

Sept. 16, 1969

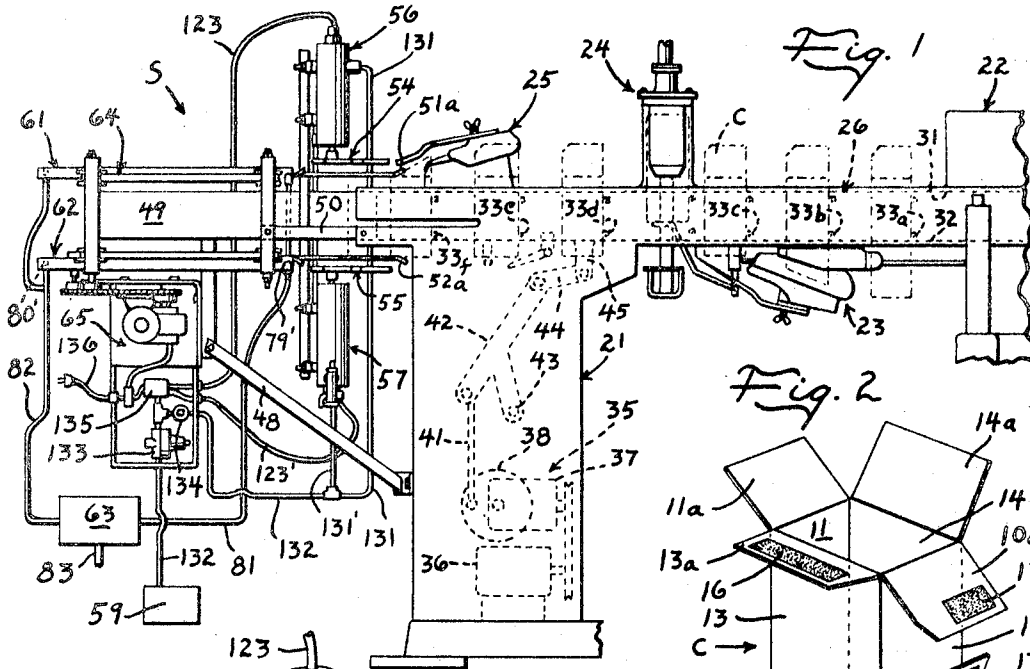
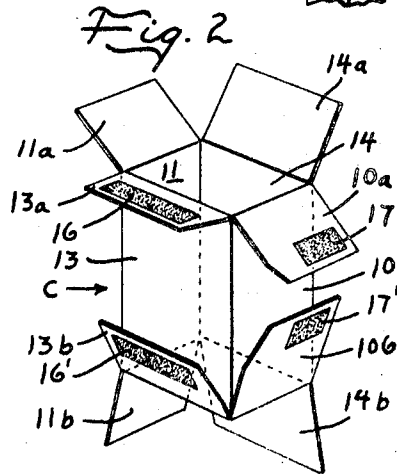
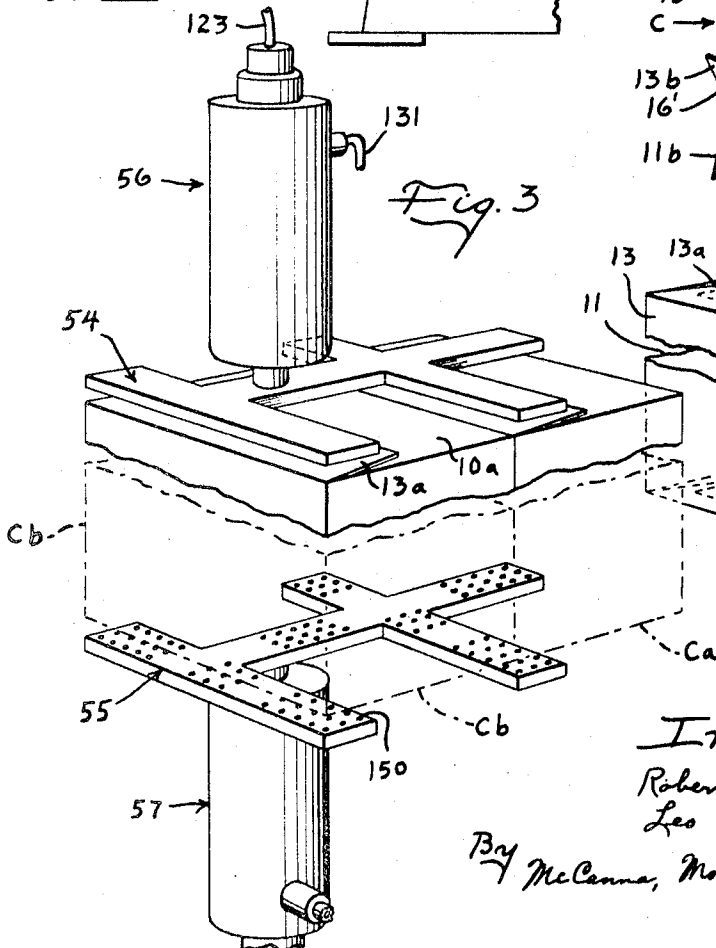
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3,466,838

