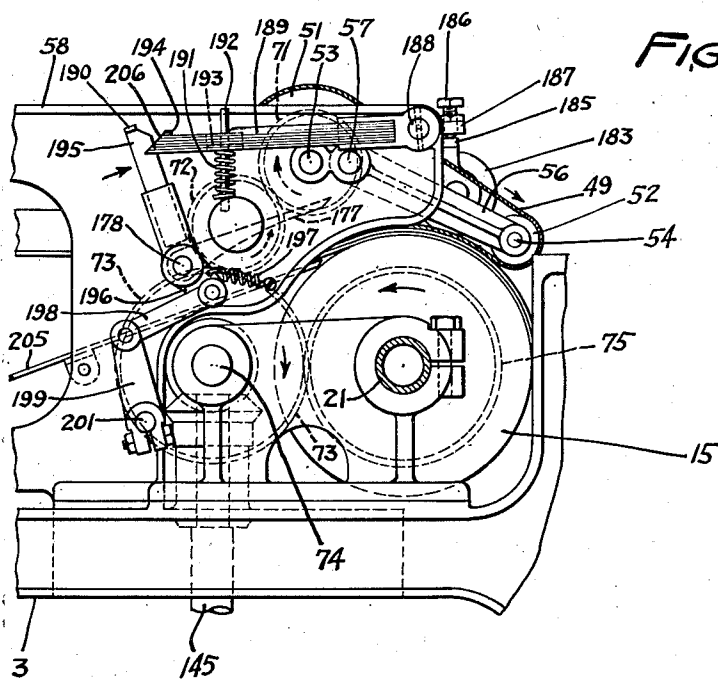


FIG. 9

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2,220,073

MECHANISM FOR FEEDING BLANKS

Filed April 28, 1938

10 Sheets-Sheet 9

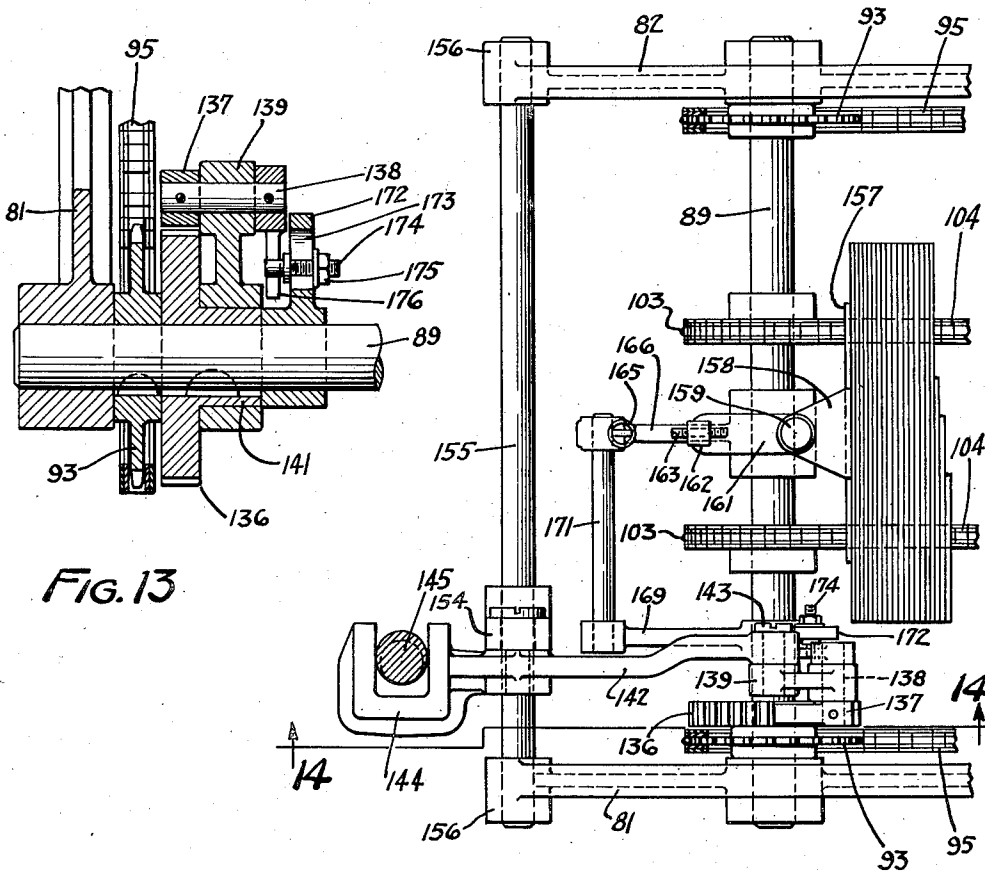


FIG. 13

FIG. 11

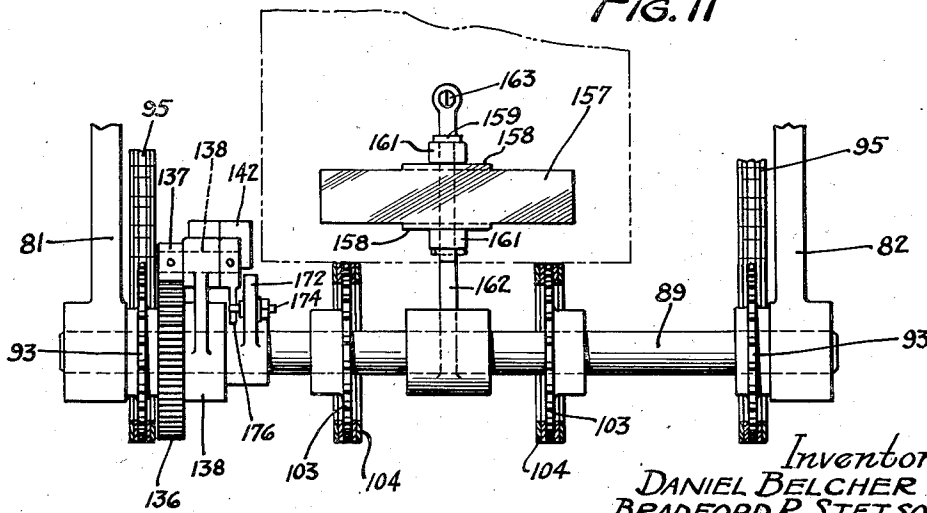


FIG. 12

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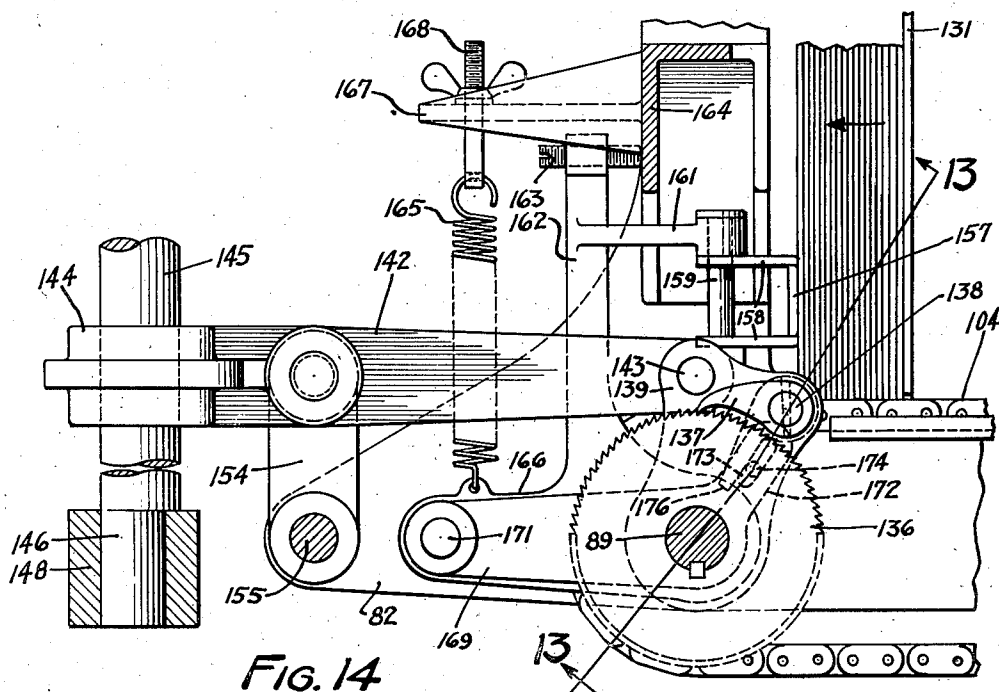
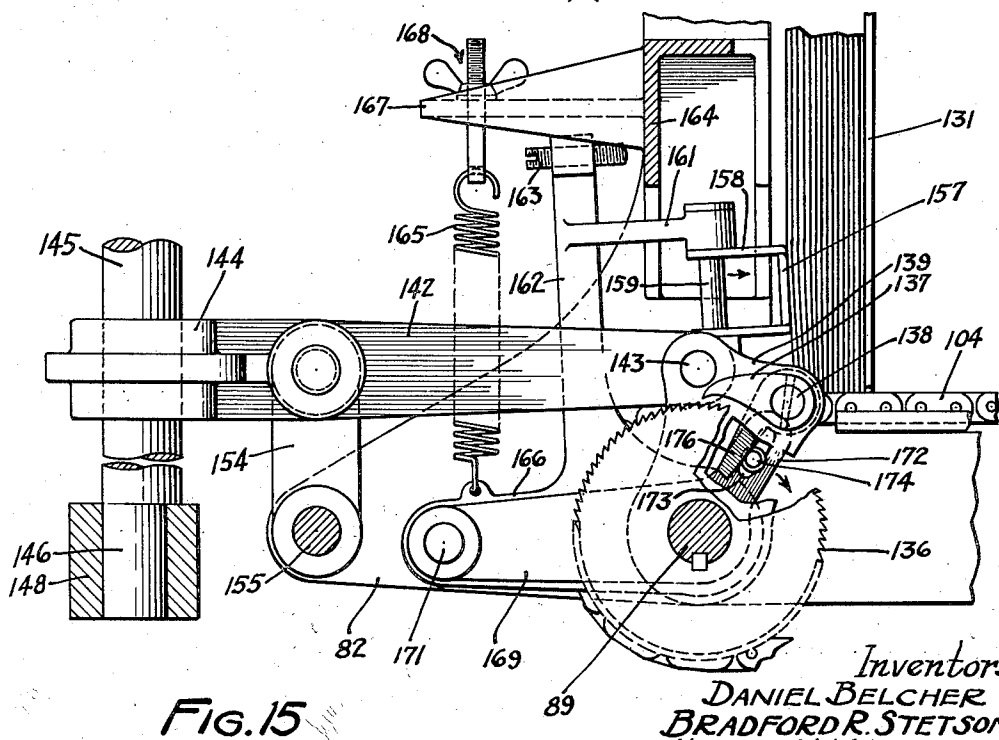
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MECHANISM FOR FEEDING BLANKS

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10 Sheets-Sheet 10



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UNITED STATES PATENT OFFICE

2,220,073

MECHANISM FOR FEEDING BLANKS

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Application April 28, 1938, Serial No. 204,748

6 Claims. (Cl. 271-12)

This invention relates to an improved apparatus for feeding blanks, such as open ended tube blanks, to a bag bottomer or machine for making the bottoms of the bags, or to any other desired apparatus or mechanism to which the blanks are to be fed, one at a time.

