

Dec. 5, 1950

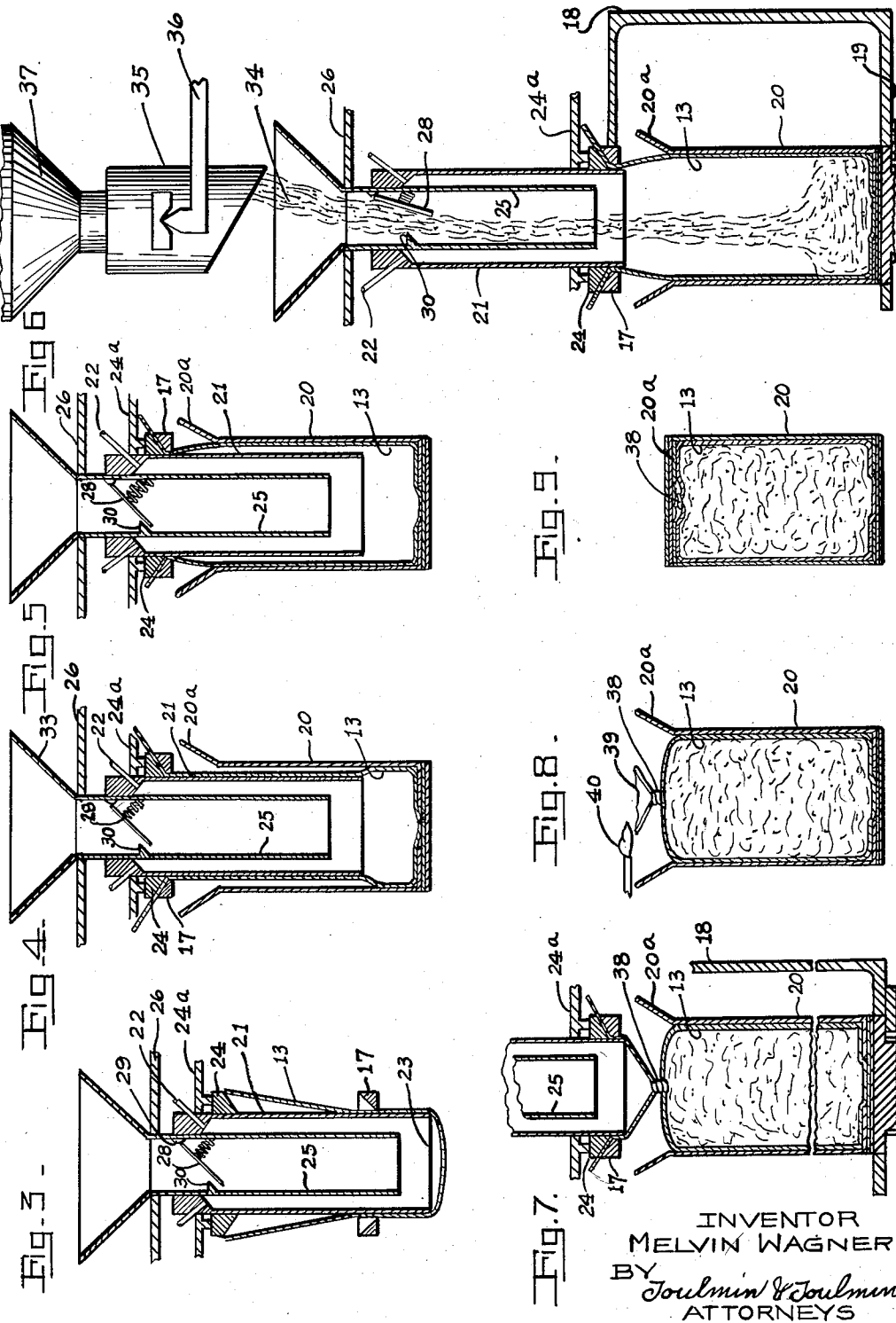
M. WAGNER

2,532,871

MACHINE AND METHOD OF FORMING A PACKAGE

Filed Sept. 21, 1945

4 Sheets-Sheet 2



Dec. 5, 1950

M. WAGNER

2,532,871

MACHINE AND METHOD OF FORMING A PACKAGE

Filed Sept. 21, 1945

4 Sheets-Sheet 3

Fig. 10.

