June 27, 1933. P. LANGHAMMER 1,915,499

METHOD AND APPARATUS FOR WRAPPING ARTICLES

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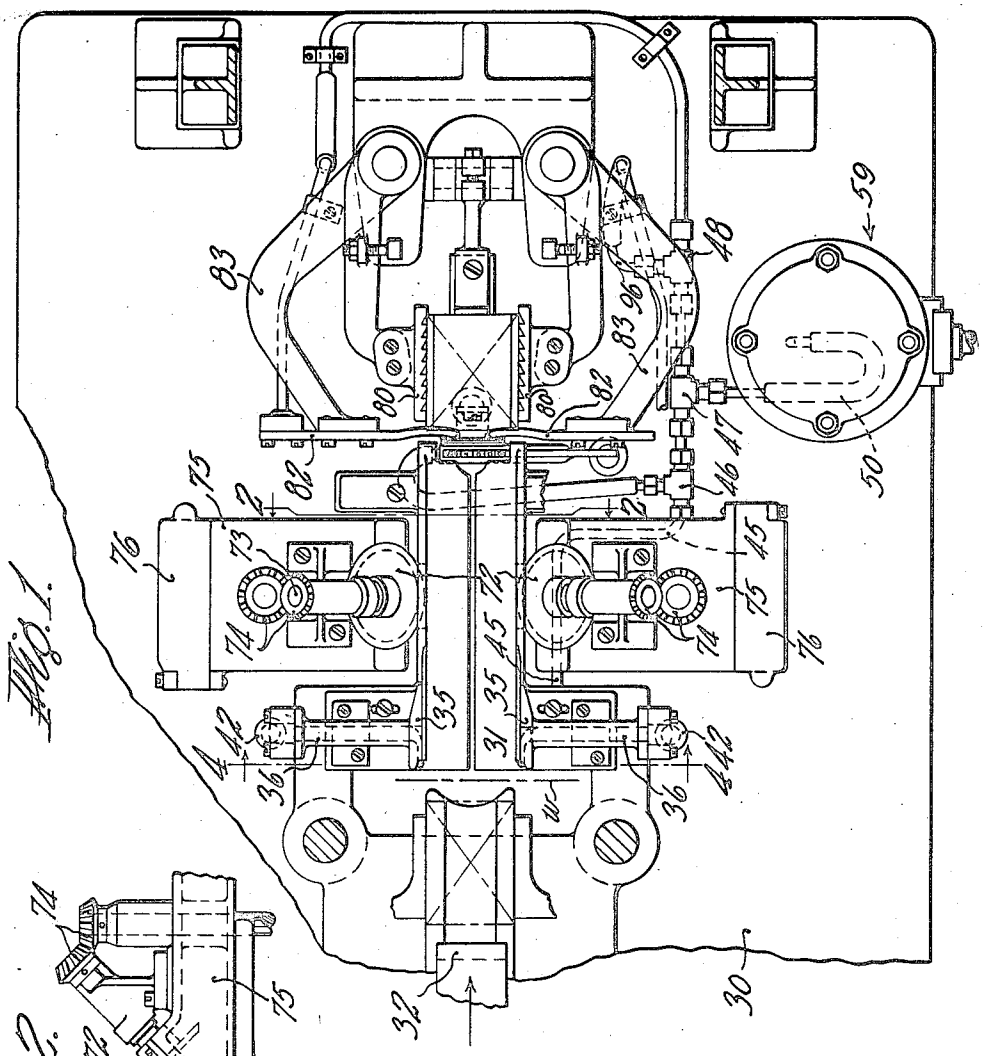


Fig. 1.

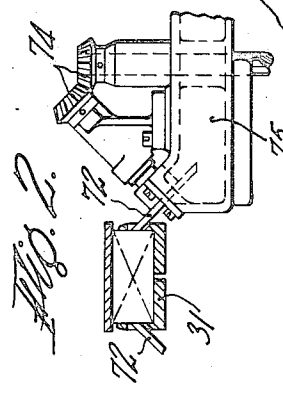


Fig. 2.

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Fig. 5.

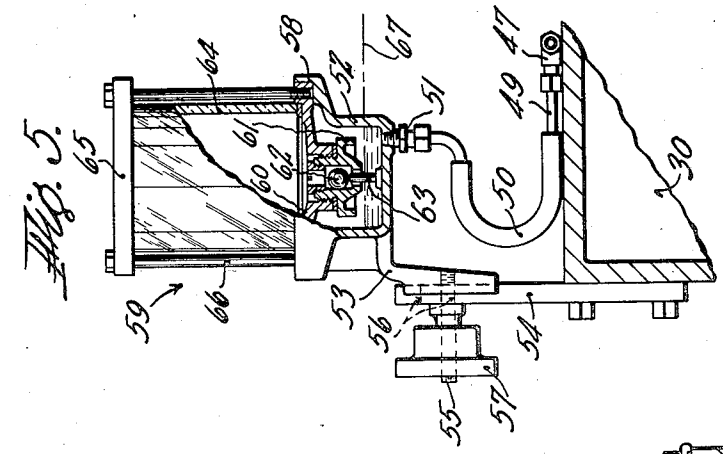


Fig. 4.

