No. 810,005. PATENTED JAN. 16, 1906.

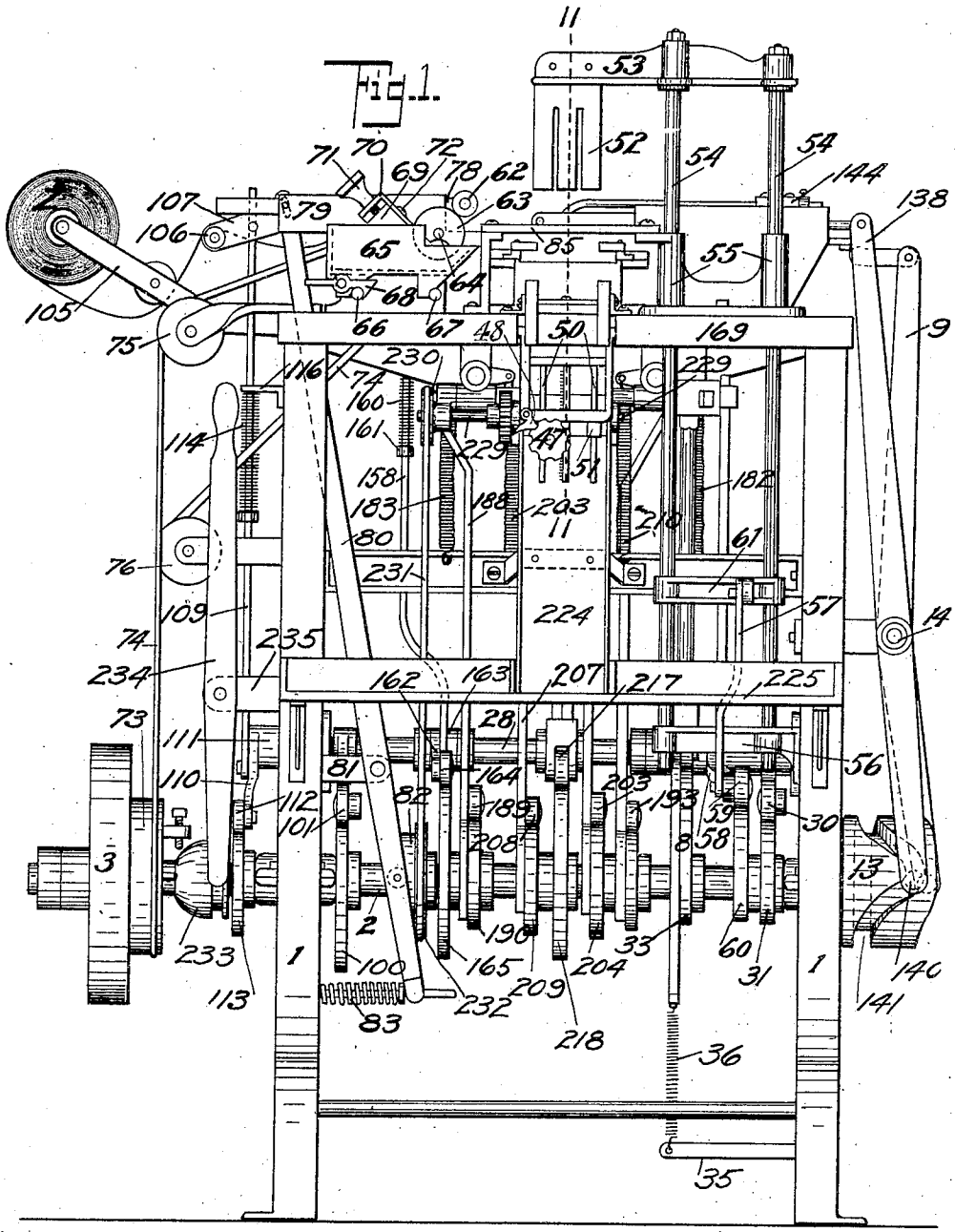
E. J. TIERNEY & P. FUNCK.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED APR. 21, 1904.

7 SHEETS—SHEET 1.

Fig. 1.



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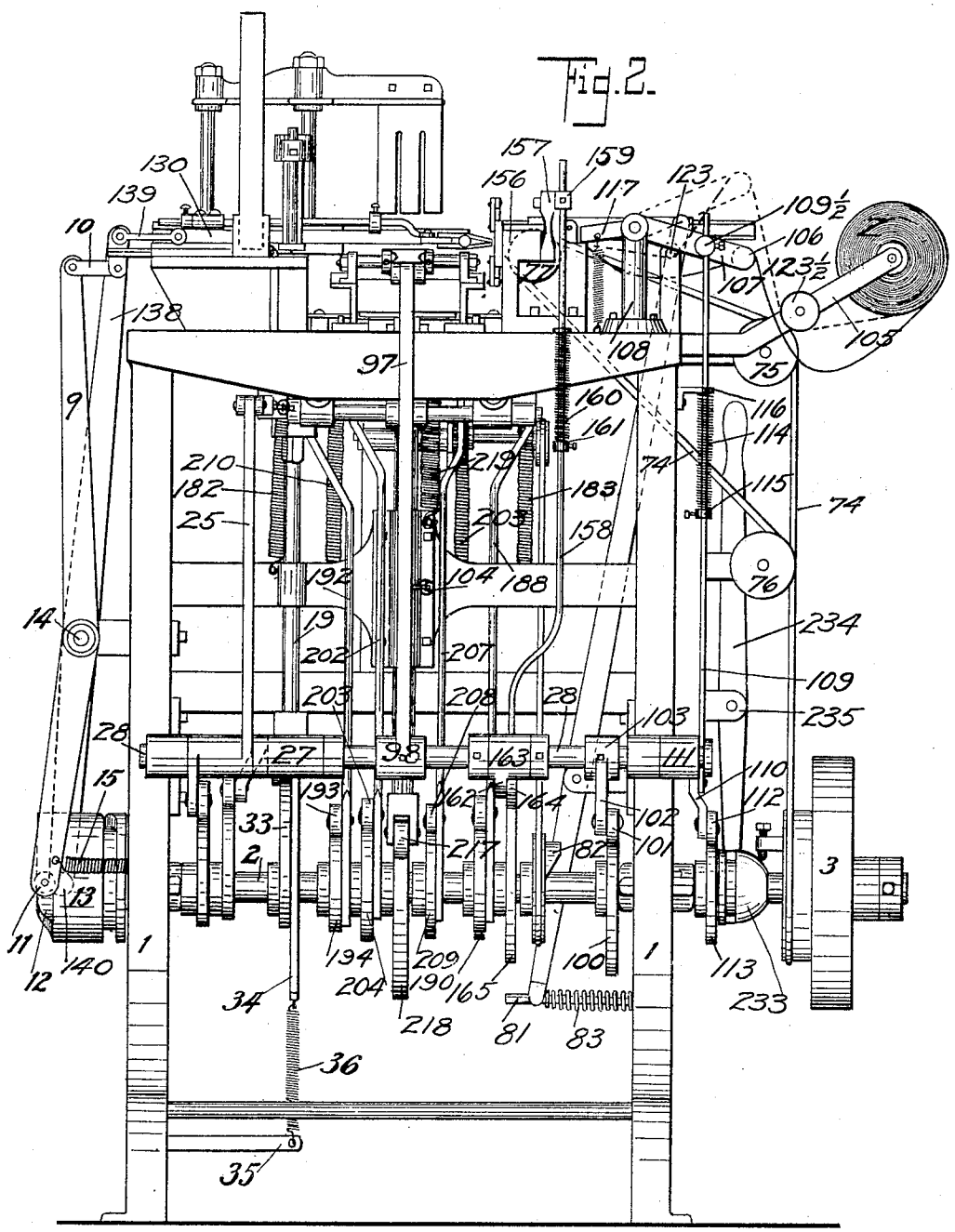
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Fig. 2.



