J. W. DEARBORN.

PACKAGE WRAPPING MACHINE.

APPLICATION FILED MAY 29, 1914.

1,158,186.

Patented Oct. 26, 1915.

7 SHEETS—SHEET 1.

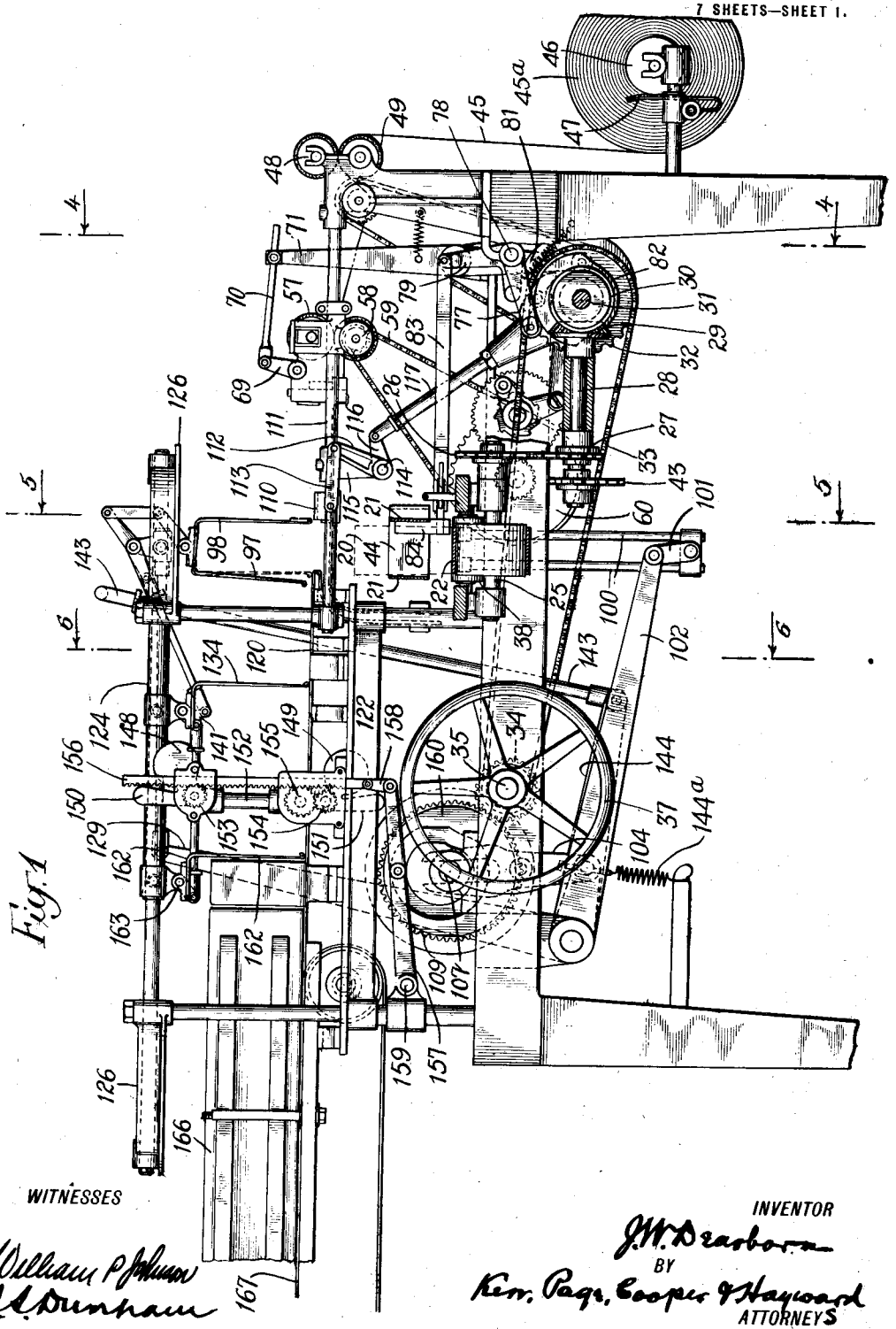


Fig. 1

WITNESSES

William P. Johnson

S. A. Dunham

INVENTOR

J. W. Dearborn

BY

Kerr, Page, Cooper & Hayward

ATTORNEYS

J. W. DEARBORN.

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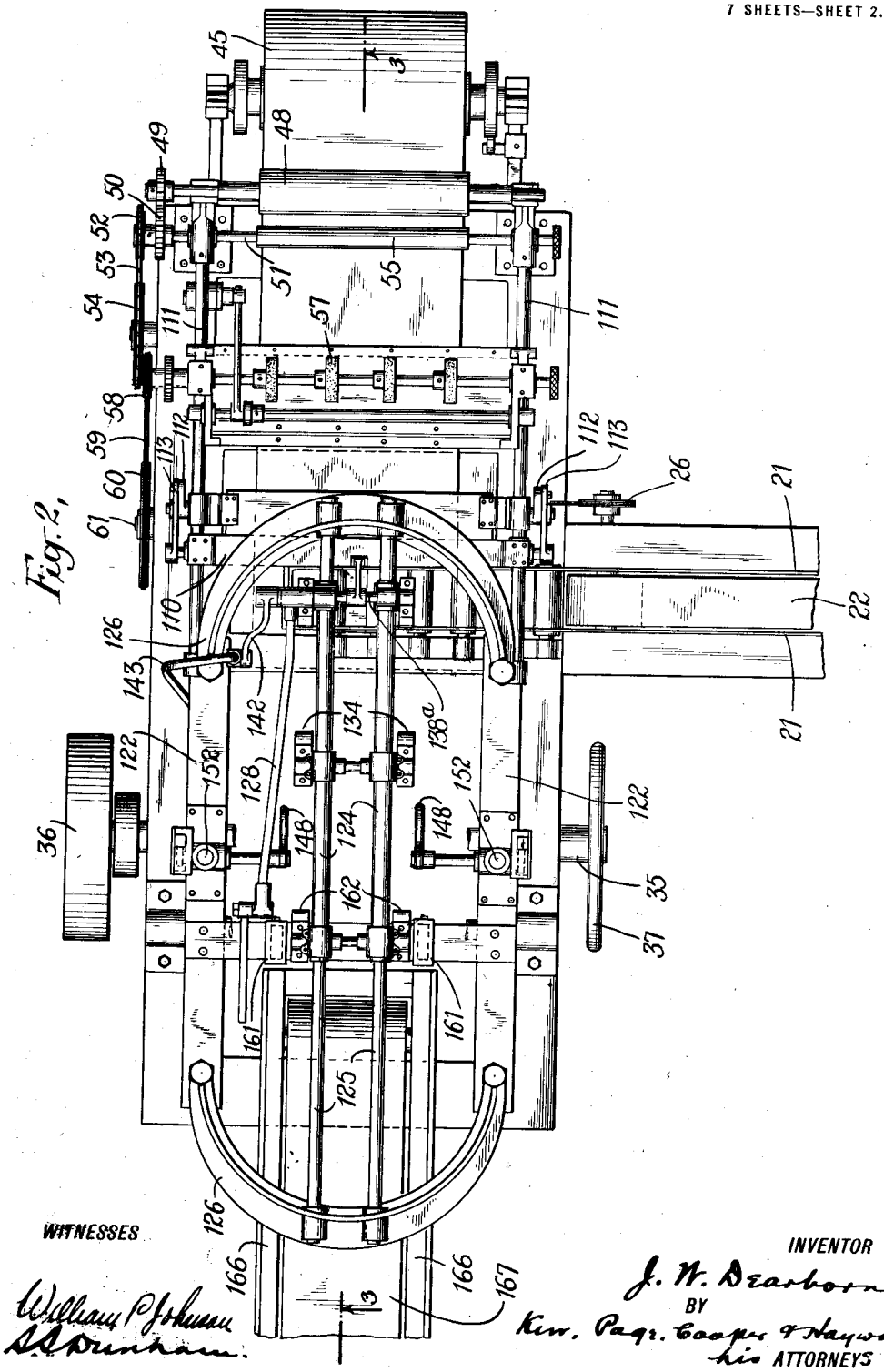
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7 SHEETS—SHEET 2.

