Dec. 23, 1941. L. THOMAS 2,267,345

COOKER

Filed June 12, 1939

Fig. 1.

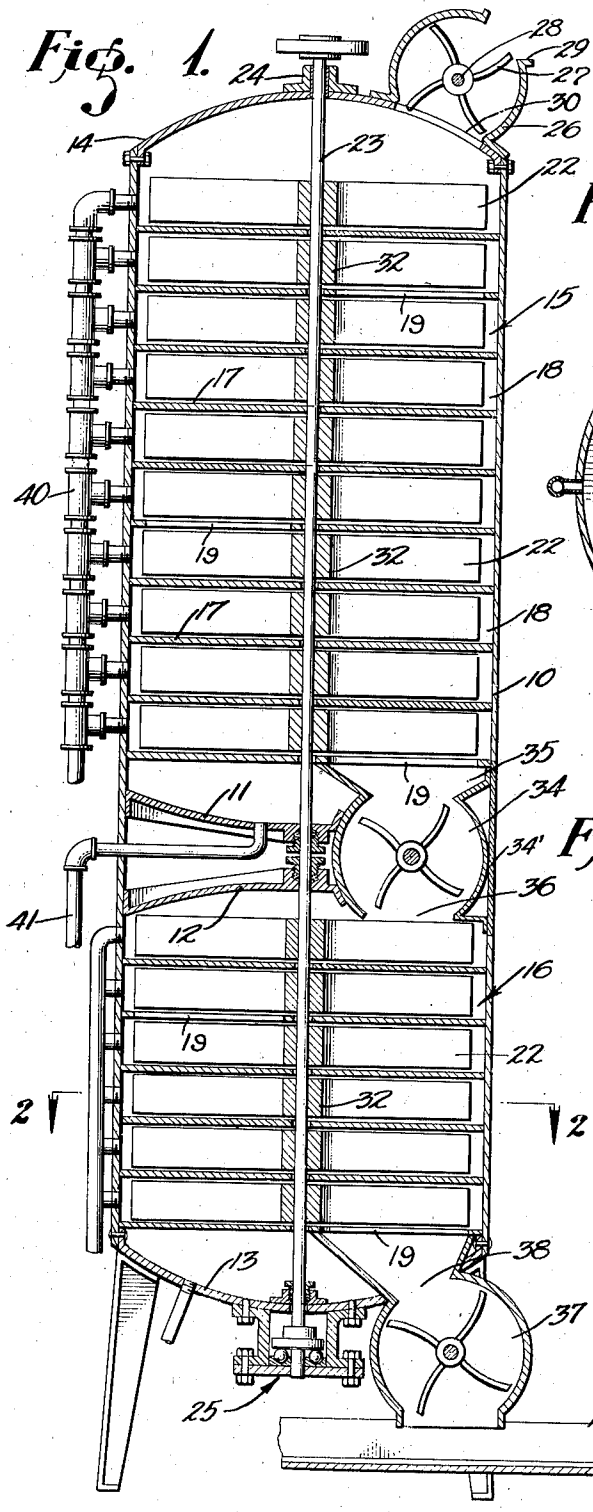


Fig. 2.

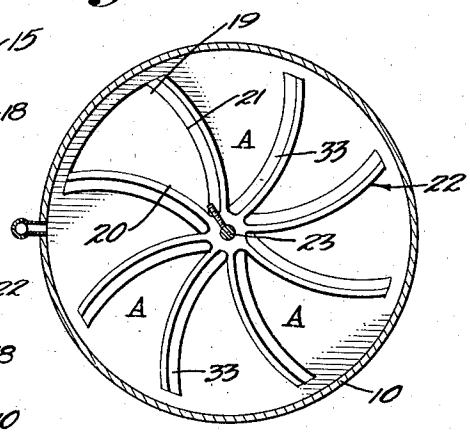
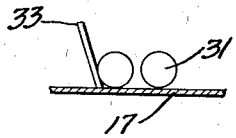


Fig. 3.



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COOKER

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2 Claims. (Cl. 126—272)

This invention relates to canning machinery and particularly pertains to a cooker.

In the canning of various vegetables, fruits, meats and other food products it is common practice to pass the sealed cans through apparatus within which the food products are cooked or sterilized. In connection with some products and particularly fish, such as tuna, which is cooked before packing and re-heated after being sealed within the cans, there is a tendency for the contents of the can to be scorched. Heretofore, it has been common practice to pass the cans through the cooker while they are being rolled. This disturbs the contents of the can so that it will move or change position with relation to the cylindrical wall of the can but does not effectively disturb the contents of the can in contact with the ends of the can, thereby making it more probable that the material within the can will scorch at the ends of the can.

The present invention contemplates a vertically arranged cooker and cooler which insures that the cans will be fed through the machine in what might be termed a random action so that they may roll on their sides, stand on their ends and be dropped from course to course of the apparatus in a manner to forcefully disturb the contents of the can and insure that it will not have a tendency to stick to any wall of the can, either a side wall or an end wall, and it is a further object of the present invention to provide means whereby the cans will be fed through the machine at a maximum speed and with a minimum amount of wear so that the tin will not be worn from the can walls and so that the cans will not be dented or otherwise objectionably damaged. Another object of the present invention is to disturb the contents of the can so that a uniform heat exchange action will take place between the contents of the can and the surrounding medium, whether it be a heating medium or a cooling medium.