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Fig. 3.

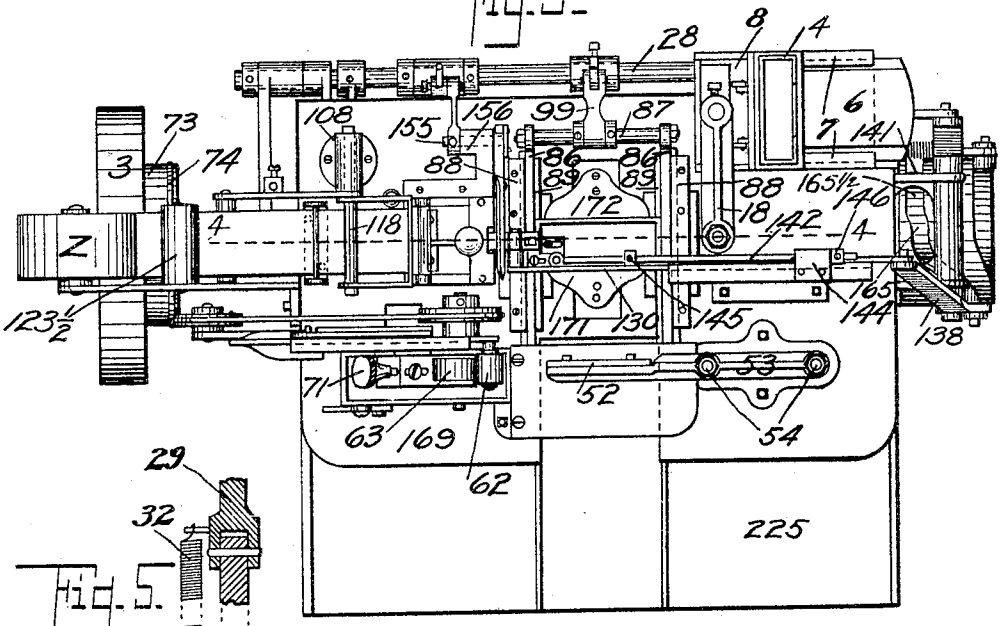


Fig. 5.

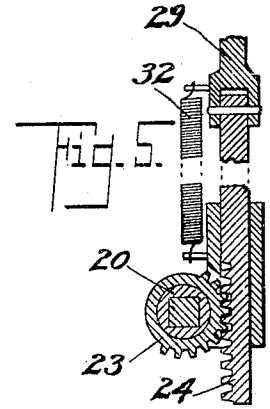
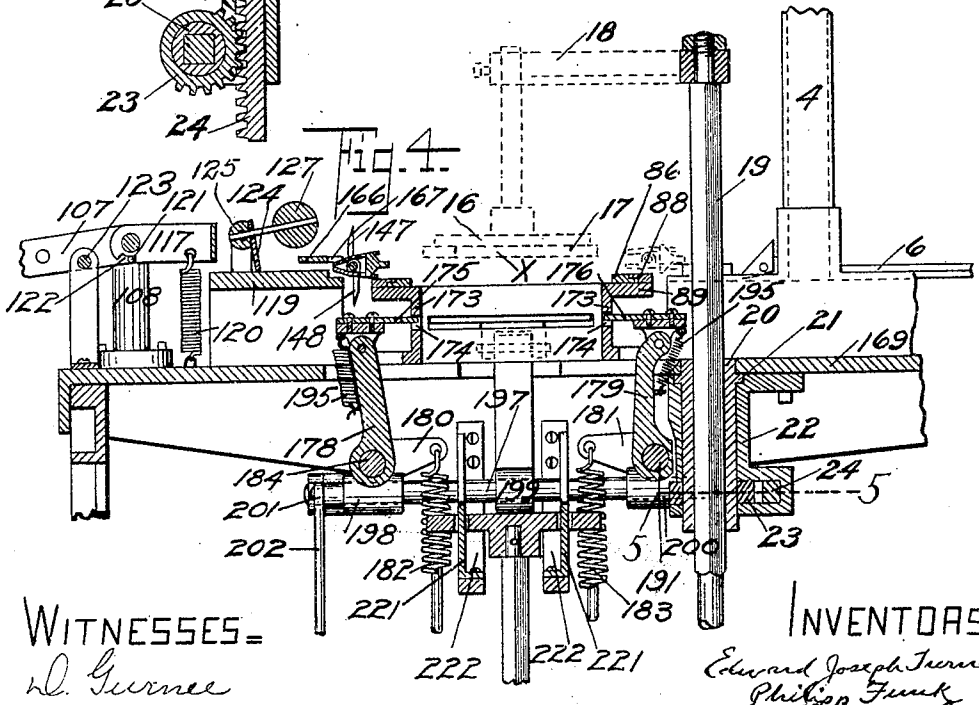


Fig. 4.



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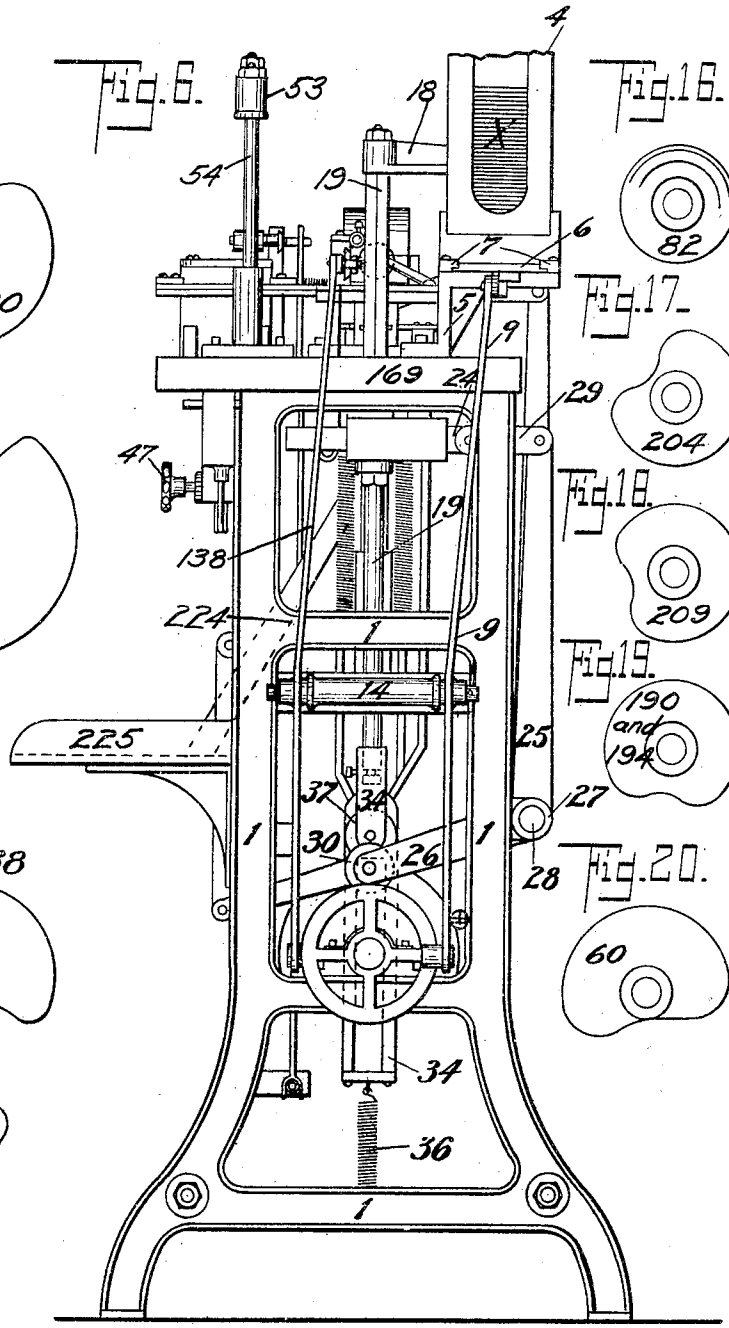


Fig. 6.

