Feb. 1, 1944. M. J. MILMOE 2,340,836

METHOD OF PACKAGE WRAPPING AND SEALING

Original Filed Feb. 15, 1937

FIG. 1.

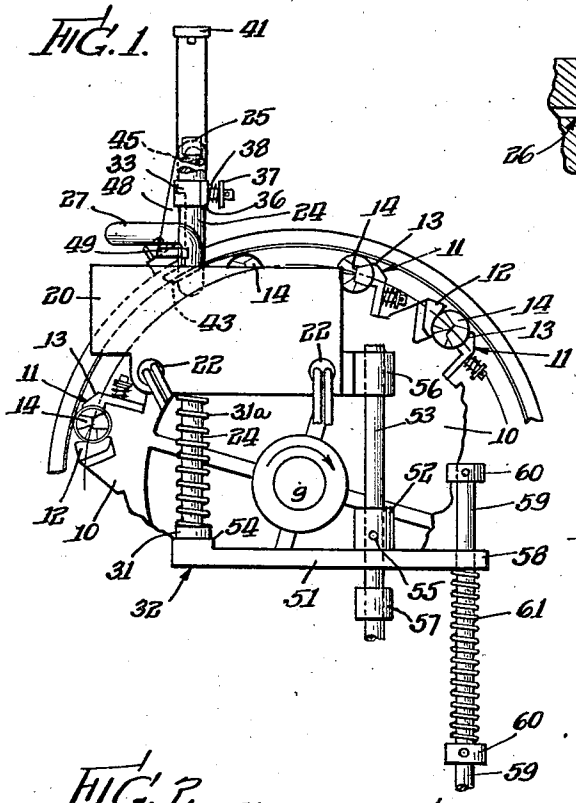


FIG. 5.

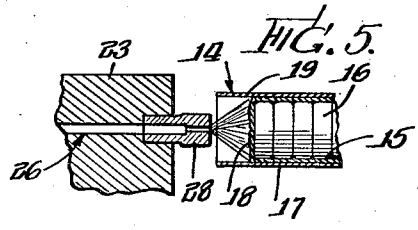


FIG. 6.

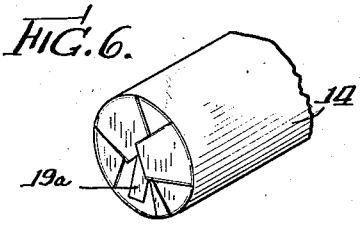


FIG. 7.

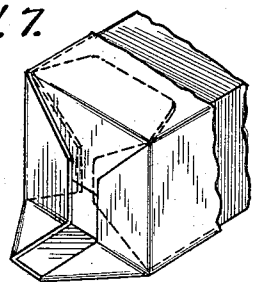


FIG. 2.