PACKAGING METHOD AND APPARATUS

Filed Dec. 30, 1966

3 Sheets-Sheet 1



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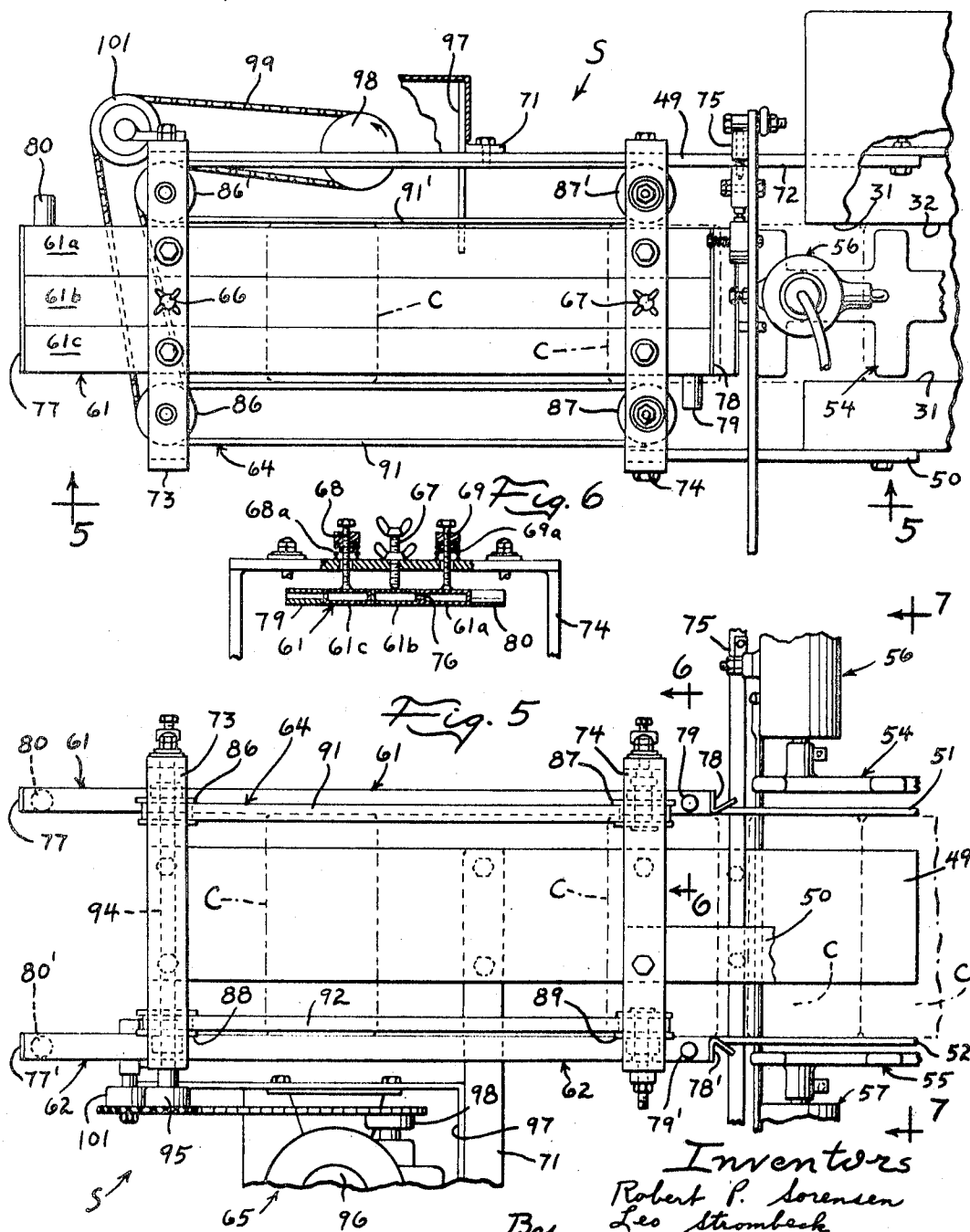
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PACKAGING METHOD AND APPARATUS

