Feb. 14, 1928.

R. L. JEWELL

1,659,202

DOOR CLOSING APPARATUS

Filed Nov. 25, 1925

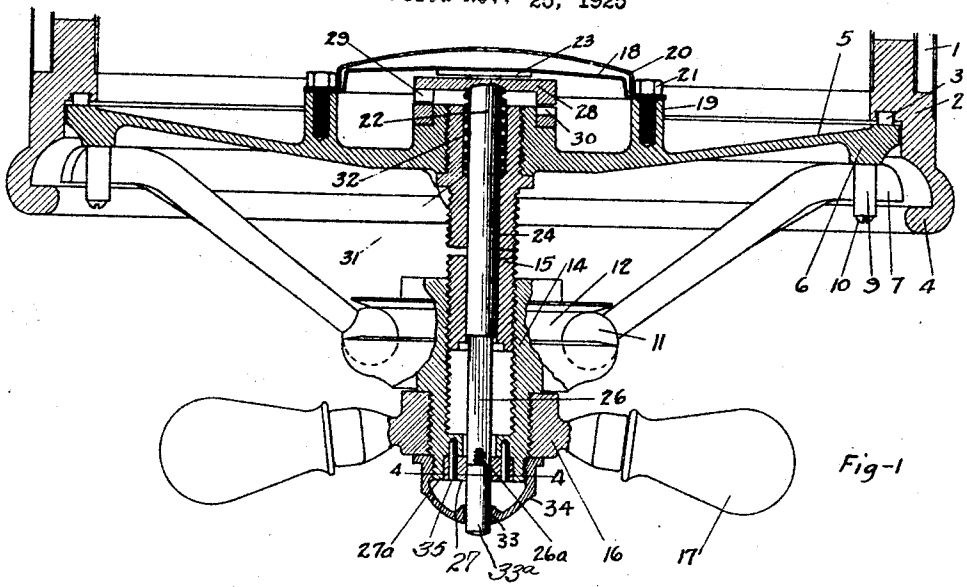


Fig-1

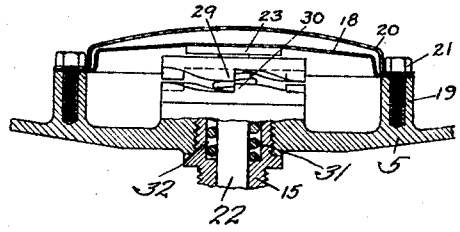


Fig 2

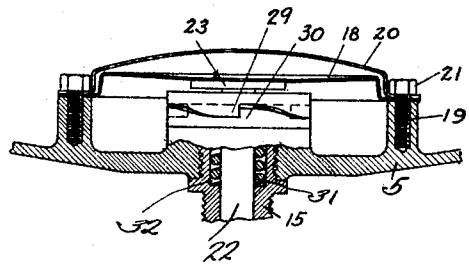


Fig. 3

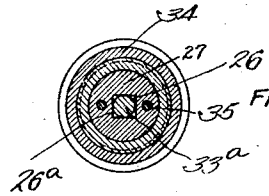


Fig. 4

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UNITED STATES PATENT OFFICE.

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DOOR-CLOSING APPARATUS.

Application filed November 25, 1925. Serial No. 71,480.

Closure covers for pressure chambers present some danger especially where they are provided with quick-acting release devices in that the operator sometimes releases the covers with pressure in the chambers and this involves more or less danger. The present invention is designed to obviate this by automatically locking the securing mechanism of the cover against release so long as there is pressure in the chamber. Details and features of the invention will appear from the specification and claims.

The invention is illustrated in the accompanying drawings as follows:—

Fig. 1 shows a central section through the cover.

Fig. 2 a sectional view through the pressure responsive means with the pressure released.

Fig. 3 a similar view with the pressure on the pressure responsive means.

Fig. 4 a section on the line 4—4 in Fig. 1.

1 marks the chamber, 2 the chamber head having the cover seat 3, 4 the inturned locking flange, 5 the cover closing on the seat 3, 6 fulcrum ring for the closing-levers 7, and 9 a strap over the ends of the levers, the strap being secured by screws 10.

The levers 7 have the spherical ends 11 which are mounted in a head 12. The head 12 is mounted on a nut 14. The nut is screw threaded on a post 15 extending outwardly from the cover. The nut has a handle ring 16 secured to it and the operating handle 17 extends radially from the ring 16. By operating the nut, the head is moved inwardly or outwardly actuating the levers and setting the door. The inner ends of the levers 7 may be swung rotatively to move the levers into and out of position to engage the flanged end 4. This is a common method of operating covers on doors of this type.

