June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 1

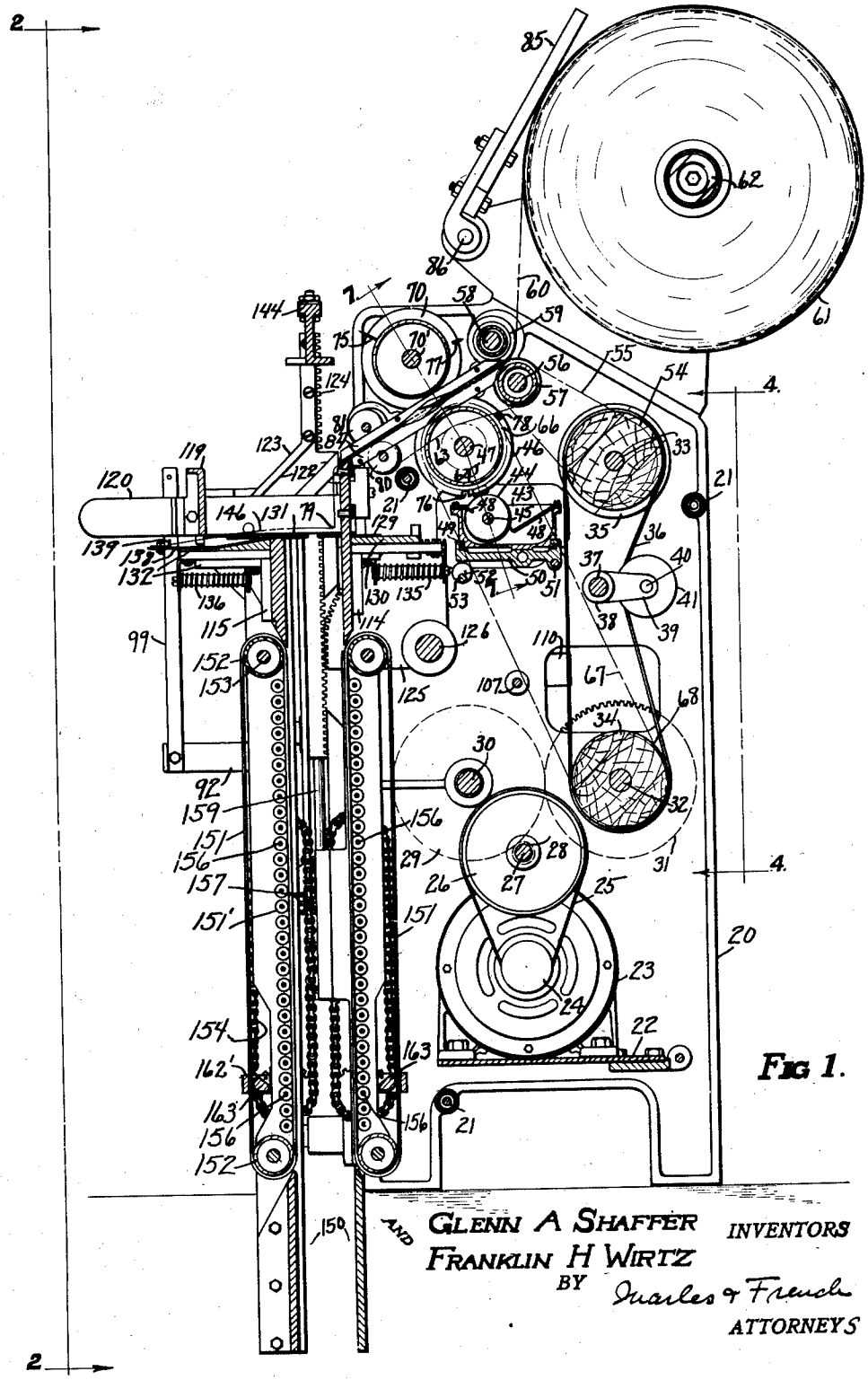


Fig 1.

