Nov. 2, 1937. E. F. CHAMBLESS 2,097,515

METHOD OF AND MACHINE FOR PACKAGING GOODS

Filed Dec. 12, 1935 3 Sheets-Sheet 1

Fig. 1.

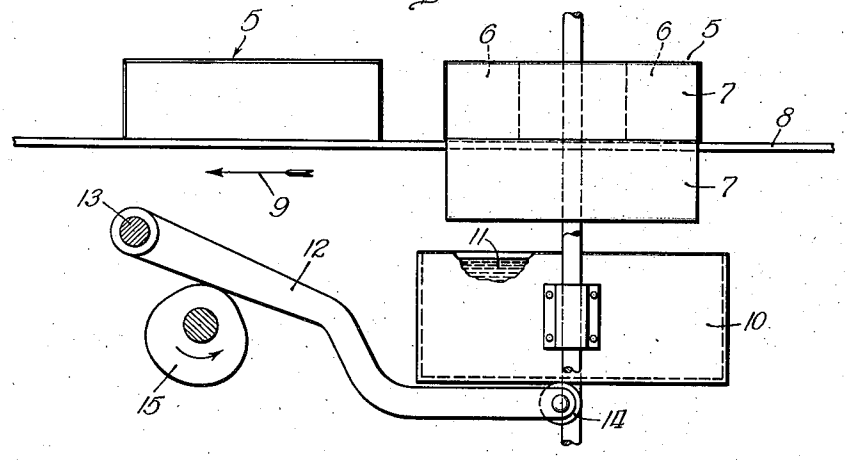


Fig. 3.

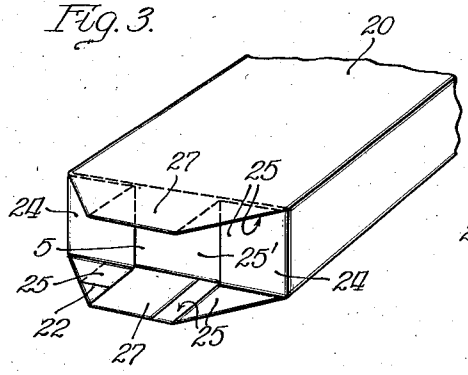


Fig. 4.

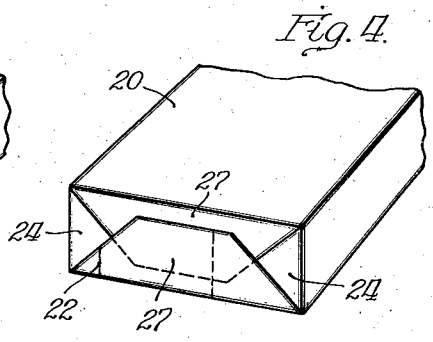


Fig. 5.

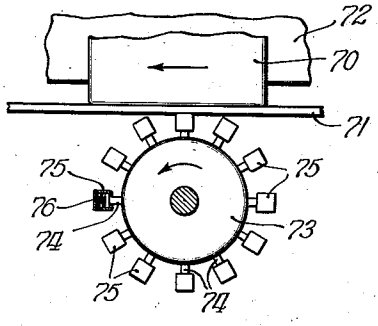
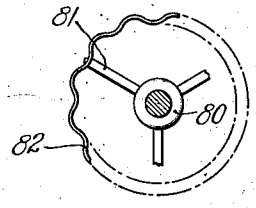


Fig. 6.