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Fig. 4



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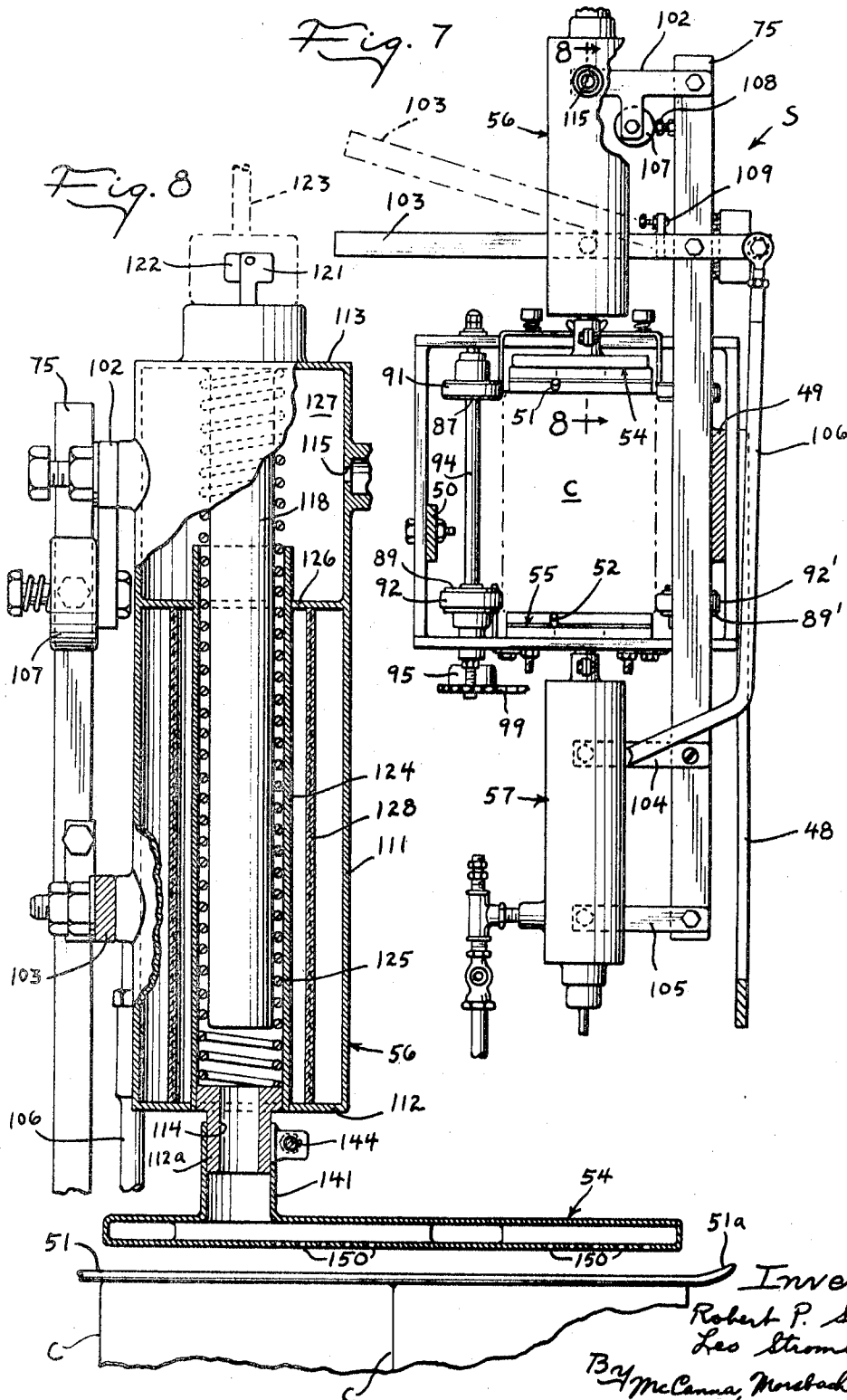
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PACKAGING METHOD AND APPARATUS

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U.S. Cl. 53—29

11 Claims

ABSTRACT OF THE DISCLOSURE

A method of packaging ice cream in cartons including: directing jets of hot air against the outside of folded end flaps of a filled carton at locations overlying areas of heat sealable adhesive on the underside of the flaps, and cooling the end flaps. An apparatus for sealing the folded end flaps of a carton including a distributor head spaced from the end flaps and for directing continuously flowing hot air against the outer surface of the end flaps to soften adhesive carried on the underside of the flaps, a heater head for heating the air, a conveyor for moving the cartons to the distributor head in step fashion, and a cooling head thereafter contacting the end flaps.

Background of the invention

This invention relates to improvements in packaging methods and apparatus.

The present invention is particularly advantageous for packaging in cartons of the type having end flaps for folding in overlapping relationship and having a heat sealable material disposed inwardly of the outer surface of the end flaps. Such cartons are well known, being frequently used in packaging ice cream, for example. A typical carton is disclosed in U.S. Patent No. 3,219,257 issued to Ralph F. Anderson. Cartons of this type are commonly preformed and fed to a packaging machine in flattened condition. The machine then opens the carton, folds the lower flaps, fills the carton through the open upper end, and then folds the upper end flaps. Heretofore the adhesive has sometimes been softened prior to infolding of the end flaps. This is difficult to accomplish. Another practice is to fold the end flaps and then apply heat to the entire end of the carton, as with a hot blade, to soften the adhesive and seal the carton. With some products, such as frozen comestibles, it is difficult to apply adequate heat to the folded end flaps of a carton to seal the same, without also adversely affecting the product in the carton. When contact-type heat sealers are used, it is difficult to maintain temperature control within proper limits. Also, waxes and other thermoplastic materials on the outer surface of the cartons will adhere to a contact-type heat sealer, further aggravating the temperature control problem and necessitating cleaning.

Summary

The present invention provides a new and useful method of packaging a frozen comestible and an improved sealing apparatus which may include a unique heater apparatus.

It is a general object of the present invention to provide a new and useful packaging method and apparatus which alleviates the above noted problems.

Another object is to provide a packaging apparatus and method for sealing cartons after the end flaps have been folded in overlapping relationship.

Still another object is to provide a new and useful heater apparatus and a distributor means usable therewith.

The above, as well as other advantages and objects of the present invention, will become apparent as the same

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becomes better understood from the following detailed description when taken in conjunction with the drawings.

