Dec. 24, 1968 M. W. LOVELESS 3,417,896

LID FOR CANNING RETORT

Filed Feb. 17, 1967 2 Sheets-Sheet 1

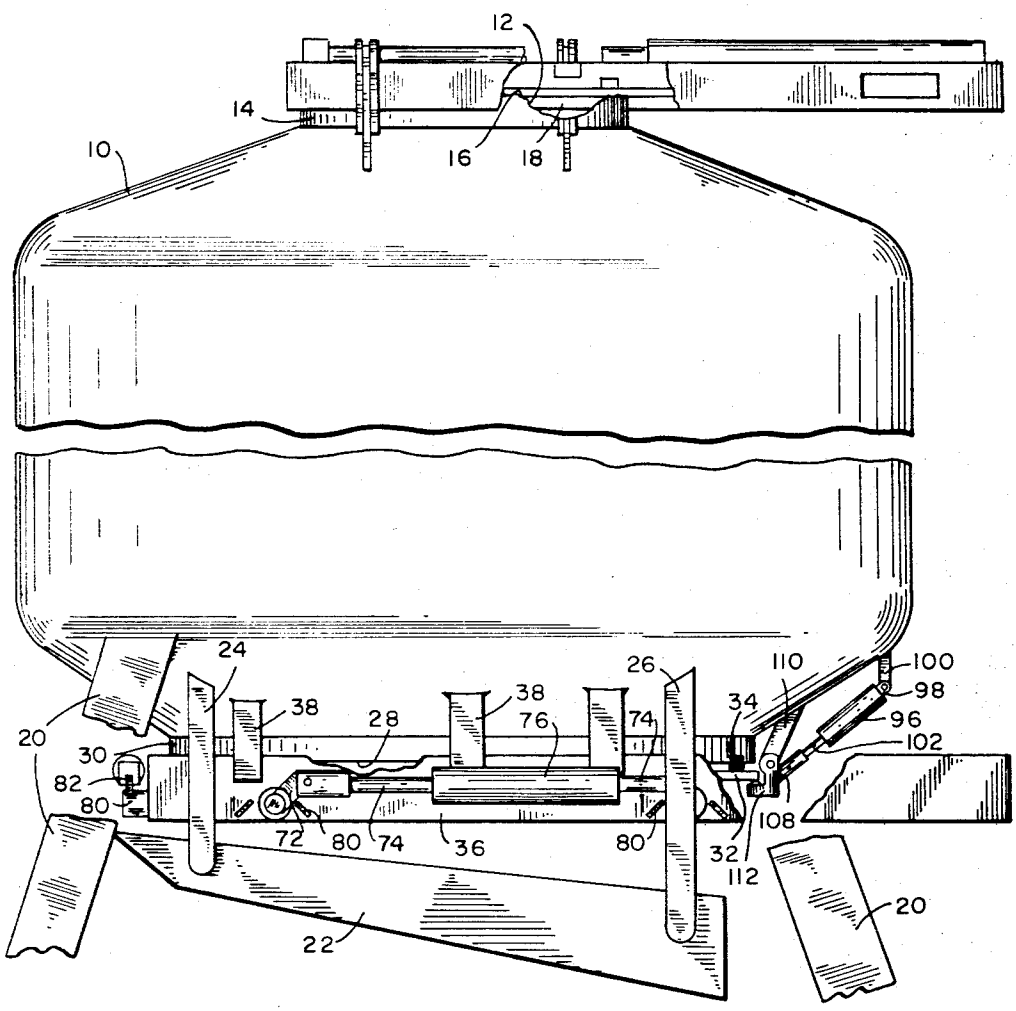


FIG. 1

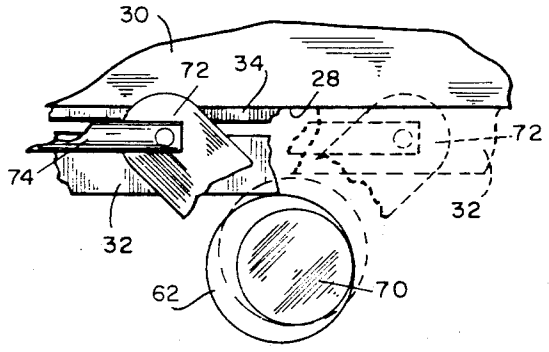


FIG. 4

INVENTOR.
MARION W. LOVELESS

BY Head & Johnson

ATTORNEYS

Dec. 24, 1968 M. W. LOVELESS 3,417,896

LID FOR CANNING RETORT

Filed Feb. 17, 1967 2 Sheets-Sheet 2

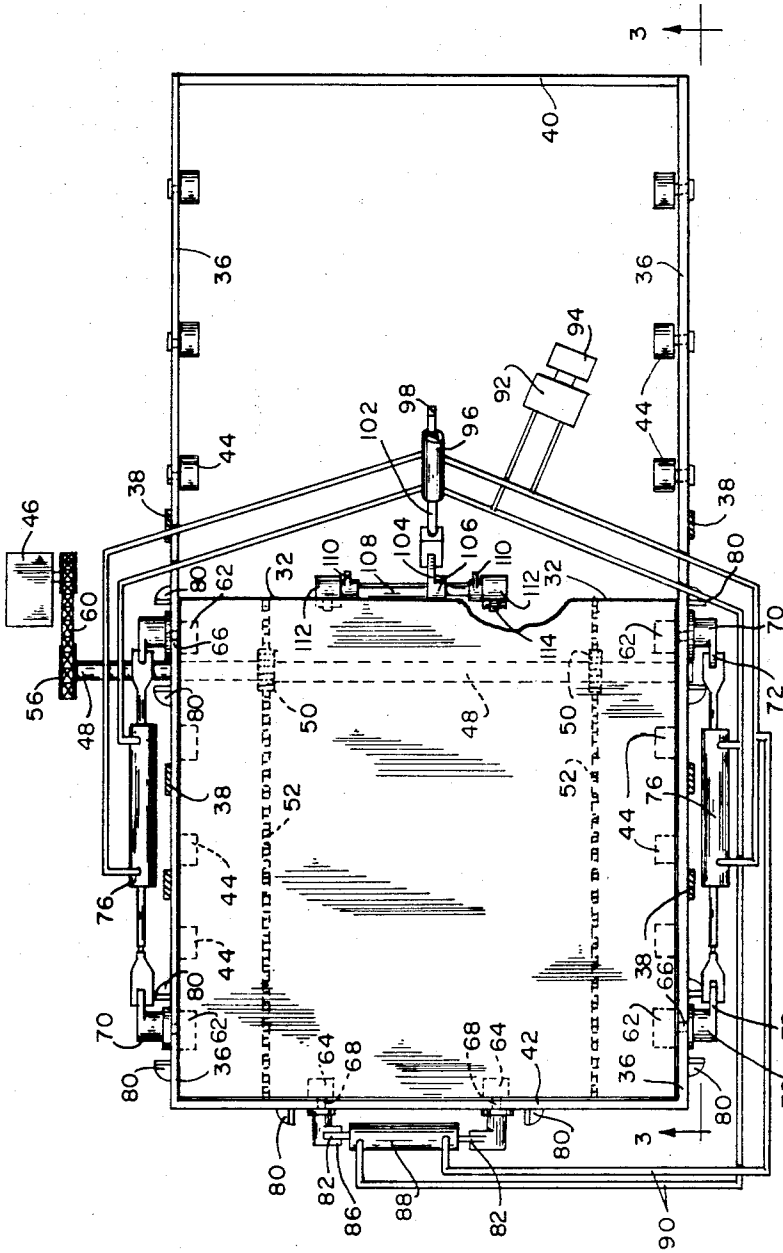


FIG. 2

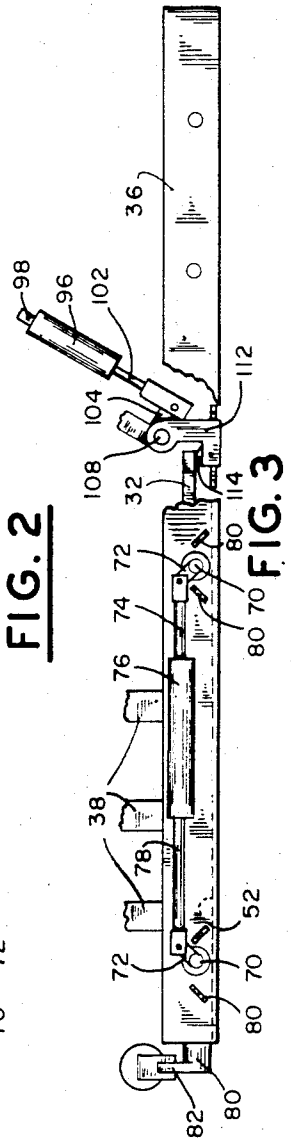


FIG. 3

INVENTOR.
MARION W. LOVELESS

BY Head & Johnson

ATTORNEYS

United States Patent Office 3,417,896 Patented Dec. 24, 1968

3,417,896

LID FOR CANNING RETORT

Marion W. Loveless, 419 S. Allegheny, Tulsa, Okla. 94112

Filed Feb. 17, 1967, Ser. No. 616,939
4 Claims. (Cl. 220—41)

ABSTRACT OF THE DISCLOSURE

This invention relates to an improved closure for a pressurized vessel, particularly the type of pressurized vessel described as a canning retort. More particularly, this invention relates to an improved closure for a lower opening of a pressurized vessel.

