Jan. 5, 1937. J. T. McCROSSON 2,066,356

MEANS FOR VACUUMIZING, GASIFYING, AND SIRUPING CONTAINERS

Filed Nov. 28, 1931 4 Sheets-Sheet 1

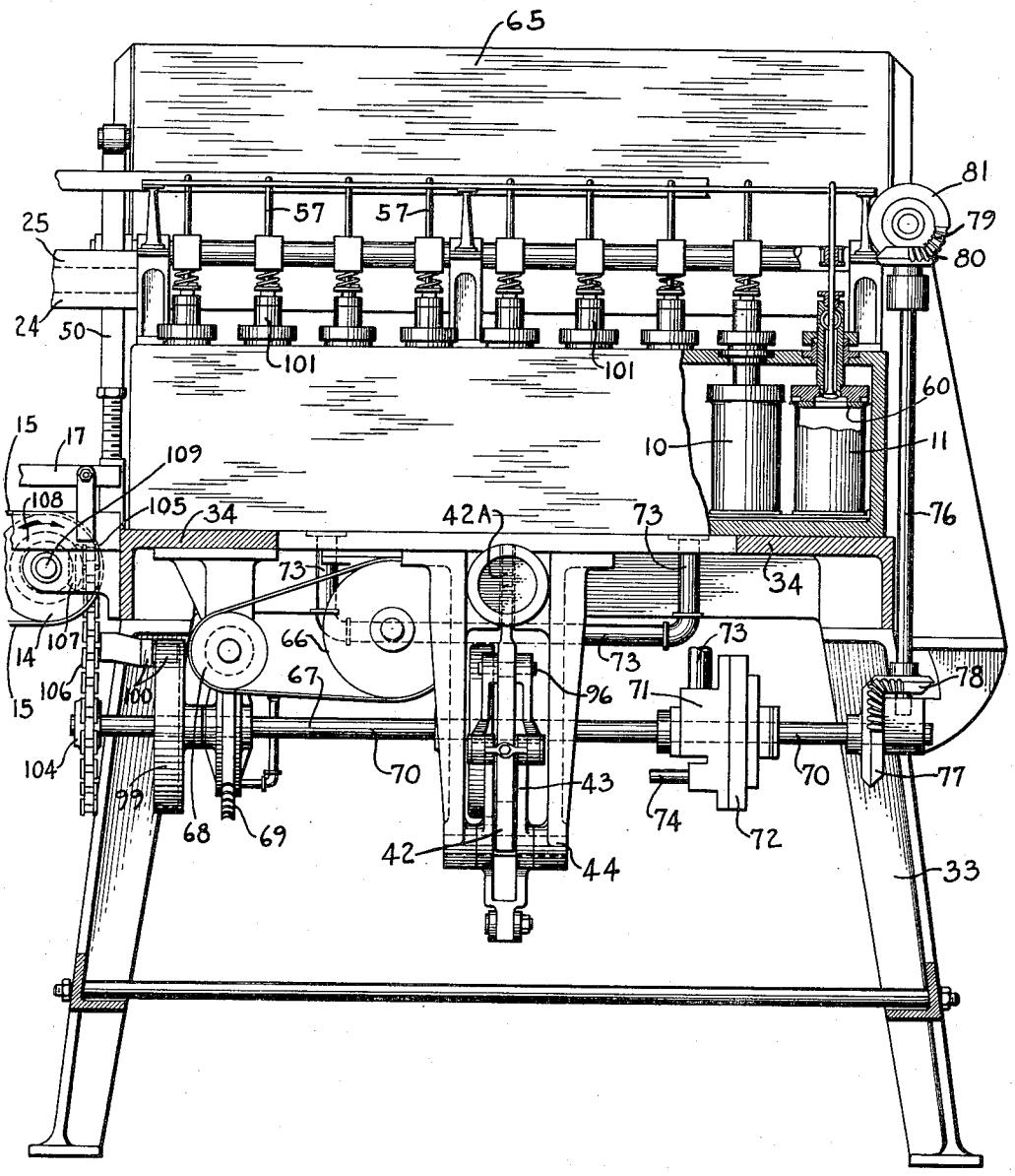


FIG — 1

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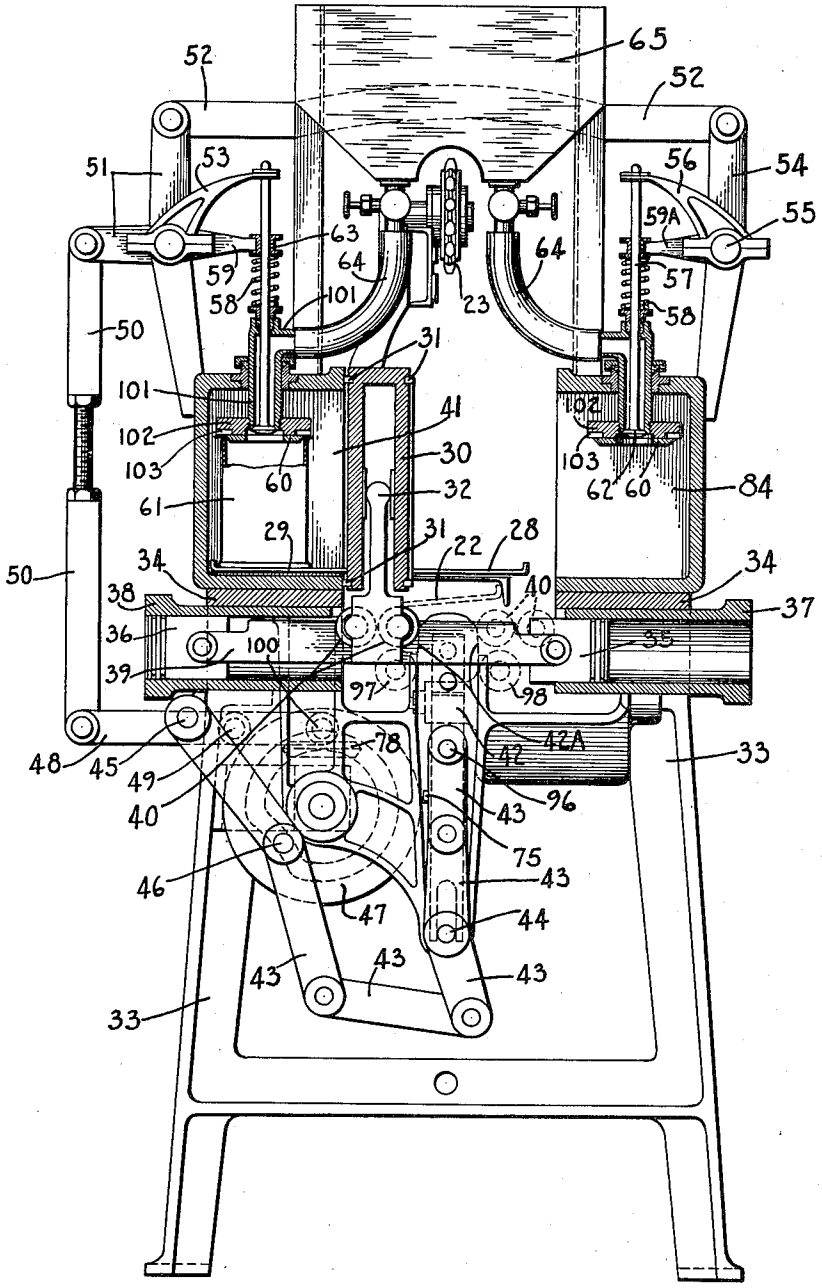


