

June 16, 1925.

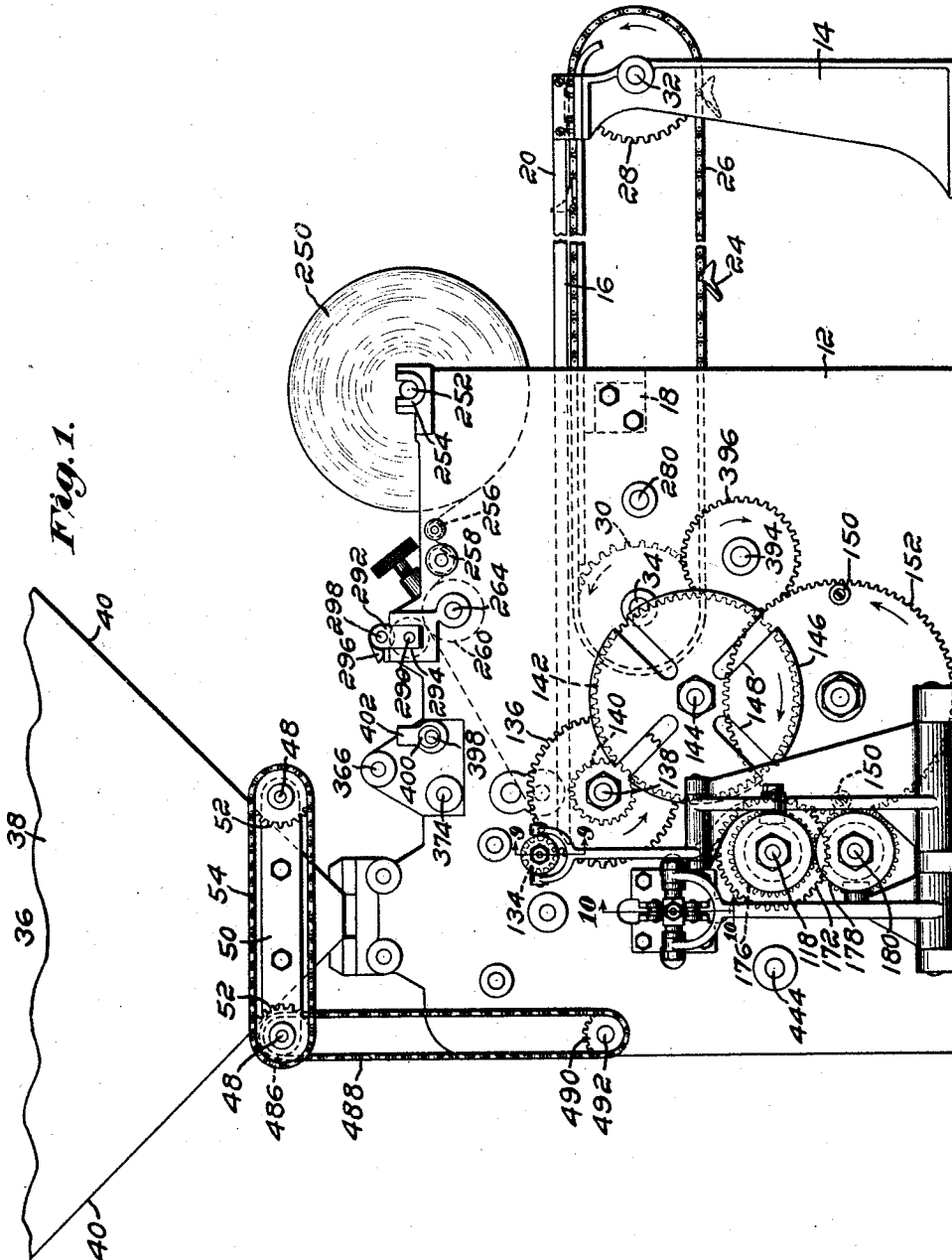
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A. C. VAN SLUYS ET AL

PACKAGING MACHINE

Filed Nov. 2, 1922

8 Sheets-Sheet 1



Inventors:
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June 16, 1925.

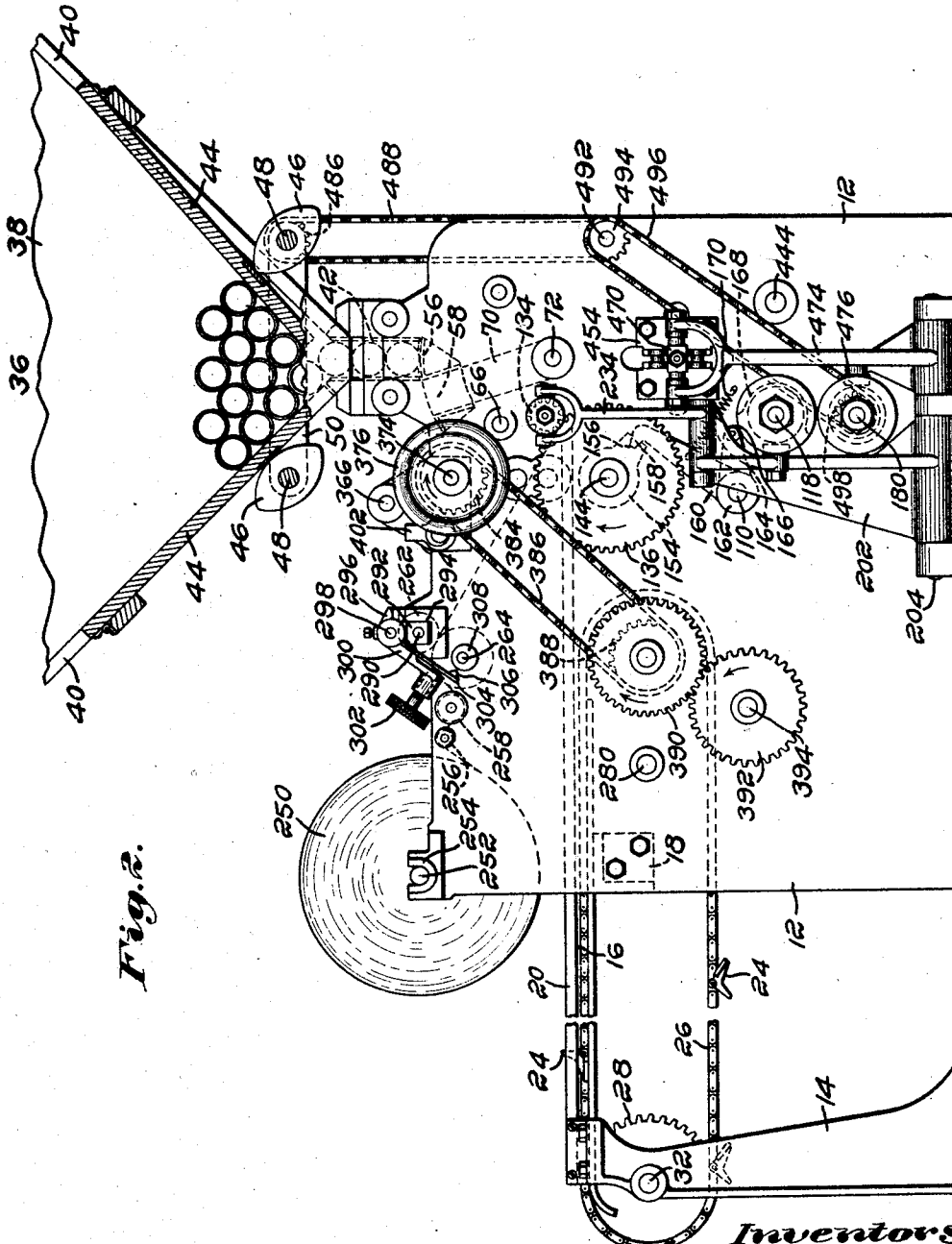
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PACKAGING MACHINE