AND GLENN A SHAFFER INVENTORS
FRANKLIN H WIRTZ
BY Charles & French
ATTORNEYS

June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 2

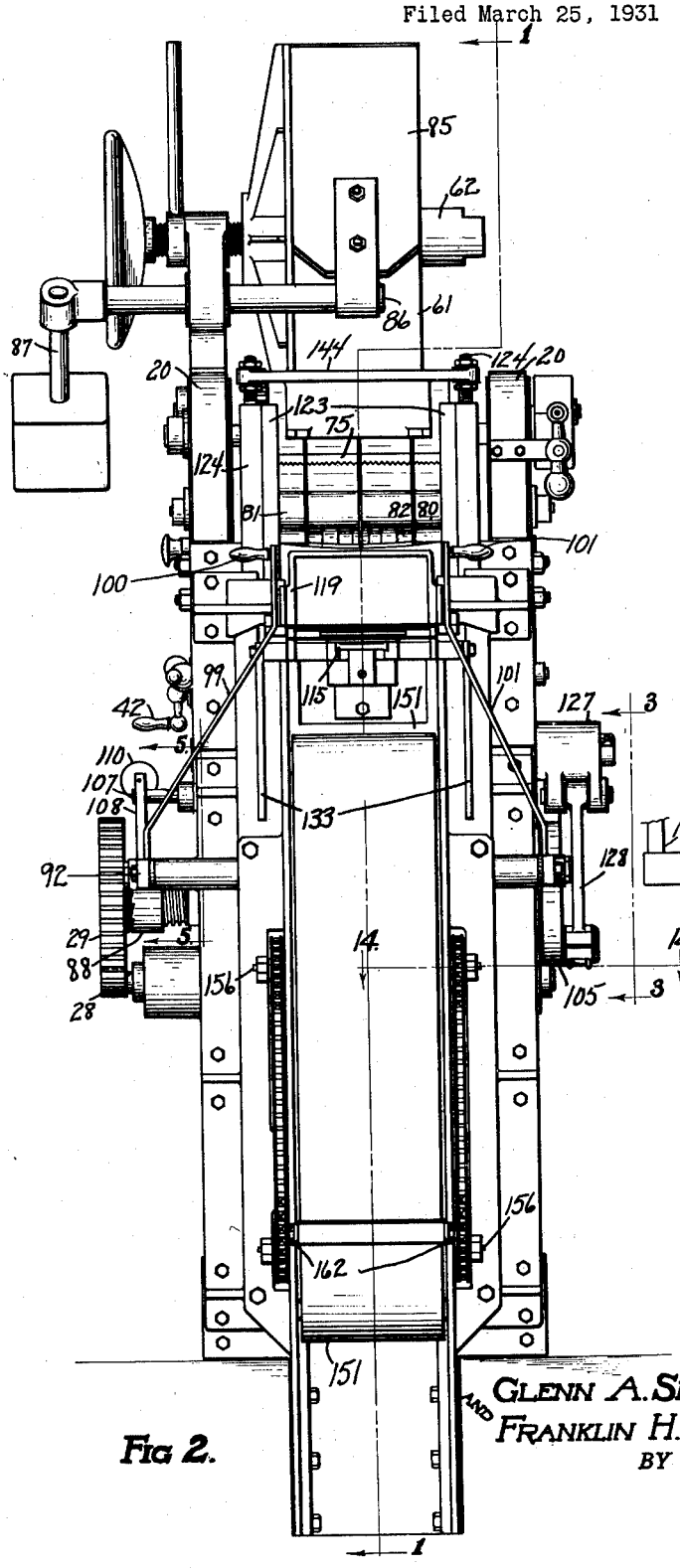


Fig 2.

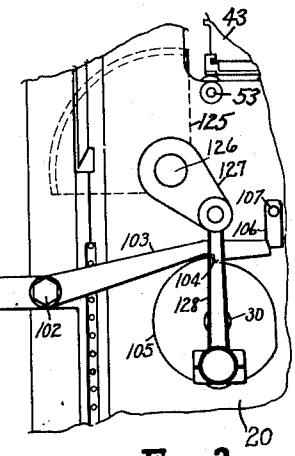


Fig 3.

GLENN A. SHAFFER AND FRANKLIN H. WIRTZ INVENTORS

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June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 3

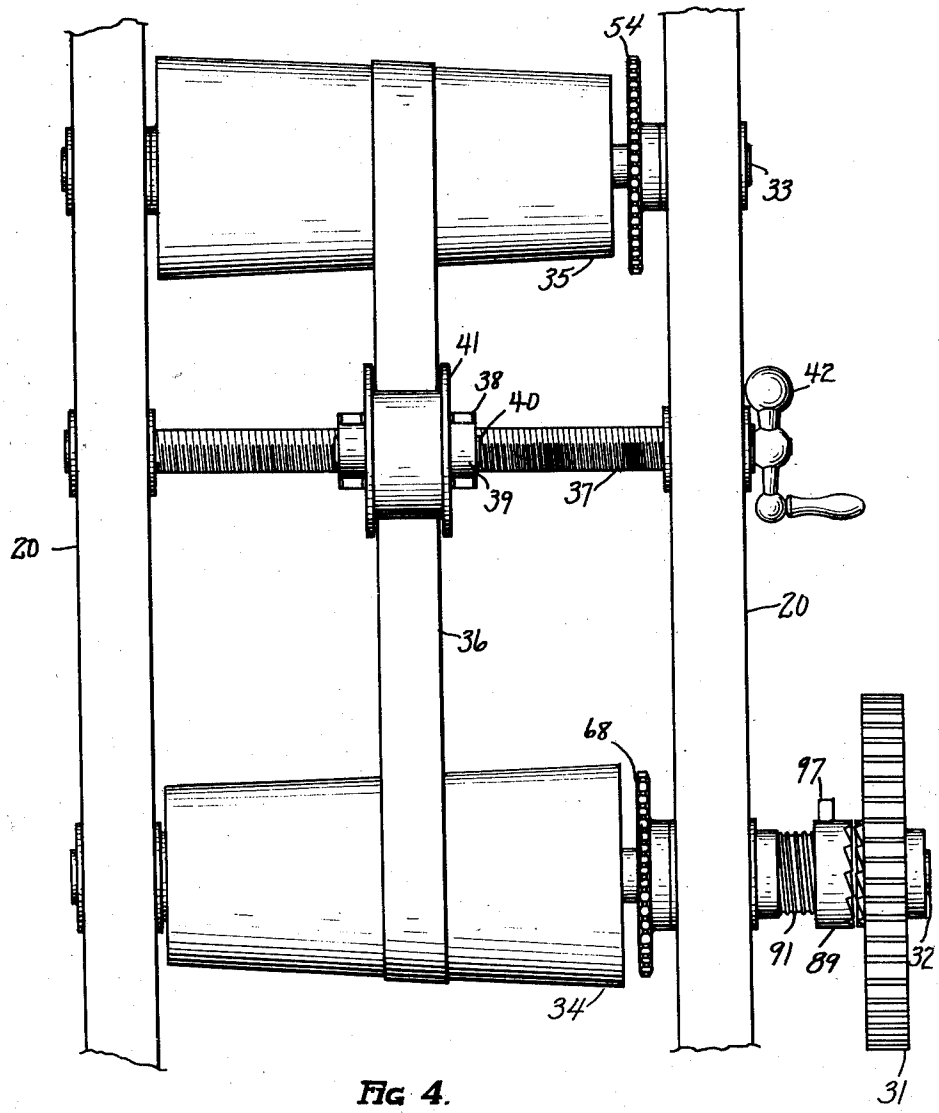


Fig 4.

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June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 4

