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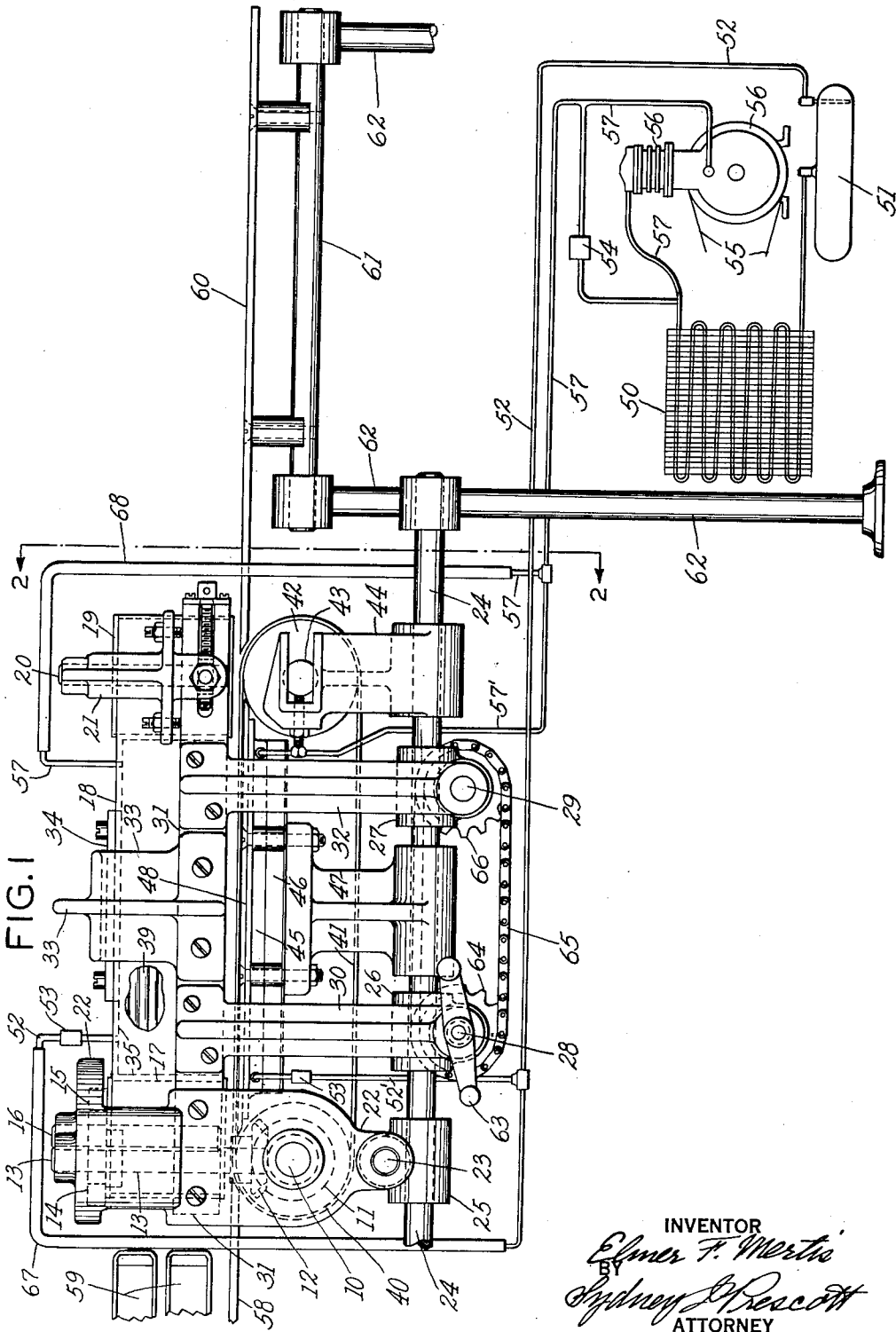
E. F. MERTIS

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COOLING DEVICE FOR HOT SEALS