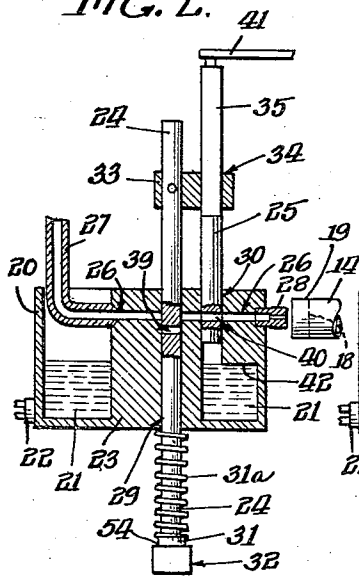


FIG. 3

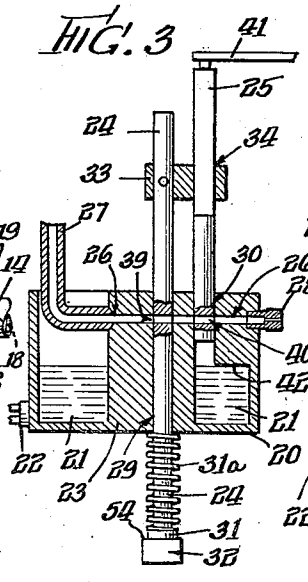
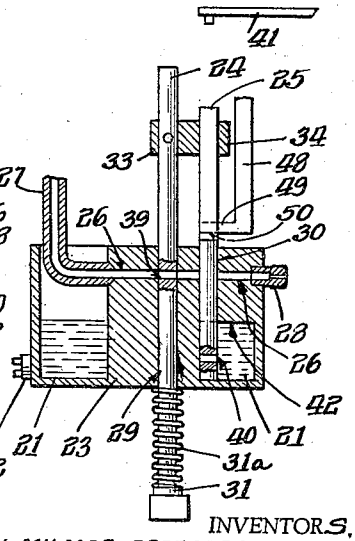


FIG. 4.



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UNITED STATES PATENT OFFICE

2,340,836

METHOD OF PACKAGE WRAPPING AND SEALING

Michael J. Milmoe, deceased, late of Glen Ellyn, Ill., by Florence G. M. Milmoe, executrix, Glen Ellyn, Ill., and Clarence J. Malhiot, Oak Park, Ill.; said Michael J. Milmoe and said Clarence J. Malhiot assignors to F. B. Redington Co., Chicago, Ill., a corporation of Illinois

Original application February 15, 1937, Serial No. 125,804. Divided and this application January 28, 1941, Serial No. 376,356

16 Claims. (Cl. 93—2)

This invention relates to methods of wrapping articles, and more particularly to methods for sealing and closing packages.

It is an object of the invention to provide new and improved wrapping and sealing methods for packaging articles, such methods being particularly adapted to the closing and sealing of package end folds or flaps.

In accordance with the invention improved methods are provided for effecting a tight seal on a package by ejecting in spray or mist form a predetermined quantity of wax or other adhesive against a package portion to be sealed, such as the open end of a carton or other package. After the application of the sealing material, the enclosing wrapper portions, such as the end folds of a package wrapper, are folded onto the package body and caused by the sealing means to adhere in locked position whereby to provide a thorough and tight seal for the package.

Further objects of the invention are to provide in packaging operations of the type stated methods for insuring the complete but controlled impregnation or covering of the package or wrapper portions to be sealed, and methods for insuring the even and controlled distribution of a governed quantity of adhesive to such portions.

Still further objects of the invention are to provide for the intermittent and timed control of the application of the adhesive in relation to the movement of the packages through a packaging machine or the like, and for the inhibiting of the application of the adhesive in the event no package is presented to the sealing station.

Yet another object of the invention is to provide improved sealing methods and means adapted for the sealing of an outer wrapper, such as the end folds thereof, upon an inner package wrapper in a double wrapper package.

Various other objects, advantages and features of the invention will appear from the following specification when taken in connection with the accompanying drawing wherein a preferred embodiment of the invention is set forth for purposes of illustration.

In the drawing, wherein like reference numerals refer to like parts throughout:

Fig. 1 is a partial, detail, elevational view of a wrapping and sealing mechanism adapted for carrying out the methods of the invention;

Fig. 2 is a detail, sectional view of a portion of the mechanism of Fig. 1, more particularly the sealing means thereof, showing the position of the parts just prior to the adhesive applying position;

Fig. 3 is a view similar to Fig. 2, but showing the position of the parts as they reach the adhesive applying position;

Fig. 4 is a view similar to Figs. 2 and 3, but showing the position of the parts when the adhesive conveying valve or rod is locked from operation as when a package is not properly positioned at the adhesive applying station;

Fig. 5 is a detail view on an enlarged scale, more particularly illustrating the package in position to receive the adhesive at the adhesive applying or waxing station;

Fig. 6 is a detail view of the form of package shown in Fig. 5 with the outer wrapper in sealed position; and

Fig. 7 illustrates another form of package and more specifically a carton to which the methods of the invention are readily adaptable.