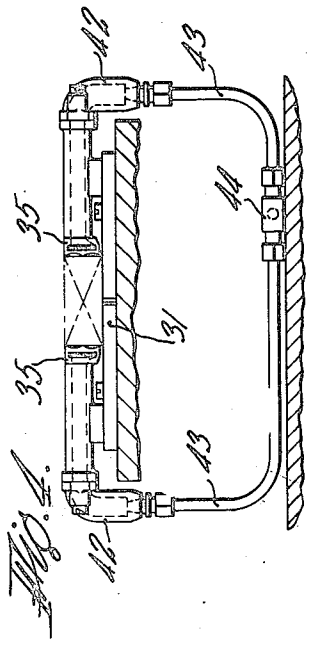
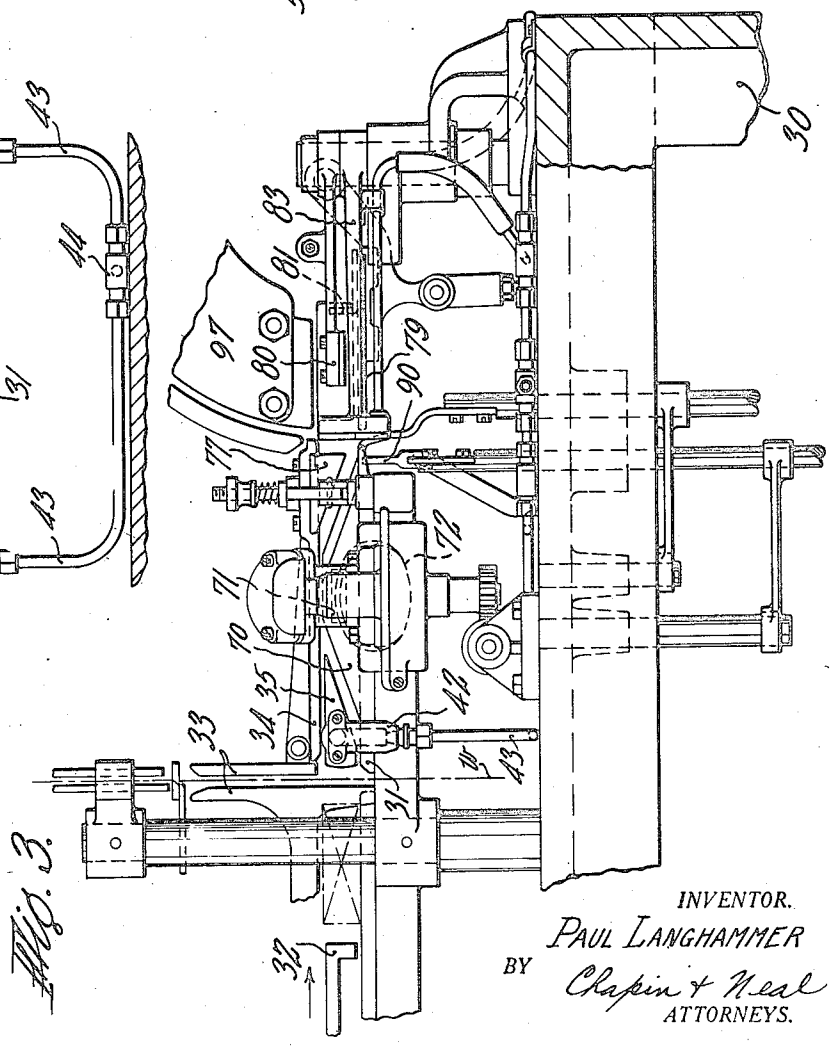


Fig. 3.



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Fig. 6.

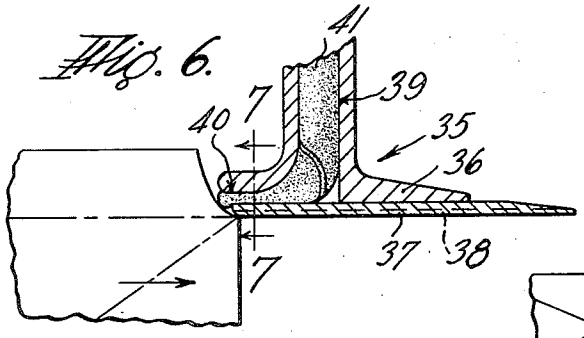


Fig. 7.

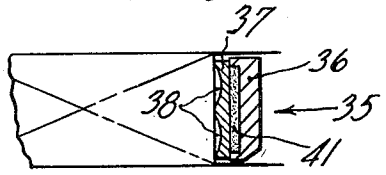


Fig. 8.

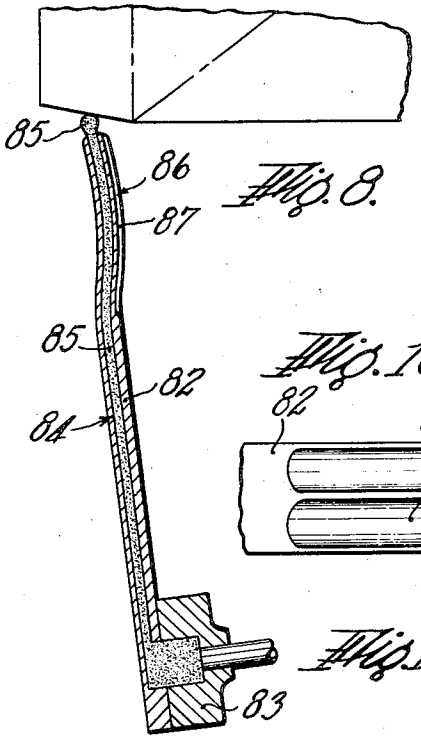


Fig. 9.

