Dec. 12, 1950 L. E. FINCH 2,534,164

PRESSURE COOKER

Filed June 14, 1946 2 Sheets-Sheet 1

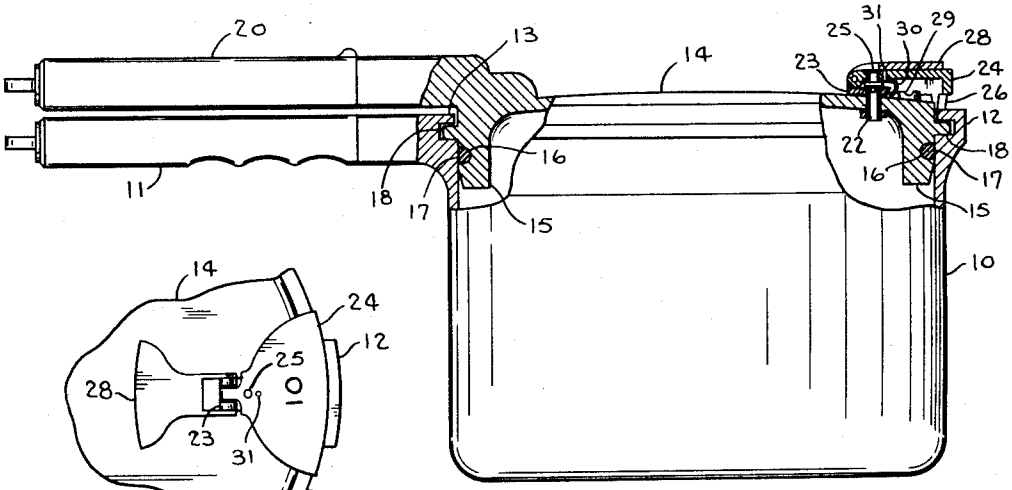


FIG. 1

FIG. 3

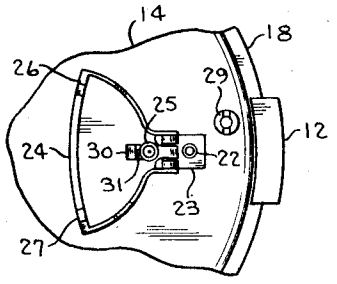


FIG. 4

FIG. 2

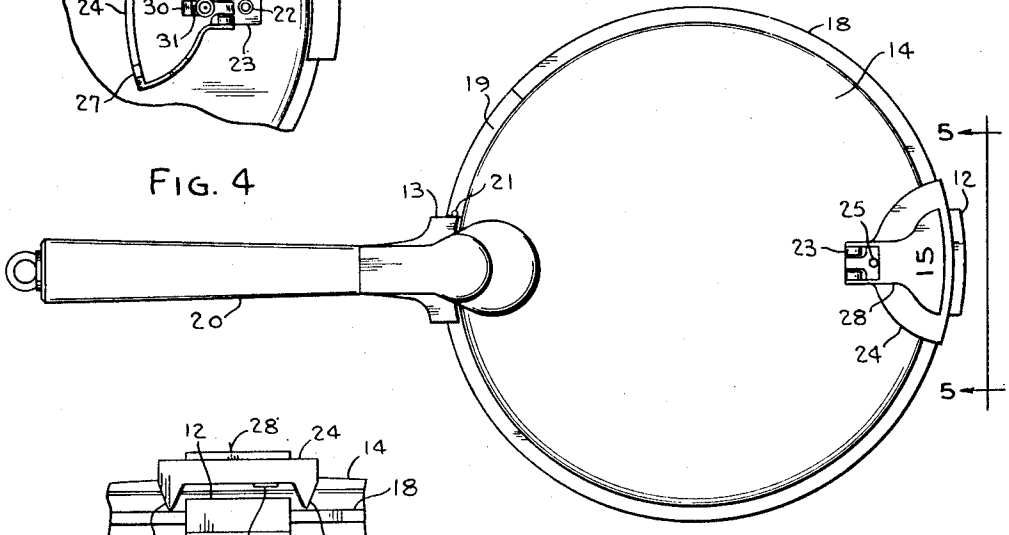


FIG. 5

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PRESSURE COOKER

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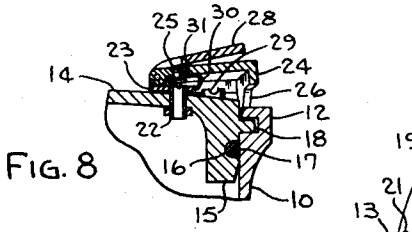


FIG. 8

FIG. 6

FIG. 7

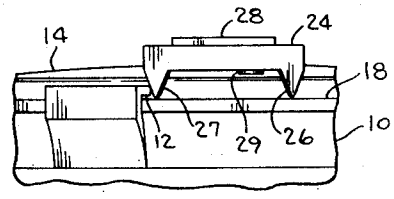


FIG. 10

FIG. 9

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Patented Dec. 12, 1950

2,534,164

UNITED STATES PATENT OFFICE

2,534,164

PRESSURE COOKER

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Application June 14, 1946, Serial No. 676,671

6 Claims. (Cl. 220—44)

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This invention relates to improvements in pressure cookers.

