June 19, 1945. C. ARELT 2,378,457

MECHANISM FOR CLOSING THE OPEN TUBULAR END OF THE WRAPPER OF A PACKAGE

Original Filed Feb. 20, 1940 4 Sheets-Sheet 1

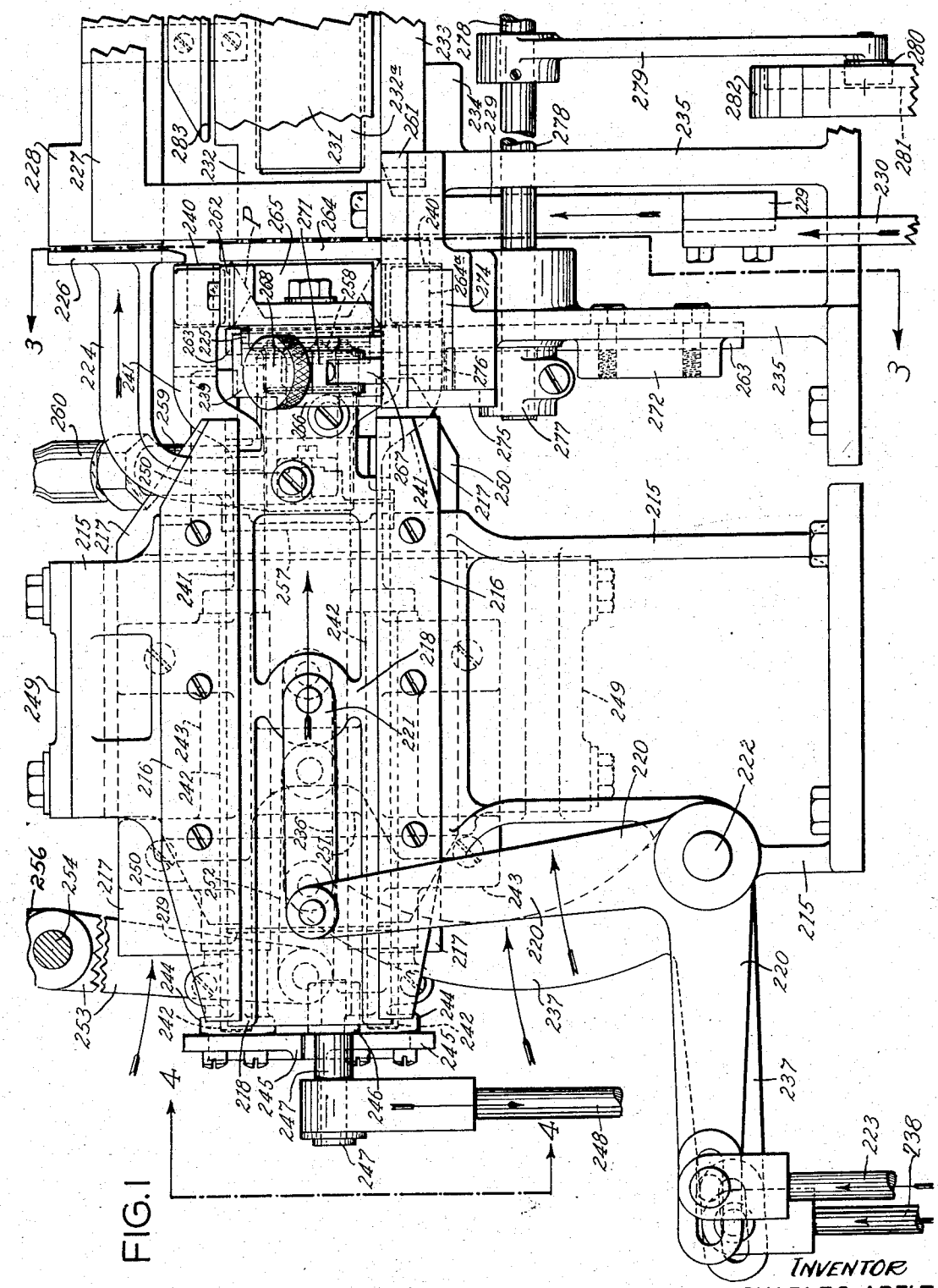


FIG. 1

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Original Filed Feb. 20, 1940 4 Sheets-Sheet 2

