March 21, 1944. C. ARELT 2,344,666

HIGH SPEED CIGARETTE PACKAGING MACHINE

Filed Feb. 20, 1940 3 Sheets-Sheet 1

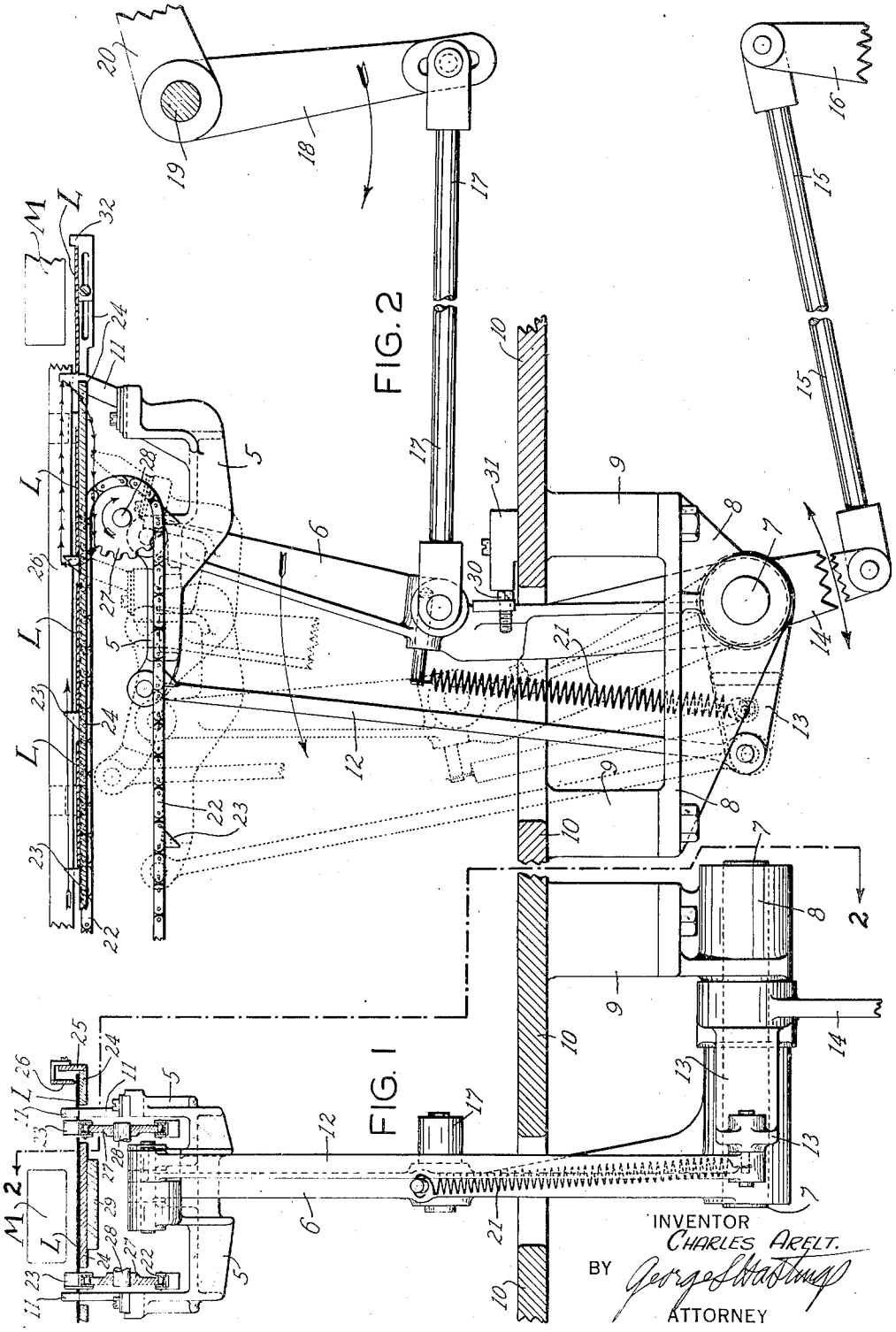


FIG. 2

FIG. 1

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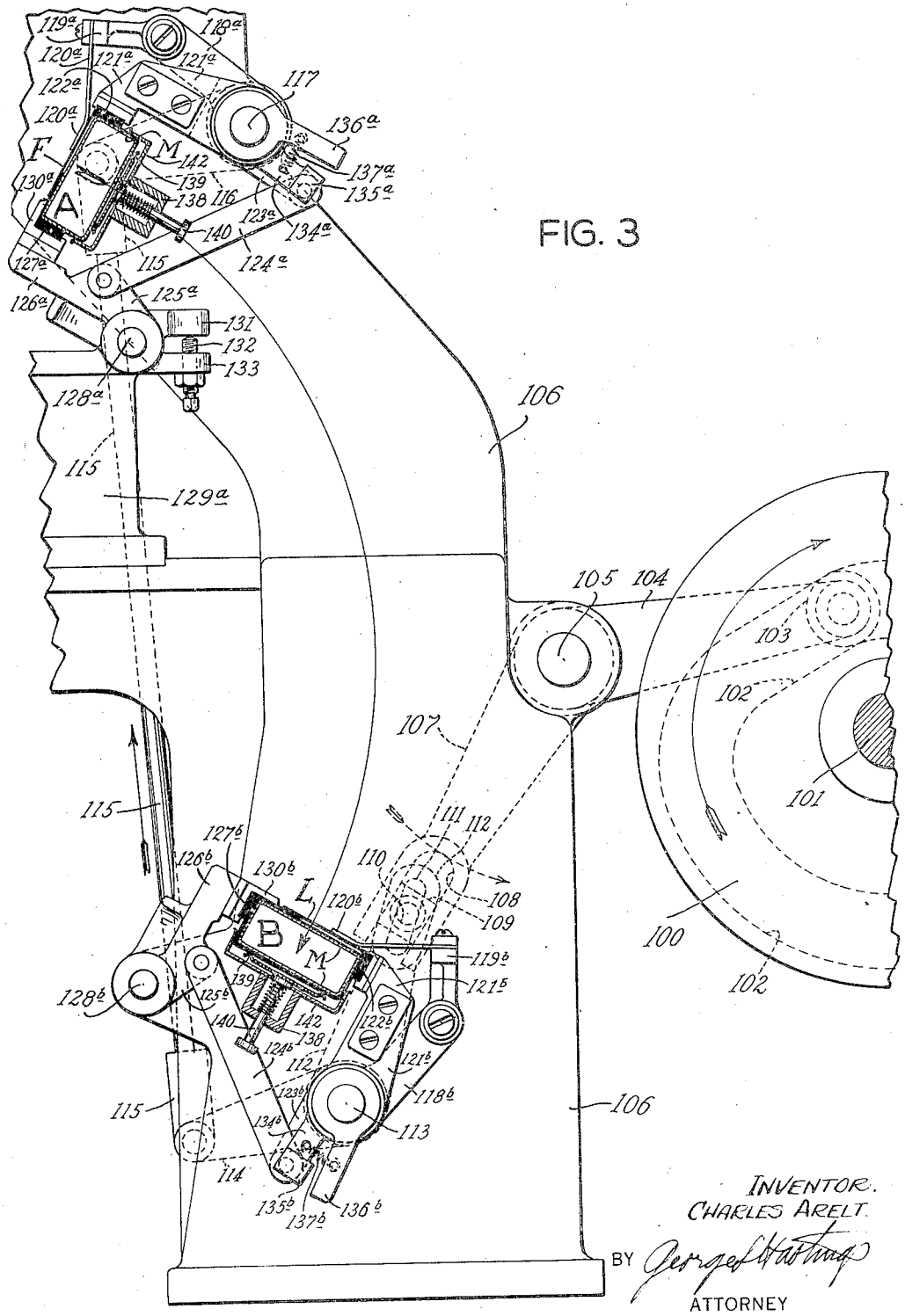


