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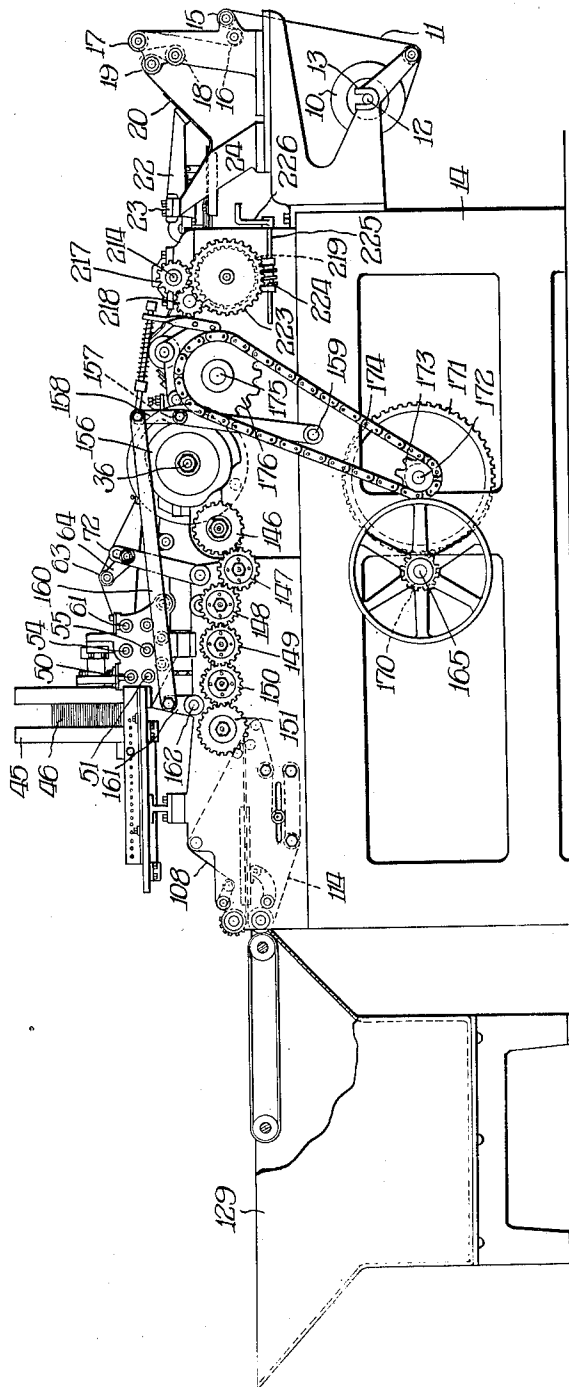
W. W. McCAIN

2,063,392

PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 1



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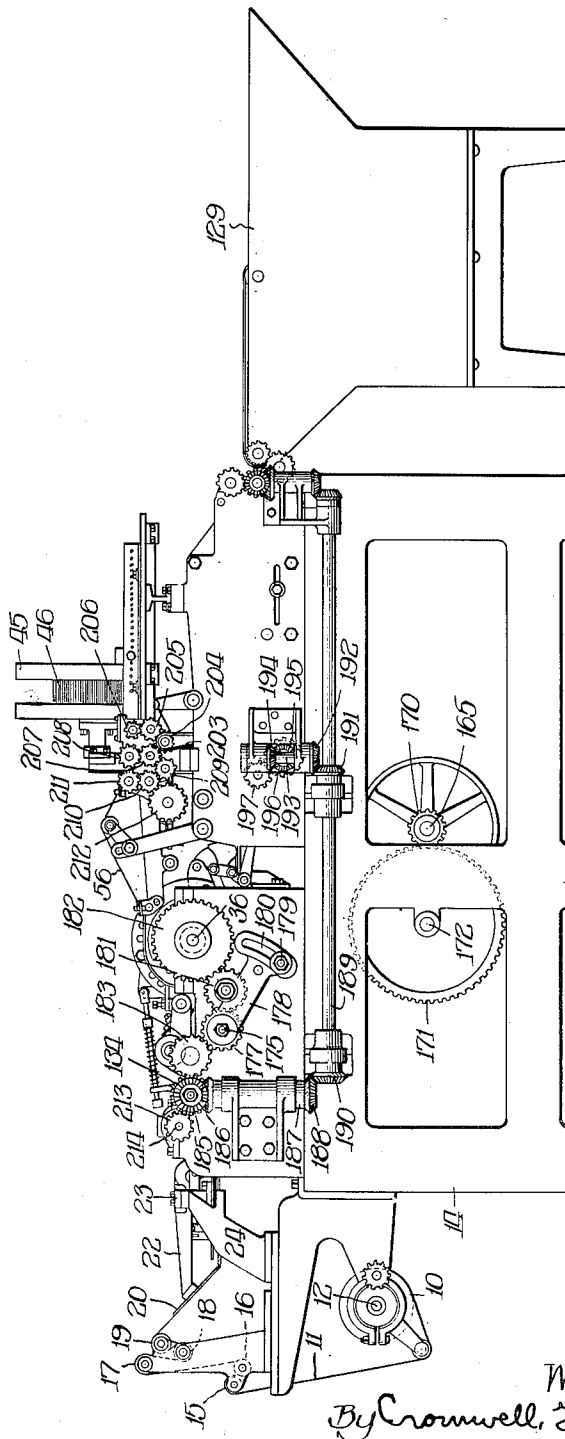
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PACKAGE MACHINE

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9 Sheets-Sheet 2

Fig. 2.



Dec. 8, 1936.

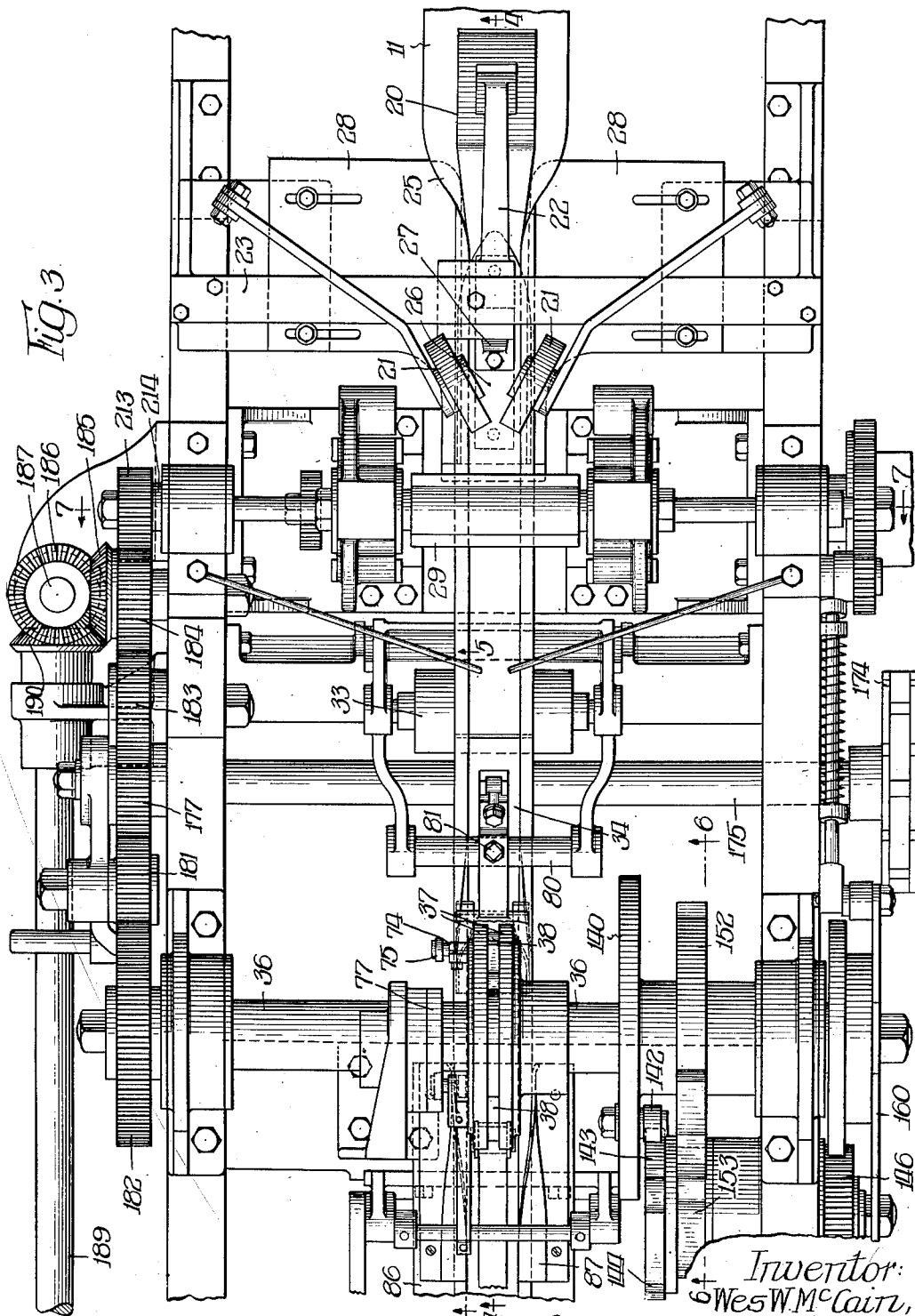
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PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 3