This application is a division of the copending application of Michael J. Milmoe and Clarence J. Malhiot, Serial No. 125,804, filed February 15, 1937, and entitled Wrapping machine sealing and detector mechanism, now issued as Patent No. 2,254,108, dated August 26, 1941. The present application is directed more particularly to the method of packaging and sealing articles in accordance with the principles of the invention, and while such methods for purposes of illustration are set forth in association with the mechanism and machine disclosed, it is to be understood that the methods are to be considered as limited in scope and application only as hereinafter defined in the claims.

Referring more particularly to the drawings, and to the machine illustrated as suitable and well adapted for carrying out the methods of the invention, the mechanism disclosed comprises a suitable frame or supporting structure in which a driven shaft 9 is suitably journalled. The shaft 9 has fixed thereto for rotation therewith a conveyor 10, which in the present instance is circular in the form of a wheel, there being a plurality of flexible spaced carriers 11 each including a supporting portion 12 and a spring pressed article supporting finger 13, Fig. 1. Packages 14 are carried about the periphery of the conveyor and held by the carriers 11.

The packages 14, Fig. 5, each comprise an inner wrapper 15 wrapped about a plurality of stacked circular articles 16. An outer wrapper 17 is wrapped about the wrapper 15 and is tubular in shape. The end of the tubular wrapper 17 extends a predetermined distance beyond the

end 18 of the inner folded wrapper 15. The outer wrapper, therefore, has an extension 19 which is adapted to be again folded about the once wrapped article. The method of arranging the wrapper and sealing the ends may be as disclosed in Patent No. 2,019,191, issued October 29, 1935, and assigned to the present assignee. An opening tape 19a set forth in said patent, may be included.

A wax pot or other adhesive carrying receptacle 20 is arranged in juxtaposition with respect to the article carrying mechanism to permit the open end of a wrapper about an article to be sprayed with a predetermined amount of wax or other adhesive so that when the outer wrapper is folded down in position a tight seal is effected.

The receptacle 20 is adapted to contain a predetermined quantity of wax or other adhesive 21 and where wax is used as the sealing agent, heating elements 22 may be provided for melting the wax and maintaining the same at a predetermined operating temperature. The receptacle 20 is provided with a lug or boss portion 23 to provide a bearing for the vertically movable valves or rods 24 and 25, Figs. 2, 3 and 4.

The bearing 23 is provided with a transverse bore or passage 26 to which an air pipe or line 27, Fig. 2, leading to a source of air pressure (not shown), is connected to provide a passage from the air pressure means to a nozzle 28. The bore 26 transverses the bores 29 and 30 provided in the bearing 23 for the vertical rods or valves 24 and 25 respectively. One part of the bearing or boss 23 extends from the top of the receptacle 20 to the bottom, and it is through this solid part that the bore 29 is formed for the reception of the rod 24. The other part of the bearing or boss 23 extends only a part way down, as clearly shown in Figs. 2 and 3, to permit the lower end of the rod 25 to be immersed in the wax 21, Fig. 4. The rod 24 is slidably movable in the bore 29 and extends completely through the bearing 23 throughout its entire vertical length and above and below the top and bottom of the receptacle 20.

An operating head 31 is connected to the lower end of the rod 24 and is operated by operating mechanism 32 to cause vertical movement of the rod 24. This operating mechanism 32 is operatively but resiliently connected and correlated with the means which operates the package carrying member or wheel 10 so that operation of the rod 24 is synchronized with the operation of the drive shaft 9 of the article carrying wheel 10. This operating mechanism 32 is provided with a resilient feature, as will later be described, so that jars and strains are taken off the parts should the rod 24 be stuck for some reason or other, such as the freezing or caking of the wax.

A spring 31a encircles the lower end of the shaft or rod 24 and is arranged between the bottom of the receptacle 20 and the upper surface of the member 31. The purpose of this spring is to lower the rod 24 after it has been raised by the operating means 32.

