Sept. 5, 1939. F. T. JENKINS 2,171,876

RETORT DOOR

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Fig. 1

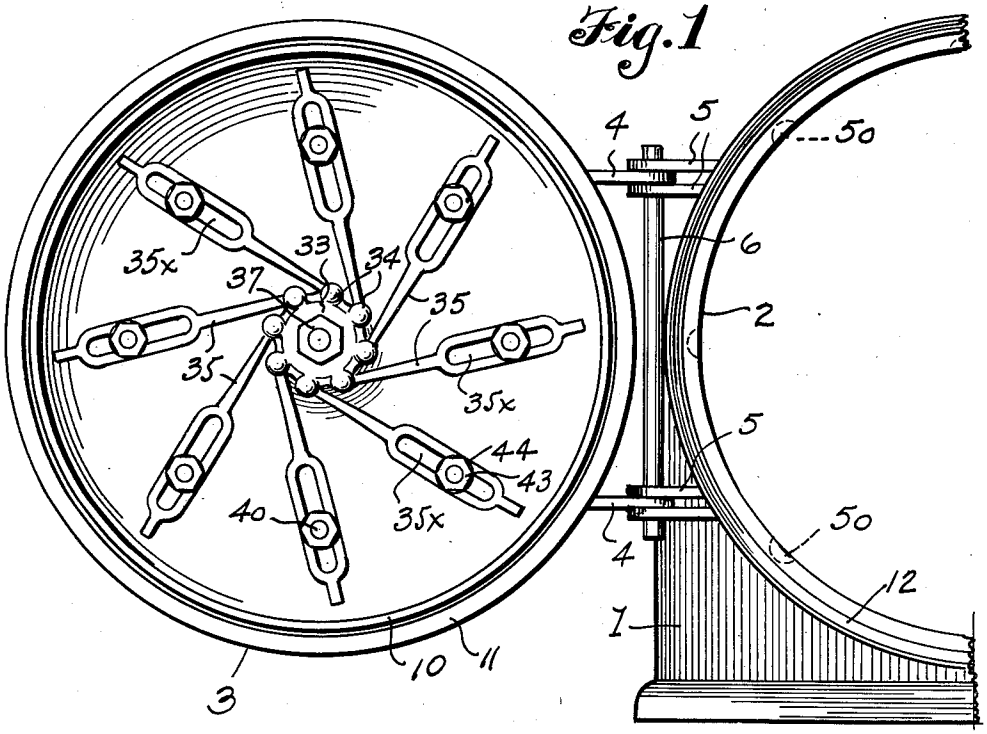
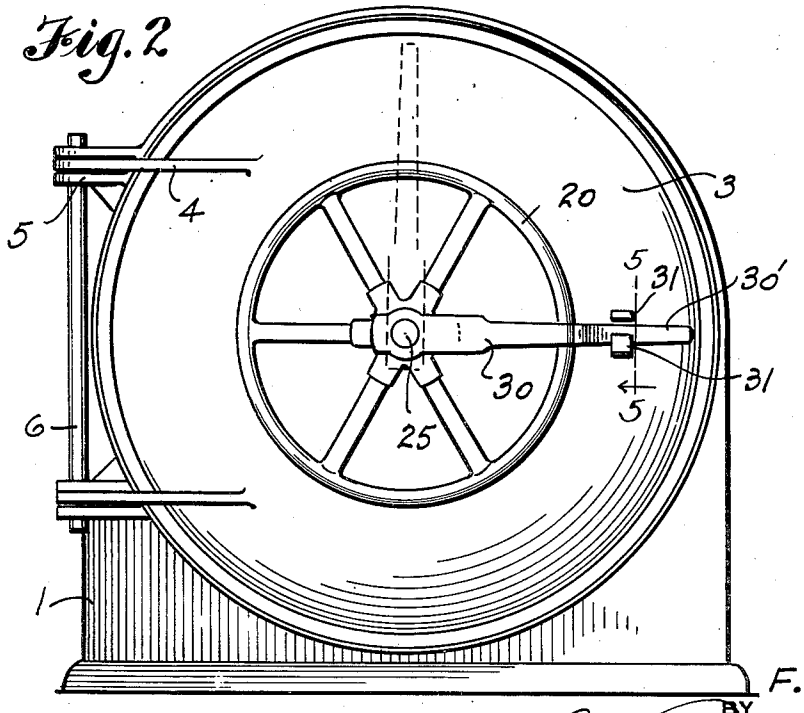