An object of the present invention is to provide a novel mechanism for feeding sheet material or tube blanks to a bottoming machine or other structure, whereby the blanks are fed thereto, one at a time, in rapid succession, from a suitable magazine which operates in timed relation to the feeding means.

A further object is to provide a pneumatic feeding mechanism which is not dependent upon tabs or other devices on the blanks for its operation.

A further object is to provide a feeding mechanism which will automatically feed blank sheets or tubes to a receiving mechanism, one at a time, which is so designed and constructed that it does not require the constant attention of an operator, whereby the operation of feeding the blanks is greatly facilitated and also whereby it may be done at small cost.

A further object is to provide a mechanism for feeding blanks or bag tubes to a suitable receiving means, said mechanism comprising a device for positively preventing more than one blank from being fed to the receiving means at a time, and whereby should two or more blanks accidentally be lifted or fed from the magazine at one time by the feeding means, said device will automatically divert such blanks from the normal path of travel of the blanks, after which the feeding means is immediately restored to normal feeding operation without requiring the services of an attendant.

Other objects of the invention reside in the novel construction of the magazine and the means provided therein for advancing the blanks to the feed drum, whereby the number of blanks in the magazine does not affect the operation of the feeding means; in the means whereby the magazine may be filled, when necessary, without interrupting the operation of the machine; in the provision of means whereby all necessary adjustments may readily be made while the machine is in operation; in the provision of a feeding mechanism in which all of the principal movements are rotary, whereby it may be operated at high speed, as compared to similar machines employing reciprocal or oscillatory movements; in the provision of a pneumatically operated feeding mechanism comprising a rotary feed drum having a plurality of suction apertures in the periphery

thereof adapted to engage each successive bag blank or tube, whereby the suction through said apertures will grip the adjacent blank and lift it out of the magazine and deliver it to the receiving mechanism; and, in the provision of a bag blank or tube feeding mechanism, in which the feeding of the blanks or tubes from the magazine is accomplished entirely by vacuum or air suction, whereby the inherent condition of the tubes or blanks will not affect the operation of the feeding mechanism.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a side elevation of our improved feeding mechanism;

Figure 2 is a plan view of Figure 1;

Figure 3 is an end view of Figure 1, showing the air supply means;

Figure 4 is a cross-sectional view on the line 4-4 of Figure 1;

Figure 5 is a detail sectional view on the line 5-5 of Figure 4, on a larger scale, showing the pneumatic feed drum and the means for holding the blanks in contact with the periphery thereof;

Figure 6 is a detail sectional view on the line 6-6 of Figure 7, showing a blank being fed from the magazine;

Figure 7 is a cross-sectional view on the line 7-7 of Figure 1, showing the arrangement of the suction holes in the periphery of the pneumatic feed drum;

Figure 8 is a view similar to Figure 6, showing the means for diverting the bag blanks away from their normal path of travel, in the event that two or more blanks are fed around the feed drum at one time;

Figure 9 is a detail view showing the mechanism for operating the blank diverting fingers;

Figure 10 is a sectional plan view on the line 10-10 of Figure 1, showing the construction of the pneumatic feed drum and the driving means therefor;

Figure 11 is a fragmentary view showing the discharge end of the magazine for supporting and advancing the blanks to the feed drum;

Figure 12 is a detail sectional view on the line 12—12 of Figure 1, showing only the discharge end of the magazine for feeding the blanks to the feed drum;

5 Figure 13 is a detail sectional view on the line 13—13 of Figure 14, showing a portion of the drive mechanism for the magazine;

Figure 14 is a detail sectional view on the line 14—14 of Figure 11, showing the means for intermittently operating the magazine in operative position; and

Figure 15 is a view similar to Figure 14, with the parts shown in inoperative position.

Frame

15 The novel apparatus herein disclosed is shown comprising a main frame, generally indicated by the numeral 2, composed of side members 3 and 4 supported at one end by legs 5, as shown in 20 Figure 1. The opposite end of the main frame may be supported upon a suitable supporting structure, such, for example, as the frame of a bottoming machine or other receiving means, a portion of which is indicated by the numeral 6. 25 The side members of the main frame are shown secured together by suitable cross members 7, 8, 9, and 11, whereby a very rigid frame structure is provided.

Pneumatic feeding means

30 An important feature of the present invention resides in the novel construction of the feeding means, which successively feeds the blanks from a suitable magazine, subsequently to be described, to a receiving means such, for example, as a bot- 35 toming machine, indicated at 6 in Figure 1.

As best shown in Figures 5, 6, 7, 8, and 10, the feeding means comprises a drum having heads 16 and 17 secured to the ends thereof in leak- 40 proof relation. These heads have hubs 18 and 19, respectively, shown rotatably supported on a tubular member 21. The member 21 is non-rotatably supported in split hubs 22 provided in the side frame members 3 and 4, respectively, as best shown in Figure 10.

45 A segmental casing 23 is shown mounted within the feed drum 15, and has a split hub whereby it may be adjustably secured to the tubular member 21 by means of bolts 25, as will readily be understood by reference to Figures 8 and 10. 50 The walls of the casing 23 cooperate to provide a suction chamber 26, which is in direct communication with the interior of the tubular member 21 through a plurality of small apertures 28, provided in a wall of the tubular member 21. 55 The cylindrical wall portion 29 of the casing 23 is turned to fit snugly the bore 31 of the drum 15, and has a plurality of elongated openings or slots 32 therein. The slots 32 are adapted to register with a plurality of suction holes 33 provided in the wall of the drum 15, whereby a suction 60 may be created at the surface of the feed drum in the area 34 defined by the apertures 33, as will be understood by reference to Figures 5 and 7.