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8 Sheets-Sheet 2



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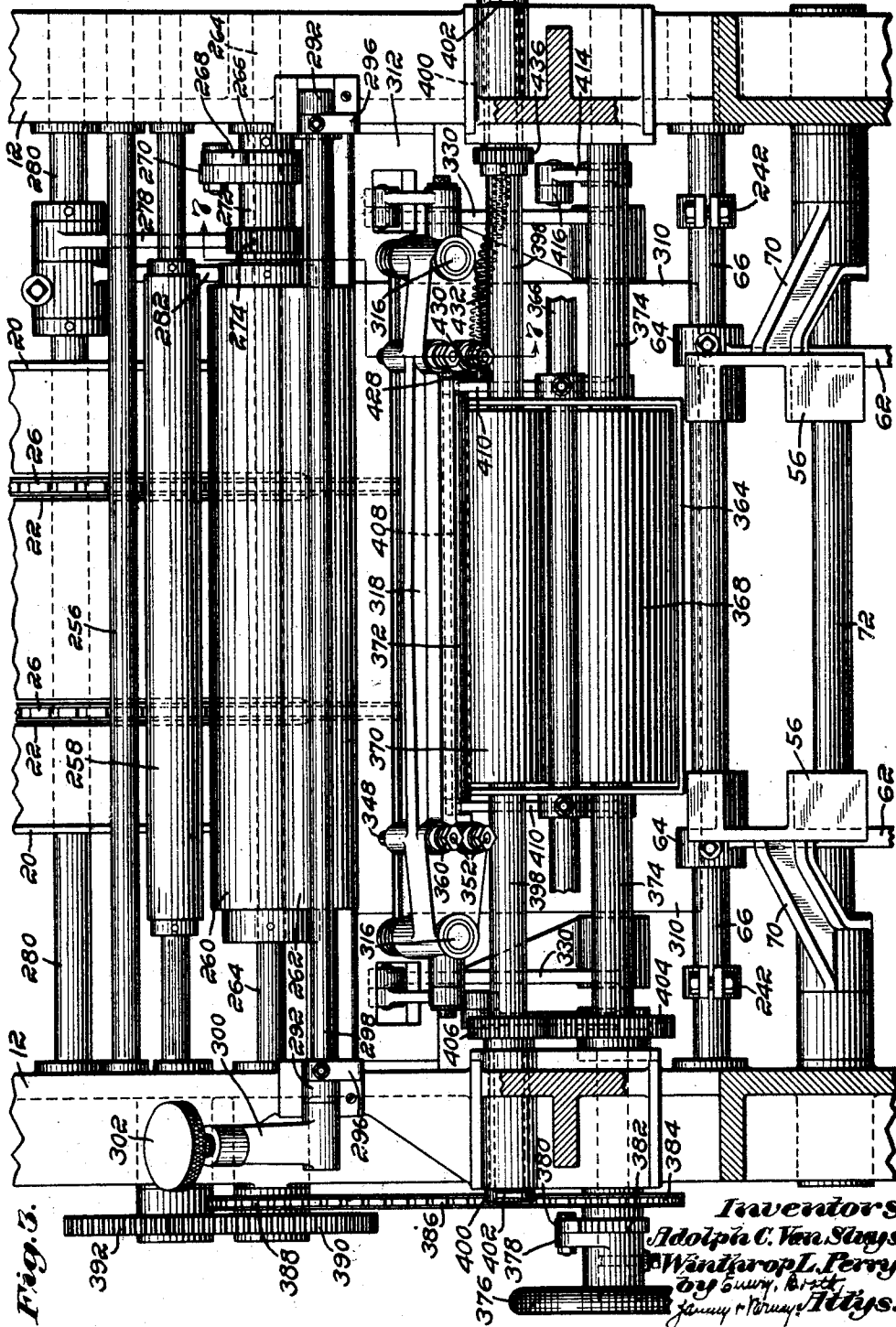
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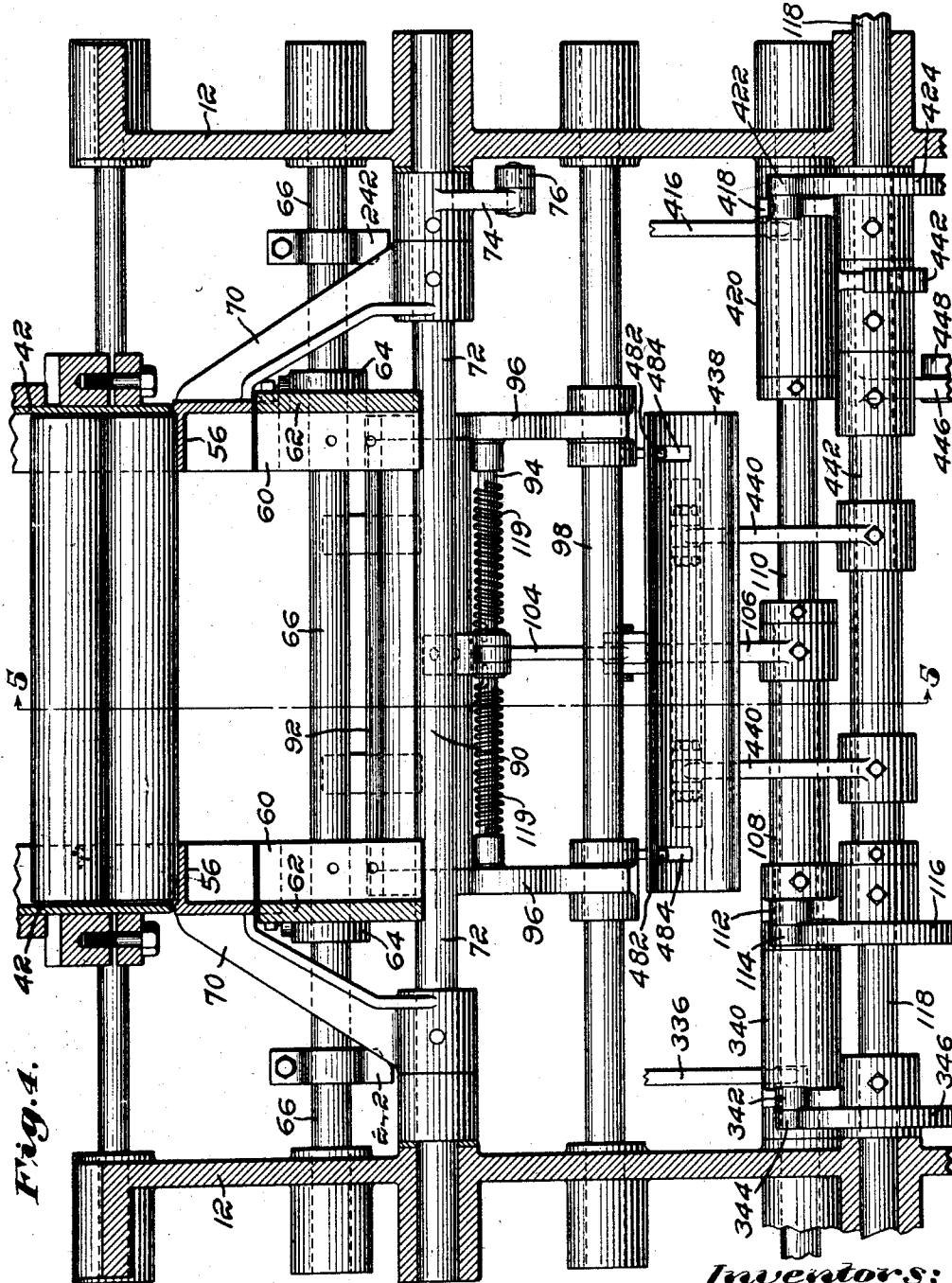


Fig. 1.

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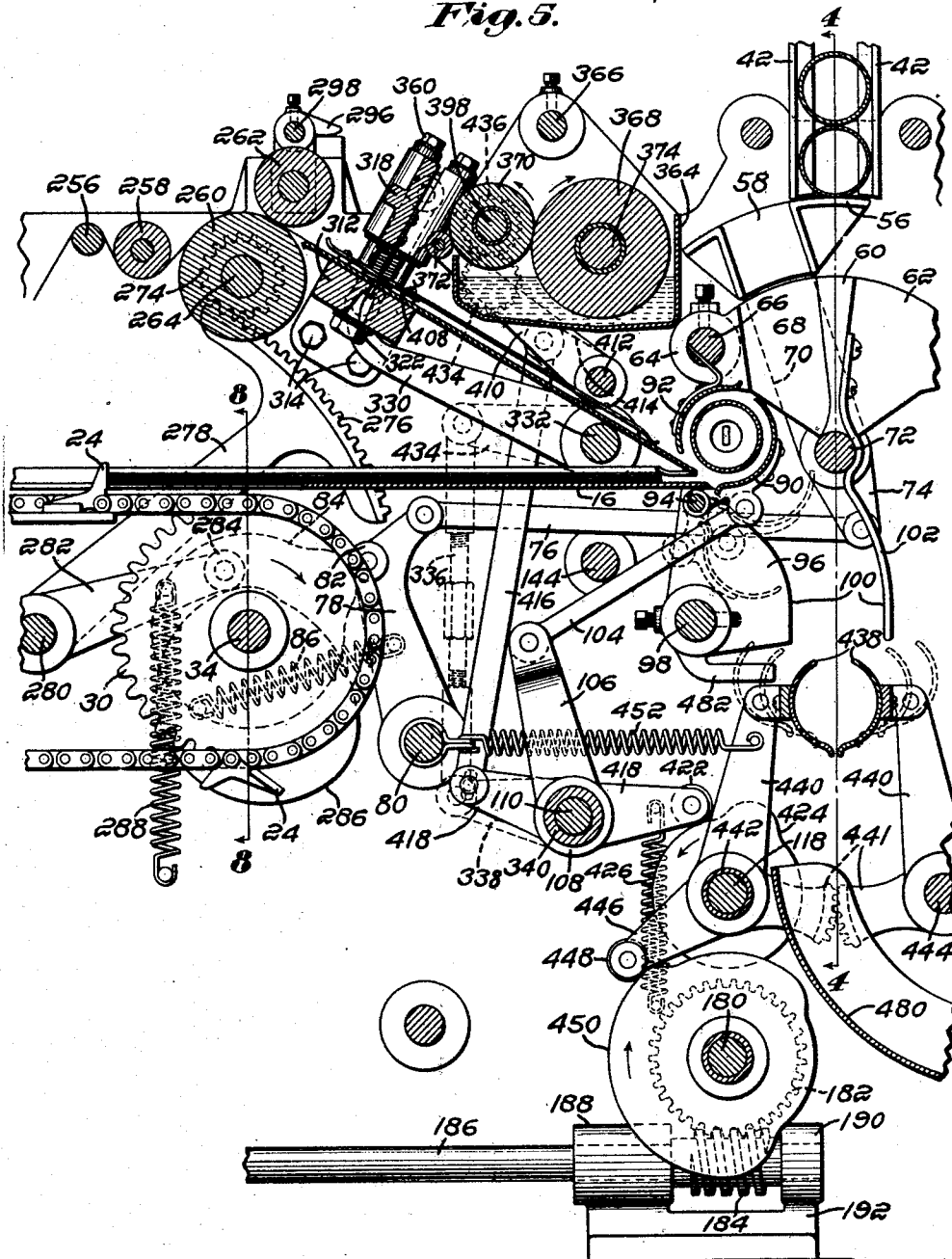
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PACKAGING MACHINE