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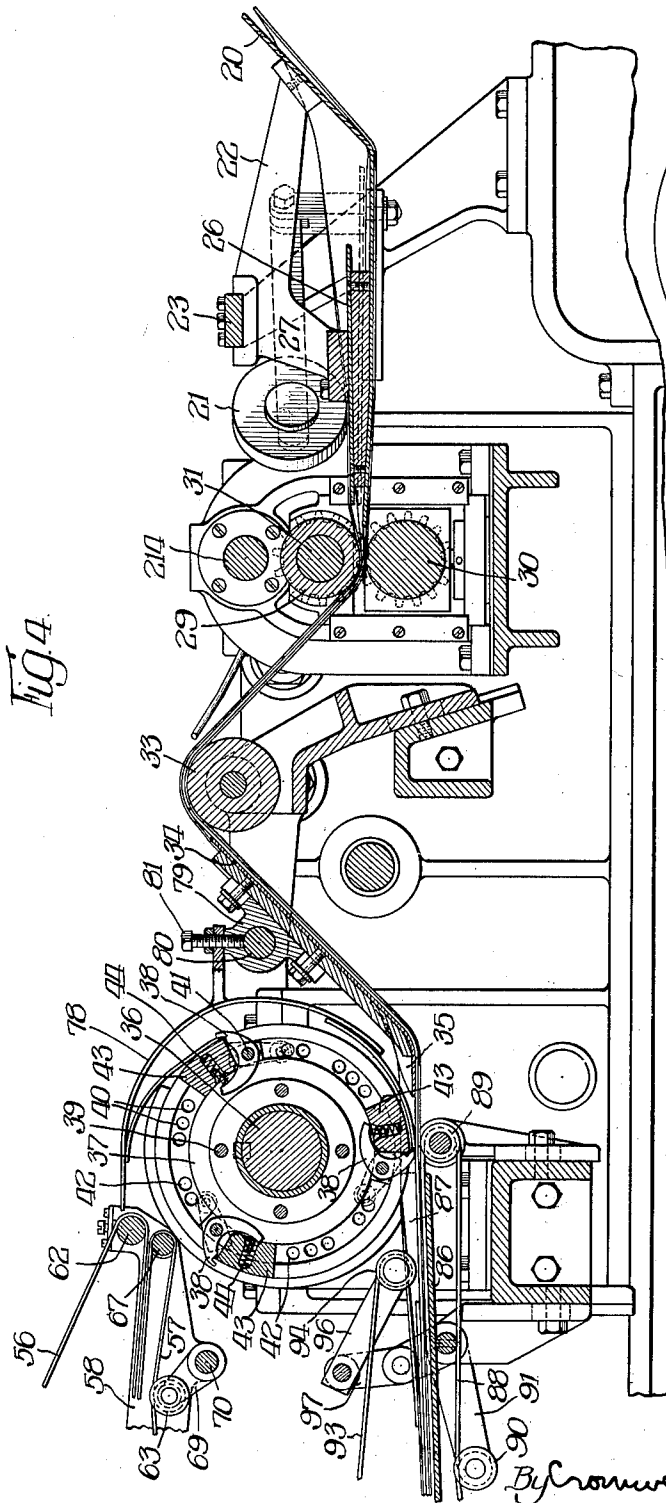
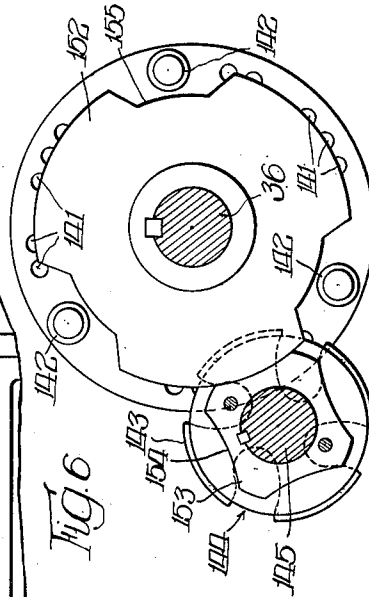
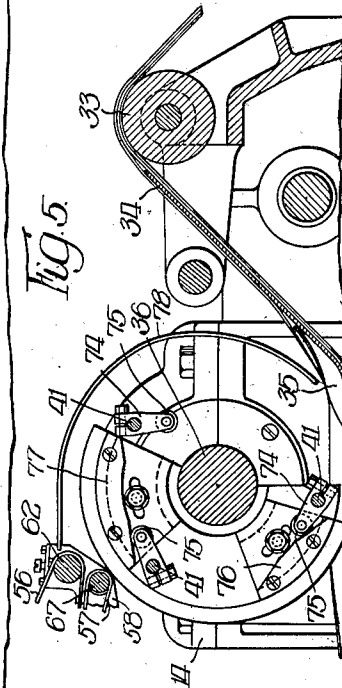
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PACKAGE MACHINE

