Feb. 7, 1961 H. C. JENNINGS, JR 2,970,718

STERILIZER DOOR

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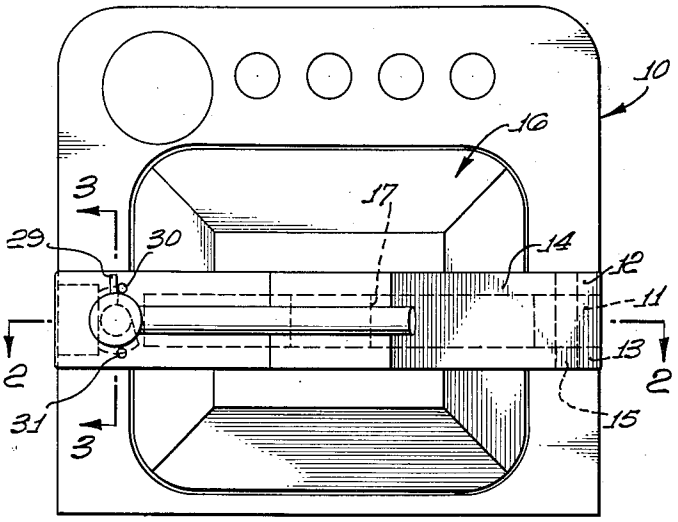

FIG. 1.

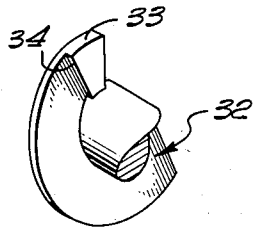

FIG. 5.

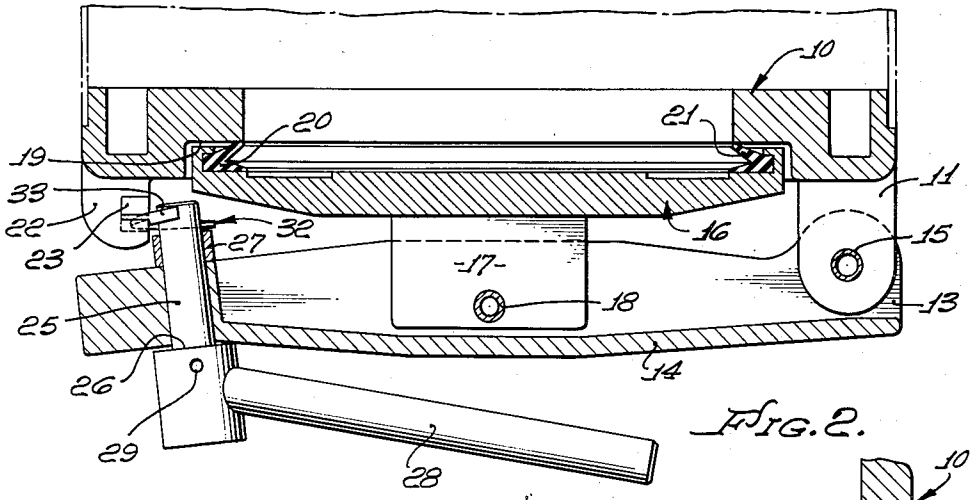

FIG. 2.

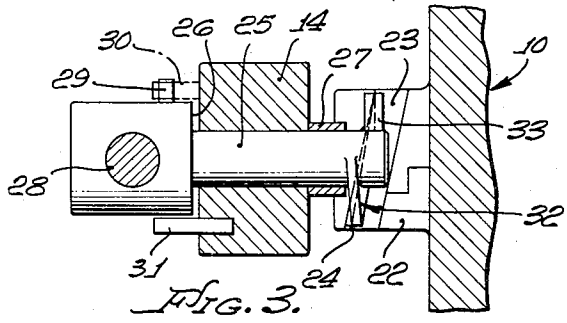

FIG. 3.

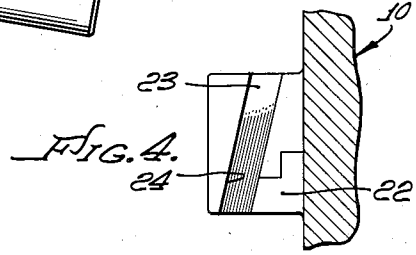

FIG. 4.