FIG. 3

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FIG. 4

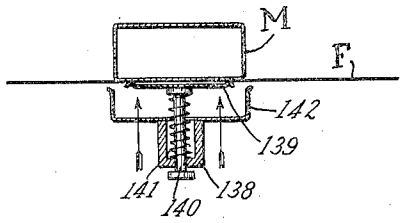


FIG. 5

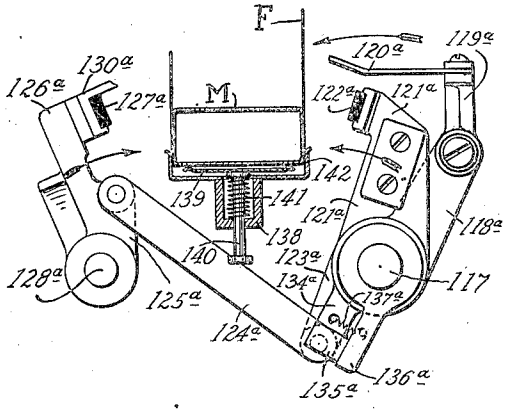


FIG. 6

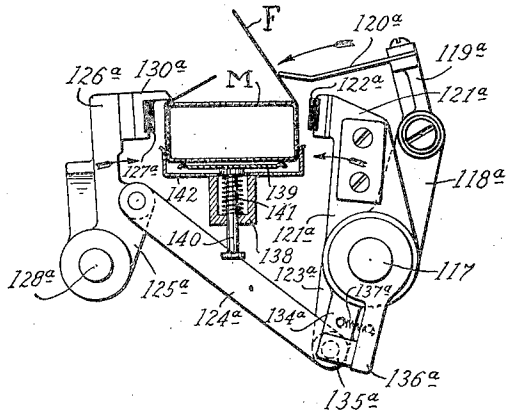


FIG. 7

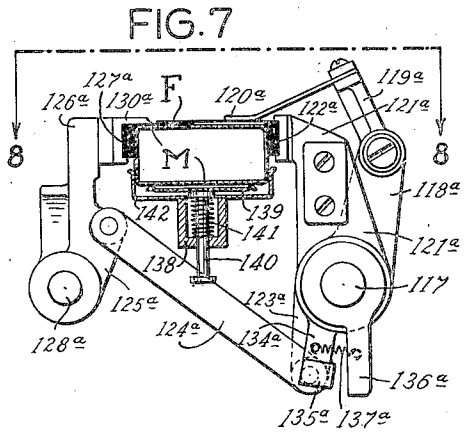
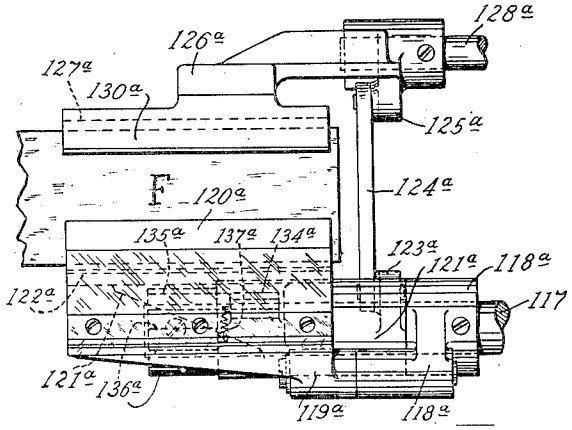


FIG. 8



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UNITED STATES PATENT OFFICE

2,344,666

HIGH SPEED CIGARETTE PACKAGING MACHINE

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Application February 20, 1940, Serial No. 319,864

9 Claims. (Cl. 93—12)

This invention relates to improvements in packaging, more particularly to cigarette packaging machines.

An object of the invention is to provide improved transferring of the label sheet into the path of a traveling mandrel about which the label is subsequently folded. To this end the label is delivered from a magazine or the like upon guides which extend continuously to either side of the path of the mandrels, and the labels are advanced along said guides to a position below an approaching mandrel. Thus the labels may be advanced into the desired position with minimum disturbance.