By referring to Figures 7 and 10, it will be 65 noted that the intermediate or central portion 35 of the feed drum 15 is cylindrical, whereas, the end portions 36 thereof are slightly tapered so that the drum is slightly smaller in diameter at its ends. By thus forming the periphery of 70 the feed drum, the central portion of the drum will contact the blanks with greater pressure than its end portions, whereby the apertures 33 are sealed by the blanks so that the air suction or vacuum created at the periphery of the drum 75 through these apertures will positively grip each

bag blank or tube, when the perforated portion 34 of the cylinder contacts the blank, as shown in Figures 5 and 6. It will be noted that the casing 23 within the feed drum 15 is so positioned that the apertures 33 in the wall of the drum are not brought into registration with the slots 32 in the cylindrical wall 29 of the casing 23, until the leading apertures 37 reach a position in substantially horizontal alinement with the axis of the feed drum 15, as clearly illustrated in Figure 5. By so positioning the parts, only the upper portion of the blank is initially gripped by the suction device. In the operation of the feeding mechanism, the drum 15 rotates continually and one blank is withdrawn from the magazine for each revolution of the drum. 15

One end of the tubular member 21 is shown connected to a suitable vacuum tank, generally indicated by the numeral 20, by a suitable pipe connection 30; shown in Figures 2 and 3. A control valve 40 may be interposed between the tubular member 21 and the pipe connection 30 to control the suction through the apertures 33 and 37 of the feed drum 15. Suitable means, not shown, is provided for creating a vacuum in the tank 20. 25

Means is provided for guiding or holding the upper ends of the blanks against the periphery of the feed drum to facilitate feeding them around the upper portion of the drum and onto 30 a suitable receiving table, generally indicated by the numeral 41. The means provided for thus holding the upper end of each blank in contact with the periphery of the drum is shown comprising a plurality of resilient fingers 42, which 35 have their free end portions substantially engaging the periphery of the drum, as best shown in Figure 5. Similar resilient fingers 43 are shown positioned beneath the fingers 42 and operate to prevent more than one blank from being withdrawn from the magazine at a time. The fingers 42 and 43 are shown secured to a suitable block 44 supported on a cross rod 45 having its end portions supported in brackets 46 secured to the upright end portions 47 and 48, respec- 45 tively, of the side members 3 and 4 of the main frame.

A pair of endless flexible elements 49 are shown mounted on suitable sheaves 51 and 52 and have their lower runs arranged to engage the periphery 50 of the feed drum 15, thereby to firmly hold the blanks in contact with the periphery thereof. The speed of the flexible elements 49 is equal to the peripheral speed of the drum 15, whereby the elements 49 cooperate with the periphery of 55 the drum to feed the blanks around the upper portion of the feed drum to the table 41.

The sheaves 51 are secured to a cross shaft 53, and the relatively smaller sheaves 52 are shown secured to a short shaft 54, mounted in suitable 60 bearings 55 provided in the lower ends of a pair of brackets 56. These brackets are pivotally supported upon suitable studs 57 secured to the upright frame members 58 and 59. The frame members 58 and 59 are shown suitably secured to the upper surfaces of the side frame members 3 and 4, as will be readily understood by reference to Figures 6 and 7. 65

Receiving table

70 The receiving table 41 comprises spaced apart plate elements 61 shown supported on cross members 62 provided at the upper portion of the upright frame members 58 and 59, as clearly illustrated in Figures 6 and 8. 75

Means is provided for conveying the blanks over the table 41 to the bottoming machine or other receiving means 6, and is shown comprising a chain 63 mounted on suitable sprockets 64 and 65. The sprocket 65 is secured to the cross shaft 53 between the sheaves 51, and the sprocket 64 is similarly supported upon a shaft 66 provided at the opposite end of the receiving table 41, as shown in Figure 6. The chain 63 has lugs 67 adapted to travel in a slot or gap 68 provided between the plates 61 forming the table 41, as clearly shown in Figures 4 and 6. The chain operates in timed relation to the peripheral speed of the drum 15, so that each blank delivered onto the receiving table 41 will be discharged therefrom to the receiving means, shown in Figure 1.

The shaft 53 which operates the conveyor chain 63, is shown provided with a suitable pinion 71 driven from an idler gear 72 which, in turn, is driven from a gear 73 secured to the main operating shaft 74, best shown in Figure 10. The hub 18 of the feed drum 15 is shown provided with a gear 75 which meshes with the gear 73 on the shaft 74, whereby it is driven simultaneously therewith. The operating shaft 74 may be driven from any suitable source of power, not shown, by means of a chain 76 and sprocket 77, shown in Figure 10.

Magazine

The magazine is best shown in Figures 1, 2, and 3, and comprises spaced frame members 81 and 82, shown mounted for vertical adjustment on suitable threaded rods or posts 83 and 84. These rods are rotatably mounted in suitable bearings provided in the leg portions 5 of the main frame 2, as best shown in Figures 1 and 2. The magazine frame members 81 and 82 are provided with suitable hubs 85 which have threaded apertures adapted to receive the posts 83 and 84. The hubs 85 are vertically movable in suitable guides 86 provided in the leg portions 5 of the main frame 2. The threaded rods 83 and 84 are operatively connected together at their lower ends by a suitable cross chain 87, and the upper end of the post 83 is shown provided with a suitable operating crank 88. By thus operatively connecting together the posts 83 and 84, they will be simultaneously rotated, when the crank 88 is operated, thereby to vertically adjust the magazine for bags of different heights.

The magazine is shown provided at its lower portion with a pair of cross shafts 89 and 91, the latter being mounted for lateral adjustment by suitable means, such as indicated at 92 in Figure 1. A pair of sprockets 93 are secured to the shaft 89 and are disposed adjacent to the side frame members 81 and 82 of the magazine, as clearly illustrated in Figures 11, 12, and 13. Similar sprockets 94 are mounted on the shaft 91 at the opposite end of the magazine and are similarly disposed in close proximity to the frame members 81 and 82. Chains 95 are operatively engaged with the sprockets 93 and 94 and with similar sprockets 96 and 97, provided at the upper portion of the magazine frame, as best illustrated in Figure 1. The sprockets 96 and 97 are mounted on studs 98, best shown in Figure 3. Suitable take-up sprockets 99 are adjustably mounted in the side frame members of the magazine, as shown at 101 in Figure 1, whereby the chains 95 may be maintained at the proper tension.