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8 Sheets-Sheet 5

Fig. 5.



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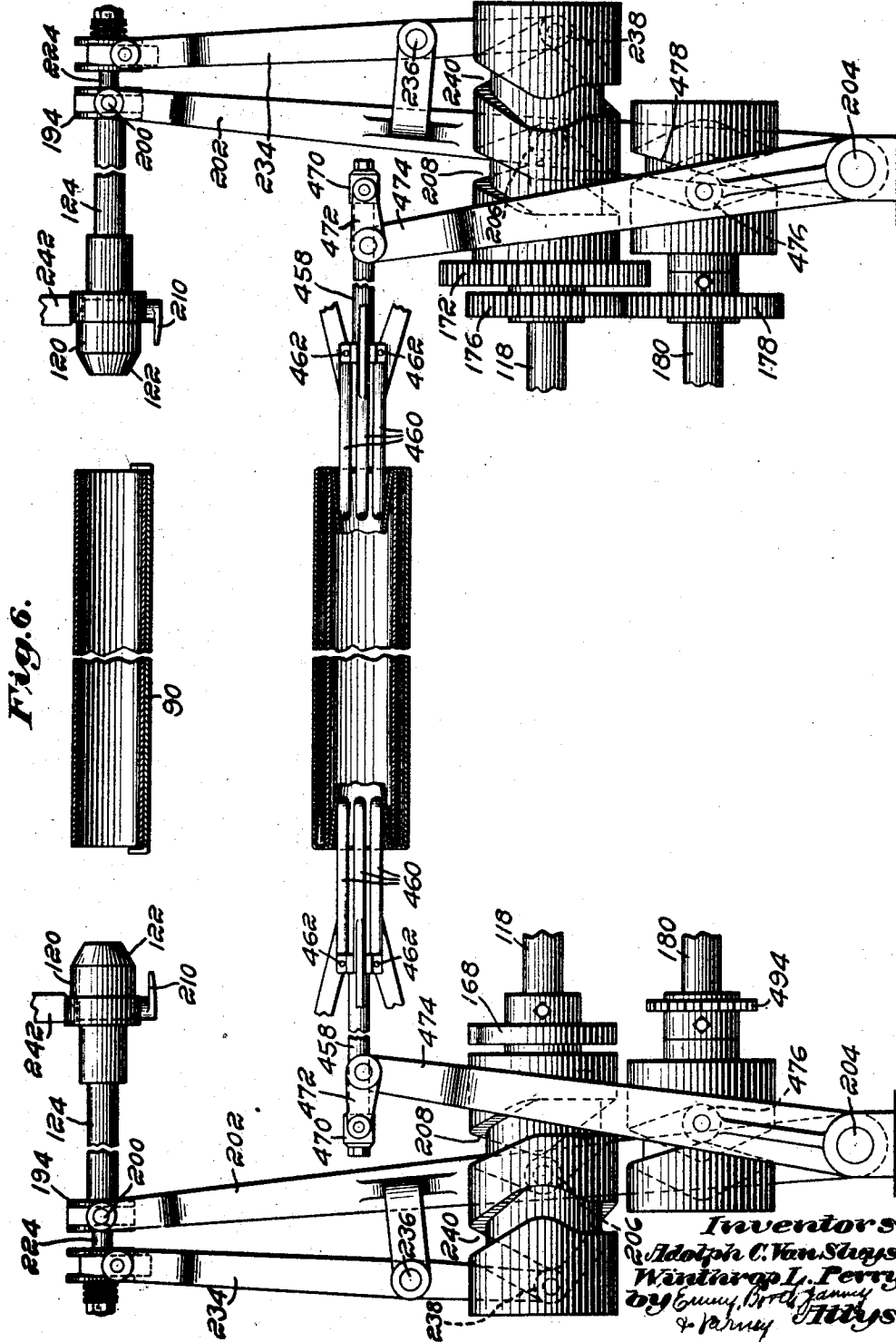
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PACKAGING MACHINE

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8 Sheets-Sheet 6



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PACKAGING MACHINE

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8 Sheets-Sheet 7

Fig. 7.

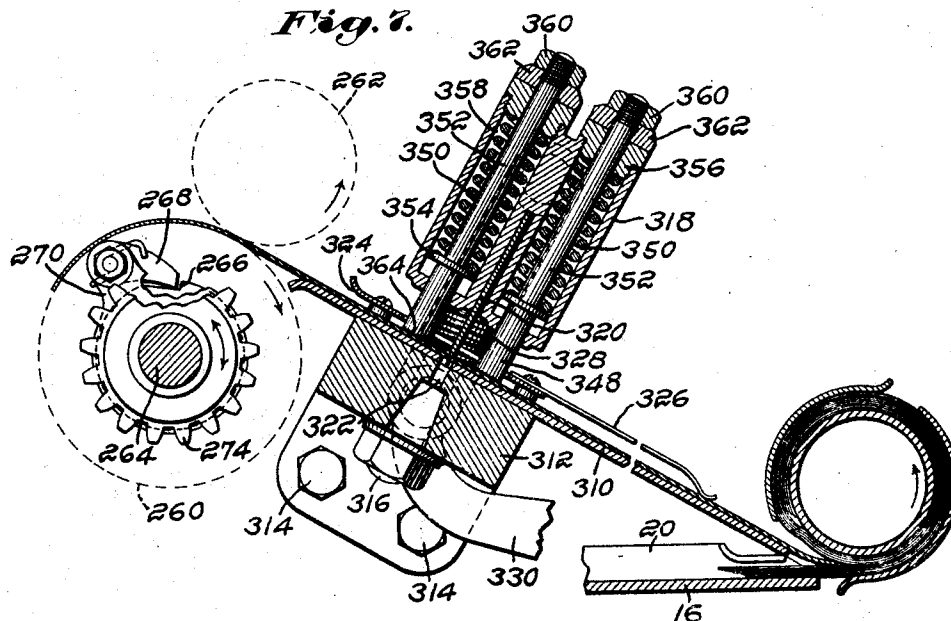
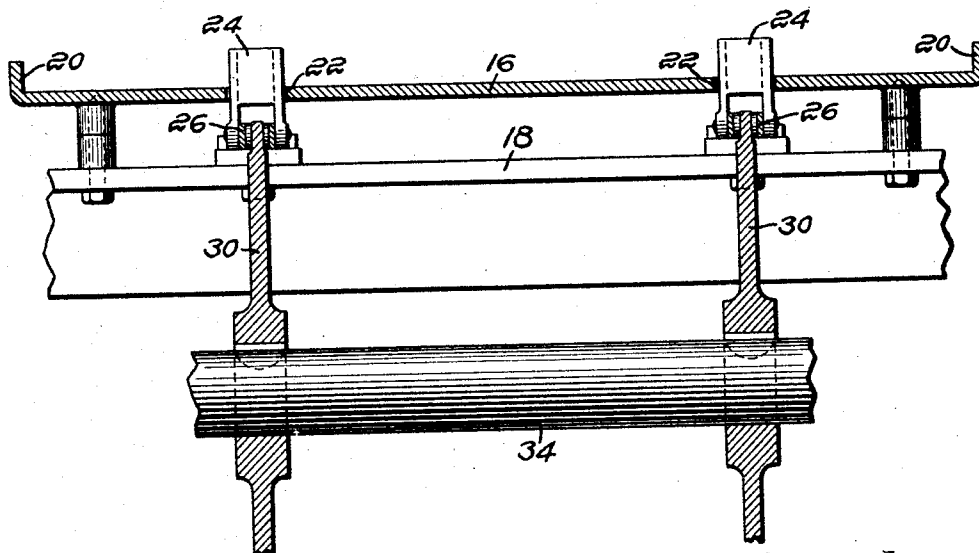


Fig. 8.