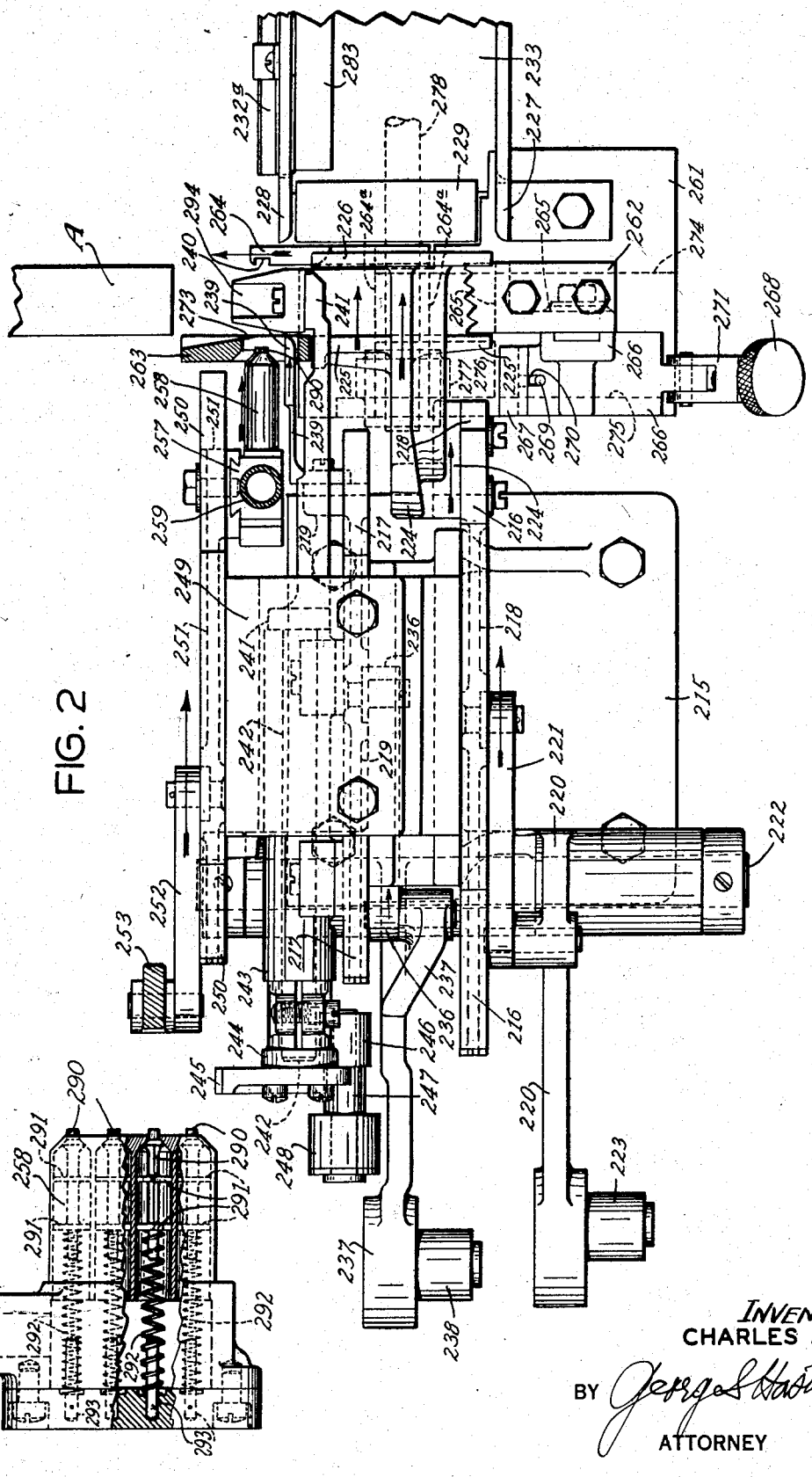


FIG. 2

FIG. 11

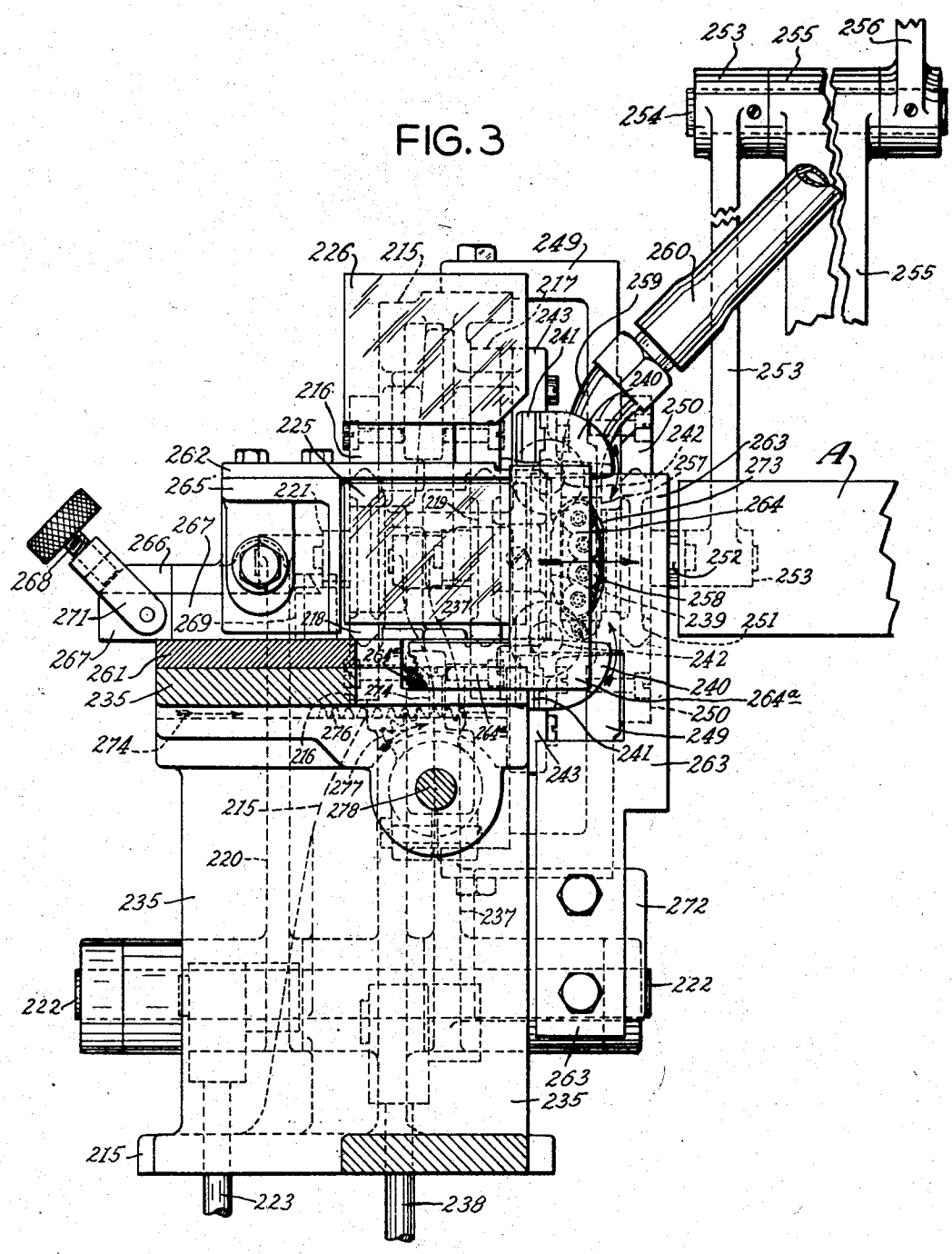
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MECHANISM FOR CLOSING THE OPEN TUBULAR END OF THE WRAPPER OF A PACKAGE

Original Filed Feb. 20, 1940 4 Sheets-Sheet 3

FIG. 3



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Original Filed Feb. 20, 1940 4 Sheets-Sheet 4

