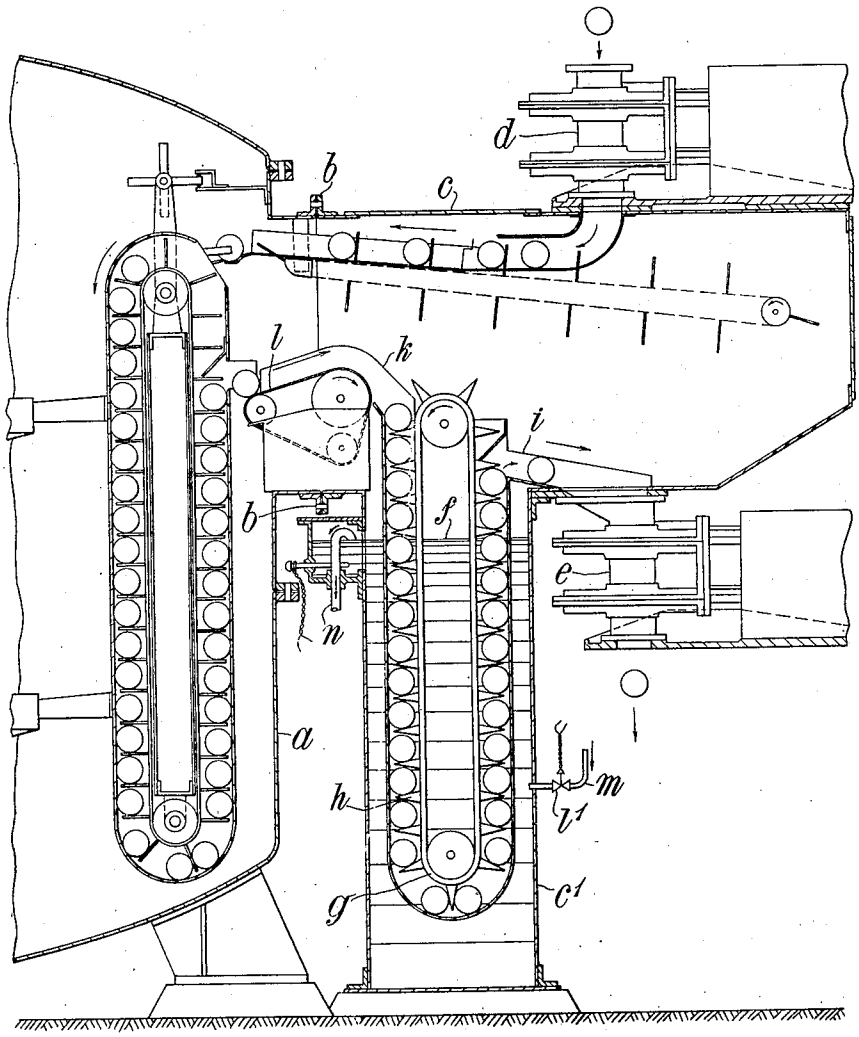
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COOKING, HEATING, OR LIKE APPARATUS FOR TREATING TINS OF FOOD OR OTHER ARTICLES

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COOKING, HEATING, OR LIKE APPARATUS FOR TREATING TINS OF FOOD OR OTHER ARTICLES

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6 Claims. (Cl. 126—272)

This invention relates to apparatus primarily intended for the cooking of foodstuffs in hermetically sealed containers (hereinafter for brevity referred to as "cans") although it will be understood that the invention may be applied with equal effect and like advantage to other cooking, heating and like apparatus.

In the processing of tinned products the pressure within the can usually rises considerably above atmospheric pressure and it is essential subsequently to reduce such pressure before the can is exposed to the atmosphere as otherwise the can would be very liable to burst with the result that the can would be spoiled and the contents lost. Such reduction of pressure is usually accomplished by a preliminary cooling of the can and even in cases where the pressure is not raised materially above atmospheric it is desirable to provide some preliminary cooling in order to facilitate the handling of the cans.