Fig. 2,



WITNESSES

William P. Johnson

S. S. Burnham.

INVENTOR

J. W. Dearborn

BY

Kerr, Page, Cooper & Hayward

his ATTORNEYS

J. W. DEARBORN.

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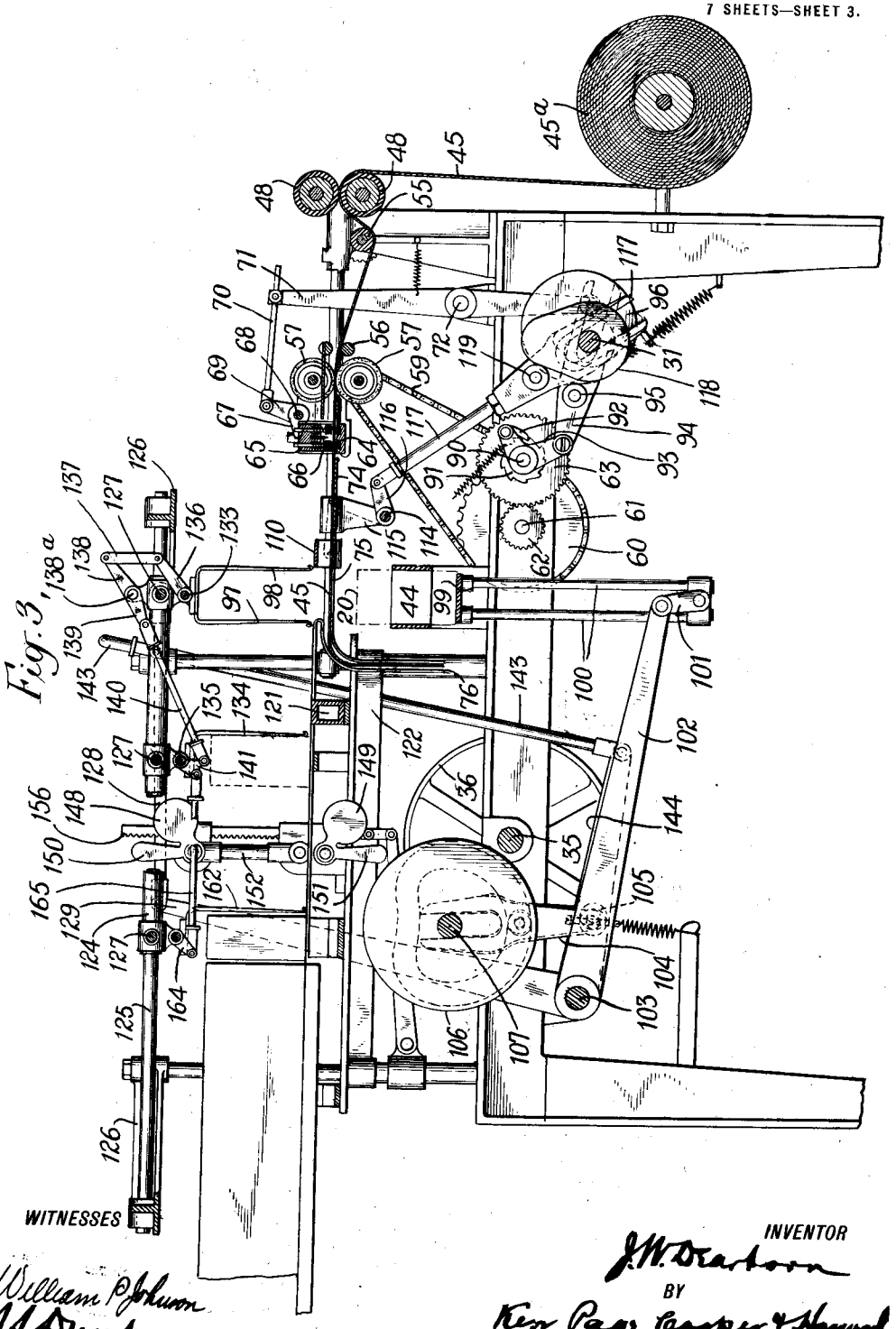
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Fig. 3.



WITNESSES

William P. Johnson

S. D. Dunham

INVENTOR

J. W. Dearborn

BY

Kerr, Page, Cooper & Hayward

ATTORNEYS

J. W. DEARBORN.

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7 SHEETS—SHEET 4.

Fig. 6,

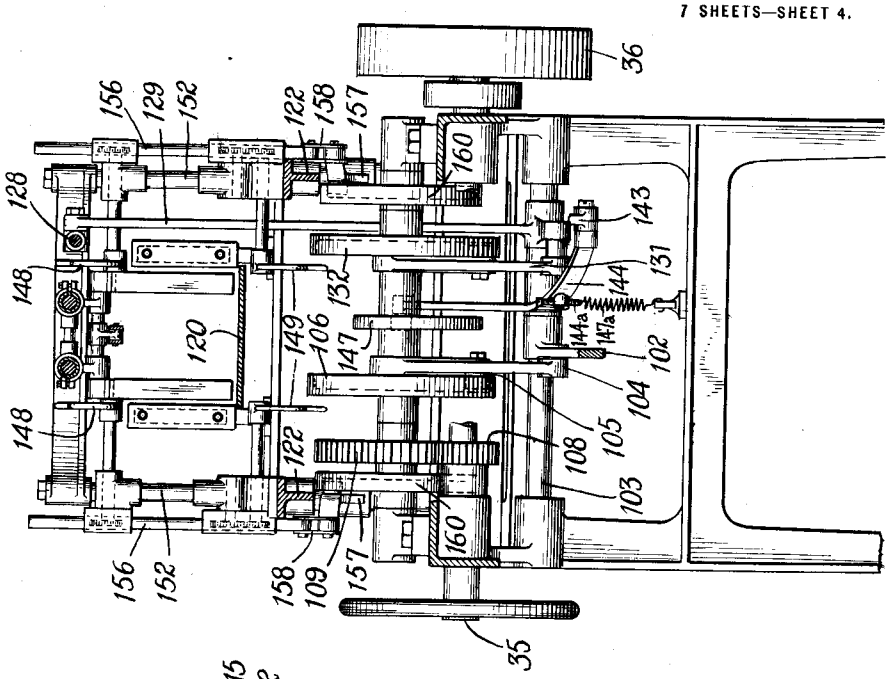
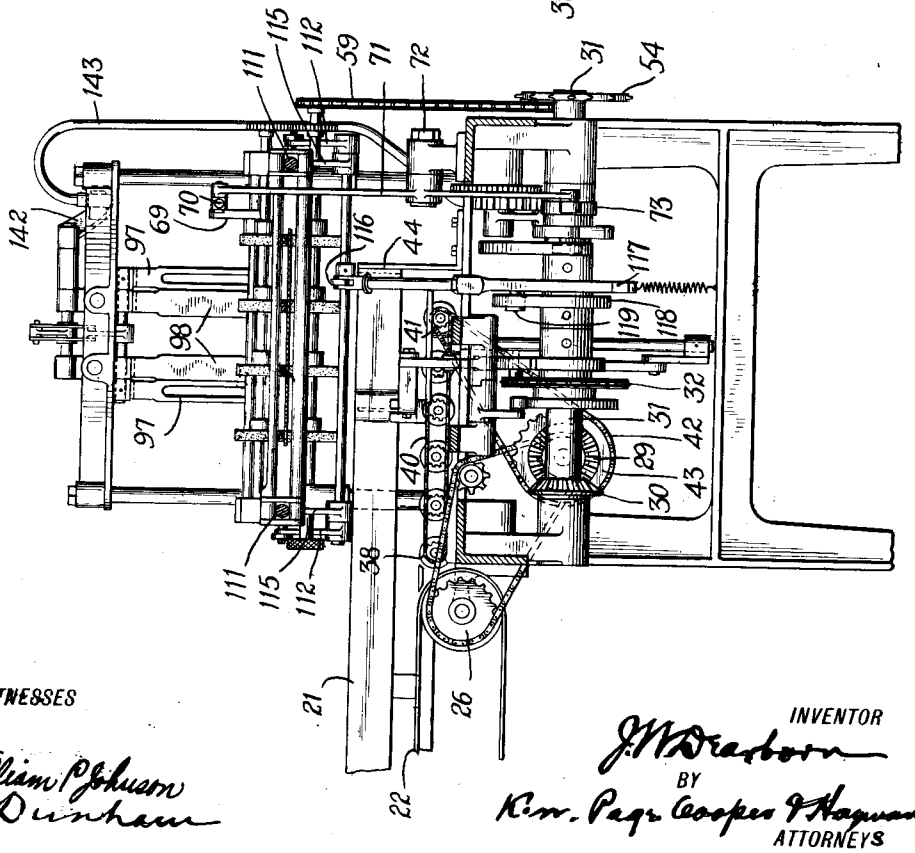