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A. C. VAN SLUYS ET AL

PACKAGING MACHINE

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8 Sheets-Sheet 8

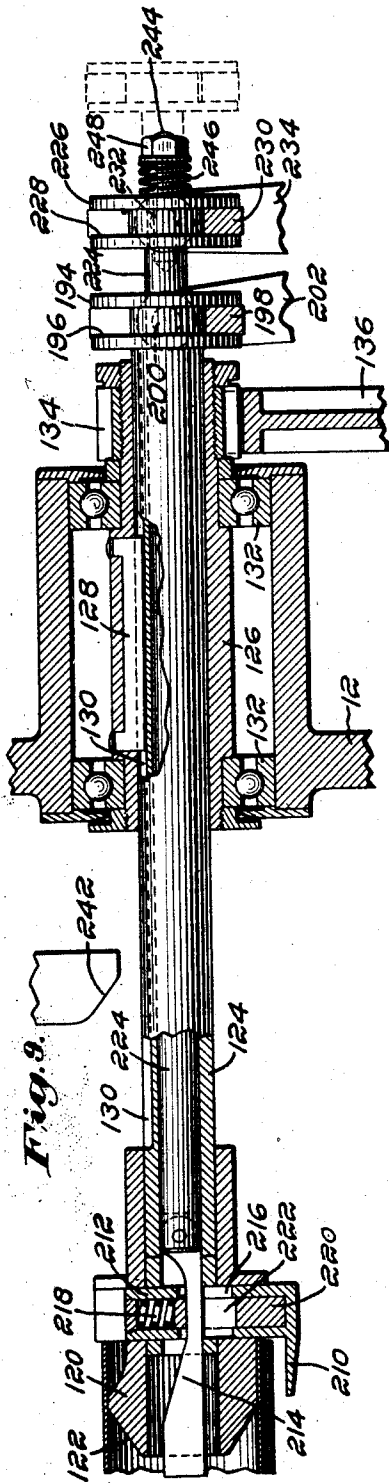
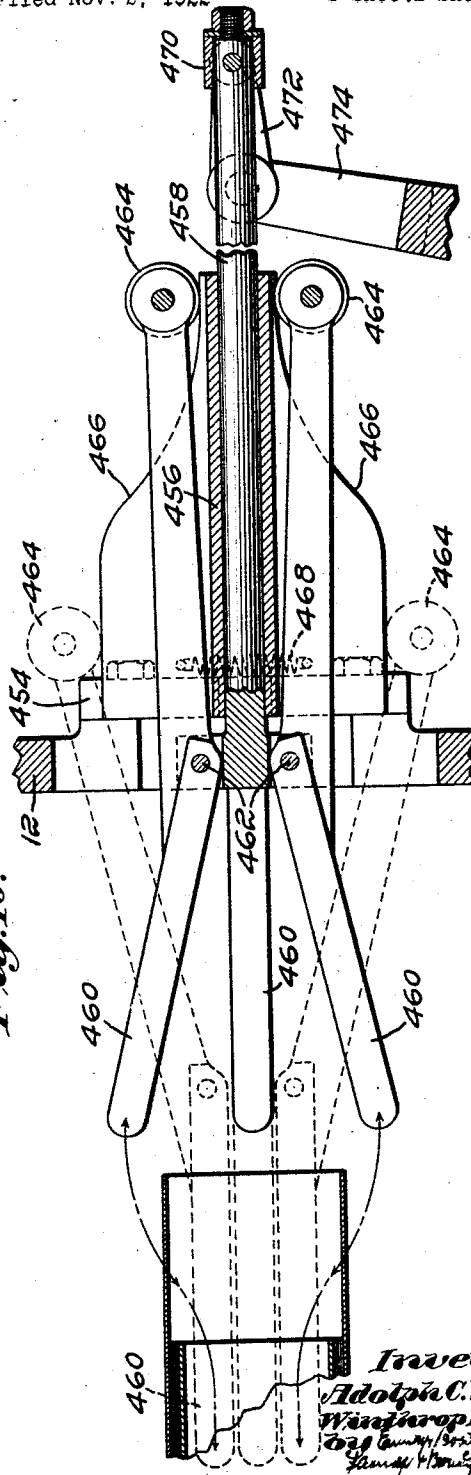


Fig. 10.



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UNITED STATES PATENT OFFICE.

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PACKAGING MACHINE.

Application filed November 2, 1922. Serial No. 593,502.

To all whom it may concern:

Be it known that we, ADOLPH C. VAN SLUYS and WINTHROP L. PERRY, citizens of the United States, and residents of Nashua, in the county of Hillsborough and State of New Hampshire, have invented an Improvement in Packaging Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to packaging machines and aims to provide a novel and improved machine for winding one or more, usually several sheets of material such as waxed paper onto a suitable core such as a cardboard tube, and for applying a wrapper about the sheets and the core. The invention will be best understood by reference to the following description when taken in connection with the accompanying drawings of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings,

Fig. 1 is a side elevation of a packaging machine exemplifying our invention, portions of the same being broken away to save space;

Fig. 2 is an elevation of a machine partly in vertical section as viewed from the side opposite to that shown in Fig. 1;

Fig. 3 is a plan of some of the principal parts of the machine, some portions of the frame being shown in horizontal section;

Fig. 4 is a vertical sectional view on line 4—4 of Fig. 5;

Fig. 5 is a sectional view on line 5—5 of Fig. 4;

Fig. 6 is a skeletonized elevation partly in vertical section of the rolling and tucking mechanisms;

Fig. 7 is a vertical sectional view on an enlarged scale illustrating the wrapper mechanism, taken on line 7—7 of Fig. 3;

Fig. 8 is a vertical sectional view of a portion of the paper feeding mechanism on an enlarged scale on line 8—8 of Fig. 5;

Fig. 9 is a vertical sectional view partly

in elevation of one side of the rotating mechanism on an enlarged scale on line 9—9 of Fig. 1; and

Fig. 10 is a vertical sectional view of one side of the tucking mechanism on an enlarged scale on line 10—10 of Fig. 1.

Referring to the drawings and to the embodiment of the invention which is selected for exemplification, there is shown a packaging machine having a suitable framework for supporting the various mechanisms, the same comprising two main side frames 12 best shown in Figs. 1 and 2, and two auxiliary side frames 14.

The waxed paper feed will now be described, reference being had to Fig. 8. An operator places the sheets in successive piles on a table 16 suitably supported on the framework as by the auxiliary side frames 14 (see Fig. 1) and a tie piece 18 which is secured at its ends to the main frames 12. The table is provided with lateral guides 20 (see Fig. 8) between which the sheets are placed and by which the successive piles are guided toward their destination by the mechanism now to be described.

Still referring to Fig. 8, the table is provided with a pair of longitudinal slots 22 to receive pairs of pushers 24 by which the successive piles are progressed along the table. In the present example these pushers are lugs or dogs pivoted at suitable intervals on chains 26 which pass over and are driven by pairs of sprocket wheels 28 and 30 (see Fig. 1). The sprocket wheels 28 are secured to a shaft 32 which is journaled in bearings presented by the auxiliary frames 14, while the sprocket wheels 30 are secured to a shaft 34 which is journaled in bearings presented by the main frames 12.

The mechanism for feeding the hollow cores will now be described, reference being had at first to Fig. 2. Suitably supported on the main frames 12 is a hopper 36 having two ends 38 and two sides 40, the latter converging downwardly toward an outlet presented by a vertical raceway 42 which is of the proper dimensions for the reception of the tubes in vertical series as they pass

from the hopper. It is found that the feeding of tubes to the raceway is accomplished most satisfactorily by agitating the tubes in the hopper, as by providing the sides 40 with hinged portions 44 which are caused to move in and out in alternation as by cams 46 secured to shafts 48, the latter being mounted in appropriate bearings presented by horizontal bars 50.

Referring now to Fig. 1, the shafts and their cams are driven in unison by suitable mechanism, herein sprocket wheels 52 secured to the respective shafts and connected by a chain 54. Referring now to Fig. 5, escape of the tubes from the raceway is controlled by a raceway cut-off which, in the present example, is a pair of segments 56 presenting openings 58 which are of substantially the same dimensions horizontally as the raceway, and when brought into registration therewith afford a pocket, the depth of which is just a little more than sufficient to receive one tube. A bottom for this pocket is afforded by a pair of stops 60 directly beneath the vertical raceway 42, said stops being conveniently formed as inwardly directed flanges on webs 62 of a pair of brackets 64 (see Fig. 4) secured to a rod 66 which extends transversely of the machine and terminates at opposite ends in the main side frames 12, as will be evident from a comparison of Figs. 4 and 5. The brackets 64 present channels affording a second raceway 68 adapted to receive the tubes when the cut-off segments 56 are swung to the left (Fig. 5) to carry the openings 58 out of registration with the raceway 42 and into registration with the raceway 68. Thus it is evident that with each complete cycle of the cut-off segments, the lowermost tube in the raceway 42 will be allowed to drop into the pocket which is then carried laterally to deliver said tube to the raceway 68, while in the meantime the segments 56 block the lower end of the raceway 42 and prevent the escape of the next succeeding tube.