Fig. 16.

Fig. 12.

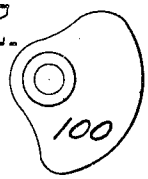


Fig. 17.

Fig. 13.

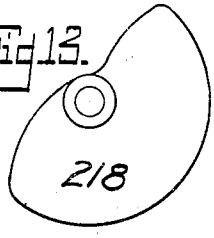


Fig. 18.

Fig. 19.

Fig. 14.

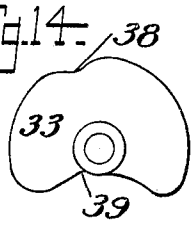
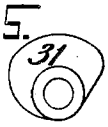


Fig. 20.

Fig. 15.



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Fig. 7.

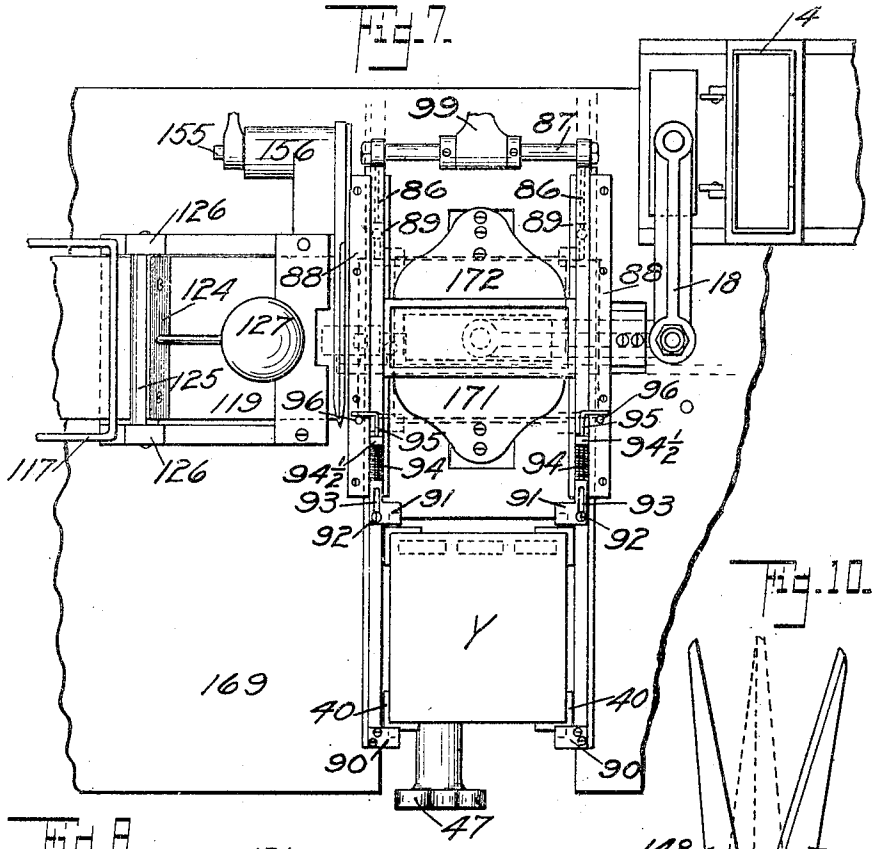


Fig. 8.

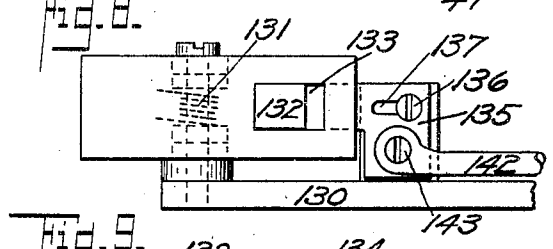


Fig. 9.

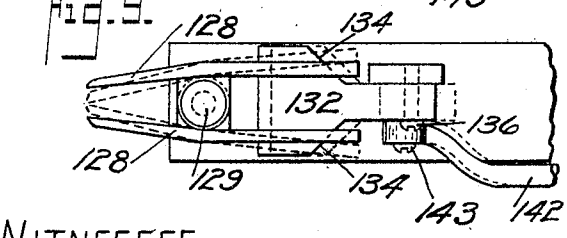
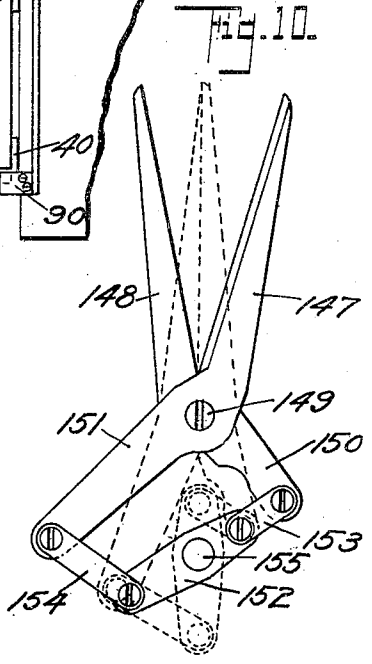


Fig. 10.



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Fig. 11.

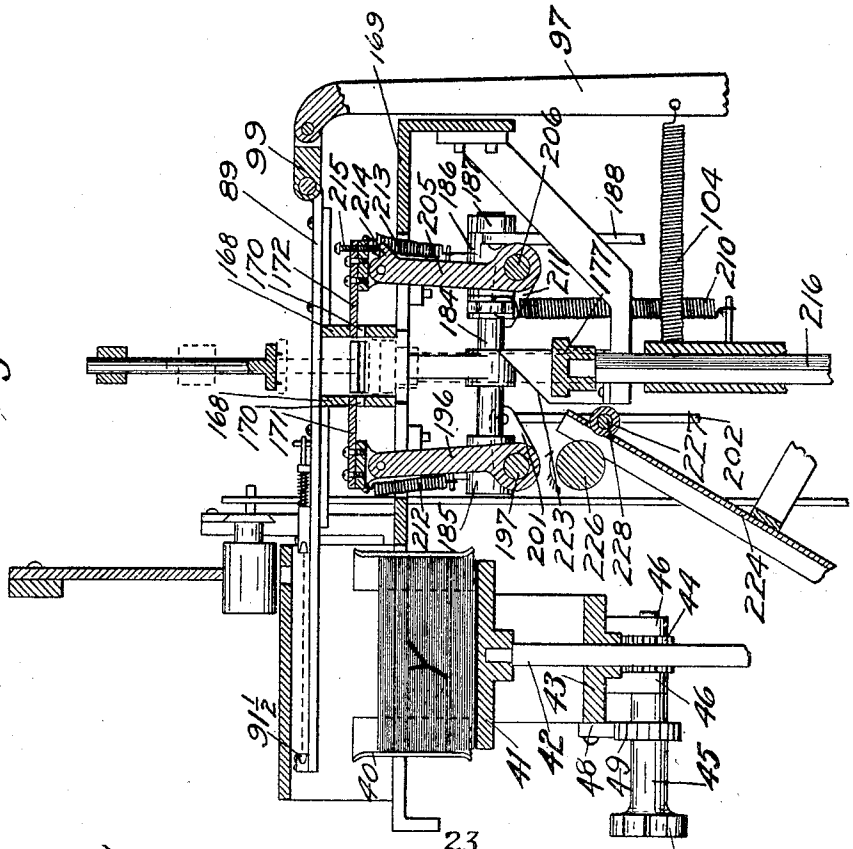


Fig. 21.

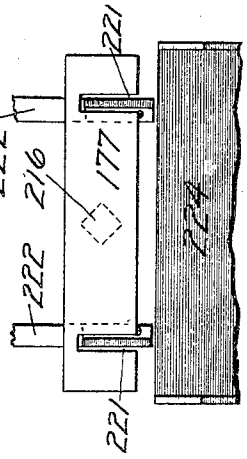


Fig. 22.

