

May 5, 1942.

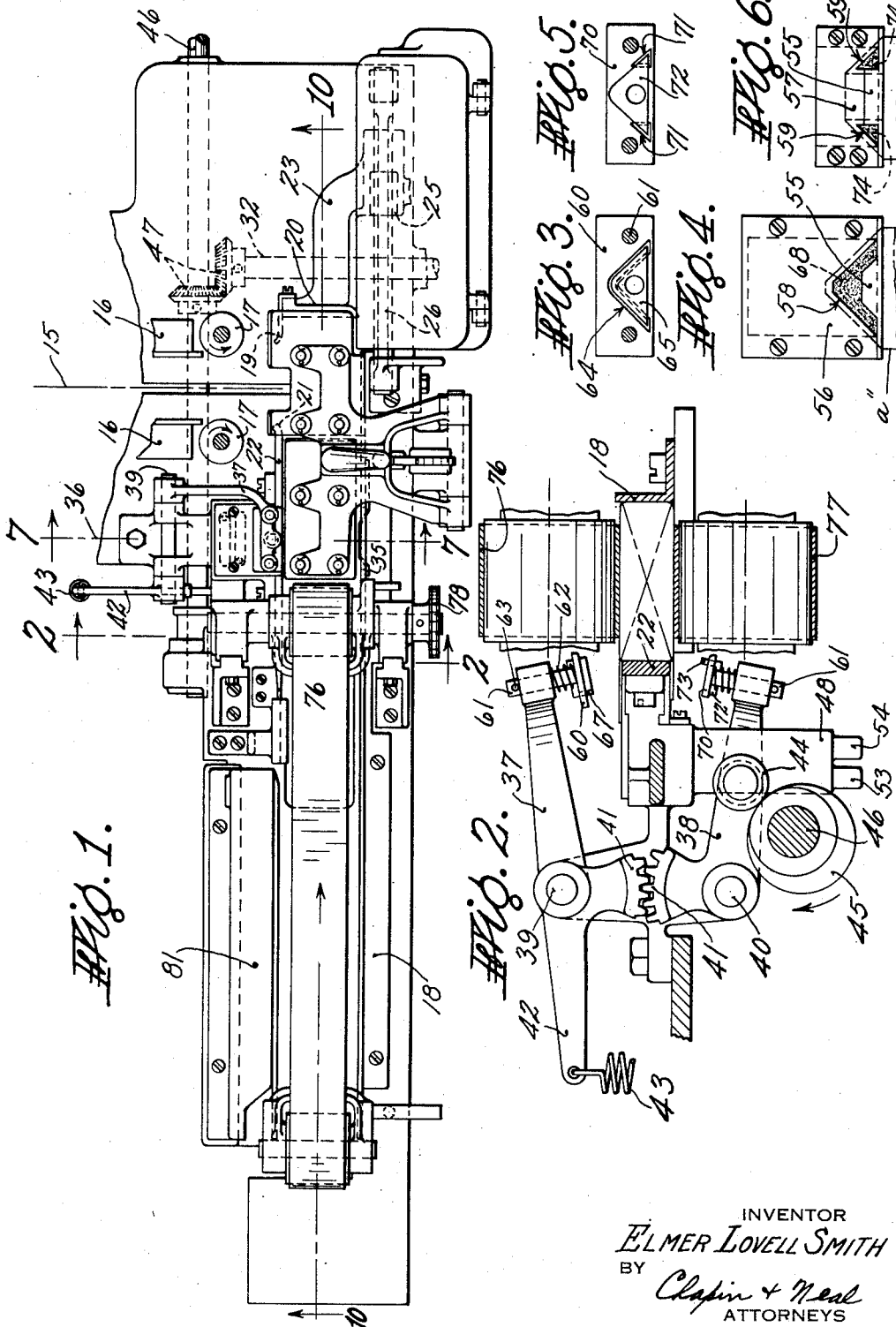
E. L. SMITH

2,281,887

WRAPPING MACHINE

Filed July 28, 1939

3 Sheets-Sheet 1



INVENTOR
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ATTORNEYS

