Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 1

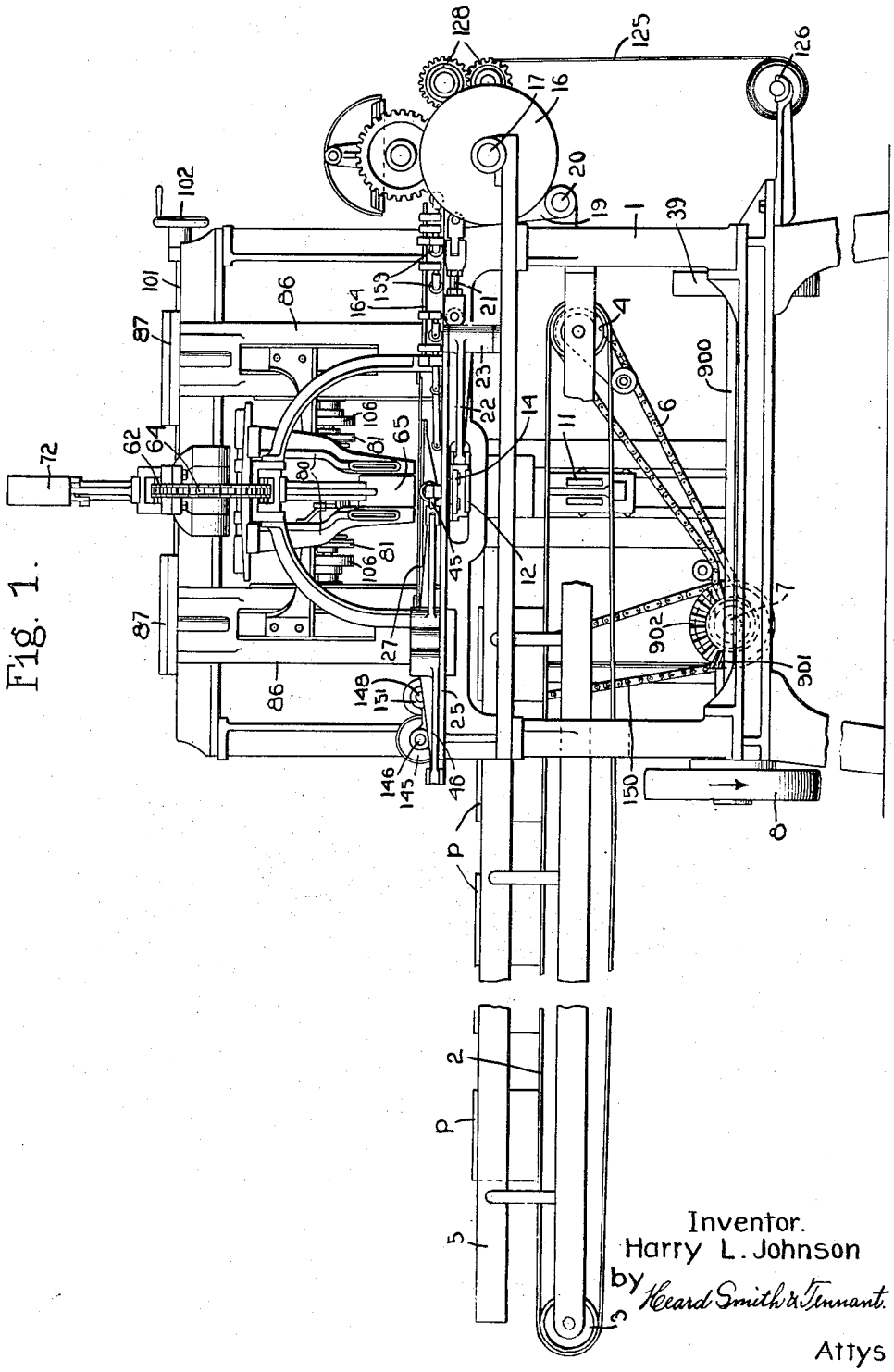


Fig. 1.

Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 2

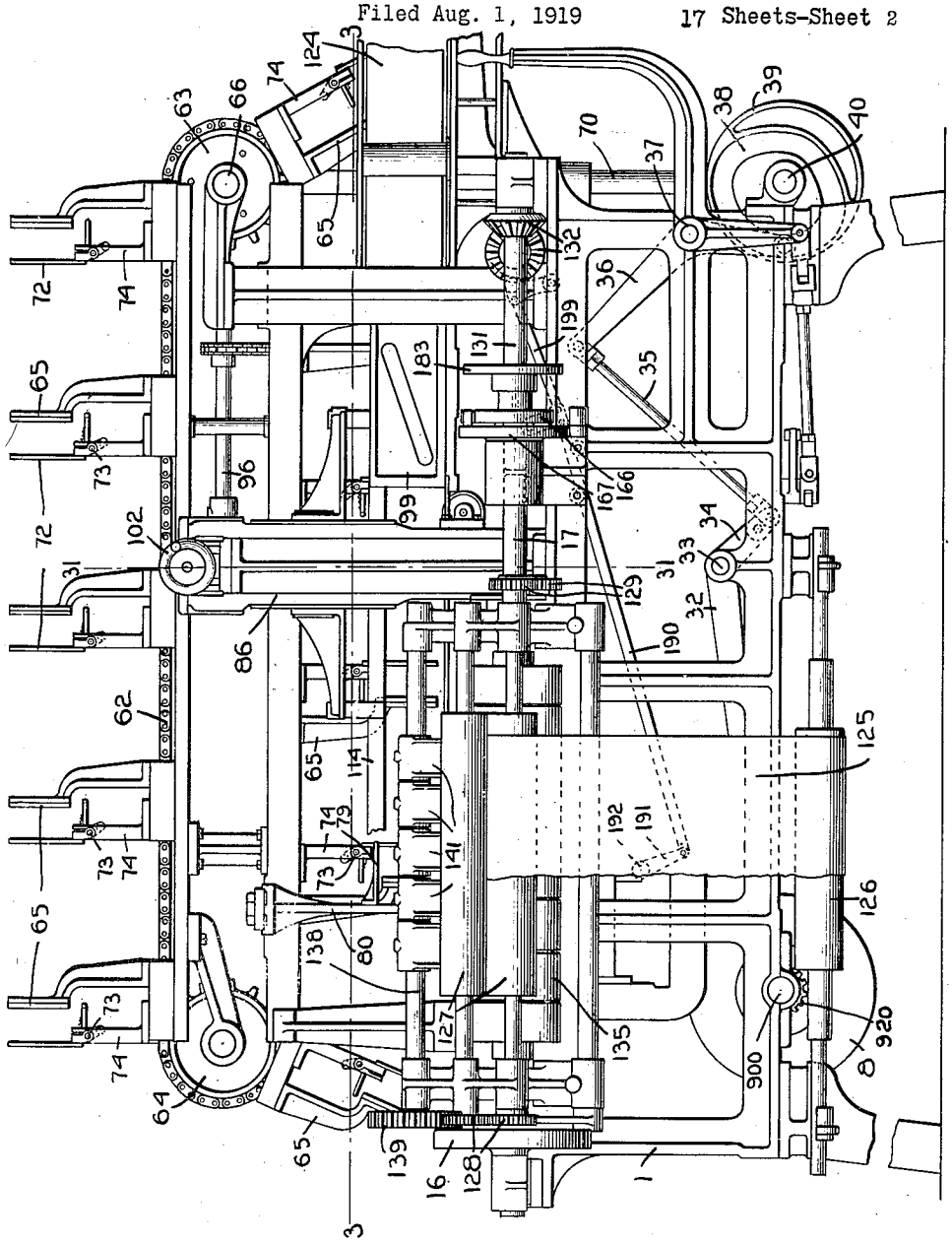


Fig. 2.

Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

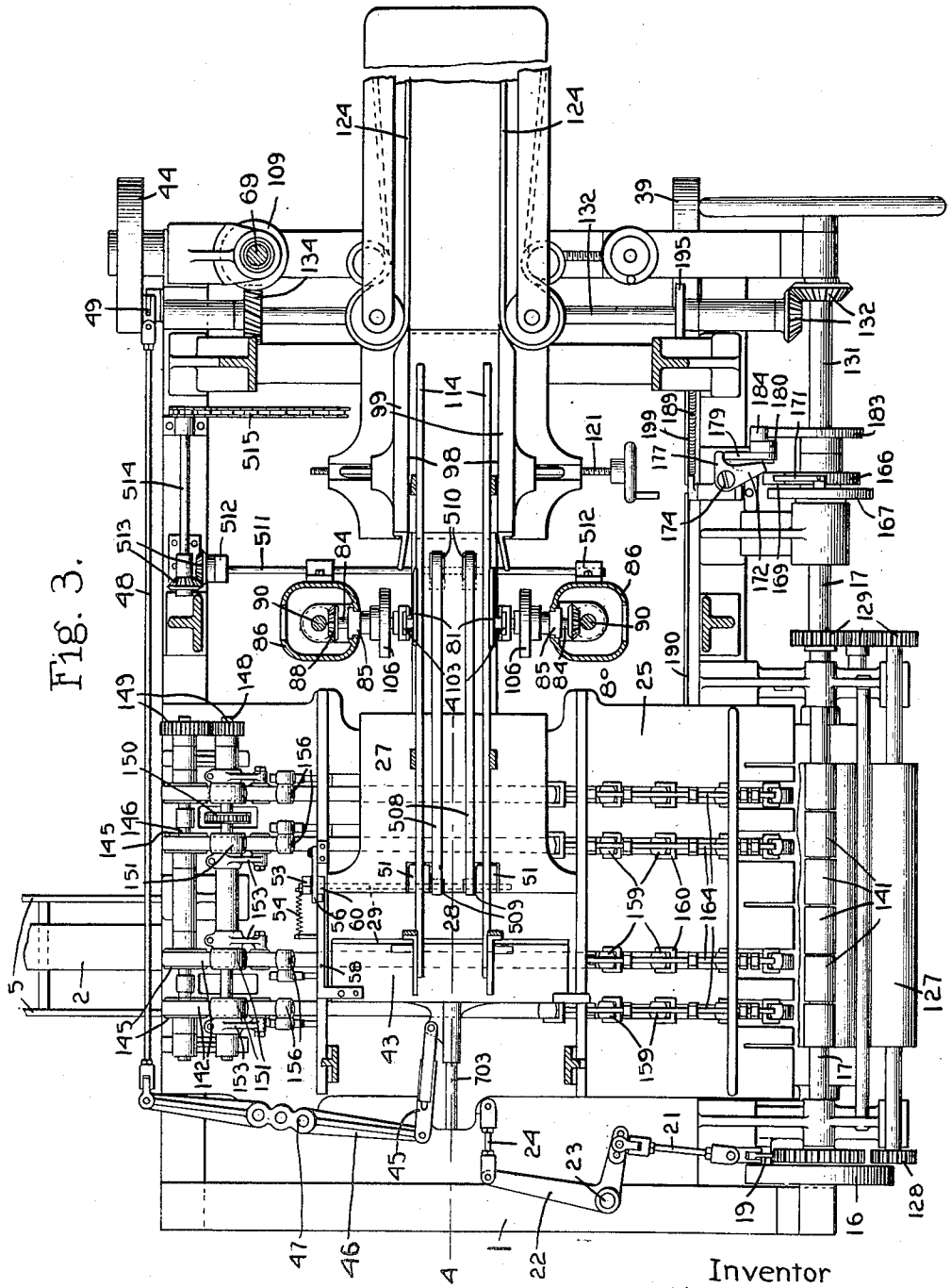
Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 3

Fig. 3.



Inventor
Harry L. Johnson
by Heard Smith & Tennant.
Attys

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 4

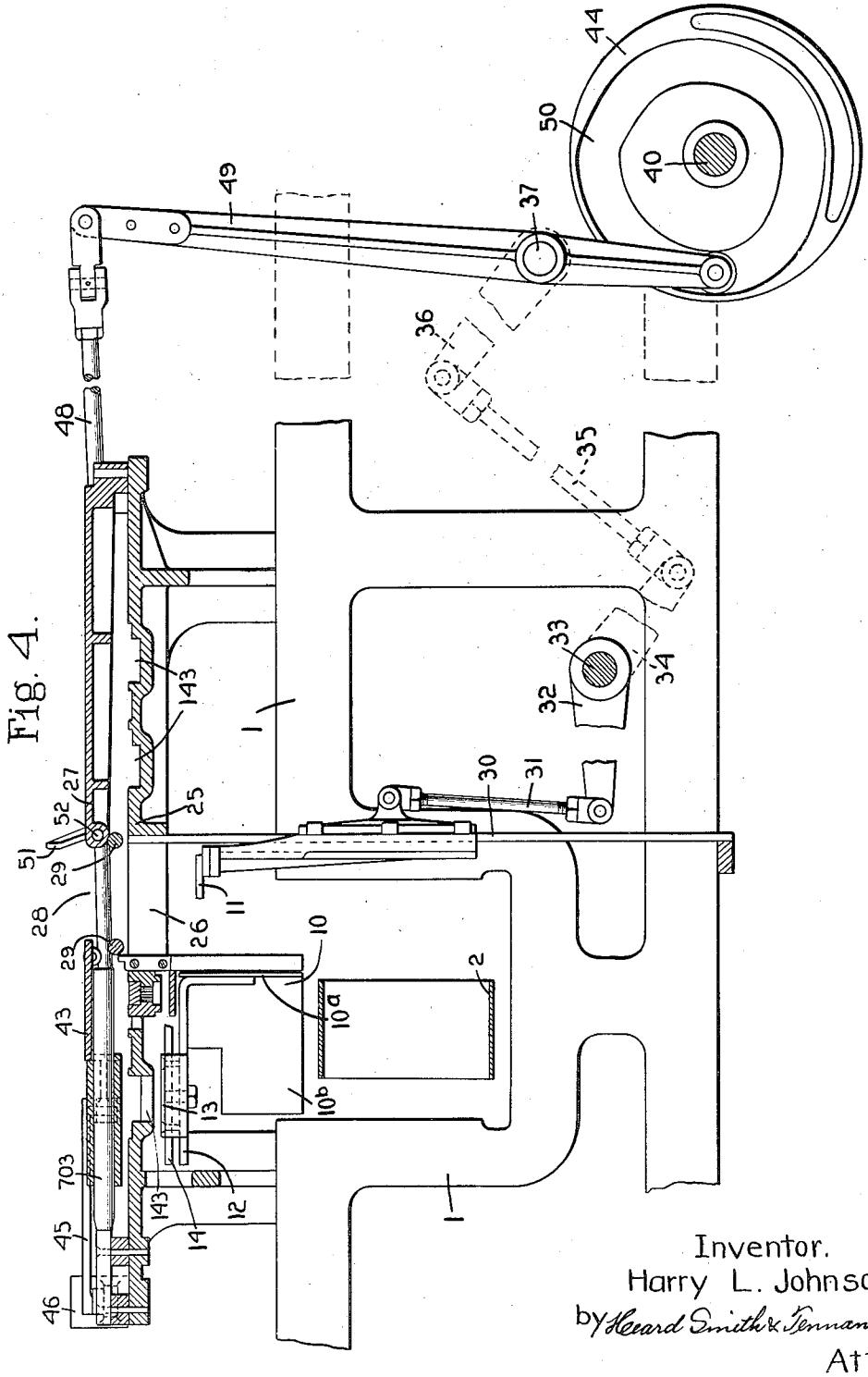


Fig. 4.

Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 5

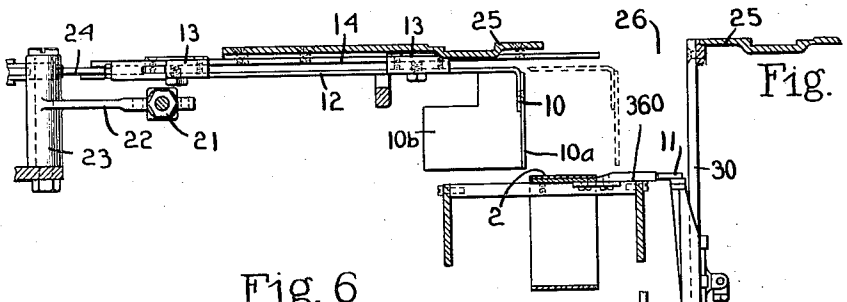


Fig. 5

Fig. 6

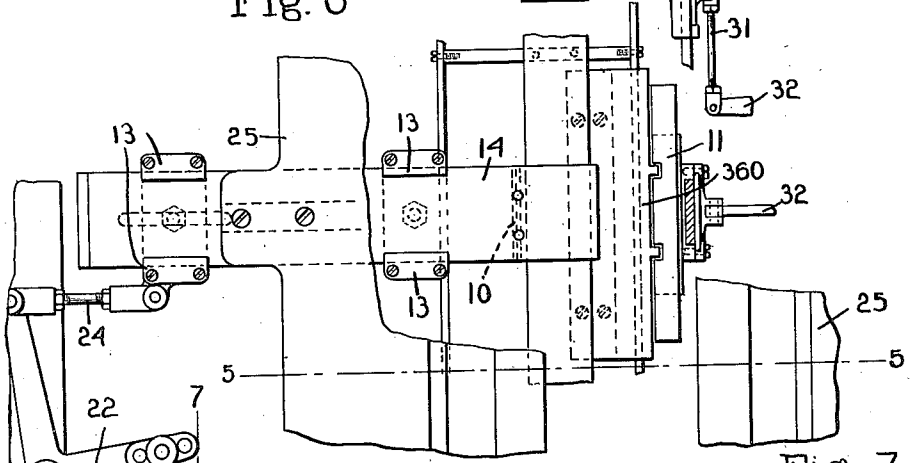
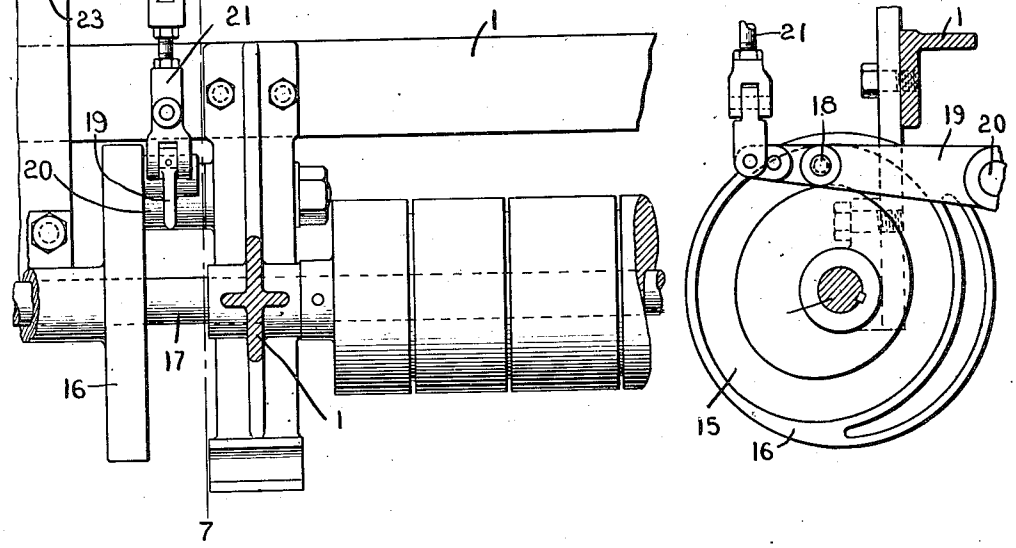


Fig. 7.



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 6

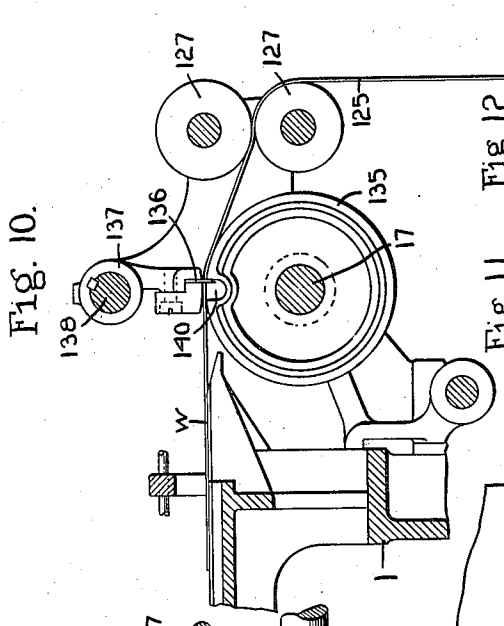


Fig. 10.

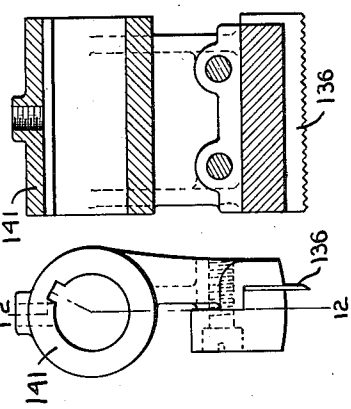


Fig. 12.

Fig. 11.

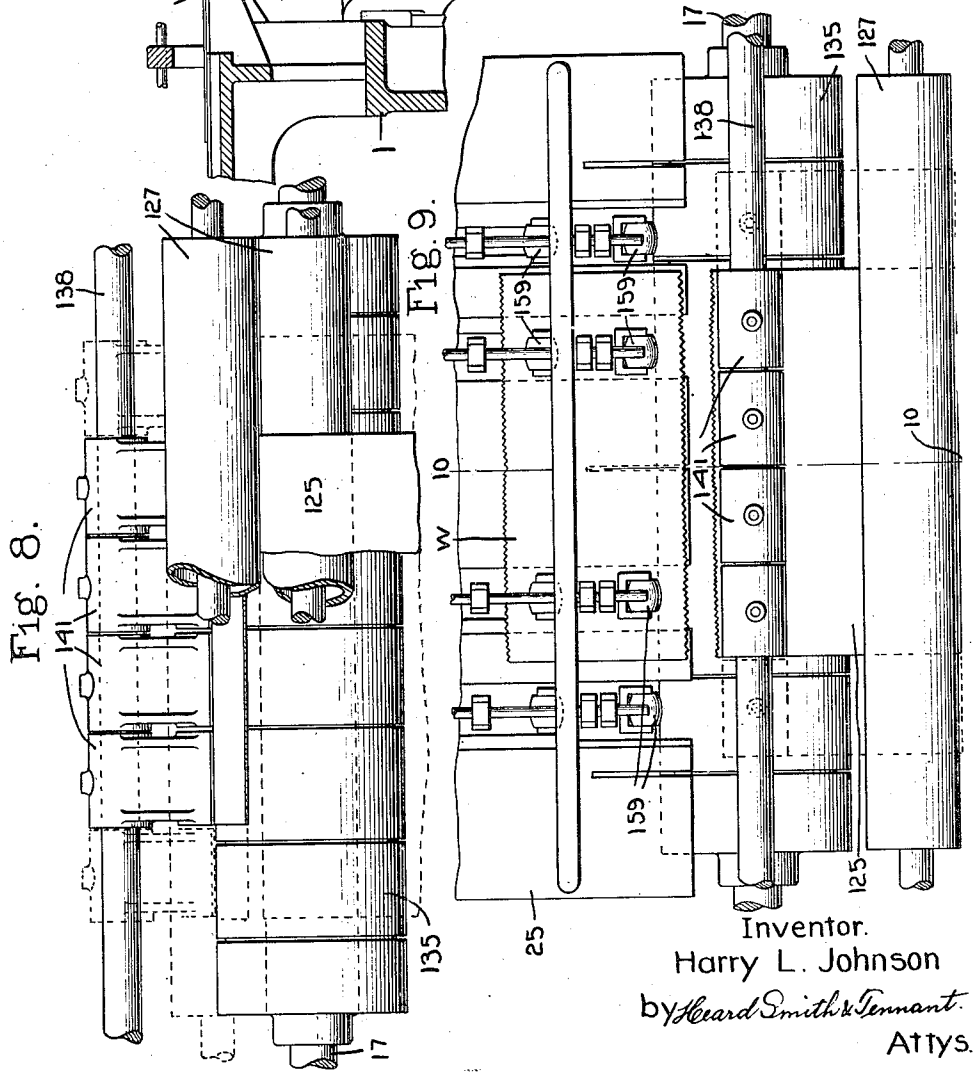


Fig. 8.

Fig. 9.

Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 7

Fig. 13.

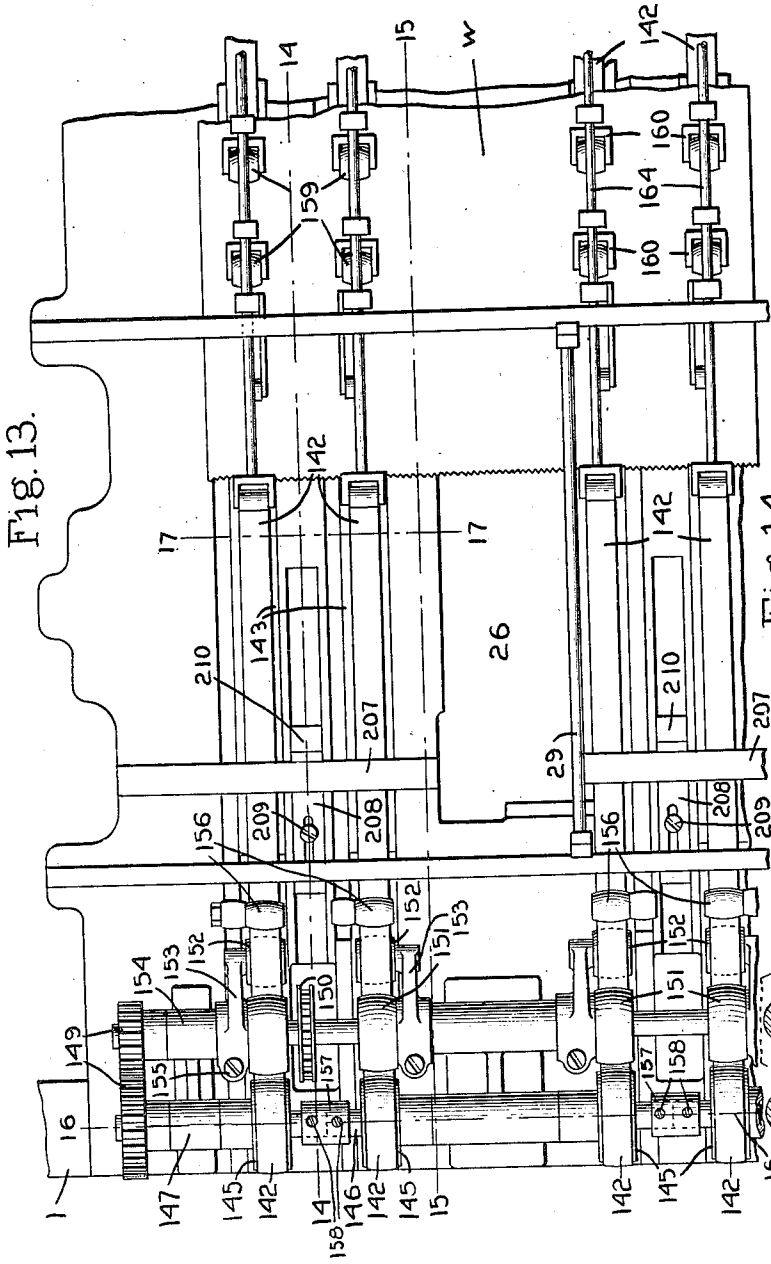
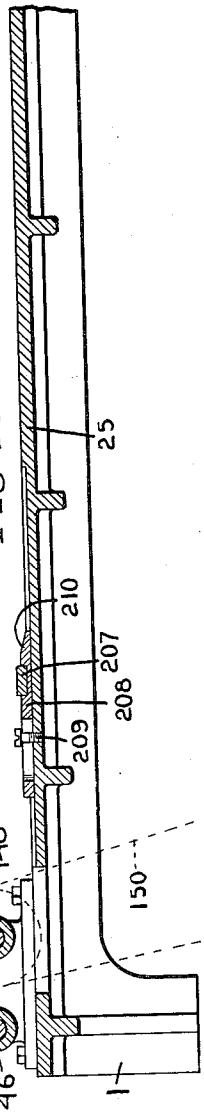


Fig. 14.