Fig. 2



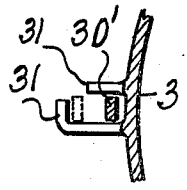


Fig. 3

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Fig. 4

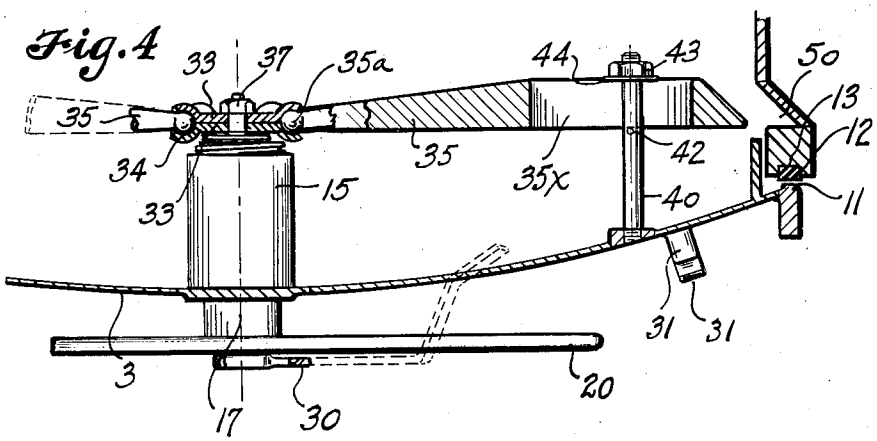


Fig. 5

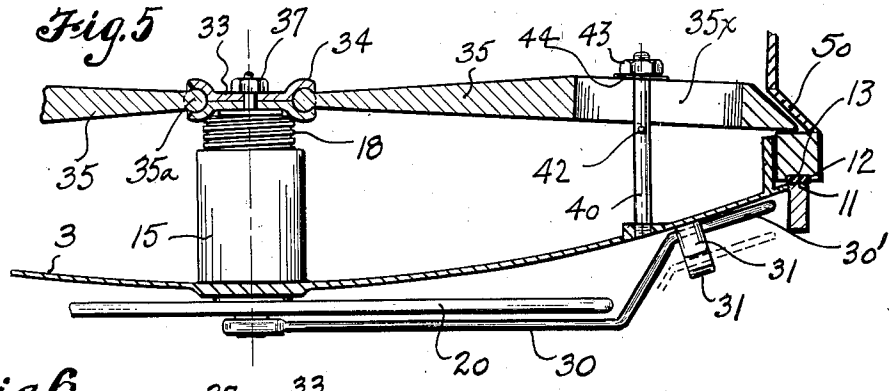
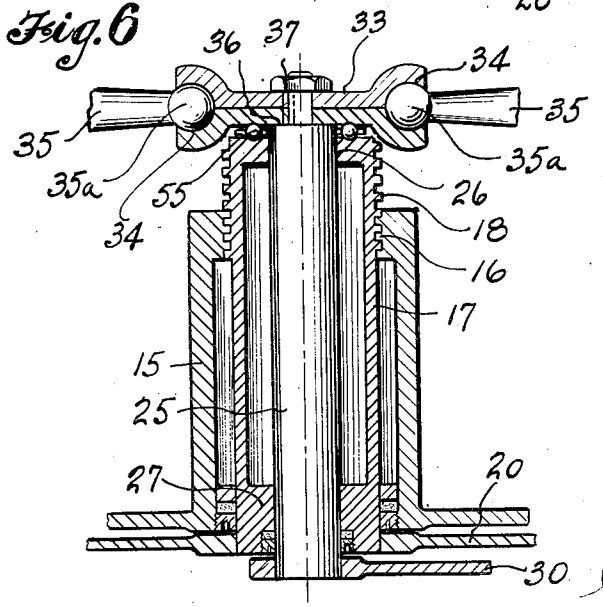


Fig. 6



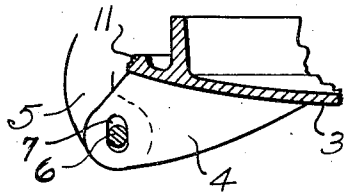


Fig. 7

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UNITED STATES PATENT OFFICE

2,171,876

RETORT DOOR

Fredrick T. Jenkins, Seattle, Wash.

Application February 25, 1938, Serial No. 192,546

4 Claims. (Cl. 220—57)

This invention relates to improvements in retort doors and has reference more particularly to retorts of that character now quite extensively used for the cooking therein of products in sealed cans by the application of steam under high temperature and pressure into the retort.

Explanatory to the present invention, it will here be stated that retorts of the character to which the present invention applies are generally of considerable size and are made to withstand exceedingly high internal pressures. Also, the entrance to such a retort is quite large; for example, from one to six feet in diameter in order to permit the movement therethrough of small truck loads of products into and from the retort. The doors for closing these retort openings are generally hinged to swing between open and closed positions and are equipped with means whereby they may be locked and sealed and closed in pressure tight joints.