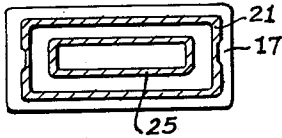


Fig. 11.

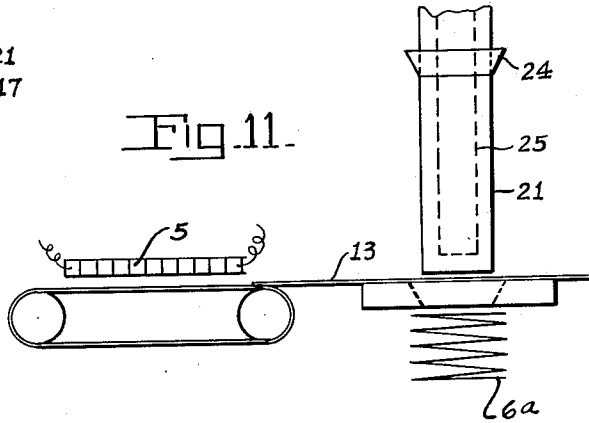


Fig. 12.

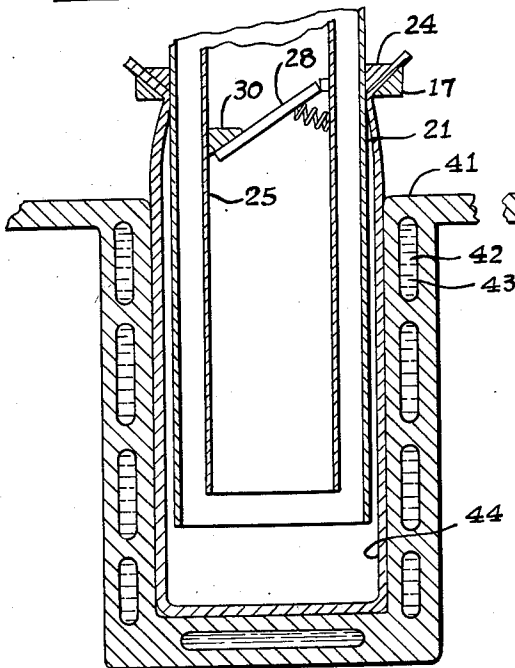
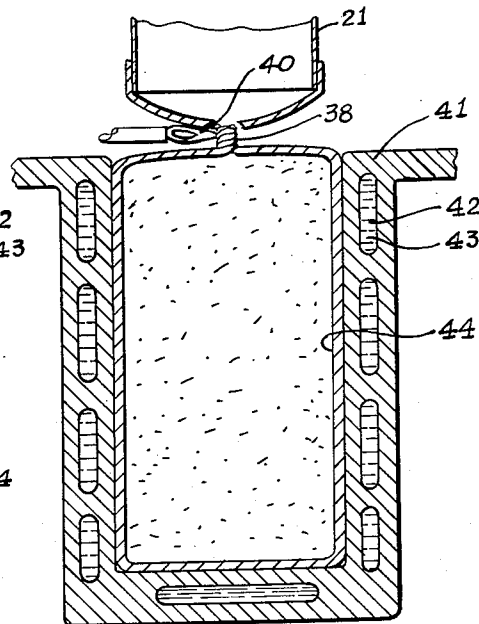


Fig. 13.



INVENTOR
MELVIN WAGNER
BY
Toulmin & Toulmin
ATTORNEYS

Dec. 5, 1950

M. WAGNER

2,532,871

MACHINE AND METHOD OF FORMING A PACKAGE

Filed Sept. 21, 1945

4 Sheets-Sheet 4

Fig. 14.