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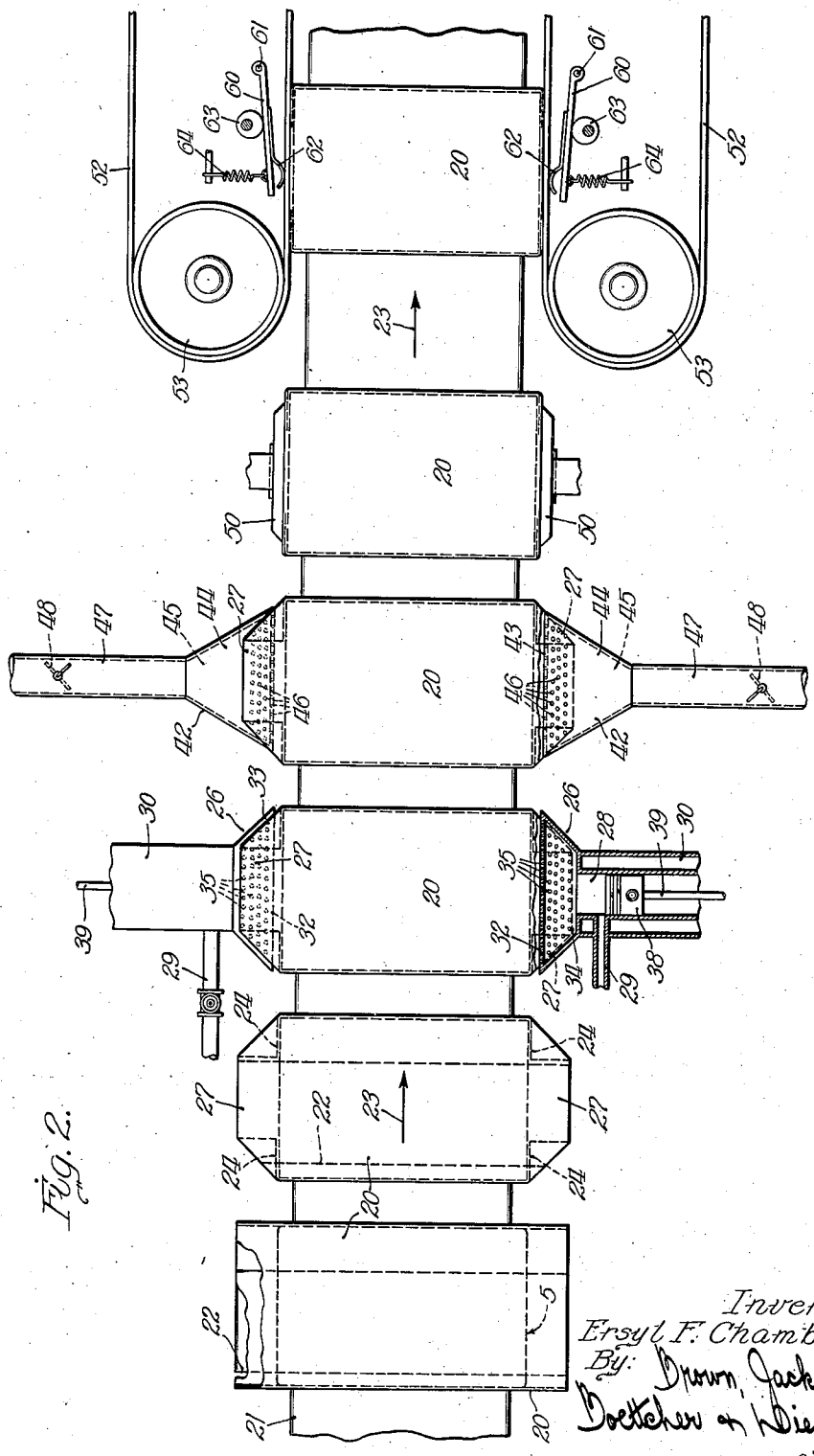


Fig. 2.

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Fig. 7.

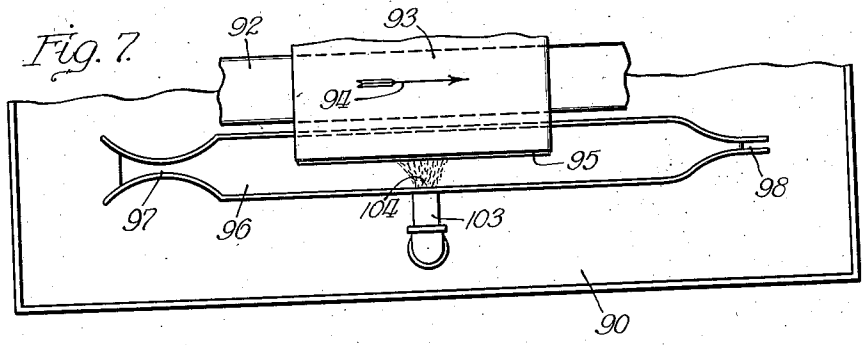


Fig. 8.