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9 Sheets-Sheet 4



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2,063,392

PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 5

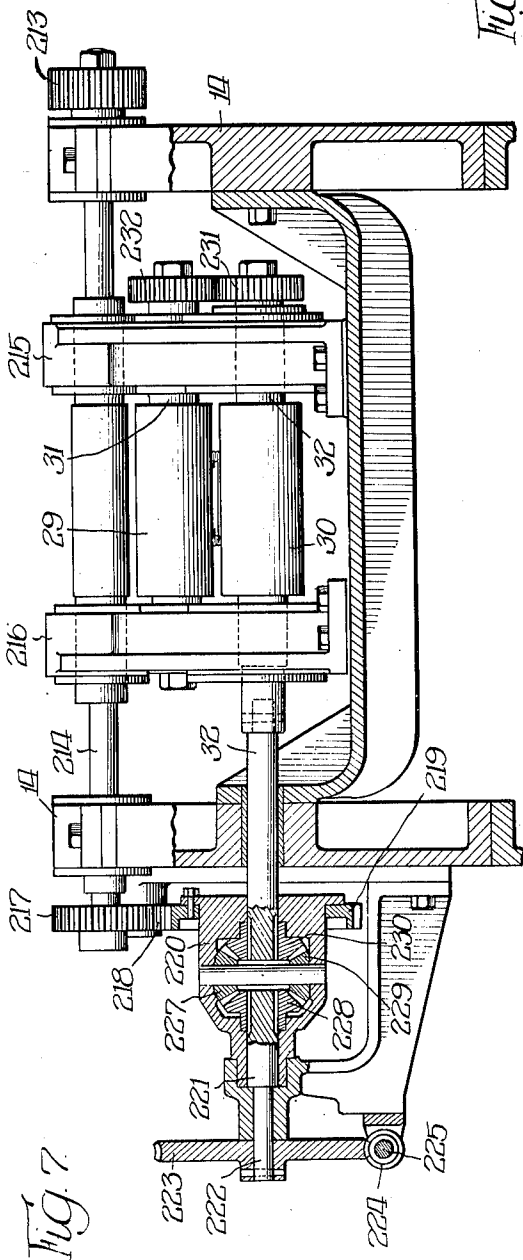


Fig. 7

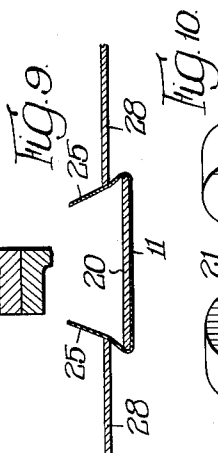


Fig. 9

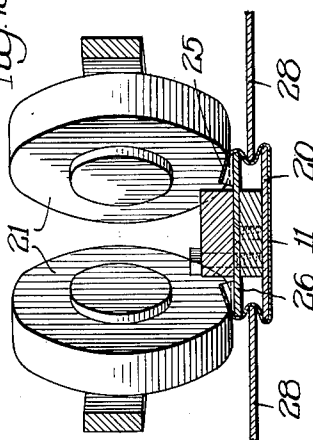


Fig. 10

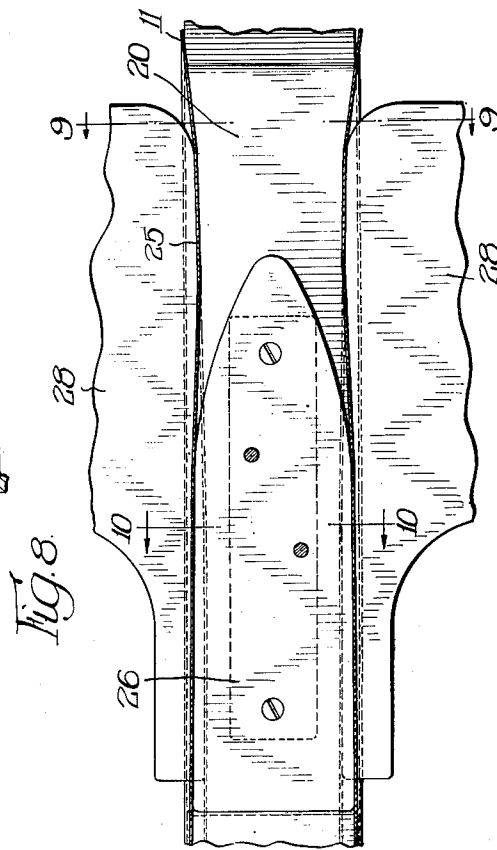


Fig. 8

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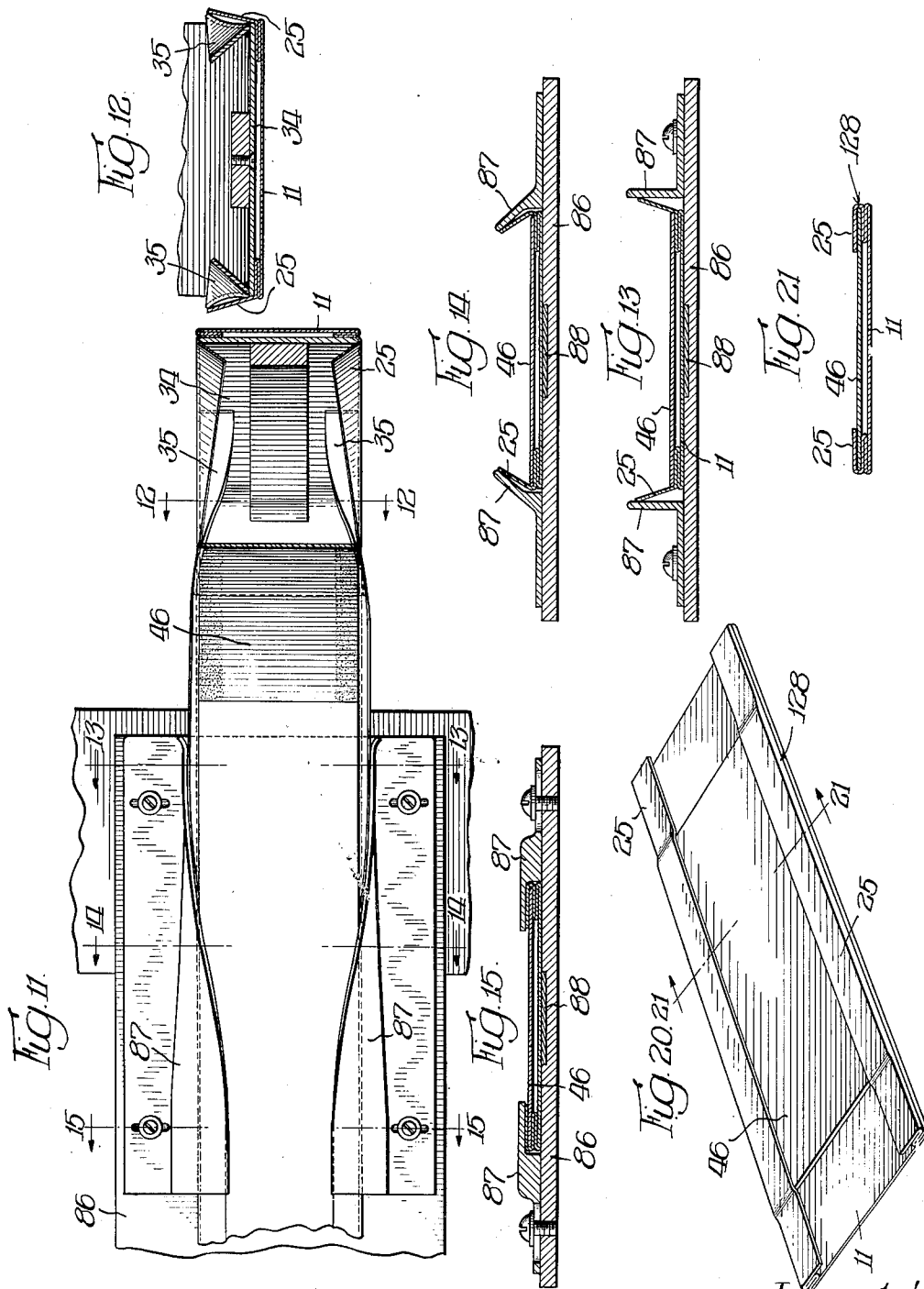
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PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 6