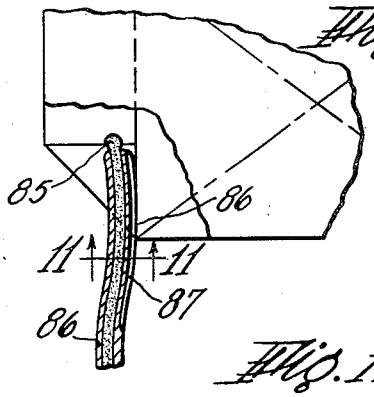


Fig. 10.

Fig. 11.

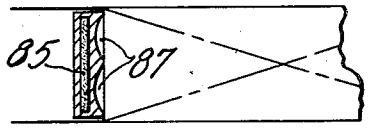
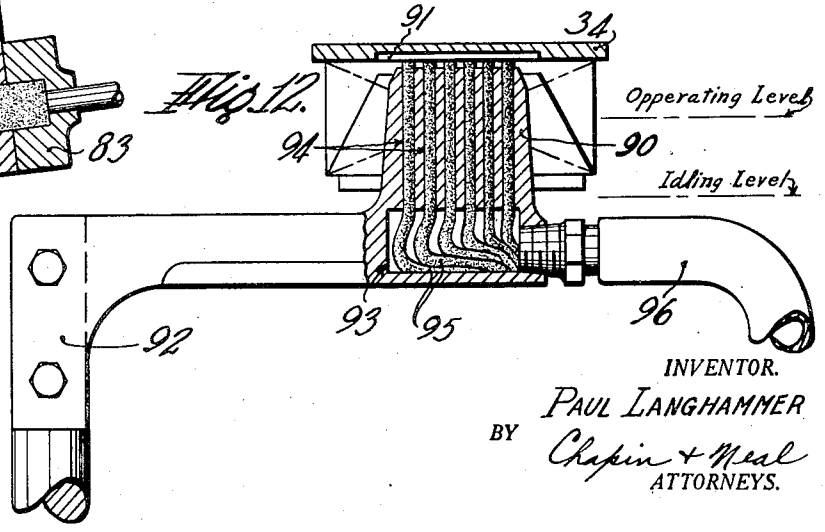


Fig. 12.



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Fig. 13.

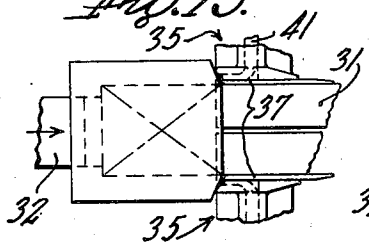


Fig. 14.

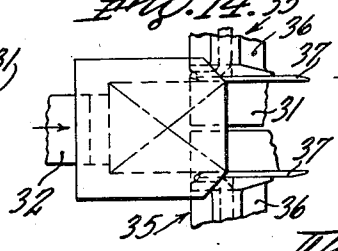


Fig. 15.

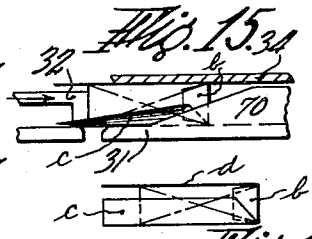


Fig. 16.

Fig. 17.

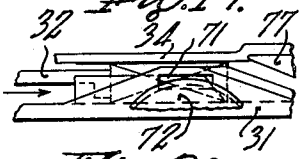


Fig. 18.

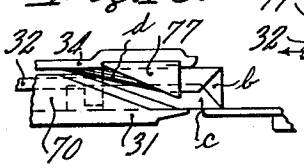


Fig. 19.

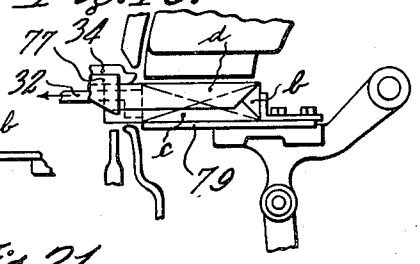


Fig. 20.

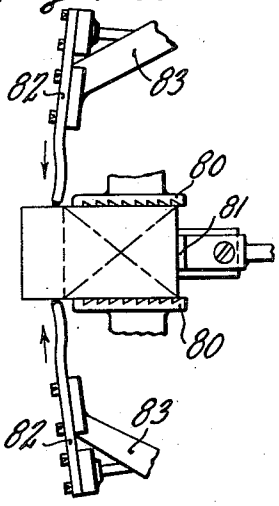


Fig. 21.

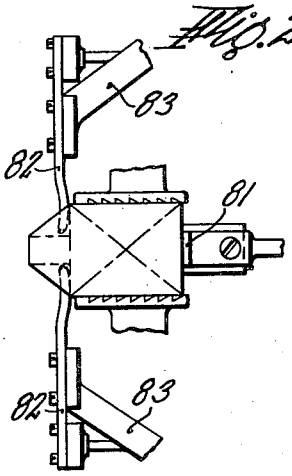


Fig. 22.

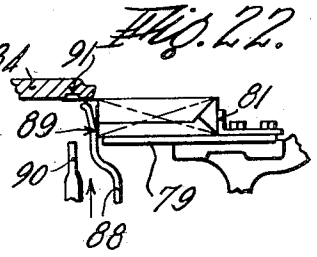


Fig. 23.