In releasing and opening the doors of retorts of this kind, after a cooking operation by use of steam under pressure, precaution must be taken to see to it that the door is not released for opening while any appreciable amount of steam under pressure remains in the retort; the reason for this being that injury to the operator, or persons near, might result from the door being blown open and steam and hot water discharged. Heretofore, various means have been provided to safeguard the operator against such injury, but such means have, generally, been inadequate or unsatisfactory for various reasons such, for instance, as being too expensive, cumbersome or not easily operated.

In view of the above, it has been the principal object of this invention to provide a novel means for mounting and locking a retort door so that it cannot be released for opening except after a certain movement through a position of adjustment that permits an escapement from the retort of internal pressure, thus insuring the operator against possible damage or injury.

It is also an object of this invention to provide an improved and relatively inexpensive means for locking the door of a retort in closed position, and which lock remains effective during that period of adjustment designed for the escapement of internal pressure from the retort.

More specifically stated, the present invention resides in the provision of means in conjunction with door locking devices for adjusting the locked door away from its sealed position to permit the escapement of pressure but without releasing the door for opening, and which arrangement requires that the pressure releasing adjustment be to a definite extent before the door locking means may be actuated to position for opening the door.

Still further objects of the invention reside in the details of construction of the various parts; in their combination and in the mode of operation as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a view showing, in elevation, the inside of the retort door in open position, and with the locking bars retracted.

Fig. 2 is a view showing, in elevation, the outside of the door with the release lever in locked position.

Fig. 3 is a detail on section 3—3 in Fig. 2.

Fig. 4 is a horizontal, sectional view of the door, and an adjacent part of the retort, showing the locking levers released for opening the door.

Fig. 5 is a similar view with the door locked.

Fig. 6 is an enlarged, sectional detail of the door lock lever adjusting means.

Fig. 7 is a detail of the hinge construction.

Referring more in detail to the drawings—

1 designates, in general, a retort designed for the cooking therein of canned products by use of steam under pressure. 2 designates a circular opening into the retort and 3 a door adapted to close the opening.

As will be observed best in Figs. 1 and 3, the door 3 is circular and is equipped at one side with spaced flanges or hinge ears 4 adapted to cooperatively overlap with hinge ears 5 extended from the retort, to receive a vertical hinge pin 6 therethrough by which the door is supported to swing between open and closed positions. Also, it will be observed by reference to Fig. 7, that the hinge ears are slotted as at 7 to receive the pin, and these slots are so directed as to permit a direct inward and outward adjustment of the door, for a purpose that will presently be understood.

Referring now particularly to Fig. 5, it is to be observed that the door 3 is slightly outwardly dished and is formed about the periphery with an inwardly directed flange 11 adapted, when the door is closed, to seat tightly against a joint sealing gasket 12 set in a channel 13 about the opening 2.

Rigidly mounted on the door 3, coaxially thereof, and extending inwardly therefrom, is a tubular bearing sleeve 15 which, within its inner end portion, is internally threaded, as at 16 and mounts therein a smaller, tubular bearing sleeve 17 which extends, at its outer end, beyond the front face of the door, and, at its inner end, extends beyound the inner end of sleeve 15. This sleeve 17 is threaded, as at 18, from its inner end to approximately a medial point, and its threads mesh with the threads 16 of sleeve 15 for a relative inward or an outward adjustment of the sleeve 17 by rotation thereof in opposite directions. For this purpose, there is fixed on the outer end of the tubular sleeve 17, a wheel 20 of substantial diameter.

Extended axially through the sleeve 17 is a shaft 25 rotatably mounted by bearings 26 and 27 that are formed at the opposite ends of sleeve 17 respectively; these bearings being of any suitable kind and pressure-tight in order to prevent leakage of steam from the retort.

Fixed to the outer end of the shaft 25 is a radially extending lever 30 for rotating the shaft, and this lever, near its outer end, is bent inwardly to provide a handle portion 30' that will lie closely to the outer surface of the door for disposition between two spaced studs, or steps 31—31 as a means of locking the lever against that movement required for rotating shaft 25.

Fixed coaxially upon the inner end of the shaft 25, are two circular, superimposed disks 33—33, formed at their peripheries with opposedly facing ball sockets 34 which coact to form a plurality of retaining sockets for the ball shaped ends 35a of a like number of door lock levers 35. As shown best in Fig. 4, the two disks 33—33, are keyed on a reduced end portion of shaft 25 and are clamped against a shoulder 36 on the shaft by a holding nut 37 that is threaded onto the outer end of the reduced portion.