Drawings

FIGURE 1 is a front elevational view of a packaging machine incorporating a preferred embodiment of the present invention and capable of performing the steps of the method;

FIG. 2 is a perspective view of one type of carton which may be sealed by the method and apparatus of this invention;

FIG. 3 is a generally diagrammatic, perspective view of a portion of the apparatus of FIG. 1;

FIG. 4 is a plan view of a preferred embodiment of the improved portion of the apparatus of FIG. 1;

FIG. 5 is a front elevational view as taken along line 5—5 of FIG. 4;

FIG. 6 is a partial cross-sectional view taken generally along line 6—6 of FIG. 5;

FIG. 7 is a view taken along line 7—7 of FIG. 5; and

FIG. 8 is a sectional view, on a larger scale, taken along line 8—8 of FIG. 7.

Description

The preferred embodiment hereafter described includes a machine for erecting cartons, folding the end flaps thereof, and filling the cartons. The machine advantageously has mechanism for advancing the cartons in step fashion. The preferred embodiment includes a sealing apparatus S, including a heating station, whereat adhesive on the carton flaps is softened, and a cooling station where the adhesive is hardened to complete the seal.

Reference is now made more particularly to the drawings which illustrate the best presently known mode of carrying out the invention and wherein similar reference characters indicate the same parts throughout the several views.

A typical carton C, best illustrated in FIG. 2, may be formed from a blank conveniently of cardboard or the like. The carton illustrated has its end flaps deflected outwardly for better illustration, it being understood that the end flaps are generally planar with the side walls when the carton is first erected. The carton generally includes first and second opposed side walls 10 and 11, and third and fourth opposed sides walls 13 and 14, each connected along fold lines to one edge of each of the first and second side walls. The side walls each have end flaps connected to opposite ends along fold lines, and the end flaps are arranged for folding in overlapping relationship, as shown in FIG. 3. Side wall 14 has end flaps 14a, 14b shaped for generally overlying the upper and lower ends of the carton, respectively. At the upper end of the carton, side walls 11, 10 and 13, have upper end flaps 11a, 10a and 13a adapted for infolding in that order after end flap 14a has first been folded. Similarly, lower end flaps 11b, 10b and 13b are arranged for infolding in overlying relationship. An adhesive is applied to an adhesive area 16 on the underside of end flap 13a. An adhesive is also applied to a second adhesive area 17 on the underside of end flap 10a. In a similar fashion, adhesive areas are located on the bottom end flaps as shown at 16' and 17', these areas being a mirror image of the previously described areas 16 and 17. The adhesive on areas 16, 17, 16' and 17' is preferably of the heat-sensitive type which is heat-softenable and which will harden rapidly upon cooling. In this manner, when the end flaps are folded in overlapping relationship, as shown in FIG. 3, the heat-sealable adhesive is in a pattern on selected areas of the overlapping surfaces of the flaps and disposed inwardly of the exposed outer surface of the flaps. It is contemplated that the adhesive may be otherwise located than on the underside of the flaps, such as on the outer side

of the overlapped area; however, the above-described arrangement is preferred. It should be understood that the above-described carton is merely typical of cartons usable in the present invention and that the invention should not be limited to the exact carton described. Another typical carton is described in detail in the aforementioned patent to Ralph F. Anderson, and reference is made thereto for more complete description of the structure of such a carton.

The sealing apparatus S of the present invention is specifically designed for use with a carton erecting, filling and closing machine of the type shown in United States Patent No. 2,612,016, issued to Swan F. Anderson, and is herein described in conjunction with such a packaging machine. It is to be understood, however, that the sealing apparatus can be adapted for use with other packaging machines and that certain features of the present invention are of general utility.

The carton filling and closing machine illustrated in FIG. 1 is more specifically disclosed in the aforementioned Patent No. 2,612,016, and reference is hereby made to that patent for a more complete description of the construction and operation of the filling machine. In general, the machine includes a base 21, a carton feeding and erecting apparatus 22, a lower flap-folding apparatus 23, a filling mechanism 24, an upper carton flap-folding mechanism 25, and a conveyor means 26 for intermittently advancing the cartons in step fashion from the feeding and erecting mechanism 22 past the folding and filling apparatus. The sealing apparatus S is provided at the discharge end of the conveyor 26, it being understood that the invention is not limited to this exact location.

The conveyor 26 includes laterally spaced pairs of upper and lower rails 31 and 32 which form guideways therebetween for slidably supporting an elongated slide member. In the embodiment illustrated, the slide members have a plurality of sets of carton-engaging pawls 33a-33f at spaced points therealong, and which carton-engaging pawls project into the space between the slides to engage the cartons therebetween and index or advance the cartons in step fashion when the slide members move forwardly (to the left as viewed in FIG. 1). The pawls are shaped so as to automatically retract when the slide members move rearwardly to pass around the cartons and behind the next proceeding carton. The slide member is reciprocated by a drive mechanism generally designated 35, which includes a motor 36 drivingly connected to a one-revolution clutch 37. The one-revolution clutch is connected to an eccentric 38 which is driven through one revolution each time the clutch is operated. The eccentric 38 is connected through a link 41 to a lever 42 pivotally attached as at 43, to the base 21. Lever 42 has its upper end connected through linkage 44 and 45 to extend and retract the slide member.