FIG. 4

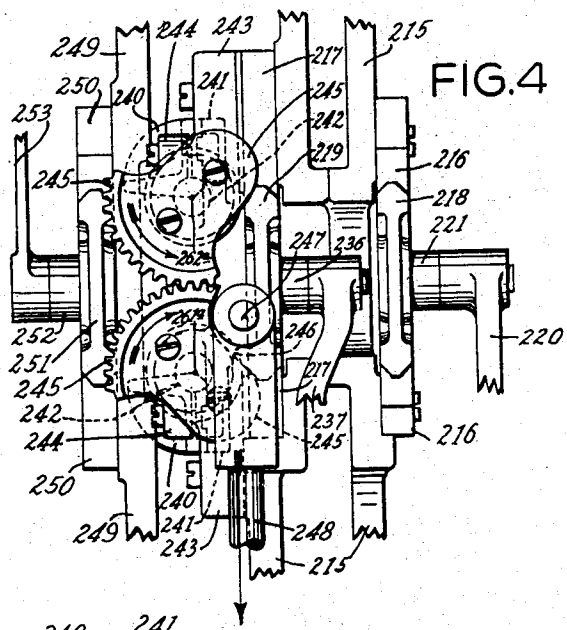


FIG. 5

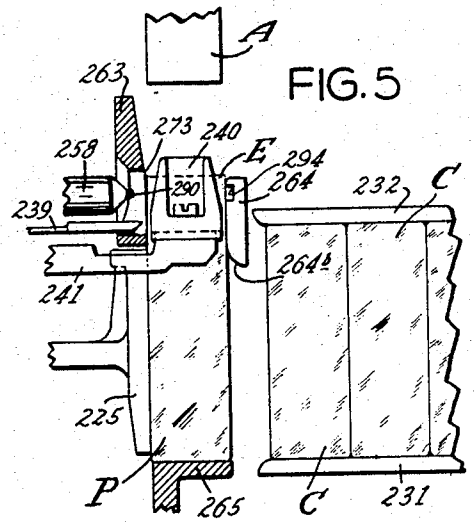


FIG. 6

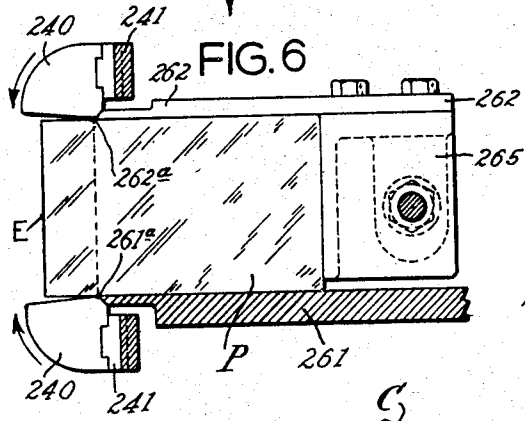


FIG. 7

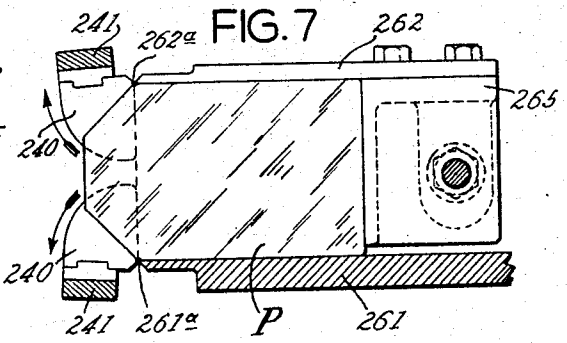


FIG. 8

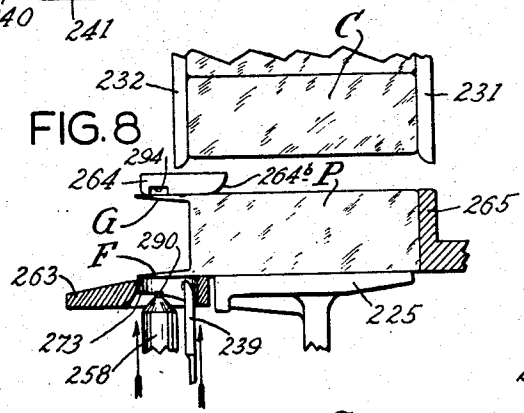


FIG. 9

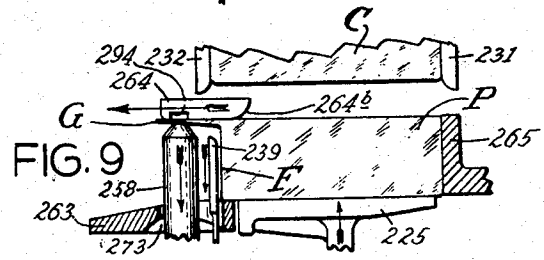
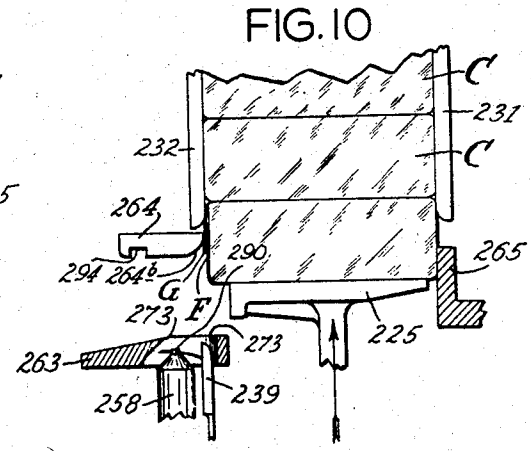


FIG. 10



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Patented June 19, 1945 2,378,457

UNITED STATES PATENT OFFICE

2,378,457

MECHANISM FOR CLOSING THE OPEN TUBULAR END OF THE WRAPPER OF A PACKAGE

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Original application February 20, 1940, Serial No. 319,864. Divided and this application June 17, 1943, Serial No. 491,122

13 Claims. (Cl. 93—6)

This invention relates to improvements in wrapper or package end closing mechanism for packaging machines, especially machines for the packaging of cigarettes and constitutes a division of my co-pending application, S. N. 319,864, filed February 20, 1940.