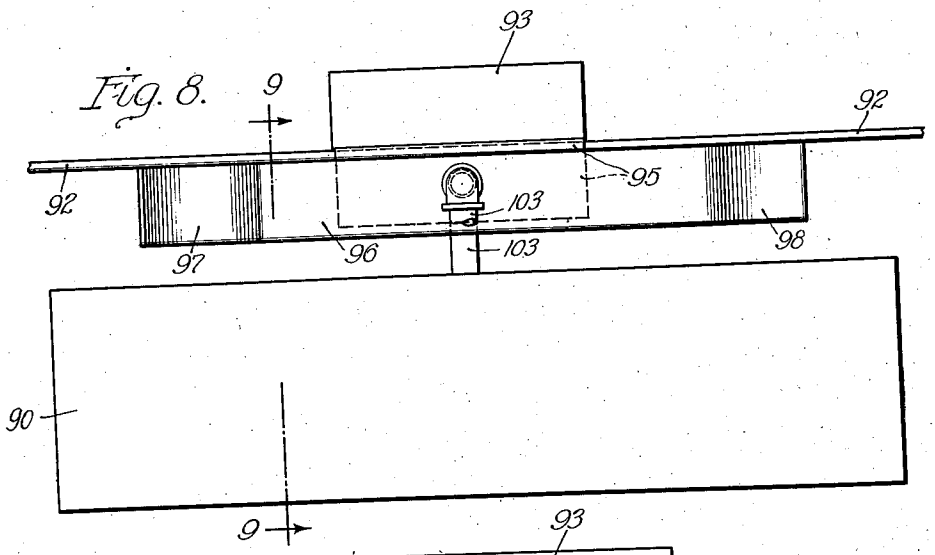
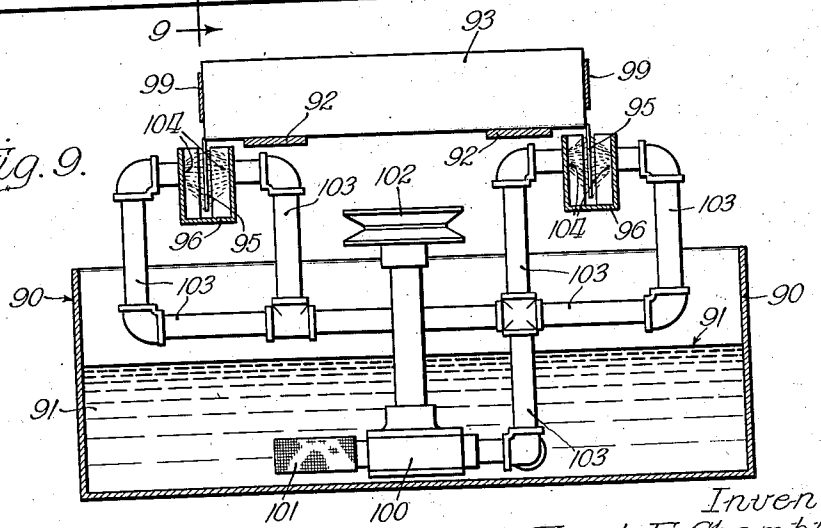


Fig. 9.



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UNITED STATES PATENT OFFICE

2,097,515

METHOD OF AND MACHINE FOR PACKAGING GOODS

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Application December 12, 1935, Serial No. 54,020

13 Claims. (Cl. 93—2)

My invention relates to a method of and apparatus for packaging goods. The particular application or use of the invention which I shall describe hereinafter is to or for the production of a moisture-proof package for marketing popcorn or other confections which are very susceptible to the deleterious effects of moisture. It is to be understood, however, that the invention is not limited to such particular use, but may be employed for the production of other packaged goods which are desirably protected against the access of moisture until opened for consumption or other use.