A pressure responsive means is arranged on the inner face of the cover and comprises a diaphragm 18 which is mounted on a ring 19 extending upwardly from the door cover and is clamped on the ring 19 which extends upwardly from the inner face of the cover by a guard plate 20 secured by screws 21 extending through the plate and into the ring 19. The diaphragm on its inner face, therefore, is subjected to chamber pressure. A pin 22 extends through an opening 24 in a post 15 and a cap 23 is arranged on the underside of the diaphragm and secured to the base of the pin. The outer end of the pin is squared at 26 and extends into a squared opening 26^a extending through a plate 27 set in a socket 27^a in the outer end of the nut, the plate 27 being locked with the nut by means of pins 35. The squared end 26 has a sliding fit in the opening 26^a and locks the nut with the pin 22.

A locking member 28 is formed on the end of the pin 22 and has the locking teeth, or shoulders 29 which are adapted to engage similar locking teeth or shoulders 30 on the inner face of the cover when the head 28 is forced outwardly in response to pressure on the diaphragm when there is pressure in the chamber. It will readily be seen, therefore, that as soon as pressure is placed on the chamber the locking of the pin 22 through the engagement of the teeth 29 and 30 in turn locks the nut 14 against turning and thus prevents the release of the closure levers so long as pressure remains in the chamber. When the pressure in the chamber is relieved the locking members are disengaged by the spring 31 which is arranged in a socket 32 on the inner end of the post 15. As soon as these members are forced out of engagement through the action of the spring when the diaphragm is relieved of pressure the pin 22 is released so that it may be turned and this in turn releasing the nut permits the nut to be swung to release the closure mechanism.

I prefer that the spring 31 be so proportioned that the complete release of the locking device will only take place with a creation of vacuum in the chamber. While the spring may be adjusted to complete the operation of unlocking just at the neutral point of pressure a more positive action is accomplished by so adjusting it as to make the release take place on the formation of a vacuum. In the ordinary operation of sterilizers for which this device has been particularly designed the succession of operations usually provide for the formation of a vacuum.

And where such release is provided and for some reason a vacuum cannot be produced, or for some reason the spring does not fully affect the release where the parts are adjusted to operate at neutral pressure

it is desirable to form an emergency operating mechanism whereby the operation of unlocking may be brought about manually from without the chamber. To this end the pin 26 is extended to an opening 33 in a cap 34. By exerting sufficient pressure on the pin the locking device may be released.

What I claim as new is:—

1. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism on the cover; means tightening the mechanism and a locking device responsive to pressure in the chamber locking the securing mechanism against release while permitting a tightening movement of the means.

2. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism comprising a tightening screw; and a locking device comprising means locking the screw against turning in releasing direction only and mechanism responsive to the chamber pressure setting said means.

3. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism comprising radial levers and a screw operating on the levers; and a locking device comprising means locking the screw against turning, and mechanism responsive to chamber pressure setting said means.

4. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism on the cover; comprising a post on the cover and a screw on the post exerting closure pressure on the cover; pressure responsive means on the chamber; a lock on the screw; and a connection between the lock and means.

5. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism on the cover; comprising a post on the cover and a screw on the post exerting closure pressure on the cover; pressure responsive means on the chamber; a lock on the screw; and a connection between the lock and means extending through the post.

6. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; a post on the cover; a nut on the post exerting closure pressure on the cover; a pin extending through the post; a diaphragm within the chamber; a lock actuated by the diaphragm for locking the pin against turning; and a locking connection between the pin and the nut.

7. In a cover closing apparatus the combination of a chamber; a cover on the chamber; closure securing mechanism on the cover; and a locking device responsive to pressure in the chamber locking the securing mechanism against release, said locking device releasing only in response to a pressure below atmosphere in the chamber.

8. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism on the cover; a locking device responsive to pressure in the chamber locking the securing mechanism against release; and manually operable mechanism for releasing said locking device.

9. In a cover closing apparatus, the combination of a chamber; a cover on the chamber; closure securing mechanism on the cover; a locking device responsive to pressure in the chamber locking the securing mechanism against release; mechanism responding to a reduction of pressure in the chamber for releasing said locking device; and manually operable means for releasing said locking device.

In testimony whereof I have hereunto set my hand.

RAYMOND L. JEWELL.