UNITED STATES PATENT OFFICE

JOHN M. YOUNG, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

APPARATUS FOR APPLYING INERT GAS TO FILLED CANS

Application filed August 30, 1924. Serial No. 735,064.

This invention relates to the packing of food products in hermetically closed cans or containers wherein all or substantially all atmospheric air is replaced by an inert gas to prevent bacteriological and other deterioration of the product.

Prior to my invention numerous food products packed in tin cans and other hermetically sealed containers have been treated to substitute an inert gas for all air content. The method of accomplishing this substitution preferred, prior to my invention, has required the placing of the filled can in a confined chamber, the exhaustion of the air from said chamber, then the introduction of an inert gas under pressure into the chamber, and the application of the cover and usually the seams of the cover in place, all while the can is in the chamber mentioned.

The gas usually employed is carbon dioxide and I have discovered by experiments that this gas is sufficiently heavier than air to effectively displace any air content of the can within a short time when the can is passed into or through a zone of said inert gas.

An important object of the invention therefore is the substitution of an inert gas for air in a can without the use of vacuum and preferably as a part of a continuous process capable of practice in timed relation with the other machines and processes of the usual canning factory.

Another important object of the invention is the provision of an improved apparatus which will reduce materially the equipment previously thought necessary for substitution of inert gas for air in cans prior to or as an incident to closing.

Another and highly important object of the invention is the improvement in the efficiency in making the above-mentioned substitution and this by the elimination of the necessity of alternately pumping air out of, then gas into, and then gas out of the chamber at each application of the inert gas.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a vertical section taken longitudinally through an apparatus embodying my present invention and more particularly identified as taken substantially on the lines 1—1 of Fig. 3;

Fig. 2 is a plan section taken substantially on the lines 2—2 of Fig. 1; and

Fig. 3 is an end elevation taken from the receiving end of the apparatus.

Fig. 4 is an enlarged transverse sectional view on line 4—4 of Fig. 2.

In the practice of the process in which my invention is in part concerned, I arrange the filled cans in a zone of an inert gas heavier than air, such inert gas being preferably carbon dioxide, and maintain the cans in this zone a period of time sufficient to permit the displacement by the heavier gas of the lighter air within the can. The zone, in accordance with my process, is preferably confined in an open top chamber through which the cans are continuously passed from end to end.

The apparatus in which my invention is also concerned in its preferred form is illustrated on the drawing.

Referring to the drawing, reference character 10 indicates a base upon suitable legs 11, which base forms the bottom of a chamber, the other walls of which consist of end walls 12 and side walls 13. This chamber is open at the top and a zone of carbon dioxide or other appropriate gas is formed and maintained in the lower part of the chamber by the introduction of said gas in the necessary quantity and rate from an inlet pipe 14 having distributing outlets orifices 15. Above this pipe is mounted a belt or other endless conveyor 16 taking over pulleys 17 and 18 mounted respec-
tively on shafts 19 and 21, having bearings in side walls of the chamber. The pulley 18 is fixed upon the shaft 21 and this shaft receives continuous rotation from a belt pulley 22 in the usual manner.

A table extension 23 is provided at the left-hand end of the machine (viewing Figs. 1 and 2) and through this is mounted a shaft 24 carrying a turret 25 above the table extension. This turret has a plurality of pockets 26 for receiving cans 27 on the table and conveying them during the rotation of the turret past a guide 28 over and onto the upper travel of the bell or conveyor 16. This upper travel of the conveyor passes over a perforated horizontal partition 30 within the chamber, which partition supports the cans and belt as the cans are conveyed.

The end wall 12 is recessed at 29 to permit the cans to be introduced into the chamber and the end wall at this point and the turret 25 extend into the chamber over the belt as may be seen by comparing Figs. 1 and 2. As the cans pass along through the chamber with the conveyor, the substitution of gas for air is produced by gravity, the air and mixture of air and gas ascending from within the cans and being replaced by the insert and heavier gas, and when the can nears the delivery end of the chamber, it is engaged by a rigid guide 31, fixed at 32 on an appropriate wall 13, this guide 31 serving to deflect the can into position for entry into a pocket 33 of a discharge turret 34, the can being guided in this engagement by the guide 31 and a second guide 35 at the opposite side of the chamber.

The turret 34 in its rotation carries the cans around for discharge by engagement with a lower discharge plate 36 and out onto an extension 37 from which the cans may be fed to the closing machine. The turret 34 is mounted upon a shaft 38, having bearings at 39 in the extension and base.

I have shown upon the drawings, particularly in Fig. 4 thereof, a cover feed provided at the discharge end of the machine for the purpose of automatically placing covers upon the cans immediately after they leave the gas chamber. While the machine may be employed either with or without this automatic feed (it being entirely feasible, under certain conditions, to position the covers by hand), the use of such a feed is considered desirable for the sake of convenience, since it has been found in practice that the gas becomes rather quickly diffused or diluted with the outside air and the cans should, therefore, be immediately covered after passing out of the gas chamber.