The invention particularly relates to packaging machines of the kind disclosed in the patent to W. B. Bronander No. 1,926,192, issued Sept. 12, 1933, in which the wrappers are folded about traveling mandrels, mounted for example on a rotary turret, to form containers closed at one end and open at the other end, into which the cigarettes or the like are inserted while still on the mandrels, the containers with the cigarettes or the like therein being ejected from the mandrels and the open ends of the containers then being closed to complete the packages.

The invention consists in a mechanism for closing the open tubular end of the wrapper of a package, including a pair of members between which the package is positioned with the end of the package against which the wrapper flaps are to be folded lying in the same plane as the ends of said members, and a pair of folders rotatable about axes coinciding with the inner corners of the ends of said members and having folding faces extending radially from said axes to engage and fold down opposite flaps of the wrapper.

The invention also comprises a mechanism for closing the open tubular end of the wrapper of a package including a pocket into which the package is inserted and held during the folding of the wrapper flaps, and said pocket includes a third member adapted to coact with one side of the package movable to meet the package as it is advanced toward the pocket and then movable with the package as it is being inserted in said pocket to ensure the proper location thereof with respect to said folders.

The invention further comprises a mechanism for closing the open tubular end of the wrapper of a package wherein the rotatable folders after folding said opposite flaps are returned to inoperative position to permit movement of a paster over the end of the package into engagement with the inner face of the outer side flap of the wrapper to apply paste thereto and said movable member engages with the other face of said flap to support the same, and preferably also the adjoining corner of the package, during the application of the paste to said flap.

Still another object is to provide a package wherein both ends thereof are closed, and to this end a label of sufficient length may be employed to provide flaps which may be folded over both package ends. Thus pouch packages may be formed and ejected from the mandrels, or the label sheet may project sufficiently beyond the inner end of the package in the mandrel to permit said end to be closed following ejection. Alternatively the paster for applying adhesive to the inner face of the outer flap on said inner package end may be used or dispensed with depending upon which type of package is desired.

With these and other objects not specifically mentioned in view the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a side elevation of the folder and tucker units and their operating mechanism;

Fig. 2 is a plan view of the same;

Fig. 3 is an end elevation of the folder and tucker units, taken on line 3—3 of Fig. 1;

Fig. 4 is a partial end elevation taken on line 4—4 of Fig. 9;

Fig. 5 to 10 inclusive are views illustrating the successive stages of the operation of the tucking and folding devices; and

Fig. 11 is a detail view of the paster nozzles.

The mechanism for closing the open tubular end of the package may consist of tucker and folder mechanisms supported by a pedestal 215. To the latter are mounted two pairs of guide bars 216 and 217. Bars 216 support a slidable guide plate 218 while bars 217 support a slidable guide plate 219. Guide plate 218 is reciprocated by a bell crank lever 220 connected to said plate by a link 221. Lever 220 is loosely mounted on a shaft 222 and is operated by a connecting rod 223 which is connected to a cam lever (not shown) actuated by a cam (not shown) of the main drive of the packing machine. Shaft 222 is supported by a bearing of the pedestal 215. To guide plate 218 is secured a pusher bracket 224 equipped with a lower pusher plate 225 and an upper pusher plate 226. The latter is employed for the purpose of pushing the defective packages in between the upper delivery rails 227 and 228 after said packages have been elevated by means of a vertically reciprocating plunger 229 (Fig. 1) operated through a link 230 by suitable actuating mechanism of a detector mechanism such as disclosed in patent to G. H. Little, 2,008,870, July 23, 1935.

Lower plate 225 is employed to push the pack-

ages delivered from the mandrel A at the ejecting station of the turret of a cigarette packaging machine such as shown in Patent No. 1,926,192, into the delivery chute which consists of a pair of side guide rails **231** and **232** and a bottom guide plate **233** supported by a lug **234** of a bracket **235** (Fig. 1). Guide plate **219**, through a link **236**, is reciprocated by a bell crank lever **237** also loosely mounted on shaft **222**. Lever **237**, through a connecting rod **238**, is operated by a suitable cam lever and cam (not shown) from the main drive of the machine. Upon the reciprocating guide plate **219** is mounted a folder plate **239** employed for the purpose of folding over one broad flap of the package after the initial folds are completed by a pair of swinging tuckers **240**.