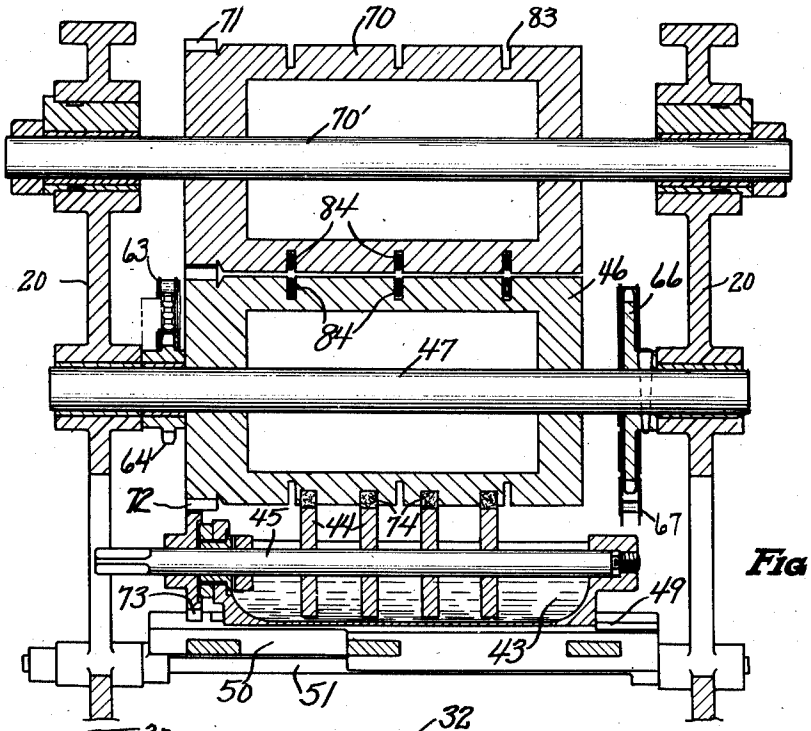


Fig 7.

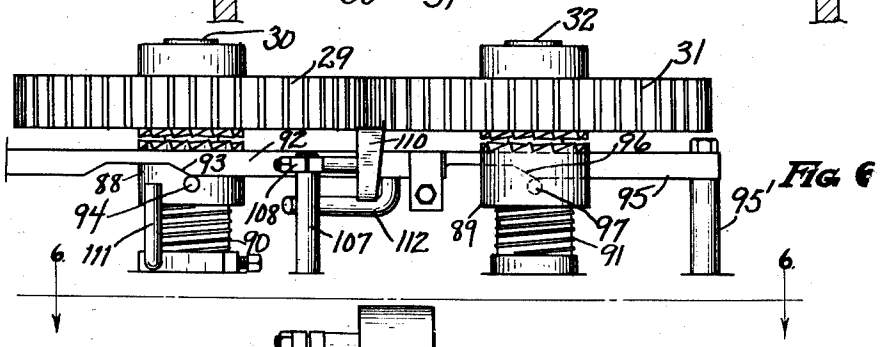


Fig 6

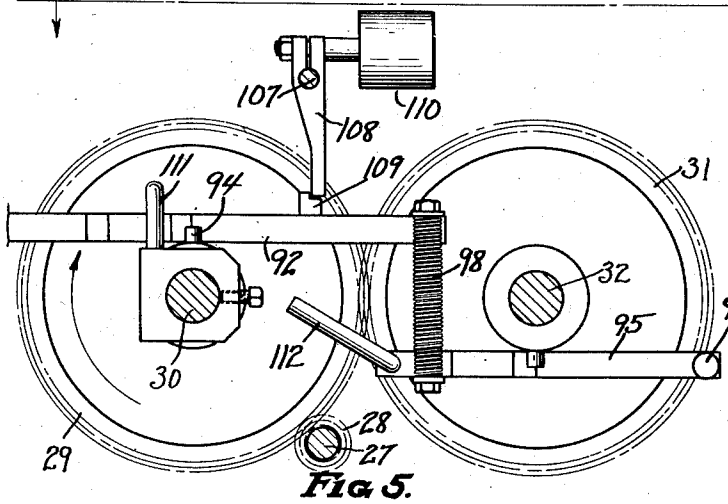


Fig 5.

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June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 5

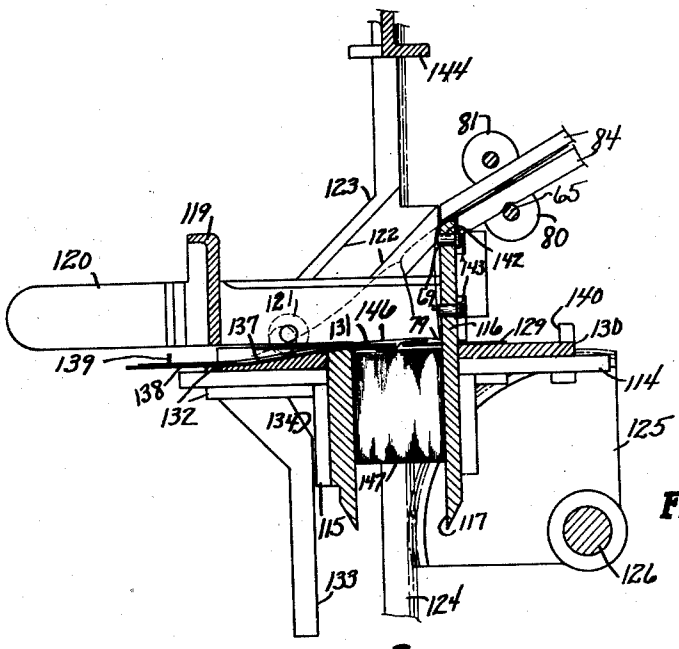


FIG 12.

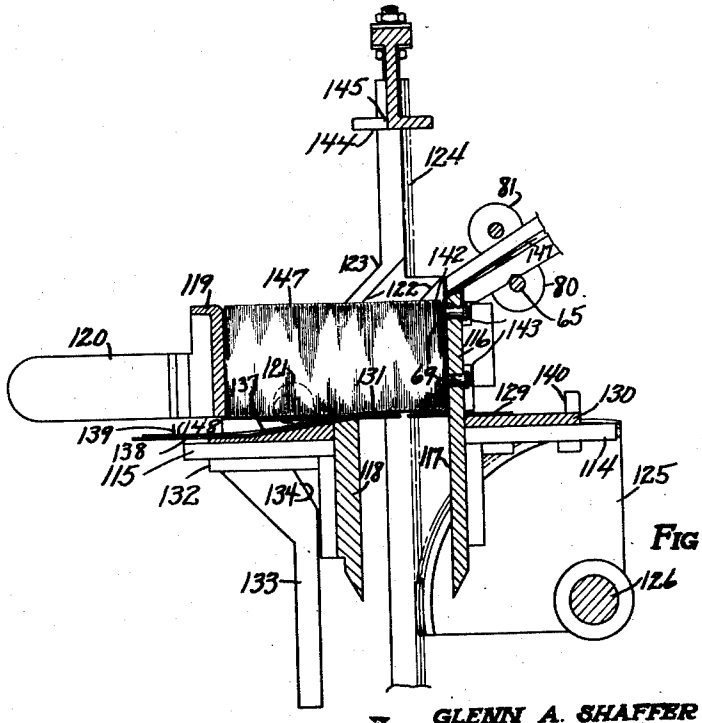


FIG 8

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June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