Fig. 4,



WITNESSES

William P. Johnson

A. S. Dunham

INVENTOR

J. W. Dearborn

BY

Kerr, Page, Cooper & Hayward

ATTORNEYS

J. W. DEARBORN.

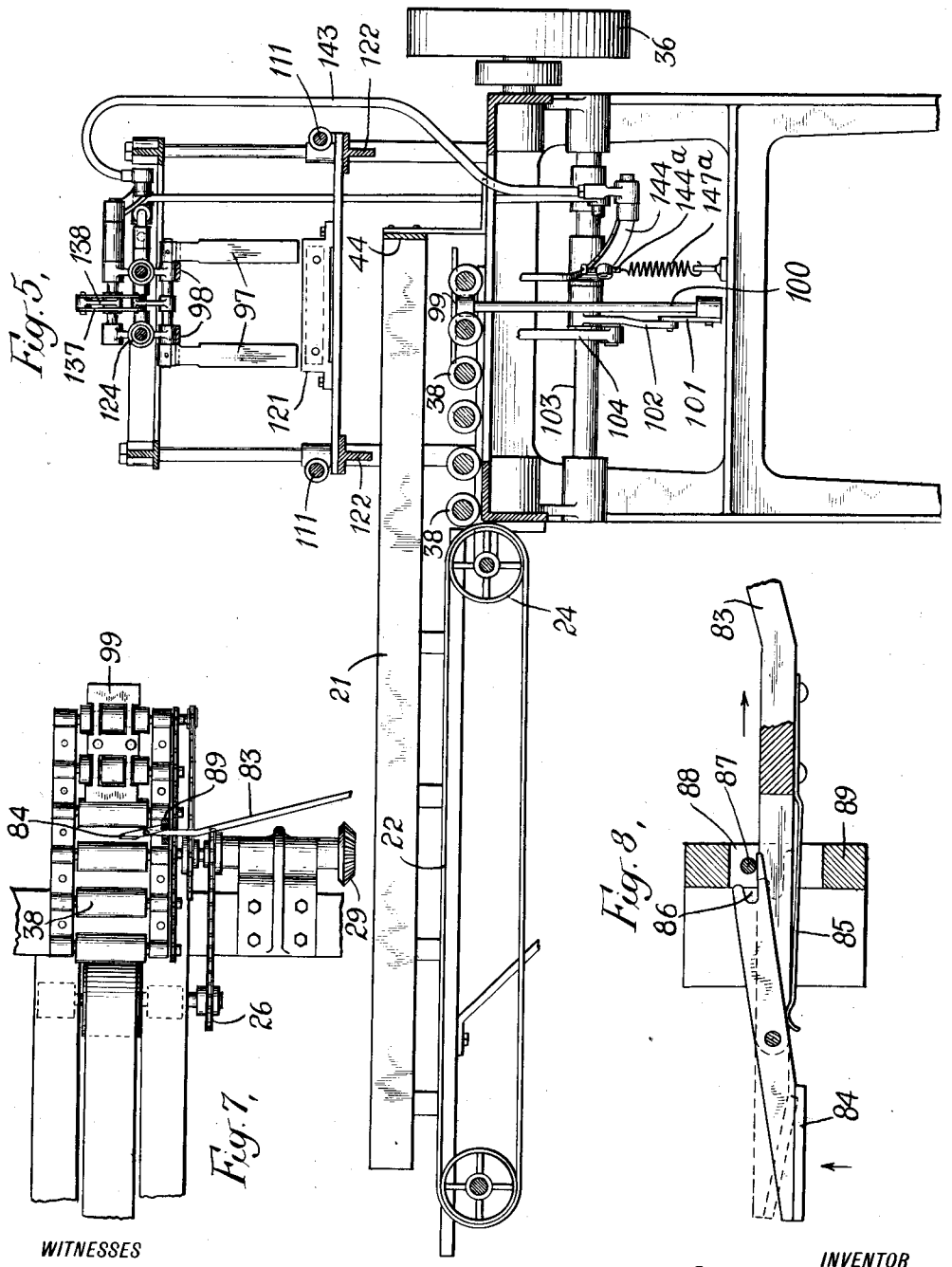
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7 SHEETS—SHEET 5.



WITNESSES

William P. Johnson

A. L. Dunham

INVENTOR

J. W. Dearborn

BY

Kerr, Page, Cooper & Hayward

ATTORNEYS

J. W. DEARBORN.

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7 SHEETS—SHEET 6.

Fig. 9,

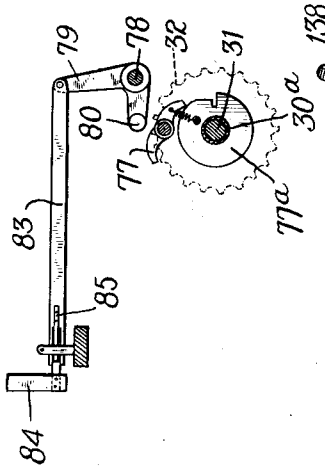


Fig. 10,

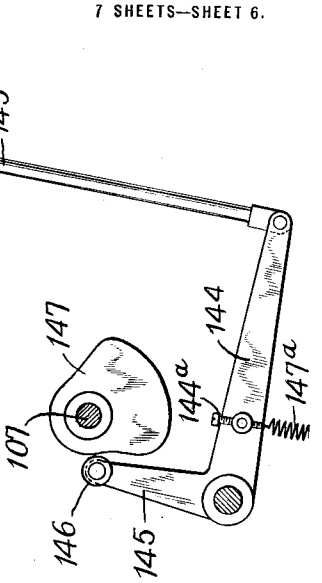


Fig. 18.

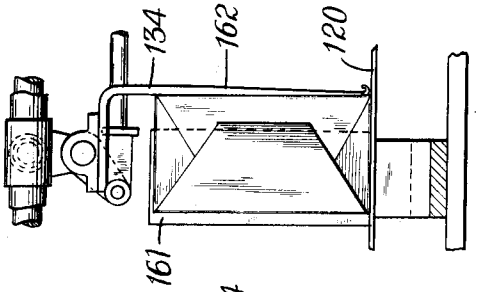


Fig. 17,

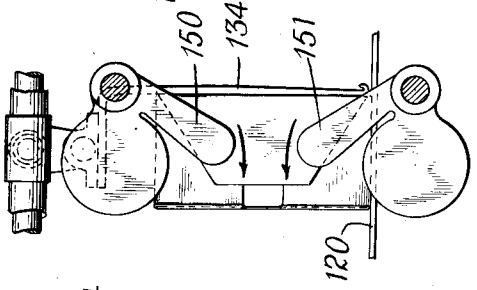


Fig. 16,

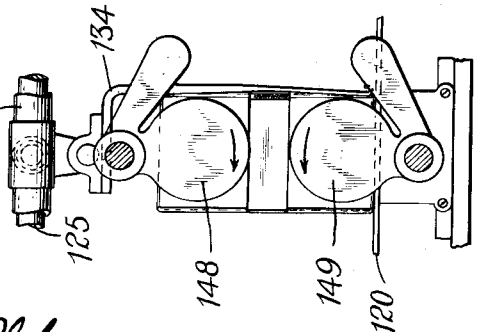
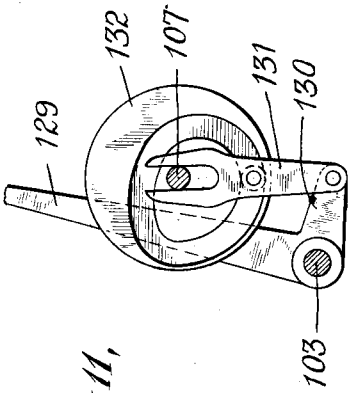


Fig. 11,



WITNESSES

William P. Johnson

A. D. Dunham

INVENTOR

J. W. Dearborn

BY

Kerr, Page, Cooper & Hayward

ATTORNEYS

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7 SHEETS—SHEET 7.

Fig. 15.