A lug 33 is fixed to the valve or rod 24 and is provided with an opening 34 therein to receive the upper squared portion 35 of the rod 25. A plate 36, Fig. 1, carreid as a part of the lug 33 frictionally engages the rod 25 and is urged thereagainst by means of a spring 38 reacting against a fastening element 37. A pressure is therefore frictionally exerted against the shaft 25 providing a friction contact between the lug 33 and the shaft 25. Therefore, when the rod 24 is reciprocated vertically, the frictional contact between the lug 33 and the rod 25 is such as to cause the lug 33 to reciprocate the rod 25.

The rods 24 and 25 are each provided with transverse bores 39 and 40, respectively, which are adapted to be brought into alinement with the passage 26 in the bearing member 23. When the bores 39 and 40 are in alinement with the passage 26 air pressure is free to pass through the ejector nozzle 28. The nozzle 28 is, of course, positioned relative to the open end of the cylindrical outer wrapper 17 to spray the closed end 18 of the inner wrapper with a predetermined quantity of wax, Fig. 5. The rod 25 carries a predetermined quantity of wax in the bore 40 and, therefore, when the bores 39 and 40 of the rods 24 and 25, respectively, are in alinement with the passage 26 in the bearing 23 the wax in the bore 40 of the rod 25 is blown out of the nozzle 28 against the end of the article package. Means (not shown) are then operated to fold over the end of the outer wrapper 17 in any desired manner, such as disclosed in the aforesaid Patent No. 2,019,191.

During operation of the driving means 32 the rod 24 is moved upwardly against the tension of the spring 31a. Upward movement of the rod 24 will normally cause upward movement of the rod 25 because the lug 33 is fixed to the rod 24 and has frictional engagement with the rod 25, the friction being sufficient to raise the rod 25 under normal operating conditions. When the rod 24 has reached the limit of its upward travel, the passage 39 in the rod 24 will be in alinement with the passage 26 in the bearing 23. The rod 25, which is being raised by the rod 24, will be limited in its upward movement by a stop 41 whereby the passage 40 in the rod 25 will be in alinement with the passage 26. As shown in Fig. 3, the air pressure coming through the line 27 will then blow out any wax which is in the passage 40 in the rod 25 and force this wax out of the nozzle 28 against the folded end of the inner wrapper 15.

After the waxing operation has been completed the operating mechanism 32 will be withdrawn from the operating boss 31 and the spring 31a will return the parts to normal inoperative position because the movement of the rods in their bores will bring the passages 39 and 40 out of alinement with the passage 26 and, therefore, the air supply from the line 27 is shut off. When the rod 24 moves downwardly the rod 25 will also be caused to move downwardly because of the frictional engagement of the rod 25 with the lug 33. The downward movement of the rod 25 is limited because of the engagement of the bottom of the rod 25 with the bottom of the receptacle 20. Excess or over-movement of the rod 24 in either direction will not be transmitted to the rod 25 because of the sliding frictional engagement. Therefore, when the rod 25 reaches the stop 41 the rod 25 will cease to move even though the rod 24 continues upwardly (compare Figs. 2 and 3). Likewise, downward movement of the rod 25 will cease when the bottom of the rod 25 engages the bottom of the receptacle, as shown in Fig. 4, even though the rod 24 should continue downwardly. However, the passage 39 in the rod 24 is so positioned with respect to the mechanism that operates the rod that at the limit of the upward movement of the rod 24 the passage will be in the position shown in Fig. 3. Therefore, during reciprocation of the rod 24 the rod 25 will also be reciprocated and positioned by stop 41 and the passages 39 and 40 will be brought into

alinement to permit the air pressure to blow the wax in the passage 40 out of the nozzle 28.

During each reciprocation of the rod 25 the lower end of the rod is immersed in the liquid wax 21 and a predetermined amount of wax is deposited in the passage 40. The wax cannot escape from the passage 40 as the normal wax line is above the lower end 42 of the bearing 23 and, therefore, is confined by the material of the boss which surrounds the bore 30.

Of course, it is desirable and really necessary that no wax be sprayed when no wrapped article 14 is in position to receive the wax. Therefore, detector means are provided to prevent the passage 40 from coming into alinement with the passage 26 when no article is in position to receive the wax treatment.