The feed comprises a stockholder 61, supported upon an extension bracket 62, having thereon a track part 63 in which the covers are directed to position above the cans 27 as they are delivered from the machine by the discharge turret 34, the track part 63 being cut away above the assembling position, as indicated at 63', so that the covers are positioned directly upon the tops of the cans. A slide 64 is mounted to travel in a guide-way 65, extending beneath the stack of ends 66. Said slide is adapted to be reciprocated to feed the bottommost end onto the can in the pocket of the turret adjacent the stack.

Said slide has a slotted connection at 67 with a lever 68 pivotally connected at 69 on the frame, the lower end of said lever having a slotted connection at 71' with a yoke member 72, which carries a roller 73, following an eccentric groove 74 in a cam 75 mounted upon the vertical shaft 38 just above the beveled gear 41.

The mechanism just described operates in timed relation to the rotation of the turret 34 to place the covers upon the cans as they are discharged in manner which will be readily understood.

Each of the shafts 24 and 38 is provided with a bevel pinion 41, which engages with a companion bevel pinion 42 on a power shaft 43 mounted below the base 10 and journaled in cross members 44 arranged between and integral with the legs at each end. This shaft 43 is provided also with a pulley 45 for actuating the drive shaft and through the drive shaft, the turrets.

Gas is admitted to the chamber from the pipe 14 in accordance with the number of cans passing through the chamber and to this end, the feed pipe 46 is provided with a valve 47 controlled by a valve lever 48. This valve lever is connected by a link 49 with an upright lever 51, the upper end of which carries a head 52 arranged in a slot 53 in the guide 28 in position for engagement with a can in a turret pocket 26. An arm 54 is pivotally connected at 55 with the lever 51 and carries a cam roll 56 engaged in a cam 57 on shaft 24. As the turret 25 rotates, the cam pulls the lever 51 to the left (viewing Fig. 3) as each pocket, containing a can, is presented to the guide 28. If a can is present in the pocket, the head 52 engages the side of the can and the lower end of the lever is moved inwardly to open the valve and admit a small additional charge of gas in amount having direct ratio with the gas removed from the chamber as a result of the substitution for air in the can. Whenever, and as often as, the pockets 26 pass the guide 28 without a can, the upper end of the lever 51 may be swung in under the action of the cam 57 and no gas is admitted as a result, the lever 51 at such times moving idly about its lower end without moving the valve.

As the cans pass through the chamber, the air floats from within the cans out through the heavier inert gas and escapes to the atmosphere through the open top. Experiment has demonstrated that this transposi-
tion in the can occurs within easily practi-
cal limits of time travel and it will be mani-
fest that since the operation is continuous, it
may be run at high speed and at any speed
that may be desired to maintain the cycle of
operation in the canning factory or packing
house, this being largely determined by the
rate of turret rotation.
The invention concerns itself both with the
process and apparatus and it will be apparent
that various changes may be made in the
form, construction and arrangement of the
parts without departing from the spirit and
scope of the invention, or sacrificing all of its
material advantages, the form hereinbefore
described being merely a preferred embo-
diment thereof.

I claim:

1. An apparatus for applying an inert gas
to replace air in filled cans, which comprises,
a chamber providing a zone of said inert gas,
and means moving cans continuously into and
out of said chamber and through said zone
of gas for a period sufficient to permit dis-
placement of air in the cans by said gas, and
means for supplying inert gas to said zone
during the moving of said cans.

2. An apparatus for applying an inert gas
to filled cans preparatory to closing, which
comprises, a chamber open at its top and
adapted to contain a zone of an inert gas heav-
ier than air, means for moving a can into and
out of said chamber, the vertical walls of said
chamber extending above the tops of can
thereunder, whereby said inert gas may dis-
place the air in said cans.

3. An apparatus for applying an inert gas
to filled cans preparatory to closing, which
comprises, a chamber containing a zone of
inert gas heavier than air, means for introduct-
ing cans into and removing them from said
chamber, whereby to permit displacement of
air in the cans by said inert gas, and
means for supplying inert gas to said cham-
berr in amount determined by the number of
cans introduced into said chamber.

4. An apparatus for applying an inert gas
to filled cans preparatory to closing, which
comprises, a chamber containing an inert
gas, means for conveying cans continuously
into, through and out of said chamber and
through said zone of inert gas, said chamber
being open at the top for escape of air dis-
placed by said gas in said cans from said
chamber.

5. An apparatus for applying an inert gas
to filled cans preparatory to closing, which
comprises, a chamber open at the top and
adapted to contain a zone of inert gas heavier
than air, means for moving cans into said
chamber to permit displacement of air in the
cans, a gas supply conduit, and a valve con-
trolling admission of additional inert gas to
said chamber, operable by the passage of a

JOHN M. YOUNG.