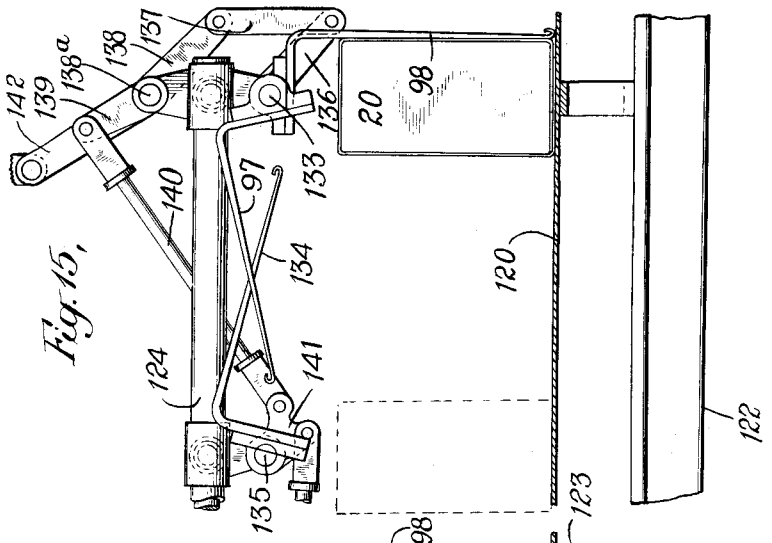


Fig. 14.

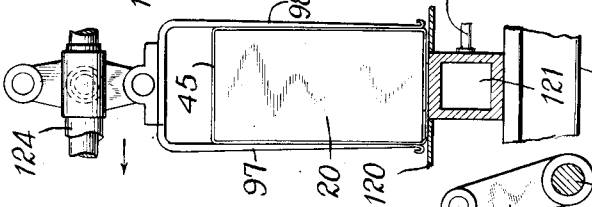


Fig. 13.

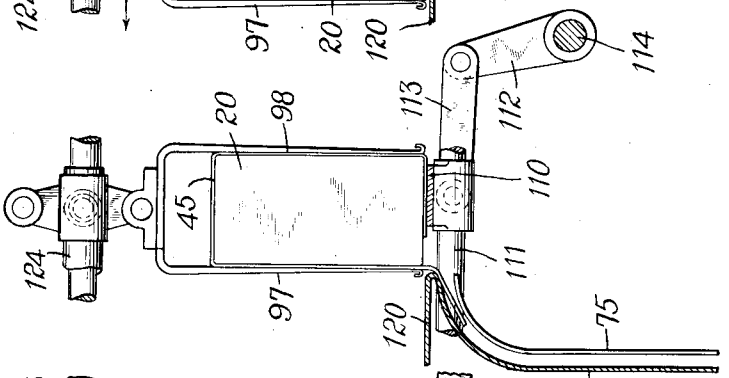
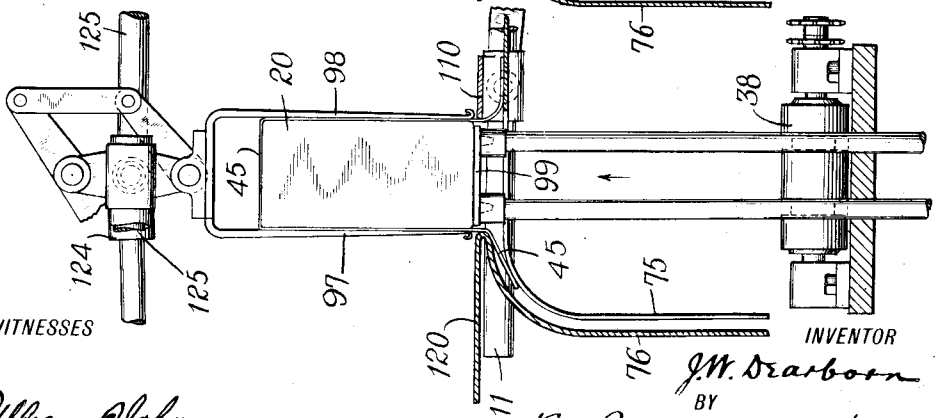


Fig. 12.



WITNESSES

William P. Johnson

A. S. Dunham

INVENTOR

J. W. Dearborn

BY

Kin, Page, Cooper & Haymond

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN W. DEARBORN, OF SPRINGFIELD, MASSACHUSETTS.

PACKAGE-WRAPPING MACHINE.

1,158,186. Specification of Letters Patent. Patented Oct. 26, 1915.

Application filed May 29, 1914. Serial No. 841,747.

To all whom it may concern:

Be it known that I, JOHN W. DEARBORN, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Package-Wrapping Machines, of which the following is a full, clear, and exact description.

This invention relates to machines for wrapping packages in paper or other fabric, and its chief object is to improve such machines, particularly in the direction of simplicity of construction and certainty of operation.

A further object is to make the operation of the paper feeding mechanism dependent upon the supply of packages to the machine.

Heretofore, if for any reason the attendant should cease to supply packages without stopping the machine, the paper feed would continue to deliver paper to the wrapping mechanism, thereby clogging the latter with paper which has to be removed, with considerable trouble and loss of time, before the machine can be put to work again. In accordance with my present invention, whenever there is no package entering the machine the paper feed ceases to operate and remains out of operation until a package is presented to the machine, though in the meantime the wrapping mechanism or parts thereof may continue to operate idly.

To these and other ends the invention consists in the novel features of construction and combinations of elements hereinafter described.

One form of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the complete machine. Fig. 2 is a plan view. Fig. 3 is a section on line 3—3 of Fig. 2. Figs. 4, 5 and 6 are cross-sections on lines 4—4, 5—5, and 6—6, respectively, of Fig. 1. Fig. 7 is a detail plan view of a portion of the mechanism that carries the packages to the wrapping devices, showing the element which controls the paper-feeding mechanism. Fig. 8 is a detail plan view, on a larger scale, of the paper-feed controlling element. Fig. 9 is a detail side view of part of the paper-feed controlling mechanism. Fig. 10 is a detail side view of part of the mechanism for opening and closing the devices which grasp and advance the packages in the machine. Fig. 11 is a detail side view of part of the mechanism which advances and retracts the package-grasping devices. Figs. 12, 13, 14 and 15 are detail side views, on a large scale, showing successive positions of the package-advancing devices. Figs. 16, 17 and 18 are detail side views, on a large scale, illustrating the end-folding operation.

In the embodiment illustrated, the machine is designed to use paper impregnated with wax or other suitable substance capable of fusing at a relatively low temperature, so that the wrapper can be sealed by heating the folds, pressing them together, and then allowing them to cool while under pressure; but it is to be understood that the invention is not limited to such use.

The packages to be wrapped, one of which is shown in dotted lines at 20 in Figs. 1 and 3, are carried laterally into the machine between lateral guides 21 by a horizontal belt conveyer 22 running over suitable drums or pulleys, one of which, shown at 24 in Figs. 1 and 5, serves to drive the conveyer. This drum is fixed to a horizontal shaft 25 which has fixed to it at one end a sprocket 26 driven by a chain from a sprocket 27 on a shaft 28. The latter is driven by a bevel gear 29 (Fig. 4) on its other end, meshing with a bevel gear 30 fixed on a sleeve 30^a (Fig. 9) loose on a transverse shaft 31. The sleeve carries and is driven by a sprocket 32 and chain 33 from a sprocket 34 on the main driving shaft 35 extending transversely of the machine. A driving pulley 36 (Figs. 2 and 6) is provided on one end of the driving shaft, and on the other end is a hand-wheel 37 by which the shaft can be rotated manually when desired.

From the conveyer 22 the packages are received by a series of feed-rollers 38 having sprockets 39 (Fig. 4) at one end, which are driven by a chain 40. The innermost roller has two sprockets, one (not shown) for the chain 40, and the other, 41, for the

driving chain 42 running from a sprocket 43 on the shaft 28 (Fig. 1). The feed-rollers 38 carry the packages against a vertical stop plate 44 at the inner end of the guides 21.