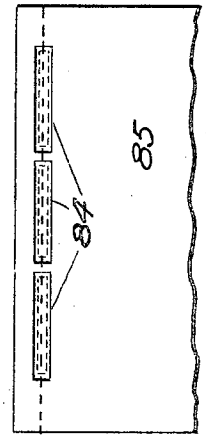
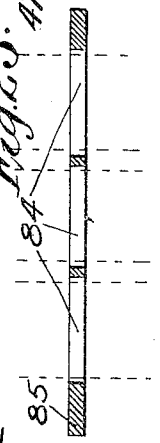


Fig. 23.



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PACKAGE WRAPPING MACHINE.

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Fig. 24.

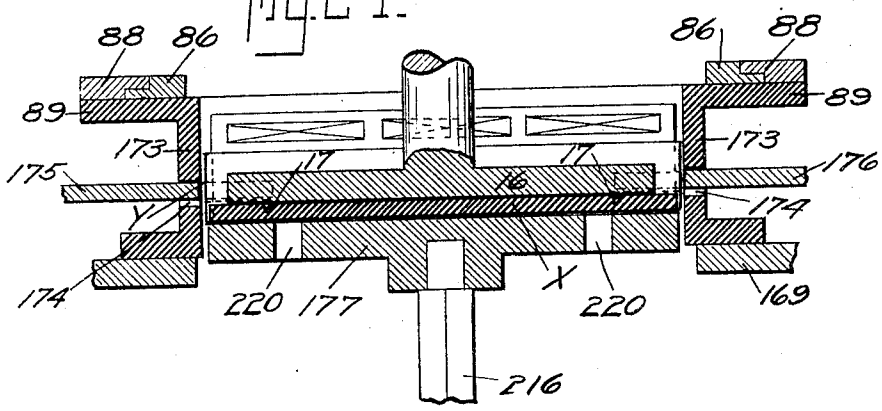


Fig. 25.

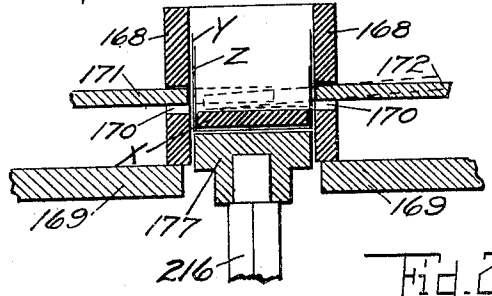


Fig. 26.

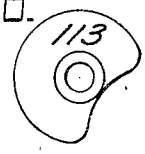


Fig. 28.

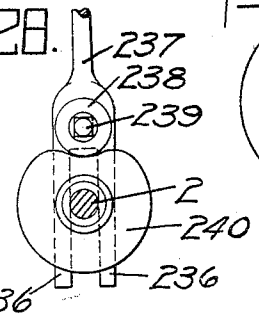
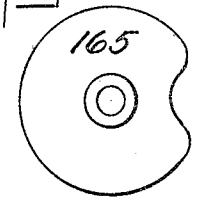


Fig. 27.



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UNITED STATES PATENT OFFICE.

EDWARD JOSEPH TIERNEY AND PHILIPP FUNCK, OF ROCHESTER, NEW YORK, ASSIGNORS TO THOMAS B. DUNN, OF ROCHESTER, NEW YORK.

PACKAGE-WRAPPING MACHINE.

No. 810,005. Specification of Letters Patent. Patented Jan. 16, 1906.

Application filed April 21, 1904. Serial No. 204,295.

To all whom it may concern:

Be it known that we, EDWARD JOSEPH TIERNEY and PHILIPP FUNCK, citizens of the United States, and residents of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Package-Wrapping Machines, of which the following is a specification.

This invention relates to package-wrapping machines, and has for its object to produce a machine that is adapted to take articles successively from a storage-magazine and to wrap each of them in order in one or more wrappers.

The specific form of the machine represented in the drawings is constructed with particular reference to wrapping flat oblong sticks of gum, which is the form in which gum is usually placed upon the retail market. In the form of machine here shown the sticks of gum are wrapped in two separate pieces of paper—an inner piece of paraffin-paper and an outer wrapper. Several consecutive steps are involved in the operation of the machine, which may be briefly described as follows: The sticks of gum are stacked in a magazine adapted to hold them and the supplies of paraffin-paper and folders in which they are to be wrapped are placed in their respective supports. The first operation of the machine takes a wrapper from the supply-stack and places it in a support above the folding-box, ready to receive the gum. A suitable length of paraffin-paper is next placed upon the wrapper. At the same time, approximately, a single stick of gum is removed from the magazine and placed upon the paraffin-paper and wrapper, the former being uppermost, which are in position to receive the gum by the time that it arrives above the folding-box. The papers and gum are then forced into the folding-box and the papers are folded and fastened down upon the gum. The completed package thus formed is then discharged from the machine. The several mechanisms are operated primarily from a single driven shaft and are so timed in their operation as to perform the functions mentioned above in their proper relative order.

Referring to the drawings, Figure 1 represents a front view of the machine. Fig. 2 is a rear view. Fig. 3 is a top view. Fig. 4 is a section on the line 4 4 of Fig. 3. Fig. 5 is a section on the line 5 5 of Fig. 4. Fig. 6 is a side view from the right of Fig. 1. Fig. 7 is a partial top view, enlarged. Fig. 8 is a bottom view of a pair of nippers that draw out the paraffin-paper. Fig. 9 is a side view of said nippers. Fig. 10 represents a pair of shears that cut the paraffin-paper. Fig. 11 is a section on the line 11 11 of Fig. 1. Figs. 12 to 20, inclusive, are cams that operate different parts of the mechanism. Fig. 21 is a plan view of a platen on which the gum is folded. Fig. 22 is a plan view of a plate. Fig. 23 is a section on the line 23 23 of Fig. 22. Fig. 24 is a vertical longitudinal section, enlarged, through the center of the folding-box. Fig. 25 is a vertical longitudinal transverse section, enlarged, through the center of the folding-box. Figs. 26 and 27 are cams, and Fig. 28 is a side view showing generally the engagement of the cams with their respective rollers.

1 represents a frame suitable in form and construction to support the working parts of the machine. 2 is a main shaft, which is journaled in suitable bearings in the frame 1, and 3 is the pulley by which the shaft is driven.

The packages that are to be wrapped, in this instance sticks of gum X, are stacked in the magazine 4, which is supported upon the top of the frame 1 by the bracket 5. The bottom stick of gum in the stack lies upon the floor of the magazine. A slide 6 slides in guides 7 through the magaznie 4 and is of proper thickness to force out therefrom the lowest stick of gum without engaging the stick next above it. When the silde 6 passes in through the magazine, it forces the lowest piece of gum ahead of it, as stated above, out from the magazine onto the plate 8. The slide 6 is operated by the lever 9. The upper end of the lever 9 is attached to the outer end of the slide 6 through the short connecting-rod 10. A roller 11 on its lower end engages with a cam-face 12 in the wheel 13, the latter being attached to the driven shaft 2, so as to rotate with it. Midway between said points the rod is pivotally attached to a cross-bar 14 on the machine-frame. A spring 15 tends to pull the lower end of the lever 9 in toward the frame. Thus the lever 9 is rocked back and forth, so that it reciprocates the slide 6 beneath the stack of gum in the magazine to feed it to the swinging gum-carrier, which is