The present invention contemplates a provision of a cylindrical retort having a central vertical axis and being formed with a plurality of compartments arranged in superimposed relation to each other and successively communicating whereby cans may be fed downwardly from compartment to compartment in a manner to agitate the contents of a can and to properly feed the cans without wear or other damage to them.

The invention is illustrated by way of example in the accompanying drawing, in which:

Figure 1 is a view in central vertical section showing a cooking retort and a cooler embodied in one unit.

Fig. 2 is a view in transverse section showing one arrangement of an impeller structure and particularly disclosing the cycloidal formation of the impeller blades and the feed opening through one of the partitions.

Fig. 3 is an enlarged view in end elevation showing the inclined pitch of one of the impeller blades and indicating a fragmentary portion of a partition over which it travels.

Referring more particularly to the drawing, 10 indicates an outer cylindrical shell having a central axis extending vertically. The shell as here disclosed is provided with intermediate heads 11 and 12, a lower head 13 and an upper head 14. The heads 11 and 14 combine with the shell to form a retort compartment 15 while the heads 12 and 13 combine to form a cooling compartment 16. It is understood that while the invention is here illustrated as embodying the construction of a cooking retort and a cooling compartment in one shell that the present invention is not so limited, and is more particularly concerned with a method and means for feeding the cans from point to point within the structure.

The retort compartment 15 is divided at different heights by horizontal partitions 17. These partitions thus form a plurality of compartments 18. Each partition is formed with an opening 19 through it which is substantially sector shape, the opposite edges of the opening being curved.

As shown in Fig. 2 of the drawing, the area of the passageways 19 is such as to represent substantially one-eighth of the area of each partition. The openings 19 through successive partitions are progressively arranged circumferentially of the central axis of the shell whereby cans falling through one opening 19 in a partition 17 will fall onto the floor of the next compartment and will not fall directly through more than one opening at a time. By this arrangement cans fed into one compartment 18 will be retained in this compartment until the can has traveled seven-eighths of the circumference of the compartment, after which it is discharged into the next succeeding compartment.

Disposed within each compartment 18 and between the partitions 17 are star wheels 22 by which cans may be moved over the face of the partition member 17 upon which the cans rest. The star wheels are separately mounted upon a vertical drive shaft 23 which extends longitudinally through the shell and is supported in

suitable bearings 24 and 25. The shaft is driven by any desired mechanism and is preferably driven continuously, since the excessive weight of the cans which are moved over the partitions will create an amount of friction which could not be easily overcome if the cans came to rest during transit.

Mounted at the top of the shell 10 and communicating with the uppermost compartment 18 is a valve housing 26 within which a rotary can star wheel 27 is mounted. This star wheel is carried on a horizontal shaft 28 and is suitably driven to pass cans into the upper end of the shell 10 from a can run 29 and through a passageway 30. The arms of the star wheel are spaced apart a sufficient distance so that a plurality of cans 31 may be caught in each pocket of the star wheel with the cans lying in a random arrangement, after which the cans are dumped into the uppermost compartment 18.

The star wheels 22 which are carried upon the vertical shaft 23 have a central hub structure 32 and arms 33. The arms are disposed in a general radial direction, although they are arcuate, the arc substantially intersecting the rotary axis of the shaft 23. The formation of the arms 33 agrees substantially with the cycloidal shape of the edges 20 and 21 of the opening 19 through the partition 17 and the circumferential distance between the outer ends of the arms is substantially that represented by the circumferential points of the outer edge of the openings 19. This arrangement has been used for the definite purpose of holding the mass of cans against centrifugal action as the star wheels 22 rotate and for insuring that they will spill through the openings 19 from compartment to compartment in a manner to disturb the arrangement of the cans for the purpose herein set forth. The arcuate formation of the blades 33 of the star wheels 22 causes these blades to have a hooking action which would hold the cans in a mass and would tend to prevent them from moving outwardly along the blades by centrifugal force and being dragged along the wall of the shell 10. The result will be that in the present instance the cans which are standing on ends will easily slide over the surface of the partitions 17 and the cans which are lying on their sides will roll along the partitions 17. This hooked arrangement thus makes it possible for the cans to arrange themselves at random and to thereafter be moved in a body to the discharge opening 19 with a minimum amount of friction and thus a minimum power requirement for driving the shaft 23. As shown in Fig. 3 the blades 33 of the star wheels 22 are inclined toward the vertical in a counter direction to the travel of the cans so that the cans will be properly driven ahead on the partitions 17 and an action exerted tending to lift the weight of the can off of the partitions to facilitate in feeding the cans forwardly with a minimum friction.