While the package is in position against the stop plate 44, as described in the last paragraph, the sheet of paper with which the package is to be wrapped is fed across the top of the package. The paper, designated by 45, is drawn from a roll 45ª at the right-hand end of the machine (as seen in Figs. 1, 2 and 3), mounted on a mandrel 46, against which bears a friction spring 47 to prevent the roll turning faster than the paper is drawn off. From the roll 45ª the paper passes up to and toward the left between two friction-surfaced transverse feed-rollers 48, the lower of which is driven by a gear 49 (Fig. 2) meshing with a gear 50 on a shaft 51 parallel to the feed rollers 48. This shaft is driven by a sprocket 52 and chain 53 from a sprocket 54 on a transverse shaft 31 (Figs. 1 and 4). The shaft 51 has a roller 55 under which the paper passes, thence over a guide bar 56, to the upper and lower feed-disks 57, the latter of which are driven by a sprocket 58 and chain 59 (Fig. 3) from a sprocket 60 on a transverse shaft 61. This shaft is rotated by a gear 62 meshing with a gear 63 which is itself rotated by means to be described presently. From the feed disks the paper 45 passes to the cutting mechanism. This mechanism comprises, in the present instance, two lower transverse strips of friction material carried by a plate 64 (Fig. 3), and two upper strips of similar material carried by spring pressed plungers in a vertically movable plate or bar 65. Rigidly fixed to the upper bar 65 and between the two upper strips is a transverse knife 66, the cutting (lower) edge of which is above the said strips when the plate is in its upper position. It will therefore be seen that if the bar 65 is depressed the upper strips will first come down upon the paper and hold it stretched under the knife. Then the springs around the plungers which carry the upper strips will yield, and the knife will then meet the paper and sever it.

The up and down movement of the bar 65, described in the last paragraph, is effected by an arm 67 (Fig. 3) on a rock shaft 68, which is rocked by an arm 69 connected by a link 70 to an actuating lever 71 fulcrumed at 72 and oscillated periodically by a cam 73 (Fig. 4) on the shaft 31. The speed of the feed-rollers 48 and feed-disks 57 is such that between operations of the cutting mechanism the strip of paper fed forward will be sufficient to extend across the package 20 (Fig. 3) and about as far beyond the same as the distance from the cutting mechanism to the package. From the cutting mechanism the paper passes over a horizontal supporting plate 74 (Fig. 3). Up to a point just in rear of the package, this plate extends clear across the path of the paper, but beyond such point it extends in the form of guide strips 75 at (and above) the ends of the package. Beyond the package these guide strips bend down in parallelism with a forwardly curved and downwardly extending plate 76, between which and the aforesaid strips the paper is guided downwardly after passing the package, as clearly shown in Fig. 3.

The shaft 31, described above as driving the paper-feed rollers 48 through the agency of the sprocket 54 and the feed disks or wheels 57 through the agency of gears 63 and 62 and sprocket 60, is itself driven by the sprocket 32, as before stated. This sprocket, however, is not fast on the shaft. Instead, it is loose on the shaft, but it is locked up with it when the machine is operating by the means now to be described. On the side of the sprocket (Figs. 4 and 9) is a pawl 77, overhanging a one-toothed ratchet or clutch-disk 77ª which is pinned to the shaft, so that so long as the pawl and ratchet are engaged (as in Fig. 9) the sprocket will rotate the shaft. Above the circular path of the pawl is a shaft 78, on which a bell-crank lever 79 is loosely mounted with a roller 80 on the end of its horizontal arm. Manifestly, if this roller is in the path of the tail of the revolving pawl 77, as is the case in Fig. 9, the tail will strike the roller and the pawl will be thrown out of engagement with the ratchet 77ª, whereupon the sprocket 32 and pawl 77 will continue to revolve but leave the ratchet 77ª, the shaft 31, the paper feed-rollers 48, and paper-feed disks 57 stationary. In short, the operation of the devices mentioned depends upon the position of the bell-crank lever 79. On the other hand, the position of the bell-crank depends upon the presence in the machine of a package to be wrapped, and this dependence is produced as follows: On the shaft 78 is an arm 81 (Figs. 1 and 4), yieldingly connected with the bell-crank 79 in such manner that the arm can rock the crank unless the latter encounters a certain resistance, in which case the connection between the two will yield and permit the arm to rock idly. On the end of the arm is a roller bearing on a cam 82 rigidly connected to the sprocket 32 (on the sleeve 30ª) and hence rotating therewith. The arm is therefore rocked intermittently by the cam and will accordingly tend to rock the bell-crank 79 clockwise (as seen in Figs. 1 and 9) and hence swing the roller 80 up out of the path of the pawl 77,—and will indeed do so if the bell-crank is not positively held,—thereby permitting the pawl to remain in engagement with the ratchet or clutch disk 77ª.

Extending forwardly from the upper arm of the bell-crank 79 is a link 83 (Figs. 1, 7, 8, and 9), on the forward end of which is a lever 84, held yieldingly in the position shown in Fig. 8 by a spring 85. Remembering that the link, being connected to the bell-crank, must reciprocate as the latter rocks, it will be seen that if on the rightward stroke the lever 84 is in the position shown in Fig. 8, the notch 86 will engage the pin 87 fixed in the opening 88 through which the link and lever project through the plate 89 into the path of the packages advancing to the wrapping mechanism. The bell-crank 79 therefore cannot be rocked clockwise (as seen in Figs. 1 and 9) by the cam 82 and arm 81, and the arm therefore swings up idly under the rise of the cam. Consequently the roller 80 remains in the path of the tail of the pawl 77 and the latter will accordingly be thrown out of engagement with the clutch-disk or ratchet 77a. This deprives the paper-feeding mechanism of power and it accordingly ceases to operate. On the other hand, if there is a package being advanced by the rollers 38 against the lever 84 (in the direction of the arrow in Fig. 8) the lever will be swung to the dotted-line position; with the result that when the link 83 moves toward the right the notch 86 misses the pin 87, and the link can therefore continue its movement in that direction, thus permitting the cam 82 and arm 81 to continue to swing the bell crank 79, with the result that the roller 80 is carried out of the path of the pawl 77. The latter therefore remains in engagement with the clutch element 77a and the paper-feeding mechanism continues to operate. It will thus be seen, from the foregoing, that the supplying of wrapping paper depends upon the supplying of packages to be wrapped, with the result that unused paper cannot accumulate in the wrapping mechanism, clogging the machine and requiring cleaning out before the machine can be put to work again.

The gear 63 (Fig. 3), previously described as driving the paper-feed disks 57 through the agency of the gear 62, sprocket 60 and chain 59, is mounted on a short transverse shaft 90 in rigid connection with a ratchet 91, which is rotated intermittently by a pawl 92 carried by a bell-crank lever 93 fulcrumed loosely on the shaft. The lever is rocked clockwise (as seen in Fig. 3) by a link 94 reciprocated by means of a roller 95 mounted on the side of the link and cooperating with a cam 96 fixed on the shaft 31, the link being guided in a substantially rectilinear path by its forked right end straddling the last-named shaft. The disks 57 therefore rotate intermittently. While they are idle the rollers 48, operating continuously, form a loop of paper between them and the disks, which is taken up and fed through the cutting mechanism to the package when the said disks are next set in motion.

Immediately above the position of the innermost package on the conveying rollers 38, (which position may for convenience be aptly termed the first "station"), is a package gripping device (Figs. 3 and 5) comprising two pairs of depending spring fingers 97, 98. The spacing of the fingers transversely of the machine is about the same as the length of the package, and longitudinally of the machine (that is, from right to left as seen in Fig. 3) is sufficient to grip the package snugly. When the package is at its innermost position, against the stop plate 44, it is directly above an elevator or carrier 99 (see also Fig. 7) normally out of contact with the package, and having openings through which the conveying rollers work. When a sheet of paper is in position above the package, as shown at 45 in Fig. 3, the elevator rises and carries both paper and package into the gripper 97—98 as shown in Fig. 12. Initially the forward gripper-fingers 97 stand about as indicated in Fig. 1, that is, tipped slightly forward, to insure that the lower end of the fingers will not be in the path of the ascending package. When the latter is about half-way up in the gripper the said fingers are swung down against the package as in Fig. 12.

The upward movement of the elevator 99 to lift the paper and package into the position shown in Fig. 12 is effected by means of two upright vertically movable rods 100 (Fig. 3) on the top of which the elevator is mounted and which are connected at the bottom by a link 101 to the end of an arm 102 pivotally mounted at its other end on a transverse shaft 103. This arm is rocked at the proper intervals by a forked link 104, straddling the shaft 107 and having a lateral roller 105 extending into the cam-groove of the cam 106 (see also Fig. 6), on a countershaft 107 parallel to the main shaft 35 and driven therefrom by means of the gears 108, 109. Thus the cam 106, reciprocating the link 104, rocks the arm 102 and raises and lowers the package-elevator 99.