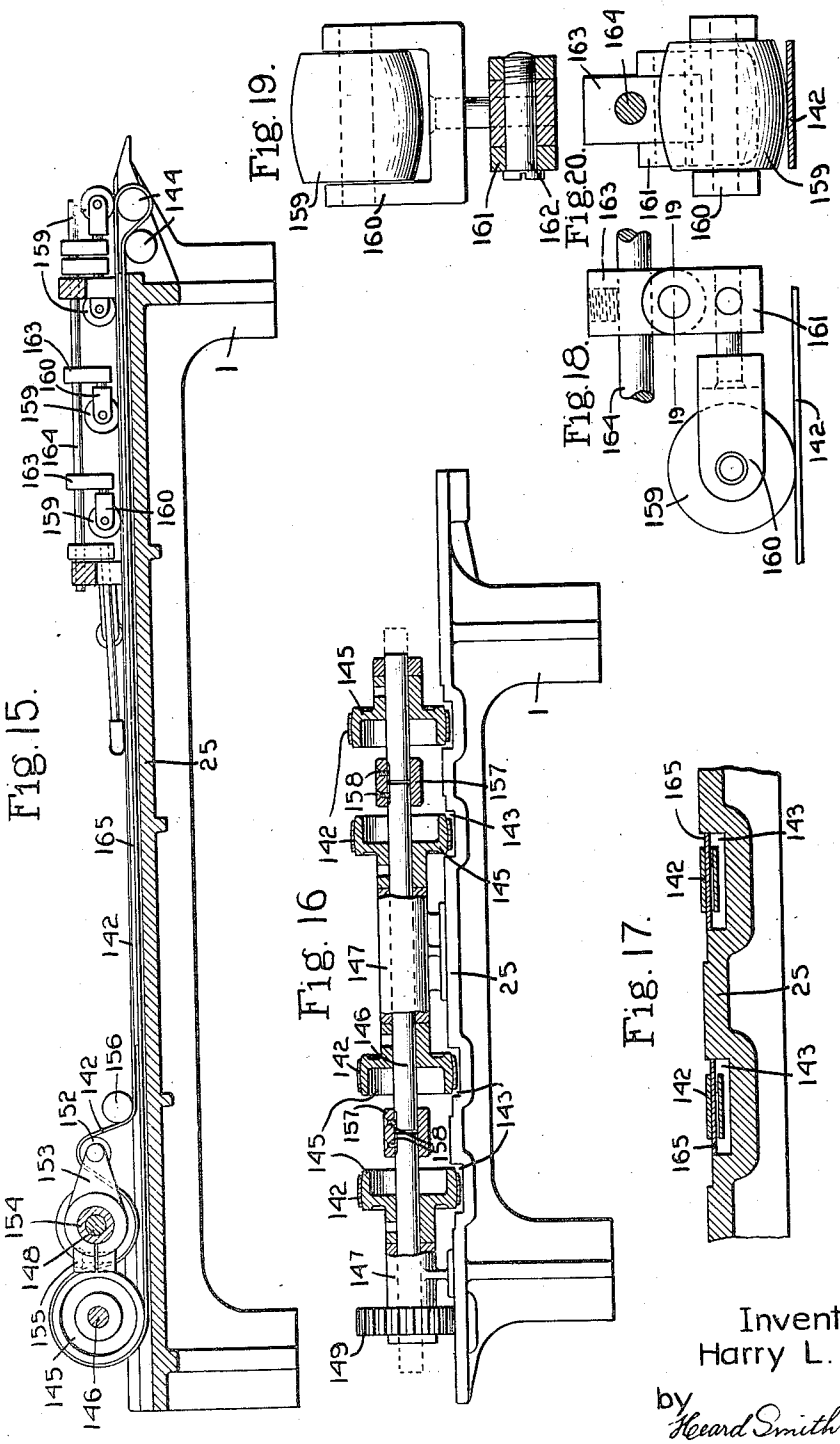
Inventor.
Harry L. Johnson
by Heard Smith & Kennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 8



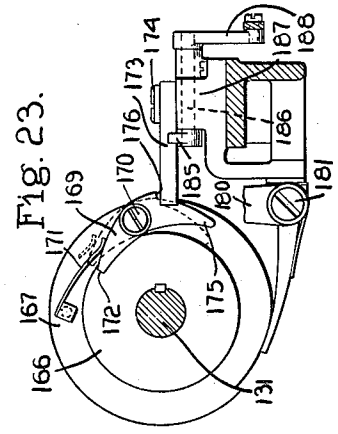
Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

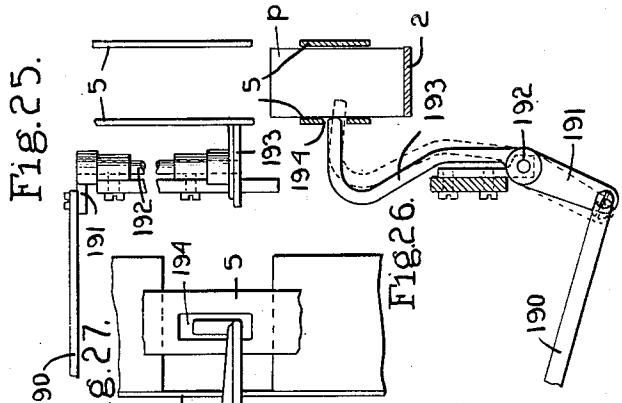
Jan. 15, 1924. 1,481,207

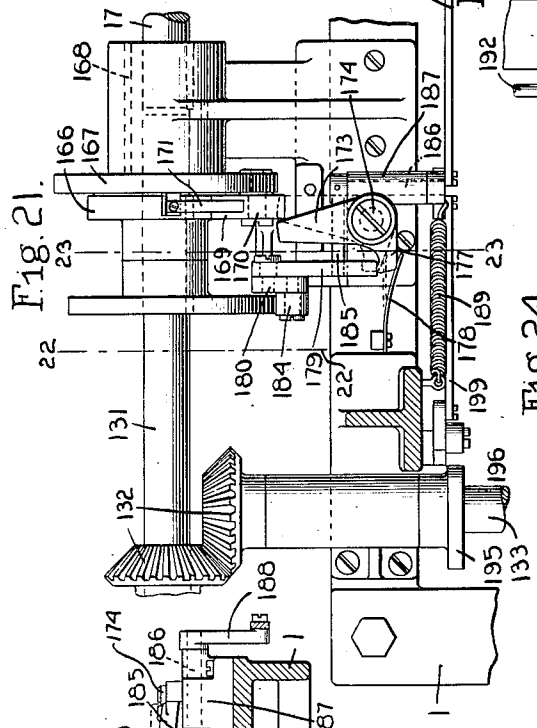
H. L. JOHNSON

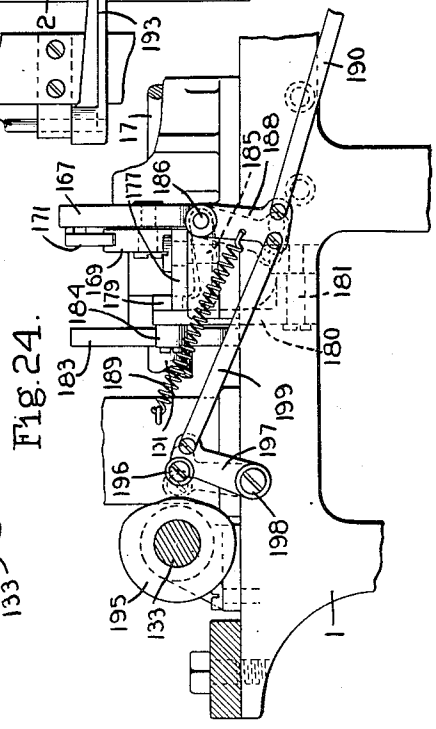
WRAPPING MACHINE

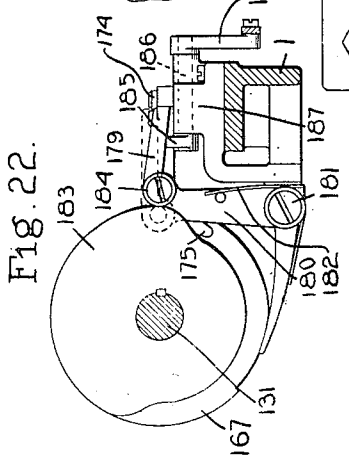
Filed Aug. 1, 1919 17 Sheets-Sheet 9











Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 10

Fig. 28.

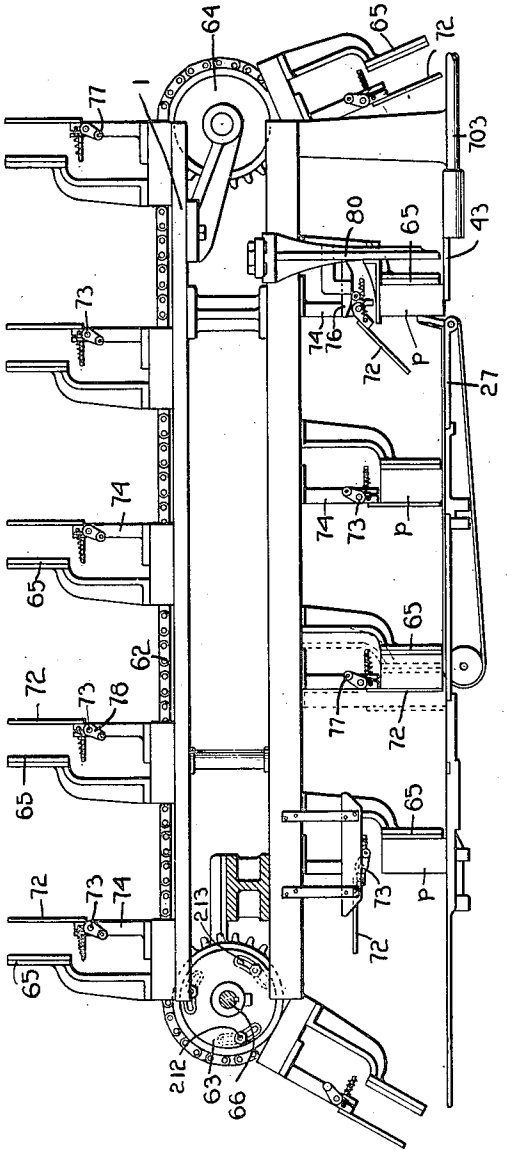


Fig. 30.

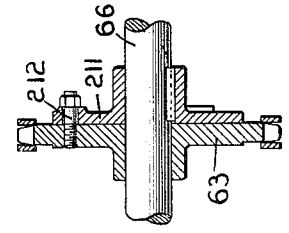
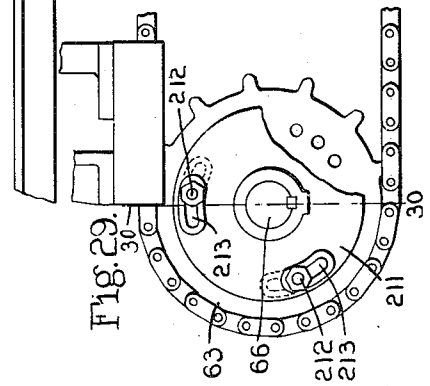


Fig. 29.



Inventor.
Harry L. Johnson
by Heard Smith & Tennant
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 11

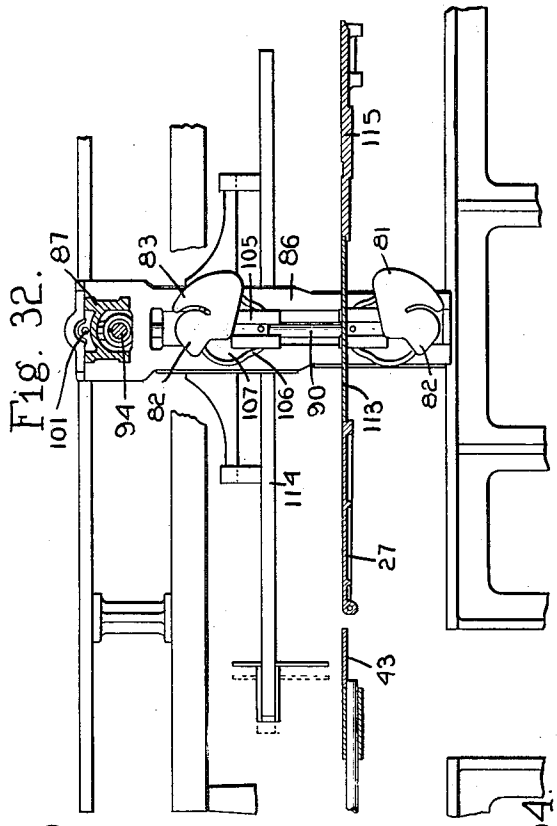


Fig. 32.

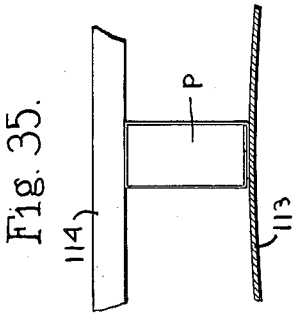


Fig. 35.

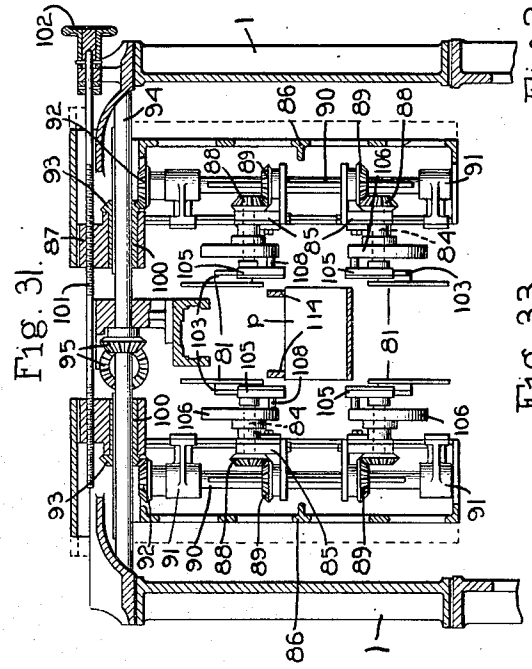


Fig. 31.

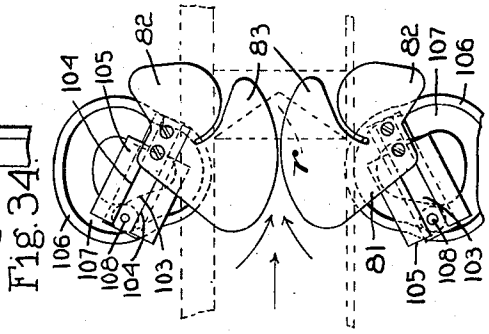


Fig. 34.