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STERILIZER DOOR

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2 Claims. (Cl. 220—55.3)

This invention relates to improvements in doors for sterilizers and other vessels designed to contain fluids under high pressures.

Explanatory of the present invention, sterilizers have heretofore been provided which have openable doors through which articles to be sterilized can be placed in the sterilizer. When the sterilizer has been filled with the articles to be sterilized the door is closed and steam is either supplied to the sterilizer or generated therein and maintained therein under high pressure the required time to accomplish sterilization. Thereafter, the pressure is reduced to atmospheric pressure or substantially so and the door opened and the sterilized articles removed from the sterilizer.

It frequently occurs, however, that the door is opened prior to the time that the steam pressure within the sterilizer has been reduced to atmospheric pressure with the result that the door may be thrown open violently and the escaping steam produces scalds or burns.

An object of the present invention is to provide a door for sterilizers and similar pressure vessels which is so designed that it is impossible to open the door until the pressure within the vessel has been reduced to atmospheric pressure or substantially so. As long as pressure remains in the sterilizer of any substantial magnitude this pressure being effective on the door prevents the turning of its release mechanism into a releasing position. However, whenever the pressure within the sterilizer reaches atmospheric pressure or substantially so, the door can then be opened for the admission of articles to be sterilized or the removal of sterilized articles from the sterilizer.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a view in front elevation of the sterilizer door, the door being shown in its closed position;

Fig. 2 is a horizontal section taken substantially upon the line 2—2 upon Fig. 1 in the direction indicated;

Fig. 3 is a vertical section taken substantially upon the line 3—3 upon Fig. 1 in the direction indicated;

Fig. 4 is a partial view in vertical section illustrating details of the keeper for the door; and

Fig. 5 is a perspective view illustrating a portion of the latch for the door.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, 10 indicates the door frame of a sterilizer. At one side of the door frame there is a knuckle 11 above and below which there are ears 12 and 13 on a bar 14 which is pivotally connected to the knuckle by a pivot pin 15 enabling the bar 14 to be swung between door-opening and door-closing positions.

The door for the sterilizer is indicated at 16 and has a boss 17 on its back which is pivotally connected to the bar 14 by means of a pivot pin 18. This pivotal connection enables the door to self-adjust itself with relation to a seat 19 on the door frame.

Near the marginal edges of the door 16 there is a channel designed to partially receive a resilient seal 20. This seal is approximately V-shaped in cross-section having a flange 21 designed to resiliently press against the seat 19. The seal in effect performs a double function. One function of the seal is to prevent leakage around the door between the door and its seat 19. The other function of the seal is to yieldably urge the door 16 outwardly or away from its seat 19.

In accordance with the present invention, a keeper 22 is arranged on the door frame 10 on the opposite side thereof from knuckle 11. This keeper has an inclined groove 23 formed on its inner face presenting a surface or shoulder 24 that is engageable by the latch on the bar 14 which holds the door in closed position. The latch is in the form of a rocker shaft 25 that is rotatably mounted in the swinging end of the bar 14 for rotation about an axis extending generally in the direction of swing of the swinging end of bar 14, and held against axial movement between a shoulder 26 and a collar 27 thereon. This rocker shaft can be rotated by means of a handle 28 through approximately 180°. A pin 29 on the rocker shaft is engageable with upper and lower pins 30 and 31 on the bar 14 at each of its extreme positions of rotation.

On the inner end of the rocker shaft 25 there is formed a partial or half-thread or helical cam 32. This partial thread or helical cam extends approximately one-half way around the rocker shaft 25. At one end of the half-thread or helical cam it is thickened as at 33 to provide a shoulder 34 engageable with the inner face of the keeper 22 as illustrated on Fig. 2.