The sealing apparatus, generally designated S, is provided at the discharge end of conveyor 26 and is mounted on the filling machine in any suitable manner. As shown, the mounting includes a bracket support 48 attached to the base 21, and longitudinal supports 49 and 50, best shown in FIG. 4. In general, the sealing apparatus S may include upper and lower fingers 51 and 52, upper and lower distributor heads 54 and 55, upper and lower heating mechanisms 56 and 57, a supply of air under pressure 59, upper and lower cooling heads 61 and 62, a chiller 63, a conveyor mechanism 64, and a drive mechanism 65.

Bracket 48 provides support for a framework including a vertical support member 71 attached to longitudinal support member 49 upon which are mounted transverse frame members 73 and 74 and a vertical mounting bracket 75. Cooling heads, generally designated 61 and 62, are secured to the upper and lower legs, respectively, of transverse frame members 73 and 74 in any convenient manner, as by bolting. As best shown in FIG. 6, upper cooling head 61 is advantageously formed of a plurality of rectangular tubular members 61a-61c in

side-by-side parallel relationship and advantageously having a width to accommodate the width of carton C. The tubular members are provided with end closures 77 and 78 and with internal openings, as at 76, to communicate the tubular members to provide a continuous channel for flow of a coolant therethrough. For this purpose, an inlet 79 is provided in tubular member 61c, and an outlet 80 is provided in tubular member 61a. Lower cooling head 62 is similarly constructed and has end closures 77' and 78', an inlet 79', and an outlet 80', as best shown in FIG. 5. Inlets 79 and 79' are connected to chiller 63 by conduit 81 (see FIG. 1), and the chiller conveniently includes means for pumping the coolant through the conduit and cooling heads. Outlets 80 and 80' are likewise connected to a return conduit 82 to return the liquid to the chiller 63 which is arranged to cool the liquid sufficiently for recirculation to the cooling heads. Chiller 63 is conveniently connected to any convenient source of supply as by conduit 83 and, in the embodiment illustrated, water is conveniently used as the coolant liquid. It should be understood that the number of tubular members in each head is not important, and that they need not be contiguous in all cases. Preferably, however, the cooling heads 61 and 62 are spaced from each other a dimension corresponding to the height of container C so that the heads serve to maintain the folded flaps contiguous during the cooling operation, at which time the adhesive hardens and completes the seal. For this purpose, upper cooling head 61 is conveniently adjustable, as shown in FIGS. 4-6. Adjustable bolts 66 and 67 are threaded through the upper leg of frame members 73 and 74, respectively. Each bolt is conveniently provided with a lock nut and operates to position cooling head 61. A pair of bolts 68 and 69 are secured to members 61c and 61a, respectively, and pass through openings in the frame 74. Springs 68a and 69a urge the cooling head 61 upwardly against bolt 67. A similar arrangement is provided to urge the other end of cooling head 61 against bolt 66. It should be noted that upper and lower end closures 78 and 78', respectively, have outwardly extending tapered portions to aid in the receipt of the container between the cooling heads.

Conveyor 64 is arranged for advancing the cartons through the cooling heads. In the embodiment illustrated, the conveyor includes a pair of belt-type mechanisms adjacent each side of the cooling heads for engaging the adjacent sides of the carton C and advancing the cartons. The front pair of belt-type mechanism includes upper pulleys 86 and 87 mounted on the upper legs of frames 73 and 74, respectively, and lower pulleys 88 and 89 mounted on the lower legs of frames 73 and 74, respectively. Upper and lower belts 91 and 92 extend between the upper and lower pairs of pulleys. Pulleys 86 and 88 are interconnected by drive shaft 94 which depends below the lower leg of frame 73 and has a sprocket 95 attached thereto (see FIG. 5). The other pair of belt-type mechanism is similarly arranged, and similar parts are designated in the drawing by the same numerals with the postscript prime ('), and further description is deemed unnecessary. The conveyor is driven by drive mechanism 65 which includes a motor 96 mounted on vertical support member 71 as by bracket 97 and arranged for driving sprocket 98. A chain 99 is entrained around sprockets 95, 95' and an idler sprocket 101 in such a manner that sprockets 95 and 95' are driven in opposite directions, as shown in FIG. 4. In this manner, the opposite pairs of belt-type mechanism are driven in opposite directions and cooperate to advance the containers. The conveyor mechanism 64 is advantageously arranged to advance the cartons at a speed greater than the maximum speed of the machine. In this manner, the speed of the conveyor 64 need not be adjusted with adjustments in the rate of cartons filled by the machine. It is contemplated that other arrangements may be utilized to pass the containers between the cooling heads, if desired.

Fingers 51 and 52 are conveniently mounted on end closures 78 and 78', respectively, and extend longitudinally toward the filling machine, as best seen in FIG. 5. The fingers hold the folded flaps contiguous in folded position, and cooperate with the pairs of spaced rails 31 and 32 (see FIG. 4) to support the filled cartons at the heating station. The outer ends 51a and 52a (see FIG. 1 of the fingers 51 and 52 are advantageously bent away from the carton to allow the carton to easily slide between the fingers. As best seen in FIG. 7, the fingers are offset somewhat from the center line so as to not interfere with air discharged from the distributor head 54 and 55, as will hereinafter become apparent. It should be understood that the exact location of the fingers may be varied in accordance with the glue pattern on that other means for holding the flap contiguous may be utilized, if desired.