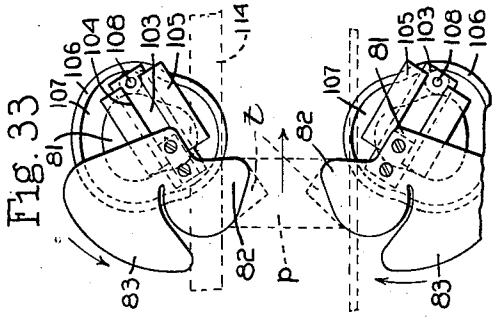


Fig. 33

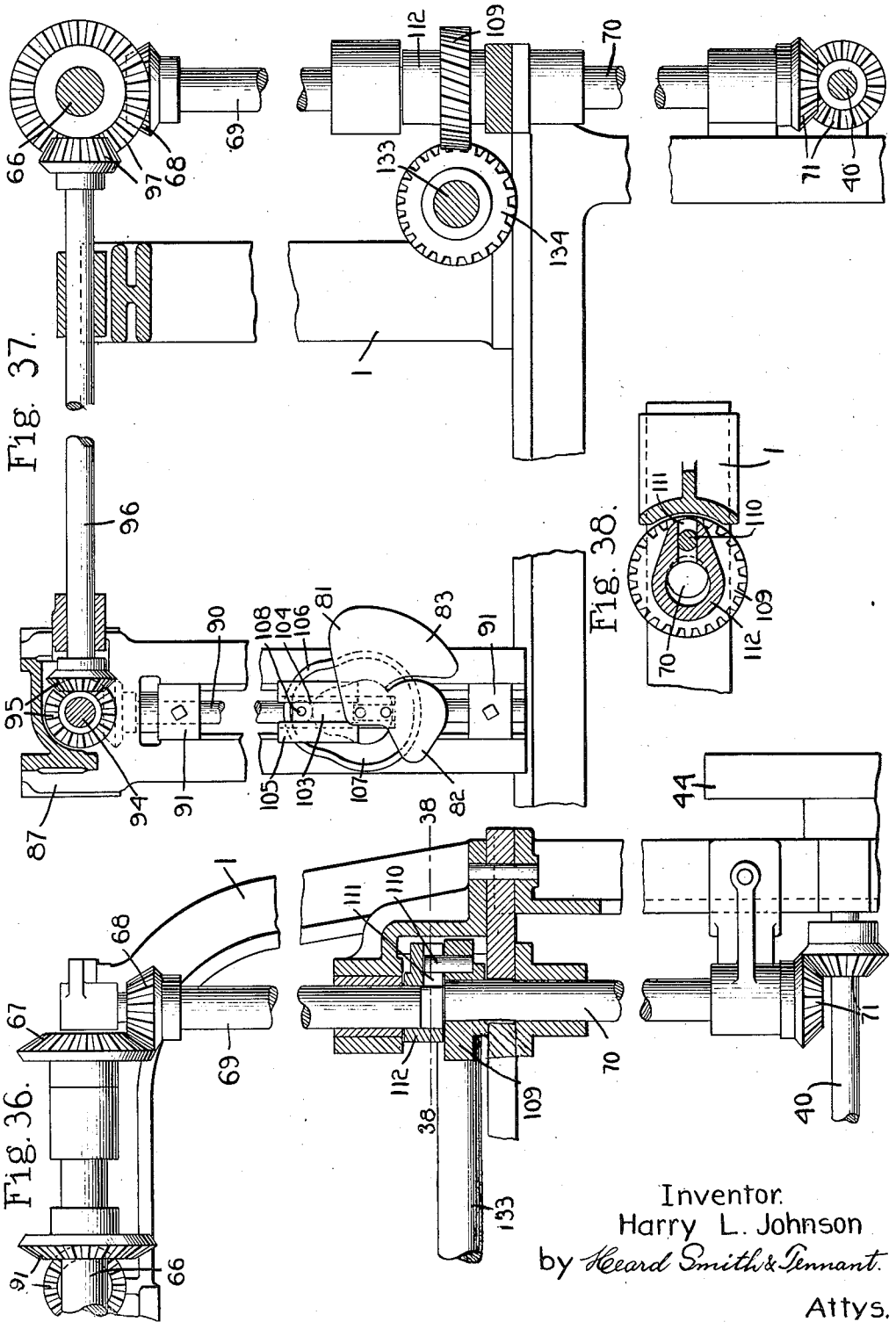
Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 12



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 13

Fig. 39.

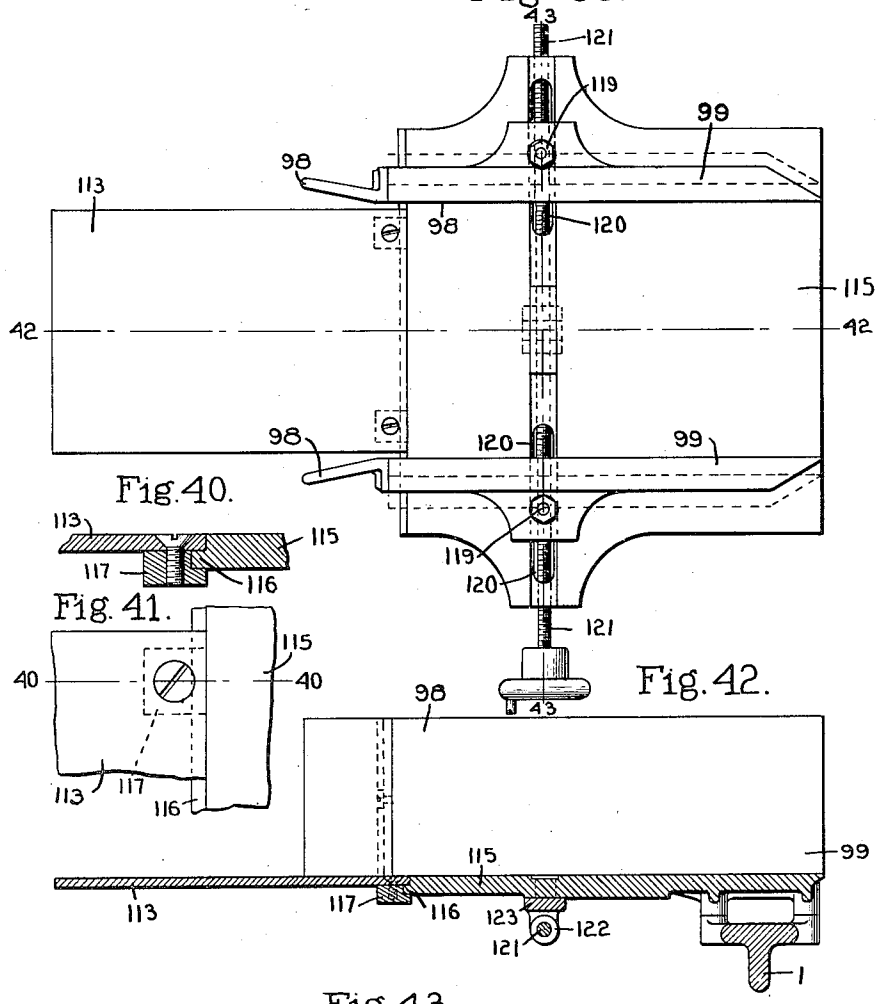
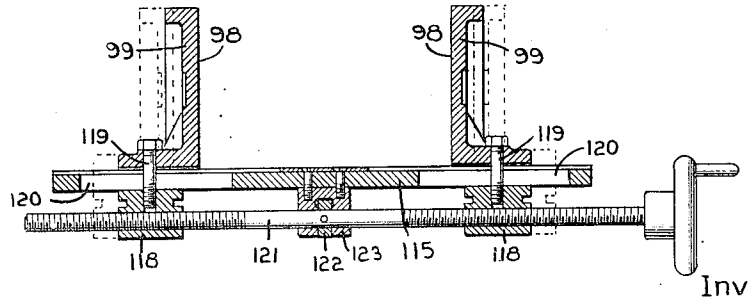


Fig. 40.

Fig. 41.

Fig. 42.

Fig. 43.



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 14

Fig. 44.

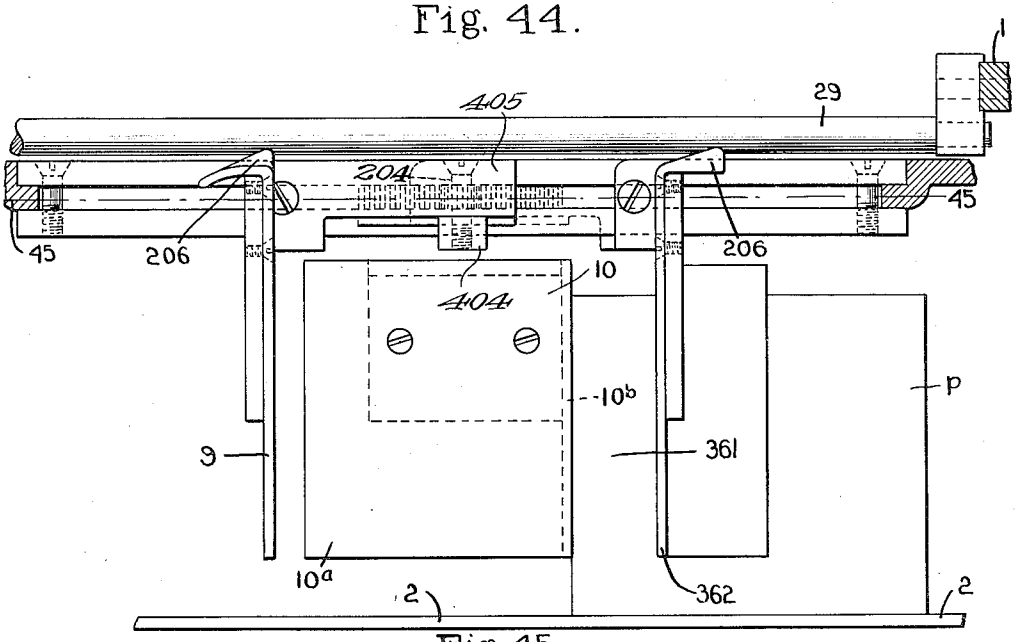
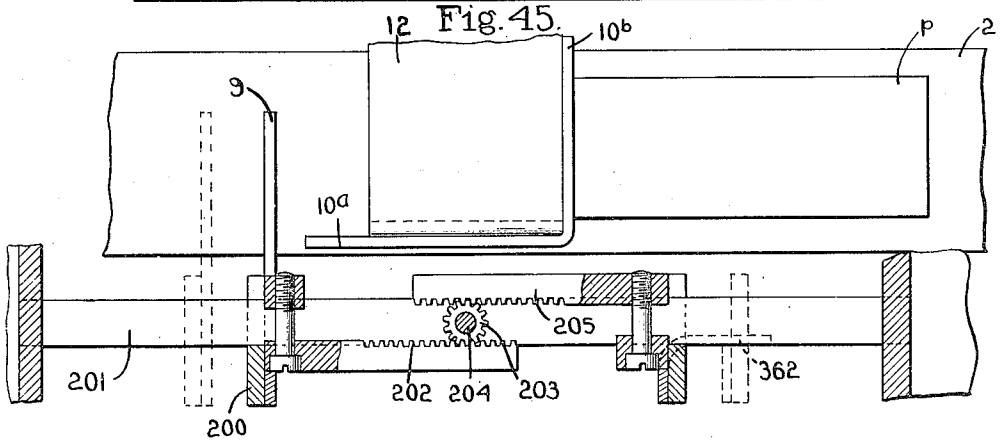


Fig. 45.



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 15

Fig. 46.

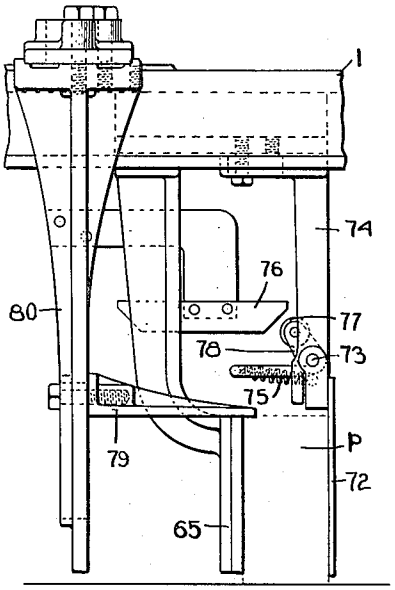


Fig. 47.

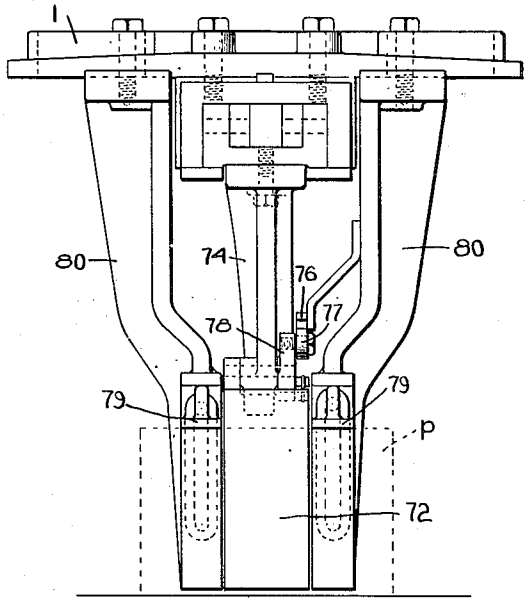


Fig. 48.

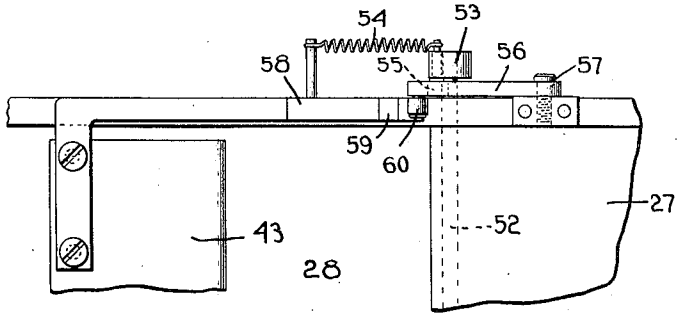


Fig. 49.