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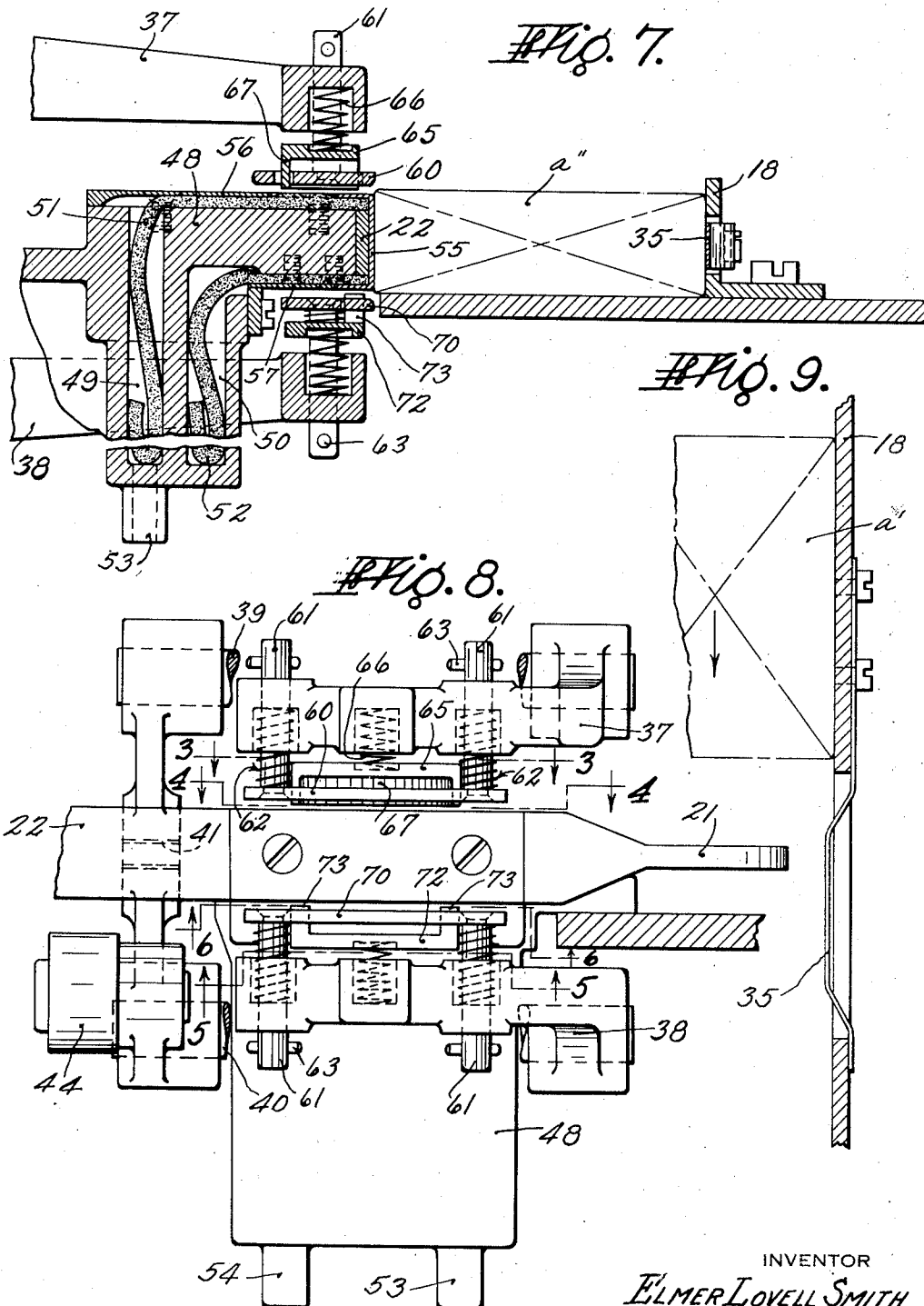
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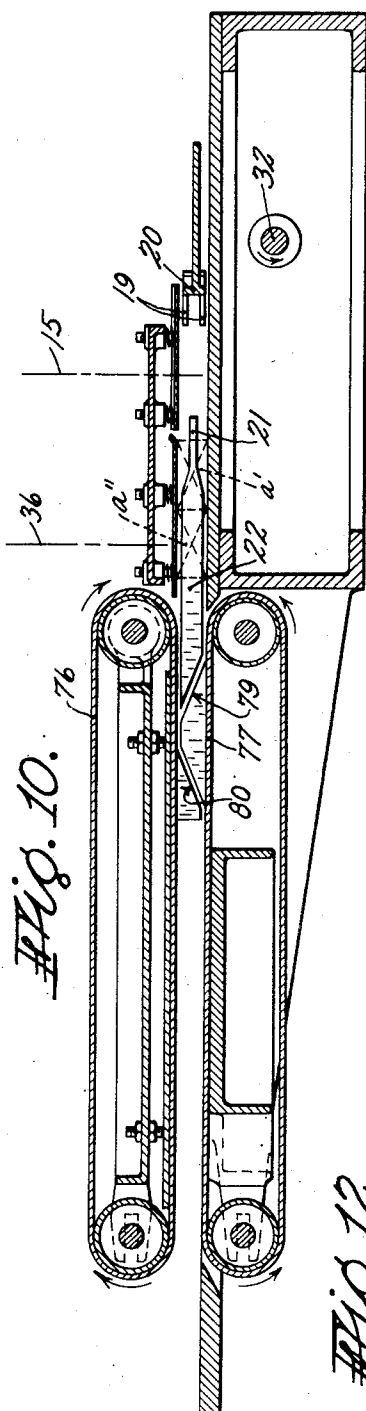