Filed March 1, 1934

2 Sheets-Sheet 1



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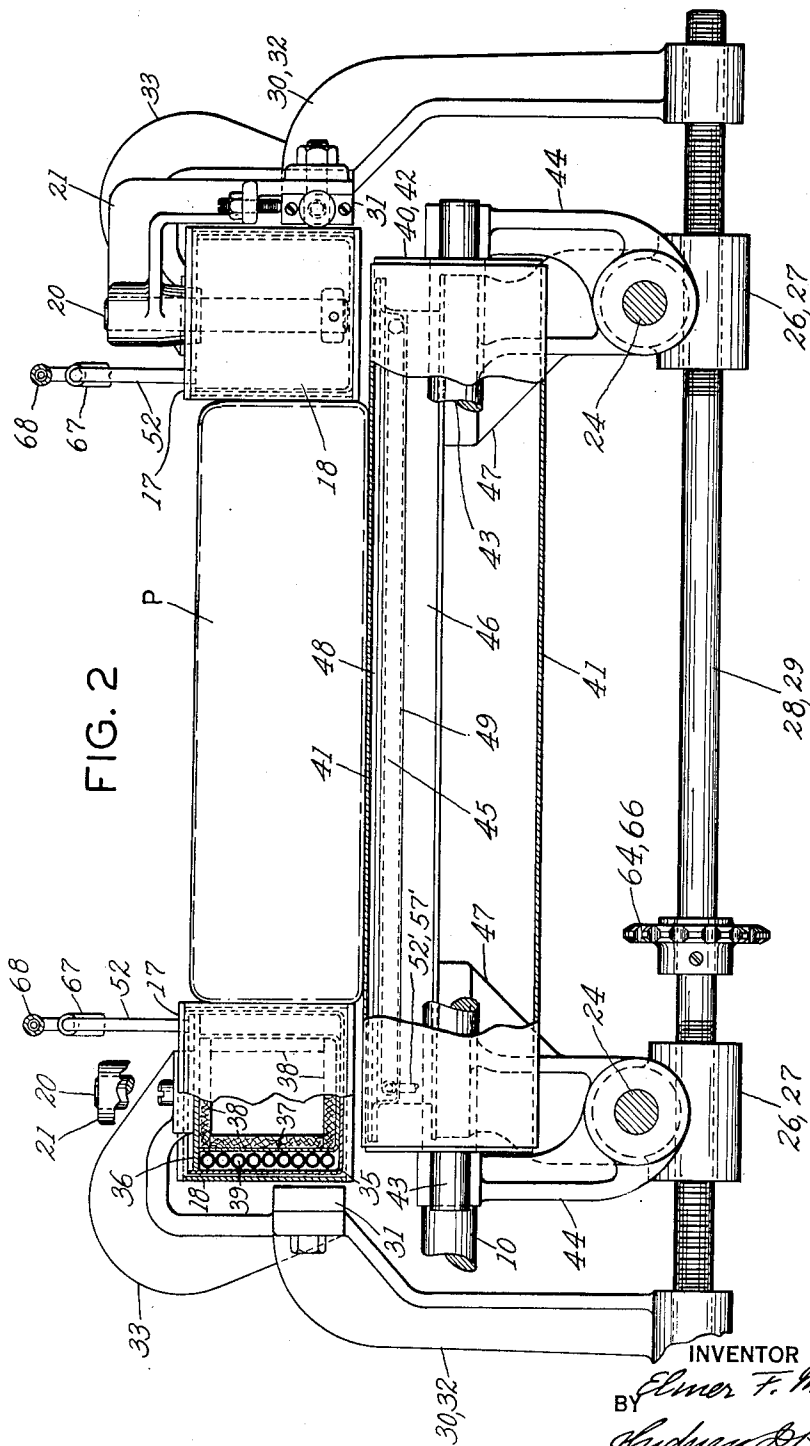
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COOLING DEVICE FOR HOT SEALS

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Application March 1, 1934, Serial No. 713,562

14 Claims. (Cl. 93—2)

This invention relates to an improved cooling device for wrapping machines which employ heated members to seal the wrapper after it is folded about the package, its main object being the production of a refrigerated constant temperature cooling device for chilling the heated seals of wrapped packages.

In the present invention a refrigerating unit similar to that of a household refrigerator is employed. The liquid refrigerant which may be ammonia, sulfur dioxide, or other suitable substance, is forced up through feed pipes or tubes to expansion valves where its flow is regulated to permit a small stream of the liquid refrigerant to enter and vaporize in the expansion coils of the chilling unit. The chilling unit consists of a bottom brine cooler and two side brine coolers, all of which are equipped with expansion coils.