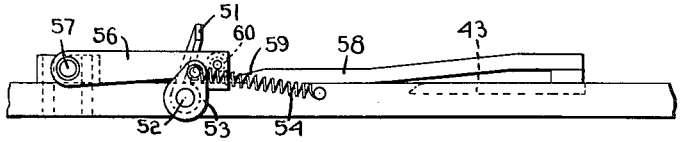
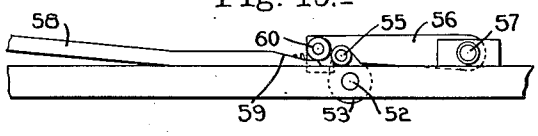


Fig. 49a.



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys.

Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 16

Fig. 50.

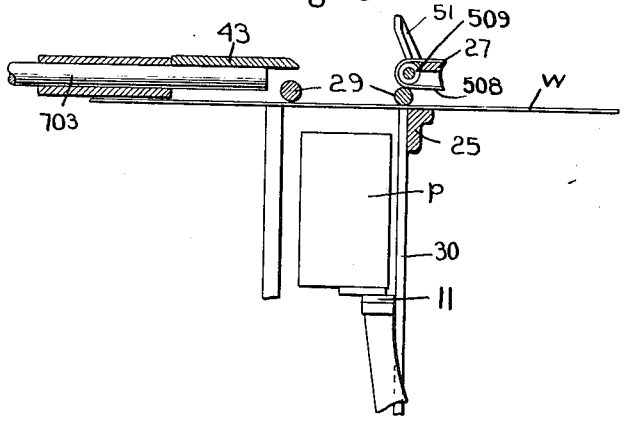


Fig. 51.

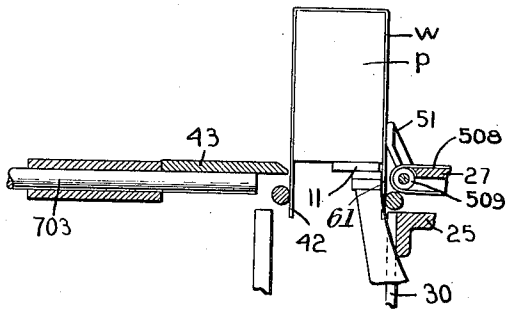


Fig. 52.

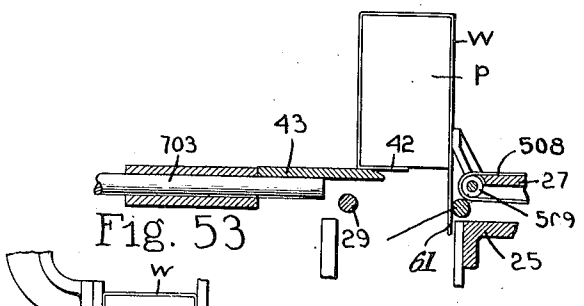
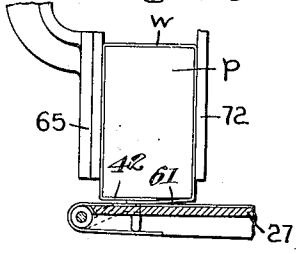


Fig. 53



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.

Attys

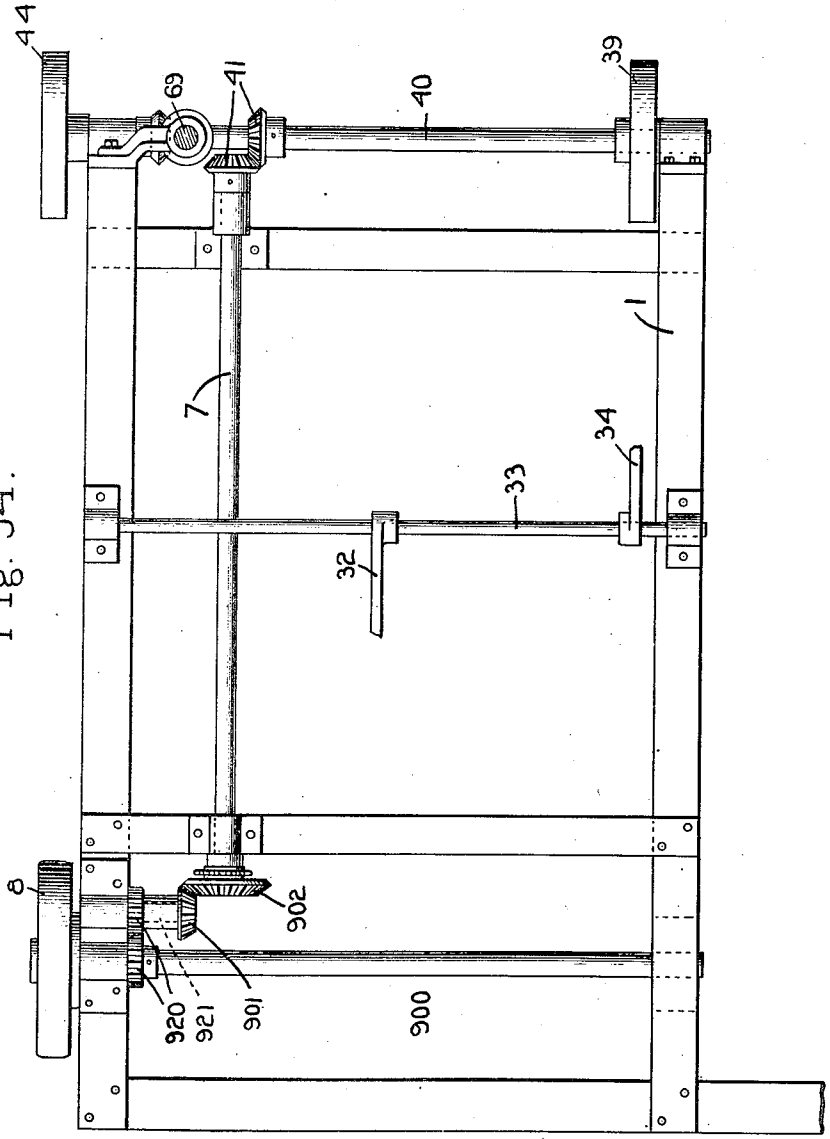
Jan. 15, 1924. 1,481,207

H. L. JOHNSON

WRAPPING MACHINE

Filed Aug. 1, 1919 17 Sheets-Sheet 17

Fig. 54.



Inventor.
Harry L. Johnson
by Heard Smith & Tennant.
Attys

Patented Jan. 15, 1924. 1,481,207

UNITED STATES PATENT OFFICE.

HARRY L. JOHNSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO PERCY E. GINN, OF JAMAICA PLAIN, MASSACHUSETTS.

WRAPPING MACHINE.

Application filed August 1, 1919. Serial No. 314,592.

To all whom it may concern:

Be it known that I, HARRY L. JOHNSON, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Wrapping Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to wrapping machines of that type which are adapted to wrap a sheet of paper about a package, and, if the wrapping paper is a wax paper, to seal wrapped package by softening or melting the wax on the paper at the places where it is folded so as to cause the folded edges to adhere together.

The objects of my invention are to provide an improved machine of this type which has various novel features, all as will be more fully hereinafter set forth.

In order to give an understanding of my invention, I have illustrated in the drawings a selected embodiment thereof which will now be described, after which the novel features will be pointed out in the appended claims.

In the drawings, Fig. 1 is an end view of a machine embodying my invention;

Fig. 2 is a side view thereof;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is a fragmentary sectional view on substantially the line 4—4, Fig. 3;

Fig. 5 is a fragmentary sectional view showing the feeding plunger, said section being taken on substantially the line 5—5, Fig. 6;

Fig. 6 is a plan view of the parts shown in Fig. 5, said figure also showing the means for operating the transferring plunger;

Fig. 7 is a section on the line 7—7, Fig. 6;

Fig. 8 is a detail of the paper-feeding device;

Fig. 9 is a plan view of Fig. 8;

Fig. 10 is a section on the line 10—10, Fig. 9;

Fig. 11 is a side view of one section of the paper-cutting knife;

Fig. 12 is a section on the line 12—12, Fig. 11;

Fig. 13 is a plan view of the paper-feeding and guiding devices;

Fig. 14 is a section on substantially the line 14—14, Fig. 13;

Fig. 15 is a section on the line 15—15, Fig. 13;

Fig. 16 is a section on the line 16—16, Fig. 13;

Fig. 17 is a section on the line 17—17, Fig. 13;

Fig. 18 is a side view of one of the presser rolls for the wax paper;

Fig. 19 is a section on the line 19—19, Fig. 18;

Fig. 20 is a view of Fig. 18 looking toward the right;

Fig. 21 is a plan view of the controlling device for the paper-feeding mechanism;

Fig. 22 is a section on the line 22—22, Fig. 21;

Fig. 23 is a section on the line 23—23, Fig. 21;

Fig. 24 is a side view of Fig. 21;

Fig. 25 is a plan view of the feeler that feels for packages being delivered to the machine and that controls the paper-feeding mechanism;

Fig. 26 is an end view of Fig. 25;

Fig. 27 is a side view of Fig. 25;

Fig. 28 is a detail side view of the conveyor which carries the packages through the folding mechanism;

Fig. 29 is a detail of the driving sprocket for the conveyor;

Fig. 30 is a section on the line 30—30, Fig. 29;

Fig. 31 is a section on substantially the line 31—31, Fig. 2;

Fig. 32 is a section taken on a vertical line substantially centrally of Fig. 31;

Figs. 33 and 34 are views showing the operation of the end folders;

Fig. 35 shows the character of the support for the package at the point where the end folders operate;

Fig. 36 is a detail view showing the driving mechanism for the end folders;

Fig. 37 shows the same mechanism looking to the right, Fig. 36;

Fig. 38 is a section on the line 38—38, Fig. 36;

Fig. 39 is a plan view of the heater for sealing the package;

Fig. 40 is a section on the line 40—40, Fig. 41;

Fig. 41 is a plan view of Fig. 40;

Fig. 42 is a section on the line 42—42, Fig. 39;

Fig. 43 is a section on the line 43—43, Fig. 39;

Fig. 44 is a detail view of the positioning stop for the packages on the feeding-in belt and the means for adjusting it;

Fig. 45 is a section on the line 45—45, Fig. 44;

Fig. 46 is a detail view of a portion of the conveyor;

Fig. 47 is an end view of Fig. 46;

Fig. 48 is a fragmentary view of the device for folding one end of the wrapper about the package;

Fig. 49 is an end view of Fig. 48;

Fig. 49[a] is a view of Fig. 48 looking from the opposite side from that shown in Fig. 49;

Figs. 50, 51, 52 and 53 are diagrammatic views showing various steps in the operation of folding the wrapper about the package;

Fig. 54 shows the arrangement of shafting for driving the different parts of the machine.

The complete machine herein illustrated comprises a feeding-in belt by which the packages are fed into the machine, a transferring plunger for transferring the packages singly from the feeding-in belt to a feed plunger, said feed plunger which elevates the packages through an opening in the bed of the machine, paper-feeding devices which feed sheets of wax paper over the feed plunger and beneath the opening in said frame so that when the feed plunger raises the package through the opening the sheet of wax paper is carried up through the opening with the package, and during its operation is wrapped about three sides of the package by the sides of the opening, folding instrumentalities which fold the edges of the paper about the bottom of the package and also fold the ends of the paper about the ends of the package, and a heater which heats the folded portions of the paper sufficiently to soften the wax thereon so as to seal the package.

The operative parts of the machine are carried by a suitable framework indicated generally at 1. The feeding-in belt which feeds the packages *p* into the machine is indicated at 2, and it passes around two direction pulleys 3 and 4 and has at each side thereof guide members 5 between which the packages *p* are carried by the belt. The belt may be driven in any suitable way, but I have herein shown the pulley 4 as positively driven from a sprocket chain 6 which passes around a sprocket wheel rigid with the pulley 4 and which is actuated by a sprocket wheel on a driving shaft 7 that extends longitudinally of the frame. Said shaft 7 is shown as being driven from a driving pulley 8 carried by a shaft 900 that is geared by means of gears 920 to a shaft 921 that has a bevel gear 901 thereon meshing with a bevel gear 902 on the shaft 7.

Situated at the inner end of the feeding-in belt is a transferring plunger 10 which moves transversely of the belt and by its movement transfers the end package *p* on the belt from the belt to the feed plunger 11 which has a vertical movement. The transferring plunger 10 has the front vertical face 10[a] which acts against the package to push it from the feeding-in belt 2 onto the feed plunger, and the side face 10[b] which is situated over the belt when the plunger is in the forward position shown in Fig. 45 and in dotted lines Fig. 5. This side face 10[b] acts as a stop for the packages *p* on the feeding-in belt and holds the package in position until the transferring plunger is withdrawn. When said transferring plunger is in its retracted position shown by full lines, Fig. 5, then the packages on the belt 2 will be fed forward until the foremost package strikes the stop 9. This stop properly positions the foremost package so that on the next forward movement of the transferring plunger said foremost package will be pushed from the feeding-in belt onto the vertically-moving feed plunger 11.

Situated between the feeding-in belt 2 and the plunger 11 is a supporting platform 360 which partially supports the package *p* when it is in position on the feed plunger. In passing onto the feed plunger the package is pushed through an opening 361 (see Fig. 44) between the stop plate 9 and a guide plate 362, said opening constituting a sort of guide opening for the packages as they are delivered to the plunger.

The transferring plunger 10 is carried by a slide 12 which is provided with guiding ears 13 that embrace and are guided by a guide-plate 14 (see Figs. 5 and 6) carried by the frame, and said slide is actuated from a cam groove 15 formed in a cam 16 fast on a shaft 17 forming an element of the paper-supply device, as will be presently described. The cam groove 15 receives a stud 18 carried by a lever 19 pivoted to the frame at 20 and connected by a link 21 with an elbow-lever 22 pivoted to the frame at 23. This elbow-lever is connected by another link 24 to the slide 12 so that at every revolution of the shaft 17 the transferring plunger will be given a complete forward and backward reciprocation. It will be noted that this transferring plunger is actuated from the shaft 17 forming part of the paper-supplying means, and hence will only be actuated as the paper-supplying means is operating. The purpose of this will be presently described.