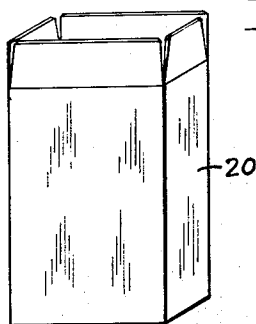


Fig. 15.

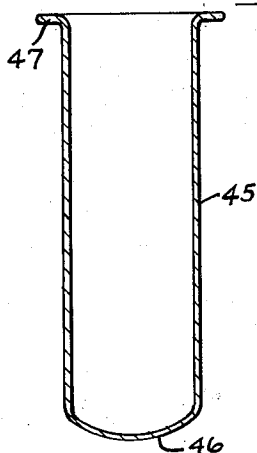


Fig. 16.

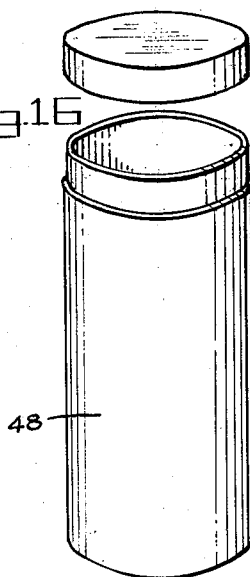


Fig. 17.

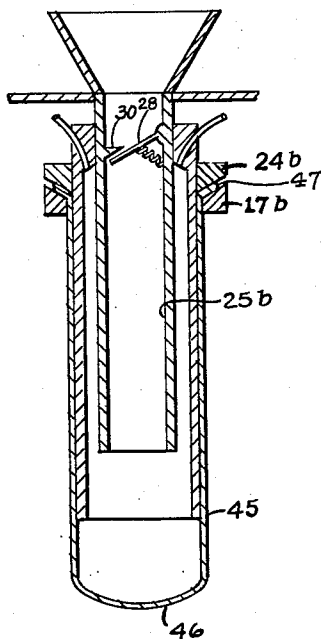


Fig. 18.

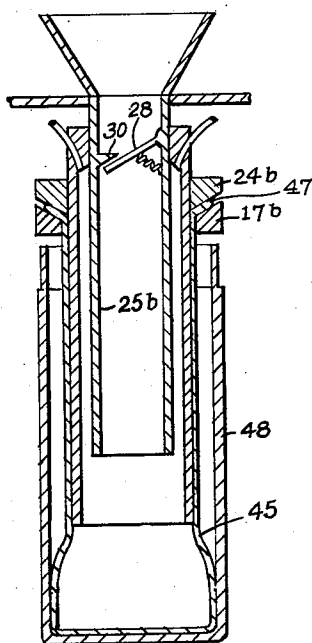
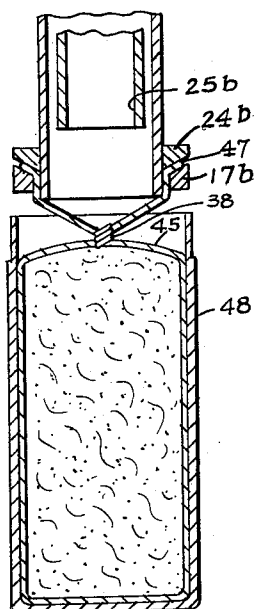


Fig. 19.



INVENTOR
MELVIN WAGNER
BY
Toulmin & Toulmin
ATTORNEYS

UNITED STATES PATENT OFFICE

2,532,871

MACHINE AND METHOD OF FORMING A PACKAGE

Melvin Wagner, Ambler, Pa., assignor to Glenside Bag Company, Glenside, Pa., a copartnership

Application September 21, 1945, Serial No. 617,785

4 Claims. (Cl. 18—56)

1

This invention relates to a package for the packaging of foodstuffs and other materials, and in particular to the method of making, filling and sealing a heat sealed package.