The cut-off segments 56 are herein conveniently formed as integral parts of two arms 70, best shown in Fig. 4, secured to a rock-shaft 72 which is mounted in suitable bearings presented by the main side frames 12. A short arm 74, also secured to the rock-shaft and shown at the right-hand side of Fig. 4 as well as at the right-hand side of Fig. 5, is connected by a link 76 to a cam lever 78 which is mounted on the shaft 80. A cam-roll 82 carried by the lever (see Fig. 5) cooperates with a cam 84 against which it is held by a spring 86. The cam is secured to the shaft 84 which is mounted in turn on suitable bearings presented by the side frames 12. When therefore, the shaft is rotated, the cam, acting through the lever 78, link 76 and arms 74 and 70,

oscillates the segments 56 in properly timed relationship with the other cooperating parts of the machine. Incidentally it may be noted that the brackets 64 (see Fig. 5) are supported not only by the cross rod 66, but also by the rock-shaft 72 on which they rest.

The winding or coiling mechanism will now be described, reference being had at first to Fig. 5. When the tube gravitates through the second raceway, it is received upon a segmental movable receptacle 90, which, at the moment, is disposed in the generally horizontal position represented in dotted lines in Fig. 5. This receptacle is then swung upward into the position represented in full lines in Fig. 5, wherein it cooperates with an opposite fixed receptacle 92 of similar character, which is supported by the cross-rod 66. These two segmental receptacles together present a chamber into which the tube is brought preparatory to the assembling therewith of the pile of waxed paper which is to be wound about the tube in a manner presently to be described. After the winding operation is completed, including the application of the wrapper, the movable receptacle 90 is swung from the position shown in full lines of Fig. 5 to the lowermost position shown in dotted lines therein, thereby causing the package to be discharged therefrom as will appear more fully hereinafter.

The oscillation of the receptacle 90 herein is conveniently accomplished by mounting the latter on a rock shaft 94, which as best shown in Fig. 4, is supported in bearings presented by brackets 96 which are secured to a cross-rod 98, the latter in turn being supported by the side frames 12. These brackets (see Fig. 5) herein conveniently afford one side or guideway of a third raceway 100, the other side of which is presented by a pair of brackets 102 which are secured to and depend from the brackets 64 respectively. When therefore, the receptacle 90 swings in a downward direction to the lowermost position represented in dotted lines in Fig. 5, the package is allowed to descend the third raceway 100.

The oscillation of the receptacle 90 is accomplished in this instance by a link 104 connecting said receptacle to an arm 106. The arm 106 is secured to a sleeve 108 which, as best shown in Fig. 4, is mounted to turn loosely on a shaft 110, and to the other end of this sleeve is secured a second arm 112 carrying a cam roll 114 which cooperates with a cam 116, the latter being secured to a shaft 118 mounted in bearings presented by the side frames 12. The outline cam 116 is such as to give the receptacle 90 a properly timed movement with relation to the other parts of the machine. The cam-roll is caused to follow the cam by the use of a

suitably arranged spring, herein a pair of torsional springs 119 (see Fig. 4) coiled about the rock-shaft 94.

The core rotating mechanism will now be described, reference being had at first to Fig. 6. The rotating mechanism is in duplicate, there being one for each end of the tube, hence it will be necessary to describe only one in detail. Adjacent to each end of the tube is a plug 120 having a tapered end 122, the better to enable it to enter the tube and to center the latter, especially as the tube, when lying on the segmental receptacle 90 is somewhat below the position which it should occupy during the winding of the sheets thereon,—in other words the axis of the tube is below the axis of the segments 90 and 92 (Fig. 5). The taper on the plug enables it to lift the tube and to center it preparatory to the winding operation, it being understood of course that the body of the plug has a fairly snug fit with the interior of the tube.

Referring now to Fig. 9, each plug is secured to a hollow shaft 124 which is loosely mounted in a sleeve 126 in which it is capable of sliding in an axial direction, but is compelled to rotate therewith by a key 128 secured to the sleeve and adapted to slide lengthwise in a key way 130 provided in the hollow shaft. The sleeve is mounted to rotate in appropriate bearings 132 in the side frames 12.

Rotation of the sleeve and the hollow shaft is accomplished in the present example by gearing including a pinion 134 which is secured to the sleeve and meshes with a gear 136 (see Fig. 9). This gear is secured to a shaft 138 (see Fig. 1) to which is also secured a pinion 140, the latter meshing with a gear 142, which is secured to a shaft 144 journaled in suitable bearings in the side frames 12. Mechanism is provided to rotate the gear 142 intermittently as by Geneva gearing, including a disc 146 secured to the gear 144 and provided with a plurality of radial slots 148, herein four in number, adapted for cooperation with two rollers 150 carried by a gear 152. Each rotation of the gear 152 is accomplished by one half-rotation of the slotted disc 146. The ratio of the gearing is such as to impart to the plugs 120 the required amount of rotation at the proper time in the operation of the machine.

Referring now to Fig. 2, as a means to lock the shaft 144 against rotation during the periods of rest of the slotted disc 146, we have provided suitable locking means herein comprising a disc 154 secured to the shaft and presenting a notch 156 to receive a dog 160 which is a part of a bell-crank lever 162 loosely mounted on the shaft 110 and having an arm 164 carrying a cam-roll 166 which cooperates with a cam 168, the

contour of which is such as to rock the dog to and fro and to cause the same to lock and unlock the slotted disc of the intermittent gearing at the proper times in the operation of the machine. A spring 170 attached to one end of the dog and at the other end of the frame maintains the cam roll in contact with the cam.

Referring again to Fig. 1, the gear 152 which carries the rollers 150 meshes with and is driven by a gear 172 which is secured to the shaft 118 to which is also secured a gear 176 and the latter in turn meshes with and is driven by a gear 178 which is secured to a shaft 180. Referring now to the lower portion of Fig. 5, to the shaft 180 is secured a worm-gear 182 which meshes with and is driven by a worm 184 secured to a main driving shaft 186, the latter being mounted on bearings 188 and 190 presented by a bearing bracket 192.

Referring to Fig. 9 and to the plugs, the rotative movement of which has just been described, we will now describe the mechanism for reciprocating the plugs to carry them toward and from each other and into and out of the ends of the tube. Suitably formed on or secured to each of the hollow shafts 124 is a collar 194 presenting an annular groove 196 which receives a yoke 198 having trunnions 200 pivoted in the forked end of a lever 202.

Referring now to Fig. 6, each of the levers 202 is fulcrumed on a pivot 204 and carries a cam roll 206 which cooperates with a barrel cam 208 whose form is such as to cause properly timed in and out movements of the plug with a suitable period of rest, while the plug is fully seated in the tube and during the rotation of the latter.

Referring once more to Fig. 9 and to the plugs, the reciprocation of which has just been described, we will now describe the mechanism for securing the sheet or sheets to the tube preparatory to the rotation of the latter by the plugs. Carried by each of the plugs is a gripper 210 appropriately mounted for radial movement, as by providing the same with a cylindrical shank 212 which extends through a correspondingly-shaped opening provided in the plug. The inward, gripping movement of the gripper is accomplished by a cam 214 which is mounted to slide lengthwise within the plug and extends through a slot 216 provided in the latter. Preferably means are provided to cause the gripper to engage the paper on the tube with yielding pressure. One convenient way of accomplishing this is by the interposition of a spring between the cam and the gripper as by making the shank 212 hollow for the reception of a spring 218 and a plunger 220, the latter being provided with a slot 222 in which the reciprocable cam is re-

ceived. The slots 216 and 222 are so related that sliding movement of the cam toward the right from the position shown in Fig. 9 is, at first, accomplished by movement of the plunger and the gripper in unison and, when the gripper brings up against the paper on the tube, the spring is adapted to yield and, while the plunger continues its positive movement under the influence of the cam, the further movement of the gripper is yielding. Hence, it follows that the sheets are gripped by spring pressure, thus enabling a considerable difference in thickness to be accommodated and ensuring a firm engagement of the gripper with the sheets.

Reciprocation of the cam is accomplished by securing the same to a rod 224 which slides axially in the hollow shaft 124, but is held against turning movement with relation thereto by the engagement of the latter in turn with the hollow shaft and the plug which it carries. The outer end of the rod 224 carries a collar 226 which presents an annular groove 228 for the reception of a yoke 230 having trunnions 232 pivoted in the forked end of a lever 234.