At the heating station are located tubular distributor heads 54 and 55 and heating heads 56 and 57. As best shown in FIG. 7, heating head 56 is mounted on vertical mounting bracket 75 by means of parallel links 102 and 103. Similarly, heater head 57 is mounted by parallel links 104 and 105. Links 103 and 104 are interconnected by arm 106, and link 103 extends outwardly a convenient distance to provide a handle which may be moved between the positions shown in solid and in phantom in FIG. 7. In this manner, all links 102-105 are moved simultaneously and heater heads 56 and 57 and the attached distributor heads 54 and 55 can be moved from the illustrated operative position spaced from the end flaps to an inoperative position spaced further therefrom. An eccentric 107 is mounted on link 102 and engages a stop 108 on bracket 75 to limit movement at the operative position. Eccentric 107 is provided with a plurality of positions so that the distance distributor heads 54 and 55 are disposed from the carton C may be selectively adjusted. The distance of the distributor heads can be selected empirically and will depend on various variants including thickness of the carton flaps, speed of the machine, air pressure, air temperature, and type of adhesive used. It has been found that an eccentric arrangement to provide a distributor head spacing from one-quarter to one-half inch will accommodate most situations. A second stop 109 is conveniently mounted on link 103 for engaging bracket 75 to limit movement at the inoperative position.

Heater heads 56 and 57 are of identical construction, and the following description of heater head 56 should be taken as applying also to heater head 57. As best shown in FIG. 8, heater head 56 comprises an elongate cylindrical housing 111 having end portions 112 and 113 secured thereto. End portion 112 has an outlet opening 114 centered therein. An inlet opening in the form of orifice 115 is located in housing 111 adjacent the end portion 113. A generally cylindrical heating element 118 is coaxially disposed in housing 111 and extends to a point adjacent outlet opening 114. Heating element 118 is preferably attached to end portion 113 and has its electrical conductors extending through the end portion 113. The conductors advantageously terminate in prongs 121 and 122 which may be connected to a power source as through cable 123. A sleeve 124 is attached to end portion 112 and surrounds heating element 118. The sleeve 124 conveniently extends the majority of the length of the heating element and is spaced therefrom to accommodate a helical wrap 125 therebetween. Helical wrap 125 defines a continuous path around heating element 118 for the passage of air from inlet 115 to outlet 114. In the embodiment illustrated, helical wrap 125 is advantageously in the form of a stainless steel spring closely adjacent both the heating element 118 and sleeve 124. A wall 126 engages both housing 111 and sleeve 124 to define an inlet chamber 127 into which inlet opening 115 communicates. Disposed between sleeve 124 and housing 111 is insulation herein shown as tubing 128

advantageously formed of mica and having reflective qualities. As can be seen, the mica tube 128 extends from end portion 112 to wall 126.

As stated above, heating element 118 is preferably attached to end portion 113 and extends to a point adjacent end portion 112. It has been found that heating element 118 preferably has a higher heating capacity adjacent end portion 113 than adjacent outlet 114. In this embodiment, a heating capacity of 1000 watts is utilized for the higher heating capacity and 600 watts is utilized adjacent outlet 114. This may be achieved in any convenient manner such as by providing additional winding for the higher heating capacity. In this manner, heating element 118 provides its higher capacity at a point adjacent inlet 115 where cool air enters chamber 127. As this air passes along the path defined by spiral wrap 125, a certain amount of heat is carried along the heater element. As a result, this cooperates with the lower heat-infi capacity to maintain a substantially uniform temperature throughout the full length of the heating element 118 and thereby maintain a longer life of the heating element. Additionally, this provides a substantially uniform heating of the air discharged through outlet 114. With a high heating capacity adjacent inlet 115, it is preferable that no electrical connections be exposed inside the heating head. As a result, it is preferable that the conductors extend through end portion 113 as described above. With the exception of the mica insulation 128, the parts of heater head 56 advantageously have a stainless steel exterior for resistance to corrosion, and for sanitary purposes when used in packaging comestibles.

Inlet opening 115 communicates with conduit 131 which is attached to conduit 132 leading from air supply 59. Interposed in conduit 132 is a pressure regulator 133. It has been found that by using an orifice 115 of 0.116" diameter, the pressure in chamber 127 is about one-fifth of the pressure in conduits 131 and 132, when the conduit pressure is about 20-30 p.s.i. Thus, if regulator 133 is set so that the pressure on gauge 134 shows 25 p.s.i., the pressure in the heating head will be one-fifth of that, or five pounds. Since the pressure of the supply 59 will necessarily vary, this particular arrangement is such that as much as two and one-half pounds' variance in supply pressure, for example, will cause only one-half pound of variance in the heating and distributor head pressure. This allows a wider range of control by regulator 133 to maintain the outlet pressure within desirable limits.

Communicating with conduit 132 is a pressure-actuated switch 135 which operates as an electrical safety valve. As can be seen, an inlet cable 136 which may be attached to any convenient source of supply, leads to safety valve 135, and cables 123 and 123' lead therefrom. With this arrangement, when the pressure in conduit 132 varies beyond the allowable limits, the switch 135 is opened. In this manner, the supply is cut off to the heater heads 56 and 57, thereby terminating their operation and providing a convenient safety measure.