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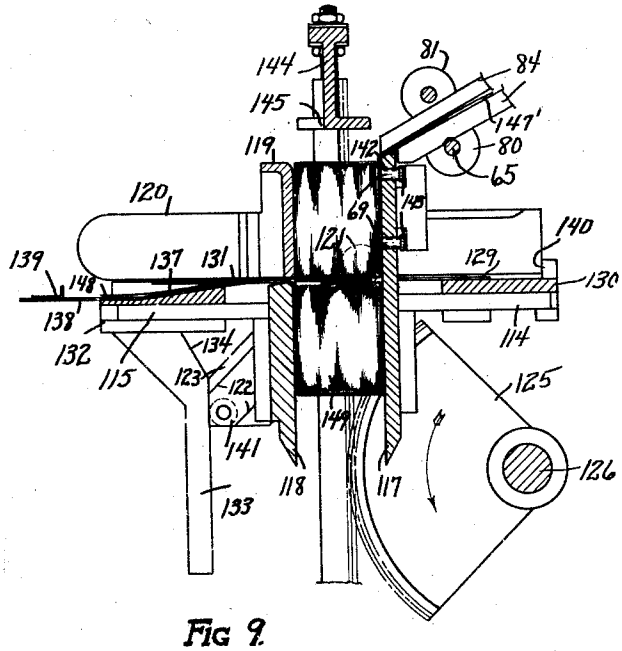


FIG 9.

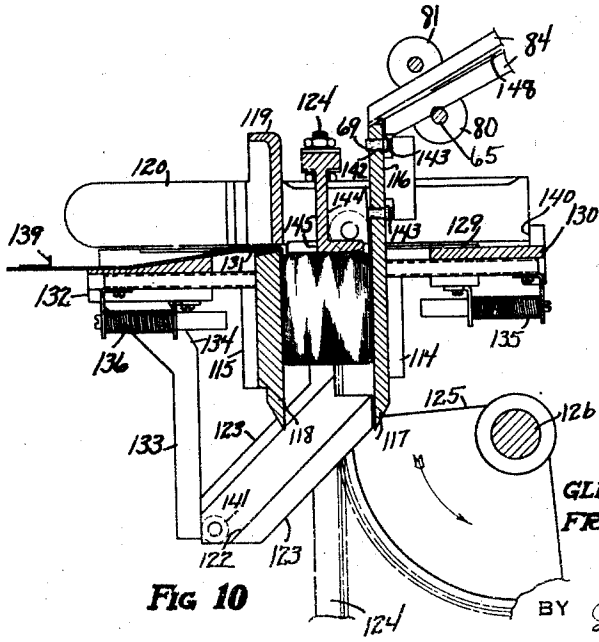


FIG 10

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June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 7

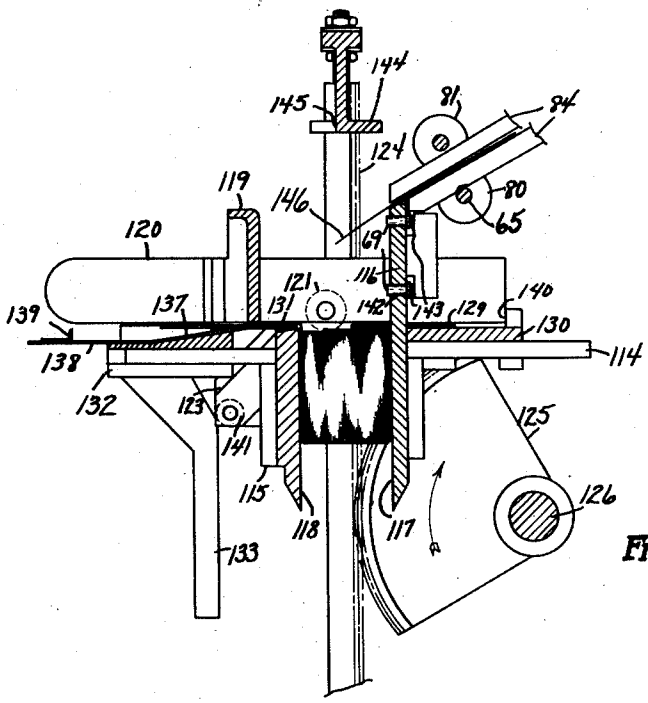


Fig 11.

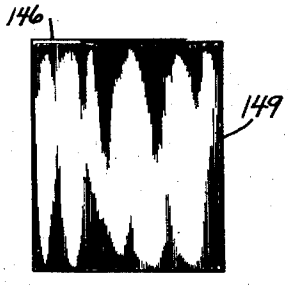


Fig 13.

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June 13, 1933. G. A. SHAFFER ET AL 1,913,727

PACKAGING MACHINE

Filed March 25, 1931 8 Sheets-Sheet 8

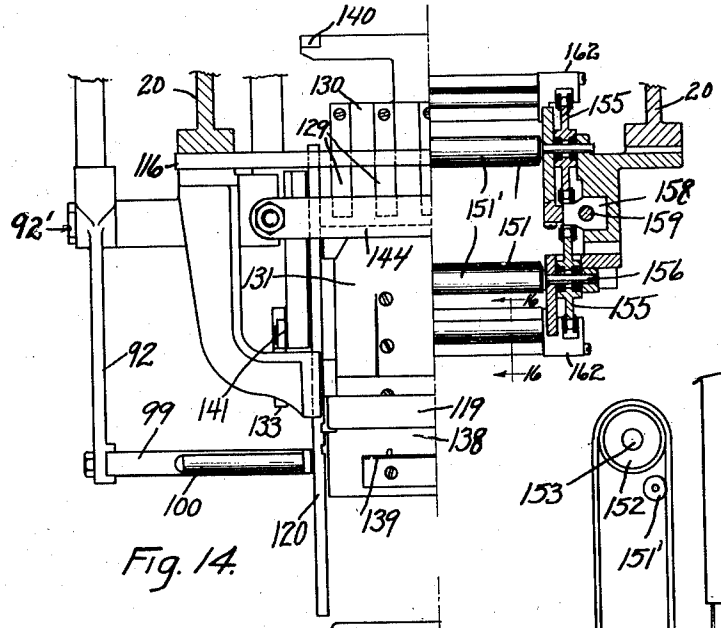


Fig. 14.