In an effort to provide a water-proof package of this sort, a flexible waxed or paraffined paper wrapper has been commonly employed. Where heat and pressure are applied to seal such a wrapper by the wax thereon, the desired seal is not obtained without applying additional wax. Heretofore in the art, this additional wax has been applied subsequently to the operation of sealing the package.

This scheme of applying the additional wax after the foldable flap portions, for example, are folded and sealed, has the objection of putting the additional wax only on the external surfaces of the foldable flap portions of the wrapper. The folded and sealed condition of the flap portion prevents the additional wax from reaching the inner or underlying surfaces of the folded portion of the wrapper. This additional wax therefore does not seal and water-proof these inner or underlying surfaces of the folded portions, and, as a result, the wrapper is not sealed and water-proofed as effectively as possible.

According to my invention, I wrap the goods in a waxed or paraffined paper wrapper. I then apply additional wax to a portion of the wrapper and preferably thoroughly over all inner surfaces of the flap portions before these flap portions are folded closed and sealed, and then, subsequently to the application of this additional wax, I seal the flap portions of the wrapper to which the additional wax is applied. Where I refer to wax or paraffine in the present specification and in the appended claims, I intend that these terms shall, in the broader aspects of the invention, comprehend these materials and any similar or equivalent materials.

The chief advantage in applying the additional wax before completely folding and sealing the foldable flap portions of the wrapper lies in the ability thereby to place the additional wax thoroughly over all inner or underlying surfaces of the foldable portions of the wrapper. I find by tests that the sealing and water-proof character of the package are thus considerably improved, and the goods are preserved against the deleterious effects of moisture, better than possible heretofore in the art.

Other objects and advantages and numerous adaptations of the invention will more fully appear from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a more or less diagrammatic side view showing the step of sealing the inner wrapper or carton;

Figure 2 is a more or less diagrammatic plan view showing the outer wrapper applied and the preferred process of partially folding the wrapper, then applying additional wax and heat to the foldable portion, and subsequently completing the fold and applying pressure to seal the portion of the wrapper to which the additional wax and heat are applied;

Figure 3 is a fragmentary end view showing the wrapper after the partial folding of the foldable portion thereof and before the application of the additional wax and heat;

Figure 4 is a similar view showing the foldable portion after the folding and sealing of the same has been completed;

Figure 5 is a fragmentary view showing a modified form of pressure means with an equalizing action for assuring proper sealing of the low portions of the folded wrapper;

Figure 6 is a view showing another form of pressure sealing means with an equalizing action;

Figure 7 is a fragmentary plan view showing another form of mechanism for applying wax to the open flaps of the inner carton;

Figure 8 is a side elevational view of the mechanism shown in Figure 7; and

Figure 9 is a transverse sectional view taken on the line 9—9 of Figure 8.

The inner wrapper or carton 5 is preferably made of stiff paper board, and may be of the usual form, comprising an elongated rectangular body and the customary end flaps 6 and 7 which are folded inwardly to enclose the contained goods. This inner carton may be coated with wax and heated and dried to remove any moisture, or it may be of any other suitable or preferred form.

The carton 5 is placed on a belt or conveyor 8 with the top or outer flap 7 turned down as shown in Figure 1. A wax tank 10, containing a body of melted wax 11, is disposed beneath the belt 8 in position to be raised to immerse the

downturned flap 7 in the melted wax in the movement of the carton on the belt 8. The wax tank may be raised in any suitable manner, as, for example, by an arm 12 pivoted at 13 and having an end 14 underlying the tank 10 and a cam 15 which, in its rotation, lifts the arm 12 upwardly about the pivot 13 and raises the tank 10. After the wax is applied to the downturned flap 7, this flap is folded up and sealed by the wax thereon to the corresponding downturned opposite flap 7 which underlies the outer flap and, in turn, overlies the inturned end flaps. After both ends have been closed and sealed, the carton may pass between compression belts for cooling and completing the sealing.