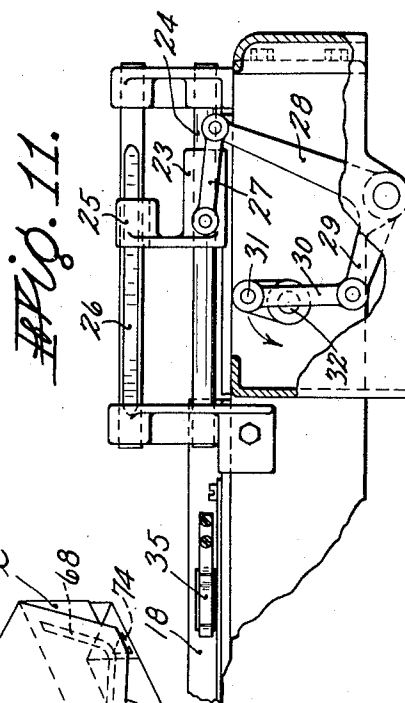
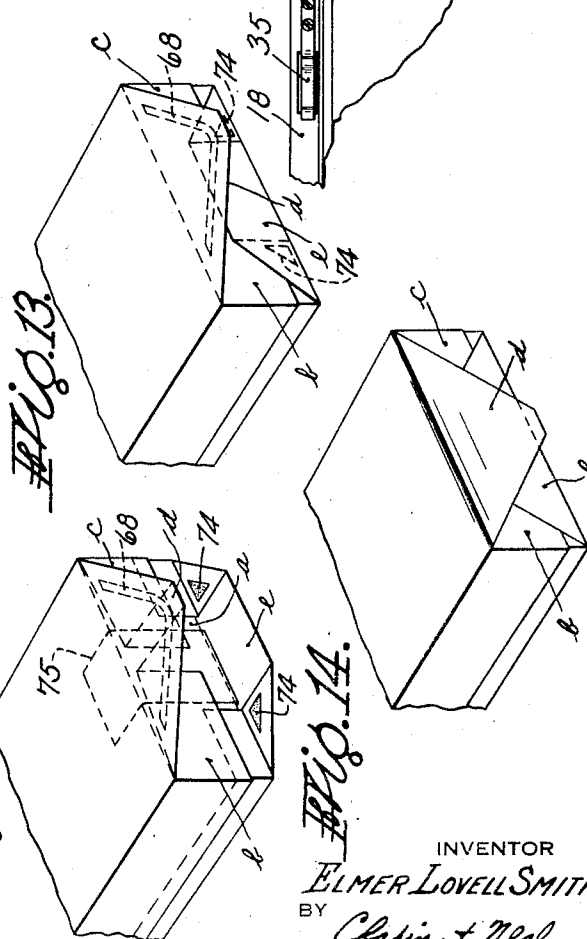
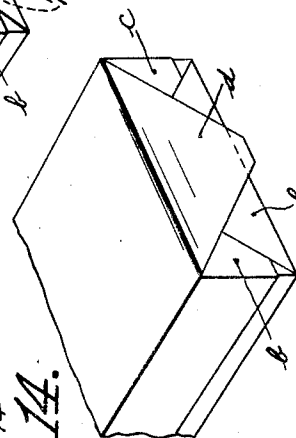
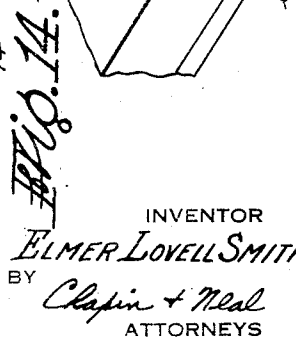
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,281,887