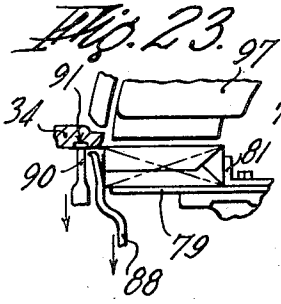
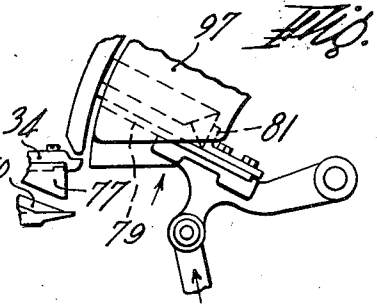


Fig. 24.



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METHOD AND APPARATUS FOR WRAPPING ARTICLES

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Fig. 25.

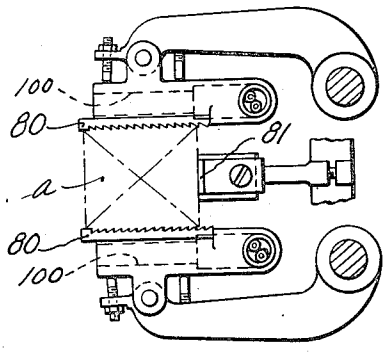


Fig. 26.

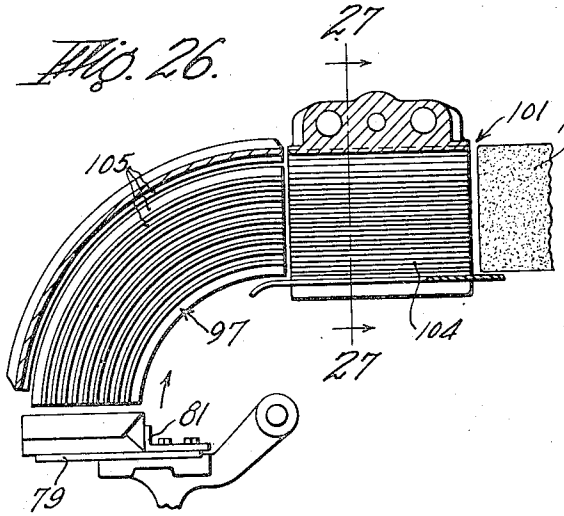
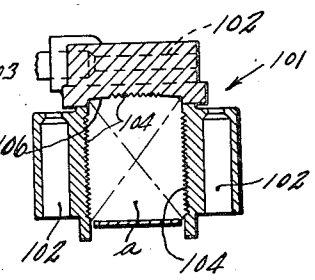


Fig. 27.



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Patented June 27, 1933 1,915,499

UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR WRAPPING ARTICLES

Application filed January 10, 1931. Serial No. 507,923.

The present invention relates to wrapping machines and has particular reference to machines designed for the enclosure of articles in a wrapping material bearing a soluble coating, such as the coated regenerated cellulose film commercially known as moisture-proof cellophane. Ordinary adhesives are not thoroughly satisfactory with this material because of their failure to adhere sufficiently to the coating. Special adhesives have been developed for cellophane, but these are not entirely satisfactory for machine wrapping, due both to lack of adhesion and to their resinous character which renders their application both unpleasant and difficult. Efficient sealing of moisture-proof cellophane can, however, be accomplished by moistening the surfaces which are to be joined together with a solvent for the surface coating and then holding them pressed in contact until the solvent has evaporated. One suitable solvent for this purpose is ethylene glycol monomethyl ether, which is a fluid of about the consistency of water.

It is one object of this invention to provide novel mechanism for applying a sealing liquid to packages during the wrapping operation, so that the wrapping will be upon its completion entirely sealed. A further object is to provide a novel union of sealing liquid applying means with the folding mechanism. A further object is to localize the application of sealing liquid, so that none will be applied to the package itself. A further object is to provide a single device for delivering sealing liquid to applying means at several points upon the wrapping machine. Additional objects will appear from the following description and claims.

Referring to the drawings:

Fig. 1 is a top plan view of a portion of a wrapping machine embodying my invention;

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

Fig. 3 is a side elevation of the portion of the machine shown in Fig. 1;

Fig. 4 is a sectional detail on line 4—4 of Fig. 1;

Fig. 5 is an end elevation, partly broken away, of the central supply which furnishes sealing liquid to the machine;

Fig. 6 is a top plan sectional view of the first tucking devices, showing the action of the liquid applying means;

Fig. 7 is a section on line 7—7 of Fig. 6;

Fig. 8 is a top plan view, on an enlarged scale, of the rear tucker shown nearest the bottom of the sheet in Fig. 1;

Fig. 9 is a similar view showing a slightly later stage in the operation of this folder;

Fig. 10 is a side elevation of the folder shown in Fig. 9;

Fig. 11 is a section on line 11—11 of Fig. 9;

Fig. 12 is a transverse section showing the construction of the dauber for applying sealing liquid to the final flap;

Fig. 13 is a plan view showing the start of the first tucking operation;

Fig. 14 is a similar view showing a later stage;

Fig. 15 is a side elevation showing the start of the folding up of the bottom side flap;

Fig. 16 is a side elevation of the package with this bottom side flap completely folded;

Fig. 17 is a view similar to Fig. 15 showing the application of sealing fluid to the folded flap;

Fig. 18 is a similar view showing the folding of the top side flap;

Fig. 19 is a similar view showing the package, with the side flaps folded, in position in the folding box where the rear tucks and the rear bottom flaps are folded;

Fig. 20 is a top plan view showing the rear tucks about to be formed;

Fig. 21 is a similar view showing the completion of these tucks;

Fig. 22 is a side elevation showing the folding of the bottom rear flap;

Fig. 23 is a similar view showing the application of sealing liquid to the final flap;

Fig. 24 is a similar view showing the folding of the final flap;

Fig. 25 is a top plan view, similar to a fragment of Fig. 1, illustrating a modification;

Fig. 26 is a section, taken on a vertical plane midway of the delivery channel; and

Fig. 27 is a section on line 27—27 of Fig. 26.