FIG-2

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MEANS FOR VACUUMIZING, GASIFYING, AND SIRUPING CONTAINERS

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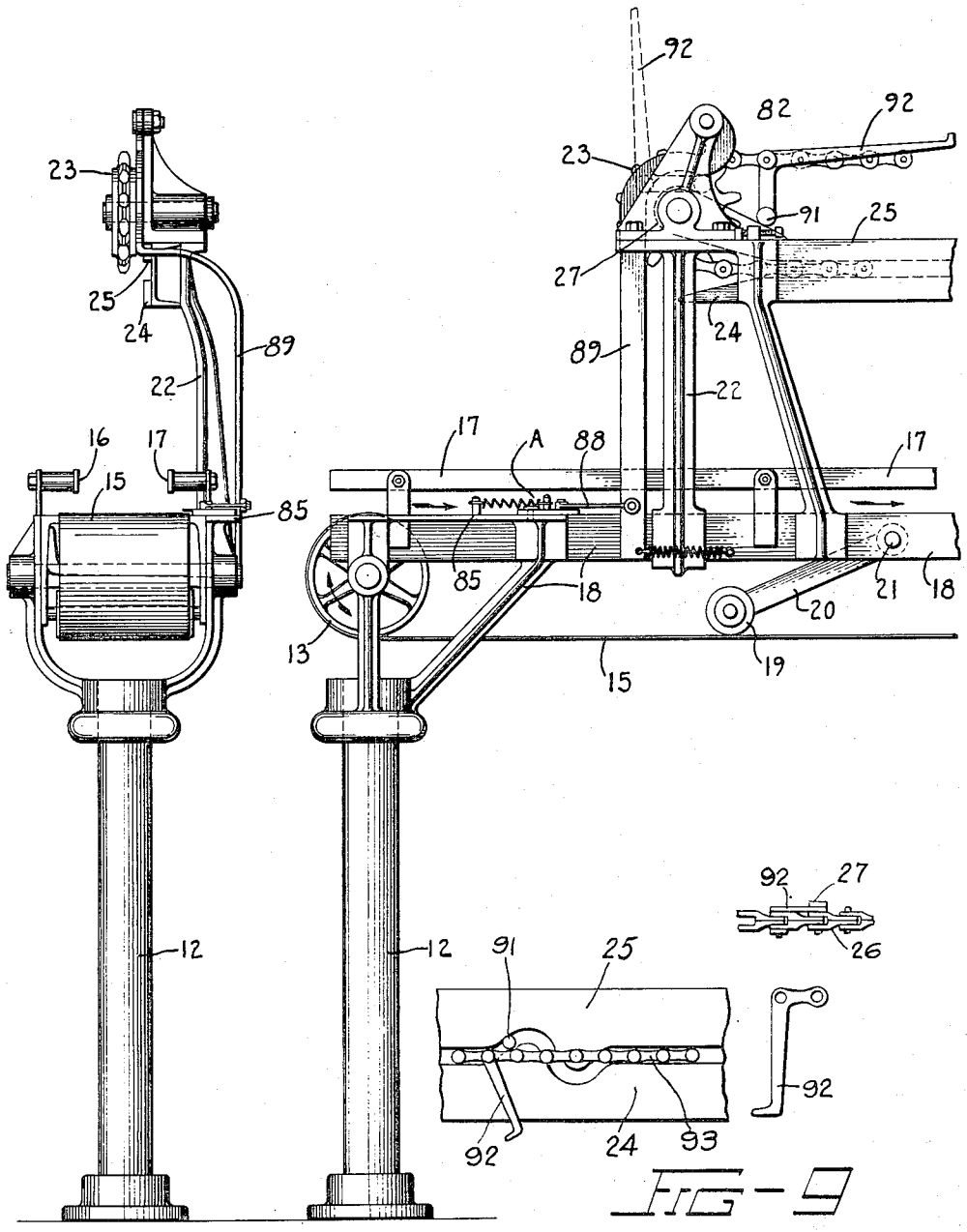