Pressure cookers of the type designed and intended for domestic use must be substantially fool-proof in operation. Often the user fails to complete the lock between the cover and the container, and after pressure builds up within the cooker the incomplete lock will break or otherwise become disengaged and the cover will fly off endangering nearby persons. There have been times when the user, contrary to directions, will disengage the lock between cover and container while there still remains greater than atmospheric pressure within the cooker. This likewise causes the cover to dangerously jump up from the container. Many times the user will misplace the separate weight which constitutes a part of the pressure selector and regulator valve, and the temptation is present to plug the vent with any available means. This also creates a hazardous condition.

One object of this invention, therefore, is to provide a pressure cooker which will automatically prevent the creation of greater than atmospheric pressure within the container until the lock between cover and container has been completely accomplished.

Another object of this invention is to provide a pressure cooker which will automatically vent the container to atmosphere upon the initiating of the unlocking of the cover.

Another object of this invention is to provide a pressure cooker the cover of which cannot be partially locked or unlocked unless the container is vented to atmosphere.

A still further object of this invention is to provide a pressure cooker in which the pressure selector member of the regulator valve is always attached to the cooker and is readily manipulated to obtain the selected pressure limit.

These objects are obtained by various means. One way is to utilize the relative movement of the parts accomplishing the lock or unlock between cover and container to keep open the vent of the pressure regulator during all of such movement. In cookers where the cover is rotated relative to the container to accomplish the lock or unlock therebetween, the pressure regulator valve engages with and rides on a portion on the container at the beginning of the rotation of the cover and slides along such portion during the rotation to locked position. In this engaged position of the valve, the vent is open to atmosphere. Hence, if the locking movement is not completed, pressure within the container can never exceed atmosphere. Upon the completion of the locking movement the projection disengages from such portion and the valve is moved so as to close the vent. Immediately on the commencement of the reverse or unlocking rotation, the projection again engages with such portion and opens the vent to atmosphere. In cookers where the cover has no rotative movement relative to the container and a locking part is moved relative to the cover and the container to effectuate the lock, the valve may be carried by the locking member so as to ride along the cover until at the end of the closing movement of the locking part it comes into alinement with the vent which until then has been open to atmosphere. Instead of mounting the valve on the locking part, the locking part may extend over the vent except when moved to completely locked position. Only when in that position may the valve be placed on the vent. When the valve is on the vent it restrains the locking member from being slid toward unlocked position. In all these cases the act of placing the cover on the container and commencing the normal locking operation automatically vents the interior of the cooker to atmosphere and maintains it so vented until the lock is completed. Thus pressure above atmosphere can never be attained while the cover is only partially locked to the container. Also the commencement of the unlocking of the cover likewise vents the interior of the cooker to atmosphere, and the cover cannot be removed while there is greater than atmospheric pressure in the cooker.

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The novel features, which are considered characteristic of the invention, are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Figure 1 is a view in side elevation with parts shown in fragmentary section of a pressure cooker embodying the present invention;

Figure 2 is a top plan view of the pressure cooker viewed in Fig. 1;

Figure 3 is a fragmentary top plan view of the pressure regulator comprising an element of the pressure cooker embodying the present invention with one of the selecting weights moved out of operative position;

Figure 4 is a top plan view of the pressure regu-

lator of Fig. 3 with both of the weights and the valve member moved out of operative position;

Figure 5 is a fragmentary side elevation view taken from the line 5—5 of Fig. 2;

Figure 6 is a top plan view of the pressure cooker of Fig. 1 with the cover shown in a half-locked position relative to the containers;

Figure 7 is a fragmentary side elevation view taken from the line 7—7 of Fig. 6;

Figure 8 is a fragmentary sectional view taken on the line 8—8 of Fig. 7;

Figure 9 is a top plan view of the pressure cooker of Fig. 1 with the top placed on the container and prior to any rotative movement thereof to effect the lock therebetween; and

Figure 10 is a fragmentary side elevation view taken from the line 10—10 of Fig. 9.