A steel belt over which the packages pass is located over the bottom cooler while the side coolers are mounted between the runs of endless steel belts. The packages upon leaving the heated sealing members of the wrapping machine enter the cooling chamber formed by the bottom end side belts, wherein the hot seals of the package are chilled, thus assuring a perfectly sealed package.

Another advantage is the saving of floor space as compared with prior machines equipped with water-cooled belts, which in order to fulfill their purpose had to be extremely long. The present refrigerated system permits a much shorter cooling chamber, and a perfectly sealed package is always produced as the temperature of the chilling belts is not dependent on the variable temperature of cooling water.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a partial side elevation of a wrapping machine equipped with the improved cooling device; and

Fig. 2 is a sectional end view of the same taken on line 2—2 of Fig. 1.

In carrying the invention into effect there is provided means for heat sealing a wrapped package, and a refrigerated constant temperature cooling device for chilling the heated seals of the wrapped package. In the best constructions contemplated the cooling device includes a plurality of endless belts formed of heat conductive material and arranged to engage the heat sealed bottom seam and end flaps of the wrapper, brine tanks bearing against said belts to chill

the same, and a thermostatically controlled refrigerating unit for maintaining the brine in said tanks at a constant temperature. These various means and parts may be widely varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the specific construction shown and described.

Referring to the drawings, Figs. 1 and 2, a driven shaft 10 of the wrapping machines carries spaced bevel gears 11 which mesh with bevel gears 12 mounted on vertical shafts 13. The upper ends of shafts 13 carry gears 14 meshing with gears 15 fast to shafts 16. On shafts 16 are mounted pulleys 17 which drive endless steel belts 18 running over idler pulleys 19, mounted on shafts 20 supported in brackets 21. A pair of housings 22 supporting the vertical shafts 13 and 16, are slidably mounted on the shaft 10 and cross-bar 23.

The rods 24, one end of which is mounted in bearings of the machine (not shown), carry bearings 25, 26, and 27 which support the bar 23 and spindles 28 and 29 respectively. The spindle 28 carries arms 30, the upper ends of the latter being fastened to bars 31; spindle 29 carries arms 32 also fastened to bars 31. One end of the bars 31 is attached to the housings 22, and the brackets 33 fastened to the bars 31 have at their upper ends ledges 34 which carry side brine coolers 35.

Referring now to Fig. 2, the side brine coolers 35 have a cover 36 which closes an inner tank 37. The interior of tank 37 is insulated with suitable insulating strips 38 formed of cork or other suitable material to prevent the conduction of heat to the brine cooler 35 from brackets 33. Expansion-coils 39 are submerged in the brine filling the space between the outer tank 35 and the inner tank 37 of each brine cooler 35.

The shaft 10 carries a pulley 40 driving an endless metal belt 41 running over an idler pulley 42. The latter is mounted on a shaft 43 adjustably supported in take-up brackets 44. In the space between the pulleys 40 and 42, is placed a bottom brine cooler 45 resting on a heat insulating pad 46 carried by brackets 47, supported on the rods 24. Attached to the top of cooler 45 is a support plate or cooling surface 48 over which runs the metal belt 41. An expansion-coil 49 is submerged in the brine filling the interior of cooler 45.

Referring now to Fig. 1, the lower coils of condenser 50 and the receiver 51 contain the re-

refrigerant in a liquid condition. The upper coils of the condenser are filled with refrigerant in gaseous form under sufficient pressure to prevent the liquid refrigerant from boiling or vaporizing. This gas pressure pushes down upon the liquid refrigerant and forces it up through the feed pipes 52 leading to the expansion-coils of the side coolers 35, and through a branch pipe 52' leading to the bottom cooler 45. The pipes 52 and 52' at a point close to their juncture with their respective coolers, are equipped with expansion valves 53 which regulate the flow of the liquid refrigerant and permit only a small stream of liquid to vaporize and enter the expansion-coils of the coolers 35 and 45, thereby absorbing heat from the brine and chilling it.

A dual pressure control 54 of conventional construction connected across the inlet and outlet of a compressor 56 controls the cutout circuit of a motor (not shown) which by means of a belt 55 drives the compressor 56. The inlet of the latter is connected to the pipe 57 which is equipped with flexible hose connectors 68 leading to the outlets of the expansion coils in the coolers 35 and having a branch line 57' leading to the outlet of the expansion coil in the bottom cooler 45, the compressor serving to pump the vaporized refrigerant out of the expansion coils and compress the refrigerant and deliver it to the condenser wherein it liquefies upon cooling. A blast of air forced over the condenser coils by means of a fan attached to the shaft of the motor (not shown) hastens this process of cooling. It may be noted that the dual pressure control 54 causes the compressor to maintain a constant supply of liquid refrigerant in the receiver 51. Furthermore, on the return line 57 is mounted a thermostat (not shown), which controls the expansion valves 53 in a well known manner to maintain the brine coolers at a substantially constant temperature.