Sprockets 102, similar to the sprockets 93, are secured to the shaft 91 adjacent the intermediate portion thereof, and cooperate with a pair of

similar sprockets 103 to support and drive a pair of chains 104. The sprockets 103 are secured to the shaft 89, as best shown in Figure 12. The chains 104 are spaced apart; as shown in Figures 3 and 12 and provide the support for the bag tubes or blanks, as indicated by the dotted lines in Figures 3 and 12. Suitable guides 100 are mounted on cross members 105 of the magazine frame and cooperate to guide the empty bag tubes or blanks along the magazine in a direction towards the feed drum 15. The guides 100 are adjustable laterally, whereby the magazine may be adapted for blanks of different widths.

Suitable guides 107 are disposed over the guides 100 and cooperate therewith to guide the blanks along in the magazine. The guides 107 are supported at one end by rods 108 adjustably supported in a pair of brackets 109 suitably secured to the upright portion of the main frame, as clearly shown in Figure 1. The opposite ends of the guides 107 are supported by rods 111 and 112, the latter being adjustably mounted in a hub 113 provided in the side member 4 of the main frame.

Blank vibrating means

Means is provided for imparting a slight vibratory motion to the blanks, as they approach the feed drum 15, whereby they will be squared with one another so that they will be properly aligned with the feed drum 15, when engaged thereby, as shown, for example, in Figure 5. The means provided for thus imparting a vibratory motion to the blanks just before they are fed from the magazine by the feed drum 15, is best shown in Figure 10, and comprises a sleeve 114 having a bore therein for receiving the rod 111. The rod is adapted for longitudinal adjustment in the member 114 by such means as a set screw 115. The sleeve 114 is slidably mounted in a flanged bushing 116 supported in a suitable hub 117 of the main frame 3 and secured thereto by suitable screws 118. The inner end portion of the bushing 116 is provided with diametrically opposed slots 119 adapted to receive radial pins 121 secured in the sleeve 114. The slots 119 and pins 121 cooperate to prevent relative rotary movement between the sleeve 114 and bushing 116.

A sprocket wheel 122 has a hub 123 rotatably mounted on the inner end of the bushing 116 between the pins 121 and the inner face of the hub 117. The inner face of the hub 123 of the sprocket is shown provided with diametrically opposed cam faces 124, against which the pins 121 are constantly engaged, as the result of a spring 125 coiled about the outer end portion of the sleeve 114 between the flange 126 thereof and the flanged end of the bushing 116. The cam faces 124 of the sprocket 122 have diametrically disposed shoulders or steps 127 which cooperate with the cam faces 124 to impart a limited axial movement to the sleeve 114, and therefore the rod 111 secured thereto, when the sprocket wheel 122 is rotated. The sprocket wheel 122 has a chain 128 operatively connecting it to a sprocket wheel 129 which may be secured to the hub 19 of the feed drum 15, as shown in Figure 10. By this arrangement, it will be noted that when the drum is rotated, the upper guide 107 supported on the rod 111 will be constantly vibrated when the machine is in operation.

Another feature of the invention resides in the means provided in the magazine for supporting the traveling bags or blanks in upright position and whereby all of the blanks supported in the magazine may be fed to the receiving table 41 by

the feed drum 15. The means provided for thus supporting the traveling blanks in an upright position is best shown in Figures 3, 14, and 15 and comprises a plate 131 having laterally extending arms 132 provided with downwardly directed projections 133 adapted to be received in selected links of the upper runs of the chains 95. The lower end of the plate 131 is provided with similar depending projections 134 adapted to be received in selected links of the chains 104. The upper end of the plate 131 preferably has a suitable hand grip 135, whereby the plate may be conveniently positioned on the upper runs of the four chains or removed therefrom, as desired. Figures 3, 14, and 15, illustrate the position of the plate 131 when the machine is in operation, wherein it will be noted that the plate travels as a unit with the upper runs of the chains 95 and 104 and supports the blanks in upright position in the magazine. By supporting the plate 131 on the chains as above described, all of the blanks in the magazine may be fed therefrom. By reference to Figure 1, it will be noted that the plate 131 and its laterally extending arms 132 are comparatively thin in the direction of travel of the blanks, whereby additional blanks may be inserted into the magazine back of the plate 131 when the latter approaches the feed drum 15. When a fresh supply of blanks are inserted into the magazine, the operator or attendant will hold the stack of blanks at the outer end of the magazine in an upright position with one hand, while he removes the plate 131 with the other hand and then positions it back of the trailing blank of the new supply. It is to be understood that the blanks in the magazine are first pressed together in the direction of travel, before the plate 131 is positioned on the chains back of the last blank. It will thus be seen that the novel magazine herein disclosed may readily be reloaded without interrupting the operation of the machine. It is also so constructed that it will handle blanks of different sizes. By relatively adjusting the guides 104 and 107 laterally, bag tubes of different widths may be handled, and in like manner, bag tubes of different heights may readily be fed through the apparatus by properly adjusting the height of the magazine by manipulation of the crank handle 88, which vertically adjusts the entire magazine, with respect to the feed drum, as will be readily understood by reference to Figures 1, 2, and 5.