Inventor:
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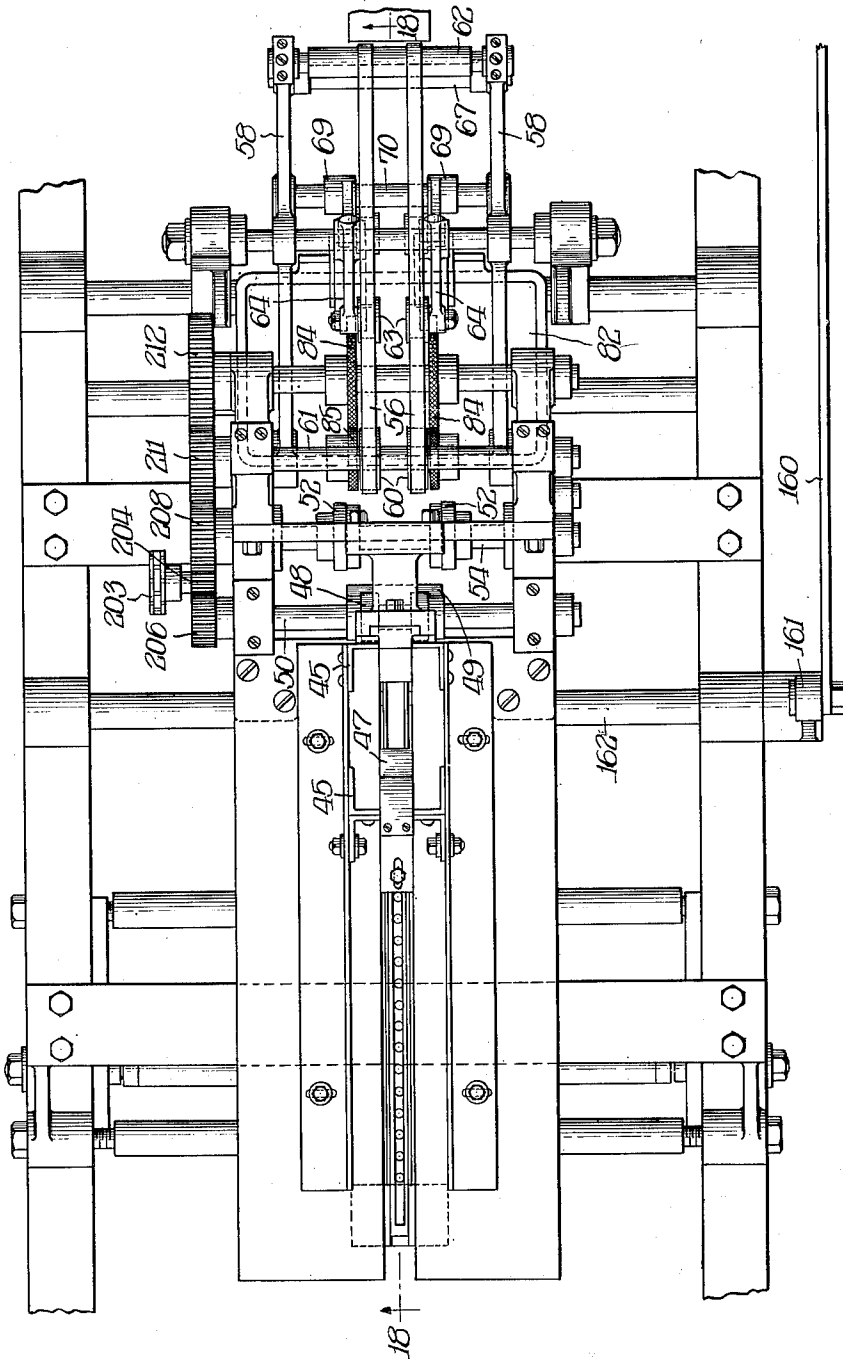
2,063,392

PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 7

Fig. 16



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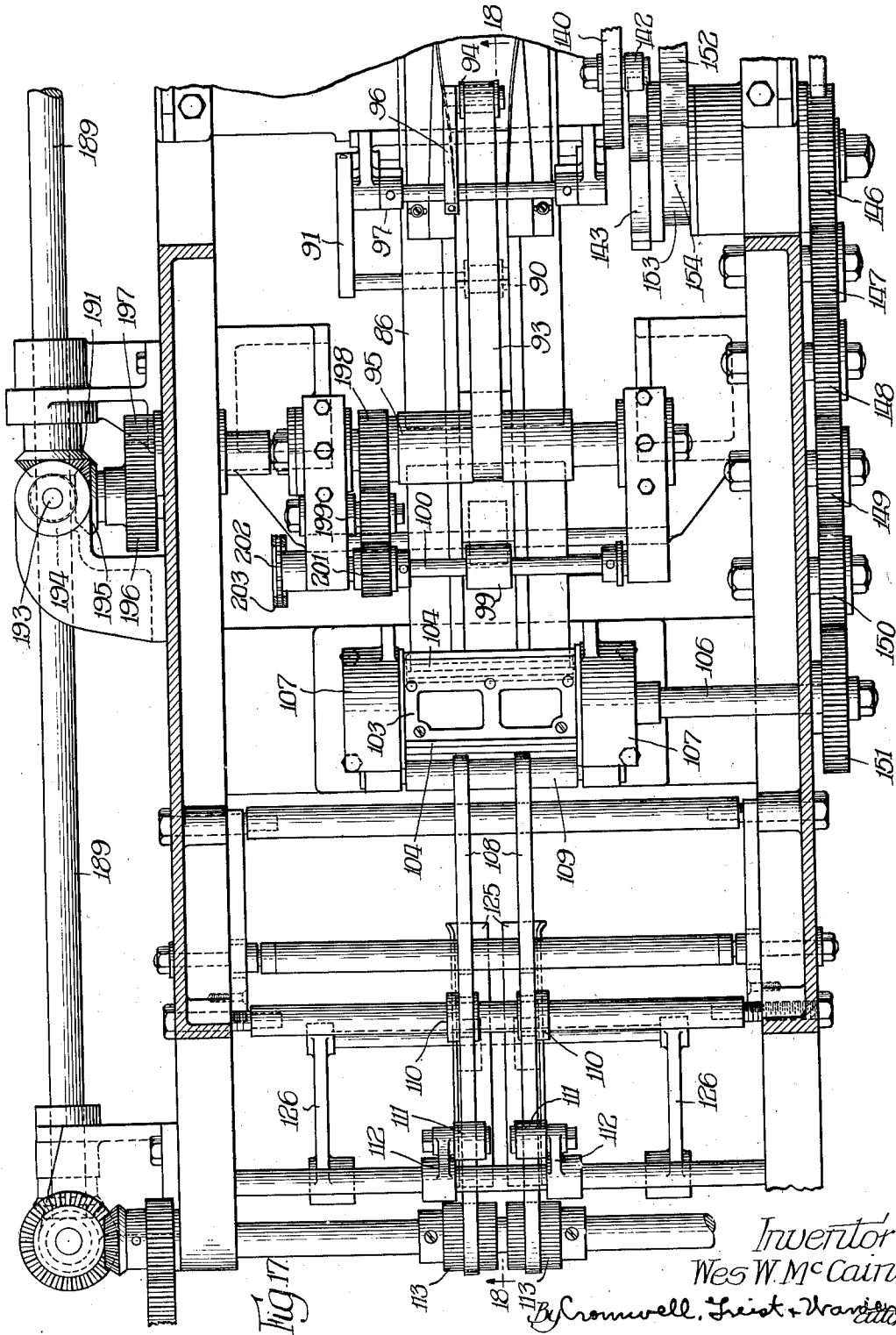
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PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 8



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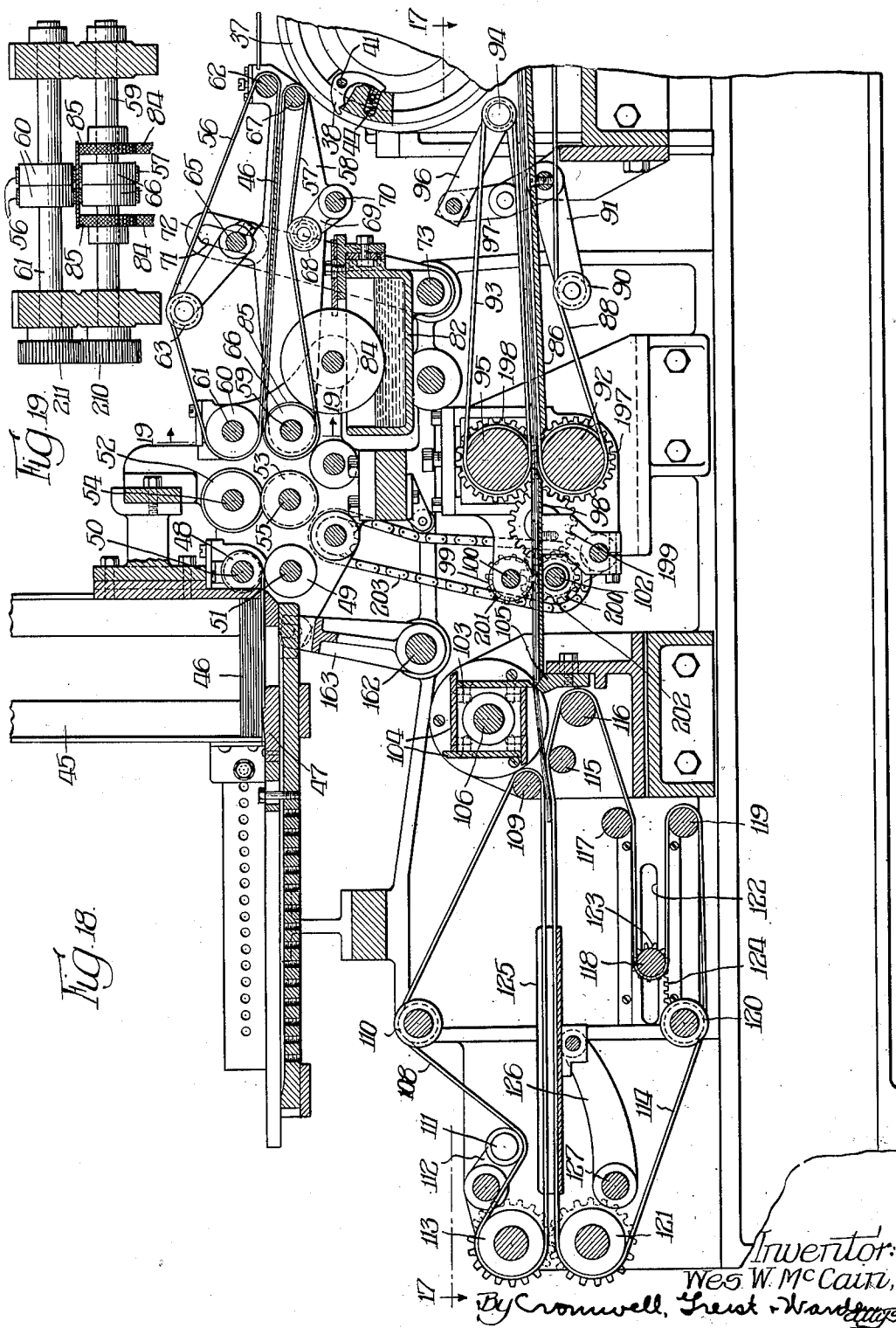
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PACKAGE MACHINE