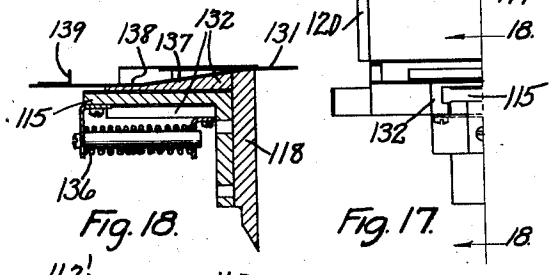


Fig. 18. Fig. 17.

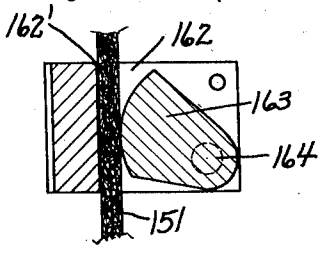


Fig. 16.

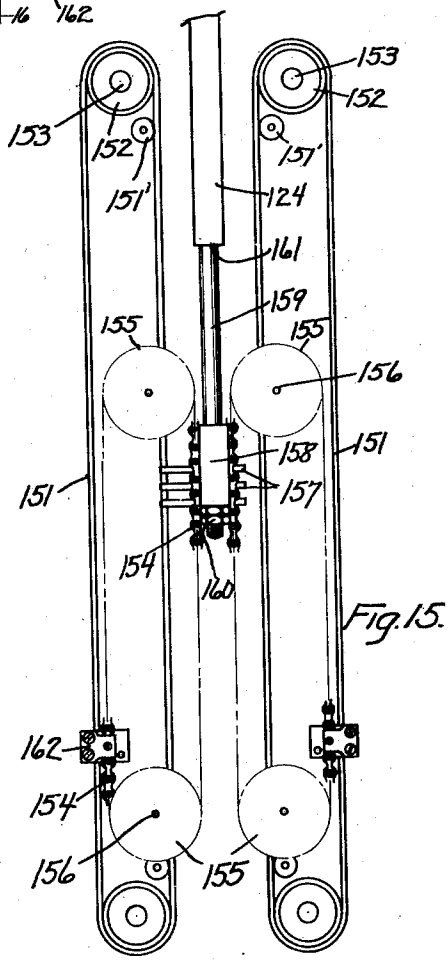


Fig. 15.

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BY Marks & French
ATTORNEYS

Patented June 13, 1933 1,913,727

UNITED STATES PATENT OFFICE

GLENN A. SHAFFER AND FRANKLIN H. WIRTZ, OF GREEN BAY, WISCONSIN, ASSIGNORS TO FORT HOWARD PAPER COMPANY, OF GREEN BAY, WISCONSIN, A CORPORATION OF WISCONSIN

PACKAGING MACHINE

Application filed March 25, 1931. Serial No. 525,136.

The invention relates to packaging machines.

The general object of the invention is to provide an apparatus for forming packets composed of a number of loose sheets, such as paper napkins, toilet paper and the like, wherein these sheets are formed into the package by a band surrounding the same and having its ends secured together as by adhesive, the banding material being automatically taken from a supply roll and folded about the sheets and secured together by the machine hereinafter described.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings, Fig. 1 is a vertical sectional view taken on the broken line 1—1 of Fig. 2;

Fig. 2 is a front end elevation view of the machine embodying the invention;

Fig. 3 is a detail side elevation view as viewed along the line 3—3 of Fig. 2;

Fig. 4 is a detail end elevation view as viewed along the line 4—4 of Fig. 1;

Fig. 5 is a detail side elevation view of a portion of the driving mechanism; viewed along line 5—5 of Fig. 2;

Fig. 6 is a detail plan view of the parts shown in Fig. 5;

Fig. 7 is a detail sectional view taken on the line 7—7 of Fig. 1;

Fig. 8 is a vertical sectional view through the packaging mechanism with the parts in position at the start of forming the package;

Fig. 9 is a view similar to Fig. 8 showing the parts at the next stage and also a finished package;

Fig. 10 is a view similar to Fig. 8 showing the position of the parts just before the ends of the band are secured together;

Fig. 11 is a view similar to Fig. 8 showing the bundle or package just before the last flap is folded over and the next band starting into position;

Fig. 12 is a view similar to Fig. 8 showing the band or label completely surrounding the package and the band in position to receive the next bundle of paper napkins or sheets;

Fig. 13 is an end view of the completed package;

Fig. 14 is a composite view, half being a plan view of the compressing and folding unit and the other half being a detail transverse sectional view taken on the line 14—14 of Fig. 2;

Fig. 15 is an elevation view of the delivery belt operating mechanism;

Fig. 16 is a detail sectional view of one of the one-way belt clutches in engaged position;

Fig. 17 is a detail end elevation view of a half of the folding mechanism;

Fig. 18 is a detail transverse sectional view taken on the line 18—18 of Fig. 17.

Referring to the drawings and to Figs. 1 and 2, the machine includes the main side frames 20 suitably secured together to form the framework of the machine by tie rods 21 and provided with a shelf 22 upon which an electric motor 23 is mounted.

The drive pulley 24 of the motor is connected by a belt 25 with a pulley 26 on a shaft 27 which carries a small gear 28 meshing with a larger gear 29 on a shaft 30, which gear 29 also meshes with a gear 31 on a shaft 32. As shown in Fig. 1 and 4, the shaft 32 is preferably connected to a supply roll operating shaft 33 by a variable speed drive mechanism comprising the oppositely disposed cone pulley 34 and 35, on said shafts 32 and 33 respectively, connected together by a drive belt 36 which is associated with a combination belt shifter and tightener device comprising a screw feed shaft 37 having a nut member 38 mounted thereon to move lengthwise thereof, and provided with spaced arms 39 carrying the shaft 40 on which a shift roller 41 is mounted, said shaft 37 provided with an operating crank handle 42.

A receptacle 43 containing adhesive has paste rolls 44 mounted to work therein on a shaft 45 to supply adhesive to an adhesive applying roll 46 mounted on a shaft 47. A scraper member 48 is mounted on the receptacle 43 to cooperate with the paste rolls 44 and said receptacle is mounted on ways 49 for longitudinal adjustment relative to a supporting shelf 50 which is pivoted on a shaft

51 and adapted to be tilted to raise or lower the rolls 44 by means of an eccentric 52 mounted on a shaft 53.