Magazine driving means

The means for driving the conveyer chains 95 and 104 of the magazine is controlled by the removal of the blanks therefrom by the feed drum 15, as best shown in Figures 11, 12, 13, 14, and 15. As here shown, a ratchet wheel 136 is secured to the shaft 89 and is adapted to be intermittently driven by a pawl 137, secured to a pin 138. This pin is pivotally mounted in an arm 139 rotatably supported on the hub 141 of the ratchet 136. A connecting rod 142 has one end pivotally connected to the arm 139, as shown at 143 in Figures 14 and 15. The opposite end of the connecting rod has a yoke-shaped head 144 embracing an upright shaft 145, having eccentrically disposed end portions 146 and 147. The lower end portion 146 is shown supported in a bearing 148 in a hanger 149 secured to the cross member 8 of the main frame, as shown in Figure 4. The upper end portion 147 of the shaft 145 is mounted in a bearing 151 provided in the cross member 7, and has a bevel pinion 152 se-

cured thereto. This pinion meshes with a similar pinion 153 secured to the main operating shaft 74, whereby the shaft 145 is constantly rotated when the machine is in operation.

The end of the connecting rod 142 adjacent to the eccentric shaft 145, is supported by a link 154 whose lower end is mounted on a shaft 155 rotatably supported in suitable bearings 156 provided in the side members 81 and 82 of the magazine frame. It will thus be seen that the connecting rod 142 is supported directly upon the frame of the magazine and is movable up and down simultaneously therewith. When the machine is in operation and the above described parts are in the position shown in Figure 14, the pawl 137 will be operatively engaged with the ratchet wheel 136 and will thereby intermittently rotate it for each revolution of the eccentric shaft 145, thereby imparting intermittent motion to the conveyer chains of the magazine.

The ratchet drive mechanism, above described, so operates with respect to the rotation of the feed drum 15 that the blanks are fed towards the feed drum at a slightly higher rate of speed than the drum removes them from the magazine, whereby the blanks will always be supported in the magazine with the leading blank engaging the periphery of the feed drum. Because of the conveyer chains of the magazine feeding the blanks to the feed drum slightly faster than the drum can remove them therefrom, means is provided for automatically interrupting the operation of the magazine driving mechanism, when the pressure against the blanks reaches a predetermined figure.

The means provided for thus automatically interrupting the operation of the magazine is best illustrated in Figures 5, 11, 12, 14, and 15, and comprises a trip member or plate 157 having apertured lugs 158 shown mounted upon a suitable supporting pin 159. This pin is shown supported in laterally extending projections 161 of a lever 162 having its lower end pivotally supported upon the shaft 89 of the magazine. The upper end of the lever 162 has mounted therein, an adjusting screw 163 which is adapted to engage a cross member 164 of the magazine frame. A suitable spring 165 is shown having one end secured to a horizontal arm 166 of the lever 162 and its opposite end adjustably connected to a projection 167 of the cross member 164 by a suitable adjusting device 168. The spring 165 constantly urges the lever 162 in a direction to cause the adjusting screw 163 to engage the cross member 164. When the adjusting screw 163 is so positioned, the trip plate 157 is in operative position, as shown in Figures 5 and 14.

The arm 162, as previously stated, is pivotally supported on the shaft 89, and has its horizontal arm 166 secured to an arm 169 by a suitable rod 171, best shown in Figure 11. The arm 169 has an upstanding portion 172 provided with an elongated opening or slot 173 in which a suitable pin 174 is adjustably mounted by such means as a nut 175, shown in Figure 13. The slot 173 thus permits radial adjustment of the pin 174 in the upright portion 172 of the arm 169. A small finger 176 is secured to the stub shaft 138 and is positioned to be engaged by the pin 174, as will subsequently be described.

In the operation of the above described mechanism, when the trip plate 157 is moved forwardly from the position shown in Figure 14 to that shown in Figure 15, the lever 162 is swung outwardly against the tension of the spring 165, whereby the lower horizontal arm 166 of the

lever 162 swings downwardly and thereby imparts a similar movement to the arm 169, because of its connection therewith through the rod 171. Such downward movement of the arm 169 will swing the pin 174 into engagement with the finger 176, whereby the ratchet dog 137 is moved out of engagement with the periphery of the ratchet wheel 136, as clearly illustrated in Figure 15. When the dog 137 is thus disengaged from the ratchet wheel 136, rotation of the shaft 89 is interrupted, whereby the conveyer chains of the magazine are similarly interrupted to prevent further feeding of the blanks towards the feed drum 15.

The upright shaft 145 rotates continually, because of its connection with the main operating shaft 74 through the bevel pinions 152 and 153, shown in Figures 4 and 10. Such continued rotation of the eccentric shaft 145 will cause the dog 137 to be oscillated back and forth over the ratchet wheel 136, until a certain number of blanks have been fed from the magazine to the receiving table 41 by the feed drum 15. As the pressure against the trip plate 157 decreases, the spring 165 gradually restores the trip plate 157 to its normal position, shown in Figure 14, whereby the horizontal arm 169 is swung upwardly and thereby moves the pin 174 in a direction to permit the pawl 137 to move into driving engagement with the ratchet wheel, as shown in Figure 14. As soon as the parts are restored to the positions shown in Figure 14, the magazine is immediately set into motion to intermittently advance the blanks towards the feed drum 15, as indicated by the arrow in Figure 14.

Blank diverting means

Means is provided for preventing more than one bag to be delivered onto the receiving table 41 at a time. Such means is best shown in Figures 1, 4, 5, 6, 8, and 9, and comprises a plurality of elongated fingers 177, shown secured to a rock shaft 178 mounted in suitable bearings provided in the side members 58 and 59 of the upper portion of the main frame of the apparatus, as best shown in Figure 4. The fingers 177 are spaced apart lengthwise of the shaft 178, as clearly illustrated in Figures 2 and 4. The two intermediate fingers have their terminals reduced in width, whereby they may be received in a pair of spaced annular grooves 181 provided in the periphery of the feed drum 15, as clearly illustrated in Figure 10. The remaining fingers 177 have their terminals adapted to engage the periphery of the feed drum 15 in such a manner that the blanks may readily be fed thereover onto the receiving table 41. The fingers 177 normally bridge a gap between the feed drum 15 and the adjacent end of the receiving table 41, as shown in Figures 5 and 6, whereby the blanks may be fed thereover without interruption. In Figures 5 and 6, the fingers 177 are shown in their normal positions.