Filed Jan. 23, 1933

9 Sheets-Sheet 9



UNITED STATES PATENT OFFICE

2,063,392

PACKAGE MACHINE

Wes W. McCain, Oak Park, Ill., assignor to Shellmar Products Company, Chicago, Ill., a corporation of Delaware

Application January 23, 1933, Serial No. 653,033

11 Claims. (Cl. 93—1)

The present invention relates to the formation of packages, and has particular reference to a method and machine for making fabricated packages such as those having a relatively rigid bottom or backing member and a thin, flexible front or top member.

Packages of this general type have met with considerable favor in the art. One of such packages consists of a rectangular cardboard back to which are glued along the lower longitudinal edges thereof the longitudinal edges of a rectangular sheet of thin transparent cellulose sheeting such as the product known as "cellophane", the ends of the cellulose sheeting extending beyond the cardboard and being adapted to be folded over at a point spaced from the cardboard and secured to the cardboard to close the package. Preferably the side portions of the cellulose sheeting are provided with longitudinal bellows folds.

This extension of the ends of the cellulose material beyond the ends of the cardboard complicate somewhat the rapid production of the packages. Also, the necessity of producing packages of various lengths and widths makes it essential, from an economical standpoint, that a machine for producing the packages be adjustable for different sizes.

A principal object of the present invention is the provision of a method and apparatus for production of packages of the type described.

An additional object is the provision of apparatus for producing packages of different sizes.

These and other objects will be apparent from a consideration of the following illustrative and explanative description of a preferred embodiment of my invention and by reference to the accompanying drawings, in which

Fig. 1 is a side view of a machine for making packages of the type described;

Fig. 2 is a side view of the opposite side of the machine;

Fig. 3 is a plan view of a part of the front section of the machine, and shows the forming and indexing means thereof;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 3;

Fig. 5 is a sectional view taken along line 5—5 of Fig. 3;

Fig. 6 is a sectional view taken along line 6—6 of Fig. 3;

Fig. 7 is a sectional view taken along line 7—7 of Fig. 3;

Fig. 8 is an enlarged fragmentary view of the

tube-forming mechanism used in connection with the machine;

Fig. 9 is a sectional view taken along line 9—9 of Fig. 8;

Fig. 10 is a sectional view taken along line 10—10 of Fig. 8 and also shows rollers for assisting the action of the tube-forming mechanism;

Fig. 11 is an enlarged fragmentary view of the second and third forming mechanisms for opening and closing the tube lip;

Fig. 12 is a sectional view taken along line 12—12 of Fig. 11;

Fig. 13 is a sectional view taken along line 13—13 of Fig. 11;

Fig. 14 is a sectional view taken along line 14—14 of Fig. 11;

Fig. 15 is a sectional view taken along line 15—15 of Fig. 11;

Fig. 16 is a plan view of the machine showing the hopper and gluing mechanisms thereof;

Fig. 17 is a plan view of the machine taken along line 17—17 of Fig. 18 and shows the cutting and transfer mechanism of the machine;

Fig. 18 is a sectional view taken along lines 18—18 of Figs. 16 and 17;

Fig. 19 is an enlarged sectional view taken along line 19—19 of Fig. 18 and shows the operating of the gluing rollers;

Fig. 20 is a perspective view of a package constructed by the machine; and

Fig. 21 is a sectional view of the package taken along line 21—21 of Fig. 20.

In accordance with my invention, a web of transparent cellulose material is continuously formed into an open-sided tube provided with longitudinal bellows folds along its side portions and inwardly folded free edges along its top. These inwardly folded edges are continuously opened as the tube passes through the machine, and sections of cardboard backing material are deposited within the opened edges and resting upon the bellows fold at properly spaced intervals. The opened edges are then folded down and adhesively secured to the back of the cardboard, thereby forming a fabricated web of package lengths. This web is passed through a cutter which severs the cellulose material halfway between the end section of cardboard and the one next adjacent, to complete the formation of individual packages.

As shown in the drawings, a roll 10 of a cellophane web 11 is mounted on a shaft 12 journaled in bearings 13 of the frame structure 14. The web 11 is threaded around idler rolls 15, 16, 17, 18 and 19, which act to maintain the web

in alignment. From roll 19 the web 11 passes beneath the bottom former plate 20, the latter being supported near its rear portion by means of an arm 22 which is adjustably mounted on a cross bar 23 of the frame structure. The rear portion 20 inclines downwardly at an angle preferably less than 45° and joins the horizontal front portion 24.

As the cellulose web changes its direction from an inclined angle to the horizontal, its outer free edges, which extend beyond the lower former plate 20, are turned upwardly. A horizontal upper former plate 26 is suspended adjacent and spaced from the lower former plate 20 by an arm 27 extending from the cross bar 23 of the frame structure. Extending inwardly between the upper and lower former plates are side or bellows former plates 28 which press the upwardly extending edges of the cellophane sheet inwardly between the top and bottom plates to form a bellows fold. The free edges of the portions 25 are turned over against the upper forming plate 26 by means of the rubber faced tension rollers 21.

The folding of the web transforms the same into an open tube formation having longitudinal bellows folds along its edges and inwardly extending free edges at its top. This tube passes from the forming plates and between upper draw roll 29 and lower draw roll 30, these rolls being mounted on shafts 31 and 32, respectively, which are journaled in the frame structure 14. In addition to progressing the cellulose web through the machine, the draw rolls, at least one of which is preferably rubber faced, exert a certain amount of pressure on the folded portions of the partial tube, thereby making permanent the creases caused by the formation of bellows folds and the inwardly turned free edges.

Before the fabrication of cardboard backing members with the folded cellulose web is possible it is necessary again to open the folded edges 25 so that the cardboard sections may be inserted therebetween. For this reason the folded web is passed through a second forming mechanism. From the draw rolls the folded web passes upwardly over an idler roll 33. It then passes downwardly beneath the inclined former plate 34, the free edges of the web being threaded above the plate, whereby the free edges 25 are turned upwardly and outwardly, the flared plates 35 assisting in this action as shown in Figs. 11 and 12.