FIG-3 FIG-4

FIG-9

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MEANS FOR VACUUMIZING, GASIFYING, AND SIRUPING CONTAINERS

Filed Nov. 28, 1931 4 Sheets-Sheet 4

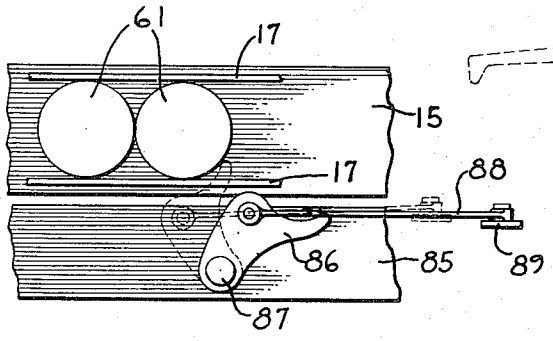


FIG - 5

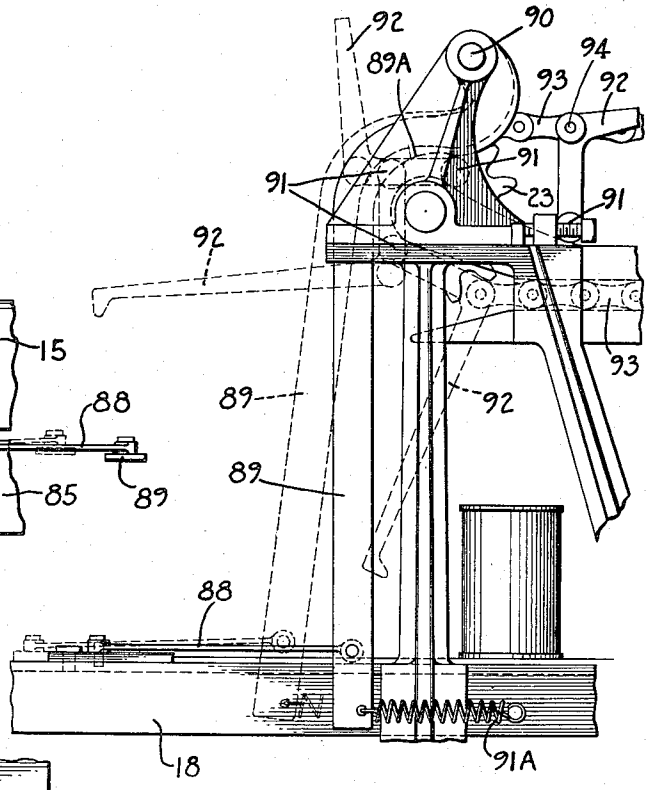


FIG - 6

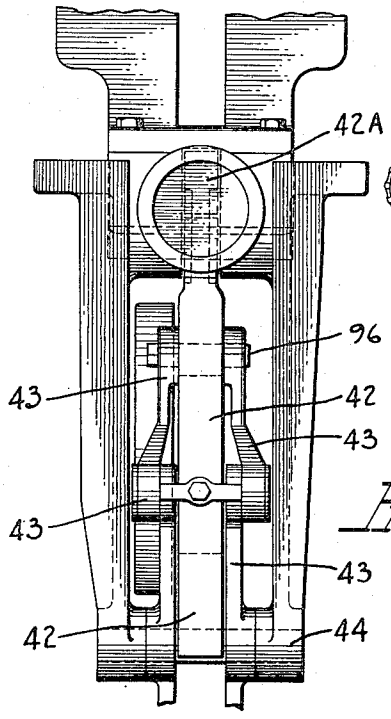


FIG - 7

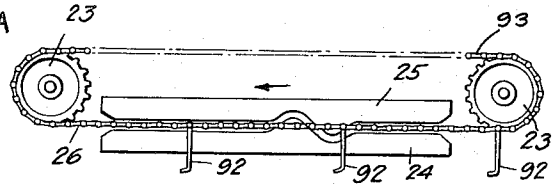


FIG - 8

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Patented Jan. 5, 1937 2,066,356

UNITED STATES PATENT OFFICE

2,066,356

MEANS FOR VACUUMIZING, GASIFYING, AND SIRUPING CONTAINERS

John T. McCrosson, Port-au-Prince, Haiti

Application November 28, 1931, Serial No. 577,794

7 Claims. (Cl. 99—234)

This invention refers to means for vacuumizing, gasifying and siruping containers for food and other products, and more especially to a device for filling and preserving the product, or the liquid parts thereof, in containers such as tin cans.

An object of the invention is to provide a means for packing such products in cans, which includes the step of introducing the solid elements in the cans or containers prior to introduction into this device, and thereafter to automatically sirup the product as the containers are fed through the device.

Another object is to provide an automatic means in association with the above, whereby the containers may be vacuumized and/or gasified before the operation of siruping or filling, to be thereafter sealed up in such manner as to preserve the contents of the containers and prevent their deterioration.

All these and other objects, as suggested herebelow, are attained by the means now to be described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevational view, partly in cross section, of the complete device, minus the conveyor table, for use in performing the triple operations of vacuumizing, gasifying and siruping containers, including the essential corollary operations of introducing and discharging said containers to and from the device automatically and at a high rate of speed.

Fig. 2 is an end elevation showing the essential operating parts of the device of Fig. 1.

Fig. 3 is an end elevation taken from the opposite end of the complete device to that of Fig. 2, and showing the conveyor which introduces the containers to the device of Fig. 1.

Fig. 4 is a side elevational view, partly complete, of the container conveyor of Fig. 3, and which is an essential part of the device of Fig. 1, and extending from the lefthand side thereof as viewed in the drawings, Fig. 1.

Fig. 5 is a fragmentary top plan view showing the detail of the container retarding means, as the containers are fed along to the machine by the belt conveyor.