adapted to pick it up and transfer it to the folding-box, where it is wrapped. The gum-carrier is best seen in Figs. 2 to 5, inclusive. It comprises a plate 16, whose under surface has teeth 17 for picking up a stick of gum X, as shown in dotted lines in Fig. 4. The plate 16 is carried by a frame 18, which is adapted to swing back and forth between the plate 8, where the gum is placed one stick at a time from the magazine to the folding-box. The frame 18 is, moreover, caused to descend both when the plate 16 lies over the gum on the plate 8, in order to pick it up, and when the plate 16 lies over the folding-box, in order to deposit it. The frame 18 is oscillated and raised and lowered through the medium of the vertical shaft 19, by which it is carried. The shaft 19 is squared part way of its length, and upon this squared part there is a sleeve 20, revolubly supported by the frame by the flange 21, which lies in a groove in the bracket 22. (See Figs. 4 and 5.) The sleeve 20 carries a pinion 23, which meshes with the rack 24. The rack 24 is oscillated by a bell-crank lever (see Fig. 6) in the following manner: The arms 25 and 26 of the lever are attached to the hub 27, which is loose upon the shaft 28. The upper arm 25 of the lever is connected with the rack 24 through the link 29, (see Fig. 6,) and the lower arm 26 carries a roller 30, that engages a cam 31, (see Fig. 15,) carried by the driven shaft 2. (See Fig. 1.) A spring 32, fastened at one end to the link 29 and at the other end to the bracket 22, tends to return the rack 24 to its retracted position. (See Fig. 5.) The contour of the cam 31 (see Fig. 15) causes the gum-carrier frame 18 to swing rapidly back and forth and to pause both when over the table 8 and the folding-box, for the shaft carrying the gum-carrier frame is turned as the lower arm 26 of the bell-crank lever is elevated by the cam and also when it is depressed by the action of the spring 32. It should be noticed that the impulse by which the carrier is swung from the table 8 to the folding-box with its stick of gum is derived from the contraction of this spring. For raising and lowering the gum-carrier frame while it passes over the stick of gum on the table 8 and again over the folding-box another cam 33 on the driving-shaft 2 is employed. This cam is shown in Fig. 14. A frame 34 is attached at one end to the carrier-shaft 19 and at its other end to the arm 35 on the frame of the machine through the spring 36. (See Fig. 2.) This frame carries above the cam 33 a roller 37, which is adapted to engage said cam, whereby the carrier-shaft is raised against the resistance of the spring 36. The cam 33 has two depressions which permit the carrier-shaft to be drawn downwardly by the spring 36. The depression 38 (shown uppermost in Fig. 14) permits the carrier-shaft to be pulled down, so that the plate 16 picks up a piece of gum X by its teeth 17, and the lower depression 39 is adapted to permit the carrier to force the gum down into the folding-box. The depression 38 is abrupt, while the other is more gradual, in order to meet the different requirements with respect to the two movements. Figs. 14 and 15 are intended to show by comparison the relative positions of these two cams, which, respectively, are essential to the horizontal and vertical reciprocation of the gum-carrier. While the gum-carrier is transferring a stick of gum from the table 8 in front of the magazine, where it has been placed by the slide, to the position above the folding-box in the manner described a piece of paraffin-paper and a wrapper are placed in position above the folding-box, ready to receive the stick of gum. A supply of outer wrappers Y are placed in a magazine, resting upon a vertically-adjustable base 41. (See Fig. 11.) The base 41 is supported upon a vertical rack 42, which passes through the guide 43 and engages a pinion 44 (see Fig. 1) upon the horizontal shaft 45. The shaft 45 is journaled in brackets 46 46, one of which is on each side of the pinion 44. The shaft 45 is provided with a knob 47, by which it can be manipulated to raise the base 41. A latch 48 on the guide 43 retains the base in the position in which it is set by engaging with the pinion 49, and rods 50 50, that are attached to the movable base and that slide through the bracket 51, aline the base. (See Fig. 1.) The wrappers Y are picked one by one from their magazine and placed upon a carrier, by which they are conveyed to the folding-box. The picker, whereby the wrappers are taken from the magazine, comprises the vertical fingers 52, carried by the horizontal arm 53, which latter in turn is supported by the two similar parallel vertically-movable rods 54 54. These rods slide in the guiding-brackets 55 and 56. The vertical rods 54 are supported by the arm 57 of a lever whose other arm 58 is pivoted upon the shaft 28. A roller 59, carried by the lever, engages the cam 60 on the driven shaft 2. The lever-arm 57 is connected with the vertical rods 54 54 by the yoke 61. The shape of the cam 60 is shown in Fig. 20. When the cam is in the position there shown, the picker is elevated, and when it is turned over the picker falls by its own gravity into the magazine, so that the fingers 52 rest upon the top of the pile of wrappers. The picker is thus enabled to take a wrapper from the magazine, whatever the height of the pile of wrappers may be in the magazine, within the limits of the stroke of the picker. Glue is placed upon the ends of the fingers, so that the top wrapper will adhere to them and can be lifted by the picker out from the magazine. The glue is placed upon the bottom of the fingers 52 by the roller 62, which is adapted to be slid beneath and come into contact with the

bottom of the fingers for that purpose when the picker is in its elevated position. The roller 62 takes its glue from the roller 63, which revolves on its shaft 64 in a box 65 containing liquid glue or other suitable adhesive. The glue-box 65 is represented as resting upon supports 66 and 67 (see Fig. 1) and secured thereon by the catch 68. Means for adjusting the roller 63 within the glue-box are provided, consisting of a block 69, that supports the shaft 64 and is movable within the frame 70 by the thumb-screw 71 and locked in position by the set-screw 72. The roller 63 is revolved by the pulley 73 on the driven shaft 2 through the belt 74, that passes around said pulley and over the guide-wheels 75 and 76 and the pulley 77, that is attached to the shaft 64 of the roller 63. The moistening-roller is supported upon the end of the reciprocating slide held in the frame 79. The slide is moved inwardly by means of the lever 80, which is attached at its upper end to said slide and is pivoted to the bracket 81. The lever is tilted by the face-cam 82 on the driven shaft 2 against the resistance of the spring 83. The cam 82 is so placed with reference to the cam 60 that the slide 78 will be caused to carry the roller inwardly by the cam 82, so as to arrive beneath the fingers 52 while they are held in their elevated position by the cam 60. The spring 83 returns the moistening-roller to its initial position, in which it is in contact with the revolving roller 63 and receives a fresh supply of glue therefrom. When the fingers 52 of the picker descend into the magazine that contains the wrappers, they respectively pass through slots 84 in a stripping-plate 85.

