Nov. 19, 1968 H. R. GARRETT 3,411,267

FILLING AND SEALING MACHINE

Filed Nov. 28, 1966

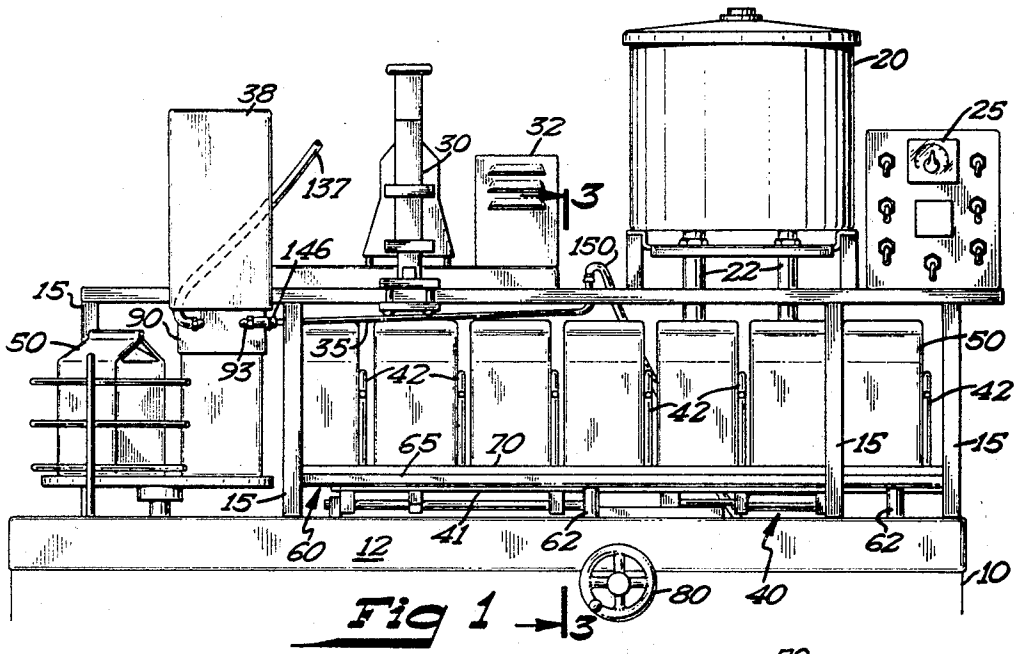


Fig 1

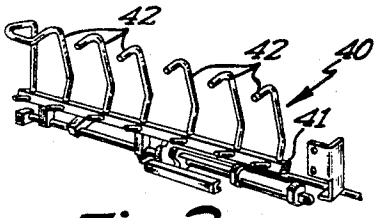


Fig 2

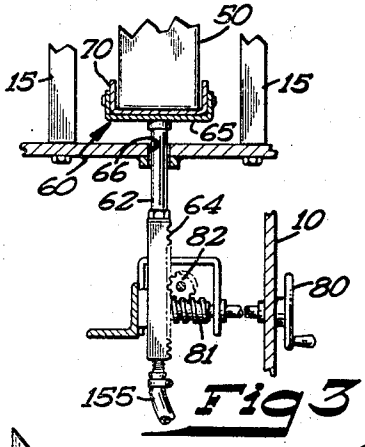


Fig 3

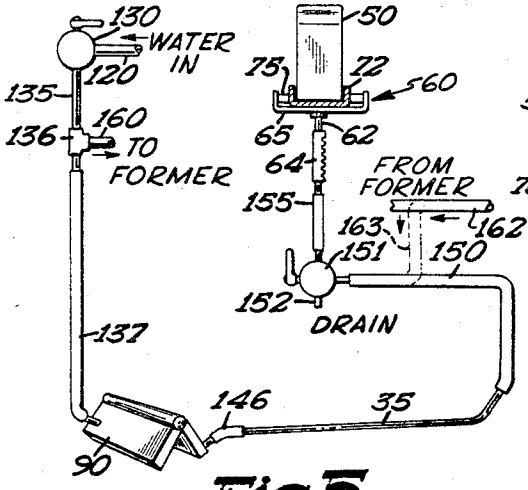


Fig 5

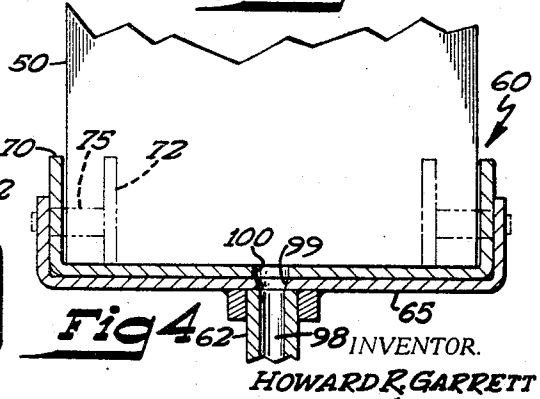


Fig 4

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United States Patent Office 3,411,267
Patented Nov. 19, 1968

3,411,267

FILLING AND SEALING MACHINE

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Filed Nov. 28, 1966, Ser. No. 597,311
8 Claims. (Cl. 53—266)

ABSTRACT

This invention is directed to a filling and sealing machine for filling preformed plastic coated paper cartons with a fluid and sealing the top of the same. The improvement resides in the introduction of a cooling and lubricating medium to the conveying portion of the machine, which moves the cartons during the filling and sealing operation, for the purpose of solidifying the bottom seals on the carton prior to filling of the same and to lubricate the bottom surface of the carton in contact with the conveying means to facilitate moving of the same on the filling and sealing machine.

My invention relates to filling and sealing machines and more particularly to an improved filling and sealing machine which provides cooling and lubrication of the bottoms of the cartons being filled thereon.

Filling and sealing machines for various types of fluids, such as milk products and others are broadly old. As an example, the present invention is directed to an improvement over a filling and sealing machine of the type shown in the pending patent application of James M. Duddleston and Howard R. Garrett, Ser. No. 524,518 filed Feb. 2, 1966, and entitled, Combined Paper Carton and Plastic Bottle Filling Machine. With the recent trend to combining carton forming apparatus with carton filling and sealing apparatus for continuous automatic operation of the same and for high-speed forming and filling, a problem has arisen relative to the cooling of the apparatus and particularly with respect to cooling of the preformed cartons prior to filling of the same. This machinery is particularly concerned with plastic coated paper cartons which are erected from carton blanks in a flattened condition, formed and sealed into an erected carton which is liquid tight, filled with a liquid product and sealed at the top to complete the enclosure and provide a filled carton. It is particularly