WRAPPING MACHINE

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Application July 28, 1939, Serial No. 287,106

11 Claims. (Cl. 93—2)

In the wrapping of articles with what is sometimes referred to as a die fold, it has been customary to feed the articles along one channel in which a wrapper is picked up and folded about five sides of the article with a tubular wrapper extension trailing behind the sixth side. At the termination of this first wrapping channel the article is carried laterally in order to fold this tubular wrapper extension against this sixth side.

It is the object of the present invention to improve the mechanism for handling the article in the second channel, and the mechanism for sealing the wrapper flaps on the sixth side of the article. The invention also relates to mechanism which will reduce the number of defective packages occurring during periods when the machine is stopped. The manner in which these and other objects have been accomplished will appear from the following description and claims.

Referring to the drawings:

Fig. 1 is a fragmentary top plan of the machine showing the second channel only;

Fig. 2 is a section on line 2—2 of Fig. 1 taken on a larger scale;

Fig. 3 is a section on line 3—3 of Fig. 8 showing the creasing mechanism for the top folds;

Fig. 4 is a section on line 4—4 of Fig. 8;

Fig. 5 is a section on line 5—5 of Fig. 8, corresponding to Fig. 3 but showing the mechanism for creasing the bottom fold;

Fig. 6 is a section on line 6—6 of Fig. 8;

Fig. 7 is a detail similar to Fig. 2 but on a still larger scale and taken in median section;

Fig. 8 is a detail looking from the right hand side of Fig. 7 with the package removed;

Fig. 9 is a detail in top plan of the right hand side of the channel shown in Fig. 7;

Fig. 10 is a section on line 10—10 in Fig. 1 with the creasing and sealing mechanism removed for clarity;

Fig. 11 is a fragmentary side elevation of the operating mechanism for the plunger which feeds the articles from the end of the first channel past the solvent applying station; and

Figs. 12, 13 and 14 are details showing in successive steps the creasing and folding of the sixth side of the package.

The center line of the first channel is shown at 15. Since the invention is concerned with the treatment of the article in the second channel and since the construction of the first channel can be varied as desired without affecting the mechanism in the second, the first channel has not been described in detail. The articles may be fed along it by a continuous conveyor mechanism

such as is shown in the Smith and Wetsel Patent 2,189,087, Feb. 6, 1940. By this mechanism the article and wrapper are fed through suitable folding mechanism, preferably containing solvent applying mechanism if the wrapping material carries a soluble coating. The article is finally passed between heaters 16 and then through rubber rolls 17, the latter stripping the article from the advancing pusher and, with the aid of mechanism such as set forth in the Smith and Wetsel application, positioning the partly wrapped article against the side guide 18 of the second channel which extends at right angles to the first.

As mentioned above, when disposed in this position the article *a* has the wrapper folded about five of its sides and projecting as a tubular extension beyond the sixth side in a direction toward the first folding channel. The first tuck *b* in this tubular extension is made by tucking fingers 19 on a pusher 20 which is reciprocated back and forth along the line of the second channel by mechanism to be described. It will be seen that the tuck *b* is made before the pusher contacts with the side of the article, and that the article will thereafter be advanced by the pusher, being carried past a tucking finger 21 which forms the leading end of a side guide 22 opposite to the side guide 18 of the second channel.