After these operations of sealing the carton, the carton is wrapped in a flexible waxed or paraffined paper wrapper 20 and transferred to the belt or conveyor 21 of the wrapping machine, preferably with the overlapping edges or seam 22 disposed downwardly. These overlapping edges 22 may be sealed by the wax thereon, as, for example, by the application of heat and pressure, or in any other suitable or preferred manner. The belt 21 travels in the direction indicated by the arrows 23.

The first step in the wrapping machine is partially to fold the ends of the wrapper 20, extending beyond the ends of the carton 5, by folding in the opposite ends of the extending portions of the wrapper to form the end folds 24. The package with these end folds 24 completed is shown in Figure 3. The folds 24 are preferably formed in the movement of the wrapped carton on the belt 21. The folding means may be of any existing or preferred form.

Beyond the position at which the folds 24 are formed in the movement of the belt 21, means is provided for applying additional wax thoroughly over all of the inner or underlying surfaces 25 (Figure 3) of the foldable portions of the wrapper 20 and the adjacent end portion 25' of the carton 5. The application of this additional wax may be performed in any suitable manner. Preferably a nozzle 26 is provided at each of the opposite sides of the belt 21. Each of the nozzles 26 is shaped to correspond with the shapes of the unfolded top and bottom flap portions 27 and to fit between these unfolded flap portions so that in the movement of the package on the belt these flap portions of the wrapper will pass over the tops and beneath the bottoms of the nozzles 26, as shown. The previous formation of the inturned end folds 24 permits the nozzles 26 to enter between the unfolded flap portions 27.

Each nozzle 26 has a communicating cylinder 28 to which hot melted wax is supplied by a hot wax inlet conduit 29. Each cylinder 28 is preferably steam-jacketed at 30 to maintain the wax in the desired melted condition and at the desired temperature. Each of the inner walls 32 of the nozzles 26, which inner walls parallel the ends of the carton, and the top and bottom walls 33 and 34, respectively, of the nozzles, are provided with a multiplicity of apertures 35 through which the melted wax is forced or sprayed to form a uniform coat or film of wax over the inner surfaces of the top and bottom flaps 27 and over the ends of the wrapped carton. The melted wax may be forced or sprayed upon the surfaces in any suitable manner, as by a pressure tank connected to the wax supply conduit 29, this conduit being provided with a valve opened, for example, by a cam driven by the machine to spray the melted wax from the top, bottom, and inner end of each nozzle to coat the inner or underlying surfaces 25 and 25' thoroughly and uniformly.

Preferably, however, the melted wax is forced upon the surfaces 25 and 25' by small pistons 38 operating in the cylinders 28. These pistons are provided with suitable actuating mechanism 39 which operates the pistons at intervals properly timed with respect to the movement of the belt 21.

If the package is of a different form, the ends of the nozzles 26 may be correspondingly formed to spray the melted wax uniformly over all inner or underlying surfaces of the wrapper and over the end of the inner container. The apertures 35 are preferably small enough to retain the wax when pressure is not applied. The conduits 29 may be provided with suitable valves. When these valves are open, the melted wax runs in and fills the nozzles 26 and the inner ends of the cylinders 28. Assuming that the piston 38 (Figure 2) is shown in its outermost position and that its inner end is positioned at the inner end of the cylinder 28 when the piston is at its innermost position, then the amount of wax applied with each stroke of the piston will be equal to the volume of the inner end of the cylinder 28. If desired, means may be provided for adjusting the stroke of the piston to vary the amount of wax applied with each stroke, and the cylinders 28 may be dimensioned to suit requirements.

Beyond the nozzles 26 in the direction of movement of the belt 21, means is provided for blowing blasts of hot air upon the inner surfaces of the top and bottom flaps 27 and upon the ends of the wrapped carton. This hot air applying means preferably comprises a pair of nozzles 42, one at each of the opposite sides of the belt 21. These nozzles 42, like the melted wax applying nozzles 26, are shaped to fit between the top and bottom flaps 27 so that in the movement of the package with the belt 21 these flaps 27 will pass over the tops and beneath the bottoms of the nozzles 42. The inner walls 43 of the nozzles 42 parallel the ends of the carton, and the top and bottom walls 44 and 45 are at least coextensive with the inner surfaces of the top and bottom flaps 27.