applicable to the milk industry. With present day forming machinery, the plastic coated cartons after being erected and formed on a forming machine, will be directed onto a filling and sealing machine immediately and the heated plastic coating of the base of the carton is still apt to be sticky or tacky and susceptible to leakage as well as sticking on the surface of the filling and sealing machine. The present invention is directed to an improved filler sealer machine which has provisions for cooling of the base of the carton to solidify the tempered plastic covering and provide a positive bottom seal to the carton prior to the time that fluid or milk is inserted into the same. This will prevent leakage from the bottom of the carton. The particular cooling medium also provides a lubricant for moving the carton on the surface of the filling and sealing machine so that the carton will not vibrate or tip as it is advanced along the same. This eliminates the possibility of splashing or spillage from the carton after filling. In such machinery, it is presently conventional to use water as a cooling medium for the sealing jaws on the sealing structure of the machine as well as cooled flap deflecting rails which are also cooled from the water supply to prevent sticking of the heated upper flaps of the carton prior to the sealing operation. In the present invention, the same fluid source, that is tap water, is used on the base of the conveying apparatus to lubricate the

surface and cool the base of the carton. In some instances, the forming machinery uses the same cooling source and the particular source of cooling and lubricating medium may be used from either machine as a continuation of the flow through the cooling lines before disposal of the same. Such a cooling medium is allowed to spill onto the sealed top of the filling and sealing machine to insure that the upper surface of the same will be kept cleaned of the product or fluid, such as milk, being placed in the cartons.

Therefore it is the principal object of this invention to provide an improved filling and sealing machine.

Another object of this invention is to provide in an improved filling and sealing machine, provisions for cooling of the carton to be filled on the machine prior to filling of the same.

A further object of this invention is to provide in an improved filling and sealing machine, provisions for lubricating the surface of the filling and sealing machine to facilitate moving of the cartons thereon.