Means is provided for automatically operating the fingers to move them into the position shown in Figure 8, in the event that two or more blanks should be fed from the magazine by the feed drum 15 at the same time, as shown in Figure 8. The means provided for thus causing the fingers 177 to be moved into the position shown in Figure 8, is shown comprising a roller or small wheel 183 adapted to ride on the blanks, as they are fed from the magazine to the receiving table 41 by the feed drum 15. The wheel 183 is supported in a yoke 184 pivotally mounted on the shaft 53.

The yoke 184 has an upstanding portion 185 adapted to engage the lower terminal of an abutment screw 186, shown adjustably mounted in a small arm 187 secured to a shaft 188 supported in suitable bearings provided in the side members of the upper portion of the machine frame. A latch 189 is secured to one end of the shaft 188 and has a spring 191 normally holding it in a horizontal position, as shown in Figure 1. The spring 191 is shown coiled about a rod 192 having its lower end suitably secured to the side frame member of the machine and its upper end passing through a guide 193 in the latch 189, whereby the spring is retained in proper position with respect to the latch 189.

The outer end of the latch 189 is shown provided with a shoulder 194 adapted to engage an offset terminal 190 provided on the upper end of a spring-actuated arm 195, thereby to retain the arm 195 in substantially a vertical position, as shown in Figure 1. The arm 195 is secured to the shaft 178 upon which the fingers 177 are mounted. The arm 195 has a depending portion 196 to which one end of a spring 197 is secured. The opposite end of this spring is shown fixed to the machine frame, whereby the spring 197 constantly tends to move the arm 195 from the position shown in Figure 1 to that shown in Figure 9. A link 198 connects the depending portion 196 of the arm 195 to the upper end of an arm 199, shown secured to a cross shaft 201, mounted in suitable bearings provided in the side members of the machine frame. A small lever 202 is shown secured to the shaft 201 and has a roller 203 adapted to engage a cam 204 secured to the main operating shaft 74, as shown in Figures 5, 6, and 8. When the arm 195 is retained in its normal vertical position by the latch 189, as shown in Figure 1, the roller 203 of the arm 202 will be in the position shown in Figures 5 and 6, whereby the high point of the cam 204 may pass freely thereby, without imparting movement to the rock shaft 201. Should the arm 195 be released from the latch 189, the spring 197 will move the arm 195 to the position shown in Figure 9, whereby the linkage connecting it to the rock shaft 201 will cause the arm 202, carrying the roller 203, to swing the latter into the path of the high point of the cam 204, as shown in Figure 8, whereby a rocking movement is imparted to the shaft 201 each time the cam 204 engages the roller 203.

The operation of the blank diverting means, as above described, is as follows: when the blanks are fed from the magazine to the receiving table 41, one at a time, as shown in Figure 6, the upright portion 185 of the yoke 184 will not engage the lower terminal of the adjusting screw 186, whereby no movement is imparted to the rock shaft 188.

Should two or more blanks, however, be simultaneously fed from the magazine over the periphery of the feed drum 15, then the additional thickness of the material on the periphery of the feed drum, because two or more blanks are positioned thereon, will elevate the yoke sufficiently to cause the upright portion 185 thereof to engage the adjusting screw 186 and thereby rock the shaft 188 sufficiently to cause the latch 189 to release the arm 195. As soon as the arm 195 is released from the latch 189, the spring 197 will swing it to the position shown in Figure 9, whereby the diverting fingers 177 will be elevated into the path of the blanks, as shown in Figure 8, thereby diverting the two or more blanks simul-

taneously fed from the magazine, to be delivered onto an inclined chute 205, shown in Figures 6 and 8. At the same time, the roller 203 will be moved into operative engagement with the cam 204 so that for each revolution of the feed drum 15, the diverting fingers 177 are moved downwardly into engagement with the periphery of the drum.

If but a single blank is fed from the magazine by the feed drum 15 at the next revolution thereof, the arm 195 will become interlocked with the latch 189, whereupon the machine is restored to its normal feeding operation. The outer end of the latch 189 is beveled, as shown at 206, whereby the arm 195 may, in the event that the latch is in its normal horizontal position, depress it and thereby move into engagement with the shoulder 184 thereof, as shown in Figure 1. It will thus be noted that, if two or more bags are simultaneously fed from the magazine, said blanks are diverted onto the inclined chute or plate 205, and the machine is immediately restored to its normal feeding operation, when the blanks are again fed, one at a time, over the feed drum 15. This is a very desirable feature of the machine, in that it positively prevents jamming of the bottoming machine or other receiving means to which the blanks are fed from the receiving table 41.

To guide the blanks along the receiving table 41, suitable guide rails 207 are shown provided adjacent each side of the receiving table 41. These guide rails are shown secured to rods 208 adjustably mounted in guides 209 provided in the machine frame, whereby the spacing between the rails 207 may be varied to adapt the machine for bags of different widths. A pair of resilient fingers 211 are also shown provided over the receiving table 41 which operate to firmly hold the blanks against the surface of the receiving table at the discharge end thereof, so that they may be properly guided into the bottoming machine or other receiving means to which the bag tubes are delivered. The rods 211 are shown secured at one end by suitable screws 212.