It is an object of this invention to provide for a preformed container in which is placed and expanded under heat or pressure, or both, a one-piece heat sealable liner preferably of thermoplastic material, and which can be filled, sealed and the package closed by a series of operations.

It is an object of this invention to provide a lined container in which the lining is blown in one piece against the inner walls of the container and caused to line, adhere and seal the interior of the container.

It is a further object to provide in association with this heat sealed liner, means of expanding it under the influence of hot or cold gases or hot or cold liquids, and of heating the container by the heat of the liquids and means to fill it with dry or semi-dry materials.

It is an object of this invention to provide a method by which continuous strips of heat sealable material are fed into containers, caused to expand within the containers and line said containers; and thereafter the containers so lined are filled and sealed.

It is an object of this invention to provide means by which a heat sealing liner is blown into a container with hot gases, while in this thermoplastic condition it is caused to conform to the configuration of the container and adhere thereto.

It is a further object to provide means such as a revolution of the package after it has once been filled so as to twist the thermoplastic liner and bring about its ultimate heat sealing.

It is a further object to provide a tubular container with a tubular inserted thermoplastic liner which is caused to adhere to the interior thereof.

It is an additional object to provide a thermoplastic container without an outside reinforcing and supporting container and to provide means and method by which either a filled or molten thermoplastic can be fed into a blowing spout and blown into a mold, the mold can be cooled, the product can be placed within the blown plastic and the plastic sealed to the top so that in this case the plastic itself becomes the entire package.

It is an object of this invention to provide a seamless, continuous thermoplastic skin around the product to enclose it to eliminate the pre-

2

vious failures in hermetically sealable packages which occur at the seams.

It will be understood that in the art heretofore as practiced that the difficulties with packages having either exterior or interior linings of thermoplastic materials has been the sealing of the seams either of the thermoplastic material or the combination of thermoplastic material and the board container.

It is an object of the present invention to eliminate these difficulties by providing a one piece thermoplastic liner or container so that there are no joints, seams or other breaks in the continuous body which cause difficulty due to leakage.

Referring to the drawings:

Figure 1 is a plan view of the mechanism for supplying from a continuous roll of sheets of thermoplastic material by sealing them beneath a table and over a guide and into a container supported beneath the thermoplastic sheet.

Figure 2 is a section on the line 2—2 of Figure 1, the remainder of Figure 2 being shown in elevation.

Figure 3 is a diagrammatic sectional view showing the heat-sealable plastic sheet being moved up into position on the filler spout, and the gas delivery spout.

Figure 4 is a view showing the heat sealable liner as delivered into the interior of the supporting container and with the heat sealable liner partially expanded by the application of hot gases which have pressed the heat sealable liner towards the bottom and a part of the inner walls of the container.

Figure 5 is a similar view showing the completion of the operation of applying the hot gases to cause the thermoplastic material to completely engage the inner walls of the container.

Figure 6 is a similar view showing the filling operation by which the expanded thermoplastic liner is now being filled with materials that are passing into it from the measuring hopper through the filler spout.

Figure 7 illustrates one method of sealing the thermoplastic container by twisting the top thereof.

Figure 8 is a similar view showing the result of the twisting action and the severance of the top of the thermoplastic material from the remainder of the sheet.

Figure 9 is a sectional view showing the completely filled and sealed composite package of this invention.

Figure 10 is a section on the line 10—10, look-

ing in the direction of the arrows, on Figure 2.

Figure 11 is a diagrammatic view similar to Figure 2 showing an alternative method of heating.

Figure 12 is a section through a mold and its cooling mechanism for receiving a sheet of relatively heavy thermoplastic material to form an unsupported container together with a showing in section of the support for the filler, the gas passageway and the filler passageway.

Figure 13 is a similar view showing the thermoplastic container after it has been filled, twisted, sealed and the material of the package cut away from the remainder material by the use of a flame for hermetically sealing and cutting off the material.