As the cellulose web travels downwardly from roll 33 the outer edges 25, which have been folded inwardly by the forming mechanism, pass over the top of plate 34, while the remainder of the folded web passes beneath the plate. Adjacent the bottom of plate 34 are provided plates 35 which are twisted from a position flat against the former plate to an upright position adjacent the outer edge of the former plate. As the folded-over free edges 25 of the cellulose web 11 strike the twisted or flanged plates 35 they are rotated thereby into erect position, the action being assisted by the change in direction of the web adjacent the lower portion of plate 34 and the flanged plates 35, as shown in Fig. 5.

Mounted transversely of the path of the web 11 and adjacent the inclined plate 34 is a shaft 36 having keyed thereon two associated gripper disks 37 which are adapted to hold therebetween one or more gripping fingers 38. The disks 37 are clamped together by bolts 39 and are pro-

vided with a number of spaced holes 40 adjacent their peripheral portion. Pins 41 are passed through corresponding holes 40 in the two disks and form shafts to which the gripper fingers 38 are pivoted. Adjacent the gripper fingers 38 and mounted in slots 42 of the disks 37 are the blocks 43 against which the outer portion of the gripper fingers are pressed by means of recessed springs 44 acting against the lower or inner end of the pivoted gripper fingers. It will be seen that the number and position of gripping units can be varied as desired. To change the position of the gripper units the disks 37 are separated and pins 41 are changed to the proper holes 40, gripper fingers 38 being carried on the latter. Blocks 43 are also changed in position to correspond with the changed position of the gripper fingers, and the disks 37 are again clamped together. Gripper units may be added or removed, as will be obvious. A hopper 45 is provided to hold a supply of cardboard backs 46 which are removed, one at a time, from the bottom of the hopper by means of the reciprocating dog 47. The hopper is made adjustable in width and length to accommodate cardboard backs of various sizes.

As the cardboard backs 46 are kicked from an open slot in the lower wall of the hopper by the forward motion of 47, they are received between an upper roll 48 and a lower roll 49; carried on shafts 50 and 51, respectively, which are suitably journaled in the frame structure. These draw rolls assist in withdrawing the backing members 46 from the hopper and transfer them to a second set of draw rolls 52 and 53 carried by journaled shafts 54 and 55, respectively.

From the second set of draw rolls, the cardboard backing members 46 are delivered into a system of tapes which travel at a speed faster than the surface speed of the gripper disks 37. These tapes carry the cardboard members substantially tangentially to the gripper disks and movement of reciprocating dog 47 is so timed that the cardboard members reach the gripper disks at the time gripper fingers 38 are momentarily opened.

Upper continuous tapes 56 are carried by a drive roll 60 mounted on shaft 61 which is journaled in the main frame structure 14. After passing beneath roll 60 the upper tapes pass in the direction of their travel toward the gripper disks 37 and at a substantially tangential direction thereto. Adjacent the gripper disks, tapes 56 turn about an idler roller 62 and travel in a reverse direction over roller 63 which is carried by an adjustable arm 64 pivoted to shaft 65.

Lower continuous tapes 57 pass about drive roll 66 mounted on shaft 59 which is journaled in the frame 14 in a manner similar to shaft 61. Tapes 57 pass over roll 66 in the direction of their travel and extend along the lower side of upper tapes 56 to an idler roller 67 adjacent the gripper disks. After passing beneath roller 67, tapes 57 return to roll 66 across a roller 68 carried by an adjustable arm 69, the latter being supported on a shaft 70.

Shafts 65 and 70 and the idler rolls 62 and 67 are mounted in independent frame units 71 which are pivoted to and adjustable about shaft 59. The free end of the independent frame units 71 are adjustably supported by engagement in openings 71 of upwardly extending arms 72, the latter being pivoted to a shaft 73 mounted in the frame structure 14.

As before stated, the tapes travel at a speed greater than the peripheral speed of the gripper disks. The cardboard backing members are therefore thrust beneath the gripper fingers 38 as the latter momentarily open at the point of contact of the cardboard and gripper disks. By proper regulation of the level of engagement of shaft 65 with pivoted arm 72, the cardboard backing members may be made to contact the gripper disks at any desired angle. As the tape system pivots about shaft 59, it will be seen that adjustment of the position of frames 58 will require adjustment of the upper tape 56. To make this tape relatively longer or shorter, it is necessary only to adjust the position of arm 64 on shaft 65, a suitable set screw being employed to lock the arm in any desired position. The relative length of lower tape 57 similarly is controlled by regulation of arm 69 on shaft 70.

As shown in detail in Fig. 5, the pins 41 to which the gripper fingers 38 are pivoted extend through one of the gripper disks and has secured to its outer end an arm 74 which carries a cam roller 75. This cam roller is positioned to contact and be depressed by a lower stationary cam 76 adjacent the lower portion of the gripper disk and an upper stationary cam 77 adjacent the upper portion of the gripper disk. When the rollers 75 are not in contact with these cams, the gripper fingers are pressed against the gripper blocks by the action of compression spring 44 acting on the opposite end of the gripper fingers. However, as the cam roller 75 strike the cam 76 and 77 the gripper fingers are opened against the pressure of springs 44. When the cam roller leaves the cams, the springs 44 cause the gripper fingers again to press against the gripper blocks.

Upper cam 77 is so positioned as to cause the gripper fingers 38 to open up just before the cardboard backing members 46 are thrust into tangential position with respect to the gripper disks, and, as the cardboard members are traveling faster than the peripheral speed of the gripper disks, the cardboard is thrust beneath the opened gripper finger, and is maintained in this position by the pushing action of the tapes until the cam roller passes out of contact with cam 77, whereupon the gripper finger closes to engage the cardboard.

After engaging the cardboard backing member, the gripper units continue rotation in a clockwise direction as viewed in Fig. 4. To provide a guide and guard for the cardboard members as rotated with the gripper unit a semi-circular plate 78 is mounted concentric with the gripper disks. This plate is brazed to a bar which is attached to the support member 79. The latter member also acts as a support for the former unit 34, and is pivotally mounted on a cross rod 80 which is attached to the frame of the machine, a set screw 81 being employed to lock the member 79 in any desired position. It will be observed that this mounting of the former member 34 permits of its adjustment with respect to the roll 33.

The gripper disks 37 ordinarily are provided with a plurality of gripper fingers, so that a plurality of cardboard backing members are carried thereon in spaced relation. As the gripper disks rotate into such position that the gripper fingers are in the position shown by the lower gripper fingers in Fig. 4, the cardboard backing members carried thereby are inserted between the upraised free edges 25 of the folded cellulose

web and above the bellows fold thereof. At this point the cam wheel 75 strikes the lower cam 76 and the gripper fingers open, thereby depositing the cardboard sections in the folded web at spaced intervals.

In traveling from the hopper 45 to the gripper disks 37 and while held by tapes 56 and 57, the cardboard backing members are provided along each longitudinal marginal portion of their lower side with a line of glue or other suitable adhesive. As shown in Fig. 18, a glue pot 82 is mounted to the frame structure beneath the tapes 57. Within this pot rotatable glue wheels 84 are mounted, and make peripheral contact with glue wheels 85, the latter being mounted on shaft 59 as shown in Fig. 19, and making contact at their upper portion with the cardboard backing members along the longitudinal edges of their lower sides, thereby depositing marginal lines of glue.

Thus, as the folded cellulose web passes beneath the gripper disks it is provided with a series of spaced cardboard backing members having longitudinal glue lines on their upper surface and resting upon the upper layer of the bellows fold in the web. The web then passes through a third former, the structure and action of which is shown in Figs. 11, 13, 14 and 15. This third former consists of a longitudinally extending base plate 86 above which the web travels and two twisted or flanged plates 87, adjustably mounted thereon. Plates 87 are twisted from an upright position adjacent the outer edges of the cellulose web, as shown in Fig. 13, into a position parallel to and spaced from the base plate 86, as shown in Fig. 15. As the cellulose web containing spaced cardboard backing members passes through the third former, the opened lip portions or free edges 25 are rotated back into closed position and in contact with the cardboard backing member, thereby causing the edges or lips 25 of the web to adhere to the glue on the cardboard backing members, and completing the fabrication of the web.