The wrapper, which is cut from a web of waxed paper or other similar material, having been wrapped about the package P with the wrapper ends overlapped on the package ends, by suitable means (not shown) forming a part of the machine, the wrapped package is pushed across a heated bottom sealing plate 58 and between a set of side heater members 59 also forming a part of the machine. Thus the bottom seam and the overlapped end flaps of the package are heat sealed. The advancing package finally reaches the cooling chamber consisting of the bottom belt 41 and side belts 18 wherein the hot seals of the package press against the aforesaid cooling belts, thus being chilled and thus set to produce a perfectly wrapped package. The package issuing from the cooling chamber come to rest on a delivery table 60, the table 60 being mounted on a cross bar 61 supported by posts 62.

The turning of handle 63 connected to the end of spindle 28, turns a sprocket 64 over which runs a chain 65 turning a sprocket 66 mounted on spindle 29. It is thus seen that the turning of the spindles move the arms 30 and 32 in or out, thereby also moving all the members attached to the bar 31. The in and out adjustment of the conveyor belts 18 sets the conveyor for different lengths of packages. Therefore, the feed lines 52 have flexible hose connections 67 and the return lines 57 have flexible hose connections 68.

What is claimed is:

1. The combination with the heat sealing mechanism of a package wrapping machine, of a refrigerated cooling chamber for chilling,

heated seals of the packages, and thermostatically controlled means for circulating refrigerant through and maintaining said chamber at a substantially uniform temperature, said means including valves operating to stop the flow of refrigerant to said chamber whenever it falls below a predetermined temperature; said means including a device for stopping the further delivery of refrigerant to said chamber whenever it falls below a predetermined temperature.

2. The combination with the heat sealing mechanism of a package wrapping machine, of a refrigerant cooling chamber for chilling heated seals of the packages, and means for maintaining said chamber at a substantially uniform temperature, said means including a refrigerant unit connected to said chamber for delivery of liquid refrigerant for vaporization therein and a device actuated by a predetermined pressure of the vaporized refrigerant for starting the operation of said unit.

3. The combination with the heat sealing mechanism of a package wrapping machine, of refrigerated brine tank for chilling heated seals of the packages, and thermostatically controlled means for maintaining the brine in said tank at a substantially uniform temperature, said means including an expansion coil submerged in the brine in said tank and an expansion valve for delivering refrigerant to said coil for vaporization therein.

4. Means for chilling heated seals of wrapped packages, comprising an endless belt formed of heat conductive material adapted to engage a heated seal of a wrapped package to chill it, a brine cooler bearing against said belt to chill the same, and thermostatically controlled means for maintaining the brine in said cooler at a substantially constant temperature, said means including an expansion coil immersed in the brine in said cooler and an expansion coil for delivering refrigerant to said coil for vaporization therein.

5. In a wrapping machine, the combination with a device for heat sealing the folds of wrapped packages, of a refrigerated cooling vessel arranged to chill folds of the packages after the same are heat sealed, a member supporting said vessel, a refrigerating unit adjacent and connected to said vessel to circulate a refrigerating medium through the same and thus maintain the same at a low temperature, and means for insulating said vessel from said member.

6. In a wrapping machine, the combination with a device for heat sealing the end folds of packages, of a set of cooling vessels arranged to chill the end folds of the packages after the same have been heat sealed, means for advancing the packages sidewise between said vessels, members for supporting said vessels, refrigerating means connected to each of said vessels for circulating a refrigerating medium through the same to maintain them at a low temperature, means for insulating said vessels from said members, and mechanism for relatively adjusting said vessels to accommodate packages of various lengths.

7. In a wrapping machine, the combination with a device for heat sealing wrapped packages, of an insulated refrigerated cooling vessel, a stationary cooling surface on said vessel arranged to chill folds of the packages after the same have been heat sealed, and a thermostatically controlled refrigerating unit adjacent and connected

to said vessel to maintain said vessel and surface at a substantially constant temperature.