Referring now to Fig. 6, the lever 234 has its fulcrum at 236 on the lever 202 and hence partakes of the swinging movements of the latter under the influence of the cam 208. However, the lever 234 is given a swinging movement with relation to the lever 202 by the use of a cam-roll 238 carried by the lever 234 and cooperating with a cam 240. It should be observed that the two cam paths 208 and 240 are very similar, in fact, they are so related that the hollow shaft 124 and the rod 224, for the most part, move in unison, but the cam-paths differ to the extent that, when the plug has entered to its fullest extent into the tube, it then remains stationary while the rod 224, carrying the cam 214, moves in an outward direction and thereby causes the gripper to move radially into engagement with the paper to grip the latter against the tube. The rod 224 then remains stationary to cause the paper to remain within the grasp of the gripper during the rotation of the tube.

After the winding operation has been completed, as will appear more fully hereinafter, the plugs are withdrawn in opposite outward directions. No attempt, however, is made to retract the gripper in a radial outward direction at this time, but the axial movement of the plug carrying the gripper therewith is relied upon to slide the gripper lengthwise out of engagement with the paper on the tube. However, it is necessary that, preparatory to the introduction of the plug into the next tube, the gripper shall resume its initial, radially outward position, and to this end we have provided two cams 242, one for each of the

grippers, which are mounted in fixed position on the frame of the machine, and, when the plugs are retracted to the positions shown in Fig. 6, the shanks of the grippers engage these cams and restore the grippers to their initial positions.

In the present example, each of the collars 226 (see the right-hand side of Fig. 9) is mounted to slide axially on a stud 244 carried by the outer end of the rod 224, and encircling this stud is a spring 246 interposed between the collar and an abutment conveniently in the form of a nut 248 threaded onto the outer end of the stud. This spring is auxiliary to the spring 218; which, it will be remembered, causes the gripper to engage the paper with yielding pressure. When, in the operation of the gripper, the cam 214 has forced the same as far as possible against the paper through the intervention of the spring 218, the cam 214 will remain stationary and the spring 246 will yield and allow the collar 226 to move toward the right under the influence of its cam 240.

The wrapper feeding mechanism will next be described, reference being had at first to Fig. 1. A web of paper in the form of a roll 250 is supported by a shaft 252 in bearings 254 presented by the side frames 12. The web of paper is led from the roll over suitable arranged tension rolls 256 and 258 (see Fig. 5) and between a pair of cooperating feed rolls 260 and 262, either or both of which may be made yielding, as by being covered with rubber. An intermittent rotative movement in one direction (clockwise in Fig. 5) is imparted to the lower roll 262 as by the use of a pawl and ratchet mechanism shown in end elevation in Fig. 7 and in plan at the right-hand side of Fig. 3. The roll 260 is secured to a shaft 264 to which is also secured a single-toothed ratchet 266 which cooperates with a spring-pressed pawl 268 pivoted on a pawl carrier, herein an arm 270 on a sleeve 272 which is loosely mounted on the shaft 264 and is provided with a pinion 274 which, as shown in Fig. 5, meshes with a segmental gear 276 carried by a vibrating arm 278. This arm is secured to a shaft 280 to which is also secured an arm 282 carrying a cam-roll 284 which is held in engagement with a cam 286 by a spring 288. The cam is secured to the shaft 34 hereinbefore described.

When therefore, the cam rotates, an up and down movement is imparted to the segmental gear. The parts are so proportioned that one stroke of the segmental gear in an upward direction causes one full rotation of the pinion 274 and consequently one full rotation of the pawl carrier and pawl, thereby causing or tending to cause an advance of the web of paper a linear dis-

tance equal to the circumference of the lower feed roll 260. Downward movement of the segmental gear rotates the pinion 274 in the reverse direction and causes the pawl to travel idly around the ratchet and to snap into place behind the single tooth thereon in readiness for the next upward movement of the segmental gear.

It may not be necessary to use the full rotation of the lower feed roll 260 to feed the required length of paper for the wrapper. Moreover if, as is often the case, there is printed matter on the wrapper it may be desirable to vary the amount of feeding movement from time to time to ensure the proper location of the printed matter between the two ends of the severed piece which forms the wrapper. No matter how accurate the feeding mechanism may be, the slightest error will gradually accumulate and in time would result in the stoppage of the web in an incorrect position with relation to the cutting mechanism later to be described. To avoid this difficulty, we have provided means to enable the operator to vary the amount of feeding movement from time to time during the operation of the machine. Referring to Fig. 2, the upper feed roll is so mounted as to be capable of being raised and lowered out of and into contact with the lower feed roll, it being secured to a shaft 290 which is journaled in bearing blocks 292 mounted to slide vertically in guides 294 presented by the side frames 12. To these bearing blocks, we have pivoted short arms in the nature of cams 296 as by a shaft 298 to which both cams are secured, said shaft being mounted in the bearing blocks as best shown in plan in Fig. 3. To this rock-shaft, is also secured an arm 300, which, as best shown in Fig. 2, carries an adjusting screw 302 which bears against a flat spring 304 carried by the arm 300 and presenting a wiper 306 adapted for engagement with a cam 308 secured to the shaft 264.

When therefore, during the rotation of the lower feed roll, the lobe on the cam engages the wiper and lifts the arm 300, engagement of the cams 296 with the top of the side frames 12 presents a fulcrum point about which the cams rock in an upward direction, thereby lifting the rock shaft 298, bearing blocks 292 and upper feed roll 262. The amount which the feed roll is thus lifted may be varied by turning the adjusting screw 302 in the proper direction.

The web of paper, after passing between the feed rolls, descends an inclined platen 310 (see Fig. 7), the latter extending to a point adjacent to the roll, which is held between and rotated by the hereinbefore described plugs. This platen terminates at

a sufficient distance above the table 16 to permit the passage of the pile of waxed paper sheets beneath the platen to the proper position to be engaged by the grippers carried by the plugs. The platen is suitably secured to a crosswise tie-piece 312 which is secured, as by cap screws 314 to the side frames 12. This tie-piece also presents a convenient support for a cutting mechanism now to be described.

Secured to and projecting in a generally upward direction from the tie-piece are two studs 316 which, as best shown in plan in Fig. 3, present guides for a cross-head 318 which carries a knife 320, best shown in Fig. 7. Preferably, the platen 310 and the supporting tie-piece 312 are slotted as at 322 to present an entrance for the knife, thereby to ensure complete severance of the web when the knife descends. A stripper 324 which extends the entire width of the web and is secured to the tie-piece, ensures the release of the web of the paper from the knife when the latter ascends after severing the web to form the wrapper. A pair of springs 326 press the wrapper against the platen and ensure its accurate introduction into place between two convolutions of the sheets about the tube.

The means for holding the web of paper stationary adjacent the cutting point during the operation of severing the web to form the wrapper, and for holding the latter in fixed position until the proper moment for its introduction between two adjacent convolutions of the waxed paper, will now be described, reference being had to Fig. 7. The cross-head carries two pairs of plungers 348, which are adapted to press the web of paper upon the platen on opposite sides of the slot into which the knife descends, each plunger to this end being resiliently mounted as by the provision of a helically coiled spring 350 encircling a shank 352 presented by the plunger, one end of the spring being seated against an abutment 354 carried by the plunger, and its other end against a fixed abutment, herein a plug 356, threaded into the upper end of a chamber 358 formed in the cross-head. The descent of the plunger may be limited by suitable means, such as a nut 360 threaded onto the upper end of the plunger, and resting against a collar 362, which loosely encircles the plunger, and rests against the plug 356. Preferably, the lower end of the plunger is checkered, or otherwise roughened, as at 364, thereby to afford a non-slipping engagement with the web of paper. In operation, as the cross-head descends, the web is first engaged by the plungers, which hold the web firmly fixed, and during the continued descent of the cross-head and while the springs are being further compressed, thus holding the web with even

greater firmness, the knife descends into and through the paper, thereby severing the web.

One pair of plungers (those below the line of cleavage of the paper) is utilized to hold the wrapper thus severed until the proper moment for it to be taken by the package. By reference to the right-hand portion of Fig. 7, it will be observed that the waxed paper sheets have been partly wound onto the tube, and that the leading edge of the wrapper is actually engaged by the inner surface of the innermost sheet, which therefore tends to drag the wrapper along with it. However, the plungers hold the wrapper until just the proper moment for its release, which is when the leading ends of the waxed paper sheets have traveled to a point where the outer surface of the outermost sheet contacts with the upper surface of the wrapper. The cam which controls the reciprocation of the cross-head is so timed as to elevate the plungers, and to release the wrapper at this particular point in the operation. In practice, it is found that the introduction of about an inch of the wrapper between adjacent convolutions of the waxed paper is sufficient to cause the wrapper to be grasped with sufficient firmness to ensure its being wound about the layers of waxed paper. The length of the wrapper is such as to encompass the roll of waxed paper, and to provide a sufficient overlap, which in practice usually amounts to from two and one-half to two and three-quarters inches.