The tucking finger 19 is forked to straddle the tucker 21 as is best shown in Fig. 10, so that control of the tucks is never lost. The plunger 20 carries the article to the position *a'* of Fig. 10, causing the tuck *c* to be made and carrying the article far enough along the tucker 21 so that this tucker now holds both the tucks *b* and *c* and prevents them springing outwardly. The plunger leaves the article in this position and returns in time to permit the next succeeding article to come in front of it.

The pusher 20 is mounted on a carrier 23 slidable on a rod 24 (Fig. 11) and having its upper end forked at 25 to straddle a stationary flat-sided bar 26. The carrier is connected by a link 27 with one arm 28 of a bell crank, the other arm 29 of which is connected by a link 30 with the crank pin 31 on a constantly rotating shaft 32. It will be noted that the upper end of the arm 28 travels in an arc nearly parallel to the path of the carrier 23; and that the crank 31 rotates about a point which is nearly in line with the arc of travel of the arm 29. By the use of the intervening bell crank and links mounted as described, the travel of the pusher is so regulated that it will clear the advancing articles and

leave a maximum time for the article to be positioned against the guide 18.

On the next forward stroke of the pusher the new article advanced by it will strike the article in the position *a'* and move it to the position *a''* where it is centralized with respect to the creasing and solvent applying mechanism. In order to hold the article firmly against the creasing and daubing mechanism the side guide 18 is slotted to permit the passage of a spring 35 as best shown in Figs. 7, 9 and 11. It will be observed that there is only one intermediate position between the center line 15 of the first channel and the center line 36 of the creasing mechanism. This advances the article a sufficient distance so that the creasing mechanism may clear the roll 17 and yet does not move it far enough so that cumulative variations in the thickness of various packages will adversely affect the registration of the package with the creasing mechanism.

The creasing and solvent applying mechanism is carried on two arms 37 and 38 pivotally mounted on shafts 39 and 40 and located one above and one below the second wrapping channel. The two arms are joined by gear segments 41 so that they move simultaneously in opposite directions. The upper arm 37 has an extension 42 coupled by a spring 43 to the machine frame. The lower arm 38 has a cam roll 44 held by the spring 43 against a cam 45 mounted on a drive shaft 46. This drive shaft is coupled by gears 47 (Fig. 1) to the shaft 32 driving the pusher 20.

Between the two arms the side guide 22 is located against the forward end of a solvent container 48 as best shown in Fig. 7. The container 48 is provided with two wells 49 and 50 in which solvent is maintained at suitable levels. Wicks 51 and 52 are located in each well and extend respectively to the top and the bottom side of the horizontally projecting portion of the container. Through suitable connections 53 and 54 solvent is supplied to the two wells, preferably by self-feeding mechanism of the type shown in the Langhammer Patent 1,915,499, the level in the two wells being varied to suit the different elevation of the upper portions of the two wicks.

The wicks are covered over by plates serving both as creasing surfaces and, by reason of apertures of suitable shape, as means for permitting the wicks to supply liquid to the inside surfaces of the flaps. While these plates can be made in any convenient manner they are shown as being constructed of an end plate 55, a top plate 56, and a bottom plate 57. The end plate 55 overlies the horizontal part of the container 48 as best shown in Figs. 4 and 6, being spaced from the adjacent portions of the top and bottom plates to form respectively an A-shaped opening 58 and two triangular openings 59 through which the underlying wick is exposed.

The upper arm 37 carries a creasing plate 60 supported thereon on rods 61 and pressed downwardly by springs 62, the travel of the plates away from the arm being limited by cross pins 63. The creasing plate is provided with an opening 64 generally corresponding in shape to the opening 58. The upper arm also carries a die plate 65 pressed downwardly by a spring 66 and having a depending flange 67 shaped to correspond to the openings 58 and 64. When the arm 37 is swung downwardly the plate 60 contacts the upper surface of the flap *d* extending from the article over the top cover plate 56 and irons out its folds. At the same time the flange

67 presses the flap down against the wick 51 and impresses upon its lower surface a V-shaped area of solvent 68 (Figs. 4 and 12).