Fig. 6 is a side elevational view of the details of the sprocket chain and container feeding arms attached thereto, and also showing the mechanism for automatically synchronizing the movement of the container retarding means of Fig. 5, with the other essential operations of the device.

Fig. 7 is a detail view, somewhat enlarged from that shown in the assembly of Fig. 1, of the toggle joint operated mechanism for closing and sealing the vacuum chambers.

Fig. 8 is a detail showing the feed arms, chains, sprockets and cams, and

Fig. 9 is an enlarged detail of Fig. 8 showing constructional features.

Like numerals refer to like parts throughout the several views.

The material containers, of which two are shown in Fig. 1 and numbered **10**, **11** enter the machine by being fed automatically by the conveyor shown in Figs. 3 and 4. This conveyor consists essentially of a pedestal or stand **12**, Figs. 3 and 4, mounting on suitable bearings a wide pulley **13** positioned at a distance from a second similar pulley **14**, Fig. 1, the two pulleys **13—14** being connected by a wide endless belt **15**. Adjustable guard rails **16—17** are mounted on a suitable frame **18** over the uppermost horizontal portion of belt **15**, and in a manner as clearly shown in Figs. 3 and 4, to hold the containers in vertical position on the conveyor belt as it moves them toward the machine. An idler pulley **19** is rotatably mounted on an arm **20** about a pivot **21** in the frame **18** and rests against the upper surface of the lower horizontal portion of belt **15** to keep the uppermost surface of the belt, which conveys the containers, in a stretched horizontal position, this being accomplished either by the weight of the arm and pulley or by a suitably placed spring (not shown) in a manner well known in this type of construction.

The mechanism which feeds a predetermined number of the containers (in this instance, nine) in proper sequence with the other operations of the machine, is fully described in a co-pending patent application of this inventor, Serial No. 338,695, and which was filed February 9, 1929, and therefore this disclosure shows only generally such construction. It consists of a bracket **22**, Figs. 3 and 4, having a horizontal holding portion as shown in Fig. 2 pivotally supporting a sprocket wheel **23**, and a pair of horizontal parallel spaced cam rails **24**, **25** between which a roller cam is caused to travel by being attached to the sprocket chain **93** which is driven by the companion sprocket **81**, Fig. 1, on the opposite or discharge end of the machine. With this construction, suitable arms properly spaced on the sprocket chain are made by cam motion to move downwardly between successive batches of the containers as they are moved along by the conveyor belt **15** in a direction shown by the arrows, Fig. 4, and they are carefully timed in sequence with the other oper-

ations of the machine and in manner to be now described.

The containers as they are fed to the machine on the conveyor belt 15 are halted about at the position marked A, Fig. 4. This is accomplished by mounting on a shelf member 85, Fig. 4, adjacent belt 15, a pivoted trigger arm 86, Fig. 5, pivoted to shelf 85 at 87, and being operated by a connecting link 88 pivotally attached to a vertical cam link 89, Fig. 6, terminating in a curved or cam shaped upper portion 89A and pivoted to swing about the bracket bearing 90. A spiral spring 91A attached to the lower end of lever 89, and with its other end attached on the right thereof to the frame 18 of the machine, returns said member 89 to its normal camming position, shown by full lines, from its cammed dotted line position during its normal operation. Such movement is accomplished through the movement of the roller end 91 of each of the bell crank operating arms 92, each of which is secured to the sprocket chain 93 at a pivot point 94. As sprocket chain 93 is caused to move around its end sprockets 23—81, it carries the plurality of equi-spaced bell crank arms 92, and thus the rollers 91 come to engage the cam rail 24—25, Figs. 1 and 6. Meanwhile, pivot point 94 of bell crank lever 92, has continued to be pulled around by its sprocket chain 93, causing the long outer or operating portion of arm 92 to be raised up and then moved around in a circular path in manner as shown by their dotted line positions. When roller 91 enters the cam groove in the side surface of the combined cam and sprocket wheel 23, as shown in Fig. 6, it cams outwardly or to the left of the surface 89A which projects into the cam groove, and in doing so, moves the lower end of arm 89 to the left about its pivot 90, above, thus moving, through link 88, the outer end of member 86, Fig. 5, into engagement with the most advanced container 61 to halt said container, and those following it, from being fed forward by the moving conveyor belt 15 on which they rest. As soon as roller 91 has encircled the cam groove, the spring 91A, Fig. 6, returns lever 89 to normal position; and the containers 61, being no longer retarded by member 86, are again fed by belt 15 into the machine.