8. In a wrapping machine through which wrapped packages are advanced, the combination with means for heat sealing an advancing package, of an insulated refrigerated cooling device for chilling the heated seals of the advancing package, said means including a heated bottom sealing member adapted to heat seal the bottom seam of a wrapped package and side heater members adapted to heat seal overlapped end flaps of the wrapper on the package ends, and said device including cooling vessels having flat surfaces extending along the path of the advancing package at the bottom and ends thereof, and a refrigerating unit adjacent said vessels for circulating a refrigerating medium through said vessels to chill them and said surfaces.

9. In a wrapping machine through which wrapped packages are advanced, the combination with means for heat sealing an advancing package, of a refrigerated cooling device for chilling the heated seals of the advancing package, said means including a heated bottom sealing member adapted to heat seal the bottom seam of a wrapped package, and side heater members adapted to heat seal overlapped end flaps of the wrapper on the package ends, and said device including bottom and side cooling vessels having flat surfaces extending along the path of the advancing package at the bottom and ends thereof, a refrigerating unit adjacent said vessels for circulating a volatile liquid refrigerant through said vessels to be vaporized therein; flexible pipe connections for conducting the refrigerating medium to and away from said vessels and means for adjusting each of said side cooling vessels toward and away from each other relative to said bottom cooling vessel.

10. In a wrapping machine through which wrapped packages are advanced, the combination with means for heat sealing an advancing package, of a refrigerated cooling device for chilling the heated seals of the advancing package, said means including a heated bottom sealing member adapted to heat seal the bottom seam of a wrapped package and side heater members adapted to heat seal overlapped end flaps of the wrapper on the package ends, and said device including bottom and side cooling vessels having flat surfaces extending along the path of the advancing package at the bottom and ends thereof, a thermostatically controlled refrigerating unit adjacent said device for circulating a refrigerating medium through said vessels, and mechanism for adjusting each of said side cooling vessels towards and away from the center of the bottom cooling vessel including supports for said side vessels, and right and left hand screws connected to each of said supports for simultaneously moving the same inwardly or outwardly with the side vessels.

11. In a wrapping machine through which wrapped packages are advanced, the combination with means for heat sealing an advancing package, of a refrigerated cooling device for chilling

the heated seals of the advancing package, said means including a heated bottom sealing member adapted to heat seal the bottom seam of a wrapped package and side heater members adapted to heat seal overlapped end flaps of the wrapper on the package ends, and said device including bottom and side cooling vessels having flat surfaces extending along the path of the advancing package at the bottom and ends thereof, a thermostatically controlled refrigerating unit adjacent said device for circulating a refrigerating medium through said vessels, and mechanism for adjusting each of said side cooling vessels towards and away from the center of the bottom cooling vessel including supports for said side vessels, right and left hand screws connected to each of said supports for simultaneously moving the same inwardly or outwardly with the side vessels, and insulation interposed between said supports and said side vessels.

12. In a wrapping machine through which wrapped packages are advanced, the combination with means for heat sealing an advancing package, of a refrigerated cooling device for chilling the heated seals of the advancing package, said means including side heater members adapted to heat seal overlapped end flaps of the wrapper on the package ends, and said device including cooling vessels having flat surfaces extending along the path of the advancing package at the ends thereof, an endless traveling belt for advancing the packages sidewise between said vessels and a thermostatically controlled refrigerating unit for circulating a refrigerating medium through said vessels to maintain them at a uniform temperature, said unit including a device for stopping the flow of refrigerating medium through said vessels when their temperature falls below a predetermined point.

13. The combination with a set of heated members arranged to engage the end folds of wrapped packages and heat seal the same, of a set of cooling devices arranged to engage and chill the heat sealed folds on the ends of the packages, an endless traveling member arranged to advance the heat sealed packages sidewise between said devices, a thermostatically controlled refrigerating unit adjacent said devices and connected thereto to circulate a refrigerating medium therethrough to maintain them at a constant low temperature, supports for said devices, and insulation interposed between said devices and supports.

14. The combination with a series of heated members arranged to engage the end folds and bottom seam of wrapped packages and heat seal the same, of a series of cooling devices arranged to engage the heat sealed folds and bottom seam of the packages, a thermostatically controlled refrigerating unit adjacent said devices and connected thereto to circulate a refrigerating medium therethrough to maintain them at a constant low temperature, supports for said devices, and insulating means interposed between said supports and devices.

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