The package 20 and the wrapping paper 45 being at the second station, that is to say, in the gripper 97—98 as shown in Fig. 12, the right-hand end of the paper is folded under the package as in Fig. 13 by the leftward movement of a bottom-folder 110 in the form of a transverse plate mounted to slide on the horizontal guide-rods 111 which also serve to support the paper-cutting mechanism and the bearings of the paper-feed disks 57. This leftward movement of the folder, and the subsequent retraction thereof, are effected by upwardly extending arms 112 connected to the folder by links

113 (Figs. 1, 2 and 13) and fixed at their lower ends to a transverse rock-shaft 114. The latter is mounted in bearings 115 depending from the supporting rods 111 and having fixed to it an actuating arm 116 pivotally connected to a reciprocatory link 117. The latter is guided in a substantially rectilinear path by its forked lower end straddling the shaft 31 and is reciprocated by a cam 118 (Figs. 3 and 4) on said shaft, the link having a lateral roller 119 bearing on the cam. It will be understood that the operative movement (leftward as seen in Fig. 12) is preferably concurrent with the downward movement of the elevator 99, beginning just before the latter movement begins, so as to obviate any possibility of the package slipping down in the gripper 97—98.

The partially wrapped package is now moved leftwardly from its second station (Fig. 13) to the third station. In this movement the folding and supporting plate 120, integral at its right-hand edge with the curved paper-guide 76, folds the depending left end of the paper 45 under the package 20 and underlapping the previously folded end of the sheet. Moving on toward the third station the package passes over a transverse heating device 121 consisting of a hollow chamber supported by the horizontal T-irons 122 (Figs. 2, 3, 6 and 14) and connected by a pipe 123 to a source of steam or other heating fluid, not shown. This melts the wax with which the paper is impregnated so that the overlapping edges will adhere when they cool, after moving out of contact with the heater.

The advance of the package from the second station (Fig. 13) is effected by the bodily movement of the gripper 97—98, which is actuated as follows: The fingers 97, 98 are carried by and depend from the right-hand ends (see Fig. 2) of two tubular slides 124 mounted on two horizontal guide-rods or supports 125 which are themselves supported by two arc-shaped members 126, the slides being rigidly connected together by transverse rods 127, Fig. 3. One of these slides is pivoted at its right-hand end to a link 128, pivotally connected to the upper end of a rock arm 129 (see also Figs. 6 and 11) which is loosely mounted at its lower end on the shaft 103 and rigidly connected to a horizontal arm 130, also loose on the shaft. The latter arm is pivoted to a forked link 131 straddling the cam-shaft 107 and having a lateral roller extending into a cam-groove in the side of the cam 132 on said shaft.

The partially wrapped package having arrived at about the third station, shown in Fig. 15, the forward fingers 97, fixed at the top to a transverse pivot 133 supported by the slides 124, are swung up forwardly to the position shown in Fig. 15, and at the same time a pusher comprising a pair of depending fingers 134 (see also Fig. 5) fixed at the top to a transverse pivot 135 carried by the slides, is swung up in the opposite or rearward direction, the fingers 134 being spaced closer together than the fingers 97, so as to pass the latter. These swinging movements of the two sets of fingers are effected as follows: Fixed to the pivot 133 is a rearwardly extending arm 136 (Fig. 3) connected by a link 137 to an arm 138 attached to a transverse rock-shaft 138^a mounted above the pivot 133 on the slides 124. This rock-shaft also has an arm 139 connected by a link 140 to a depending arm 141 fixed to the pivot 135. Hence if the shaft 138^a is rocked clockwise (as seen in Fig. 3) the fingers 97 will be swung up in the same direction and the pusher 134 will be swung up in the opposite direction. To rock the shaft 138^a it is provided with an actuating arm 142 (Fig. 2) pivotally connected to the depending upper end of a suitably curved link 143 (see also Figs. 3 and 4 and 6) pivoted at its lower end to the rear end of a laterally curved horizontal arm 144 (Figs. 3, 6 and 10) loose on the shaft 103. Fixed to the arm 144 is a vertical arm 145 having at its upper end a roller 146 which a spring 147^a urges toward a cam 147 rigidly mounted on the cam shaft 107, so that as the shaft rotates, the link 143 will be reciprocated and the shaft 138^a rocked.

The pusher 134 and fingers 97 having been swung up to the positions shown in Fig. 15, the slides 124 are retracted to their initial position by the means already described, including the cam 132, Fig. 11. The gripper 97—98 then stands above the package that has in the meantime been brought to the first station, on the elevator 99, and the pusher 134 is above the package left at the third station by the gripper 97—98. The cam 147 and spring 147^a now swing the pusher 134 and the fingers 97 down to initial position, as in Fig. 1, thus bringing the former behind the package already at the third station, as in Fig. 3. The elevator 99 now raises the next package into the gripper, and when the package is about half-way into the gripper the cam 147 permits the spring 147^a (Fig. 10) to swing the fingers 97 firmly against the package. The roller 146 is now out of contact with its cam, and hence the pressure of the fingers 97 on the package depends entirely on the tension of the spring 147^a, which can be regulated in any convenient manner, as by means of the screw 144^a to which the spring is connected. It will be observed that when the fingers 97 are in the position shown in Fig. 1 the pushers 134 and 162 are also in the positions shown in Fig. 1, but that the additional movement of the link 143 to swing the fingers 97 against the package has no appreciable effect on

fingers 134 and 162 for the reason that in said additional movement the arm 139 (Fig. 3) swings across the axis of the link 140. In other words, the arm 139 and link 140 are practically in line, so that the additional movement of the former produces no material longitudinal movement of the link. When the parts mentioned are in the positions shown in Fig. 3 they are exactly in line, and hence any pressure exerted on the pushers 134 and 162 and tending to swing the same will not be communicated to fingers 97 but will simply be resisted by the shaft 138a. The package having been pushed clear up into the gripper, one end of the sheet of paper is tucked under it by the folder 110, whereupon the cam 132 again advances the slides 124, that is, moves them leftwardly as seen in Fig. 3, in which movement the pusher 134 carries to the fourth station the package left at the third by the gripper and to the third station the package just pushed into the gripper by the elevator. Between the third and fourth stations are the end tuckers, circular in form and comprising two upper end-tuckers 148, and two lower designated by 149, Figs. 1, 3, and 6, which are oscillated about transverse axes. The tuckers being in the positions shown in Fig. 3 they swing down and up respectively as the package comes under them, whereby tucking in the upper and lower end-portions of the wrapping paper, as in Fig. 16. As the package moves on, the upper tuckers continue their clockwise movement, swing away from the package, and the lower their counterclockwise movement, and the blades or end-folders 150, 151, connected with and following the tuckers, come into operation, folding the rear-sides of the wrapper-ends over as in Fig. 17.

The end-tuckers and folders, described in the preceding paragraph, are pivoted to two standards 152, fixed to the T-irons 122 at the sides of the path of the package along the supporting plate 120. Outside of the standards the folders and tuckers are connected to actuating gears 153, 154, Fig. 1, the lower gears meshing with gears 155. The latter, and the upper gears 153, mesh with vertical racks 156 so that as the racks reciprocate the folders and tuckers will be oscillated in opposite directions. The racks are actuated by levers 157 (Figs. 1 and 6) connected at their rear ends to the racks by means of links 158 and fulcrumed on their forward ends at 159, on the standards which support the forward arc-shaped member 126. Between their ends the levers carry lateral rollers extending into cam-grooves in the cams 160 on the cam-shaft 107. Passing the end-tuckers and folders the package comes between the stationary end-heaters 161, Figs. 2 and 3, which fold back the remaining (front) portions of the wrapper as the package enters the space between the heaters thereby completing the end folds, as in Fig. 18. At the same time the heaters melt the wax of the wrapper and press the folds into close contact with each other. At the forward or left-hand end of the slides 124 is a forward pusher 162, of the same type as the rear pusher 134 and fixed to a transverse shaft 163 connected by an arm 164 and link 165 to the arm 141 which, it will be remembered, swings the rear pusher 134 up and down.