The containers are in this manner conveyed by means of the endless belt and the four (or other number of) equi-spaced cammed feed arms on the sprocket chain, which moves about the sprockets 23 and 81. The feed arms 92 carry the containers forwardly or to the right as shown in Fig. 4 and when they have reached a position opposite vacuum chambers 84, Fig. 2 or as shown generally in Fig. 8, the feed arm guide roller 91, Figs. 4 and 9, and moving to the right as in Fig. 4 or to the left as in Fig. 9, meets a drop in the cam groove, and being shaped like a bell-crank lever as shown, this advances the lower part of arm 92 to force the packages into proper position exactly opposite the vacuum chambers so that they can be admitted thereto. The feed arm roller 91 then meets a rise in the cam groove, Figs. 8 and 9, which throws back the lower part of arm 92 to move it out of position from interference with member 30, just prior to the lateral movement of member 30 by which the containers are moved into the vacuum chambers. To explain this further, it will be noted that the contacting end of arm 92 is first given a push forwardly, or to the left as in Fig. 9, due to its bell-crank lever end meeting the drop in the cam groove. This forward push is intensified because of the difference in leverage between the lower longer pushing arm and the upper shorter bell-crank arm. By that means the plurality of containers are pushed forwardly so that the arm 92 no longer is in contact with the last of said containers. Immediately thereafter the contacting end of arm 92 is quickly pushed back or further out of contact with its container due to the bell-crank lever end meeting the rise in the cam groove, shown to the left in Fig. 9. Thus there is a sufficient time interval when the arm 92 is free of contact with the rearmost container to permit the member 30 to cross the path of arm 92 to complete its function and move one set of containers into its chamber and simultaneously to move the other set into the path of arm 92. At this point arm 92 has passed out of the cam rail rise and drop portion and its normal progress to the left, as in Fig. 9, has been resumed, and so arm 92 again contacts the rearmost container of the vacuumized set and pushes it and its companion containers out of the machine. The containers are thus pushed into one or the other of trays 28, 29, Fig. 2, depending upon which is in position at the moment. These trays are secured to a movable gate 30 having rubber glands or other air-tight members 31 in its side vertical surfaces, as shown in Fig. 2; and this gate 30 is caused to move by means of an arm 32 projecting into its hollow interior, as clearly shown in the drawings, and which in turn is made to move in manner as hereafter described.

The machine proper comprises a pedestal or standard 33, Figs. 1 and 2, on which is mounted a heavy cast-iron bed plate 34, on which all operating parts are mounted so as to avoid the tendency of misalignment from assemblage. Bed plate 34 is, of course, then rigidly secured to its standards or leg sections 33.

A pair of opposed pistons 35—36, Fig. 2, moved horizontally in their cylinders 37—38, respectively, (in manner as hereafter described) are attached together and to the gate-moving lever 32 by means of a suitable link or cross head 39. Mounted on link 39 is a pair of friction rollers 40 which in the partial full line position shown to the left of Fig. 2, have acted to close the left-hand vacuum box 41; and when in the full dotted line position, shown to the right, the opposite side of member 30 is in engagement with the opposite vacuum box 84 to in turn close it. Steel lever 32 is bolted onto the cross head or link 39 to which pistons 35, 36 are fastened. Thus the movement upwardly of member 42 will tightly press the vacuum sealing member 30 against either vacuum box with considerable wedging pressure. Such movement is accomplished by member 42 being bolted onto a suitable toggle joint construction 43. The stationary pivots for this toggle joint 43 are 44 and 45, and a cam roller 46, Fig. 2, slides in a groove (shown by dotted lines) in a rotating cam 47, which operates the toggle in proper sequence with the other operations of the machine. In the position shown in Fig. 2, the roller 46 is in the innermost portion of the cam race and thus has moved the toggle 43 into position for wedging gate 30 against chamber 41. The cam race is so shaped that this interval of wedging is about one-fifth of the total interval for a complete cam revolution.

An eccentric pin 96, Figs. 2 and 7, connects the upper toggle joint link 43 with the wedge member 42, for the purpose of making an adjustment as the wedge surfaces 42A or attendant parts,

become worn. This pin 96 is the only connection to toggle joint 43. Member 42 is held to move in a vertical direction by having its lower end forked, as shown in dotted lines, to move over pin 44, and also by having its upper end slide between rollers 97, 98 and also—in the other plane—by having its upper end slide through a slot in the crosshead member 39.