The shaft 33 carries a sprocket 54 which may be connected by chain 55 and a sprocket, not shown, to the shaft 56 of a measuring roll 57 whose shaft is suitably geared to the shaft 58 of a companion roll 59 so that the amount of the wrapper material 60 fed from the supply roll 61 journalled on the spindle 62 can be varied by means of cone pulleys 34 and 35 and the adjustment of the belt 36 thereon. The label or wrapper feeding mechanism is actuated on the last half of a cycle by clutch mechanism hereinafter described. The shaft 47 has a sprocket 66 fixed to it connected by a chain 67 with a sprocket 68 on the shaft 32 so that the glue spreading roll 46 is driven from this shaft to make one revolution for each cycle of operations of the machine.

The shaft 56 is in turn connected by a chain and sprocket drive including the chain 63 and idler sprocket 64 with the shaft 65, the idler sprocket 64 being shown in detail in Fig. 7 so the speed of these shafts will vary in accordance with the speed of the variable speed shaft 33.

The shaft 47 carries the glue spreading roll 46 which in turn drives a knife roll 70, mounted on a shaft 70′ through gears 71 and 72 formed in or secured to one end of said rolls and the gear 72 meshes with a gear 73 on the glue roll shaft 45. The rolls 46 and 70 are spaced apart so that paper band 60 is free to slip between them thus allowing more or less paper to be fed according to the position of the belt 36 on the pulleys 34 and 35 and the glue is transferred from the rolls 44 to rubber pads 74 inset in the roll 46, which come in contact with the rear end of the wrapper or band as it is being fed to the wrapping mechanism. The wrappers are cut off from the continuous strip from the supply roll by means of a knife 75 mounted in the roll 70 co-acting with a knife groove 76 in the glue spreading roll 46. There is also a knife edge creaser 77 which cooperates with a creaser rubber 78 and puts the folding crease 79 into the wrapper for proper bending and placing in the wrapping mechanism as shown in Figs. 1 and 12.

Wrapper feed rolls 80 and 81 are respectively mounted on the shafts 65 and 65′ which are suitably geared together are for placing the wrapper in proper position in the wrapping mechanism and the feed roll 80 is provided with annular grooves 82 as shown in Fig. 2 to allow the glue spots to pass without smudging the roll 80 or wrappers.

The paper measuring rolls 57 and 59, the rolls 46 and 70 and the paper feed rolls 80 and 81 are all grooved, as at 83 in Fig. 7, for the guide strippers 84 which lead the wrapper from one set of rolls to the other.

The supply roll 61 is prevented from rotating freely by a brake device in the form of a plate 85 bearing against said roll and secured to a shaft 86 journalled on the frame of the machine and carrying a weighted arm 87.

Referring to Figs. 5 and 6, it will be noted that the gears 29 and 31 are not fast on their shafts 30 and 32 but that the hub of each gear is provided with a clutch face adapted for respective engagement with jaw clutch members 88 and 89 which are slidably keyed on their respective shafts and normally urged into clutched engagement with their respective gears by their springs 90 and 91. A clutch shifter bar 92 has a wedge shaped face 93 cooperating with a pin 94 on the member 88 and a similar bar 95 has a wedge shaped face 96 cooperating with a pin 97 on the member 89 to move said member to unclutched position. These bars 92 and 95 are connected together by a spring 98 and the bar 95 is pivotally connected at its opposite end to a post 95′. The bar 92 is rigidly connected to an arm 99 inclining upwardly at one end of the machine and provided with an operating handle 100 and the whole pivots on 92′ (see Fig. 14). A safety device is also provided to prevent operation of the clutch. Referring to Figs. 2, 3, 5 and 6, this device includes a lever handle 101 pivoted at 102 and carrying a locking arm or catch 103 engageable with a notch 104 in a crank disk 105 on the shaft 30 and also with a cam arm 106 on a shaft 107 which transverses the machine from one side to the other and at the other side, lock finger 108 is secured to said shaft 107 and engages a stop 109 on the shifter bar 92 to prevent operation of the clutch shifter until the handle 101 is pulled toward the operator and catch 103 thereby released and cam 106 moved to rock shaft 107 and thus bring finger 108 out of engagement with stop 109. Thus the clutch shifter bars 92 are released so that the operator may put the machine in operation. A weight 110 is connected to finger 108 to bring the lock in locked position on the completion of a cycle of the machine. The label feeding device is operated on the last half of a cycle and is actuated by the clutch releasing pin 111 revolving with the shaft 30 under the action of the pin 94 and as the wrapping cycle is completed contacting with the clutch releasing pin 112 which swings the shifter bar 95 downwardly to cause engagement of the clutch member 89 with the gear 31.

The wrapping mechanism which forms the most important part of the present invention will now be described with particular references to Figs. 1, 8 to 14, 17 and 18 of the drawings.

This mechanism includes a compacting or compressing chamber associated with the parts that fold the previously cut wrapper over the compacted bundle of paper articles

and includes fixed slide supports or guide bars 114 and 115, a fixed end plate 116 having a depending extension 117 forming the entrance end of a delivery chute and a fixed plate 118 forming the opposite side of this chute.

The compression chamber has its sides formed by the end plate 116, a sliding end plate 119 and sliding side plates 120 to which the plate 119 is secured, said side plates 120 working in suitable slots in the plate 116. Each of the side plates 120 of the compressor is provided with a cam roller 121 working in an inclined cam slot 122 of the cam plates 123 which are fastened to racks 124 meshing with the segmental rack gears 125 on a shaft 126 which, as shown in Fig. 3, has a crank arm 127 mounted thereon operatively connected by a connecting rod 128 to the crank disk 105 on the shaft 30 so that when said shaft is revolved, the downward movement of the racks 124 acting through the cam plates 123 will move the compressor member including end plate 119 and side plates 120 toward the right and compress the bundle of paper articles together.