The wrapping mechanism, with the excep-

tion of the devices for applying the sealing liquid, is generally similar to that described in the patent to Armstrong, 1,244,277, October 23, 1917. Operating mechanism for the various movable folders and article conveying devices is there shown, and the present description is, therefore, confined to the features of novelty and to the environment necessary for thir understanding.

The machine is supported upon a frame 30, upon which is mounted an article guiding plate 31. A pusher 32 is reciprocated by suitable mechanism over this guideway, carrying the article *a* through a wrapping sheet *w* suspended in any suitable way across the guideway between wrapper guides 33. As the article contacts with the wrapper sheet, the latter is draped over it in U-form by contact with the guideway 31 and with a top plate 34 spaced therefrom. The length of the wrapper sheet is sufficient to leave two extending portions to the rear of the package (Figs. 13 and 15) and its width sufficient so that upper and lower flaps are formed beyond the article at either side.

The article in passing underneath the top plate 34 also passes between a pair of tucking plates indicated generically at 35. One of these tucking plates is shown in section in Figs. 6 and 7 on an enlarged scale. Each plate has a body portion 36 carrying a plate 37 adapted to bear against the tucked portion *b* of the wrapper and against the side of the article. This plate is preferably grooved at 38 so as to prevent the minimum of surface in contact with the wrapper, and therefore to have the least possible tendency to wipe off the sealing fluid applied as will now be described. The body portion of each tucker is formed with a hollowed-out portion 39 opening as at 40 in the side of the tucker facing towards the on-coming article. A wick 41 is fitted into this hollowed-out portion and is adjusted so as to project slightly beyond the opening 40. Each wick continues through a bent conduit 42 (Fig. 4) which is joined with a pipe 43 connecting underneath the article guideway with a T fitting 44. A pipe 45 (Fig. 1) connects this fitting with similar T fittings 46, 47, and 48. This piping is described in some detail in order to clarify the discussion of the particular embodiment of the machine shown in the drawings, but it will be understood that the particular arrangement of fittings may be varied to suit the design of the machine upon which it is employed.

A pipe 49 (Fig. 5) joined to the T 47 is connected by a flexible hose 50 with a nipple 51 secured to a dish-like member 52. The bottom of this member is formed with a bracket 53 formed to slide upon vertical ways 54 secured to the frame. A stud 55 fastened to the bracket passes through a slot 56 in the ways and is held in any desired position of adjustment by a hand nut 57. The upper part of the dish member is formed with a seat 58 to receive a removable container indicated generically by 59. The base 60 of this container is threaded for a closure 61 having a ball valve 62 in it to prevent spilling of the contents of the container when the latter is being put in place. When the base is fully seated, the ball is raised by a stationary pin 63 on the dish member. The body of the container may be formed of a glass cylinder 64 closed at its top by a member 65 which is held to the base 60 by bolts 66. When the container is mounted in place, the liquid held in it will run out into the dish to a height (indicated by the line 67) substantially equal to that of the opening in the closure 61; any withdrawal of liquid from the dish resulting in a bubbling out of additional liquid from the container. This type of liquid feed device is well-known in many uses and requires no further description.

During the operation of the machine, the level of the dish 52 is adjusted by the hand nut 57 so that the liquid level 67 will lie just below the level of the wicks in the folders 35. In practice this level is determined when the machine is built and the parts made so that the nut may be clamped with the stud 55 against the top of the slot. When operation of the machine is to be discontinued, the nut is loosened and the member 52 lowered until the stud strikes the bottom of the slot. At this level the wicks will remain moist, but evaporation will be reduced and there will be no tendency to drip. The container 59 can of course be adjusted if desired at any intermediate level to regulate the rate of flow of the liquid in the wicks.

It will be noted from Figs. 6, 13, and 14 that the wicks projecting from the openings 40 contact with the unfolded or partially folded wrapping sheet and do not contact with the sides of the article to be wrapped. The tucks *b* are short as compared with the length of the article, and in the condition in which the article passes the tuckers 35 are the only portions of the wrapper covering the sides of the article. This arrangement of the wicks prevents smearing of the article sides with the sealing fluid and minimizes any tendency of the wrapper to stick to the article. It is for a similar reason that the face plates 37 of the tuckers are grooved at 38, the diminution of area in contact with the article and wrapper preventing any substantial amount of sealing liquid being carried from the tuck *b* onto the article surface.

As the article is still further advanced by the pusher 32, the lower side flaps *c* (Fig. 15) contact with stationary plow folders 70 and are brought up against the side of the article, as shown in Fig. 16. These flaps are thus brought in contact with the outer surfaces of

the tucks *b* which have been rendered adhesive by the application of the sealing liquid. More of the surface of the tuck is coated with the sealing liquid than is ultimately contacted with by the side flaps, as is apparent from Figs. 16 and 19, but this in practice has proved to be of no consequence; the sealing liquid preferred being a solvent only and evaporating without making any substantial change in the surface of the wrapping material.