To form a secure and dust-proof package, it is desirable to provide the overlapping margin of the wrapper with an adhesive, and to cause it to adhere to the body of the wrapper. This can be accomplished conveniently by the use of the adhesive-applying mechanism which will now be described, reference being had at first to Fig. 5. A fountain 364 is suitably disposed with relation to the web of paper, preferably above the platen and forward of the knife, considered with reference to the travel of the web. This fountain may be suitably supported upon the frame as by means of a rod 366. A fountain roll 368, submerged in a bath of suitable adhesive, transfers a coating of the latter to a distributing roll 370, from which it is taken by a vibrating transfer roll 372, which contacts alternately with the distributing roll, and with the web of paper on the platen at a point just forward of the knife.

Referring now to Fig. 3, the fountain roll is secured to a shaft 374, which extends through the ends of the fountain, and is mounted in suitable bearings in the side frames 12. Referring to the left-hand side of Fig. 3, secured to the outer end of the shaft 374 is a hand-wheel 376, by means of

which the shaft may be turned by hand preliminarily to the starting of the machine into operation. The hub of this hand wheel is provided with an arm 378, which constitutes a carrier for a pawl 380 adapted for cooperation with a ratchet 382, which is loosely mounted on the shaft. Suitably affixed to the hub of this ratchet is a sprocket wheel 384, which, as best shown in Fig. 2, is connected by a chain 386 with a sprocket wheel 388, the latter being affixed to the shaft 34 hereinbefore described in connection with the mechanism for feeding the piles of waxed paper to the point of assembly with the tubes. Also secured to the shaft 34, is a spur gear 390, which meshes with a second spur gear 392, the latter being secured to a shaft 394, which is journaled in suitable bearings in the side frames 12 of the machine. To the other end of this shaft (see Fig. 1) is secured a spur gear 396, which meshes with and is driven by a spur gear 152. The train of gearing just described rotates the fountain roll in the direction of the arrow applied thereto in Fig. 5.

The distributing roll is secured to a shaft 398, which is adjustable toward and from the fountain roll, as by being journaled in eccentric bearings 400, one of which is well shown in Fig. 1, the same being provided with handles 402, by means of which the bearings may be rotated to adjust the distributing roll toward and from the fountain roll, thereby to obtain the proper pressure of one against the other. Preferably the distributing roll is driven positively (see Fig. 3), as by gears 404 and 406, meshing with each other and secured to the fountain roll and distributor roll shafts, respectively.

Vibration of the transfer roll 372 to cause the same to contact with the distributing roll and the wrapper in alternation may be accomplished by the mechanism now to be described, reference being had to Fig. 5. The transfer roll is secured to a shaft 408, which has its ends journaled in arms 410, the latter being secured to a rockshaft 412, to which is also secured an arm 414. This arm is connected by a link 416 to a lever 418, which, as shown at the lower right-hand portion of Fig. 4, is formed on a sleeve 420, which is loosely mounted on the shaft 110. The arm 418 carries a cam-roll 422, which cooperates with a cam 424, the latter being secured to the shaft 118. The cam-roll is maintained in contact with the cam by a spring 426. When, therefore, the cam is rotated, the motion is transmitted to the transfer roll, thereby causing the latter to contact with the distributing roll, and to receive a supply of adhesive therefrom, and then to contact with the wrapper, and to transfer adhesive thereto. Preferably, the transfer roll is formed of some suitable

resilient material, such as rubber or gelatine composition, similar to that used for the rollers of printing presses. This enables the throw of the roll to be made slightly greater than the actual distance between the points of contact of the transfer roll with the distributing roll and the wrapper, since the surface of the transfer roll is adapted to yield locally. If desired, further yielding for the same purpose may be provided in the connections between the transfer roll and the cam which actuates it, as for example by making the arms 410 sufficiently slender and of such material as to be susceptible of yielding to a sufficient extent.

It is found that best results are to be had by causing the transfer roll to rotate in a direction opposite to that of the distributing roll when in contact therewith, as the transfer roll removes a greater amount of adhesive from the distributor roll under such circumstances. The mechanism for rotating the transfer roll will now be described, reference being had to the right-hand portion of Fig. 3. To one end of the shaft 408 of the transfer roll is secured a spur gear 428, which meshes with and is driven by a spur gear 430, to which one end of a flexible shaft 432 is secured, the other end of the flexible shaft being secured to a spur gear 434, which, as shown in Fig. 5 meshes with and is driven by a spur gear 436, the latter being secured to the shaft 398 of the distributing roll 370. It follows that the transfer roll is continuously rotated, but in a direction opposite to that of the distributing roll.

When the transfer roll is brought into contact with the rear marginal portion of the wrapper adjacent the line along which the web is severed, a band of adhesive is applied to the wrapper, the width depending upon the length of time the transfer roll remains in contact with the wrapper during the forward motion of the latter. In practice, it is found that a band five-eighths of an inch wide measured in the direction of the travel of the wrapper gives excellent results. When, subsequently, during the rotation of the package by the rotating mechanism, the gummed margin of the wrapper is brought into contact with the body of the latter, it is caused to adhere thereto by reason of the pressure which is exerted by the segments 90 and 92 (see Fig. 5).

The next step in the operation of the machine is to discharge the package from the rotating mechanism. This is accomplished by simply withdrawing the plugs from the ends of the tube, and contemporaneously swinging the segment 90 from the position shown in full lines in Fig. 5 to the lowermost position shown in dotted lines therein.

This permits the package to descend the third raceway 100. While the package might now be considered complete, we prefer to employ a wrapper which is wider than the length of the tube, and to tuck the projecting ends of the wrapper into the ends of the tube, as in this way protection is afforded for the edges of the waxed paper, which might otherwise be soiled. To these ends, the package is now delivered by the raceway 100 into a receptacle presented by a pair of segments 438, which are caused to move toward and from each other, thereby to open and receive the package, and then to close and hold the latter during the tucking of the ends. In the present embodiment, this is conveniently accomplished by mounting the segments on arms 440, which are caused to move in unison, as by the provision of intermeshing segmental gears 441. Referring to Fig. 4, it will be observed that there are two pairs of arms 440, one pair for each of the segments. As shown in this figure, one pair is secured to a sleeve 442, which is loosely mounted on the shaft 118. The other pair (see Fig. 5) is secured to a rock shaft 444, which is mounted in bearings in the side frames 12 (see Figs. 1 and 2).

The to and fro movement of the arms 440 is accomplished by providing an arm 446 secured to the sleeve 442 (as best shown in Fig. 5), and carrying a cam-roll 448, which cooperates with a cam 450, against which it is held by a spring 452, which is attached at one end to one of the arms 440 and at its other end to the shaft 80. It follows that rotation of the cam is accompanied by opening and closing movements of the segments 438, with appropriate periods of rest indicated by the outline of the cam in Fig. 5, which shows the parts in the relative positions which they occupy at the beginning of a period of rest in the closed position of the segments, which period is followed by their opening movement for the receipt of the package.

The mechanism for crimping the projecting ends of the wrapper and tucking them into the ends of the tube will now be described, reference being had at first to Fig. 10. This crimping and tucking mechanism is in duplicate, and a description of one set will suffice for both. Attached to the outer face of each of said frames 12 is a bracket 454, which presents a guide 456 for a reciprocable rod 458, which is axially aligned with the package when the latter is held between the segments 438. The inner end of this rod carries a plurality of fingers 460, herein four, each of which is fulcrumed on a pivot 462, and carries at its outer end a cam-roll 464. Each of these rolls cooperates with a fixed cam 466, conveniently formed as an integral part of the bracket

454. Oppositely disposed fingers are connected to each other by springs 468, which maintain the cam-rolls in contact with their respective cams.

5 Each of the rods 458 is given an in and out movement by mechanism presently to be described, as a result of which the fingers are caused to travel along the paths indicated by the reverse-curved, broken lines, and the arrows at the left-hand portion of Fig. 10, during which the fingers close on the projecting end of the wrapper, crimp the same, and finally thrust the wrapper into the end of the tube, the final position being that which is clearly shown in Fig. 6.

10 The mechanism for reciprocating the rods 458 will now be described, referring to Fig. 6. Attached to the outer end of each rod is a yoke 470, the ends of which are connected by links 472 with the forked end of a lever 474, which is fulcrumed on the pivot 204, and carries a cam-roll 476 cooperating with a barrel cam 478, the latter being secured to the shaft 180. When, therefore, the cam is rotated, the lever is swung to and fro, and the desired reciprocating motion is imparted to the rods which carry the crimping and tucking fingers. After the ends of the wrapper have been tucked into the ends of the tube, the package is complete, and it is then released by the opening of the segments 438 (see Fig. 5), and falls onto a chute 480, which may guide the package to the desired point of delivery. Occasionally it has been found that a package tends to adhere to the left-hand segment in Fig. 5. To cause the release of the package from the segment under such circumstances, we have provided a pair of fixed fingers 482, suitably formed on or secured to the bracket 96, and have provided corresponding openings 484 in the adjacent segment 438, whereby when the latter recedes, the package, if it should happen to adhere to the segment, is brought up against the fingers and is thereby detached from the segment.