A plurality of folding fingers 129 are secured to a plate 130 slidably mounted and guided on the support 114 and a folding plate 131 is secured to a slide member 132 slidably mounted and guided on the support 115 and having straight line cam extension 133 provided with a relief 134. A coil spring 135 is interposed between a part of the plate 130 and a fixed part of the machine to normally urge said plate and the fingers 129 inwardly or toward the left and a similar spring 136 is interposed between the member 132 and a fixed part of the machine to normally urge said member and the folding plate 131 inwardly or toward the right. The member 132 has an inclined paper guide recess 137 below the plate 131 and a plate 138 on the bottom of said recess provided with a limiting stop 139 extending across it. The plate 130 is provided with projections 140 adapted to be engaged by the side plates 120 to move said plate and the fingers 129 outwardly against the action of the spring 135 while the cam plates 123 each have a cam roller 141 engageable with the adjacent straight line cam 133 to move the member 132 and consequently the folding plate 131 outwardly against the action of the spring 136.

Push buttons 69 are slidably mounted in openings 142 in the plate 116 and backed by springs 143 to move inwardly to prevent the wrapper from sticking to this plate for any reason.

A pusher or plunger member 144 here shown in the form of an I beam, which over the package is recessed at 145 at one side adjacent plate 131 and which has slots in it to clear the side plates 120, is connected to the upper ends of the rack bars 124 and works in the space formed by the plates forming the compression chamber and moves the wrapped package out of said chamber into the delivery chute formed by the extension 117 and plate 118.

With the described arrangement of the parts forming the wrapping mechanism in mind, the wrapper 146 which has been previously cut and creased is fed by the rollers 80 and 81 in the compressing and wrapping chamber as shown by the dotted lines in Fig. 12 when the parts are in the position there shown and as its end strikes the stop 139, the wrapper assumes the full line position shown in that figure and in Fig. 8 which occurs during the last cycle of the operation of the drive means and the collected articles 147 are then placed in the compression chamber as shown in Fig. 8. Thereafter the operator releases the safety device by pulling forwardly on lever 101 and then moves the clutch drive control member 99 toward him which through the mechanism previously described rotates the shaft 30, disk 105 and through rod 128, crank 127 and shaft 126 turn the rack gear 125 to move the racks 124 downwardly and hence the cam plates 123 which acting on the side plates 120 through the roller 121 move said plates and hence the plate 119 to compress the articles forming the bundle, the parts assuming the position shown in Fig. 9. While this movement is taking place, the plates 120 move the plate 130 and folding fingers 129 outwardly by their engagement with the stops 140 so that said fingers move out of the path of the wrapper and the bundle in the compressing chamber and at the same time the rollers 141 acting on the cam extensions 133 move the member 132 and folding plate 131 outwardly so that said plate 131 moves out of the path of the bundle. Thereafter the plunger 144 moves downwardly against the top of the bundle and pushes it into the delivery chute and as it does so, carries the end flap 147′ of the wrapper downwardly and also pulls the other end of the wrapper forwardly along the plate 138 so that at this stage the wrapper surrounds three sides of the bundle for a portion of its length as shown in Fig. 10. Thereafter the rack gear 125 reverses its movement and the plunger moves upwardly as shown in Fig. 11. As the plunger moves upwardly, the cam plates 123 are carried upwardly by the rack bars 124 and this permits the folding fingers 129 to move inwardly first to fold the end 147′ of the wrapper over the top side of the bundle and thereafter the rollers 141 reaching the reliefs 134 permits the folding plate 131 to move inwardly to bend the other end 148 of the wrapper over the top of the bundle and over and in overlapping relation with the end 147 as shown at the completion of the operations in Fig. 12. Under these conditions it will be noted that the fingers 129 are now be-

tween the end flaps of the wrapper which thus holds the flaps apart to allow the glue or adhesive to partially set and the next package will on being forced into the delivery chute provide the necessary pressure to glue the flaps together, it being understood that the glue spots previously deposited on the wrapper are disposed in the spaces between the fingers 129.

The wrapping material as above pointed out is of less width than the package and forms a band about the bundle and is formed by cutting the continuous strip from the supply roll into bands of the requisite length, it being understood that each of these strips may have printed matter thereon, designating the product.

In many instances, the package as formed above may be delivered directly from the chute formed by the plates 117 and 118 and the completed package 149 is shown in Fig. 13. On springy or spongy material however, such as crepe paper, the package 149 should be confined until the glue is set and this has been accomplished in the present instance by having a package channel 150 of sufficient length to allow for the proper setting of the glue. In operation the package channel 150 is filled with packages which have been omitted from the drawings to show up the mechanism associated with this channel.

As shown, the channel in Figs 1, 2, 15 and 16, includes a pair of oppositely disposed endless belts 151 which form sides of the channel for a portion of its length. Each of these belts passes over spaced pulleys 152 on shafts 153 and at their inner run are backed by rollers 151′. Outside of the channel a pair of endless chains 154 are trained over sprockets 155 on spaced shafts 156. At one point these chains 154 are secured by pins 157 to a block 158 slidably mounted on tubular extension 159 on the rack bars 124 which carry adjustable nuts 160 to engage the block 158 on the upward stroke of said bars and which provide a shoulder 161 to engage the block on the downward movement of said bars so that only a portion of the movement or stroke of the rack bar is used to move the chains 154. Each of the chains 154 is adapted to be connected to the outer run of the adjacent belt 151 by a one way clutch best shown in Fig. 16. This clutch includes a block 162 carried by the chain and having a belt engaging face 162′ that cooperates with a clutch or wedge member 163 to clamp the belt between them as the outer run of the chain moves upwardly and to release the belt as the chain moves in the opposite direction, thus moving the inner run of the belts 154 with the packages therebetween downwardly through the channel 150, each clutch member 163 being pivotally mounted at 164 in the blocks 162. Thus the packages are retained in confined condition for a considerable period after the flaps of the wrapper have been pasted together and until the paste is set or set sufficiently to hold the wrapper against any expansive action of the paper articles in the bundle.

From the foregoing it will be noted that we have provided a machine in which the wrapper cut from the supply roll is automatically wrapped around a compressed bundle of paper articles, and has its ends secured together by adhesive and the finished product then delivered from the machine.

We desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What we claim as our invention is:

1. In an apparatus of the character described, the combination of a compression chamber, having parts movable to compact a plurality of paper articles therein widthwise of said articles, means for applying adhesive to a part of a wrapper, means for feeding the wrapper into said chamber in advance of placing the articles therein, means for moving the said parts to compact the bundle, means for bringing the wrapper about the same while maintaining the bundle under compression, and means for folding over the ends of the wrapper while the bundle is in compacted condition to complete the formation of the package.