The plate 86 is provided with a central longitudinal recess in which travels in the direction of travel of the web a continuous tape 88. This tape passes about an idler roller 89, a tension roller 90 which is carried on an adjustable arm 91, and a drive roller 92. The idler roll 89 is positioned beneath the gripper disks and the tape is driven in such a manner to impart forward motion to the cellulose web throughout the length of plate 86.

An upper continuous tape 93 is mounted immediately above the plate 86 and cooperates with the lower plate in transferring the fabricated web in a forward direction. An adjustable idler roller 94 carries one end of the continuous tape 93 while the opposite end passes about an upper drive roll 95, which is mounted immediately above the similar drive roll 92. The rolls 95 and 92 carry tapes 93 and 88 in recesses, whereby the rolls are permitted to contact the fabricated web and to exert a pulling effect thereon. Also, as these rolls contact the fabricated web adjacent its edges, the folded-over edges of the cellulose web are pressed into contact with the glued cardboard backing member. It is preferred that this contact be light in order to prevent squeezing of the glue from beneath the edges 25.

Roller 94 is mounted on adjustable arms 96 and 97, whereby the tension of upper tape 93 as

well as its distance from lower tape 88 may be varied as desired.

The main drive for the cellulose web is provided by draw rolls 30 and 31. However, it is important to maintain the forward end of the web taut, and for this reason the rolls 92 and 95 are preferably rotated slightly faster than the peripheral speed of draw rolls 30 and 31.

A second base plate 98 is mounted on the side of rolls 92 and 95 opposite plate 86 and acts as a continued support for the fabricated web. The importance of this will be further apparent upon subsequent consideration of the differential drive of the machine.

Above plate 98 is mounted a small, centrally positioned roller 99 carried by a shaft 100. This roller is driven at a speed equal to that of tension rolls 92 and 95, and continues the even travel of the fabricated web into the cutting mechanism to be described presently. A similar roller 101 carried by shaft 102 is mounted beneath base plate 98 and extends upwardly through an opening therein into contiguous position with respect to roller 99.

After the cellulose web is fabricated to the spaced cardboard backing members, the web is severed between the end cardboard and the one next adjacent to form individual packages having a rigid back member and thin, flexible, transparent facings and ends extending beyond the ends of the cardboard back. Ordinarily, one or both of the projecting ends of cellulose material will be folded over and glued to the back of the cardboard, before or after insertion of articles to be packaged, but for present purposes it is sufficient to describe the mechanism by which the package is completed without folded-over ends.

The cutting mechanism by which individual packages are severed from the fabricated web comprises an upper cutting roll 103 provided with one or more cutting knives 104 secured thereto and a lower stationary cutting plate 105. The mechanism shown in the drawings has four knives arranged at 90-degree intervals about the cutting roll. These knives are arranged to cut at intervals. That is, they are so timed as to cut individual package lengths from the web by severing the cellophane web between adjacent sections of cardboard.

Cutting roll 103 is mounted on a shaft 106 which is journaled in bearings 107 adjacent the cutting knives, an extension of the shaft being journaled in a third bearing in the frame structure of the machine.

As package lengths are severed by the cutting mechanism, they are received by a system of tapes which travel at a greater speed than the speed of the fabricated web, and are carried thereby to a source of disposal or to mechanism for performing further operations such as end folding. This system, as shown in Fig. 18, includes upper tapes 108 carried by idler rollers 109 and 110, a tension roll 111 carried by an adjustable arm 112, and a drive roller 113. Below tapes 108 are mounted similar tapes 114 carried by idler rollers 115, 116, 117, 118, 119 and 120, and a drive roll 121 positioned beneath roll 113. Idler roll 118 is adjustably mounted in horizontal slots 122 of the frame structure and carries gears 123 which mesh with the gears of a stationary rack bar 124. The tension of the tapes is adjusted by regulating the position of roller 118 in the slot 122, a nut or set screw being employed to maintain the roller in any desired position.

To maintain the severed package lengths in alignment during their transfer by tapes 108 and 114 a guide 125 is mounted adjacent the tapes. This guide is carried by arms 126 which are supported on a bar 127.

The individual packages 128, shown in Figs. 20 and 21, emerge from tapes 108 and 114 and fall into a hopper 129.

An important feature of my machine is the indexing system by which packages of different lengths may be produced. To accomplish this result it is necessary to regulate the action of the cutting knives in accordance with the length of the cellulose material between successive cuts. In accordance with my invention an index wheel 140 is keyed to shaft 36 upon which the gripper units are mounted. The index wheel, which is preferably larger in diameter than the gripper disks, is provided with a series of openings 141 adjacent its periphery, which openings correspond in spacing to the spacing of openings 40 in the gripper disk 37. The openings 40 are arranged in a combination which will allow one, two, three, four, five, six or seven gripper fingers to be mounted thereon in equally spaced relation, the number chosen being dependent upon the length of the cardboard backing member and the length of the cellulose end portion extending beyond the cardboard in the complete package.

In openings 141 in the index wheel corresponding to the openings 40 of the gripper disk into which are secured gripper fingers, are mounted cam rollers 142. These rollers, in rotating with the gripper fingers, transfer power through a Geneva motion mechanism to a chain of gears operating the cutting knives, thereby providing for one cutting operation for each cardboard backing delivered by the gripper units, and for timing such operation to sever the web mid-way between adjacent sections of cardboard. The cam rollers 142 rotate with the index wheel and engage the cam wheel 143 at the openings 144 therein, continued rotation of the index wheel imparting 90 degrees rotation to the cam wheel, thereby causing one of the knives 104 to operate.

Cam wheel 143 is keyed to a shaft 145 which is journaled in the frame structure 14 and carries a gear 146. This gear operates the cutting roll through a chain of gears 147, 148, 149, 150 and 151.

To prevent rotation of shaft 145 between cutting periods, a cam-locking wheel 152 is keyed to shaft 36 of the index wheel, and this cam wheel engages depressed portions 154 in a co-operating cam-locking wheel 153 which is keyed to shaft 145. When the cam rollers 142 rotate into a position to operate the cam wheel 143, the cam-locking wheel 153 is released from engagement with cam-locking wheel 152 by rotation of the depressed portions 155 of the latter into a position adjacent the cam-locking wheel 153. After 90 degrees rotation the two cam-locking wheels 152 and 153 again engage to stop rotation of the cutting knives. It will be understood that a cam-locking wheel 152 will be employed which has a number of depressed portions 155 equal to the number of cam rollers 142.

The length of packages produced by the machine does not depend upon the speed of the web therethrough, and the speed of the web is not necessarily changed upon a change in the package length. Package length is controlled by the number and length of cardboard sections inserted in the web. If it is desired to produce

a relatively long package, only one gripper finger may be employed. In such case, only one cam roller is mounted on the index wheel, whereby the cutting mechanism operates only once for each revolution of the gripper units. It is also necessary to employ cam wheels 152 and 153 having a single depression therein.

If it is desired to make a smaller package, a larger number of gripper fingers and cam rollers, and cam wheels having a corresponding number of depressions, are employed. As shown in the drawings, the machine is set for the production of a package having a length requiring three gripper fingers on the gripper disks, a similar number of cam rollers being mounted on the index wheel, and cams 152 and 153 being employed with three depressions.

In order to feed a cardboard backing member for each gripper finger employed on the gripper disks, a cam 156 having a number of equally spaced depressed portions equal to the number of gripper fingers on the gripper disks is keyed to shaft 36. This cam operates a cam follower 157 which imparts reciprocal motion to the lever arm 158, the latter being pivoted to the frame at 159, and having its free end secured to a bar 160. This bar operates a crank arm 161 which rotates shaft 162 to which the reciprocating dog 47 is attached by means of open ended arms 163. Thus, each time a gripper finger opens up, a cardboard backing member is fed into it from the hopper 45.

To drive the mechanism described heretofore, any suitable means may be employed. As shown in the drawings, a main drive shaft 165 has a gear 170 meshing with gear 171 on shaft 172. The latter shaft is provided with a sprocket 173 and chain 174 which drives shaft 175 through sprocket wheel 176. The opposite end of shaft 175 has a gear 177 and a pivoted arm 178, the position of the latter being controlled by nut 179 and slot 180. A gear 181 is journaled in arm 178 and drives a larger gear 182 which is keyed to shaft 36 of the gripper disks and index wheel.