The package having been advanced to the fourth station, between the end heaters 161, the slides 124 come to rest and the cam 147 (Figs. 6 and 10) and associated parts swing the front gripper-fingers 97 and pusher 134 up, as previously described. At the same time the forward or second pusher 162 is swung up (and toward the rear) by its connection with the arm 141. The cam 132 (Figs. 6 and 11) now retracts the slides 124 to initial position, with the raised forward pusher over the package just left at the fourth station. At this stage of the operation there is a package at three of the four stations, as will be readily understood; the first package being at the fourth station with its wrapper completely folded and its end-folds being heated and pressed, the second package at the third station, and the third at the first station, on the elevator 99 below the gripper 97—98. The cam 147 now swings the fingers 97 down in front of the empty second station, and the pushers 134, 162 down behind the packages at the third and fourth stations, whereupon the elevator raises into the gripper the package on the elevator, partially wrapping the package as previously described. The cam 132 and arm 129 then advance slides 124, in which movement the forward pusher 162 moves the first package out from between the end heaters 161, and in between the cooling plates 166 (Figs. 1 and 2) which chill the melted wax of the end folds and cause the latter to adhere to each other. Moving on between the cooling plates 166 the package meets the conveyer 167 (driven in any convenient manner, not shown) which carries it out of the machine. The pushers 162, 134, and the gripper-fingers 97 are now swung up and the slides 124 retracted to initial position after which the said pushers and fingers are swung down to operative position, thus completing the cycle. The succeeding operation is then simply a repetition of the cycle already described.

It should be stated that the timing of the machine is such that the lever 84 (Figs. 7 and 8) is always in the path of the packages except when the elevator 99 is in its lower position, so that packages cannot be carried into the path of the elevator while the latter is ascending, descending, or is in its upper

position. The lever 84 having been withdrawn from the path of the packages by the arm 83, the package which had been bearing against the lever is carried on to the elevator, and after such package has passed the path of the lever the latter is moved back into the path of the packages and in front of the next succeeding package.

It is to be understood that the invention is not limited to the construction herein specifically described, but is capable of embodiment in other forms without departure from its spirit.

I claim:

1. In a wrapping machine, in combination, an elevator adapted to receive the package to be wrapped and defining the first station thereof, a downwardly open gripper above the elevator and defining the second station of the package, paper-feeding mechanism to insert a sheet of wrapping paper between the package on the elevator and the gripper, means to raise the elevator and carry the package and paper into the gripper with the bottom portions of the paper depending below the gripper, a folder movable under the package in the gripper to fold one depending portion of the paper under the package, means for shifting the gripper horizontally to a third station, and later retract the gripper, a device in the path of the package between the second and third stations to fold the remaining depending portion of the paper under the package, mechanism to open the gripper and release the package after arrival thereof at the third station, means for advancing the package beyond the third station, and mechanism for forming the end-folds of the wrapper.

2. In a wrapping machine, in combination, an elevator adapted to receive the package to be wrapped and defining the first station thereof, a horizontally movable downwardly open gripper above the elevator and defining a second station, paper-feeding devices for inserting a sheet of paper between the gripper and the package on the elevator, means to raise the elevator and carry the package and paper into the gripper, whereby the paper is folded down over the front and rear of the package and its bottom portions left depending below the package, a folder movable under the package to fold one of said depending portions, means to advance the gripper to a third station and retract the same to the second station, means to fold the remaining depending portion of the paper, mechanism to open the gripper and release the package while at the third station and to close the gripper after its retraction to the second station, a pusher connected with the gripper in advance thereof to move horizontally in unison therewith, and movable into and out of the path of the package, means enabling the gripper opening and closing mechanism to move the pusher out of the path of the package as the gripper opens and into the path as the gripper closes whereby on the succeeding advance of the gripper the pusher will advance the package from the third station, and means to produce the end-folds of the paper.

3. In a wrapping machine, in combination, a package-gripper having an open side to receive a package to be wrapped, a package-carrier adjacent to the gripper and movable from an initial position toward the open side of the gripper to move the package into the latter, means to feed a sheet of paper across the open side of the gripper while the carrier is in its initial position, a pusher in advance of the gripper, means to advance and retract the gripper and the pusher in unison, and mechanism to withdraw the pusher from the path of the package and release the gripper from the package while the pusher and gripper are advanced and to restore the gripper and pusher to initial position when the two are retracted.

4. In a wrapping machine, in combination, a package-advancing gripper comprising a member to engage the rear of the package and a pivoted member to engage the front of the package, a pivoted package-pusher in front of the gripper, means to advance and retract the gripper and pusher, and mechanism to swing pivoted member and the pusher out of the path of the package before retraction and into the path of the package after retraction of the pusher and gripper.

5. In a wrapping machine, in combination, a package-advancing gripper having a pivoted member to engage the front of the package and adapted to swing out of the path of advance of the packages, a plurality of package-pushers one in front of the others in advance of the gripper and each consisting of a pivoted member adapted to swing out of and into the path of advance of the packages, means to advance and retract the gripper and the pushers, and mechanism to swing all said pivoted members out of the path of the packages before retraction and into the said path after retraction of the gripper and pushers.

6. In a wrapping machine, in combination, a plurality of package-advancing devices spaced one in front of the other and each comprising a member pivoted to swing into and out of the path of the package, means to advance and retract said members, and mechanism to swing the members out of the path of the packages before retraction and into the said path after retraction.

7. In a wrapping machine, a sliding element, a package-advancing gripper connected to said element and having a member

adapted to engage the front of the package, a package-pusher connected with the slide in advance of the pusher and movable into and out of the path of the package, means to advance and retract the sliding element, and means to move the said member and the pusher into and out of the path of the package.

8. In a wrapping machine, in combination, a downwardly open package gripper, a package-elevator below the gripper to lift a package into the same, means for feeding a sheet of paper between the gripper and a package on the elevator, a package-supporting plate extending in advance of the gripper, a package-pusher in front of the gripper, means to advance and retract the gripper and the pusher, mechanism to move the pusher into and out of the path of the packages on the supporting-plate, mechanism for releasing the gripper from the package, and means for actuating said mechanisms.

9. In a wrapping machine, in combination, a horizontal plate to support a plurality of spaced packages one in front of the other, a supporting guide above and parallel to the plate, a slide movable longitudinally on the guide, a package-gripper carried by the slide at the rear thereof and having a front member pivoted to swing into and out of the path of the packages on the plate, a package-pusher carried by the slide in front of the gripper and comprising a member pivoted to swing into and out of said path, connecting means between said pivoted members whereby the two are caused to swing simultaneously but in opposite directions, means to swing said members, and means to advance and retract the slide.

10. In a wrapping machine, in combination, a package-gripper having a depending front member pivoted at the top to swing upwardly and forwardly, a package-pusher in advance of the gripper and pivoted to swing upwardly and rearwardly, means to advance and retract the gripper and the pusher, an arm connected with the pivoted member of the gripper to swing the same, a link connecting said arm with the pusher to swing the latter, and means to actuate the said arm in one direction before and in the opposite direction after the gripper and the pusher are retracted.

11. In a wrapping machine, in combination, an elevator adapted to receive a package and lift the same from a lower to an upper position; means for conveying packages to the elevator; mechanism for feeding a sheet of paper between the said upper and lower positions; a package-gripper arranged to receive the package from the elevator and simultaneously fold the paper over the package; a bottom-folder adapted to operate under the package while the same is in the gripper; an actuating shaft; devices connecting the paper-feeding means and the bottom-folder with the shaft for actuation thereby; means for driving the shaft; and controlling mechanism for the driving means, dependent for operation upon the movement of a package on the conveying means to a predetermined point in the path of the packages to the elevator, and mechanism for driving the aforesaid elevator and conveying means independently of said actuating shaft and said controlling means.

12. In a wrapping machine, in combination, an elevator adapted to receive a package and lift the same from a lower to an upper position; means for feeding a sheet of paper between the said upper and lower positions; a package-gripper arranged to receive the package from the elevator and simultaneously fold the paper over the package; a bottom folder adapted to operate under the package while the same is in the gripper; means for conveying packages to the elevator; an actuating element common to the paper-feeding mechanism and the bottom folder; means for driving said actuating element, dependent for operation upon movement of a package on the conveying means past a predetermined point in the path of the packages to the elevator, and mechanism for driving the conveying means and the elevator independently of the said actuating element and its driving means.

13. In a wrapping machine, in combination, means for conveying to a first station the packages to be wrapped; a device to receive the packages at the first station and carry the same to a second station; means for feeding a sheet of paper between the two stations; means at the second station to receive the package and fold the paper over the same; a folder to operate on the paper at the second station; an actuating element connected with the aforesaid paper-feeding means and folder, to actuate the same; a constantly moving driving member constantly connected with said conveying means and said device; and means for connecting the driving member to said actuating element and dependent for operation upon the conveyance of the packages past a predetermined point by the conveying means.