When the door 16 is in closed position as illustrated, fluid pressure existing in the sterilizer is effective on the inner face of the door. This pressure is also effective on the flange 21 of the rubber seal to press this flange into firm engagement with the seat 19 and thus prevent leakage around the edges of the door. The pressure that is effective on the inner face of the door 16 urges the door outwardly with a considerable force, pressing the half-thread or helical cam 32 into firm engagement with the shoulder 24 on the keeper 22. While this condition continues to exist the engagement of the shoulder 34 with the inner face of the keeper 22 prevents rotation of the rocker shaft 25 from the latching position shown into releasing position. However, when the pressure within the sterilizer is reduced to atmospheric pressure or substantially so, it is then possible to press the bar 14 and the door 16 toward the seat 19, thus compressing the yieldable seal 20 sufficiently to cause the shoulder 34 to clear the top of the keeper 22 and to enter the top of the inclined groove 23. Once that the thickened portion 33 on the rotary latch has entered the inclined groove 23 on the keeper it is then possible to continue rotation of the rotary latch 25 by the handle 28 through approximately 180° and thus position the blank side of the latch opposite the keeper. This releases or detaches the bar 14 from the keeper and the door 16, together with the bar 14 can be swung into open position.

In closing the sterilizer the door 16 and the bar 14 are swung into closed position, and in so doing, the door 16 centralizes itself with respect to its seat 19 by virtue of the pivotal connection at 18 by pressing the door inwardly and thus compressing the rubber seal 20 slightly. The thickened portion 33 on the half-thread can be caused to enter the bottom of the inclined groove 23 on the keeper. The rotary latch 25 can then be rotated by its handle 28 until the shoulder 34 clears the top of the shoulder 24 and on snapping into the position shown in Fig. 2, reverse rotation of the latch cannot be accomplished without pressing the door 16 inwardly the required distance to

compress the seat 20 and enable the shoulder 34 to clear the upper portion of the shoulder 24 and enter the groove. As long as pressure materially above atmospheric is effective on the door 16 this inward movement and deformation of the seal 20 is impossible. Consequently, as long as pressure exists in the sterilizer it is impossible to accidentally or inadvertently open the door. It is only when pressure in the sterilizer is reduced to atmospheric pressure or approximately so that it is possible to press the door 16 inwardly the necessary distance to clear the shoulder 34.

When pressure in the sterilizer is only slightly above atmospheric pressure or the sterilizer contains what is sometimes referred to as residual pressure, it might be possible to press the door inwardly a sufficient distance to enable the shoulder 34 to clear the upper portion of the shoulder 24 and enter the groove. However, even when this is possible the movement of the shoulder 34 down the inclined groove 23 enables the seal 20 to disengage the seat 19 before the handle has completed its 180° turn to a releasing position. This releases any remaining or residual pressure in the chamber around the marginal edges of the door before the door can be blown open by this remaining pressure.

Various changes may be made in the details of construction without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A door for a pressure vessel adapted to contain a fluid under pressure, said door having a resilient sealing means around its edges urging the door to open and sealing the door against leakage around its edges, a swingable bar on which the door is pivotally mounted, a latch rotatably mounted on the swinging end of the bar for rotation about an axis extending generally in the direction of swing of the swinging end of the bar, a keeper engageable by the latch to releasably hold the bar and door in door-closing position, said latch having a helical cam extending partially around the inner end of the latch engageable with the keeper to hold the bar and door in closed position

and on rotation of the latch to disengage the keeper whereby the door may be opened, said cam having a shoulder adjacent one end thereof engageable with the keeper and preventing rotation of the latch into keeper-disengaging position unless it is possible to force the door inwardly in the absence of material pressure in the vessel and compress the sealing means.

2. A door for a pressure vessel adapted to contain a fluid under pressure, said door having a resilient sealing means around its edges urging the door to open and sealing the door against leakage around its edges, a swingable bar on which the door is pivotally mounted, a latch rotatably mounted on the swinging end of the bar for rotation about an axis extending generally in the direction of swing of the swinging end of the bar, a keeper engageable by the latch to releasably hold the bar and door in door-closing position, said keeper having a downwardly and forwardly inclined groove therein, said latch having a partial helical cam on the inner end thereof extending partially around the inner end of the latch adapted to enter said groove in the keeper to hold the bar and door in closed position and on rotation of the latch to disengage the keeper whereby the door may be opened, said cam having a shoulder adjacent one end thereof engageable with the keeper and preventing rotation of the latch into keeper-disengaging position unless it is possible to force the door inwardly in the absence of material pressure in the vessel and compress the sealing means.

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