The stationary folders 70 which turn up the bottom side flaps are cut away as at 71 to permit sealing liquid applying wheels 72 to pass through into contact with the outer surfaces of these flaps. These wheels, as best shown in Figs. 1 and 2, are preferably formed as conically faced disks each mounted on a shaft 73 driven by bevel gearing 74 from any continuously rotating part of the machine. The wheels are set on a slant and have their lower portions dipping into troughs 75 provided with hinged covers 76. These troughs are kept supplied with the same sealing liquid as is delivered to the wicks, the liquid being transferred by the wheels to the upper edges of the outer surfaces of the lower side flaps *c*.

As the articles are still further carried along by the pusher 32, the upper side flaps *d* contact with stationary folding plates 77 (Fig. 18) which turn them down over the tucks *b* and the previously folder lower side flaps *c*. The package, now completely folded on its sides, is finally deposited by the pusher in a folding chamber composed of a movable bottom plate 79 (Fig. 22), a pair of side plates 80 (Fig. 20), and an end abutment 81. The first operation in this station, after the pusher has withdrawn, is the folding of the opposed rear tucks *e*. This is done by a pair of tuckers 82 mounted upon arms 83 adapted to be swung towards each other at intervals by any suitable mechanism. Each tucker is hollowed out as at 84 (Figs. 8, 9, 10, and 11) to receive a wick 85 which projects slightly beyond the end of the tucker. The end section of the tucker is slightly curved as indicated at 86 in Fig. 8, and its article engaging surface is provided with contact reducing grooves 87. It is apparent from Fig. 9 that the curvature of the tucker keeps the wick away from the end of the article,—a result aided by the location of the wick in the end rather than in the side of the tucker,—so that while sealing liquid will be spread on the wrapper it will not be carried onto the end of the article. At the same time, the wrapper will be neatly creased over the corner of the article, as is apparent in Fig. 9.

After these two tucks *e* have been made (Fig. 21) and coated on their outer surfaces with sealing liquid as described, the lower rear flap *f* is folded up by a folder 88, as shown in Fig. 22. This folder is operated by any suitable mechanism, such for example as that shown in the Armstrong patent referred to above. The upper end of this folder is preferably curved away from the end of the article as at 89, so that it will complete the fold without wiping against the adhesive rear tucks *e*. While this folder is in position, a dauber 90 is elevated to contact with the lower side of the rearwardly extending upper rear flap *g*. The action of this dauber is shown in Fig. 23 and its construction in Fig. 12. At a point directly above the dauber the top plate 34 is cut away at 91, so that no sealing liquid will be spread upon the plate in the absence of a package.

The dauber is carried upon a bracket 92 reciprocated vertically once during each cycle of the machine by any suitable mechanism. The body of the dauber is hollowed out at 93 to form a liquid receiving chamber. A plurality of wick conduits 94 extend from this chamber to the upper surface of the dauber. Within these conduits are wicks 95, which project slightly beyond the top of the dauber and are brought together in the chamber 93. This chamber has an inlet connected by a flexible tube 96 with the T 46 previously mentioned.

As soon as the rear top flap has had sealing liquid placed upon it by the dauber, the bottom plate 79 is raised (by an oscillating movement as shown in Fig. 24), carrying the article into a delivery chute 97 and folding over the flap in the usual manner. It will be noted that as distinguished from ordinary gluing methods, all of the flaps are secured by adhesion to those overlying it, producing a condition more similar to heat sealing than to gluing. Heat sealing does not produce a thoroughly tight package with the moisture-proof cellophane at present commercially available, and whereas it is satisfactory in cases where the wrapped article is not to receive much handling, it does not produce a sufficiently permanent union of the overlying folds for articles such as packages of cigarettes. This is due to the fact that there is no large quantity of fusible material on the surface of moisture-proof cellophane, the coating being very thin and only carrying a relatively small quantity of fusible material. Union of a thoroughly permanent character, however, takes place when the surfaces of the wrapper are moistened with a solvent such as is described above and are then pressed together until the solvent evaporates.

It is preferable to subject the package to mild heat to drive out the solvent from between the folds. For this purpose the side members 80 and the walls of the delivery chute may be provided with electric heaters. In Fig. 25 the side members 80 are shown as provided with electric heating elements 100 installed as in the usual heat-sealing ma-

chines. The curved portion 97 of the delivery channel may or may not be provided with heaters. It is generally preferable to install the heaters in a short horizontal length 101 of the chute, as shown in Figs. 26 and 27. Heaters 102 of ordinary construction may be used to warm the walls of this auxiliary section. The remainder of the delivery chute 103 is unheated and serves to retain the folds in position until they are thoroughly stuck together.

One refinement of the delivery channel has proved to have considerable value in this connection. It will be noted from Figs. 26 and 27 that the walls of the delivery channels have fine corrugations 104 somewhat similar to screw threads in appearance. These corrugations do not interfere materially with the transfer of heat to the package walls from the heated chute, but prevent the cellophane from adhering to the heated surface and serve the additional purpose of providing a ready vent for the volatilized solvent. Similar corrugations 105, which may be of somewhat larger size if desired, are provided in the arcuate portion 97 of the chute. The upper wall 106 of the chute may be somewhat rounded, as shown in Fig. 27, in cases where the wrapped packages have a tendency to assume that shape.