Operation

In the operation of the novel machine herein disclosed, the blanks or bag tubes are placed on end in the magazine in closely abutting relation. The entire length of the magazine may be filled with blanks, or the magazine may be only partially filled, as desired. The backing plate 131 is then inserted back of and against the last blank in the magazine and is operatively engaged with the upper runs of the chains 95 and 104, as best illustrated in Figure 3, whereby the backing plate 131 is retained in fixed relation with respect to the blanks positioned adjacent thereto. As the blanks are successively fed from the magazine by the feed drum 15, the blanks in the magazine are constantly being advanced to the feed drum until all of the blanks in the magazine have been fed therefrom.

The speed of the magazine is such that the bags are delivered to the drum slightly faster than they are removed from the magazines by the feed drum. Because of this, the blanks will intermittently become somewhat compressed between the trip plate 157 and the backing plate 131, which pressure eventually moves the trip plate 157 forwardly from the position shown in Figure 14 to the position shown in Figure 15, thereby causing the dog 137 to be moved out of driving engagement with the ratchet wheel 136, as hereinbefore

described. When the dog is thus moved out of driving engagement with the ratchet wheel, the operation of the magazine is immediately interrupted. The feed drum 15, however, will continue to feed blanks from the magazine to the receiving table 41, until the pressure against the trip plate 157 is released, whereupon said plate returns to its normal position, as shown in Figure 14, and again moves the pawl 137 into driving engagement with the ratchet wheel 136. Such operation of the parts will immediately cause the magazine to resume operation and again intermittently advance the blanks towards the feed drum 15.

The blank diverting mechanism is also important in that it assures that the blanks will be delivered to the receiving table 41, one at a time, and in properly spaced relation.

The machine is so constructed that it may readily and conveniently be adjusted from one size bag to another in a minimum of time. It operates automatically and does not require the constant care of an attendant, as is customary with feeding apparatus of this general nature now in use.

The novel construction of the feed drum is such that it may readily be adjusted to produce the desired vacuum pull on the walls of the blanks to positively feed them, one at a time, from the magazine to the feed table 41, from which they may be delivered to the receiving means such, for example, as a bottoming machine, in timed relation thereto.

The magazine may readily be adjusted for various heights of blanks or bags by rotation of the crank 88, and the guides 100 and 107 of the magazine may similarly be adjusted to adapt the magazine for handling bags of different widths. Also, by means of the backing plate 131, the magazine may readily be filled or reloaded at any time, without interrupting the operation of the machine.

We claim as our invention:

1. In an apparatus for feeding blanks, a support for the blanks, a hollow feed drum having a plurality of apertures in a portion of its periphery, a segment mounted within said drum and in communication with a suction device, said segment having a cylindrical portion fitting the bore of the drum and provided with suitable openings whereby when the apertures in the wall of the drum pass over said openings, a suction is created through said apertures to cause a blank engaging the periphery of the drum to be fed from its support and onto a suitable receiving means, the suction through said apertures being interrupted, when said apertures move out of communication with the openings in the segment, whereby the blank is released, and resilient means for holding the leading edge portion of a blank in contact with the periphery of the drum to cause the suction through said aperture to effectively grip the blank.

2. In an apparatus for feeding blanks, a magazine for supporting the blanks in upright position, a hollow feed drum having a plurality of apertures in a portion of its periphery, a segment mounted within the drum and in communication with a suction device, said segment having a cylindrical portion fitting the bore of the drum and provided with suitable openings, whereby when the apertures in the wall of the drum pass over said openings, a suction is created through said apertures to cause a blank engaging the periphery of the drum to be fed from the

magazine, resilient means engaging the upper ends of the blanks supported adjacent to the drum, whereby but one blank can be fed from the magazine at a time, and an endless belt co-operating with said resilient means to hold the blank in feeding engagement with the periphery of the drum.

3. In an apparatus for feeding blanks, a magazine for supporting the blanks in upright position, a hollow feed drum having a section of its periphery provided with a plurality of apertures, a segment mounted on the tubular member within the drum and having a chamber therein, said tubular member being in communication with said chamber and a suction device, in communication with the interior of the segment, and said segment having a cylindrical portion fitting the bore of the drum and having apertures therein adapted to register with the apertures in the drum, each time the apertures in the drum pass by the leading blank in the magazine, whereby a suction is created through the apertures in the drum to thereby cause the blank engaging the periphery of the drum to be fed from the magazine, and a resilient finger for holding the upper end of the blank against the periphery of the drum, whereby but one blank can be fed from the magazine at a time.

4. In an apparatus for feeding blanks, a support in which the blanks to be fed are retained in an upright position, a hollow feed drum having a plurality of apertures in a section of its periphery, means within the drum for intermittently causing a suction through the apertures in the drum, when said apertures pass the upper portion of a blank supported in said support, whereby the blank will adhere to the periphery of the drum by suction, and a resilient finger positioned

adjacent to the feed drum adapted to hold the leading blank in feeding engagement with the periphery of the drum.

5. In an apparatus for feeding blanks, a magazine in which the blanks are supported on one end, a feed drum for feeding the blanks from the magazine, one at a time, means in the magazine for advancing the blanks to the feed drum, suction means in the periphery of the feed drum adapted to cause the leading blank in the magazine to adhere to the periphery of the feed drum and be fed from the magazine, and a pair of resilient fingers positioned over the blanks adjacent to the feed drum, one of said fingers engaging the tops of the blanks adjacent to the feed drum, thereby to control the delivery of the blanks from the magazine, and the other of said fingers holding the leading blank in feeding engagement with the periphery of the drum, whereby the blanks may be quickly fed from the magazine, one at a time.

6. In an apparatus for feeding blanks, a feed drum, a magazine for the blanks having means for advancing the blanks to the feed drum, suction means in a portion of the periphery of the feed drum adapted to successively engage and feed blanks from the magazine, a pair of flexible elements or belts spaced apart lengthwise of the drum and each having a run adapted to engage the periphery of the feed drum, thereby to hold the blank being fed in feeding engagement with the periphery of the drum, and means whereby but one blank can be fed from the magazine at a time.

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35