Referring to the drawings by reference numerals, the pressure cooker comprises a container 10 which is provided with the customary handle 11 by which the container may be manipulated. The container 10 is provided at oppositely spaced portions with cover holding or retaining lugs 12 and 13. One of these lugs 13 is preferably (but not necessarily) formed at the juncture of the handle 11 with the wall of the container 10. Such position causes the pouring sides of the container to be free from any projections which would interfere with the normal emptying of the contents of the container. The purpose of these lugs 12 and 13 is to limit and restrain the upward movement of the cover member 14 under the influence of pressure above atmosphere generated within the container, and their size is designed to provide adequate holding strength. The cover 14 is disk-like in shape and has a depending annular flange or skirt 15 which extends down within the container when the cover is positioned thereon. The external diameter of this flange is slightly less than the diameter of the interior of the vessel so as to have an easy fit therein. The outer wall of the flange 15 is provided with an encircling groove 16 into which is inserted a sealing ring 17 formed of rubber or other compressible and resilient materials. Its thickness is such that it extends slightly beyond the outer cylindrical surface of the flange 15 and provides a surface-to-surface contact with the interior of the vessel 10 when the cover is in position. With seals of this character it is not essential to press or clamp down the cover against the container to form the seal. As pressure greater than the atmosphere is generated within the container, the cover will rise within the limits permitted by the lugs 12 and 13, and the seal between the sealing ring 17 and the vessel 10 will be increased by the action of the internal pressure. In order to prevent the cover from rising beyond the limits of the holding lugs 12 and 13, it is provided with a laterally extending rim 18. This rim 18 is provided with an opening 19 adjacent the handle 20. As shown in Figures 2, 6 and 9, the opening 19 is spaced angularly clockwise from the juncture between the handle 20 and the cover 14. The opening 19 is, of course, long enough to permit the lug 13 to pass therethrough. With this construction, to position and lock the cover 14 on the container the handles 11 and 12 are relatively positioned as shown in Figure 9, whereupon the rim 18 may be inserted under the lug 12 and the flange 15 positioned within the container 10. The handle side of the cover 14 may then be lowered so that the lug 13 passes through the opening 19 permitting the rim 18 to rest flush against the upper edge of the container 10. To complete the lock the cover 14, by manipulation of the handle 20, is moved in a clockwise rotation relative to the container 10 until the handles are in substantial alinement as shown in Figure 2. This causes the rim 18 to pass under the lug 13. A small pin 21 or other like abutment positioned on the upper edge of the container 10 adjacent the juncture of the handle 11 with said container will engage the edge of the rim 18 at the opening 19 to arrest the clockwise motion of the cover when the handles are in substantial alinement. When the cover has been fully rotated from the position shown in Figure 9 to the position shown in Figures 1 and 2, the full areas of the lugs 12 and 13 have a surface-to-surface abutment with the rim 18 of the container and jointly act to keep the cover 14 from rising upwardly under the influence of internal pressure.

In order to prevent pressure from increasing beyond atmospheric while the cover is in a non-lock or partially locked position (such as is shown in Figure 6) or to prevent the cover from being rotated away from completely locked position when there is pressure greater than atmosphere within the container, a safety device is incorporated. This safety device in the embodiment shown herein is also utilized as a pressure regulator. However, a separate regulator may be used in addition to the safety device. In the embodiment shown herein this safety device and pressure regulator comprises a tube 22 passing through an aperture in the cover 14 adjacent its edge. The tube 22 is hollow and provides a vent by which internal pressure may escape to atmosphere. The tube 22 is also utilized to hold in place on the top of the cover a bracket member 23 for pivotally holding various weights. To the bracket member 23 there is hinged by means of a pin a weighted valve-carrying member 24 shaped generally as illustrated. The length of the valve-carrying member 24 from its pivotal axis to its outer edge is sufficient to bring the outer edge substantially in alinement with the outer edge of the rim 18. The purpose of making the valve-carrying member 24 somewhat fan-shaped is to cause its outer edge to be longer than the lug 12. A cone-shaped valve 25 is mounted on the underside of the valve-carrying member 24 by a stem passing through an aperture in such member. This stem is peened or riveted to hold the valve in place. However, there is provided a loose fit between the valve 25 and the member 24 so that the valve can have movement with respect thereto permitting it to have a self-centering and alining action. The valve 25 is placed as near to the fulcrum or pivotal axis of the member 24 as is practical and is in alinement with the top opening in the vent 22. This results in the greatest possible force tending to keep the valve closed. It has been found that when the member 24 is provided with a skirt-like depending flange a smoother operation results. The outer corners of member 24 have tooth-like downward projections 26 and 27 which in the normal closed position of the valve are slightly spaced from the rim 18 as is shown in Figures 5 and 10.