Each of the walls 43, 44 and 45 is provided with a multiplicity of apertures 46, and a hot air supply conduit 47 is connected to each nozzle 42. These hot air supply conduits may be provided with valve means 48 which may be operated by suitable cam means to blow hot air thoroughly over the inner surfaces of the flaps 27 and over the ends of the wrapped carton when the carton is positioned between the nozzles 42 in its movement with the belt. The action of the machine may be intermittent, so that the wrapped carton will pause momentarily in the wax and hot air applying positions, and in any other desired position in its continuous movement through the machine.

The air supplied by the nozzles 42 is heated to a temperature which will heat the wax on the surfaces to which the air is applied sufficiently to seal the ends of the wrapper by the wax thereon when the top and bottom flaps are folded to closed position. There may be a cooling of the wax between the positions of wax and hot air application, or the operation may be so rapid that there is no appreciable cooling between these positions. Instead of applying the wax and heated air in separate steps, I contemplate applying the additional wax and heated air together within the scope of the broader aspects of my present invention. I also contemplate applying the additional wax otherwise than by spraying

it upon the desired surfaces as illustrated and described, and I contemplate, within the broader aspects of the invention, applying the heat in other manners than that shown and described.

After the wrapped carton leaves its position between the nozzles **42**, it is positioned between knife members **50** or other suitable means which operates to fold the top and bottom flaps **27** at the ends of the carton to closed position, one overlapping the other. When closed, these flaps **27** overlap the folded portions **24** and the ends of the wrapped carton, and are sealed effectively by the wax thereon to render the carton moisture-proof and preserve the contents of the carton against the deleterious effects of moisture. The wax which I apply in accordance with my present invention is preferably without moisture, and the usual wax on the inner carton and on the wrapper **20** is also preferably without moisture. The additional wax which is applied firmly unites with or becomes fused to the wax already on the wrapper and carton, forming wax coatings or films over all inner or underlying surfaces of the folded ends of the wrapper, whereby to seal the folded ends of the wrapper and all seams produced by such seals.

After the flaps **27** are folded to closed position, the folded ends of the wrapped carton are pressed into snug contact until the wax is cooled and set to seal the folds. This is preferably accomplished by passing the wrapped carton between a pair of compression belts **52** which operate over pulleys **53** and along opposite sides of the belt **21**, with their inner runs at right-angles to the run of the belt **21** and in position to press the folded ends of the wrapper into snug contact. Blasts of air or other cooling or chilling means may be applied to the closed ends of the wrapper along the path of travel of the wrapped carton between the belts **52**, whereby the wax may be cooled and set to seal the folds.

The belts **52** are preferably formed of rubber or other flexible material which will accommodate itself to the high and low portions of the folded ends of the wrapper. Belts of other material and, in fact, other pressure means are, however, contemplated within the broader aspects of the present invention.

In order to assure snug contact of the high and low portions of the folded ends of the wrapper, and particularly to press the low portions into snug contact, I provide pressure means with yieldable equalizers. In Figure 2, these pressure and equalizing devices comprise arms **60** pivoted at **61**, one adjacent the inner run of each belt **52**. These arms **60** carry equalizer springs **62** positioned to engage the inner run of the belt **52** and operable through the belt to tamp or press, by a series of light blows, the low portions of the folded ends of the wrapper into snug contact as the wrapped carton travels along with the belt **21**. The arms **60** are held yieldingly in engagement with cams **63** by springs **64**. The cams **63** are driven, for example, by the driving mechanism for the machine, and, with the springs **64**, oscillate the arms **60** back and forth to produce the tamping or series of light blows upon the low portions of the wrapped end of the carton, as above described. This tapping of the low portions is much the same as would be produced manually by a rapid series of light blows with the fingers.