Figure 14 is a perspective view of the preformed container used in the form of the invention illustrated in Figures 1 to 10 inclusive.

Figure 15 illustrates a plastic lining in the shape of a tube.

Figure 16 is a perspective view of a type of round, preformed container for use with the tube-shaped lining shown in Figure 15.

Figure 17 is a diagrammatic sectional view showing the tubular lining mounted upon the gas delivering spout.

Figure 18 is a view showing the thermoplastic tubular sealing body within the container.

Figure 19 illustrates the filling and sealing of the plastic container.

Referring to the drawings in detail, 1 designates a roll of thermoplastic material such as "Pliofilm" or other similar thermoplastic sheet material. This roll is mounted upon a spool or spindle 2 which in turn is supported on the bracket 3. The sheet passes over the outer roll 4 between the heaters 5 and 6 and thence between the feeding and guiding rolls 7 over the support 8 between the cutting rolls 9 and 10 which are provided respectively with a cutting knife 11 and a receiving groove 12 whereby the sheets are cut in lengths as indicated at 13. The sheets are moved away from the remainder of the continuous sheet by the belt conveyor consisting of the belt 14 and the driving rollers 15 and 16. The sheet 13 passes over the support ring 17. This supporting ring is mounted upon a reciprocating supporting bracket 18, the base of which at 19 serves as a support for the container of cardboard or other similar materials designated 20.

This container is sealed at the bottom and open at the top. It is placed beneath the ring 17 and in position to receive the sheet 13 as hereinafter described.

Above the sheet 13 and above the supporting ring 17 is the following structure. A gas supplying tube 21 is provided with gas supplying pipes or passageways 22. The bottom of this tube 21 is open at 23. This tube fits within the opening 17a of the ring 17 and is adapted to pass through it. The relative movement of the tube 21 engaging with the sheet 13 draws the sheet through the opening 17a of the ring 17 until the ring 17 engages the annular shoulder 24 on the exterior of the tube and thereby embraces the upper margins of the thermoplastic sheet 13 between the ring 17 and the shoulder 24 where their annular tapered faces come together with the sheet between them. This action of the tube 21 in placing the thermoplastic sheet within the container 20 brings it to a point adjacent the bottom of that container.

Thereafter, hot gases are admitted to the pipes 22, through the thermoplastic container to be

heated and expanded. As this occurs, the tube 21 is withdrawn and the thermoplastic sheet 13 is forced outwardly against the inner walls of the container 20 in such a manner that, due to its being heated and therefore plastic, it will adhere to those inner walls and form a continuous lining for the container 20.

It will be understood that the supply pipe 21 has mounted on the exterior thereof the ring 24 which reciprocates over its surface and is moved by the actuator 24a. The loading or feed tube 25 is carried within the gas tube 21 in spaced relationship. Both of these tubes are supported by reason of the carrier plate 26 that is connected in the top of the filler tube 25. This supporting plate 26 or under table rotates beneath the main table 27. The filler spout 25 is provided with a spring supported door 28 hinged to 29 engaging the abutment 30.

The pipes 22 shown diagrammatically in the several views are connected to sources of cold or hot gas through the slots 31 for cold gas and 32 for hot gas from a suitable source of supply when the under table 29 has brought the assembled parts from position A to position B. When the under table 29 moves the assembled parts from position B to position C it brings them beneath the hopper 33 through which the material 34 is admitted from the measuring spout 35 controlled by the arm 36 which admits the materials from the supply hopper 37. It will be noted at this time that in order to permit of the full loading of the container with a thermoplastic lining that the support 18 has returned to its original, lower position but that the collar 24 has remained in engagement with the thermoplastic sheet and has continued to clamp it in cooperation with the ring 17. In this way, the supply of material may be fully discharged into the container to fill it and any continued supply of gas may also be affected. Thereafter the filled container is moved from position C through position D during which period it is rotated as indicated as in Figure 7. This serves to impart a twist 38 to the top of the thermoplastic lining. By the time that this twist is completed the container has arrived at position E where the surplus material of thermoplastic sheet 13 is severed at 39 either by a flame 40 or other means. Thereafter the container 20 has its top portions 20a turned over and sealed. This may be effected in any type of automatic or hand machine well known in the art.