In my Patent No. 3,235,103, I have described a pressurizable canning retore having automatically upper and lower closure members and automatic means for receiving cans from the bottom opening.

The primary object of this invention is to provide an improved closure for a large diameter opening of a pressure vessel such as a canning retort.

Another object of this invention is to provide a closure member for a lower opening of a pressurized vessel, such as a canning retort, in which the closure member can be moved from an opened to a closed position and from a closed position to an open position automatically and with the minimum of time and labor.

Still another object of this invention is to provide a closure member for a lower opening of a pressurized vessel, such as a canning retort in which the closure member is brought into sealable contact with the lower opening by hydraulic means.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIGURE 1 is a side elevational view of a canning retort showing a closure member prepared according to this invention position adjacent a lower opening of the retort.

FIGURE 2 is a top view of a closure member according to this invention in position on its supporting frame.

FIGURE 3 is a cross-sectional view along the lines 3—3 of FIGURE 2 showing the vertical relationship of certain cam members of the closure member.

FIGURE 4 is a fragmentary view of a side cam member showing its operation in greater detail.

The closure member of this invention comprises a large plate member which is brought into sealable engagement against a lower opening of a pressure vessel, such as a canning retort. In positioning the closing member against the lower opening, two motions of the closure member are required; first, the closure member must be moved horizontally to a position directly below the opening without being subjected to frictional engagement with the opening during its horizontal movement, and second, the closure member must be raised vertically from its position below the opening into sealable contact with the opening. As disclosed herein, the horizontal movement of the closure member is accomplished by a rack and pinion arrangement, but other equally adaptable means are envisioned, such as a hydraulic cylinder and plunger. The raising of the closure member into sealable engagement with the lower opening is accomplished by an arrangement of cam members which are actuated rotatably to apply pressure against the lower surface of the closure member, thus raising it into position.

Referring now to the drawings in detail, pressure vessel **10** is shown, which in the canning industry is referred to as a canning retort, which has a top opening **12** surrounded by a collar **14** which provides a flat circumferential surface **16** against which upper lid **18** can be placed in sealable arrangement. The details of construction of a suitable upper closure member and manner of operation are shown clearly in my Patent No. 3,235,103, referred to above.

Pressure vessel **10** is supported on legs **20**, portions of which have been broken away in FIGURE 1 to permit a view of the lower components of the pressure vessel, so that the elevational relationship of certain of these components may be appreciated. Also in FIGURE 1, the vessel is shown to include a receiving basket **22** which is held in place below the vessel by a matching pair of pivotal supports **24** at one end of the basket and a matching pair of swingable supports **26** at the other end of the basket. The basket **22** is provided below the vessel to receive cans which are discharged through lower opening **28** in vessel **10**. A detailed construction of an alternative form of basket is also shown in my Patent No. 3,235,103. Lower opening **28** is surrounded by a downwardly extending collar **30** against which lower lid **32** can be sealably engaged by being pressed against resilient sealing member **34** held in collar **30**.

Referring now also to FIGURES 2 and 3, the lower closure member according to this invention is shown in greater detail. FIGURES 2 and 3 show more clearly the relationship of the components of the lower closure member of the pressure vessel. Positioned below lower opening **28** are a pair of parallel support rails **36** which are arranged substantially horizontal beneath the pressure vessel and secured thereto by a multiplicity of support brackets **38**. At one end of each of the lower support rails **36** is a first end support rail **40** and at the other end of each support rail **38** is a second end rail **42**. Support rails **36**, **40**, and **42** are substantially horizontal in order to provide smooth operation of the lower closure member. Positioned along each of the support rails **36** at properly spaced intervals are a number of roller members **44** upon which lower lid **32** rides during the opening and closing operations. That is, in its open position lid **32** occupies an area between the support rails **36** in the vicinity of first end support rail **40**. Then, when the closing operation begins, motor **46** which drives shaft **48** is actuated and pinion gears **50** on shaft **48** mesh with racks **52** secured to the bottom of lower lid **32** to move lower lid **32** horizontally over rollers **44** to a position beneath the lower opening **28** in the pressure vessel with lid **32** being stopped sufficiently close to second end **42** that lid **32** will completely cover lower lid opening **28**. Shaft **48** is rotated by the connection of pulley **56** with motor **46** by chain drive **60**. During the movement from a fully open position to a partially closed position beneath pressure vessel **10**, lid **32** remains out of frictional contact with resilient sealing member **34** in lower collar **30**. The most important feature of this invention is the manner in which lid **32** is brought from a partially closed position directly beneath pressure vessel **10** to a fully closed position of pressurizable engagement with sealing member **34** against roller opening **28**. Lid **32** is moved horizontally on rollers **44** by the engagement of pinion gears **50** with racks **52** secured to the lower surface of lid **32**. Of course, shaft **48** could be interconnected with motor **46** by other means, such as a V-belt drive or shaft **48** could be gearably directed to motor **46**.