Another object of this invention is to provide in an improved filling and sealing machine, a simplified cooling and lubricating arrangement which utilizes the same cooling medium as the sealing means thereon.

Still another object of this invention is to provide in apparatus of this type an arrangement for cooling and lubricating the machine while permitting is to be adapted for varying sized cartons.

These and other objects of this invention will become apparent from a reading of the attached description together with the drawings wherein:

FIGURE 1 is a front elevation view of the improved filling and sealing machine;

FIGURE 2 is a perspective view of the advancing or conveying mechanism of the improved filling and sealing machine;

FIGURE 3 is a sectional view of the elevating mechanism for the conveying portion of the improved filling and sealing machine taken along the lines 3—3 in FIGURE 1;

FIGURE 4 is an enlarged sectional view of a portion of the elevating mechanism of FIGURE 3 showing the adjustment for varying sized cartons; and

FIGURE 5 is a schematic piping diagram for the improved filling and sealing machine.

My improved filling and sealing machine is shown in elevation in FIGURE 1 comprising a base or frame structure **10** with a table top or cover **12** positioned on the frame and supporting the remaining portion of the machine. The table top is generally made of a metal material, such as stainless steel, which may be readily cleaned and is liquid tight to prevent seepage of liquids into associated drive apparatus positioned within the base and located below the same. The table top presents a flat surface upon which is positioned an upstanding frame structure **15** in the form of a plurality of vertical upright members and translationally extending connecting frame parts. Positioned on this upstanding frame are the various components of the filling and sealing machine. Thus, as is indicated in FIGURE 1, the upstanding frame portion mounts a reservoir **20** with dispensing valves **22** connected thereto for the purpose of dispensing fluid from the reservoir into containers to be filled. Also mounted on the upstanding frame structure is a suitable control box **25** which includes the electrical circuitry for the machine. In addition, the upstanding frame structure **15** mounts a suitable hooded electric heater portion **30** with control apparatus **32** therefore, a pair of flap folding guide rails **35** and a top flap sealing structure **38** by means of which the open gable top flaps on the conventional carton are sealed to complete enclosure of the carton after filling.

The specific disclosure of the component parts of the filling and sealing machine may vary and hence their detail are omitted for simplicity. In a filling and sealing ma-

chine of this type, such as is shown in the co-pending application of J. M. Duddleston and Howard R. Garrett, Ser. No. 524,518, filed Feb. 2, 1966, the particular application of the machine is for filling plastic coated paper milk cartons as well as plastic bottles. Such a machine, except for the plastic bottle capper, is substantially identical to the details of the present machine. In apparatus of this type, the plastic coated carton is directed down a conveying mechanism mounted on the table portion of the base beneath the various filling and sealing components. The cartons are preformed cartons which may be erected from a flattened carton blank by a forming machine directly coupled to the filling and sealing machine. The cartons have the base of the same sealed by tempering a plastic coating on the paper and folding the bottom flaps against a mandrel with a suitable pressing operation to cause the flaps to adhere to one another and form an erected carton with a sealed base. The top gable flaps of the carton are open and when the carton is directed onto the filling and sealing machine it will be moved in a stepped manner beneath the dispensing valve to be filled. After filling, the carton is moved beneath a heating element which directs heat onto the open top flaps of the carton tempering the plastic cover thereon. The heated carton flaps are then directed or guided toward a closed position by means of guide rails or flap closing rails conditioning the same for closure. A pair of clamping jaws in the form of a sealing mechanism located adjacent the end of the closing rails engages the flaps in their near-closed position and clamps the same together to seal the flaps and close the carton. Such a structure is conventional with most filling and sealing machines.