As stated above, the transferring plunger 10 in moving from the full to the dotted line position, Fig. 5, carries a package *p* from the belt 2 onto the feed plunger 11. This feed plunger and belt are situated be-

neath the bed of the machine which comprises the lower plate 25 having an opening 26 therein and an upper plate 27 also having an opening 28 therein. The upward movement of the feed plunger 11 carries the package upwardly through the openings 26, 28 into a position above the upper plate 27, and as each package is thus elevated through the openings 26, 28, it is taken by the conveyor and carried to the end folders, as will be presently described.

The paper-feeding devices which will also be presently described are arranged to feed sheets of wrapping paper *w* into position between the two bed plates 25 and 27 and over the opening 26, and as a result, when the elevator 11 elevates the package through the openings 28, it will carry the wrapping paper *w* upwardly through the opening 28, as indicated in Fig. 51 thereby folding the wrapping paper *w* about three sides of the package.

29 indicate rolls placed at opposite edges of the opening and spaced apart a distance equal to the width of the package so that as the package *p* with its wrapping paper *w* is forced up through the opening 28, the rolls 29 will engage the sides of the package and hold the paper in close contact therewith, thus folding the paper about three sides of the package.

The feed plunger 11 is herein shown as guided in its reciprocations by a guiding member 30 and as being connected by a link 31 to an arm 32 fast on a rock-shaft 33 which extends transversely of the frame, said rock-shaft having another arm 34 fast thereon which is connected by a link 35 to a lever 36 pivoted to the frame at 37 and having a projection or roll which is received in a cam groove 38 in a cam member 39 carried by the shaft 40, see Fig. 2. Said shaft 40 extends transversely of the frame 1 and is geared to the shaft 7 by suitable bevel gears 41 (see Fig. 54). The elevating plunger will thus be reciprocating in a vertical direction so long as the shaft 7 is operating.

After each package has been raised into the position shown in Fig. 51 thereby to wrap the sheet of paper *w* around three sides of the package, the edge 42 of the paper *w* is folded underneath the bottom of the package by means of an edge folder 43. This edge folder is in the form of a plate which is mounted on the frame for horizontal movement, and it is actuated in proper timed relation with the other parts of the machine so that after the package is raised into the position shown in Fig. 51, the folder 43 moves forwardly, and in doing so forces the edge 42 of paper beneath the package, as shown in Fig. 52. This edge folder is illustrated in Figs. 3, 48 and 49, and it is actuated from a cam member 44 fast on the shaft 40. For this purpose said folder is connected by a link 45 to a lever 46 pivoted to the frame at 47 and connected in turn by a link 48 to a lever 49 having a projection entering a cam groove 50 in the cam 44. The edge folder 43 is guided in its reciprocations by a guide member 703. The lever 46 is provided with a plurality of holes for receiving the pivot 47 so that by shifting the lever into different positions relative to the pivot, the extent of movement of the edge folder 43 can be varied. This provides for operating on packages of different sizes.

Situated at the rear of the opening 28 above the bed 27 and at the opposite side of said opening from the edge folder 43 are two guide fingers 51, see Figs. 4, 48 and 49, which are fast on a rock-shaft 52, said rock-shaft having an arm 53 fast thereon to which is connected a pulling spring 54. Said arm 53 is also provided with a pin 55 adapted to be received in a notch formed in a locking latch 56 pivoted at 57 to the frame. Said locking latch normally holds the fingers 51 in their elevated position so that when the package *p* is elevated through the opening 28, said fingers will press against the back side of the package and will hold the wrapping paper *w* firmly in contact with the package.

After the edge 42 of wrapping paper has been folded underneath the package, as shown in Fig. 52, the package is then engaged by the conveyor, presently to be described, and moved over the bed plate 27. Means are provided whereby the guide fingers 51 are unlocked just before the package is carried backwardly onto the bed 27 by the conveyor, and in the construction shown, this unlocking of the fingers is accomplished by the folding movement of the edge folder 43. Said folder 43 is provided with an arm 58 having a cam or beveled surface 59 thereon, and as the folder is given its folding movement the cam surface 59 of said arm passes under a roll 60 carried by the locking latch 56 and raises said latch sufficiently to disengage it from the pin 55. This unlocks the fingers 51 so that when the package *p* is carried onto the bed plate 27 by the conveyor, said fingers can swing downwardly into a horizontal position to allow the packages to pass over them. During this movement of the package the edge 61 of the paper is folded underneath the package, as shown in Fig. 53, by the edge of the opening 28, the yielding pressure of the fingers 51 against the bottom of the package assisting in this folding operation. As soon as the package has passed over the fingers 51, the spring 54 returns them to their upright position where they become automatically locked by the latch 56.

At this stage of the operations the wrapping paper is wrapped about the four sides

of the package *p* as indicated in Fig. 53, but not about the ends thereof. This wrapping of the paper about the ends of the package is accomplished by end folders and the packages are carried from the elevator to the end folders by means of a conveyor situated above the plate 27 and which comprises an endless-chain element 62 which passes around a driving sprocket 63 and an idle sprocket 64 carried by the frame 1 and which carries a plurality of pushers 65 that are adapted to take the packages from the elevator and move them backwardly to the end folders. The driving sprocket 63 is driven from the shaft 40 by the mechanism shown in Figs. 36 and 37. This sprocket is fast on a shaft 66 which extends transversely of the machine and which is provided at its end with a bevel gear 67 meshing with a bevel gear 68 on a vertical shaft 69, said shaft being connected to and driven from another vertical shaft 70 which in turn is geared to the shaft 40 by the bevel gears 71. Each pusher has associated therewith a clamping member 72 which is adapted to engage the opposite side of the package from that which the pusher engages and which clamps the package against the pusher as it is being carried along by the conveyor. The object of these clamping members 72 is to hold the paper firmly wrapped about the sides of the package while the package is being fed to the end folders. Each clamping member 72 is pivotally mounted at 73 to an arm 74 rigid with the pusher, and each clamp is acted on by a pulling spring 75 which tends to hold it in operative position in parallelism with the pusher. Means are provided whereby as each pusher comes into position over the opening 28 the corresponding clamp 72 will be swung out of the way so as not to interfere at all with the elevating movement of the package caused by the feed plunger 11. This is accomplished herein by providing a stationary cam 76 situated to engage a roll 77 on an arm 78 rigid with the clamping member 72 so that as each clamping member passes under the cam 76, the latter will through its action on the arm 78 swing the clamping member upwardly into a horizontal position. The clamping member will be held in this position so long as the roll 77 is in engagement with the cam 76 and when the roll passes out from under the cam, the spring 75 will swing the clamping member downwardly into engagement with the package, as shown in Fig. 46. The clamping member 72 is thus held in its elevated position while it is passing over the opening 28, and hence it will pass over the package and allow the package to be engaged by the pusher 65. As soon as the package has fairly engaged the pusher 65, the arm 78 passes out from under the cam 76 to allow the clamping member to swing into its operative clamping position.

Situated above the opening 28 is a fixed arm 79 carried by a bracket 80 secured to the frame, said arm being preferably adjustably secured to the bracket so that its vertical position can be changed. This arm 79 will be so placed that when the package is elevated through the opening 28, the top side of the package will come into contact with the arm and the package will thus be firmly held between the elevator and the arm 79 until it is taken by the pusher 65. After the package has been taken by the pusher and the clamp 72 has moved into operative position, then the package will be firmly held between the pusher and clamp as it is carried forward to the end folding devices. The end folding devices which fold the wrapper about the ends of the package are of the rotary type which are arranged in pairs, one pair of folders being employed at each end of the package. These end folders are shown in Figs. 32, 33, 34 and 37, and they are indicated generally at 81. Each folder comprises a nose portion 82 which folds the top or bottom flap of the portion of the wrapper which projects beyond the end of the package, and the wing portion 83 which folds the side flap of said projecting portion. Each folder is carried by a horizontal shaft 84 which is journaled in a suitable bracket 85 supported in a hollow leg 86 which depends from a carriage 87. The shaft 84 of each holder has a bevel gear 88 thereon which meshes with a bevel gear 89 on a vertical shaft 90 that is journaled in bearings 91 carried by the hollow leg 86. Each shaft 90 is provided with a bevel gear 92 at its upper end which meshes with a bevel gear 93 on a shaft 94 extending transversely of the frame. The shaft 94 in turn is driven by bevel gears 95 from a shaft 96 extending longitudinally of the machine and which in turn is driven by bevel gears 97 from the shaft 66. The gearing is so timed that the folders rotate in timed relation with the movement of the pushers 65. The operation of these folders on a package is indicated in Figs. 33 and 34, in which the arrows indicate the direction of movement of the package and the direction of rotation of the folders.

When the package approaches the end folders, the end flaps of the wrapper *w* project beyond the ends of the package, and as the package moves past the folder the nose portions 82 of the folders engage the top and bottom flaps *t* and fold them downwardly against the end of the package, and as the package continues its forward movement and the folders continue their rotation the wings 83 engage the rear side flap *r* and fold it onto the top and bottom flaps as

usual in wrapping machines having folders of this type. The other side flap at each end of the package is folded by engagement with the side walls 98 of the heater 99 into which the package is carried from the end folder.

I have provided herein suitable means for adjusting the end folders on opposite sides toward and from each other to accommodate packages of different length and also for adjusting the folders of each pair toward and from each other to accommodate packages of different heights.

The lateral adjustment of the folders is accomplished by making the carriages 87 capable of sliding longitudinally of the shaft 94. Each of the bevel gears 93 is formed on a sleeve 100 which is journaled in the carriage 87, said sleeves being splined to the shaft 94. The carriages 87 are engaged by an adjusting screw 101 having a right-hand threaded engagement with one carriage and a left-hand threaded engagement with the other carriage so that by turning said adjusting screw 101 by means of the hand-wheel 102 thereon the carriages will be moved toward and from each other as indicated by the dotted lines in Fig. 31.

Since the folders and the vertical shafts 90 for driving them are mounted in the legs 86 depending from the carriages the adjustment of the carriages will adjust the folders bodily toward and from each other. The adjustment of the folders of each pair relative to each other in a vertical direction is provided for by making the brackets 85 vertically adjustable in the legs 86.

It will be noted that the folders rotate and therefore that the folding portions 82 and 83 thereof are travelling in a circular path while the package during the folding operation is moving in a straight line path. This difference in the direction of movement of the package and the folding portions of the folders is apt to cause a displacement or wrinkling of the paper during the folding operation. To avoid this and to provide a folder which will make a perfect fold at the end of the package, I have provided novel means whereby the folder is given a longitudinal as well as rotary movement so that the nose portion 82 of each folder is given a movement in the direction of the travel as well as its rotary movement while it is folding the top or bottom flap t so that it will not only move downwardly as required to effect the folding, but will also move with the package in a longitudinal direction without roughing up the fold, and I have also provided means whereby the wing portion 83 is given a quick forward movement in a substantially straight line to fold the rear side flap r. Further, the means for feeding the packages during the folding operation is constructed so that the packages will have a slower movement while the folding operation is being accomplished than between such folding operations.

For giving this variable movement to the folders, I provide the following mechanism:

Each end folder 81 is carried by a block or slide 103 which is slidably mounted in a groove or way 104 formed in a head 105 that is fast on and rotates with the shaft 84. Each bracket 85 has fast thereon a controlling cam 106 provided with a cam groove 107 which receives a pin or projection 108 extending from the slide or block 103. As the shaft 84 rotates the folder will rotate therewith and at the same speed of rotation because said folder is carried by the head 105 on the shaft. As the folder rotates the pin or projection 108 extending therefrom will travel around the cam groove 107 and the folder will thus be given a sliding movement back and forth in the ways 104. The construction of the parts is such that when the folder is in the position shown in Fig. 33 and the nose 82 of the upper folder is moving downwardly and that of the lower folder moving upwardly to fold the top and bottom flaps t, the pin 81 will be moving away from the center of rotation, thus drawing the nose portions 82 toward the center of rotation. This combined movement serves to cause the noses 82 to travel in a flat arc or in a line approximating a horizontal line. The result is that these nose portions move toward each other to fold the top and bottom flaps, and then move in substantially a horizontal line from the position shown in Fig. 33 to that shown in Fig. 34. When the wing portions 83 are swung into the position midway between the position shown in Figs. 33 and 34 and thus begin to fold the rear flaps r, the pin 108 is moving down the left-hand side of the groove 107 and thus is giving the folder a bodily movement to the right in addition to its rotary movement. The result is that the wings 83 will have a rapid horizontal movement in a flat arc or approximately straight line thereby to quickly fold the rear flap. The action of the folders on the flaps, therefore, is such as to fold the flaps correctly without danger that the rotative movement of the folders will displace the folded flaps due to the difference in direction of movement of the folders and the package.

I have stated above that the speed of feeding movement of the conveyor is varied during the folding operation on each package. This is herein accomplished by connecting the shaft sections 69 and 70 with a connection which produces a variable rotatable movement of the shaft section 69, such connection being shown in Figs. 36 and 38. The shaft section 70 has fast thereon a connecting member 109 provided with a pin 110 which operates in a slot 111 formed in a collar 112 fast on the shaft 69. The shafts 69

and 70 are offset from each other or are situated slightly out of line, as indicated in Fig. 36, and hence as the shaft 70 rotates the distance of the pin 110 from the shaft 69 will vary. This will cause a variable speed to the shaft 69, the speed of said shaft being slower at the time when the folders are operating on a package and being faster when the folders are swinging from the position shown in Fig. 34 to that shown in Fig. 33. The speed of the packages is thus increased while they are being delivered to and taken from the folders and is reduced while the folders are acting thereon.

By the operation of this variable speed and the operation of the folders a perfect fold can be produced without wrinkling the paper and the speed of operation is increased because of the more rapid movement of the packages between folding operations.

During the folding operation the packages are moving over a plate 113 which leads to the heater, and I will preferably make this plate slightly crowning, as shown in Fig. 35, so that the top of the package will be firmly pressed against the guide bars 114 during the folding operation.

The heater which is shown at 99 (see Figs. 39 to 43) is of usual type and is provided with a base portion 115 which forms a continuation of the plate 113 and the two side walls 98. The base and side walls are heated by any suitable means, preferably electrical means, so that as the package passes through the heater, the bottom and sides of the package are heated sufficiently to soften the wax on the wax paper, thus sealing the folded flaps. In order to provide a smooth joint between the plate 113 and the base of the heater, the front edge of said base is provided with a lip 116 on which the edge of the plate 113 rests, as shown in Fig. 40, and said plate has clamping blocks 117 fastened to its under side which embrace the under side of the lip 116, thus holding the plate and base of the heater in proper alinement.