FIGURES 2 and 3 also disclose the components and their relationship to each other which interact to open and close the lower lid **32**. In the opened position, lower lid **32** rests upon rollers **44** and rollers **62** positioned along the side support rails **36** and rollers **64** positioned adjacent second support rail **42**. Rollers **62** have a shaft member **66** extending through lower support rails **36**, and rollers **64** have shaft members **68** extending through support rail **42**. Shaft members **66** are secured to an eccentric

roller **70** to which is secured a lever member **72**. Lever member **72** is connected, as shown in FIGURE 3, to a hydraulically operated component. A first one of the lever members **72** is connected to a bracket **74** secured to one end of a hydraulic cylinder **76**. The other lever members **72** on that same side of support rail **36** is connected to a plunger member **78** operating slidably within hydraulic cylinders **76**. Thus, entrance of hydraulic fluid into hydraulic cylinders **76** causes plunger member **78** to be extended rotating lever members **72**, eccentric rollers **70**, shafts **66** and rollers **62** in directions away from the hydraulic cylinder **76**. The interaction of eccentric rollers **70** and rollers **62** causes rollers **62** to be raised vertically as hydraulic cylinder **76** is actuated to extend plunger **78**. Stop members **80** are provided to control the extension of plunger **78**, and the usual hydraulic overload may be incorporated into the system to act as a limit control.

In a similar manner shaft member **68** extending through support rail **42** are secured to eccentric rollers **80** which are attached to lever members **82**. One of the lever members **82** is pivotally connected to a bracket member **84** in the same manner that levers **72** are attached to brackets **74**. The other lever member **82** is pivotally connected to a plunger member **86** operating slidably within hydraulic cylinder **88**. Hydraulic cylinder **88** is actuated by hydraulic fluid flowing through lines **90** and by means of hydraulic lines **90** is interconnected with hydraulic cylinders **76**. Thus, when hydraulic cylinders **76** are actuated to raise lid **32** into its sealable position against opening **28**, hydraulic cylinder **88** is also actuated to raise rollers **64** at the same time and same level as rollers **62**.

Hydraulic fluid is pumped through lines **90** by means of a pump **92** operated by a motor **94**. An important part of this invention is the provision of lid closing components on each side of the lid, as shown in FIGURES 2 and 3, a closing component on each of the four sides of the rectangular lid. The significant part of this invention is that the sealing force as supplied by the hydraulic members disclosed herein is applied symmetrically around the outer lower edges of the lid. This is accomplished by providing a hydraulic cylinder which is operable on that edge of the lid which is best described as the trailing edge of the lid as the lid moves horizontally into position beneath the canning retort. With a lower lid of other geometry, such as being circular, the hydraulic members should again be disposed symmetrically around the lower lid, and one hydraulic member positioned adjacent the trailing edge.