With reference to Figure 11, this is an alternative construction to that shown in Figure 2. In addition to the heater 5, there is provided an alternative method of heating through the coil 5a.

Referring to Figures 12 and 13, these views illustrate the method of making a self-supporting thermoplastic fuel container without an outer supporting board container. By using heavier film it is possible to provide such a container in the manner hereinafter described.

A water cooled mold designated 41 having passageways 42 for the water 43 or other cooling or heating liquid is so arranged to receive a sheet of film that is of heavier construction than that shown in other views and designated 44. This film is clamped to its upper edges after having been introduced into the mold 41 in the same manner that the film liner was introduced into the container 20. Thereafter the application of hot gases is sufficient to cause the film 44 to assume the proper configuration closely within the interior of the mold and then either cold

gases or cold water in the passageways 42 or both are applied. Thereafter the film container 44 is filled, twisted and the surplus material severed by the flame 40. In general, the procedure is the same as that heretofore described but in the views 12 and 13 the difference lies in the use of the mold 41 in the place of the container 20 and in the controlling of the temperature of the mold.

Referring to Figures 15, 16, 17, 18 and 19, this modification illustrates the use of a preformed tube with a closed bottom made in any desirable manner from a sheet of thermoplastic material. This container is in the form of a test tube which is generally insufficient in strength to act as a container by itself. It is designated 45 and is provided with a bottom 46 and an upper marginal flange 47. The upper marginal flange 47 is engaged between the clamping rings 17b and 24b. At that time the filler spout 25b has been introduced into the interior of the tube 45. In the interim, the external container in the form of a tube marked 48 has been moved upwardly over the thermoplastic tube 45. The application of hot gas causes the interior thermoplastic tube to expand against the inner walls of the outer container tube and to adhere thereto. Thereafter the procedure of filling and sealing is similar to that already described.

Method

The method of construction of the package of this invention can best be described as providing a "bubble" to provide the lining material for the protection of the packaged material. This "bubble" is blown with hot gases, into a carton made of chip board or any other such material, having either cylindrical or square walls. This method embraces the first step of taking from a supply a given sized sheet of material to form the bubble. This sheet, preferably of thermoplastic material, is then manually or automatically placed in position within the container. At the same time both the filling spout and the gas supplying spout are inserted to their maximum depth within the bubble of thermoplastic material thus roughly formed within the container. Thereafter the upper edges of the sheet to form the bubble are firmly engaged and grasped so as to hold them in position. Then the hot gases are supplied to the interior of this roughly formed "bubble." The effect of the hot gases is to both expand the thermoplastic material outwardly against the interior walls of the container to form a close fit and to also cause the thermoplastic material constituting the "bubble" to adhere to the interior of the container due to the fact that the hot gases have softened the material.

Cold gas may be used to cool and harden the thermoplastic material prior to filling with the product.

Thereafter the gas supplying spout and the material supplying spout are withdrawn, and as they are withdrawn the material that is to be packaged is introduced within the container while it is still under gas pressure to some degree. The exact sequence of the application of the gas and of the material depends upon the type of material and the type of container.

Upon the accomplishment of the foregoing steps of the method, the supplying spout for material and supplying spout for gas are completely withdrawn while the material is contained up to the limit desired within the container. There-

after the following step of rotating the container is performed so as to twist the top of the thermoplastic material. Then the next step is to sever that material preferably by a flame or other cutting means. Thereafter the top of the container is folded over and sealed in the customary manner thereby completing the package.