Each of the latter is adjustably attached to one of a pair of extension bars **241** which forms part of an oscillating shaft **242** each of which is supported by a bearing bracket **243** adjustably fastened to pedestal **215**. To the end of each shaft **242** is adjustably mounted a hub **244** to each of which is adjustably attached a gear sector **245**, both sectors meshing with each other when their centers coincide with the centers of shafts **242**. The gear sectors **245** may be adjusted a small distance radially toward each other on their shafts after the latter have been adjusted away from each other a corresponding distance. Following such adjustment the radial distance from the shaft centers to the gear teeth at the middle portions of the segments will be slightly less than the radial distance to the gear teeth at the ends of the segments, because the gear sectors are not concentric with the shaft centers but have a greater pitch diameter, but this will not interfere with their meshing. The meshing teeth will have minimum clearance at the beginning and end of each working stroke even if the tuckers **240** and shafts **242** have been adjusted as described, thus giving the tuckers a definite location and assuring a sharp fold, as all free play is eliminated at these portions of the working stroke. One of the hubs **244** is provided with a lug **246** which carries a stud **247** to which is pivoted a connecting rod **248** attached to a suitable cam lever actuated by a cam (not shown) which imparts oscillating motion to the gear sectors **245**.

To pedestal **215** is also secured a bridge bracket **249** to which is fastened a pair of guide bars **250** supporting a reciprocating guide plate **251** which, through a link **252**, is operated by an oscillating lever **253** mounted on a shaft **254** (Figs. 1 and 3) supported by a suitable bearing bracket **255** (Fig. 3). To shaft **254** is secured a cam lever **256** which is operated by means of a suitable cam (not shown) from the main drive of the packaging machine. To the reciprocating guide plate **251** is adjustably fastened a paste distributing chamber **257** to which are attached a suitable number of paste nozzles **258** having their orifices normally closed by check valves **290** whose valve heads protrude sufficiently therefrom to be unseated and thereby permit escape of adhesive upon contact of the valve heads with the inner face of the remaining outstanding broad flap. Thus adhesive may be applied to said flap for sealing the same, and when no package is in the range of action of said nozzles no adhesive will be delivered. The distribution chamber **257** is provided with a tubular neck **259** to which is attached a hose **260** (Figs. 1 and 3) connected with a suitable paste reservoir (not shown). The stems of the valves **290** are provided with collars **291** which guide the valves in their orifices and are suitably cut away to resemble a cross and permit passage of the adhesive. The valves are urged against their seats by compression springs **292** abutting the inner collars of the valve stems and seated upon pins **293** in the base of the distribution chamber.

The packages are completed with the exception of the top end folds, on mandrels or arbors on the turret of a cigarette packaging machine such as described in the above mentioned Patent 1,926,192 to W. B. Bronander. The completed packages P with the top end still open are ejected from the arbor A at the ejecting station of the turret and are pushed in a horizonal position between bottom and top guide plates **261** and **262**, respectively, of the tucking and folding unit. A stationary and a horizontally reciprocating side guide plate **263** and **264**, respectively, are provided to secure the straight entry of the package between plates **261** and **262** in the proper location for the tucking and folding operations. Plates **263** and **264** also serve the purpose of giving additional support to the top end edges of the package on which the tucking and folding mechanisms operate. The bottom plate **261** is secured to the top of the bracket **235** and the top plate **262** is fastened to an adjustably abutment **265** arranged to engage the entering end of the package when the same is properly located, and mounted on supporting lug **266** which is held in place on top of guide bar **267** adjustably fastened to plate **261**. Lug **266** is removably secured to bar **267** by a thumb screw **268** and a guide pin **269** (Figs. 2 and 3), the latter being held by bar **267** and engaging with a slot **270** (Fig. 2) in the base of lug **266**. Thumb screw **268** is supported by a forked lug **271** pivoted to bar **267**.

The stationary side guide plate **263** is secured to a lug **272** of supporting bracket **235** (Fig. 1) and is provided with a suitable opening **273** to permit the passage therethrough of the paste nozzles **258** and the folder plate **239**. The horizontally reciprocating side guide plate **264** extends vertically from its longitudinal base plate **264***a* which is secured to a horizontal slide **274** guided by a channel in bracket **235**, bottom plate **261** and a plate **275** (Figs. 1 and 3). The latter is fastened to bracket **235**. The slide **274** is provided with rack teeth **276** (Figs. 1 and 3) which engage with a gear sector **277** adjustably mounted on an oscillating shaft **278** supported by bearings of the bracket **235**. Shaft **278** is actuated by a cam lever **279** (Fig. 1) carrying a roller **280** engaging with a cam track **281** of a cam **282** operated from the main drive of the machine. As the package P is ejected from the arbor A, side guide plate **264** moves in the direction towards the arbor, meets said package and then travels with the same, stopping in a position illustrated in Fig. 1 while the package is pushed in between bottom and top plate **261** and **262** respectively, until the bottom end of the package reaches the abutment **265**. The top end E of the package is still open and the tuckers **240** swing in the direction of the arrows indicated in Fig. 6 and tuck the narrow flaps of the projecting tubular wrapper portion, as illustrated in Figs. 6 and 7. An important feature of this tucking operation is that plate **261** as well as plate **262** stay in contact with its corresponding tucker **241** at a point **261***a* and **262***a* respectively, each point being the center point of the corresponding shafts **242** which operate said tuckers. As points **261***a* and **262***a* are at the ends of their corresponding guide plates, said tuckers do not touch the side of the package and do not use the contents of the package for shaping the corner