The particular conveying mechanism may vary in form and as will be seen in FIGURE 2 is disclosed herein as an advancing mechanism indicated generally at **40**. This advancing mechanism includes a frame **41** with a plurality of arms **42** thereon which are adapted to be moved with the frame toward and away from the cartons and along the line of movement of the cartons. They engage the cartons on the side surface of the same and advance the cartons a predetermined distance to give the stepped operation after which the arms and frames are pivoted away from the carton and the frame mechanism is returned to an original position to engage the next adjacent carton in the line of cartons to be filled. In the drawings, the numeral **50** indicates the erected carton blanks being filled. These carton blanks are supported on an elevating frame, indicated generally at **60**, comprised of a plurality of vertically extending rods or shafts **62** connected to a rack member **64**, and carrying a transversely extending cross support member **65** at the upper extremity of the same positioned through apertures **66** in the top of the table. The cross members mount tray **70** which is an elongated U-shaped member designed to rest on the cross support member **65** and support the cartons thereon. This structure is located between the upstanding parts of the frame structure **15** as is shown in FIGURE 3. Thus, the tray, which is an elongated U-shaped trough member and which rests on the cross supports **65** of the elevating mechanism to be secured thereto through suitable clip means, actually supports the base of the cartons being filled. The cartons are slid along the surface of the tray with each movement of the conveying mechanism through engagement of the arms **42** with the respective cartons and through forward movement of the arms along the line of travel of the cartons beneath the dispensing, heating, conditioning and sealing apparatus. To accommodate the machine for various sized cartons, several trays with different width dimensions are provided with the machine. In FIGURE 4, as indicated in phantom at **72**, a smaller sized or width tray is used for a smaller sized carton, the tray being positioned on the transversely extending or cross support members **65** and clipped thereto through suitable clips, such as is indicated at **75**. For the purpose of adjusting the conveying apparatus to varying sized cartons, the elevating mechanism through a handle **80** on the front end of the machine operates a suitable gear **81** and pinion **82** to engage the rack **62** and elevate the shafts or rods **62** supporting or integral with the cross support members **65** to elevate the cartons relative to the table surface and hence the dispensing valve mechanism on the reservoir, the heating apparatus, the conditioning apparatus and the sealing apparatus, respectively. For smaller sized cartons, the carton must be elevated to be in close proximity with the dispensing valves and to position the top flaps of the same with respect to the heater and guide rails, as well as the clamping jaws of the sealing mechanism, for proper tempering of the carton flaps, folding and sealing of the same after filling.

As will be seen in FIGURE 1, the sealing mechanism **38** includes the clamping jaws **90** which are actuated or pivoted against the carton flaps to seal the same. These jaws are cooled through a cooling medium such as water by means of piping **137** leading into the same from a cold water source, as will be hereinafter described. Water flow through the jaws is also connected to the guide rails **35** or conditioning means by means of the piping connection **146** with the return water flow being directed through a piping or conduit **150**, which as will be later noted, may be deposited on the floor as waste water or may be utilized in cooling and lubricating the bottoms of the cartons. The improvement in the present invention includes a passage indicated at **98** through the shaft **62** and through an aperture **99** in the cross support members **65** to coincide with an aperture **100** in the trays **70** supporting the cartons. This aperture or water passage will be located on the conveying line ahead of the dispensing valves so as to cool the bottom of the cartons prior to the time that the fluid being dispensed, such as milk, will be inserted into the cartons. A suitable flexible hose connection **155** to the shaft member **62** at this position will provide this fluid passage. The water as it is directed into the support trays **70** or **72** for the cartons will be allowed to spill off the end of the trays and onto the table surface at either end of the machine as waste. This water flow will also be used for keeping the table surface of the machine clear of milk spillage or spillage of the fluid being dispensed.

In FIGURE 5 is shown a schematic piping diagram of the cooling medium, which in the present disclosure is water, for the improved filling and sealing machine. The numeral **120** identifying the pipe indicates a water inlet source to a valve **130** representing an on-off valve for the water supply to the machine. The outlet of the valve **130** is connected through a pipe **135** which includes a T-connection **136** therein, the pipe **135** leading through the flexible connection **137** to the clamping plates **90** of the sealing mechanism **38**. A flexible connection **146** connects the water supply to the folding rails or conditioning means of the filling and sealing machine with the opposite end of the guide rails being connected through the pipe **150** to a valve **151** of the diving type. This valve has a first outlet **152** from which water may be spilled to the floor and a second outlet which is connected through the flexible piping **155** to the rod **62** of the elevating mechanism to direct water through the passage therein and through the openings **100** in the bottom of the tray-like supports **70** or **72** supporting the cartons. The valve **151** may be adjusted so that only a part of the flow of cooling water through the clamping jaws and guide rails **35** will be directed up through the support rods **62** of the elevating mechanism for the conveying apparatus. In this manner the water used for cooling and lubrication is limited to prevent excess spillage. The T-connection **136** shows a stub line **160** off the same which would lead to a forming machine where a similar cooling function would be performed in connection with the press pads. A pipe **162** indicates the return line from the former, which as in-