FIGURES 2 and 3 disclose this component of the invention. An hydraulic cylinder **96** is pivotally connected at one end to pressure vessel **10** by brackets **98** and **100** as shown in FIGURE 1. Referring again to FIGURES 2 and 3, a plunger **102** operates slidably within hydraulic cylinder **96**. The exterior end of plunger **102** is pivotally connected to a lever member **104** which is securably connected to a sleeve **106** secured on axle **108**. Axle **108** rotates freely in support brackets **110** which are in turn secured to the lower portion of the pressure vessel **10** to provide support and leverage for axle **108** and its components. The ends of axle **108** extends through each of the support brackets **110**, and to either end of said shaft **108** is secured a cam member **112** which is actuated by the rotation of shaft **108**. At the lower end of cam member **112** is a roller member **114** which, upon actuation of cam member **112**, can be brought to bear against the lower surface of lid **32** to assist in raising lid **32** to a sealably closed position in the same manner as rollers **62** and **64**. Hydraulic cylinder **96** is actuated by hydraulic fluid flowing through hydraulic lines **90**. Pressurized hydraulic fluid **90** in hydraulic cylinder **96** extends plunger **102** which, because it is pivotally connected to lever **104** secured to sleeve **106** and axle **108**, rotates axle **108** which in turn rotates cam member **112** to bring cam member **112** to a position adjacent and below lid **32**, and eventually to bring roller **114** into contact with the lower surface of lid **32**. The actuation of hydraulic cylinder **96** is adjusted to coincide with the movement of lid **32** and to coincide with the actuation of hydraulic cylinders **76** and **88**.

In operation, lid **32** is brought from a fully opened position adjacent support rail **40** to a partially closed position adjacent support rail **42** by the actuation of motor **46** which causes shaft **48** to rotate causing gears **50** to mesh with racks **52** so that lid **32** moves horizontally to a position below opening **28**. As lid **32** moves to this position from its fully opened position, it rests upon rollers **44**. During this movement of lid **32** from its fully opened position to its partially closed position, hydraulic cylinder **96** is actuated so as to retract plunger **102**. This movement rotates axle **108** which causes cam member **112** to move upward and above lid **32** so as to be out of the way of lid **32**. Lid **32** is then able to move into position below lower opening **28** as described herein. Then, with lid **32** positioned below opening **28**, simultaneous actuation of hydraulic cylinders **76**, **88**, and **96** cause lid **32** to be forced upwardly sealably against sealing member **34** around lower opening **28**. Thus, actuation of hydraulic cylinder **96** as previously described, extends plunger **102** to cause cam member **112** to bring roller **114** beneath lid **32** and to assist in forcing lid **32** upwardly. At the same time, hydraulic cylinders **76** and **88** are actuated to cause levers **72** and **82** to rotate eccentric rollers **70** and **80** which act as cam members in bringing rollers **62** and **64** upwardly against the lower surface of lid **32** to assist in forcing lid **32** sealably against resilient sealing member **34**. In the operation of opening the lid **32**, hydraulic cylinder **96** is actuated to retract plunger **102** so that rollers **114** are released from below lid **32** and moved to a position out of the way above the lid, and hydraulic cylinders **76** and **88** are actuated so that plungers **78** and **86** are retracted thus lowering roller members **62** and **64**. The lid **32** is then released from a sealable engagement with opening **28** and again rests on rollers **44** with racks **52** meshing with gears **50**. Motor **46** is then actuated to cause shaft **48** and gears **50** to rotate with the meshing of gears **50** and racks **52** causing lid **32** to move horizontally to its fully open position.

Although this invention has been described with a certain degree of particularity, it is obvious that many changes may be made in the details of construction and the arrangement of components without departing from the spirit and scope of the invention which is best defined by the appended claims.

What is claimed is:

1. An improved closure for a large diameter opening of a pressure vessel, said opening having a circumferential sealing closure edge, comprising:

spaced parallel substantially horizontal support rails adjacent, below and exterior of said opening, each of said guide rails having spaced roller members;

a lower lid movable substantially horizontally relative to and parallel said opening to fully close said opening in one position and to fully expose said opening in another position;

means of controllably moving said lower lid between said fully closed position and said fully exposed position; and

means of sealably positioning said lid into pressurizable engagement with said closure edge comprising a multiplicity of rotatable eccentric cam members engaging the lower surface of said lid, at least one of said cam members positioned adjacent a trailing edge of said lid, said cam members, upon rotation thereof, moving said lower lid upwardly into said pressurizable engagement.

2. An improved closure for a large diameter opening of a pressure vessel as described in claim **1** wherein said cam member adjacent said trailing edge includes a shaft member held in position at a point above said opening and said shaft member is pivotally connected to a cam roller member and pivots said cam roller member to a

first position beneath said lid to raise said lid to a second position above and out of contact with said lid.

3. An improved closure for a large diameter opening of a pressure vessel as described in claim 2 in which each of said cam members includes hydraulic means for rotating said cam members.

4. An improved closure for a large diameter opening of a pressure vessel as described in claim 3 in which said hydraulic means are interconnected to operate said cam members simultaneously in moving said lid into said pressurizable engagement.

References Cited

FOREIGN PATENTS

369,490 2/1922 Germany.

JAMES B. MARBERT, *Primary Examiner.*