A sliding frame is provided for receiving the wrapper from the picker and carrying it to the folding-box. This frame comprises the side bars 86 86, connected by the cross-rod 87. (See Fig. 3.) The side bars 86 86 are retained by the gibs 88 88 upon their respective beds 89 89. Plates 90 90 at the two front corners of the frame, respectively, and plates 91 91 at the two rear corners of said frame, respectively, have recesses 91½ to receive the corners of the wrapper. (See Fig. 11.) The plates 91 91 are, respectively, slidingly attached to the frame by means of screws 92 92 in the slots 93 93 in said plates, respectively. (See Fig. 7.) Springs 94 94 between the plates 91 91 and abutments 94½ 94½ on the side bars 86 86, respectively, force the plates inwardly. Rods 95 95 are attached to the plates 91 91, respectively, whose outer ends are respectively adapted to engage pins 96 96, projecting from the gibs 88 88, respectively, when the frame lies over the wrapper-magazine, and thereby to draw back the plate 91 91, so as to open the frame to receive a wrapper from the picker. The wrapper-carrying frame is oscillated by the arm 97, attached to the shaft 28 by its hub 98 (see Fig. 2) and connected to the frame by the link 99. (See Fig. 3.) The arm 97 is accordingly rocked by the rotation of the shaft 28. That is accomplished by the cam 100, which engages a roller 101, carried by the arm 102, which latter is fastened to the shaft 28 by the hub 103. The cam 100 by tilting the arm 102 pulls back the frame, and a spring 104 (see Fig. 11) pulls it forward, when the cam permits the arm 102 to descend. The cam 100 is so proportioned and set upon the driven shaft 2 that the frame starts backward, and so releases the plates 91 91 the instant that the wrapper is pulled from the fingers 52 by the stripping-plate 85, whereby the wrapper is caught and held in the frame by the corner-plates 90 90 and 91 91. At approximately the same time that the wrapper is brought into position above the folding-box by the reciprocating frame and before the stick of gum is placed upon the wrapper by the gum-carrier a suitable length of paraffin-paper is cut off from a roll of such paper and placed upon the wrapper. A roll of paraffin-paper Z is shown revolubly supported at the left side of the machine upon the arm 105. The strip of paraffin-paper Z is carried over the roller 106 on the arm 107, which is pivoted to the post 108. The arm 107 is reciprocated by the rod 109, which is adjustably attached thereto by the clamp 109½. The lower end of the rod 109 is attached to the arm 110, which in turn is attached to the hub 111 on the shaft 28 at one end and carries the roller 112 at its other end, that engages the cam 113 on the driven shaft 2. The cam 113 raises the arm 112 and accordingly elevates the roller 106, as shown in dotted lines in Fig. 2, against the resistance of a spring 114, which is placed between a collar 115 on the rod 109 and a bracket 116 on the frame of the machine. The spring 114 returns the roller to its lower position, where the cut in the cam is uppermost. The frame 117, which swings vertically on its shaft 118, is pivotally supported by the post 108 and holds the paper down upon the plate 119 by the action of the spring 120 while the arm 107 is elevated; but when the arm is depressed a pin 121 on the arm 107 travels in a slot 122 in the frame 117 until it reaches the shoulder at the end of the slot, when it lifts the frame 117 against the action of the spring 120, so as to release the paper. (See Figs. 3 and 4.) When the arm 107 is raised, the strip of paper engages a fixed pin 123 and a roller 123½ on the arm 105, as shown by dotted lines in Fig. 2, and the paper is unwound from the roll Z and left slack, when the arm descends again, so that it can be pulled into position across the machine easily and smoothly. Additional means are shown for preventing the strip of paraffin-paper from being pulled back by the arm 107 when it is elevated and which also prevent the paper

from being forced back by the pincers, which draw it out across the machine in the manner presently to be described. This other holding means consists of the transverse plate 124, which is attached to the cross-bar 125, which in turn is pivoted in the ears 126 126. (See Fig. 7.) The plate 124 is a little wider than the distance between the cross-bar 125 and the plate 119, so that the lower edge of the plate 124 rests upon the plate 119, and said plate can only swing outwardly. The plate 124 is held down upon the plate 119 by the weight 127. Thus the paper is held from being pulled out; but when it is pulled inwardly the plate yields and permits it to pass. The paper is pulled into the machine and over the wrapper into its position above the folding-box by nippers, which are made to grip the edge of the paper and to travel with it across the machine until the paper lies in the position specified, when it is released from the nippers, the proper length having been severed from the strip by scissors which are made to operate at the proper time. The nippers are shown in Figs. 8 and 9. They comprise the jaws 128 128, that are fulcrumed upon the rod 129, which projects at right angles from the slide 130. The nippers are normally held open, as shown in Fig. 9, by a coiled spring 131. They are closed by a wedge-shaped block 132, which lies between the non-engaging ends of the jaws and projects through apertures 133 therein, the inner edges of the apertures being beveled to correspond, respectively, with the inclined surfaces 134 134 on the block 132. The nippers are accordingly closed, as shown by the dotted lines in Fig. 9, by moving the block 132 longitudinally with reference to them. This is done in the following manner: The block 132 is attached to a plate 135 by a screw 136 on one part, which enters a slot 137 in the other, so that one has some movement with reference to the other. The slide 130 is attached to the lever 138 by the link 139. (See Figs. 2 and 3.) The lever 138 is pivoted to the cross-bar 14 and carries at its lower end beyond the fulcrum a roller 140, that engages a cam-shaped groove 141 in the wheel 13. (See Fig. 1.) Thus the nippers are oscillated back and forth, the length of the stroke being enough to carry the nippers from the plate 119 to a point beyond the folding-box, as shown by dotted lines in Fig. 4, at which they will have pulled the paper across said box. The cams are arranged so that the wrapper will arrive in position over the folding-box before the paraffin-paper is drawn across it. The nippers are made to close upon the edge of the paper when they reach the plate 119 and to open to release it when they reach the position beyond the folding-box shown in dotted lines in Fig. 4, by moving at the proper times the block 132 with reference to the nippers. This is done (see Figs. 8 and 9) by a rod 142, which is attached to the plate 135, as by the screw 143, and movably supported above the slide 130, that actuates the nippers by the bracket 144, (see Fig. 3,) so that it will move with it. Upon the rod 142 there are secured two collars 145 and 146, (see Fig. 3,) which, respectively, are adapted to engage the bracket 144 just before the completion of the strokes of the slide 130. When the slide 130 is moved inwardly, the rod 142 will be carried with it until the collar 146 strikes the bracket 144, when the slide 130, and consequently the nippers, will move longitudinally with reference to the block 132 by the length of the slot 137, and consequently the nippers will be closed. When the slide 130, carrying the nippers, moves in the other direction, the rod 142 will be carried along with it until the collar 145 engages the bracket 144, when the block will be moved in the other direction, with reference to the nippers, and release them, so that the spring 131 can open them. The positions of the collars 145 and 146 on the rod 142 and the location of the bracket 144 are established with reference to properly timing the opening and closing of the nippers.

Scissors are employed to cut off strips of the desired length for wrapping the sticks of gum. The blades 147 and 148 of a pair of scissors are shown adjacent to the inner edge of the plate 119. The construction and operation of the particular form of scissors employed are shown in Fig. 10. By referring to that figure it will be seen that the blades 147 and 148 are pivoted together by the bolt 149 and that the arms 150 and 151 of said blades, respectively, are bent outwardly. The arms 150 and 151 are connected with a lever 152 by links 153 and 154, respectively. The lever 152 is fastened to the rock-shaft 155, (see Fig. 3,) which in turn is revolubly supported by the bracket 156. (See Fig. 2.) An arm 157 is fastened to the other end of the rock-shaft 155, and that is pivotally attached to the vertically-reciprocating rod 158, as by the collar 159. (See Fig. 2.) A coiled spring 160 upon the rod 158 between a block 161 on said rod and a stationary part of the machine tends to force the rod 158 downwardly, thereby moving the arm 157 and lever 152, together with the links 153 and 154, into the position shown by the dotted lines in Fig. 10, whereby the blades of the scissors are closed. The rod 158 is connected at its lower end with a lever 162. This lever is fulcrumed upon the shaft 28 by a hub 163 at one end (see Fig. 1) and carries a roller 164 at its other end, the rod being attached to it at a point between. The roller 164 engages with a cam 165 (see Fig. 27) on the driven shaft 2. The cam keeps the rod elevated, and consequently the scissors open against the tension of the spring 160, except when the roller 164 enters the depression in the cam, when the rod descends under the in-

fluence of the spring 160, closing the scissors. The cam is so placed upon the driven shaft 2 with reference to the operations of the nippers that the scissors are closed to cut the paraffin-paper at the moment just before the nippers reach the position shown by dotted lines in Fig. 4. The cam-slot 141 in the wheel 13 has a straight portion 165½, (see Fig. 3,) which is located just before the nippers complete their outward movement. At this point the scissors are caused to close, severing the paraffin-paper, and then the nippers resume their outward course to the position shown in dotted lines in Fig. 4. When the nippers approach the scissors, their jaws are approaching each other and the blades of the scissors are open, so that the nippers can reach between the blades of the scissors to grip the paper, as represented in Fig. 4. A guide-plate 166, also shown in Fig. 4, holds the end of the paraffin-paper down upon the plate 119 in position for the nippers to catch it, and this plate 166 is recessed at 167, so that the nippers can pass beyond its edge.