The vent 22, valve-carrying member 24, and valve 25 are positioned diametrically opposite the handle 20. When the cover 14 is placed on the container in the relative position shown in Figure 9, both the projections 26 and 27 are on the counter-clockwise side of the lug 12. While in this position the valve 25 is closed, and no pressure can be built up within the container as the cover not being secured will rise and per-

mit the escape of such pressure as it forms. However, when the cover 14 is rotated clockwise to commence the locking thereof, the projection 27 rides up on and along the top of the lug 12. This action causes the outer end of the valve-carrying member 24 to be raised upwardly and the valve 25 to be moved to open position as shown in Figures 7 and 8. It will be understood that the hinge or pivotal connection between the member 24 and the bracket member 23 is sufficiently loose to permit some twisting in connection with the tilting However, the engagement between the projection 26 and the top of the rim 18 coacts with the upward movement of the projection 27 to effect sufficient raising of the outer end of the member 24, without a binding action on the pivot pin, to open the valve. If the rotation of the cover is stopped part way through the locking motion such as is shown in the relative position illustrated in Figure 6 the valve 25 will remain open and substantially no pressure greater than atmosphere can be built up within the container. Thus the danger attendant an impartial or incomplete lock is eliminated. When the clockwise locking movement has been completed and the cover handle 20 is in substantial alinement with the container handle 11, the projection 27 will have just slid off of the top of the lug 12 and the weight of the member 24 will again force the valve 25 to close the vent. This position is illustrated in Figures 1, 2 and 5. If for some reason the user of the pressure cooker attempts to remove the cover 14 while there is greater than atmospheric pressure in the container, it will be necessary to rotate the cover in a counter-clockwise direction from the position shown in Figure 2. If the interior pressure is great, there will be such a frictional resistance between the lugs 12 and 13 and the rim 18 that such movement could not be performed by one not specially trained or skilled. However, if the interior pressure is still above atmosphere but not greatly in excess thereof, such movement may be commenced. In such event and upon the initiating of such movement, the tooth 27 immediately rides up to and along the top of the lug 12. This at once opens the valve 22 venting the interior of the vessel to atmosphere. Such venting in all practical instances permits a sufficiently rapid lowering of the pressure within the vessel so that by the time the unlocking is completed there will not remain sufficient pressure to cause the cover to dangerously fly off the container.

When it is desired to utilize the safety device also as a pressure regulator as well as a safety device and to provide for the pre-selecting of various pressures, an auxiliary weight 28 may also be hinged to the bracket member 23. When a pressure higher than that obtained by the use of the valve-carrying member 24 is desired, the auxiliary weight 28 is manually thrown over so as to rest upon the top of the member 24 as is shown in Figure 1. If the lower pressure is desired, the auxiliary weight 28 is pivoted away from the valve-carrying member 24 to the position shown in Figure 3 where it will have no effect upon keeping the valve 25 in closed position. The pressures derived by the use of the members 24 and 25 may be stamped on the upper surface of those members so that the user may make the proper desired selection. In operation as a pressure regulator, when the interior pressure reaches 15 pounds it will be sufficient to cause the valve 25 to raise up both members 24 and 28, thereby permitting escape of steam through the vent 22 thus keeping the pressure at that desired value. If only the member 24 is used, the valve will open and pressure will escape when it reaches 10 pounds.

In the event that the valve 25 should become stuck through some unforeseen reason and the pressure within the vessel exceed the amount of 15 pounds above atmosphere, it is desirable to have a standard safety plug such as that designated 29 which will blow out at a pressure above that amount but substantially less than the breaking pressure of the vessel. Whenever the vessel is being transported while there is an interior pressure substantially equal to that set by the pressure regulator, there is a tendency to flip the valve-carrying member 24 and weight 28 about their pivot to a point where they will fall against the top of the cover 14. This will permit a small geyser of steam to shoot out through the vent 22 which may startle the person handling the vessel. In order to prevent this, the member 24 is provided with a spring 30 which is held by a small pin 31 to the underside of the member 24. The spring 30 has an end which just engages an edge of the bracket member 23 when the member 24 is raised up by the action of the lug 12 as heretofore described. Hence the spring 30 in no way interferes with the normal action of the valve 25 and yet it restrains any further upward movement of the member 24 under the force of escaping steam. However, if it is desired to fully open the valve 25, the spring will deflect slightly under manual force and permit the member 24 to be swung fully out of the way. The spring 30 is sufficiently strong, however, to prevent escaping steam and jiggling motion from flipping the member 24 completely over, thus fully exposing the vent.