In the drawings and as described hereinbefore, one of the ways of performing the foregoing method, but not the only way, is to provide a rotary table that conveys the packaging machinery performing the above steps to a series of stations (A), for initial formation of the sheet into a rough bubble; (B) for the introduction of gas; (C) for the filling of the container with material; (D) for twisting the top of the thermoplastic material to seal the bubble; and (E) cutting off the top of the material above the seal and folding over the top of the container and sealing it to complete the package.

It will be apparent that these several steps can be performed by a great variety of mechanisms without departing from the spirit of this invention. It is desired to comprehend within it such modifications both of method and of apparatus as may be necessary to adapt this invention to various conditions of usage all within the scope of the hereinafter appended claims. It will be further understood that the illustrations of this application are purely diagrammatic and illustrative and are not meant to be drawn to scale nor to be construed as a limitation as to construction or method of operation. For instance, the heaters may vary in a great variety of ways and the particular mechanism of feeding, of supplying gas, of holding the thermoplastic material and of presenting the package to different stages may be varied in endless manner.

It will be understood that I desire to comprehend within my invention such modifications as come within the scope of the claims and the invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a method of forming a package, holding a portion of a sheet of thermoplastic material marginally, blowing hot gases into the interior thereof to expand and heat the thermoplastic material, forming it into a package of predetermined shape, regulating the temperature of the containing means in order to fix the shape of the thermoplastic material after it is so blown, rotating the thermoplastic bubble so blown to cause the portion thereof that is held marginally to be twisted just below where it is so held, and severing such material above the twist to remove the surplus thermoplastic material so held.

2. In a method of forming a package, the steps of (a) providing a sheet of thermoplastic material, (b) providing a support container, (c) introducing said supply of thermoplastic material into the container with the portion removed from the edges of the sheet forced adjacent the support container bottom and the edges of said sheet being maintained outside of the support container, (d) blowing said thermoplastic material outwardly in a bubble against the inner walls of the container to form a seamless lining, (e) filling said container, (f) twisting and sealing the thermoplastic material to seal the material therewithin, (g) severing the surplus thermoplastic material, and (h) folding over the top of the outer container and sealing it.

3. In a machine for manufacturing containers,

7

means for feeding preheated sheets of thermoplastic material one by one to a loading position, means to telescope each of said sheets into a preformed outer container having an open end by inserting said sheet in said outer container, means for introducing gas into said container and sheet, means for introducing materials to be packaged within said sheet, means to grasp the upper edges of said sheet at least during said blowing and filling operation, and means for moving said container and its sheet step by step from an inserting position to a gas-blowing position, to a filling position, to a twisting position to seal the thermoplastic sheet, and to a cut-off and sealing position.

4. In a machine for forming containers, means of supplying a preheated sheet of thermoplastic material, means of severing said sheet in lengths, means of feeding said lengths to a position horizontally disposed over a vertically disposed open-mouth outer container, means of telescopically arranging the thermoplastic sheet within the container, means of grasping the upper margin of said sheet, means of introducing hot gases within said thermoplastic sheet to blow it as a bubble against the inner walls of said container while the upper edges of the sheet are so held, means for introducing material into the bubble so blown, means of rotating the composite package thus

8

formed and of twisting the thermoplastic material to seal it, means of severing the surplus thermoplastic material between the twist and the upper edge thereof so held, and means of folding the open end of the outer container over the sealed end of the one-piece thermoplastic bubble within said container.

MELVIN WAGNER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,737,874	Busch	Dec. 3, 1929
1,790,397	Woods et al.	Jan. 27, 1931
2,158,837	Schukraft	May 16, 1939
2,289,668	Mallory	July 14, 1942
2,295,066	Weikert	Sept. 8, 1942
2,328,798	Gardner	Sept. 7, 1943
2,335,978	Vogt	Dec. 7, 1943
2,338,604	Silveyra	Jan. 4, 1944
2,349,177	Kopitke	May 16, 1944
2,394,935	Palmer	Feb. 12, 1946
2,403,482	Cloud	July 9, 1946