The side walls 98 of the heater are adjustable toward and from each other to accommodate different sizes of packages. This is herein accomplished by connecting a nut 118 to each side wall by means of a bolt 119 which operates in a slot 120 formed in the base 115. The two nuts 118 have screw-threaded engagement with an adjusting screw 121, said screw having a right and left-hand screw thread so that when it is rotated the nuts will be moved toward and from each other, as shown by full and dotted lines Fig. 43. The screw is held from longitudinal movement by means of a collar 122 thereon which is confined in a block 123 secured to the underside of the base 115.

After the packages pass from the heater 99 they are carried between two endless belt devices 124 which produce sufficient pressure against the ends of the package to hold the flaps closed until the softened wax sets.

I have stated above that means are provided for feeding sheets of wrapping paper to each package to be folded thereabout. These separate sheets of wrapping paper are cut automatically from a web of paper 125 that is wound on a roll 126 supported in the main frame 1, as seen in Figs. 1 and 2. This web of paper passes between two feed rolls 127 and then to a knife which cuts off the required length. Feeding means are provided which then feeds this length into position to be wrapped about the package, as above described. The feeding rolls 127 are geared together so as to rotate in unison by suitable gears 128, and the lower feed roll is driven by gears 129 from a shaft 17. This shaft in turn is driven from another shaft 131 axially alined therewith and which is geared by means of bevel gearing 132 to a cross-shaft 133, said shaft being geared by means of spiral gears 134 to the shaft 70. One of the spiral gears may be the connecting member 109 which constitutes part of the variable speed connection between the shaft sections 70 and 69.

The shaft 17 has a measuring roll 135 thereon over which the web 125 passes and which cooperates with a knife that cuts appropriate lengths from said roll. The knife comprises a knife blade 136 carried by a knife holder mounted on a shaft 138, said shaft being geared to the shaft 17 by suitable gearing 139. The measuring roll 135 is provided with a longitudinal groove 140 to receive the knife blade 136, as indicated in Fig. 10. The gears 139 are such that the knife and the measuring roll 135 rotate at the same speed and hence at each rotation the knife will enter the groove 136, as shown in Fig. 10, and will thus sever the paper at this point. The knife blade as well as the knife holder are made in sections, each section of the knife holder being indicated at 141. The object of making the knife in sections is so that any number of sections may be used, depending on the width of the web of paper.

In Fig. 9 I have shown at *w* a length of paper which has been severed from the web 125. I have provided means for feeding these severed sections *w* into position over the opening 26. This feeding means comprises a plurality of endless feeding belts 142 which operate in grooves 143 formed in the under bed plate 25. These endless belts pass around guide pulleys 144 at the entrance end and around driving pulleys 145 at the opposite end and the runs of the belt are separated by thin metal plates 165, see Fig. 17. The driving pulleys 145 are carried by a shaft 146 journaled in suitable

bearings 147 and geared to a shaft 148 by means of the gears 149. The shaft 148 has a sprocket wheel thereon which is driven by a sprocket chain 150, said chain being driven from a sprocket wheel on the shaft 7. The feed belts 142 are, therefore, continuously operating so long as the shaft 7 is rotating. The shaft 148 is also provided with pulleys 151 thereon which engage the driving belts and assist the driving pulleys 145 in rotating the belts. Each belt is kept tight by means of a belt tightener herein shown as a roll 152 carried by an arm 153 which is adjustably mounted on a stationary sleeve 154 through which the shaft 148 passes, said arm having a split hub and being clamped in position on said sleeve by the clamping bolt 155. The belt passes over the belt-tightening pulley 152 and then under a pulley 156 which is mounted on a stationary support. If any belt becomes slack at all, it can be tightened by adjusting the belt-tightening arm 153 upwardly slightly.

The shaft 146 is made in sections, said sections being connected together by the collars 157 which are secured to the shaft sections by set screws 158. The object of this construction is to facilitate the removal of the belts from the pulleys 155 if desired. If it is desired to place a new belt on any one of the pulleys 145, then one of the collars 158 adjacent said pulley will be loosened and slid longitudinally of the shaft thereby opening a gap between the shaft sections through which one run of the belt may be introduced.

As the web of paper 125 is fed forward by the feed rolls, the front edge of the paper is carried onto the feed belt 142 and underneath presser rolls 159 which hold the paper in contact with the belts. As soon as a sufficient length of paper has been fed forward the knife operates to sever said length and the feed belts 142 continue the movement of the severed piece of paper into the position to be wrapped about the package. There are a plurality of these presser rolls 159 which hold the paper against the feed belt as it travels. Said presser rolls are preferably carried in pivotally-mounted yokes so that the weight of the roll will always be freely applied to the paper. The construction of these presser rolls is best seen in Figs. 18 to 20, each roll being journaled in a yoke 160, the stem of which is connected to a block 161 that is pivoted at 162 to a collar 163 fast on a supporting rod 164. The presser rolls thus freely rest on the paper and hold it in contact with the feed belts with sufficient pressure to produce proper feed.

It will be noted that the paper-feeding belts are operating continuously so long as the machine is operating, and in order to prevent the delivery of paper to the machine whenever a package fails to be delivered to the folding instrumentalities, I have provided means controlled by the feed of the packages for controlling the operation of the knife and the delivery of paper thereto.

It will be remembered that the shaft 17 through which the knife and the feed rolls 127 are operated is connected to and driven by the shaft 131, and this connection is in the form of a clutch device, the operation of which is controlled by the packages as they are fed along by the feeding-in belt, and just prior to their arrival at the stop 9.

A feeler is associated with the feeding-in belt 2 which feels for packages and which is so connected with the clutch that if there is a package on the belt 2 in proper position to be transferred, the clutch will be operated to connect the shaft 131 to the shaft 17, thus causing the knife to be actuated to sever a length of paper which is delivered to said package as it is in turn delivered to the folding instrumentalities. If, however, there is no package in position to be transferred then the feeler operates to prevent the clutch from actuating, and as a result, the knife will remain inactive until a package arrives in position to be engaged by the feeler.

A clutch device for connecting the shaft 131 and shaft 17 is shown in Figs. 3, 21, 22, 23 and 24, and the feeler is shown in Figs. 25, 26 and 27. This clutch device comprises a clutch disk 166 fast on the shaft 131 and a co-operating clutch member 167 fast on the shaft 17, said member 167 being in the form of a disk which is rigid with a sleeve 168 into which the end of the shaft 131 enters and which is keyed to the shaft 17. The disk 167 has a pawl 169 which is pivoted thereto at 170 and which is acted on by a spring 171. The clutch member 166 is provided with a shoulder 172 which is adapted to engage the pawl 169, as shown in full lines, Fig. 23, thereby coupling the two clutch members together. When the pawl occupies its full line position, Fig. 23, then the shaft 17 will be driven from the continuously-operating shaft 131. A controlling device is provided which is controlled by the feeler and which operates to throw the pawl 169 into the dotted line position Fig. 23, thus disconnecting it from the shoulder 172 whenever there are no packages being fed along the belt 2. This controller device comprises a member 173 pivoted at 174 to the frame and adapted when in its dotted line position Fig. 21 to engage the inclined tail 175 of the pawl as the disk 167 rotates thereby disconnecting said pawl from the shoulder 172. The pawl is provided with a shoulder 176 which by its engagement with the member 173 brings the shaft 17 to rest at a predetermined point in its rotation. The member 173 is pivoted, as stated above, and when it is thrown into its full line position, Fig. 21, it is out of the

path of the pawl 169 and, therefore, is inoperative so far as disconnecting the clutch connection is concerned. The member 173 is provided with a laterally-extending arm 177 which is engaged by a spring 178 that normally tends to move said member into its operative position shown in dotted lines, Fig. 21. 179 is a bunter which is pivotally carried by the upper end of an arm 180 that is pivoted to the frame at 181 and is acted upon by a spring 182 which normally tends to move it to the left, Fig. 22. The shaft 131 has a cam 183 thereon which engages a roll 184 extending from the arm 180 and hence as the shaft 131 rotates, said cam vibrates the arm 180 and thus gives the bunter 179 a to-and-fro movement. When this bunter is in the full line position shown in Fig. 22, it will during its movement to the right of said figure, engage the arm 177 of the member 173 and swing said member from the dotted to the full line position. The cam 183 is timed so that this movement of the member 173 from dotted to full line position will occur while the pawl 169 is passing said member 173 and hence so long as the bunter 179 is operative, the member 173 will be withdrawn from the path of the pawl at each revolution and the clutch will continue to operatively connect the shaft 131 and 17. Situated beneath the bunter 179 is a lifting finger 185 which is fast on a rock-shaft 186 journaled in a suitable bearing 187. This rock-shaft has a depending arm 188 fast thereon to which is connected a pulling spring 189 that normally tends to swing the arm to the left, Fig. 24, thereby to raise the lifting finger. This arm 188 is connected by a link 190 to an arm 191 fast on a shaft 192 to which is also rigidly connected a feeler finger 193. The end of this feeler finger 193 is situated above the upper run of the feeding-in belt 2 and opposite one of the guide rails 5 which guide the packages p that are on said belt. One of these guide rails has an opening 194 therein at a point adjacent the transferring plunger 10, so that the package which is on the belt and against the face 10^b is in position to be engaged by the feeler. The feeler has a vibrating motion from the full to the dotted line position shown in Fig. 26, this being accomplished by means of a cam 195 on the shaft 133, which cam is adapted to act against a roll 196 carried by an arm 197 that is pivoted at 198 to the frame and is connected by a link 199 to the arm 188. If there are no packages p on the belt 2 to interfere with the full movement of the feeler 193, the spring 189 will hold the roll 196 against the face of the cam 195 and said cam will, therefore, oscillate the feeler between the full and dotted line positions, Fig. 26. This oscillating movement will, of course, be accompanied by a corresponding swinging movement of the arm 188 and a consequent vertical swinging movement of the lifting finger 185. Hence so long as there are no packages on the belt 2, the lifting finger 185 will swing upwardly at each revolution of the shaft 133 thereby lifting the bunter 179 above the arm 177. This lifting movement of the bunter always occurs at the time that the bunter is about to be moved to the right, Fig. 22, by the cam 183, and, therefore, if the bunter is lifted by the finger because of the absence of a package on the belt 2, then the movement of the bunter will be in a path above the arm 177, as shown by dotted lines, Fig. 22, so that the bunter will not actuate the member 173 and the clutch will, therefore, remain disengaged. If, however, there is a package p on the belt, then when the feeler swings forwardly, it will engage said package, as shown in full lines, Fig. 26, and will be held in such position by the package. This will hold the lifting finger in its depressed position so that the bunter will remain in its full line position Fig. 22. When the bunter is actuated by the cam 183 it will engage the arm 177 and swing the member 173 into the full line position, Fig. 21, thereby withdrawing said member from the spring-pressed pawl 169. Said pawl will immediately drop into position to be engaged by the shoulder 172, thus clutching the shafts 17 and 131 together. So long, therefore, as there is a package on the feeding-in belt 2 against and in position to be transferred thereby by the transferring plunger, the clutch will remain operative so that the feed rolls 127 will continue operating to deliver paper to the knife and the knife will operate to cut sheets of paper w from the web which are delivered to the paper-feeding means. The absence of a package at the delivery end of the feeding-in belt will result in disconnecting the clutch, as above described, and thus stopping the operation of the paper feed rolls and the knife. The mechanism is so constructed that the time required to transfer a package from the belt onto the feed plunger and then to raise the package through the opening is the same as that required to cut the paper and feed the cut section over the opening 26, and hence by the mechanism shown the feed of the paper is controlled so that no paper will be fed to the folding mechanism except when a package is being delivered.

It will be remembered that the transferring plunger is actuated from the cam 16 on the shaft 17, and hence said plunger only operates when permitted to do so by the action of the feeler. As a result, the transferring plunger will remain at rest in its rearward position so long as there is an absence of packages at the delivery end of

the feeding-in belt, but when a package comes opposite the feeler, then the clutch above mentioned is set in operation to actuate the shaft 17 by which the transferring plunger is operated.

The stop 9 is made adjustable to accommodate packages of different sizes, and in effecting this adjustment, it is essential that the adjustment should be such that the center of the packages of any size will always come in the center line of the pushers 65. The means for adjusting the stop 9 is shown in Figs. 44 and 45. Said stop is carried by a supporting member 200 which is slidably mounted on a cross-bar 201 and is provided with rack teeth 202 engaging a pinion 203 which is rotatably mounted on the shank of a screw 204 that is supported in a support 405. This screw 204 has a nut 404, which, when tightened up, clamps the gear 203 and locks it from turning. This pinion also engages with the teeth of another rack member 205 which is also guided by the bar 201 and from which depends the guide member 362. By this means the stop 9 and the guide member 362 are connected so that they must necessarily move together but oppositely. When it is desired to adjust relatively the members 9 and 362, the nut 404 is loosened and the gear 203 can then be turned thereby shifting the rack bars 202 and 205, and because the members 362 and 9 are secured to said rack bars they will be thereby adjusted to the desired extent. When the proper adjustment has been completed the nut 404 may be again tightened so as to hold the parts in their adjusted position. The member 200 and rack 205 carry projections 206, over which the paper is fed. Said projections operate to crown the paper upwardly slightly at its central point. The object of this is to give the paper a slight upward bend so that it will fold about the package more readily as the package moves up through the opening 26.

207 is a paper stop to limit the feeding movement of the wrappers *w* and properly position them over the opening 26. This stop is in the form of a bar which is carried by slides 208 that are adjustably secured to the bed 25 by means of clamping screws 209. This provides for adjusting said bar to correspond to the size of the package being wrapped. Each of the slides 208 extends forwardly beyond the stop bar 207 and is provided with a beveled surface 210 which acts as a guide for the edge of the paper. This beveled surface lifts the edge of the paper slightly from the bed and brings it against the bar 207.

In order that the conveyor may operate properly on packages of different sizes, it is necessary to adjust it forwardly or backwardly relative to the driving shaft 66 as the size of the package varies. This is herein accomplished by adjustably connecting the driving sprocket 63 to the shaft 66. Said shaft 66 has fast thereon a collar 211 which overlies the driving sprocket 63 and is detachably connected to said sprocket by means of clamping bolts 212 which operate in slots 213 formed in the collar 211. When the clamping bolts 212 are loosened, the sprocket 63 can be advanced or retarded relative to the shaft 66 thereby advancing or retarding the pushers 65 so that they will be in proper timed relation with the other parts of the mechanism.