A wrapper having been picked from the pile of wrappers Y in the magazine 40, caught in the reciprocating wrapper-carrying frame and carried in over the folding box, and a piece of paraffin-paper having been placed upon the wrapper in the manner indicated before the gum-carrier is swung over the folding-box, the gum-carrier when it reaches that point and is depressed, so as to force the stick of gum that it carries down into the box in the manner described above, by the action of the spring 36 also forces down into the folding-box the wrapper and piece of paraffin-paper that are supported over the folding-box beneath the stick of gum by the reciprocating wrapper-carrying frame. The papers fold up, as represented by Y and Z, so that they pass through the frame into the folding-box. (See Figs. 24 and 25.) The sides of the box 168 168 (see Fig. 25) are supported upon the top 169 of the machine-frame and are respectively slotted at 170 170 to permit the side-folders 171 and 172 to pass through them, respectively. The end pieces 173 173 of the folding-box are also represented as supported upon the top 169 of the machine-frame and are represented as integral, respectively, with the beds 89 89, upon which the wrapper-carrying frame slides The end pieces 173 173 are respectively slotted at 174 174 to permit the end-folders 175 176 to pass through them. A reciprocating platen 177 receives the papers and the gum and supports them while the papers are folded down upon the gum. As soon as the gum-carrier has forced the papers and gum down into the folding-box to the platen the roller 37, attached to the lower end of its shaft 19, begins to ascend the incline of the depression 39 in the cam 33, (see Fig. 14,) so as to withdraw the carrier from the folding-box before it is swung back to the table 8 for another piece of gum; but just before the gum-carrier starts to rise the end-folders 175 176 start inwardly, so that they overlie the ends of the stick of gum, which is somewhat longer than the plate 16 on the carrier, (see Fig. 24,) when the carrier begins to rise. This is for the purpose of holding the stick of gum down so that the teeth 17 on the carrier-plate 16 may be withdrawn from it. The gum-carrier is raised out of the way of the end-folders 175 and 176 before they can reach it.

The means for operating the end-folders are shown in Fig. 4. The end-folders or folding-plates 175 and 176, respectively, are pivotally mounted upon the arms 178 and 179 and which are mounted, respectively, upon the rock-shaft 184 and 191, upon which the arms 180 and 181 are also mounted, respectively, said arms, in connection with said shafts, respectively constituting bell-crank levers. Springs 182 and 183 are respectively attached to the arms 180 and 181 at one end and to suitable stationary fixtures upon the machine-frame at the other. The springs 182 and 183 tend to rock the levers, and so to force the end-folding plates 175 and 176, respectively, through the slots 174 174 in the end pieces. The end plates 175 and 176 are withdrawn from the folding-box by positive means. The shaft 184 is rotatively supported in brackets 185 and 186 and carries a rocking arm 187, which latter is pivotally attached to a rod 188. (See Fig. 11.) This rod carries a roller 189 at its lower end, which engages a cam 190 (see Fig. 19) on the driven shaft 2. When the roller enters the depression in the cam, the spring 182 rocks the lever so that the folding-plate 175 is forced into the folding-box. The horizontal rocking shaft 191 is rocked by the vertical rod 192 through an arm (not shown) like that shown in connection with the other shaft 184. The rod 192 carries at its lower end a roller 193, which engages a cam 194 on the driven shaft 2, like that which actuates the other end-folder. (See Fig. 19.) This end-folder 176 accordingly is forced into the folding-box by its spring 183 and withdrawn therefrom by the action of the cam 194 in the same manner as is the other end-folder. The end-folders 175 and 176 are maintained horizontally throughout their reciprocation by means of springs 195 195, respectively, which are respectively connected at one end to the backs of these plates and at their other ends to the arms 178 and 179, respectively, whereby they are respectively tilted up against the upper edges of the slots 174 174 in the end plates 173 173, respectively, of the folding-box. (See Fig. 4.) After the end-folding plates 175 and 176 have folded the ends of the papers down upon the stick of gum and as soon as they have been withdrawn from the fold-

ing-box, so that they cannot interfere with the operation of the side-folders 171 and 172, the latter are made to enter the folding-box through the slots 170 170, respectively, in its sides 168 168, respectively. The side-folder 171 is actuated by the arm 196, that is attached to the shaft 197 at 199. This shaft rotates in brackets 198 and 200, which are suitably attached to the top plate 169, and in turn carries an arm 201, which is pivotally connected with the rod 202. (See Fig. 4.) The arm 196, the shaft 197, and the arm 201 constitute a bell-crank lever. The rod 202 carries a roller 203 at its lower end that engages with a cam 204 (see Fig. 17) on the driven shaft 2, by which the rod 202 is raised and the bell-crank lever rocked to withdraw the side plate 171 from the folding-box. A spring 203 is attached at one end to the other arm 201 of the bell-crank lever by which the side-folder 171 is actuated and at its other end to a fixed part of the frame, so that the side-folder 171 is forced by said spring inwardly through the slot 170 in the side 168 of said folding-box when the roller 203 on the end of the rod 202 enters the depression in the cam 204. The other side-folding plate 172 is actuated in like manner by a bell-crank lever comprising the arm 205, the shaft 206, and the arm 211. The folding-plate 172 is pivotally attached, as represented in Fig. 11, to the arm 205. The arm 211 is pivotally connected with the vertical rod 207. A roller 208 on the end of this rod engages a cam 209 (see Fig. 18) on the driven shaft 2, so that this side-folding plate 172 is withdrawn from the folding-box in the same manner as is the folding-plate 171. A spring 210 is attached at one end to the arm 211 of the bell-crank lever and at its other end to a fixed part of the machine, (see Fig. 11,) so that when the roller 208 enters the depression in the cam 209 the spring forces the side-folding plate 172 through the slot 170 into the folding-box. The side-folding plates are pivotally attached to their respective bell-crank levers, as represented in Fig. 11, and are horizontally maintained during their reciprocation by means of springs 212 and 213, which are respectively connected with said plates and with their respective arms 196 and 205 in the same way that the end-folding plates are. The cams 204 and 209 are so placed upon the driven shaft 2 with reference to each other that the depression in the cam 204 comes beneath the roller 203 before the depression in the cam 209 comes beneath the roller 208. The relative positions of these cams upon the driven shaft is shown by the comparative positions of these cams in Figs. 17 and 18. It accordingly follows that the side-folding plate 171 will enter the folding-box and be part way withdrawn from it before the side plate 172 starts into it. This is essential only when the side-folding plates employed are so wide that they overlap, as represented by dotted lines in Fig. 25. Besides being forced into the folding-box the side-folding plate 172 is tilted so that its inner edge bears down upon the package for the purpose of sealing it with the glue that has been left upon the wrapper by the fingers 52 of the picker. The folding-plate is tilted by a shoulder 214 on the arm 205 of the bell-crank lever that operates this plate, which engages a set-screw 215 in said plate. (See Fig. 11.)

When the gum has been wrapped within the papers, as described above, the platen is drawn down and the package is discharged from the machine. The shaft 216, which supports the platen 177, carries a roller 217, (see Fig. 2,) which engages with a cam 218 (see Fig. 13) on the driven shaft 2. A spring 219 (see Fig. 2) pulls the platen down when the roller 217 enters the depression in the cam 218. The platen is transversely slotted at 220 220, (see Fig. 24,) so that the vertical plates 221 221 on the brackets 222 222 project through said slots when the platen reaches the end of its downward stroke. (See Fig. 4.) The edges 223 223 of these plates are inclined, (see Fig. 11,) so that the gum is tilted and caused to slide off the platen. A chute 224, set at an angle adjacent to the platen, receives the gum and delivers it upon the table 225. (See Fig. 1.) As the package passes down the chute it is carried between the adjacent rollers 226 and 227, which compress the package so that the glue will adhere to the wrapper. The roller 227 is represented as freely rotative on the shaft 228 (see Fig. 11) and the roller 226 as driven in the direction of the arrow in Fig. 11. The roller 226 is carried by the horizontal shaft 229, which is revoluble in suitable bearings on the machine-frame. This shaft carries a pulley 230, (see Fig. 1,) which is driven by a belt 231 from a constantly-running pulley 232 on the driven shaft 2. The driven roller 226 is preferably one made of hard material and the free roller 227 one of rubber. A clutch 233, operated by the hand-lever 234, fulcrumed on the bracket 235, (see Fig. 1,) is employed to connect the driven shaft 2 with the driving-pulley 3.