In the embodiment of Figure 5, the wrapped package, with the ends folded closed is indicated at **70**. One of the compression belts is indicated at **71**, and the belt for moving the wrapped package through the machine is indicated at **72**. In this case the pressure wheel and equalizer is in the form of a wheel **73** which rotates in the direction of the arrow. This wheel has a plurality of radially extending pins **74** carrying equalizer caps **75**. Springs **76**, disposed within the caps **75** and between the outer ends of the caps and the outer ends of the pins **74**, press the caps yieldingly to their outermost positions. The wheel **73** rotates in the passage of the wrapped package through the machine, and the spring-pressed equalizer caps engage the low portions of the folded ends of the wrapping by a series of light blows to press these low portions into snug contact in much the same manner as the pressure and equalizing devices shown in Figure 2.

The modified pressure and equalizing wheel shown in Figure 6 comprises a hub part **80** having radial spokes **81** carrying a spring rim **82** of serpentine form. This spring rim **82** is adapted to operate upon the low portions of the folded ends of the wrapping in much the same manner as the pressure and equalizing devices shown in Figures 2 and 5.

Instead of applying the wax to the open flaps of the inner carton by the mechanism shown in Figure 1, these open flaps of the inner carton may be waxed by mechanism such as that shown in Figures 7, 8 and 9.

This alternative form of mechanism for waxing the open flaps of the inner carton comprises a wax tank **90** containing a body of melted wax **91** and disposed transversely beneath the belt **92** for moving the carton **93** in the direction indicated by the arrow **94**. The top or outer end flaps **95** of the carton are turned down as shown, and, in the movement of the carton, pass through wax receptacles **96**, one disposed longitudinally at each of the opposite sides of the belt **92**. The downturned flaps **95** of the carton enter at the restricted inlets **97** of the reseptacles **96** and pass out through the restricted outlets **98**. Flap retainers are shown at **99**.

A pump **100**, having a screened inlet **101** and driven, for example, from the driving mechanism of the machine by a pulley **102**, is submerged in the body of melted wax **91**. The outlet of the pump **100** delivers melted wax through conduits **103** which spray the melted wax at **104** over the opposite sides of the flaps **95** in their passage through the receptacles **96**. The inner and outer surfaces of the flaps **95** are thus covered or coated with films or coats of wax prior to the closing and sealing of these flaps. The open ends of the receptacles **96** permit the excess wax sprayed in these receptacles to return to the wax tank **90**.

It is to be understood that in packaging the popcorn, confections, or other goods, in accordance with my present invention, I place or enclose the same in the inner wrapper or carton **5**. Usually the carton **5**, with the wrapper folded and sealed about the same, is enclosed in an outer wrapper which will protect the package finished in accordance with the present invention. This outer wrapper may be of paper, paper-board, regenerated cellulose, or other suitable material, and may be applied as suitable or desired.

I do not intend to be limited to the details shown and described, nor do I intend to limit my invention to the precise order of the steps above

recited except as the same are particularly stated in the appended claims.

I claim:

1. The method of packaging goods which consists in wrapping the goods in a flexible waxed wrapper, spraying a film of additional wax on a portion of said wrapper, blowing a heating fluid on the portion of the wrapper upon which said additional wax is sprayed, and subsequently sealing said portion of the wrapper.

2. The method of packaging goods which consists in wrapping the goods in a flexible waxed wrapper, spraying a film of additional wax on a portion of said wrapper, subsequently to the spraying of the additional wax on a portion of the wrapper blowing hot air on the portion of the wrapper upon which said additional wax is sprayed, and, subsequently to the spraying of the additional wax and the blowing of hot air on a portion of the wrapper, sealing said portion of the wrapper.

3. The method of packaging goods which consists in wrapping a package containing the goods in a flexible waxed wrapper with a portion of the wrapper extending beyond the goods, folding the ends of said extending portion to form foldable top and bottom flaps, applying a film of additional wax and heat to the inner surfaces of said top and bottom flaps and to the end of the package, and subsequently folding the top and bottom flaps closed and sealing the same.