for the tucked ends. Therefore no injury of the contents can occur and the density of the same does not affect the folding operation. This unique construction assures that the tucker fold is laid over instead of pushed over, and the contents are not used for a support of the fold, thereby eliminating any injury to the wrapping material and to the contents of the package itself. Another great advantage of this unique tucking arrangement lies in the fact that the machine can be operated at a much higher speed than possible heretofore with ordinary tucker arrangements. It also permits the use of a much larger variety of wrapping material than with tucking methods used heretofore. After the tucking operation is completed the tuckers **240** return to their original position and the folder plate **239** advances in the direction of the arrow, indicated in Fig. 8, and folds the protruding end flap F on to the tucked ends of the package. If a pasted outer flap is desired, the nozzles **258** also move forward in the direction of the arrow and contact the remaining end flap G and deposit the desired dots of glue or paste on the inside of said flap, after which said nozzles return immediately to their original position. During said paste applying and folding operation, plate **264** serves to support and prevent shifting of either the package or said outer flap from their original position, thus assuring a uniform fold as well as a uniform application of paste to the end flap of the package.

During the return motion of folder plate **239**, guide plate **264** moves again towards the arbor A in the direction indicated by an arrow in Fig. 10 and stops when its half-rounded side edge **264***b* is aligned with the package guide **232**. Pusher plate **225**, which up to this moment served as a guide and support of the package during the tucking and folding operation, then advances and pushes said package into the package delivery chute formed by guide rails **231** and **232** and bottom plate **233**. While entering said delivery chute, end flap G passes under the half-rounded side edge **264***b* of plate **264** and is smoothly folded over the previously folded end flap F. The method employed of folding the end flaps immediately after applying paste to the same assures a better seal and thereby eliminates waste resulting from badly sealed packages.

The guide rail **232** of the delivery chute is also equipped with a heating element **232***a* (Fig. 1) which assures a quicker drying of the paste and permits a quicker removal of the finished package C from the machine. All defective packages, which are elevated by plunger **229** to the upper guide rails **227** and **228**, are pushed forward by pusher plate **226** on to a bottom guide rail **283** (Fig. 1) from which said packages are removed by the hand of the operator. In case no paste is desired, when the label forms a pouch for the package, the paste applying device can easily be removed by disconnecting link **252** and detaching bridge bracket **249** from the main frame **215**. To prevent application of paste to the plate **264** when no package is ejected into the range of action of the nozzles, a recess **294** is formed in the operative face of the plate to admit the valve heads protruding from the nozzles, whereby the valves will remain seated and no paste will be delivered.

What is claimed is:

1. In a packaging machine, the combination with members arranged to admit a package having a wrapper enclosing the girth and one end thereof, said wrapping having a tubular portion projecting from the other end of the package, of means for moving one of said members in a direction to meet the package being inserted and move along with said package until it is fully inserted between said members to assure the proper location of the package for folding the open end of the wrapper, and a stationary guide opposite said movable member arranged to engage the entering package for assuring the proper entry thereof between said members, said stationary guide being perforated, and a folder movable through said perforation for folding down one flap of the projecting tubular portion of the wrapper.

2. In a packaging machine, the combination with members arranged to admit a package having a wrapper enclosing the girth and one end thereof, said wrapping having a tubular portion projecting from the other end of the package, of means for moving one of said members in a direction to meet the package being inserted and move along with said package until it is fully inserted between said members to assure the proper location of the package for folding the open end of the wrapper, and a stationary guide opposite said movable member arranged to engage the entering package for assuring the proper entry thereof between said members, said stationary guide being perforated and a folder and a paster movable through said perforation for respectively folding down one flap of the projecting tubular portion of the wrapper and applying paste to the inner face of the opposite flap of said tubular wrapper portion.

3. In a packaging machine, the combination with members arranged to admit a package having a wrapper enclosing the girth and end thereof, said wrapper having a tubular portion projecting from one end of the package, of a stationary guide arranged to engage and guide a package entering between said members, said guide being perforated, and a folder movable thrcugh the perforation in said guide for folding down one of the flaps of said projecting tubular wrapper portion.