The object of the present invention is to facilitate the pressure reducing and/or cooling operation by means of very simple apparatus, and the invention consists in cooking and like apparatus of the kind referred to comprising a main container in which the processing is carried out and a supplementary tank or container for cooling medium, the two containers being in free communication so that they virtually comprise a single unit. Any pressure existing in one, therefore, must necessarily co-exist in the other and in consequence no valves, baffles, or other special devices are needed to prevent interchange of pressures between the two.

Further features of the invention will be apparent from the description given hereafter.

The accompanying drawing illustrates more or less diagrammatically in sectional elevation one convenient form of apparatus in accordance with the invention.

In carrying my invention into effect in one convenient manner when applying the same, for example, to the cooking of canned food products I form my pressure retort in which the processing is carried out, after the manner of that described in the specification of British Patent No. 379,460, although it will be understood that the invention is applicable to other forms of pressure retort.

The main container *a* is coupled by flanged connections *b* or otherwise to a supplementary cooling tank *c*, the flange connections being arranged on short mouthpieces on both the main and supplementary tanks or the two being otherwise suitably connected so that they are in free communication with one another; thus, steam admitted to one will circulate in both and any pressure existing in one must necessarily co-exist in the other, the two tanks in fact forming integral parts of one container.

The processing part of the apparatus is in the main container *a* whereas the supplementary cooling tank may serve a dual purpose since it may conveniently carry the rotary sliding or other valves *d e* through which the cans are fed into and discharged from the machine, and it also contains the cooling medium *f* for reducing the pressure inside the cans to a safe limit before ejecting them to the atmosphere and some means by which the cans are fed through the cooling medium.

In the particular construction illustrated the cooling medium is water contained in the leg *c'* or lower portion of the cooling tank *c*, the upper level of the water being, say, six inches or other convenient distance from the top of the leg. The leg also contains a vertical conveyor comprising, for example, an endless flexible member *g* having shelves *h* thereon by which the cans are carried down through the cooling medium and then upwards again to a discharge chute *i* whence they pass to the valve *e* by which they are ejected to atmosphere or elsewhere and a suitable chute *k* and/or conveyor *l* is provided in the opening between the cooker and cooler to transfer the cans from the cooker to the conveyor within the cooler.

Since the steam in the cooker is free to impinge on top of the water in the cooler the water itself is also under pressure to the same degree as the pressure within the cooker and the effect of the steam is to produce a hot zone at the top of the water accompanied by a certain amount of turbulence at this point but owing to the relatively small surface of water exposed to the action of the steam compared with the volume of water actually in the cooler and owing to the comparatively slow heat penetration into the water the depth of the hot zone amounts to only a few inches (perhaps of the order of six inches) with the normal steam pressure used. Such hot zone effectively insulates the cooler from the steam in the steam space and reduces to a negligible amount the steam condensation. It is, however, clear that if no cold water were admitted to the cooler the hot zone would gradually increase in depth thus decreasing the effectiveness of the cooling medium and I therefore provide means such as the inlet *m* by which cold water under pressure may be admitted to the bottom of the tank while at the same time providing a syphon *n* or other suitable arrangement for maintaining the level of water in the cooler substantially constant.

The valve *l'* controlling the ingress of cold water is preferably thermostatically controlled so that in this way the temperature of the cooling water in the cooling tank may be maintained approximately constant. If desired the thermostatic controls may be provided at different levels in the cooler.

In processes where the temperature inside the

cans (when such are admitted to the cooler) is, say, 180° to 190° F. the actual time allowed for pressure cooling may be of the order of three-quarters of a minute if the temperature of the cooling water be maintained at about 100° F. and while it will be observed that with the arrangement described the cans on emerging from the cooler pass through the hot zone and into the steam space before reaching the discharge valve, the time taken for such passage is very small so that the cans absorb only an infinitesimal amount of heat and in consequence the efficiency of the cooling is not thereby impaired.

In general the cans will have to undergo a further cooling after having been preliminarily cooled by the device described, and any suitable means may be adopted for this purpose.

It will be understood that the invention essentially consists in combining a cooker and cooler in a single unit with means for isolating the cooling medium from the heating medium if this be of a condensible nature such as steam, and the invention is not limited to any particular construction or arrangement of cooker nor to the precise arrangement described for conveying the cans through the cooler and I may modify the thermostatic controls when such are adopted and the arrangements provided for admitting the cans to the apparatus and discharging the same therefrom depending upon the purpose for which the apparatus is to be employed or any practical requirements that may have to be fulfilled.