The temperature employed in the walls of the chute may conveniently be somewhat below that necessary for fusing the coating on the moisture-proof cellophane. It has been found that where the heaters in contact with moisture-proof cellophane are kept at a temperature high enough for fusion of the coating some of this coating is volatilized and lost, reducing the strength of an otherwise none too strong joint. By the method herein described this difficulty is avoided.

Particular attention is directed to the fact that the side tucks *b* and the rear tucks *e* are both united by the action of the sealing liquid with the upper and lower flaps which are folded over them. These flaps are also, of course, united to each other. The gaps between the tucks and the overlapping folds have hitherto been impossible to seal hermetically except by heat sealing. The use of the present invention closes these gaps with a degree of sealing equal to that between the remaining folds, and producing a package covered with moisture-proof cellophane and hermetically and permanently sealed throughout. This, I believe, is a result not obtained previously.

What I claim is:

1. A method of wrapping articles which comprises folding a wrapper in U-form around one edge of the article leaving projecting extensions beyond the opposite edge, forming tucks in the sides of the wrapper adjacent the first-named edge and coating the external surfaces of the tucks with a sealing fluid, folding one side flap at each side down over the coated tucks and over the side of the article and coating the external surfaces of the flaps with a sealing fluid, folding the remaining side flaps over the first-named side flaps, thereby forming a projecting tubular wrapper extension beyond the second named edge of the article, forming end tucks in said projecting wrapper extension and coating the external surfaces of the flaps with a sealing liquid, folding one of the end flaps over the coated end tucks, coating the internal surfaces of the remaining flap with a sealing liquid, and folding the remaining end flap over the previously folded flap, whereby the wrapper will be completely wrapped about the article and will be sealed between all of its overlying folds.

2. A wrapping machine folder having a sealing liquid conduit therein, a wick located in the conduit and projecting slightly beyond the surface of the folder, and a reservoir connected to the wick for supplying a sealing liquid thereto, the reservoir being so positioned that the liquid therein is in constant communication with the wick and is at substantially the level of the exposed portion of the wick.

3. A wrapping machine folder having a face adapted for contact with an unfolded wrapper, a second face at an angle thereto adapted to press the folded wrapper against the article, and a sealing liquid conduit in the folder opening onto the first-mentioned face.

4. A wrapping machine folder having a face adapted for contact with an unfolded wrapper, a second face at an angle thereto adapted to press the folded wrapper against the article, a sealing liquid conduit in the folder opening onto the first-mentioned face, and a wick in said conduit projecting slightly beyond said face.

5. A wrapping machine folder having a sealing liquid conduit therein, a sealing liquid carrying wick located in the conduit and projecting through the surface of the folder for contact with the wrapping sheet, a liquid reservoir connected with the conduit, and means for maintaining the liquid in said reservoir at a predetermined level.

6. A wrapping machine folder having a sealing liquid conduit therein, a sealing liquid carrying wick located in the conduit and projecting through the surface of the folder for contact with the wrapping sheet, a liquid reservoir, means for maintaining the liquid at a predetermined depth in the reservoir, means for adjusting the elevation of the reservoir, and flexible piping connecting the reservoir with the conduit.

7. A machine for wrapping articles in a moisture-proof wrapping sheet having a surface adapted to be rendered adhesive by the application of a solvent, comprising succes-

sively acting means to fold the wrapper about the article, a series of wicks positioned to apply solvent between the contacting surfaces of each pair of overlying flaps whereby the package will be completely sealed against moisture without the addition of adhesive other than that carried by the wrapping sheet itself.

8. A wrapping machine adapted to handle wrapping material possessing a surface capable of being rendered adhesive by the application of a solvent, and comprising a plurality of folders each provided with a solvent conduit and with a wick in the conduit positioned to supply solvent to the surface of the wrapping material.

9. A wrapping machine of the type in which an article is passed between members which drape a sheet of wrapping material across it in U-form, having a pair of tucking devices disposed one at each side of the path of motion of the article, each device comprising a plate adapted for contact with the side of the article, a member positioned adjacent the plate and having a sealing liquid conduit extending therein to a point slightly removed from the path of motion of the article, and a wick extending through the conduit into postion to engage the paper during its folding upon the article but prior to its contact therewith.

10. A wrapping machine of the type having a wrapping channel, means for delivering into the channel an article with a wrapper draped around it in U-form, a pair of stationary side tucking plates at the entrance to the channel, stationary side folders for turning the upper and lower side flaps of the wrapper against the sides of the articles, a pair of movable rear tuckers actuable to form rear tucks in the wrapper when the article is at the end of the channel, a folder actuable to fold one of the end flaps of the article after the formation of the rear tucks, a dauber movable into contact with the surface of the second rear tucks, and means for forming the final rear fold; having sealing liquid carrying wicks in each of the side tuckers, each of the rear tuckers, and in the dauber, conduits containing each of said wicks, piping connecting the conduits together, a constant level reservoir connected with said piping to supply sealing liquid to all of the wicks under uniform conditions, and means for supplying sealing liquid between the side flaps.

11. A machine for wrapping rectangular articles comprising in combination, means for folding a wrapper around an article leaving a tubular wrapper extension beyond the end thereof, folding means for forming end tucks in said extension, means for folding flat against the article end the flaps remaining after the formation of the tucks, and mechanism for applying a sealing liquid directly between each pair of surfaces of the tucks and flaps which are to be brought into contact without applying liquid to the end of the article.