The lower arm 37 carries a creasing plate 70 having triangular openings 71 and also a die plate 72 having triangular projections 73 adapted to pass through these openings. The mounting of the creasing plate 70 and the die plate 72 are respectively similar to those of the plates 60 and 65 and need not be described in detail. The creasing plate 70 presses the lower flap *e* against the bottom cover plate 57 and creases out the folds, while at the same time the projections 73 press the flap against the lower wick 52 and imprint upon the flap two triangular areas 74. The purpose of localizing these solvent areas is to secure adequate sealing of the end of the package without bringing any of the solvent into direct contact with the revenue stamp 75 (Fig. 12) which passes around the end of the package. The solvent is frequently of a nature which, if it comes in contact with the stamp, will cause smearing or discoloration of the ink with which the latter is printed, and it will be seen from Figs. 12 to 14 that by the described apparatus solvent is applied to the flaps in such a manner that when the flaps are folded the stamp will not be brought into contact with any solvent.

Upon the next forward stroke of the plunger 20 the package in the position *a''* will be carried forwardly until it is pushed into the bite of upper and lower conveyor belts 76 and 77. These belts are suitably connected together for simultaneous operation and are preferably driven as by a sprocket 78 from a source of power separate from that which drives the shaft 46. These plates carry the article with a continuous motion past a folder 79 for flap *e*, a folder 80 for flap *d*, and a heater 81 which causes the evaporation of the solvent and a consequent sealing together of the end flaps.

By having the belts 76 and 77 driven separately from the pusher, the solvent applying device, and the conveyor which carries the articles down the first channel; and by having the article carried directly from the solvent applying station into the belts in a single operation, the danger of having the solvent dry on unfolded flaps or of overheating the articles when the machine is stopped temporarily will be greatly reduced. Once the articles are placed between the conveyor belts they are carried through the folders and past the heater, and can not be left either with their flaps partially unfolded or with their flaps in contact with the heater. At the most it will be possible to have one package left in the gluing station from which the solvent may evaporate during rest, but in general even this will not happen because usually the machine is not stopped while the articles are being delivered along the first channel. If there is no article in the position *a* at the end of the first channel the pusher 20 will reciprocate back and forth without moving the succeeding line of articles forwardly and therefore any article left in the position *a''* will have solvent applied to it again before it is moved into the conveyor belts by the pressure of an article fed away from the first channel.

I claim:

1. A wrapping machine comprising means for folding the end of a tubular wrapper extension with opposed tucks leaving opposite flaps spaced apart, a support positioned to lie between the spaced flaps, a solvent-carrying

wicking exposed on the support adjacent each of said spaced flaps, movable means for pressing the flaps against the wicking, and means mounted for movement relative to the pressing means for creasing said flaps against the surface of the support.

2. A wrapping machine comprising a channel, means for forwarding intermediately along the channel a partially wrapped article having spaced end flaps, a support adjacent the channel in position to be straddled by said flaps as the article reaches one of the rest stations, a solvent-carrying wicking carried by said support, cover plates carried by said support apertured to expose said wicking in a predetermined pattern, a pair of arms pivoted adjacent the article path, yieldable platens carried by the arms, said platens being apertured in correspondence with the apertures in the cover plates, yieldable die members carried by said arms in position to extend through said apertures, and means for oscillating the arms to cause the platens to press the flaps against the cover plates and to cause the die members to press the interior surfaces of the flaps against said wicking.

3. In a wrapping machine, a station for receiving a partially wrapped article, means for tucking opposed flaps at one side of the article leaving upper and lower generally triangular extending flaps, a support adjacent the station in position to be straddled by said flaps, solvent carrying wicking carried by the support, cover plates for the support apertured to expose said wicking in a predetermined pattern, a pair of arms pivoted adjacent the article path, a yieldable platen carried by the arms and apertured in correspondence with the apertures in the cover plates, means for oscillating the arms to cause the platens to press the flaps against the cover plates and to cause the die members to press the interior surfaces of the flaps against the wicking, means for folding successively against the end of the article the triangular flaps thus coated with solvent, a continuously moving conveyor carrying the article through the folding means, and a reciprocating pusher operable to forward articles from said station into range of said conveyor in intermittent steps, said article having a rest position adjacent said support with its extending flaps straddling the same.