The siruping mechanism is operated from an internal cam 99, Fig. 1, mounted on drive shaft 70, which, when rotated thereby, causes cam pin 100 to raise and lower. Pin 100, Figs. 1 and 2, is mounted on one end of a link 48, which is pivoted at 49, and which raises and lowers an adjustable link 50.

When link 50 rises, it moves the bell crank lever 51 to in turn move the connecting lever 52, to the right as viewed in the drawings, Fig. 2. Attached to bell crank lever 51 and moving with it about its pivot is an arm 59. The opposite or right-hand end of connecting lever 52 is pivotally attached to an arm 54 mounted to swing about the bearing 55, and carrying with it an arm 59A which is similar to arm 59. Thus the upward movement of member 50 moves downwardly the outer end of arm 59 and upwardly the outer end of arm 59A.

Arm 59 moves a tappet member 63 and with it the spindle 57 downwardly, and carries along a siruping nozzle 101, Fig. 2, which moves through a gland or packing in the top of vacuum box 41. Carried on the lower end of nozzle 101 is a siruping head 102 mounting a sealing gasket 103 adapted to press down upon the upper edge of container 61. A bronze follower 60, with beveled edges, also moves downwardly to center the container beneath said sealing gasket.

The continued downward movement of arm 59 then causes an independent downward movement of spindle 57 which presses its valve 62 off its seat, to admit the sirup from its flexible hose connection 64 from tank 65.

The same operation, of course, takes place on the opposite vacuum box 84.

And when link 50 is moved downwardly to raise these several parts to their original position, the valve 62 closes first, and then the seal is removed from the top of the container.

Drive shaft 70 mounts on its lefthand end, as viewed in Fig. 1, a drive sprocket 104, which in turn drives a smaller sprocket 105 through chain 106. Sprocket 105 has keyed to it a bevel pinion 107 which meshes with and drives a second bevel gear 108 keyed to shaft 109 on which pulley 14 revolves. This completes the drive from motor 66 to the container feeding mechanism.

In this use of the invention, the containers are usually first filled with the solid substance of the materials to be canned, and the fluid or sirup is afterward admitted in the machine in the manner heretofore described.

The machine is operated preferably by an electric motor 66, Fig. 1, operating through a belt 67, a drive pulley 68 rotating a worm (not shown) to in turn rotate the worm gear 69 which is keyed onto and rotates the drive shaft 70. Shaft 70 extends through a stationary portion of a combined vacuumizing and gasifying valve, said stationary portion being designated by the numeral 71 and being adacent to a movable portion 72, keyed to and rotating with drive shaft 70. The relative movement at slow speed of the parts 71—72 of the combined valve, opens and closes ports to the line from the vacuum and gas supply, and in proper sequence with the other operations of the machine. Thus the exhaust line is shown at 73, there being of course a suitable connection between the part of the pipe attached to the valve and the part projecting up through the machine bed 34 as shown in Fig. 1. This pipe 73 is both a vacuum and gas pipe. Another vacuum pipe (not shown) connects with cylinders 37—38, and, being operated by valve 71—72, moves pistons 35—36 to move cross head 39. This pipe of course is connected to a source of vacuum created by the usual vacuum pump. Likewise, a pipe 74 connects the valve with a source of the necessary gas and is then connected to the vacuum chambers. The details of construction of valve 71—72 are shown in applicant's co-pending application, and form no part of this invention, and so are disclosed only generally. Valves of this type are well known in the art, being shown, for instance, in Patents 952,178 dated March 15, 1910; 795,911 dated Aug. 1, 1905; 661,712 dated Nov. 13, 1900; and 592,279 dated Oct. 26, 1897. Patent Office class 251, sub-classes 84 to 90 inclusive, includes many other patents of this type, in addition to the above.

A stop 75 is positioned as shown in Fig. 2 to prevent the connecting links from the toggle joint 43 from moving past dead-center to the left.

Drive shaft 70 also rotates the vertical shaft 76, Fig. 1, through beveled gears 77—78, to in turn drive beveled gear 79 through its companion gear 80 keyed to shaft 76. Gear 79 is mounted to rotate with a sprocket wheel 81, which drives the chain 93 with its arms 92.