In the form of the invention shown in Fig. 1 of the drawing a cooler 16 is disposed beneath the cooker retort 15. A valve 34 controls the passage of cans from the retort 15 through an opening 35 in the end wall 11 of the retort and through an opening 36 into the cooler 16. The shell is provided with removable cover members 34' permitting access to the valve structure 34. In the cooling structure the cans will have time to cool as they are fed through the machine and are allowed to jostle as they fall from compartment to compartment. A valve structure 37 is provided adjacent the bottom of the cooler 16 and receives the cans from an opening 38, thereafter delivering them to a suitable conveyor 39 by which they are carried to a desired point of discharge.

In operation of the invention filled and sealed cans are delivered to the valve housing 26 through a can run 29. The valve star wheel 27 within the housing 26 is driven at a rate of speed which will permit a desired number of cans to accumulate in each pocket of the structure as the star wheel rotates. As each of the pockets moves to register with the opening 30 in the head 14 of the shell 10 the cans will be discharged from the valve housing and will fall into the spaces occurring between the arms 33 of the uppermost star wheel 22. Such a pocket is indicated at A in Fig. 2 of the drawing. The cans will then move around on the uppermost partition floor until coming into register with the discharge opening 19 in the partition 17 at which time the cans will fall through this opening and between the blades 33 of star wheel 22 in the next succeeding subjacent compartment 18. The cans are then fed around this compartment and their discharge through an opening 19 effected. This operation continues throughout the height of the retort and until the cans finally reach the discharge opening 35 where they are received by the valve included within the housing 36. At this point it is understood that the cans may be carried away on a conveyor or delivered to the top of the cooler 16. In any event, it will be evident that during the transit of the cans through the retort the cans have been dropped from partition to partition of the succeeding compartments 18 and re-arranged. This insures uniform cooking, and placement of the cans within the machine, and also insures uniform disturbance of the contents of the can so that the contents will not scorch and stick to the sides of the cans during the cooking operation. It will be further evident that since the cans when filled with tuna carry a quantity of oil this oil will be distributed through the contents and along the walls to prevent sticking of contents to the walls.

A heating medium such as steam may be delivered through a manifold 40 to the various compartments 18 and a drain 41 may be utilized to withdraw the condensate from the retort. It will also be understood that, if desired, pipes and spray nozzles may be placed within the various compartments of the cooler so that the cans will be cooled.

Attention is directed to the fact that due to the present arrangement a large number of cans may be fed through the machine continuously, for example, approximately ten cases of cans are present in each of the compartments when the machine is operating at capacity. It will also be evident that due to the present arrangement the machine does not have to be changed or adapted to accommodate cans of various sizes or shapes, thus making it possible to quickly feed any type of can into and through the machine. Another point of advantage is that the present vertical arrangement as here shown eliminates the use of a large amount of valuable floor space and gives a maximum capacity in a relatively small floor area.

It will thus be seen that by the method here disclosed it is possible to control the speed of travel of cans through the retort, thus establishing a predetermined cooking period, and that

furthermore the cans when spilled from compartment to compartment will bring about agitation suitable to prevent sticking of the contents of the cans at any point and at the same time insuring uniform penetration of the heat through the mass of material sealed in the can.

While I have shown the preferred form of my invention as now known to me, it will be understood that various changes may be made in combination, construction and arrangement of parts by those skilled in the art, without departing from the spirit of my invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A cooking retort comprising a vertical shell, a can feeding valve at the top thereof, a can discharge valve at a bottom thereof, means for introducing a heating medium into the shell, a plurality of partitions dividing the shell into a series of superposed compartments, each of said partitions being formed with a discharge opening therethrough, said discharge openings being sector-shaped with curved edges and the openings in the partitions between successive compartments being offset with relation to each other throughout the length of the structure conveying means in each of said compartments for receiving cans from the discharge openings and moving said cans over a partition while supported thereon whereby when the cans reach a discharge opening they will fall through the opening into the next succeeding compartment, said conveying means including a plurality of curved arms agreeing in contour with the curved edges of the discharge openings, and each having a concaved face disposed in the direction of movement of the conveyor, the conveyor blades being inclined from the vertical in a direction counter to movement of the conveyor.

2. A cooking retort comprising a vertical shell, a cooking compartment at the top of said shell, a cooling compartment at the bottom of said shell, a can feeding valve at the top of said shell and in communication with said cooking compartment, a cam discharge valve at the bottom of said shell communicating with said cooling compartment, means for introducing a heating medium into said cooking compartment, a plurality of partitions dividing the shell into a series of superposed compartments, each of said partitions formed with a discharge opening therethrough, said discharge openings being sector-shaped with curved edges and the openings in successive compartments being offset with relation to each other throughout the length of the structure, conveying means in each of said compartments for receiving cans from the discharge openings and moving said cans over the partitions separating said compartments while supported thereon whereby when the cans reach a discharge opening they will fall through an opening into the next succeeding compartment, said conveying means including a plurality of curved arms agreeing in contour with the curved edges of the discharge openings and each having its concaved face disposed in the direction of the movement of the conveyor, the conveyor blades being inclined from the vertical in a direction counter to movement of the conveyor, the discharge opening of the bottom compartment within the cooling chamber communicating with the can valve of the cooling chamber whereby said cans will be moved out of the shell at the completion of the cooking and cooling operation.

LEE THOMAS.