2. In a packaging apparatus, the combination of a compression chamber having parts movable to compact a plurality of paper articles therein, means for applying adhesive to an end of a wrapper, means for initially creasing said wrapper, means for feeding the creased wrapper into said chamber adjacent angularly disposed sides thereof and in advance of placing the articles therein, means for moving said parts to compact the bundle, means for bringing the wrapper about the same while maintaining the bundle in compacted position, and means for folding over the ends of the wrapper as it leaves said chamber and bringing the adhesive coated end of the wrapper into engagement with the other end of said wrapper while the bundle is in compacted condition.

3. In an apparatus of the character described, the combination with a roll for wrapping material, a receiving chamber, mechanism for feeding wrapping material from the roll to said chamber, cutting it to length and applying adhesive to an end thereof, said chamber having a movable wall to compact articles introduced therein within a portion of the wrapper and widthwise of the articles, means for thereafter bringing other portions of the wrapper about the compacted articles and means for folding over the ends of the wrapper about said articles while in a compacted condition and securing

ends of the wrapper together by the adhesive.

4. In a packaging apparatus, the combination of a compression chamber, means for delivering a wrapper to said chamber with a creased portion for disposal at one corner of said chamber, and a portion of the wrapper disposed at the bottom of said chamber, means for compacting, within the chamber in the direction of the creased portion of the wrapper, a plurality of paper articles disposed edgewise on that portion of the wrapper at the bottom of said chamber, means for moving the wrapper and the articles, while in compacted condition, out of said chamber and bringing the wrapper around the sides of said articles, and means at the exit end of said compression chamber for folding over the ends of the wrapper about the top of the package and securing them together.

5. In a packaging apparatus, the combination of a compression chamber having an opening in one end, a passage leading from said opening, folding means movable into and out of said opening, means for delivering a wrapper to said chamber while said folding means are in their inner position, means for compacting articles introduced into said chamber after the wrapper has been delivered thereto, means for moving said folding means out of said opening and then moving the compacted bundle with the wrapper about the same into said passage, and means for thereafter moving said folding means inwardly to fold the ends of the wrapper over the package.

6. In a packaging apparatus, the combination of a compression chamber having a discharge opening in one end, a passage leading from said opening, folding members reciprocating across said opening, said chamber having a movable end wall, cam means for moving said end wall inwardly to compact a bundle of paper articles disposed in said chamber within a portion of a wrapper introduced into said chamber and for moving said folding members to a position for passage of the package from said chamber to said passage, means for pushing the compacted bundle and its wrapper into said passage, and means for moving said folding members into said opening to engage and fold the ends of the wrapper over the compacted bundle.

7. In a packaging apparatus, the combination of a chamber, including a fixed end plate, movable end and side plates, means for introducing a wrapper into said chamber to extend along the bottom of said chamber and adjacent said fixed end plate, means for moving said movable end and side plates to compress together widthwise and against said fixed end plate a plurality of paper articles placed in said chamber on the wrapper, means for pushing the compacted bundle of articles out of said chamber with the wrapper partially surrounding the same, and means for folding over the ends of the wrapper while the articles are in compacted condition to complete the package, said wrapper having adhesive applied to a portion thereof to secure the ends thereof together.

8. In a packaging apparatus, the combination of a wrapper and article receiving chamber having a movable end wall, means for moving said wall to compact the articles in said chamber while enclosed in a portion of the wrapper, means for delivering the compacted group of articles with the wrapper about the same from the chamber while said wall maintains said group in compacted condition, means for folding over the ends of the wrapper to unite the same, one of the ends of said wrapper having previously had adhesive applied thereto, and a delivery chute to receive the completed packages including oppositely disposed endless belts forming side walls of said chute, said chute holding the completed bundle in compacted position for a predetermined period to allow the adhesive to set.

9. In a packaging apparatus, the combination of a wrapper and article receiving chamber having a movable end wall, means for moving said wall to compact the articles in said chamber while enclosed in a portion of the wrapper, means for delivering the compacted group of articles with the wrapper about the same from the chamber, means for folding over the ends of the wrapper to unite the same, one of the ends of said wrapper having previously had adhesive applied thereto, and a delivery chute to receive the completed packages including oppositely disposed endless belts forming side walls of said chute, said chute holding the completed bundle in compacted position for a predetermined period to allow the adhesive to set, and means for intermittently operating said belts comprising an endless chain associated with each belt to move the same by the chain while the chain is moving in one direction.

10. In a packaging apparatus, the combination of a chamber including a fixed end plate, movable end and side plates, means for introducing a wrapper into said chamber to extend along the bottom of the same and adjacent said fixed end plate; cam means for moving said movable end and side plates to compress together widthwise a group of paper articles introduced into said chamber on the wrapper, a plunger for pushing the compacted and partially wrapped group of articles out of said chamber, a rack for actuating said cam means and said plunger, means for folding over the ends of the wrapper to complete the package, said wrapper having adhesive applied to a portion thereof to secure the ends together, and delivery chute for the completed package including endless belts forming sides on the

delivering chute, and mechanism having a lost motion connection with said rack to move said belts.

11. In an apparatus of the character described, the combination of a compression chamber having parts movable to compact a loose group of articles therein widthwise of said articles, means for applying adhesive to a part of a wrapper, means for feeding the wrapper into said chamber adjacent angularly disposed sides thereof and in advance of introducing the articles therein, means for moving said parts to compact the group of articles, means for bringing the wrapper about the said group of articles while advancing the same in compacted condition, and means for folding over the ends of the wrapper while the bundle is in compacted condition to complete the formation of the package.

12. In an apparatus of the character described, the combination of a compression chamber having parts movable to compact a loose group of articles therein widthwise of said articles, means for applying adhesive to a part of a wrapper, means for feeding a wrapper into said chamber in advance of the introduction of articles therein, means for moving said parts to compress the group of articles into a compacted bundle, means for bringing other portions of the wrapper about the compacted article, and movable flap folding fingers controlled by the moving parts of said compression chamber to fold the ends of the wrapper over the compacted bundle.

In testimony whereof, we affix our signatures.

GLENN A. SHAFFER.
FRANKLIN H. WIRTZ.