Another object is to provide improved mechanism forming subject matter of my divisional application Serial No. 491,122, filed June 17, 1943, which will tuck the open end of the packages ejected from the mandrels without employing the contents thereof as a support and thereby injuring the package, and also to provide improved devices constituting subject matter of my divisional application Serial No. 491,123, filed June 17, 1943, which effectively seal the bottom folds prior to ejection.

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 permit folding over both package ends. In connection with this type of package, it is an object of the invention to provide a construction, which also forms subject matter of my divisional application Serial No. 491,122, filed June 17, 1943, for applying paste to the inner face of the outer flap, and supporting said flap during the application of paste, following the ejection of the package from the mandrel and the tucking of the open package end. 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.

Another object of the invention is to provide improved mechanism for draping and folding the foil wrapper and label sheet about the girth of the mandrel, whereby loose wrapping and slippage of the foil or labels is prevented.

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 an end elevation of the improved label transfer mechanism, shown partly in section;

Fig. 2 is a side elevation of the same, taken on line 2—2 of Fig. 1;

Fig. 3 is an end elevation of the foil and label folding mechanisms showing in section the mandrels at the foil and label folding stations;

Figs. 4 to 7 are diagrammatic end elevation views illustrating the successive stages of the operation of the foil folding mechanisms; and

Fig. 8 is a plan view of the foil folding mechanism taken on line 8—8 of Fig. 7.

Label transfer

The label transfer consists of a forked pusher bracket 5, the hub of which is pivoted to arm 6 supported by and fulcrumed to a stud 7 held by a bearing bracket 8 mounted on a pair of lugs 9 of the bed 10 of the machine. The forked end of pusher bracket 5 carries a pair of pusher fingers 11, which are adjustably mounted thereon, and the other end of said bracket is connected by a link 12 to a lever 13 fulcrumed on stud 7. To the hub of lever 13 is attached operating lever 14 which is connected by a rod 15 to a member 16 operated by a cam (not shown) of suitable design. Pusher arm 6 is also connected by a rod 17 to an operating lever 18 mounted on an oscillating shaft 19 which is actuated by a cam lever 20 operated by a cam (not shown) of suitable design. A tension spring 21, connecting arm 6 and lever 13, is provided to prevent any possible play of bracket 5 during operation. The labels L are delivered from a label stack or magazine such as disclosed in Patent #1,888,786, to W. B. Bronander, on to an endless, continuously driven pair of conveyor chains 22 which are equipped with a number of pusher lugs 23 equally spaced in such a way that each pair of lugs push one label at a time. While being advanced by these conveyor chains a lengthwise stripe of adhesive and daubs of adhesive at one end edge of the label are applied to seal the longitudinal seam and one outer flap during the formation of the package on the mandrel, by a paster such as shown in said Bronander patent. The labels are guided by a bottom guide plate 24 and a pair of side guide rails 25. To each of the latter is furthermore adjustably fastened a top guide rail 26. While the labels L are

being advanced they are taken away from the conveyor chain one by one by the reciprocating pusher fingers 11 which push the label under a mandrel M where each label is taken away and folded around said mandrel as hereinafter described. On its return stroke, fingers 11 dip sufficiently to clear the next oncoming label on chains 22, then go upward again and by a fast straight forward motion take said label away from the pusher lugs 23 of said chain and forward it below the next mandrel. The dipping backward motion as well as the straight forward motion of fingers 11 indicated by the lines of arrows in Fig. 2, is achieved through the swinging of the pusher bracket up and down, which is controlled through link 12 by lever 13 actuated by lever 14, while the arm 6 swings to and fro. The dotted lines in Fig. 2 indicate the different positions of fingers 11 and bracket 5 during their backward movement.

The advantage of this improved transfer system lies in the fact that a considerably faster and better transfer of labels is obtained in comparison with the old method of employing a separate carrier which often crushed the labels during their forward motion and rubbed the same during its backward stroke. With this construction the bottom as well as the side guide rails extend from the label magazine to the position under the mandrel M, where the label is taken away, in a straight horizontal line and any dropping, edging or shifting of the label is eliminated. The plate 24 may be notched or otherwise constructed to provide extensions projecting to either side of the path of the mandrel to support the label sheet in said path.