This application is intended to cover such changes and modifications as come within the spirit of the invention or the scope of the following claims.

I claim:

1. In a pressure cooker, a container having a cover holding lug, a cover for said container, said cover having a laterally projecting rim insertable under said lug, said cover being rotatable with respect to said container for a predetermined distance to effect a complete lock between said container and cover, a vent for said container, a loosely hinged valve for said vent movable with said cover, said valve having spaced projections the ends of which normally are spaced slightly from said rim, said valve and lug being relatively angularly spaced so that for said predetermined distance one of said projections is rideable up and on said lug and the other projection is rideable on said rim to raise said valve and open said vent.

2. In a pressure cooker, a container having oppositely positioned cover holding lugs, a cover for said container having a laterally projecting rim, an opening in said rim large enough to permit one of said lugs to pass therethrough whereby said cover may be placed on said container by inserting the rim under one of said lugs and passing the other lug through said opening, rotation of said cover when in said position for a predetermined distance causing said other lug to also be positioned completely over said rim, a vent in said cover, and a loosely hingedly mounted valve for said vent rotatable with said cover, said valve having projections the ends of which are normally slightly spaced above said rim when said valve is seated on said vent, said valve

being angularly placed relative to one of said lugs when said opening is in alinement with a lug so that upon initiating said rotation one of said projections will ride up said lug for said predetermined distance and the other projection will bear against said rim to raise said valve and open said vent.

3. In a pressure cooker, a container, a cover seatable upon said container to close the same, interengageable locking means for locking said cover to said container, said means being operated from fully locked to fully unlocked position by relative rotation of said cover with respect to said container for a predetermined distance, a container vent in said cover, a valve-carrying member hingedly mounted to said cover and having an extending end, a valve carried by said member in alinement with said vent, said extending end being swingable up and down with respect to said cover from low position in which said valve closes said vent to high position in which said valve opens said vent, said extending end when in the low position thereof having a prescribed path as said cover is rotated said predetermined distance, and an abutment on said container positioned in said prescribed path and engageable with said end whereby said end must be raised to high position during rotation of said cover for said predetermined distance to operate said locking means from fully locked to fully unlocked position.

4. In a pressure cooker, a container, a cover seatable upon said container to close the same, interengageable locking means for locking said cover to said container, said means being operated from fully locked to fully unlocked position by relative rotation of said cover with respect to said container for a predetermined distance, a pressure regulator valve for said pressure cooker, an operating member for said valve normally biased to pressure-regulating position and movable to open position to cause said valve to vent said pressure cooker, and a cam portion adapted when in engagement with said member to move said member to and maintain said member in said open position, said cam portion being movable relative to said member upon initiating said relative rotation of said cover with respect to said container to cause said cam portion to engage said member and move said member to open position, said cam portion being long enough to remain in engagement with said member while it moves relative thereto during the relative rotation of said cover with respect to said container for said predetermined distance.

5. In a pressure cooker, a container, a cover seatable upon said container to close the same, interengageable locking means for locking said cover to said container, said means being operated from fully unlocked to fully locked position by relative rotation of said cover with respect to said container for a predetermined distance, a vent for said container, a hinged valve-operating member normally biased to vent-closing position and upwardly swingable to vent open position, a valve carried by said member and moved thereby from normally biased closed position to open position, and a camming surface having a path of movement relative to said member and engageable therewith while moving in said path to swing and hold said member in open position, said camming surface being movable in said path by the relative rotation of said cover with respect to said container for said predetermined distance.

6. In a pressure cooker, a container having a cover-holding lug, a cover for said container rotatable relative to said lug for a predetermined distance to move said cover to and from fully unlocked and fully locked positions, a vent for said container, a valve for said vent normally biased to closed position and movable to open position, an operating member for said valve movable from closed to open position to bring said valve to open position, said member when in closed position having a prescribed path relative to said lug as said cover is rotated relative thereto, said member engaging said lug and being moved thereby to open position during rotation of said cover for said predetermined distance.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,494,487	Jacobs	May 20, 1924
1,823,595	Ducroux	Sept. 15, 1931
2,191,975	Stephens	Feb. 27, 1940
2,436,566	Goldberg	Feb. 24, 1948

FOREIGN PATENTS

Number	Country	Date
559,659	Germany	Sept. 22, 1932