14. In a wrapping machine, in combination, means for conveying to a first station the packages to be wrapped; means for feeding a sheet of paper across and above the first station; means to carry the package from the first to a second station; movable folding means adjacent to the second station; means for moving the package to a position beyond the said second station; folding devices beyond the second station to complete the folding operation; an actuat-

ing element common to the aforesaid paper-feeding means and movable folding means; means for continuously driving the above-mentioned conveying means, carrying means, moving means, and folding devices; and mechanism, connected with the driving means, to drive the actuating element and dependent for operation upon the conveyance of the packages past a predetermined point by the conveying means.

15. In a wrapping machine, the combination with means for conveying into the machine packages to be wrapped, devices for conveying the packages through the machine, wrapper-folding devices, means for continuously driving the said conveying means, conveying devices and folding devices; of means for feeding wrappers into position for folding over the packages to be wrapped; and mechanism connected with the wrapper-feeding means to actuate the same, dependent for operation upon the conveyance of packages into the machine by the aforesaid conveying means and capable of stoppage independently of said conveying means and devices and said folding devices.

16. In a wrapping machine, the combination with package-feeding and wrapper-folding mechanisms, and means for continuously driving said mechanisms; of paper-feeding means to feed the wrapping paper into the machine; driving mechanism for driving the paper-feeding means in harmony with the first-named mechanism and capable of stoppage independently of the latter, and devices for maintaining the said driving mechanism in operation and dependent upon the continuous supply of packages into the machine.

17. In a wrapping machine, the combination of means to receive the packages to be wrapped, mechanism for feeding a sheet of paper into position for folding over a package supported by the receiving means, driving mechanism for the paper-feeding mechanism dependent for operation upon the continued supply of packages to the said receiving means, package-moving devices to move the packages through the machine from the receiving means, folding devices operating at the path of the packages beyond the receiving means, and driving mechanism to actuate the said package-moving devices and folding devices independently of the first-named driving mechanism.

18. In a wrapping machine, in combination, conveying means for carrying into the machine the packages to be wrapped, folding means to fold a sheet of paper over a package carried into the machine by the conveying means, means for feeding a sheet of paper into folding position, driving mechanism for the paper-feeding means, controlling means for said mechanism, having a controlling element movable into and out of the path of the packages carried by said conveying means, whereby the engagement of said element by a package will set the paper-feeding means in operation, devices to complete the folding operation; and means to drive the latter continuously and independently of the said feeding means.

19. In a wrapping machine, the combination with wrapping mechanism including folding devices, and means for delivering packages thereto, of means for supplying paper to the wrapping mechanism, means in the path of the packages to control the operation of the paper-feeding means, and mechanism to drive a plurality of the folding devices independently of the last-named means.

20. In a wrapping machine, the combination of wrapping mechanism; means for delivering packages thereto; means for feeding paper into position for wrapping about the packages; mechanism to control the operation of the paper-feeding means, said mechanism including an element movable in the path of the packages to the wrapping mechanism longitudinally of the path and movable laterally into and out of the path; and means for moving said element into and out of said path.

21. In a package-wrapping machine providing a path for the packages, the combination of paper-feeding mechanism, a member movable into and out of the path of the packages and having a portion shiftable from an intitial position by the packages advancing in said path, means to arrest the said member in the outward movement thereof when the shiftable portion is in said initial position; and driving means for the paper-feeding mechanism, dependent for operation upon outward movement of said member beyond said arresting means.

22. In a wrapping machine providing a path for the packages to be wrapped, the combination with wrapping mechanism including folding devices, and continuously operating means for actuating said folding devices; of means for supplying paper to the wrapping mechanism; means connected with but disconnectible from said actuating means, for driving the paper-supplying means; and devices actuated by packages moving in the aforesaid path to maintain in connection with the aforesaid actuating means, the means for driving the paper-supplying means.

23. In a package-wrapping machine, providing a path for the packages, the combination with paper-feeding mechanism, of a controlling member movable toward and from the path of the packages, a lever carried by and movable with said member and adapted to be rocked by packages advancing in said path, a stop in position to be engaged by the lever in its outward movement to ar-

rest the said member when the lever is not rocked, and means for driving the paper-feeding mechanism, dependent for operation upon outward movement of the controlling member beyond said stop.

24. In a package-wrapping machine providing a path for the packages, the combination with paper-feeding mechanism; of a controlling member movable into and out of the path of the packages, and shiftable in another direction by packages advancing in said path; a stop arranged to arrest the member in its outward movement unless said member is shifted in said other direction; a shaft connected with the paper-feeding mechanism to actuate the same; a clutch element fixed on said shaft; a power-driven device revolving about the clutch element and movable into and out of engagement therewith; an element normally in the path of the revolving device to move the latter out of engagement with the clutch element; and means actuated by outward movement of said controlling member to move the last-named element out of the path of the revolving device.

25. In a package-wrapping machine, providing a path for the packages, the combination with paper-feeding mechanism; of a controlling member movable into and out of the path of the packages and shiftable in another direction by packages advancing in said path; means to arrest the member in its outward movement unless the member is shifted in said other direction; a shaft connected with the paper-feeding mechanism to actuate the same; a clutch element fixed on said shaft; a power-driven element co-axial with the shaft and rotatable independently thereof; a pawl carried by the power-driven element and movable into and out of engagement with the clutch element; an element normally in the path of the pawl to move the same out of engagement with the clutch element; a link connecting the last-named element and the aforesaid controlling element; a member yieldingly connected with the link to reciprocate the same; and a cam actuated by said shaft and coöperating with said arm to actuate the same.

26. In a wrapping machine providing a path for the packages to be wrapped, the combination of means for supplying packages to the machine, means for feeding paper into the path of the packages, means in the path of the packages for receiving the latter singly and simultaneously folding the paper about the same, means for taking the packages singly from the receiving means and moving them through a remaining portion of their path with the paper projecting laterally beyond said path, oscillatory folding devices at opposite sides of said path to fold upon the packages the projecting ends of the paper, continuously operating driving mechanism in constant connection with all the aforesaid means and devices save the paper feeding means, mechanism for actuating the paper feeding means, normally connected with said driving mechanism but disconnectible therefrom, a device normally in position to disconnect said actuating mechanism from the driving mechanism, means for shifting said device out of said position and a device arranged in the path of the packages entering the machine and normally in a position to prevent the operation of said shifting means but movable by the moving packages to an inoperative position.

27. In a wrapping machine, providing a path for the packages to be wrapped, the combination of devices for folding paper about the packages singly and carrying them through said path, with the ends of the paper projecting laterally from said path, oscillatory tuckers and folders at the sides of the path to operate on the ends of the paper, reciprocatory members connected with the tuckers and folders to actuate the same, a main driving shaft, means driven by the latter to reciprocate the said members, means for feeding paper into the path of packages entering the machine, a second shaft, means for driving the second shaft from the said main shaft, devices connected with the paper-feeding means to actuate the same and automatically connectible with said second shaft for actuation thereby, and means in the path of packages entering the machine, normally preventing, but shiftable by the moving packages entering the machine to permit, the automatic connection of said devices with the second shaft.

28. In a wrapping machine, the combination of means for advancing a partially wrapped article with the end-portions of the wrapper projecting laterally beyond the path of the article; upper and lower end-tuckers arranged at the sides of the path of the article and pivoted to oscillate in opposite directions; upper and lower end-folders tangential to and carried by the end-tuckers; means for swinging the upper tuckers and folders downwardly and the lower tuckers and folders upwardly as the article passes the tuckers and folders, whereby the upper and lower portions of the projecting ends of the wrapper are tucked in upon the ends of the article and the rear portions of the ends of the wrapper are folded forwardly upon the tucked-in portions; and means at the sides of the path of the article, beyond the tuckers and folders, to fold the front portions of the projecting ends of the wrapper rearwardly upon the folded rear portions.

29. In a wrapping machine, the combination of means for advancing a partially wrapped article with the end-portions of the wrapper projecting laterally from the path

of the article; upper and lower end-tuckers of circular form arranged at the sides of the path of the article and pivoted eccentrically to oscillate in opposite directions; upper and lower end-folding blades tangential to and carried by the end-tuckers and operating after the end-tuckers have operated on the projecting end-portions of the wrapper; and means for actuating the end-tuckers and folders as the advancing article reaches the same.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

JOHN W. DEARBORN.

Witnesses:
GRACE T. MCGLYNN,
ROBERT S. FOLSOM.