As mentioned heretofore, the conveyor chains 22 are driven continuously from the main drive of the machine (not shown) and are supported by means of a pair of sprockets 27 keyed to a shaft 28 supported by a suitable bearing bracket (not shown) attached to a bottom guide supporting bar 29 (Fig. 1) fastened to a suitable bracket (not shown), mounted on the main frame of the machine.

Pusher arm 6 is also equipped with an adjustable stop screw 30 (Fig. 2) checking the forward motion of arm 6 by contacting a stop lug 31 attached to frame 10. On each fork of the bottom guide plate 24 is provided a suitable stop 32, which is adjustably bolted thereon, to stop the labels in the desired position underneath the mandrel M with their leading edge disposed in the desired relation aligned with or projecting beyond the inner end of the group of cigarettes within the mandrel and their trailing edge overhanging the other end of the mandrel.

Foil and label folding mechanisms

The foil and label folding mechanisms are operated by a cam 100 (Fig. 3) mounted on a shaft 101 driven from the main drive of the machine (not shown). Cam 100 is equipped with a cam track 102 which engages a cam roller 103 mounted on a lever 104 fulcrumed on a shaft 105 supported by bearings of a bracket 106. To shaft 105 is also fastened an arm 107 the forked portion 108 of which engages with a slidable block 109 of a stud 110 which is adjustably clamped in a slot 111 of an arm 112 mounted on a shaft 113 protruding from and supported by bearings of bracket 106. To shaft 113 is furthermore fastened a lever 114 which is connected by a rod 115 with a lever 116 mounted on a shaft 117. While the latter serves to operate the mechanism for folding the foil about the mandrel at station A, shaft 113 actuates the label folding mechanism at station B (Fig. 3). Both folding mechanisms and their actions at these stations are exactly alike. Upon shaft 117 is fastened an arm 118*a* to which is secured a folder bracket 119*a* carrying a folder plate 120*a*. On shaft 117 is also loosely mounted a lever 121*a* which carries a rubber cushion 122*a*. Lever 121*a* is furthermore equipped with a lug 123*a* which, by a link 124*a* is connected with a lug 125*a* of a folder lever 126*a* also equipped with a rubber cushion 127*a*. Said folder lever 126*a* is pivoted to a shaft 128*a* held by a suitable bearing bracket 129*a*. Lever 126*a* carries furthermore a folder bar 130*a*. To shaft 128*a* is also fastened a lug 131 engaging with a control stud 132 held by a lug 133 of bracket 129*a*.

The hub of lever 121*a*, which is loosely mounted on shaft 117, is furthermore provided with a lug 134*a* having a projecting bar 135*a* which, when at inoperative position, is held in contact with an operating lug 136*a* mounted on shaft 117 by a tension spring 137*a* connecting lug 134*a* and lug 136*a*. Thus folder arm 118*a* continues its movement after rubber cushions 126*a* and 127*a* have contacted the side of the package. The mechanism and parts just described are those effecting the folding of the foil wrapper F about the girth of the mandrel at station A (Fig. 3). The mechanism and parts effecting the folding of the label L about the girth of the mandrel at station B are of the same nature and construction and perform similar functions. Therefore all parts thereof having the subscript *b* correspond to those having subscript *a* at station A.

As mentioned heretofore, the folding of the label sheet at station B is done in the same manner as the folding of the foil wrapper at station A. Therefore only one folding procedure, that of the foil wrapper need be illustrated, the successive steps of which are indicated in Figs. 4 to 7 inclusive.