The rollers 193, 203, 208, and 189 are held upon the cams 194, 204, 209, and 190, respectively, in the manner shown in Fig. 28. Referring to said figure, it will be seen that legs 236 236 are attached to a vertical rod like that which carries each of the rollers specified above and span the driven shaft 2. Said rollers are revolubly supported at one side of their respective rods on shafts projecting at right angles from said rods in the same manner that the roller 238 is supported by the shaft 239 in Fig. 28, so that it rests upon the cam 240.

It will have been noted that the following

operations are performed under the action of springs—namely, the lowering of the gum-carrier in the first place to pick up the gum and then to force it, together with the wrapping-papers, into the folding-box; the swinging of the gum-carrier from the table where it receives the gum to the folding-box; the return of the moistening-roller to the roller that supplies it with glue; the traveling of the wrapper-carrying frame from the wrapper-magazine to the folding-box; the closing of the scissors; the movement of the end and side folding plates into the folding-box to fold the wrappers, and the lowering of the platen to discharge the package from the machine. The reverse movement of each of these several parts is caused by positive means. Thus it will be seen that part of the operation of each of these several parts to which resistance is most likely to be opposed is controlled by a spring, securing smooth and even operation of the parts, eliminating vibration, and minimizing breakage.

What we claim is—

1. In a package-wrapping machine, the combination of a folder; a magazine for the article to be wrapped; means for discharging articles successively therefrom; a supply of wrappers; means for transferring the wrappers successively to the folder; a vertical shaft; a carrier supported horizontally upon said vertical shaft for taking articles discharged from the magazine and delivering them successively to the folder; means for swinging the carrier circularly around the axis of its shaft in a path between the magazine and the folder; means for moving said carrier in the direction of the axis of its said shaft to the path of the carrier at one end of its path, whereby the carrier is caused to pick up the article, and at the other end, whereby the carrier is made to deposit it within the folder; and means for releasing the article from the carrier when delivered to the folder.

2. In a package-wrapping machine, the combination of the folder; a magazine for the articles to be wrapped; means for discharging articles successively therefrom; a supply of wrappers; means for transferring the wrappers successively to the folder; a vertical shaft; a carrier supported horizontally upon said vertical shaft, for taking articles discharged from the magazine and delivering them successively to the folder; means for swinging the carrier upon its vertical shaft in a path between the magazine and the folder; a spring for moving said carrier in the direction of the axis of said shaft at one end of its path, whereby the carrier is caused to pick up the article, and also at the other end of its path, whereby the carrier is made to deposit said article within the folder; and means for releasing the article from the carrier when delivered to the folder.

3. In a package-wrapping machine, the combination of a folder; a magazine for the articles to be wrapped; means for discharging the articles successively therefrom; a supply of wrappers; means for transferring the wrappers successively to the folder; an oscillating carrier supported horizontally upon a vertical shaft, to take articles discharged from the magazine and deliver them successively to the folder; a spring to swing said carrier horizontally around its vertical shaft from the magazine to the folder; a spring to pull it down upon the article discharged from the magazine, and to pull it down to the folder; rotary cams; connections between the cams and the carriers; whereby the latter is both returned to the magazine, and elevated after each descent.

4. In a package-wrapping machine, the combination of a folder; a magazine for the articles to be wrapped; means for discharging the articles successively therefrom; a supply of wrappers; means for transferring the wrappers successively to the folder; an oscillating carrier to take articles discharged from the magazine and deliver them successively to the folder; a spring to pull said carrier down upon the article discharged from the magazine, and to pull said carrier down to the folder, after it has been swung thereto; a spring to swing it from the magazine to the folder; a pinion on the shaft of said carrier; a reciprocating rack, whereby said carrier is oscillated; rotary cams; connections between said cams and the shaft of said carrier, and said rack, respectively, whereby said carrier is, respectively, elevated after each descent, and swung from the folder to the magazine.

5. In a package-wrapping machine, the combination of a folder; a magazine for the articles to be wrapped; means for discharging the articles successively therefrom; a magazine for wrappers; a spring-actuated reciprocating frame adapted to convey a wrapper to the folder; spring-actuated plates upon said frame to engage a wrapper at its corners; positive means for returning the frame; means for transferring the wrappers one at a time from their magazine to the reciprocating frame; a carrier for taking the articles from their magazine and delivering them successively above the wrapper as it lies above the folder; means for forcing the article and the wrapper down through said frame into the folder in proper relative positions for wrapping.

6. In a package-wrapping machine, the combination of a folder; a magazine for the articles to be wrapped; means for discharging the articles successively therefrom; a magazine for wrappers; a reciprocating frame adapted to receive a wrapper and to convey it to the folder; means for transferring the wrappers successively from their magazine to the reciprocating frame; a spring adapted to move the frame from the wrapper-maga-

zine to the folder; an oscillating carrier horizontally supported upon a vertical shaft and adapted to take articles discharged from the magazine and deliver them successively to the folder; a spring adapted both to pull said carrier down upon the article discharged from the magazine at one end of its path, and to pull it into said folder at the other end of its path; a spring adapted to swing said carrier upon its vertical shaft from the magazine to the folder; a driven shaft; cams upon said shaft; connections between said cams and the reciprocating frame and carrier, respectively, whereby said parts are returned to their respective initial positions after each action of said springs, said cams being so placed upon said shaft as to cause said operations to take place in proper sequence.

7. In a package-wrapping machine, the combination of a folder; a magazine for the article to be wrapped; means for discharging articles successively therefrom; a supply of wrappers; means for transferring such wrappers successively to the folder; a vertical shaft; a carrier for taking successively the articles discharged from the magazine, and placing them upon wrappers, means for moving the carrier circularly around the axis of its shaft in a path between the magazine and the folder; means for moving said carrier in the direction of the axis of said shaft at one end of its path, to pick up the article, and at the other end of its path, both to deposit the article within the folder, and to force the wrapper into the folder with the article; and means for releasing the article from the carrier when delivered to the folder.

8. In a package-wrapping machine, the combination of a folder; a magazine for the articles to be wrapped; means for discharging articles successively therefrom; a magazine for cut outer wrappers; a reciprocating frame adapted to receive the wrappers one at a time and to convey them to the folder; means for transferring the wrappers from their magazine to the reciprocating frame; means for supporting a roll of inner wrapping material; means for severing wrappers of proper length therefrom; means for transferring the inner wrapper successively, when severed, to the folder, above the outer wrappers, respectively, a carrier to take the articles discharged from the magazine, to swing horizontally to the folder, and to descend with the articles into the folder, thereby forcing down into the folder beneath the article both inner and outer wrappers in proper relative position for folding and means for operating said carrier.

9. In a package-wrapping machine, the combination of a folding-box; means for depositing an article and wrapper therein; a vertical reciprocating platen adapted to form the floor of a folding-box during the operation of wrapping; means for wrapping the wrapper around the article; a spring adapted to lower the platen with a package upon it from the folding-box after the article has been wrapped; means for removing the package from the platen when the latter has been lowered away from the folding-box; a rotary cam; and connections between the cam and the platen, whereby the platen is held up against the folding-box during the operation of folding, and is returned to the folding-box against the resistance of the spring, after the package has been removed from it

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