In order to prevent the folded flaps on the bottom of the package from becoming wrinkled or misplaced by contact with the plates 27 and 113 as the package is traveling thereover, I have provided a pair of feed belts 508 which pass over pulleys 509 at the front of the plate 27 and over driving pulleys 510 at the rear of the plate 113. The top runs of these belts lie on top of the plates 27 and 113, and they serve to support the package and thus prevent rubbing contact between the folded flaps at the bottom of the package and said plates. These belts are driven at the same speed as the pushers of the conveyor. For this purpose the driving pulleys 510 are mounted on a shaft 511 which is journaled in suitable bearings 512, and said shaft is driven by bevel gears 513 from a longitudinally-extending shaft 514. The shaft 514 is driven by a sprocket chain 515 from the shaft 96, and the belts will, therefore, have a movement synchronous with that of the pushers 65.

I claim:

1. In a wrapping machine, the combination with folding means for folding a wrapper about a package, of a continuously reciprocating feed plunger to deliver packages to said folding means, a feeding-in belt a transfer plunger to deliver packages from said belt to said feed plunger, paper-feeding means for feeding wrappers to the folding means, means to deliver wrappers to the paper-feeding means, and means for rendering both the wrapper delivery mechanism and the transfer plunger inoperative whenever there are no packages on the feeding-in belt in position to be delivered by the transfer plunger.

2. In a wrapping machine, the combination with folding means for folding a wrapper about a package, of a feeding-in belt, a constantly moving feed plunger for delivering packages singly to said folding mechanism, a transfer plunger for transferring packages from the belt to the feed plunger, paper-feeding means to feed wrappers to the packages as they are delivered to the folding means, means to deliver wrappers to the paper-feeding means, and actuating means for the wrapper delivery means

and transfer plunger which is operable only when a package is in position on the feed belt ready to be delivered to the transfer plunger whereby when there are no packages in position to be delivered said actuating means and transfer plunger are at rest.

3. In a wrapping machine, the combination with folding means for folding a wrapper about a package, of a reciprocating device to feed packages to the folding means, paper-feeding means to feed wrappers to the packages as they are delivered to the folding means, means to supply wrappers to the paper-feeding means, and means to render said device inoperative when no packages are in position to be acted on thereby.

4. In a machine of the class described, the combination with means to fold a wrapper about a package, of means to deliver packages singly to the wrapper-folding means, a feeding-in belt by which packages are brought into the machine, means to position each package on the belt in proper relation to the delivery means, a feeler constructed to feel periodically and in timed relation with the delivery means for a package positioned by the package-positioning means, means to supply wrappers to the packages, and means controlled by the feeler when the latter fails to find a package on its feeling movement to render the wrapper-supplying means inoperative.

5. In a wrapping machine, the combination with means for folding a wrapper about a package, of means to deliver packages singly to the folding means, means to feed packages into the machine, a positioning device to position each package as it is fed into the machine in proper relation to the delivery means, a feeler having a movement only in a direction transverse to the movement of the packages as they are fed into the machine, means to vibrate said feeler in timed relation with the delivery mechanism to cause it to feel for a package positioned by the positioning means, wrapper-supply mechanism, and means controlled by the feeler to render the wrapper-supply mechanism operative or inoperative depending upon whether the feeler finds or fails to find a package in its feeling movement.

6. In a device of the class described, the combination with folding means for folding a wrapper about a package, of means to deliver packages singly to the folding means, means for feeding packages into the machine, means to position each package as it is fed into the machine in proper relation to the means that delivers the package to the folding means, a vibrating feeler constructed to feel for packages positioned by the positioning means, means to supply wrappers to the folding means, and means controlled by the feeler to render the wrapper-supply mechanism operative or inoperative depending upon whether the feeler finds or fails to find a package in its feeling movement.

7. In a device of the class described, the combination with folding means for folding a wrapper about a package, of means to deliver packages singly to the folding means, means for feeding packages into the machine, means to position each package as it is fed into the machine in proper relation to the means that delivers the package to the folding means, a vibrating feeler constructed to feel for packages positioned by the positioning means, yieldable means to vibrate the feeler, means to supply wrappers to the folding means, and means controlled by the feeler to render the wrapper-supply mechanism operative or inoperative depending upon whether the feeler finds or fails to find a package in its feeding movement.

8. In a device of the class described, the combination with folding means for folding a wrapper about a package, of means to deliver packages singly to the folding means, means for feeding packages into the machine, means to position each package as it is fed into the machine in proper relation to the means that delivers the package to the folding means, a vibrating feeler constructed to feel for packages positioned by the positioning means, yieldable means to vibrate said feeler in a path transverse to the path of movement of the package to cause the feeler to feel for a package positioned by the positioning means, wrapper-supply mechanism, and means controlled by the feeler to render the wrapper-supply mechanism operative or inoperative depending upon whether the feeler finds or fails to find a package in its feeling movement.

9. In a wrapping machine, the combination with folding means for folding a wrapper about a package, of a feeding-in belt for delivering packages to the machine, a feed plunger to deliver packages to the folding mechanism, a transfer plunger to transfer packages from the belt to the feed plunger, a device to position each package on the belt in proper relation to the transfer plunger, means to cut wrappers from a web and deliver them to the packages as the latter are delivered to the folding means, a vibrating feeler movable transversely to the direction of movement of the feeding-in belt, means to vibrate said feeler thereby to cause it to feel for packages which are positioned by the positioning device and actuating means for the cutter which is controlled by the feeler.

10. In a wrapping machine, the combination with folding means for folding a wrapper about a package, of a feeding-in belt for delivering packages to the machine, a feed plunger to deliver packages to the folding mechanism, a transfer plunger to trans-

fer packages from the belt to the feed plunger, a device to position each package on the belt in proper relation to the transfer plunger, means to cut wrappers from a web and deliver them to the packages as the latter are delivered to the folding means, a vibrating feeler movable transversely to the direction of movement of the feeding-in belt, yieldable means to vibrate said feeler thereby to cause it to feel for packages which are positioned by the positioning device and actuating means for the cutter which is controlled by the feeler.

11. In a wrapping machine, the combination with folding means for folding a wrapper about a package, of a feeding-in belt for delivering packages to the machine, a feed plunger to deliver packages to the folding mechanism, a transfer plunger to transfer packages from the belt to the feed plunger, a device to position each package on the belt in proper relation to the transfer plunger, means to cut wrappers from a web and deliver them to the packages as the latter are delivered to the folding means, a vibrating feeler movable transversely to the direction of movement of the feeding-in belt, means including a spring for vibrating said feeler in timed relation with said plunger to cause the feeler to feel for packages positioned by the positioning device, means to supply wrappers to the paper-feeding means, and means controlled by the feeler to render the supply mechanism operative or inoperative depending on whether or not the feeler finds or fails to find a package on its feeling movement.

12. In a wrapping machine, the combination with a conveyer for conveying packages, of rotary end folders supported independently of the conveyer, means to rotate said folders continuously in the same direction thereby to fold the end flaps of a wrapper about each package as it is moved along by the conveyer, and means to give each folder a bodily movement in addition to its rotary movement.

13. In a wrapping machine, the combination with a conveyer for conveying packages, of rotary end folders supported independently of the conveyer and arranged to fold the end flaps of a wrapper about each package as it is moved along by the conveyer, and means to give each folder a bodily movement in the direction of movement of the package in addition to its rotary movement during the folding operation.

14. In a wrapping machine, the combination with a frame, of rotary end folders supported thereby and arranged to fold the end flaps of a wrapper about a package, a conveyer supported independently of the end folders and operating to convey packages past the end folders, and means to give each end folder a bodily movement in the direction of movement of the package in addition to its rotary movement during the folding operation.

15. In a wrappping machine, the combination with a conveyer for conveying packages, of rotary end folders supported independently of the conveyer and arranged to fold the end flaps of a wrapper about each package as it is moved along by the conveyer, means to rotate each folder continuously in the same direction, and means to give each folder a bodily oscillating movement in addition to its rotary movement.

16. In a wrapping machine, the combination with a conveyer for conveying packages, of rotary end folders supported independently of the conveyer and arranged to fold the end flaps of a wrapper about each package as it is moved along by the conveyer, and means to give each folder a bodily vibrating movement in the direction of movement of the package in addition to its rotary movement.

17. In a wrapping machine, the combination with a conveyer for conveying packages, of rotary end folders for folding the end flaps of a wrapper about each package as it is moved along by the conveyer, and means to give each folder a bodily movement in the direction of movement of the package in addition to its rotary movement while the folder is folding the end flaps of the package and a bodily movement in the reverse direction between its operations on successive packages.

18. In a wrapping machine, the combination with rotary end folders for folding the end flaps of a wrapper about a package, of means to bring packages successively into position to be operated on by said end folders, said means operating to move each package at a variable speed while being acted on by the folders.

19. In a wrapping machine, the combination with rotary end folders for folding the end flaps of a wrapper about a package, of means to bring packages successively into position to be operated on by said end folders, said means operating to move each package at a less rate of speed while being acted on by the folders than immediately previous to or after such action.

20. In a wrapping machine, the combination with rotary end folders for folding the end flaps of a wrapper about a package, of means to bring packages successively into position to be operated on by said end folders, said means operating to move each package at a variable speed while being acted on by the folders, and means to give each folder a bodily movement in addition to its rotary movement during the folding operation.

21. In a wrapping machine, the combination with rotary end folders for folding the end flaps of a wrapper about a package, of means to bring packages successively into position to be operated on by said end folders, said means operating to move each package at a less rate of speed while being acted on by the folders than immediately previous to or after such action, and means to give each folder a bodily movement in the direction of movement of the package in addition to its rotary movement during the folding operation.

22. In a wrapping machine, the combination with a conveyor for conveying packages to be wrapped, of a rotary shaft provided with a head having a slot extending transversely to the axis of rotation, a slide mounted in said slot, an end folder carried by the slide, and means to reciprocate the slide in the slot as the end folder rotates.

23. In a wrapping machine, the combination with a conveyor for conveying packages to be wrapped, of a rotary shaft provided with a head having a slot extending transversely to the axis of rotation, a slide mounted in said slot, an end folder carried by the slide, means to reciprocate the slide in the slot as the end folder rotates, and conveyor-actuating means operating to give each package a different speed during the folding operation than immediately before or after such operation.

24. In a wrapping machine, the combination with a conveyor for conveying packages to be wrapped, of a rotary shaft provided with a head having a slot extending transversely to the axis of rotation, a slide mounted in said slot and provided with a pin, an end folder carried by said slide, and a stationary cam co-operating with said pin for moving the slide longitudinally of the slot as the folder rotates.

25. In a wrapping machine, the combination with a plate having an opening, of means to feed a wrapper across said opening, means to force a package against a wrapper and through the opening thereby to fold the wrapper about the package, guide fingers at the edge of the opening against which the package rests as it emerges therefrom, and means to periodically lock and release the fingers.

26. In a wrapping machine, the combination with a plate having an opening, of means to feed a wrapper across said opening, means to force a package against the wrapper and through said opening thereby to fold the wrapper about the package, guide fingers at the edge of the opening against which the package rests as it emerges therefrom, a conveyor to carry said package with the wrapper folded thereabout away from the opening, means to lock the fingers while the packages are passing through the opening, and means to release the fingers when the package is acted upon by the conveyer.

27. In a wrapping machine, the combination with a plate having an opening, of means to feed a wrapper across said opening, means to force a package against the wrapper and through said opening thereby to fold the wrapper about three sides of the package, movably-mounted guide fingers at the edge of the opening against which the package rests as it emerges therefrom, means to lock the guide fingers in their operative position, an edge folder to fold the edge of the wrapper about the fourth side of the package, and means rendered operative by said edge folder to unlock the guide fingers.

28. In a wrapping machine, the combination with a plate having an opening, of means to feed a wrapper across said opening, means to force a package against the wrapper and through said opening thereby to fold the wrapper about three sides of the package, movably-mounted guide fingers at the edge of the opening against which the package rests as it emerges therefrom, means to lock said guide fingers in their operative position, an edge folder to fold one edge of said wrapper about the fourth side of said package, means operative by said edge folder to release the lock for the guide fingers, and a conveyor to move said package transversely of said opening onto said plate thereby to cause the other edge of the wrapper to be folded against said fourth side of the package.

29. In a wrapping machine, the combination with a belt for supplying packages to the machine, of means for folding a wrapper about each package, a feed plunger to deliver packages to said folding means, a transfer plunger moving transversely of the belt for delivering packages laterally therefrom to the feed plunger, two guide members forming between them an opening through which the packages are delivered from the belt, one of the guide members having a stop flange to limit the belt-given movement of each package, and means for adjusting simultaneously said guide members toward and from each other.

30. In a wrapping machine, the combination with a belt for supplying packages to the machine, of means for folding a wrapper about each package, a feed plunger to deliver packages to said folding means, a transfer plunger moving transversely of the belt for delivering packages laterally therefrom to the feed plunger, two guide members forming between them an opening through which the packages are delivered from the belt, one of the guide members extending over the belt thereby constituting a stop to limit the belt-given movement of

each package, and gearing connecting said members by which they may be simultaneously adjusted toward and from each other.

31. In a wrapping machine, the combination with a belt for supplying packages to the machine, of means for folding a wrapper about each package, a feed plunger to deliver packages to said folding means, a transfer plunger moving transversely of the belt for delivering packages laterally therefrom to the feed plunger, two guide members forming between them an opening through which the packages are delivered from the belt, one of the guide members extending over the belt thereby constituting a stop to limit the belt-given movement of each package, each guide member having a rack extending therefrom, and a pinion meshing with each rack whereby the guide members can be simultaneously adjusted toward and from each other.

32. In a wrapping machine, the combination with end folders, of pushers to feed packages thereto, and belts on which the packages are supported as they are moved by the pushers.

33. In a wrapping machine, the combination with end folders, of pushers to feed packages thereto, means to actuate the pushers, belts on which packages are supported as they are moved by the pushers, and means to operate the belts from the pusher-actuating mechanism.

34. In a wrapping machine, the combination with end folders, of a conveyor for feeding packages thereto and comprising an endless chain carrying pushers, a driving sprocket for actuating said conveyor, a driving shaft for the sprocket, and an adjustable connection between said shaft and sprocket.

In testimony whereof, I have signed my name to this specification.

HARRY L. JOHNSON.