The foil is fed in front of the mandrel at the station preceding station A and a predetermined length is cut off by a foil feeding mechanism such as disclosed in Patent #1,926,192, referred to above, which also discloses an intermittently rotating turret of well known construction (not shown) to which a number of said mandrels M are attached in equally spaced relation. In front of each mandrel is located an arm 138, which is pivoted on the turret and suitably actuated, as disclosed in said Patent #1,926,192. Each arm 138 moves towards its mandrel about the moment a foil wrapper is cut from the foil web feed between it and the mandrel. Thus a clamping plate 139, which has a stem 140 mounted in arm 138 and is urged inwardly by a compression spring 141 on said stem, is moved into clamping engagement with and holds the severed foil wrapper F against the mandrel M (Fig. 4). Upon the further advance of arm 138 towards said mandrel a channel-shaped folding member 142 attached to said arm drapes the overhanging ends of said foil wrapper F against the sides of said mandrel (Fig. 5), so that the foil will assume a U-shape around the mandrel when arriving at the folding station A. At said station the mandrel stops between the folder levers 121*a* and 126*a* which move towards the mandrel in the direction indicated by the arrows in Figs. 5 and 6 until the corresponding rubber cushions 122*a* and 127*a* respectively of said folder levers contact the sides of the mandrel and press the foil firmly against said sides, thus preventing any slippage or bowing of the foil during the folding of the outstanding

flaps into overlapping relation on the mandrel. Since arm 126a is equipped with a folder bar 130a said bar will lay the shorter projecting foil flap smoothly over the corner of said mandrel and on top of the same as illustrated in Fig. 6. The longer projecting foil flap is smoothly folded over the mandrel and over the shorter foil flap by the folder plate 120a on bracket 119a of arm 118a which, due to the yielding connection of lug 134a and 136a, completes its folding action after the rubber cushions of levers 121a and 126a have contacted said mandrel.

At a station (not shown) located between stations A and B, a label sheet is fed by the label transfer described above into the space between the clamp plate 139 and the adjacent side of the mandrel, the arm 138 having been retracted with the plate 139 and folder member 142 following the clamping of the overlapped edges of the foil wrapper on the opposite face of the mandrel by a seam clamp (not shown) having the construction shown in said Patent #1,926,192. As the mandrel resumes its movement toward station B, the label sheet so positioned in its path is clamped against its forward face by plate 139 and draped over its sides by folder 142. At station B the outstanding flaps of the label are folded into overlapping relation by the folders 130b and 120b following the retraction of the seam presser which then presses the top flap, to the inner face of which a stripe of adhesive has been applied, against the inner flap to seal the longitudinal seam of the label. The upper and lower flaps of the projecting tubular portion of the foil were folded upon each other at a preceding station by folders (not shown) such as illustrated in Patent 1,885,910. At a station subsequent to that at which the label was folded about the mandrel, the tucking, and final folding of the tubular portion of the label upon the outstanding ears of the foil wrapper formed by the folders at said preceding station is accomplished, by mechanism such as illustrated in Patent 1,885,910. It will be understood that adhesive was previously applied to the portion of the label sheet corresponding to the inner face of the outer flap which is folded down on the inner flap to form a seam which is sealed by the operation of devices forming the subject matter of my divisional application Serial No. 491,123, filed June 17, 1943. Finally, at the ejecting station the cigarettes are ejected from the mandrel into which they were previously inserted, thus stripping off the foil wrapper and label from the mandrel and delivering the partially completed package to the tucker and folder unit forming the subject matter of my divisional application Serial No. 491,122, filed June 17, 1943.

What is claimed is:

1. The combination with a traveling box-shaped support, of means for feeding a wrapper into the path of said support, a clamp for pressing the wrapper against one face of said support, a U-shaped folder for draping the clamped wrapper over the sides of the support, mechanism for folding the edges of the clamped wrapper into overlapping relation on a face of said support opposite that to which the wrapper is clamped, and members for pressing the wrapper against the corners of the support adjacent the face on which the wrapper edges are overlapped, during the operation of said folding mechanism.

2. The combination with a traveling box-shaped support, of means for feeding a wrapper into the path of said support, a clamp for pressing the wrapper against one face of said support, a U-shaped folder for draping the clamped wrapper over the sides of the support, mechanism for folding the edges of the clamped wrapper into overlapping relation on a face of said support opposite that to which the wrapper is clamped, and members for pressing the wrapper against the corners of the support adjacent the face on which the wrapper edges are overlapped, during the operation of said folding mechanism, said mechanism including a swingable folder for folding one of the wrapper edges, and one of said members being yieldingly mounted on said swingable folder for movement therewith into position to press the wrapper against the corresponding adjacent corner of the support.