4. In a wrapping machine, a station for receiving a partially wrapped article, means for tucking opposed flaps at one side of the article, leaving upper and lower generally triangular extending flaps, means for imprinting a pattern of sealing liquid interiorly of said triangular flaps, means for folding the triangular flaps successively against the end of the article, a continuously moving conveyor carrying the articles through the folders, and a reciprocating pusher operable to forward articles from said station into the range of said conveyor in intermittent steps with a rest position adjacent the imprinting means.

5. In a wrapping machine, a station for receiving a partially wrapped article, means for tucking opposed flaps at one side of the article, leaving upper and lower generally triangular extending flaps, means for imprinting a pattern of sealing liquid interiorly of said triangular flaps, means for folding the triangular flaps successively against the end of the article, a continuously moving conveyor carrying the articles through the folders, and a reciprocating pusher operable to forward articles from said station into the range of said conveyor in intermittent steps with

a rest position adjacent the imprinting means, and independent driving means for said conveyor and for said pusher and imprinting means, whereby articles once provided with sealing liquid will be carried through the folding means irrespective of the stoppage of the remaining mechanism.

6. In a wrapping machine of the type in which an article with outstanding opposed generally triangular folds is forwarded intermittently along a channel, a solvent applying device adjacent a rest station of the article comprising a member having substantially flat top and bottom surfaces positioned between said flaps when the article is at said rest station, wicking within said member, said top and bottom surfaces being cut away to expose the wicking in a desired pattern, opposed plates closable upon said member to crease the folds against it, said plates being apertured to expose the wicking in the desired pattern, and dies formed to said pattern and extending through said apertures and cut away portions to press the flaps against the wicking.

7. In a wrapping machine of the type in which an article with outstanding opposed generally triangular folds is forwarded intermittently along a channel, a solvent applying device adjacent a rest station of the article comprising a member having substantially flat top and bottom surfaces positioned between said flaps when the article is at said rest station, wicking within said member, said top and bottom surfaces being cut away to expose the wicking in a desired pattern, opposed yieldable plates closable upon said member to crease the folds against it, said plates being apertured to expose the wicking in the desired pattern, and yieldable dies formed to said pattern and extending through said apertures and cut away portions to press the flaps against the wicking.

8. In a wrapping machine of the type having two channels at right angles to each other, the first channel containing means for folding a wrapper about five sides of the article leaving a tubular extension projecting beyond the sixth side, and the second channel containing means for folding the wrapper about the sixth side; means for forwarding an article along the second channel from the terminus of the second channel comprising a pusher provided with a tucker positioned to make one side tuck in the tubular extension, means for guiding the pusher, a substantially right-angled bell crank positioned so that the end of one arm travels in an arc substantially parallel to the path of the pusher, a rotating crank located substantially in a line with the path of the end of the second arm of the bell crank, and links connecting the first arm of the bell crank to the pusher and the second arm to the crank.

9. In a wrapping machine of the type having two channels at right angles to each other, the first channel containing means for folding a wrapper about five sides of the article leaving a tubular extension projecting beyond the sixth side, and the second channel containing means for folding the wrapper about the sixth side; means for forming one side tuck in said tubular extension comprising a tucking plate, a carrier on which the plate is mounted, means for guiding the carrier for reciprocation substantially parallel to the second channel, a substantially right-angled bell crank positioned so that the end of one arm travels in an arc substantially parallel to the path of the carrier rotating a

crank located substantially in a line with the path of the end of the second arm of the bell crank, and links connecting the first arm of the bell crank to the carrier and the second arm to the crank.

10. A wrapping machine comprising means for folding the end of a tubular wrapper extension with opposed tucks leaving opposite flaps spaced apart, a support positioned to lie between the spaced flaps, a solvent-carrying wicking exposed on the support adjacent each of the spaced flaps, a pair of members simultaneously movable toward and from the spaced flaps, a creaser yieldably mounted on each member and apertured to contact the support around the wick only, and a

presser yieldably mounted on each member independently of the creaser and extending through the aperture in the creaser to press a flap against the wick.

5 11. In a wrapping machine having means for folding a wrapper with tucked-in portions forming a multi-ply extending flap, a support over which said flap projects and having a wick localized on its surface in a pattern of less area
10 than the flap, a creaser apertured to clear the flap, a presser mounted to move against the flap through said aperture, and means for moving the creaser and the presser toward and from the support.

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