In the present illustration, eight of the door locking levers 35 are employed, and these extend radially of the door, each with its inner end connected by the ball and socket members, with the disks. Each lever 35 is supported near its outer end by a post 40 mounted rigidly upon and extending inwardly from the door. Also, each lever has a longitudinal slot 35x formed therein through which the outer end portion of the post extends, and each post mounts a cross pin as at 42 upon which the lever is slidable. Also, a nut 43 is threaded onto the outer end of each post to retain the lock lever thereon, and washers 44 are disposed on the posts between the levers and nuts.

The outer end portion of each lock lever is adapted to be engaged within its individual seat 50 in the retort wall adjacent the opening 2, to lock the door against opening movement.

To make the action of the lock levers easier, antifriction thrust bearings 55 of a suitable kind are interposed between the end surface of sleeve 17 and the inner disk 33, as seen in Fig. 6.

Assuming now that the door is so constructed and mounted, and that it is in closed and sealed position, as indicated by its showing in Figs. 2 and 5, it is released and opened in the following manner:

First, the wheel 20 is rotated in a direction whereby the sleeve 17 is moved longitudinally outward. This shifting of the sleeve causes the several levers 35 to pivot on their supporting posts so that their outer end portions, which are then engaged in the seats 50 about the opening 2, will operate to pry the door outwardly.

As the door is thus shifted outwardly, the seal of its rim portion 11 with the gasket 12 is broken and steam pressure is allowed to escape through this loose joint about the door. However, the door is still held against opening so long as the outer ends of the lock levers are retained in the seats. The escapement of internal pressure may be expedited by adjusting the door to its maximum outer limit before swinging.

After internal pressure has thus been allowed to escape from the retort through the loose joint opened up about the door, then the lock levers 35 are all simultaneously retracted from their seats 50 to release the door for opening. This retracting of the levers is effected by rotation of shaft 25 by the lever 30; it being understood that this lever cannot be used to rotate the shaft until the door has been adjusted outwardly a distance sufficient that the handle end 30' of the lever is moved in the clear of the retaining studs 31—31. Swinging of the lever 30 from the full line position to the dotted line position, as seen in Fig. 2, rotates the disks 33 to draw the levers to their retracted positions, as seen in Fig. 1, and it is apparent that by so doing, the levers will be retracted from their seats 50 to permit the door to be opened.

In closing the door, it is swung on its hinges to such position that the outer ends of the lock levers are in position to be seated in their respective seats 50. Then the lever 30 is swung back to locking position to rotate disks 33 and thus extend the lock levers into their seats. Finally, the wheel 20 is rotated to shift the sleeve 17 inwardly, and thus, through the leverage obtained and applied to the door through the pull on the posts 40, the door will be pulled inwardly to sealed position. The extent to which the door is tightened is dependent upon the distance inwardly toward which the sleeve 17 is shifted.

With the lock so constructed, it is quite apparent that the door cannot be swung open until after an initial outward adjustment that allows an escape of internal pressure. Also, the devices provided permit a tight and secure closing of the door to retain pressure in the retort.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is—

1. A retort comprising a housing formed with an opening, a door hinged on the housing to swing between open and housing sealing positions, a guide bearing mounted in the door substantially at a central location, a sleeve mounted in the bearing and having a threaded connection therewith for inward or outward adjustment, a shaft rotatably contained in the sleeve and extending to the inner and outer sides of the door, a plurality of door locking levers at the inside of the door, each lever having a pivotal connection at its inner end with the inner end of the said shaft eccentrically of its axis of rotation, and extending substantially radially of the door, fulcrum supports on the door mounting the outer end portions of the levers thereon for pivotal and longitudinal movement, a lever on the outer end of the shaft whereby it may be rotated to effect a simultaneous inward or an outward shifting of all lock levers from or into holding contact with the housing about the opening, and a wheel mounted on the sleeve at the outside of the door whereby it may be rotated to effect an inward adjustment of the sleeve whereby to cause an inward clamp-

ing of the odoor, or to effect an outward adjustment whereby to cause an outward shifting of the door from sealing contact with the housing.

2. A device as in claim 1 wherein the levers are longitudinally slotted along their outer end portions and said fulcrum supports comprise posts fixed on the door and extending through the slots to guide the travel of the levers, and means is provided on the posts below and above the levers to retain them pivotally on the posts.

3. A device as in claim 1 wherein spaced abutments are provided on the outside of the door to receive the shaft rotating lever therebetween incident to locking and sealing the door, and from which said lever cannot be romoved when the door is locked, except by an outward adjustment of the door made by an outward adjustment of the sleeve to such extent that the said lever is displaced outward from between said abutments.

4. A device as in claim 1 wherein a pair of disks, in face to face contact, are fixed on the inner end of said locking shaft and are formed with cooperating registering sockets, and said lock levers are provided with ball ends contained pivotally in cooperating sockets.

FREDRICK T. JENKINS.