Distributor heads 54 and 55 are advantageously mounted on heater heads 56 and 57, respectively. As best shown in FIG. 8, end portion 112 conveniently includes a nipple 112a through which outlet 114 passes. Distributor head 54 has a sleeve 141 arranged for surrounding nipple 112a. Sleeve 141 is conveniently clamped on nipple 112a as by fastener 144. The distributor heads are advantageously shaped complementary to the pattern of adhesive on the underside of the end flaps of carton C. Since adhesive areas 16 and 17 are generally T-shaped, the distributor heads are similarly shaped. Preferably, the distributor heads are arranged for directing air against two cartons, and thus a double T-shape is illustrated. In this manner, the carton designated Ca in FIG. 3 has its flaps preheated by the first portion of the distributor head and then advances to the position occupied by carton Cb where the heating continues to soften the adhesive. This arrangement allows for faster softening of the adhesive

at the heating station, but it should be understood that the present invention is not limited to such a two-step heating. As shown, a plurality of openings 150 are provided in a pattern complementary to the pattern of adhesive on the carton C. It has been found that holes 150 should be quite small to provide proper distribution of hot air throughout the distributor head. With a pattern of openings as illustrated in FIG. 3, openings 150 having a diameter in the range of 0.035" to 0.060" are exemplary. In the embodiment illustrated, the openings are preferably 0.052" in diameter and are advantageously arranged in a generally rectangular pattern from one-eighth to one-quarter inch on center. The particular pattern illustrated in FIG. 3 has been found to accommodate a large number of typical cartons and thus has a wide range of usability. As stated above, the pattern of the openings is complementary to the pattern of adhesive. By this it is meant that the openings are arranged to direct hot air against the majority of the adhesive pattern. It is important, however, that key areas of the adhesive be softened for sealing the flaps together. Likewise, a few openings outside of the adhesive pattern are not critical; however, hot air should not be directed against the entire end area of the carton since this could damage the contents. In the present embodiment, for example, hot air is directed against about 10% of the end area, thereby assuring no damage to the contents while effectuating a good seal of the end flaps.

With the above apparatus, it has been found that sealing of cartons can be quickly and economically performed. The apparatus is arranged to provide air preferably at about 5½ p.s.i. in the heating head and discharged at this pressure through openings 150. Heating element 118 is advantageously arranged to operate at about 1750° F. and, at the above pressure, will heat the air to about 1350° F. With this arrangement, distributor heads 54 and 55 are disposed from one-quarter to one-half inch from the end flaps, depending on the speed of the machine which will vary the time the carton C is disposed between the distributor heads. Following the softening of the adhesive, the next carton advanced by the filling machine will push carton Ca to position Cb. This causes carton Cb to be pushed to the cooling station where it is advanced between the cooling heads by the afordescribed conveyor mechanism 64 to cool the end flaps and adhesive, and thereby complete the sealing operation.

The afordescribed apparatus is capable of performing the method of the present invention which relates to packaging a frozen comestible, such as ice cream, in cartons of the type described. Such cartons have end flaps which are adapted to be folded in overlapping relationship and have a heat-sealable adhesive in a pattern on selected areas of the overlapping surfaces of the flaps. The cartons are erected and the end flaps are folded at one end thereof. The carton is then filled with the frozen comestible through the other end, and the end flaps are folded at said other end. Thereafter, a plurality of jets of hot air is directed against the outside of the folded flaps at locations overlying said preselected adhesive areas to soften the adhesive while the overlapping flaps are held in a contiguous position. Thereafter, the overlying end flaps are cooled to harden the adhesive and complete the seal while the overlapped flaps are still held contiguous. More particularly, the cartons are indexed or advanced intermittently in a step fashion wherein the cartons are stopped for a preselected interval during filling of the carton. The advancement is also stopped while the hot air is directed against the outside of the folded flaps for a time interval generally equal to the time for filling the carton. The hot air is directed through a distributing head apparatus spaced from the folded flaps and having a plurality of openings generally complementary to the adhesive pattern. As can be seen, the upper and lower flaps are sealed after the frozen comestible has been placed in the carton. Preferably, first and second sets of jets of hot air in said pat-

tern are provided, and the advancement of the cartons is stopped for said preselected interval at each said first and second sets of openings to soften the adhesive.

The invention in its broader aspects is not limited to the specific steps and apparatus shown and described, but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. In a machine for filling and closing cartons of the type having end flaps at the upper and lower ends thereof as it moves through the machine, the flaps at each end movable to an overlapping folded position and having a heat sealable material in a pattern on preselected areas disposed inwardly of the exposed outer surface of the flaps in said folded position; said machine having conveyor means for advancing the cartons along a path, means for folding the lower flaps, means at a filling station for filling the carton through the open upper end thereof, and means for thereafter folding the upper flaps; the improvement comprising: means for intermittently operating the conveyor means for movement of the cartons in step fashion to said filling station and thereafter to a heating station, means at the heating station for holding the upper flaps contiguous in folded position, a distributor head at the heating station spaced from the folded upper flaps and having a plurality of openings arranged complementary to said pattern of heat sealable material at the upper end, and means for continuously supplying hot air to said distributor head for discharge through said openings and against the outside of the folded upper flaps in said pattern to soften the heat sealable material.