15 In the present example, it is found convenient to drive the hopper-agitating mechanism by a train of gearing, including a sprocket wheel 486 (see Fig. 1) secured to the shaft 48, and connected by a chain 488 to a sprocket 490, which is secured to a shaft 492. To the other end of this shaft (see Fig. 2) is secured a sprocket wheel 494, connected by a chain 496 to a sprocket wheel 498 secured to the shaft 180.

20 The general operation of the machine should be understood from the foregoing description, but will now be summarized, referring to Fig. 5. The tubes are fed one by one from the hopper to the point of assembly with the waxed paper sheets and the wrapper. The tube is rotated contrainclockwise, as viewed in Fig. 5, and a pile of waxed paper sheets is advanced to a point

where it is seized by the grippers and is clamped onto the tube, which is then rotated to wind the sheets about the tube.

While the rear ends of the waxed paper sheets are still lying on a table, and the forward ends of the sheets are in some such position as that represented in Fig. 7, the web of paper from which the wrapper is to be severed is fed forward to present its free end between the tube and the waxed paper. The knife severs the web, thus forming a wrapper, which, however, is prevented from being drawn forward by the frictional engagement with the waxed paper until the winding of the latter has reached the proper point, whereupon the wrapper is released and is allowed to wind about the sheets, which by this time are completely wound on the tube.

During the first part of the advance of the wrapper, a band of adhesive material is applied to its rear marginal portion, and when the wrapper is finally completely wound about the package, the adhesive adheres to the body of the wrapper. The package is then released, and is allowed to pass on to the crimping and tucking mechanism, which crimps the projecting ends of the wrapper and tucks them into the ends of the tube. The completed package is then released, and allowed to gravitate toward the point of delivery.

Having thus described one embodiment of our invention, but without limiting ourselves thereto, what we claim and desire by Letters Patent to secure is:

1. In a machine of the class described, the combination of means for rotating a core, means to cause the rotation of the core to effect the winding of a sheet about the core, and means to cause the introduction of a portion of a wrapper between portions of said sheet, whereby continued rotation of said core will effect the winding of a remaining portion of said wrapper about said sheet and core.

2. In a machine of the class described, the combination of means for attaching a margin of a sheet to a core, means for rotating said core to wind said sheet thereon, and means to cause the introduction of a margin of a wrapper between two convolutions of said sheet and thereby secured to and wound about said sheet and core.

3. In a machine of the class described, the combination of means for winding a sheet about a core, means for applying a wrapper about said sheet with the ends of the wrapper projecting beyond the ends of the core, and causing an adhesive coated area of said wrapper to adhere to another area of said wrapper and means for collapsing the projecting ends of said wrapper.

4. In a machine of the class described,

the combination of means for winding a sheet about a core, means for applying a wrapper about said sheet with the ends of the wrapper projecting beyond the ends of the core, means for applying adhesive to an area of said wrapper and for causing such area to adhere to another area of said wrapper, and means for collapsing the projecting ends of said wrapper.

5 10 5. In a machine of the class described, the combination of means for winding a sheet about a hollow core, means for applying a wrapper about said sheet with the ends of said wrapper projecting beyond the ends of said core, and for causing an adhesive coated area of said wrapper to adhere to another area of said wrapper, and means for inserting the projecting ends of said wrapper into the ends of said core.

15 20 6. In a machine of the class described, the combination of means for winding a sheet about a hollow core and applying a wrapper about said sheet with the ends of said wrapper projecting beyond the ends of said core by rotation of said core about a stationary axis, means for causing the cores to travel from the point of application of the wrapper to another point, and means for inserting the projecting ends of said wrapper into the ends of said core at the second-mentioned point.

25 30 7. In a machine for assembling cores and sheets, the combination of a raceway having an outlet for the cores, a stop beneath and spaced from said outlet, a raceway cut-off having means to support the cores in the raceway and an opening which, when brought into registration with said outlet and said stop presents with the latter a pocket into which the lowermost core in the raceway gravitates and rests on said stop, a second raceway out of alignment with the first-mentioned raceway, means to move said cut-off to bring said opening into registration with said second raceway and to cause the transfer of the core in said pocket into said second raceway, and a winding mechanism to which such core is delivered by said second raceway and which winds a sheet or sheets about such core.

35 40 8. In a machine of the class described, the combination of means for bringing a pile of sheets into proximity with a core, means to secure the leading margin of the pile of sheets to the core, means to rotate the core about a fixed axis, and means to cause the trailing portion of the sheets to be wrapped about the core as the latter rotates.

45 50 9. In a machine of the class described, the combination of means for securing a margin of a sheet to a core, means for causing said sheet to be wound about said core by rotating the latter about a stationary axis, and means for causing a wrapper to

be secured to and wound about said core during the rotation of the latter about said axis while the latter remains stationary at the same point at which said sheet was wound.

10. In a machine of the class described, the combination of means for winding one or more sheets about a core, means for applying a wrapper about said sheet or sheets, and means for applying adhesive to a certain area of said wrapper and to cause such area to adhere to another area of said wrapper.

11. In a machine of the class described, the combination of means for winding one or more sheets about a core, means for causing a margin of a wrapper to be pinched between portions of said sheet or sheets and for causing the wrapper then to be wound about said sheet or sheets, and means for applying adhesive to a certain area of said wrapper and to cause such area to adhere to another area of said wrapper.

12. In a machine of the class described, the combination of a holder for a core, means to deliver cores one by one to said holder, means for assembling sheets and wrappers with and causing them to be wound onto said cores while held by said holder, a second holder for a core, means to cause the first holder to deliver the cores with the sheets wound thereon to the second holder, and means to crimp the ends of the wrappers while the cores are held by the second holder.

13. In a machine of the class described, the combination of a holder for a core, means to deliver cores one by one to said holder, means for applying wrappers to said cores while held by said holder, a second holder, means to cause the cores with the wrappers thereon to be delivered to the second holder, and means to complete the wrapping while the cores are held by the second holder.

14. In a machine of the class described, the combination of a holder for a core, means to deliver cores one by one to said holder, means for applying sheets to said cores while held by said holder, a second holder, means to cause said holders to open for the delivery of said cores from the first holder to the second, and means for operating on said sheets while the cores are held by the second holder.

15. In a machine of the class described, the combination of two holders, means to cause said holders to open to receive cores and to close to hold them and to cause the delivery of cores from one holder to the other, and means for applying to said cores while held in the first holder gummed wrappers which are permitted to become set while in the second holder.

16. In a packaging machine, the combination of a magazine for cores, two holders

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for the cores, means to cause the delivery of cores from said magazine to first one holder and then to the other, means for applying sheets to the cores while held by the first holder, and means for completing the packaging operation while the cores are held by the second holder.

17. In a packaging machine, the combination of a magazine for cores, two holders for the cores, a guide to guide the cores from said magazine to one holder, a guide to guide the cores from the first holder to the second, means for applying sheets to the cores while held by the first holder, and means for completing the packaging operation while the cores are held by the second holder.

18. In a machine for assembling cores and sheets, the combination of a raceway having an outlet for the cores, a stop beneath and spaced from said outlet, a raceway cut-off having means to support the cores in the raceway and an opening which, when brought into registration with said outlet and said stop, presents with the latter a pocket into which the lowermost core in the raceway gravitates and rests on said stop, a second raceway out of alignment with the first-mentioned raceway, means to move said cut-off to bring said opening into registration with said second raceway and to cause the transfer of the core in said pocket into said second raceway, a winding mechanism to which such core is delivered by said second raceway and which winds a sheet or

sheets about such core, and a third raceway to which such core is delivered following the winding of the sheet on the core.

19. In a machine for assembling cores and sheets, the combination of a raceway having an outlet for the cores, a stop beneath and spaced from said outlet, a raceway cut-off having means to support the cores in the raceway and an opening which, when brought into registration with said outlet and said stop presents with the latter a pocket into which the lowermost core in the raceway gravitates and rests on said stop, a second raceway out of alignment with the first-mentioned raceway, means to move said cut-off to bring said opening into registration with said second raceway and to cause the transfer of the core in said pocket into said second raceway, a winding mechanism to which such core is delivered by said second raceway and which winds a sheet or sheets about such core, means to cause an adhesive-coated wrapper to be wrapped about said sheet or sheets during the winding operation, a third raceway to which said core is delivered following the application of the wrapper, and a holder which receives the wrapped package from the third raceway and holds the same during the drying of the adhesive on said wrapper.

In testimony whereof, we have signed our names to this specification.

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