This detector mechanism is fully set forth in said copending parent application, Serial No. 125,804. It comprises a feeler 43, Fig. 1, rigidly mounted on a transverse shaft 45 suitably journalled in the frame of the machine. The feeler 43 is positioned in the path of the packages 14, and thus when a package 14 is transmitted to the wax receiving position the feeler 43 will be moved to the left as seen in Fig. 1, imparting a part clockwise rotation to the shaft 45. The shaft 45 also has fixed thereto a downwardly extending arm 48 having a locking lug 49, Figs. 1 and 4, at its lower end. Therefore, any movement given to the shaft 45 by the operation of the feeler 43 is transmitted to the arm 48 and consequently to the lug 49. The lug 49 on the arm 48 is adapted to engage a recess or notch 50 formed in the square portion 35 of the rod 25, and when so engaged on counterclockwise movement of the arm 48, will lock the rod 25 from vertical movement. It will thus be seen that if a package 14 is properly positioned at the wax receiving station, the feeler 43 will be engaged moving shaft 45 slightly clockwise and withdrawing the lug 49 out of the slot or notch 50 in the shaft 25, thereby allowing vertical movement of the rod 25 and permitting the waxing of the package. If, however, there is no article 14 properly in position at the waxing station, the lug 49 will not be withdrawn from the notch 50, and the vertical movement of rod 25 will therefore be prevented. Under such conditions of operation, as illustrated in Fig. 4, while the rod 24 will be vertically reciprocated in accordance with normal operating conditions, the rod 25 will remain stationary, the lug 33 merely frictionally sliding thereon, and a waxing operation will not be permitted. As the machine continues to operate and the next succeeding package is fed to the wax receiving station, the feeler element 43 will cause the locking lug 49 to be removed from the recess in the shaft 25, thereby permitting normal operation to be resumed and the waxing of the package to be effected.

Because of the possibility of the operating rod 24 sticking because of certain conditions, such as the cooling or freezing of the wax in the receptacle 20, the means for operating the rod 24 are resilient whereby the driving parts can operate in their normal manner without breaking or damaging other parts because of the sticking of the rod 24.

This flexible operating mechanism 32 may comprise an arm or bracket 51, Fig. 1, which has a boss 52 through which a vertical rod or shaft 53 extends. The rod or arm 51 has an operating head 54 which has face to face contact with the member 31. The journal or boss 52 on the member 51 is fixed to the shaft 53 in any suitable manner such as by a pin 55 whereby the rod 53 is rigidly connected to the arm 51. Upper and lower bearings 56 and 57, respectively, are fastened to part of the machine frame and provide a sliding bearing for the shaft 53. The arm 51 has an extension or tail piece 58 through which a rod or shaft 59 passes. Nuts or stops 60 are fastened to the shaft or rod 59 and a spring 61 is interposed between the lower nut 60 and the under side of the tail piece 58. The rod or member 59 is reciprocated in any well known manner such as by a cam or crank (not shown) but, of course, is synchronized with the operation of the rest of the machine to cause vertical reciprocal movement in timed relationship with the movement of the feed wheel 10 whereby intermittent synchronized movement of the shaft 24 is caused.

It will thus be seen that normally the arm 51 reciprocates as a unit with operating shaft 59, thereby imparting the desired vertical motion to the shaft 24. However, in the event shaft 24 should stick or otherwise jam, the spring 61 will be compressed, thereby allowing the operating shaft 59 to move without corresponding motion of the arm 51, as set forth for illustrative purposes in Fig. 1.

The invention is particularly adaptable for processing a package as disclosed in the aforesaid Patent No. 2,019,191 and as disclosed in Fig. 6. However, other types and forms of packages and cartons may be also employed.

In carrying out the method a predetermined quantity of wax is sprayed in mist form within the tubular extension of the outer wrapper and against the exterior surface of the inner wrapper or carton so as to thoroughly impregnate the free ends of the outer wrapper and to provide a base portion against which the wrapper may be folded. After a predetermined quantity of wax is sprayed, the outer wrapper may be folded down and over into the position shown in Fig. 6.