An adjustment (not shown), is preferably provided in connecting lever 52, as a means of controlling the adjustment of the parts which it operates.

It will thus be seen that this machine operates automatically to feed in the containers, for instance filled with the solid substance, such as canned fruit, moves them in batches equivalent to the number which the vacuumizing and gasifying chambers can hold, shifts each series of cans laterally to one side or the other to the vacuum chamber not in use, exhausts the air from each set of containers, successively, and then gasifies it. Or, instead of gasifying, it fills the container with sirup at the same time completing the vacuumizing operation; and in the meantime loading and unloading arms 92 convey a following series of containers to the opposite vacuum chamber, and then move the completely filled and prepared cans from each side tray 28—29 successively, off their respective ends to a conveyor or receptacle, to be thus ejected from the machine, while at the same time, by its continued longitudinal movement, the arms 92 move to allocate the series of containers to the position opposite the vacuum chambers to permit said containers to be moved laterally into the chambers, as already described on page 4 of this specification. This admits the following series of containers to the opposite vacuumizing chamber; and this process is repeated. Thus, material is fed in at one end, its various essential operations performed, and the completed filled cans ejected from the opposite end, and at a high rate of speed. The air is almost completely exhausted from these cans, and if desired, the necessary gasifying operation then performed (this being not always necessary or desirable). Or the can is instead completely filled with sirup leaving no space for air to be retained. The top is applied to the can, usually after removal from the machine.

Particular attention is directed to the fact that with this machine and method of operation, there results for the first time, a multiple feeding, vacuumizing, gasifying, and siruping operation; whereas heretofore these operations were always carried on singly. This feature of multiple action is important not only because it can be used to increase the efficiency of production from the machine directly as the multiple used (for instance, nine, as here shown) but also because a portion or all of such increased operating efficiency may be diverted to increase the length of treatment or the time consumed in any or all of the various machine functions. Moreover, the number of multiples used is subject only to constructional limitations.

These several steps in the method of this invention are performed in proper sequence to bring about the new and useful results accomplished.

It is to be understood that the present disclosure is for the purpose of illustration only, and that the invention is not limited thereto. To those skilled in the art, many modifications of the invention will be readily apparent, and it will also be obvious to such skilled persons that part of the method and means may be used without other parts thereof, many such combinations of the parts readily suggesting themselves. For instance, where cylindrical metal cans are shown as containers, these may be of other shapes, and made of glass, paper, or other materials. Variations, too, may be made in the driving means to the essential operating parts. And so on. Therefore, it should be, and is to be distinctly understood that for a definition of the limitations of the invention, reference must be had to the appended claims.

Having now described the invention, what is claimed as new and for which Letters Patent of the United States is desired, is:—

1. An apparatus for vacuumizing containers containing perishable material, comprising means for transporting a plurality of containers to a position between two vacuumizing chambers, means for introducing the plurality of containers to one of said chambers, means for sealing the chamber, means for vacuumizing the chamber and its containers, means for removing the containers to the said transporting means, to be ejected, and similar means for transporting, vacuumizing, and removing a second set of containers to and from the opposite vacuum chamber.

2. The invention as in claim 1, including means for siruping the containers automatically while in the vacuumizing chambers.

3. The invention as in claim 1, including means for gasifying the containers in said chambers.

4. An apparatus for continuously treating material in a plurality of containers, comprising a plurality of treatment chambers, means for feeding a plurality of containers to one of said chambers and starting the treatment thereon, means for feeding a following plurality of containers to another of said chambers and starting the treatment thereon, means for completing the treatment of the first plurality of containers and thereafter ejecting them from the apparatus, and means for then completing the treatment of the second plurality of containers, and then ejecting them from the apparatus.

5. The invention as in claim 4, all said containers being fed to and ejected from the plurality of chambers by common conveying means.

6. An apparatus for vacuumizing containers, including a pair of vacuumizing chambers opening toward each other and positioned on opposite sides of a conveyor belt, a double-sided sealing member having on each side thereof holding trays for the containers and adapted to be moved laterally to carry a plurality of containers first into one chamber and seal it, and then into the other chamber and seal it, and means including double-opposed cylinders with pistons connected to said sealing and conveying member, and adapted to move it by means of a vacuum introduced first into one cylinder and then into the other to cause movement of said pistons.

7. The invention as in claim 6, including wedging means adapted to move against the sealing member to wedge it into airtight engagement against the open side of each vacuumizing chamber.

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