2. The combination of claim 1 wherein the distributor head openings are arranged in first and second patterns, each pattern being complementary to said pattern of heat sealable material, and wherein the conveyor means and the means for intermittently operating the conveyor means advance the carton in step fashion to a position under the first pattern of openings and then to a second position under the second pattern of openings.

3. The combination of claim 1 including means at the heating station for holding the lower flaps contiguous in folded position, a second distributor head at the heating station spaced from the folded lower flaps and having a plurality of openings arranged complementary to the pattern of heat sealable material at the lower end of the container, and means for continuously supplying hot air to said second distributor head for discharge through the openings and against the outside of the folded lower flaps in the pattern of heat sealable material at the lower end of the container to soften said material.

4. The combination of claim 3 including means for holding the upper and lower flaps in contiguous folded position after the heat sealable material has been softened and for cooling said flaps to harden said material and complete the seal.

5. The combination of claim 4 wherein the last-mentioned means includes upper and lower cooling heads spaced apart a distance approximating the height of the carton, and including means for conveying the cartons slidably along the cooling heads with the end flaps engaged thereby.

6. The combination of claim 3 including means for simultaneously moving the distributor heads further away from the carton to an inoperative position such that the continuous supplying of hot air will not affect the heat sealable material of a carton at the heating station.

7. The combination of claim 6 wherein the last-mentioned means is operable for simultaneously moving the distributor heads from said inoperative position to an operative position, and including selectively adjustable means for engaging the last-mentioned means and for controlling the spacing of the distributor heads from the carton at the operative position.

8. The combination of claim 1 wherein the means for continuously supplying hot air includes an elongate heater head having first and second ends and end portions attached to said ends, said heater head having an inlet opening at the first end and an outlet opening at the second end, means for supplying air under pressure to the inlet opening, means communicating the outlet opening with the distributor head, a cylindrical heating element attached to the first end portion and extending to a point adjacent the outlet opening, said heating element having electrical conductors extending through said first end portion and with no electrical connections exposed inside the heater head, said heating element having a first portion adjacent the inlet opening and a second portion adjacent the outlet opening, said first portion having a higher heating capacity than the second portion, and means defining a path along the heater element for guiding the air past first the first portion and then the second portion of the heater element to the outlet opening.

9. In a machine for filling and closing cartons having end flaps which are sealable by the application of hot air, the combination of: an elongate heater head having first and second end portions, an inlet opening adjacent the first end portion, and an outlet opening in the second end portion; a distributor head communicating with the outlet opening for directing hot air at the end flaps; a generally cylindrical elongate heating element in the heater head and having a first end attached to the first end portion of the heater head and extending to a second end adjacent the outlet, said heating element having a first portion adjacent the inlet and a second portion adjacent the outlet, said first portion having a higher heating capacity than the second portion; a sleeve attached to the second end portion of the heater head and surrounding the heating element, said sleeve spaced from the heating element and extending a part of the length thereof; means for supplying air under pressure to said inlet opening; and a helical wrap disposed between the heating element and the sleeve to provide a path along the heating element for guiding the air first past the first portion and then the second portion to the outlet opening.

10. In a packaging apparatus for filling and closing cartons of the type having end flaps at the upper and lower ends thereof as it moves through the apparatus, the flaps at each end movable to an overlapping folded position and having a heat sealable material in a pattern on preselected areas disposed inwardly of the exposed outer surfaces of the flaps in the folded position, said pattern representing a minor portion of the end area of the carton; said apparatus having conveyor means for advancing the cartons along a path, means for folding the lower flaps to the folded position, a filling station having means for filling the carton through the open upper end thereof, and means for thereafter folding the upper flaps; the improvement comprising: a heating station positioned after the filling station, means for intermittently operating the conveyor means for movement of the cartons in a step fashion

to the filling station and thereafter to the heating station, means at the heating station for holding the upper and lower flaps each contiguous in folded position, an upper distributor head at the heating station and spaced from the folded upper flaps, a lower distributor head at the heating station and spaced from the folded lower flaps, each distributor head having a plurality of hot air openings overlying at least a major portion of the pattern of heat sealable material at the respective carton end but overlying substantially less than the total area of each carton end, means for continuously supplying hot air to the distributor heads for discharge through the openings and against a minor portion of the outside of the folded upper and lower flaps but said minor portion overlying at least a major portion of the pattern of heat sealable material to soften the same, and means for thereafter cooling the upper and lower flaps and holding the same in contiguous folded position to harden the material and complete the seal.

11. A method of packaging a frozen comestible in cartons of the type supplied initially flat, said cartons having end flaps adapted to be folded in overlapping relationship and having a heat sealable adhesive in a pattern on selected areas of the overlapping surfaces of the flaps and representing a minor portion of the end area of the carton, said method including advancing said cartons along a path with the flaps disposed at the upper and lower ends, erecting the cartons and folding the flaps at the lower end, filling the carton with the frozen comestible through the open upper end, and folding the flaps at the upper end, the improvement comprising: holding the upper and lower flaps contiguous in said folded position, directing a plurality of jets of hot air against the upper and lower folded flaps in a pattern generally complementary to the adhesive pattern, and cooling the folded flaps to harden the adhesive and complete the seal while continuing to hold the flaps contiguous.

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