dicated by the phantom connection **163**, may be connected to the valve **151** as a supply source for the elevating mechanism and **62** of the conveying portion of the machine in place of the pipe **150**, if desired. Thus, cooling water may be obtained from the former or from the remaining components of the filling and sealing machine as desired. This cooling water will flow onto the tray-like supports **70** or **72** and be in contact with the bottom of the cartons at the time they are placed on the conveying line for the filling and sealing machine. This will effect cooling and solidification of the softened plastic surface of the cartons to insure the positive and complete seal on the bottom of the cartons prior to filling of the same with the fluid being dispensed. The water film on the surface of the tray-like supports **70** or **72** also lubricates the same to facilitate sliding of the cartons thereon through engagement of the arms **42** with the cartons advancement of the supporting frame **41** so that the cartons will not stick on the surface of the tray. This insures smoothness in the conveying of the cartons and eliminates the possibility of vibration of the cartons to cause spillage of the liquid or milk from the same.

In the improved disclosure, the same fluid cooling medium used in the forming machine and in the remaining portion of the filling and sealing machine is utilized to effect the cooling of the bottom of the cartons and lubrication of the conveying portion of the machine to improve its operation. While I have shown the cooling source as a water supply, it will be recognized that other cooling mediums may be utilized for this purpose.

In considering this invention it should be remembered that the present disclosure is intended to be illustrative only and the scope of the invention should be determined by the appended claims.

What is claimed is:

1. In a filling and sealing machine, the combination of:

(a) a frame structure having a flat upper surface thereon;

(b) a supporting structure mounted on the flat upper surface of said frame structure;

(c) a reservoir including dispensing means mounted on said supporting structure and spaced from said flat upper surface of the frame structure;

(d) carton flap heating, conditioning and sealing means mounted on said supporting structure and spaced from the flat upper surface of said frame structure;

(e) carton conveying means mounted on said flat surface of the frame structure and positioned between said flat surface and said support structure beneath said reservoir and said carton flap heating, conditioning and sealing means thereon, said conveying means including a trough-like support for guiding cartons which are adapted to be filled by said dispensing means from the reservoir and sealed by said heating, conditioning and sealing means;

(f) and means included with the conveying means for cooling the surfaces of a carton in contact with said trough-like support and lubricating the support to facilitate movement of cartons by the conveying means.

2. The filling and sealing machine of claim **1** and including means on the carton conveying means for elevating the trough-like support relative to said dispensing means and said carton flap heating, conditioning and sealing means to adjust the filling and sealing machine for varying sized cartons.

3. The filling and sealing machine of claim **2** and including means on the carton conveying means for mounting selectively various trough-like supports having varying width dimensions to adjust the filling and sealing machine for varying sized cartons.

4. The filling and sealing machine of claim **3** in which the means included with the conveying means for cooling the surfaces of a carton in contact with the trough-like support is a flow of water which is directed into the trough-like support to wet, cool and lubricate the portion of a carton in contact with the trough-like support.

5. The filling and sealing machine of claim **3** in which the means included with the conveying means for cooling the surfaces of a carton in contact with the trough-like support is a tubular passage positioned in part in the trough-like support elevating means with a port to direct cooling and lubricating water into the trough-like support.

6. The filling and sealing machine of claim **1** in which the carton flap conditioning and sealing means includes connections to a source of cooling fluid medium and in which the means included with the conveying means for cooling the surfaces of a carton in contact with the trough-like support dispenses a cooling and lubricating fluid medium into the trough-like support through a fluid connection which is adapted to be connected to the same fluid medium source as the fluid medium connections for the sealing and conditioning means.

7. The filling and sealing machine of claim **4** in which said flat upper surface of the frame structure is provided with a liquid tight seal and receives drainage of the cooling and lubricating fluid from the trough-like support.

8. The filling and sealing machine of claim **4** in which the flow of water which is directed into the trough-like supports flows through an aperture in the bottom of the trough-like support and into the support to cool and lubricate the portion of a carton in contact with the trough-like support.

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