4. The method of packaging goods which consists in wrapping a package containing the goods in a flexible waxed wrapper with a portion of the wrapper extending beyond the goods, folding the ends of said extending portion to form foldable top and bottom flaps, spraying a film of additional wax on the inner surfaces of said top and bottom flaps and on the end of the package, subsequently blowing hot air on the surfaces to which said film of additional wax is applied, and, subsequently to the application of said film of additional wax and said hot air, folding the top and bottom flaps closed and sealing the same.

5. The method of packaging goods which consists in enclosing the goods in a waxed carton with an open flap, immersing said open flap in additional wax, subsequently folding said open and additionally waxed flap to closed position and sealing the same, wrapping the carton in a flexible waxed paper wrapper with a portion of the wrapper extending beyond the end of the carton, folding the ends of said extending portion to form foldable top and bottom flaps, applying a film of additional wax and heat to the inner surfaces of said top and bottom flaps and to the end of the wrapped carton, and subsequently folding the top and bottom flaps closed and sealing the same.

6. In a packaging machine, a conveyor for moving packages enclosed in a waxed wrapper having top and bottom flaps, a nozzle along the path of movement of said conveyor and adapted to enter between said flaps with the top flap extending over and the bottom flap extending beneath the nozzle, said nozzle having a multiplicity of apertures in the top, bottom and end thereof, and means for spraying melted wax through the apertures in the top, bottom and end of said nozzle and upon the inner surfaces of said top and bottom flaps and the end of the package.

7. In a packaging machine, a conveyor for moving packages enclosed in a waxed wrapper having top and bottom flaps, a nozzle along the path of movement of said conveyor and adapted to enter between said flaps with the top flap extending over and the bottom flap extending beneath the nozzle, said nozzle having a multiplicity of apertures in the top, bottom and end thereof, and means for blowing a heating fluid through the apertures in the top, bottom and end of said nozzle and upon the inner surfaces of said flaps and the end of the package.

8. In a packaging machine, a conveyor for moving goods enclosed in a waxed wrapper, means for folding and sealing the end of said wrapper, a compression belt cooperable with the end of the wrapper in the path of movement of said conveyor for pressing the folded ends of the wrapper into snug contact until the wax is cooled, and pressure means operable through said compression belt and having a yielding equalizer for pressing the low portions of the folded end of the wrapper into snug contact.

9. The method of packaging goods, which consists in wrapping the goods in a flexible waxed wrapper with a portion of the wrapper extending beyond the goods, partially folding the extending portion of the wrapper to form an extending flap, applying a film of additional wax and heat to the inner surface of said flap, and subsequently folding said flap closed and sealing the same by the wax thereon.

10. The method of packaging goods which consists in wrapping the goods in a flexible waxed wrapper with a portion of the wrapper extending beyond the goods, partially folding the extending portion of the wrapper, applying a film of additional wax and heat to the partially folded extending portion of the wrapper, and subsequently completing the folding of the extending portion of the wrapper to closed position, and sealing the same by the wax thereon.

11. The method of packaging goods which consists in wrapping the goods in a flexible waxed wrapper with a portion of the wrapper extending beyond the goods, applying a film of additional wax and heat to the extending portion of the wrapper, and subsequently folding the extending portion of the wrapper to which the additional wax has been applied closed and sealing the same by the wax thereon.

12. The method of packaging goods which consists in wrapping the goods in a flexible waxed wrapper, applying additional wax to a portion of said wrapper, subjecting the portion to which said additional wax is applied to a heating fluid to impart heat thereto, and, subsequently to the application of said additional wax and heat, applying pressure to seal the portion of the wrapper to which said additional wax and heat are applied.

13. The method of packaging goods, which consists in enclosing a package containing the goods in a waxed wrapper having top, bottom and side flaps projecting beyond the ends of the package, folding in one pair of opposed flaps at each end and leaving the other pair unfolded, then applying additional wax over the entire outer surface of the folded flaps and the entire inner surfaces of the unfolded flaps, and then closing said unfolded flaps down on said folded flaps, thereby completely sealing the ends of the package.

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