The invention also contemplates spraying wax against the end of a carton or package so that when the free ends of the outer wrapper are folded down over the carton flaps as shown in Fig. 7, a tight seal is provided. It is to be understood that the invention is not limited to the specific forms disclosed as the package may include any geometrical figure or configuration.

The invention provides a sealing method for making a tight seal on a package. A passage leading to a source of air pressure is opened and closed by the operation of the rods 24 and 25 and the amount of wax to be blown through the nozzle 28 when all the parts are in operating position is determined by the size of the orifice or passage 40 at the end of the rod 25. After the wax or other adhesive is blown or sprayed into the open cylindrical end of the outer wrapper, the wrapper is creased and folded against the end of the package whereby a tight seal is effected. By delivering a predetermined quantity of wax to a predetermined position and then causing this wax to be ejected against the end of the package or article in a spray or mist form, the entire wrapper surface to be folded is impregnated with the wax or other adhesive and then finally, when the carton flaps or outer wrapper folds are folded down in position, the wrapper will be fixed to the package and a tight seal will be effected. The detector mechanism is simple in construction and positively controls the operation of the wax spraying means depending upon whether or not

a package is in position to be operated upon. Uniform wax distribution is also insured.

Changes may be made in the form, construction and arrangement of the apparatus and in the various method steps set forth without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. The method of packaging an article which comprises applying and folding a wrapper about the article, applying a second wrapper about the first wrapper with an end of the second wrapper being open and extending beyond an end of the first wrapper, spraying a liquid adhesive against the end of the first wrapper and finally folding the extending end of the second wrapper against and about the end of the first wrapper.

2. The method of packaging an article which comprises applying a wrapper about the article with the end of the wrapper open and extending a predetermined distance beyond the article end, spraying a liquid adhesive against the end of the article in a direction axially of the article end, and thereafter folding the extending wrapper onto the article end and into a series of adhesively secured folds, whereby to provide a tight wrapper end seal for the article.

3. The method of packaging an article which comprises applying a wrapper about the article with the end of the wrapper open and extending a predetermined distance beyond the article end, spraying a liquid adhesive onto the inner surface of the extending wrapper end portion by means of a diffused spray projected substantially axially of the article end, and thereafter folding the extending wrapper end portion onto the article and into a series of adhesively secured folds, whereby to provide a tight wrapper end seal for the article.

4. The method of packaging an article which comprises applying a wrapper about the article with the end of the wrapper open and extending a predetermined distance beyond the article end, spraying a liquid adhesive against the end of the article and onto the inner surface of the extending wrapper portion by means of a diffused spray projected substantially axially of the article end, and thereafter folding the extending wrapper end onto the article and into a series of adhesively secured folds, whereby to provide a tight wrapper end seal for the article.

5. The method of packaging an article which comprises applying a wrapper about the article with the end of the wrapper open and extending a predetermined distance beyond the article end, spraying a liquid adhesive against the end of the article, folding the extending wrapper onto the article end and into a series of adhesively secured folds, and arranging an opening element within said folds to provide for the easy opening thereof.

6. The method of packaging an article which comprises applying a wrapper about the article with the end of the wrapper open and extending a predetermined distance beyond the article end, spraying a liquid adhesive onto the inner surface of the extending wrapper portion, folding the extending wrapper portion onto the article end and into a series of overlapping folds, and arranging an opening element within said folds, whereby to provide a tight wrapper end seal for the article having easy opening means arranged therein.

7. The method of packaging articles which comprises sequentially conveying a series of articles to be packaged in alinement along a predetermined path to a packaging station, arranging a wrapper about each of said articles prior to the time the articles reach the packaging station so that the end of the wrapper is open and extends beyond the article end, spraying liquid adhesive by means of a diffused spray projected substantially axially of the article end onto each article end in juxtaposition to the extending wrapper portion as each article reaches the packaging station, and thereafter folding the extending wrapper portion onto the article end and into tight sealing engagement therewith.