I claim:

1. Apparatus for pressure cooking and subsequent cooling of hermetically sealed cans comprising in combination a cooking chamber and a cooling chamber adapted to contain a cooling medium immediately adjacent the cooking chamber, the two chambers having free communication with each other at the top and the cross sectional area of the cooling chamber being small compared with its depth so that only a relatively small surface of the cooling medium is exposed to the heat of the cooking chamber, the cooling chamber being closed except for its communication with the cooking chamber.

2. Apparatus for pressure cooking and subsequent cooling of hermetically sealed cans comprising in combination a cooking chamber, a cooling chamber adapted to contain a cooling medium in free communication at the top with the cooking chamber so that both chambers are subject to the same pressure, can transfer means connecting the two chambers and conveyor means within the cooling medium for conveying the cans therethrough and having a portion extended above the surface of the cooling medium, the cross sectional area of the cooling chamber being small compared with its depth so that only a small surface area of the cooling medium is exposed to the heat of the cooking chamber and the conveyor extending vertically within the cooling chamber so that the cans enter the cooling medium at the surface thereof and emerge from the cooling medium into the space above, the cooling chamber being closed except for its communication with the cooking chamber.

3. Apparatus for pressure cooking and subsequent cooling of hermetically sealed cans comprising in combination a cooking chamber, a cooling chamber adapted to contain a cooling medium, the two chambers being in open communication with each other at the top so that both chambers are subject to the same pressure while the cooling chamber has a small cross sectional area so that only a small surface area of the cooling medium is exposed to the heat of the cooking chamber, means for conveying the cans through the cooling chamber, means for admitting fresh cooling medium to the cooling chamber and means for withdrawing an equal quantity of spent medium, the cooling chamber being closed except for its communication with the cooking chamber.

4. Apparatus for pressure cooking and subsequent cooling of hermetically sealed cans comprising in combination a cooking chamber, a laterally adjacent cooling chamber adapted to contain a cooling medium, transverse can transfer means connecting the upper portions of the two chambers, the cans entering and leaving the cooling medium at the upper surface thereof, means for admitting fresh cooling medium to the cooling chamber and means for withdrawing spent medium from the surface thereof, the cooling chamber being closed except to the cooking chamber with which the cooling chamber has free communication so that both chambers are subject to the same pressure.

5. Apparatus for pressure cooking and subsequent cooling of hermetically sealed cans comprising in combination a cooking chamber, a laterally adjacent cooling chamber adapted to contain a cooling medium, the adjacent walls of the two chambers being spaced apart, transverse can transfer means connecting the two chambers, an endless can conveyor extending vertically within the cooling chamber and the cooling medium therein and having a portion extended above the surface of the cooling medium, the cans being admitted to the upper surface of the cooling medium and emerging therefrom into the space above and the two chambers having open communication with each other at the top so that both chambers are subject to the same pressure, means for admitting fresh cooling medium to the cooling chamber and means for withdrawing spent medium from the surface thereof, the cooling chamber being closed except for its communication with the cooking chamber.

6. Apparatus for pressure cooking and subsequent cooling of hermetically sealed cans comprising in combination a cooking chamber, a laterally adjacent cooling chamber adapted to contain a cooling medium, the adjacent walls of the two chambers being spaced apart and the cross sectional area of the cooling chamber being small compared with its depth so that only a small surface of the cooling medium is exposed to the heat of the cooking chamber, the two chambers having open communication with each other at the top thereof so that both chambers are subject to the same pressure, a transverse can transfer means connecting the two chambers at the top thereof, an endless can conveyor extending vertically within the cooling chamber and the cooling medium therein and having a portion extended above the surface of the cooling medium, the cans entering the cooling medium at the upper surface of the cooling medium and emerging therefrom into the space above, means for admitting fresh cooling medium to the cooling chamber and means for withdrawing spent medium from the surface thereof the cooling chamber being closed except for its communication with the cooking chamber.

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