4. In a packaging machine, the combination with members arranged to admit a package having a wrapper enclosing the girth and end thereof, said wrapper having a tubular portion projecting from one end of the package, of a stationary guide arranged to engage and guide a package entering between said members, said guide being perforated, and a folder and a paster movable through said perforation for respectively folding down one flap of the said projecting tubular portion of the wrapper and applying paste to the inner face of the opposite flap of said tubular wrapper portion.

5. In a packaging machine, the combination with an abutment arranged to engage the closed end of a package having a wrapper enclosing the girth and one end thereof, said wrapper having a tubular portion projecting from the other end of the package, devices for tucking opposed flaps of said tubular portion, a folder for folding down the inner flap over said tucks, a paster for applying adhesive to the inner face of the outer flap, and a member movable into and out of position to support said outer flap during the application of paste to its inner face.

6. In a packaging machine, the combination with an abutment arranged to engage the closed end of a package having a wrapper enclosing the girth and one end thereof, said wrapper having a tubular portion projecting from the other end of the package, devices for tucking opposed flaps

of said tubular portion, a folder for folding down the inner flap over said tucks, a paster for applying adhesive to the inner face of the outer flap, a member movable into and out of position to support said outer flap during the application of paste to its inner face, and mechanism for actuating said member and retracting it to a position wherein it will wipe the pasted outer flap over the inner flap when said package is moved transversely past the retracted member.

7. The combination with a device for applying adhesive to one face of an outstanding flap of a wrapper enclosing the girth of a package, of a member adapted to engage the other face of said flap and support the same during the application of adhesive, and means for moving said member in and out of flap-supporting position, said member having a recess in the portion of its operative face coinciding with the portion of the flap to which adhesive is applied by said device to prevent application of adhesive to said member by said device when no wrapper is interposed between said member and device.

8. The combination with a device for applying adhesive to one face of a wrapper enclosing the girth of a package, of a member adapted to engage and support the other face of said wrapper and the adjoining corner of the package, and means for moving said member in and out of operative position, said member having a recess in the portion of its operative face coinciding with the portion of the flap to which adhesive is applied by said device to prevent application of adhesive to said member by said device when no wrapper is interposed between said member and device.

9. The combination with a set of members spaced apart sufficiently to admit a package therebetween, said package having a wrapper enclosing the girth of the package and having a tubular portion projecting from one end thereof, one end of said members coinciding with the end of the package from which said tubular wrapper portion projects, a pair of folders rotatable about an axis coinciding with the ends of said members adjacent said tubular wrapper portion and having faces extending radially from said ends of said members, and means for rotating said folders about said axis to cause said faces to fold the tubular wrapper portion.

10. The combination with a delivery chute, of a chamber aligned with said delivery chute and arranged to admit a package, supports overlying said chute, a reciprocable pusher having upper and lower faces adapted to advance packages respectively on to said supports and out of said chamber, a lifter intermediate said chamber and chute, means for actuating said pusher to cause the lower face thereof to eject a package from said chamber on to said lifter, and mechanism for elevating said lifter with the package thereon to permit the upper face of said pusher to advance the elevated package on to said supports simultaneously with the ejection of the next package from said chamber by said lower face.

11. The combination with a support for a package having a wrapper enclosing its girth and projecting from one end thereof, of a pair of tuckers rotatable about axes coinciding with the corners of a package from which said tubular wrapper portion projects and having operating faces extending from said corners outward radially from said axes, and means for rotating said tuckers about said axes to tuck said tubular wrapper portion.

12. The combination with a support for a package having a wrapper enclosing its girth and projecting from one end thereof, of a pair of tuckers rotatable about axes coinciding with the corners of a package from which said tubular wrapper portion projects and having operating faces extending from said corners outward radially from said axes, and means for rotating said tuckers about said axes to tuck said tubular wrapper portion, said means including shafts whose centers coincide with said axes, said tuckers being mounted on said shafts, and gear segments intermeshing with each other and mounted on said shafts.

13. The combination with a support for a package having a wrapper enclosing its girth and projecting from one end thereof, of a pair of tuckers rotatable about axes coinciding with the corners of a package from which said tubular wrapper portion projects and having operating faces extending from said corners outward radially from said axes, and means for rotating said tuckers about said axes to tuck said tubular wrapper portion, said means including shafts whose centers coincide with said axes, said tuckers being mounted on said shafts, and gear segments intermeshing with each other and mounted on said shafts, said shafts being adjustable away from each other, and said gear segments being adjustable radially outward on said shafts to maintain them in intermeshing relationship.

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