12. A method of wrapping articles in a material having a soluble coating which comprises applying to one only of each pair of overlapping surfaces a thin film of a non-adhesive solvent sufficient in quantity to soften the coating on both contacting surfaces of the wrapper, bringing the overlapping surfaces into contact, and heating the surfaces to drive off the solvent and leave the overlapping surfaces adhesively secured together by the coatings thereon.

13. A wrapping machine comprising a means for folding a wrapper around an article leaving an outstanding flap, an abutment for supporting the flap, and a solvent applying device movable towards the flap and the abutment to apply solvent to the flap, said device comprising a member having a plurality of closely spaced holes, a plurality of wicks extending through the holes and terminating just beyond the surface of the member to form an absorbent surface, and means for supplying solvent to the wicks.

14. A machine for wrapping articles comprising means for holding a partially wrapped article having a projecting tubular wrapper extension, a device for tucking the side portions of the wrapper extension and coating the external surfaces of said tucks with a sealing liquid, a device for folding one projecting end flap over said tucks and coating the external surface of said flap with a sealing liquid, and a device for folding the remaining end flap into adhering contact both with the tucks and with the first folded end flap.

15. A machine for wrapping articles which comprises means for folding a wrapper in U-form around one edge of the article leaving projecting extensions of the wrapper beyond the sides and the opposite edge of the article, a device for forming tucks in the sides of the wrapper adjacent the first-named edge and coating the external surfaces of the tucks with a sealing fluid, a device for folding one side flap at each side down over the coated tucks and over the side of the article and coating the external surfaces of the flaps with a sealing fluid, a device for folding the remaining side flaps over the first named side flaps, thereby forming a projecting tubular wrapper extension beyond the second named edge of the article, a device for forming end tucks in said projecting wrapper extension and coating the external surfaces of the flaps with a sealing liquid, a device for folding one of the end flaps over the coated end tucks means for coating the internal surface of the remaining end flap with a sealing liquid, and a device for folding the remaining end

flap over the previously folded flap, whereby the wrapper will be completely wrapped about the article and will be sealed between all of its overlying folds.

16. A wrapping machine folder having a face adapted for contact with an unfolded wrapper and a second face at an angle thereto adapted to press the folded wrapper against the article, a sealing liquid conduit in the folder opening onto the first-mentioned face, grooves formed in the second-mentioned face to reduce the area of contact with the wrapper, whereby when said folder and an outstanding wrapper flap are moved relatively to each other sealing liquid will be applied thereto and the flap will be pressed down against the article body without smearing the portion thereof previously coated with liquid and without applying any substantial amount of said liquid onto the body of the article, and means for supplying a sealing liquid to the conduit.

17. A wrapping machine comprising means for supporting an article having a wrapper flap outstanding from a surface thereof, a folder, means for causing relative sliding movement between the folder and said face of the article, a wick extending through the leading end of the folder so that the flap is drawn over the wick as it is laid by the folder against the surface of the article, and a reservoir for supplying sealing liquid to the wick.

18. A wrapping machine folder comprising a grooved support, a folding plate secured to the support, a wick located in the groove and against the plate and exposed beyond the end of the plate, and means for supplying a sealing liquid to the wick.

19. A wrapping machine comprising mechanism for wrapping about an article a sheet of wrapping material having a surface adapted to be rendered adhesive by the application of a solvent, leaving a wrapper extension projecting beyond one surface of the article, means for folding a flap of said extension against the article, means for coating substantially the entire external area of said flap with a solvent, means for folding at least one additional flap of said extension a portion only of the coated surface of the first-mentioned flap, leaving part of the coated surface thereof exposed, and means for holding said overlapping flaps in contact during the evaporation of at least some of the solvent from between them and from the coated and uncovered surface of the first-mentioned flap.

20. A method of wrapping articles which comprises placing around an article a sheet of wrapping material having a surface adapted to be rendered adhesive by the application of a solvent, leaving a wrapper extension projecting beyond one surface of the article, folding a flap of the extension against the article, coating substantially the entire external area of said flap with a solvent, folding at least one additional flap of said extension against a portion only of the coated surface of the first-mentioned flap, leaving part of the coated surface thereof exposed, and maintaining the overlapping flaps in contact during the evaporation of the solvent from between the flaps and from the coated and uncovered surface of the first-mentioned flap.

21. A wrapping machine comprising means for supporting an article with a wrapper flap extending therefrom, a wick carrier, a reservoir carried thereby, a wick projecting from the carrier and extending into said reservoir, means for moving the wick carrier to bring the wick into contact with the wrapper flap, a main reservoir supported on the main frame and adapted to contain a free flowing sealing liquid, connections between the two reservoirs, and means for maintaining the level of the liquid in the main reservoir substantially constant at approximately the level of the exposed surface of the wick.

In testimony whereof I have affixed my signature.

PAUL LANGHAMMER.

CERTIFICATE OF CORRECTION.

Patent No. 1,915,499. June 27, 1933.

PAUL LANGHAMMER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 35, for "prevent" read "present"; and line 70, for the syllable "cated" read "dicated"; page 3, line 33, for "folder" read "folded"; page 5, line 29, claim 9, for "postion" read "position"; and line 39, claim 10, for "articles" read "article"; page 6, line 50, claim 19, after "extension" insert "against"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of August, A. D. 1933.

M. J. Moore.

(Seal) Acting Commissioner of Patents.