Gear 177 also meshes with an idler gear 183 which drives a second idler gear 184. The latter gear has connected to it a bevel gear 185 which transmits power through a similar bevel gear 186 to a vertical shaft 187. To the lower end of shaft 187 is attached a bevel gear 188, and this gear drives horizontal shaft 189 through a similar bevel gear 190. Shaft 189 has a bevel gear 191 keyed to it in order to drive, through bevel gear 192, a short vertical shaft 193. Shaft 193 has a bevel gear 194 meshing with a bevel gear 195 on shaft to which is connected gear 196, the latter serving to drive gear 197 keyed to an extension of tension roll 92. Gear 197 drives a similar gear 198 on drive roll 95, and also meshes with an idler gear 199, which drives gear 200 on the shaft 102 of lower roller 101. Gear 200 meshes with a similar gear 201 on shaft 100 of roller 99.

Shaft 102 is provided with a sprocket wheel 202 and a chain 203 meshing therewith, the chain acting to drive an idler gear 204 which imparts rotation to shaft 51 of draw roll 49 by means of gear 205. Gear 205 drives a similar gear 206 on shaft 50 of roll 48. Gear 204 also meshes with gear 207 on lower shaft 55 of lower draw roll 53. Shaft 54 of upper draw roll 52 is driven by gear 208 meshing with gear 207. Gear 207 drives an idler gear 209 which in turn drives gear 210 keyed to shaft 59 of the lower tape driving roller 66. The upper tape driving

roller 60 is driven by gear 211 on shaft 61 meshing with gear 210. Gear 210 also drives a larger gear 212 which is connected to the shaft of the lower glue wheel 84.

Idler gear 184 meshes with gear 213 keyed to drive shaft 214, this shaft passing through and being journaled in housing members 215 and 216 to provide rigidity to the shaft. At the opposite end of shaft 214 a gear 217 keyed thereon meshes with an idler gear 218. The idler gear 218 drives a larger gear 219 which is connected to the housing 220 of a differential device. The outer end of this housing is rotatably mounted about differential shaft 221.

To an extension 222 of differential shaft 221 is connected a relatively large worm gear 223. The shaft 221 is ordinarily locked against motion by a worm 224 meshing with the worm gear 223, the worm being mounted on a shaft 225 and controlled by a hand lever 226. For this reason, all of the motion of differential housing 220 is transmitted, through differential gears 227, 228, 229 and 230, to an extension of shaft 32 to which gear 230 is keyed, the shaft 32 rotating twice for each rotation of the differential housing. It will be understood that by proper directional rotation of worm 224 and consequently shaft 221, the speed of rotation of shaft 32 may be temporarily increased or decreased.

In producing packages of the type described, it is frequently desirable to print the cellulose web prior to the formation of the package. That is, the package is produced from a web of cellulose sheeting having a printed design at properly spaced intervals. It is therefore necessary to insert the cardboard backing members in association with the sheeting in such a manner that the printing will be properly positioned with respect to the backing and cut-off. As discrepancies are bound to arise with this sort of material, the errors which normally arise would make economical production of the packages impossible without special means for providing compensation.

In accordance with my invention, if the design gets out of proper association in the package, it may be brought back into proper association by manipulation of hand lever 226. That is, motion of the hand wheel is transferred to gears 227, 228, 229 and 230 of the differential device, and the normal speed of the lower draw roll is increased or decreased, as the case may be, without affecting the speed of the cutting and cardboard inserting units of the machine. The cellulose web is thereby retarded until in proper association, or speeded up until in proper association.

To drive the upper draw roll, a gear 231 on shaft 32 is made to mesh with a similar gear 232 on shaft 31 of the upper draw roll. Consequently, a change of speed of the lower roll by manipulation of the differential device is accompanied by a similar change in the speed of the upper roll.

As stated heretofore, the present description is for purposes of illustration and explanation of a preferred embodiment of my invention. It will be understood by one skilled in the art that many variations may be made, and all variations and modifications which come within the spirit of my invention are intended to be included in the appended claims.

I claim:

1. In a machine of the type described, means for feeding a continuous web of a cellulose ma-

terial, means for folding over the outer edges of said web, means for unfolding said edges, means for inserting cardboard backing members between said edges at spaced intervals, means for adhesively securing said edges to said cardboard members, and means for severing said cellulose material between adjacent cardboard members.

2. In a machine of the type described, a bellows tube former, means for advancing a web through said former to produce a bellows tube having its free edges folded inwardly, means for opening said free edges, a cardboard feeding mechanism, means for applying longitudinal lines of glue to cardboard backing members fed by said feeding mechanism, gripper disks having gripper fingers for receiving cardboard backing members fed by said mechanism, said disks being operative to transfer said backing members to a position between the opened free edges of said web, means for releasing said members when in such position, cutting means for severing said web, and means responsive in accordance with the action of said gripper fingers for controlling the action of said cutting means.

3. In a device of the type described, a web feeding means, means for associating cardboard backing members with said web at spaced intervals, said associating means being adjustable to accommodate backing members of different lengths, cutting means for severing said web between adjacent cardboard members, and means driven by said associating means for operating said cutter, said last named means being adjustable in accordance with the adjustment of said associating means.

4. In a device of the type described, means for progressing a web of cellulose material, means for associating cardboard backing members with said web in spaced relation, means for severing said web between adjacent backing members, and means for adjusting the speed of said web independent of the speed of said associating and cutting means.

5. In a device of the type described, means for progressing a web of cellulose material, means for associating backing members with said web in spaced relation, means for severing said web between adjacent backing members, means for maintaining said web under tension, and independent means for adjusting the speed of said web progressing means.

6. In a device of the type described, means for progressing a web of cellulose material, means for associating cardboard backing members with said web in spaced relation, said associating means including gripper disks having a plurality of peripheral openings spaced in such a manner as to receive any number of gripper fingers up to seven in equally spaced relation, gripper fingers for said disks, and a driven shaft for said disks, cutting means for severing said web between adjacent cardboard backing members, and means for operating said cutting means

in accordance with the operation of said associating means, said last named means including an index wheel mounted on the shaft of said gripper disks and provided with openings spaced in accordance with the spacing of the openings in said gripper disks, cam rollers mounted in certain of the openings in said index wheel corresponding to the opening in said gripper disks in which said gripper fingers are mounted, a Geneva mechanism operated by said cams, and means responsive to said Geneva motion for actuating said cutter.

7. In a device of the type described, means for progressing a web of cellulose material, means for associating backing members with said web, means for adjusting the frequency of such association independently of the speed of said web, cutting means for severing said web between adjacent backing members, means independent of said web progressing means for operating said cutting means in accordance with the adjustment of said associating means, and means for adjusting the speed of said web progressing means independently of said associating and cutting means.

8. In a device of the type described, means for forming a bellows fold having inwardly folded free edges in cellulose material, means for outwardly folding said free edges, means for inserting a backing member between said outwardly folded edges, and means for securing said outwardly folded edges to said backing member.

9. A method of forming packages which comprises progressing a web of relatively thin flexible material, continuously forming a bellows fold with inwardly extending free edges in said web, continuously folding said edges outwardly, intermittently depositing backing members between said outwardly folded edges at spaced intervals, securing said edges to said member, and severing said web between adjacent backing members to form individual packages.

10. In a machine of the type described, means for advancing a continuous web having a design printed thereon at spaced intervals, means for associating cardboard members with said web, compensating means for adjusting the relative position between said cardboard members and said web so as to deliver said cardboard members in predetermined position with respect to the printed design on said web, and means for severing said web between adjacent cardboard members along a line spaced from adjacent ends thereof.

11. In a device of the type described, means for progressing a web of material, means for forming opposed bellows folds in said web, means for associating a sheet of another material on the inside of the free edges of said web and in overlapped relation thereto, and means for securing the inner portions of the free edges of said web with the outer portion of said sheet.

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