3. The combination with a traveling box-shaped support, of means for feeding a wrapper into the path of said support, a clamp for pressing the wrapper against one face of said support, a U-shaped folder for draping the clamped wrapper over the sides of the support, mechanism for folding the edges of the clamped wrapper into overlapping relation on a face of said support opposite that to which the wrapper is clamped, and members for pressing the wrapper against the corners of the support adjacent the face on which the wrapper edges are overlapped, during the operation of said folding mechanism, said mechanism including a swingable folder for folding one of the wrapper edges, and one of said members including a resilient cushion mounted on said folder for movement therewith into position to press the wrapper against the corresponding adjacent corner of the support.

4. The combination with a box-shaped support, of means for folding a wrapper about the girth of said support with the edges of the wrapper disposed in overlapping relation on one face of said support, and members for pressing the wrapper against the corners of the support adjacent the face on which the wrapper edges are overlapped, during the folding of said edges into overlapped relationship, said means including a swingable folder for folding one of the wrapper edges, and one of said members being yieldingly mounted on said swingable folder for movement therewith into position to press the wrapper against the corresponding adjacent corner of the support.

5. The combination with a box-shaped support, of means for folding a wrapper about the girth of said support with the edges of the wrapper disposed in overlapping relation on one face of said support, and members for pressing the wrapper against the corners of the support adjacent the face on which the wrapper edges are overlapped, during the folding of said edges into overlapped relationship, said means including a swingable folder for folding one of the wrapper edges, and one of said members including a resilient cushion mounted on said folder for movement therewith against position to press the wrapper into the corresponding adjacent corner of the support.

6. The combination with a traveling box-shaped support, of means for feeding a wrapper into the path of said support with one end of the wrapper overhanging the end of the support, a clamp for pressing the wrapper against one face of said support, a U-shaped folder for draping the clamped wrapper over the sides of the support, mechanism for folding the edges of the clamped wrapper into overlapping relation on a face of said support opposite that to which the wrapper is clamped, members for pressing

the wrapper against the corners of the support adjacent the face on which the wrapper edges are overlapped prior to the operation of said folding mechanism, and means for tucking and folding the overhanging end of the wrapper after its edges have been overlapped on said support.

7. The combination with means for folding a wrapper about the girth of a package, with the edges of the wrapper disposed in overlapping relationship along one face of the package, said means including movable folders adapted to engage and fold the wrapper into overlapping relationship along one face of the package, and mechanism for actuating said folders, of members movable into position to engage and press the wrapper against the corners only of the package adjacent the face on which the wrapper edges are overlapped, and mechanism for operating said members to press said corners while said folders are operating to overlap the wrapper edges of the wrapper over the sides of the support.

8. The combination with means for folding a wrapper about the girth of a package with the edges of the wrapper disposed in overlapping relationship along one face of the package, said means including a movable folder adapted to engage and fold one of the wrapper edges on to the face on which the wrapper edges are overlapped, and a member mounted on said folder for movement therewith into position to press the wrapper against the corner of the package over which the corresponding wrapper edge is folded by said folder.

9. The combination with a traveling box-shaped support, of means for feeding a wrapper into the path of said support, a clamp for pressing the wrapper against one face of the support, and a folder having sides whose outer edges are adapted to snugly engage the sides of said support for draping the clamped wrapper over the sides of said support, and a member supporting said folder and movable toward the face of said support to which the wrapper is clamped to cause the outer edges of the folder sides to drape the wrapper over the sides of said support, and stop the folder sides in a position wherein their outer edges are adjacent the corners of the support adjacent the face to which the wrapper is clamped, the height of the sides of said folder being substantially less than the breadth of the sides of said support, and the extent of movement of said folder supporting member during the draping of the wrapper over the sides of the support being less than the breadth of the sides of said support, so that the outer edges of the sides of the folder will lie in a position adjacent the face to which said wrapper is clamped.

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