8. The method of packaging articles which comprises cyclically separating and transmitting a quantity of liquid adhesive from a liquid adhesive reservoir to a packaging station, cyclically presenting a series of articles to be packaged to the packaging station in timed relation to the transmission of the adhesive, and cyclically projecting and spraying the separated adhesive onto the articles at said packaging station.

9. The method of packaging articles which comprises cyclically transmitting a measured amount of liquid adhesive from a liquid adhesive reservoir to a packaging station, cyclically presenting a series of articles to be packaged to the packaging station in timed relation to the transmission of the adhesive thereto, and cyclically subjecting the adhesive to the action of compressed air at the packaging station, to thereby spray a mixture of air and adhesive onto the articles.

10. The method of packaging articles which comprises withdrawing a measured volume of liquid adhesive from a liquid adhesive reservoir and transmitting it to a packaging station, arranging an article having a projecting wrapper portion to be sealed in juxtaposition to the adhesive at the packaging station, subjecting the adhesive to the action of compressed air to thereby spray a mixture of air and adhesive onto the article, and thereafter folding the projecting wrapper portion onto the article to effect the sealing thereof.

11. The method of packaging articles as defined in claim 8 wherein the transmission of the adhesive to the packaging station is inhibited in the event that an article is not at the packaging station in position to be packaged.

12. The method of packaging an article which comprises applying a wrapper about the article with the end of the wrapper open and extending a predetermined distance beyond the article end, arranging the article so wrapped at a packaging station, withdrawing a quantity of liquid adhesive from a liquid adhesive reservoir and transmitting it to the packaging station, subjecting the adhesive to the action of compressed air to thereby spray a mixture of air and adhesive against the end of the article, and thereafter folding the extending wrapper onto the article end and into a series of adhesively secured folds, whereby to provide a tight wrapper end seal for the article.

13. The method of packaging articles which comprises applying wrappers to a series of articles with the ends of the wrappers open and extending a predetermined distance beyond the article ends, cyclically presenting a series of articles so wrapped to a packaging station, cyclically separating and transmitting a quantity of liquid adhesive from a liquid adhesive reservoir to said packaging station in timed relation to the transmission of the articles thereto, cyclically

projecting and spraying the separated adhesive onto the article ends at the packaging station, and thereafter folding the extending wrapper portions onto the article ends and into a series of adhesively secured folds, whereby to provide tight wrapper end seals for the articles.

14. The method of packaging an article which comprises applying and folding a wrapper about the article, applying a second wrapper about the first wrapper with the end of the second wrapper open and extending a predetermined distance beyond the end of the first wrapper, arranging the article so wrapped at a packaging station, withdrawing a quantity of liquid adhesive from a liquid adhesive reservoir and transmitting it to said packaging station, subjecting the adhesive to the action of compressed air whereby to spray the adhesive against the end of the first wrapper, and thereafter folding the extending end of the second wrapper against and about the end of the first wrapper into a series of overlapping sealed folds.

15. The method of packaging articles which comprises sequentially conveying a series of articles to be packaged in alinement along a predetermined path to a packaging station, arranging a wrapper about each of said articles prior to the time the articles reach the packaging station so that the end of the wrapper is open and extends beyond the article end, spraying liquid adhesive onto each article end in juxtaposition to the extending wrapper portion as each article reaches the packaging station, and inhibiting the spraying of the adhesive onto the article in the event no article is present at the packaging station.

16. The method of packaging articles which comprises sequentially conveying a series of articles to be packaged in alinement along a predetermined path to a packaging station, arranging a wrapper about each of said articles prior to the time the articles reach the packaging station so that a portion of the wrapper extends beyond the article body, spraying liquid adhesive onto each article and wrapper assembly as each article reaches the packaging station, and inhibiting the spraying of the adhesive onto the article and wrapper assembly in the event that no article is present at the packaging station.

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