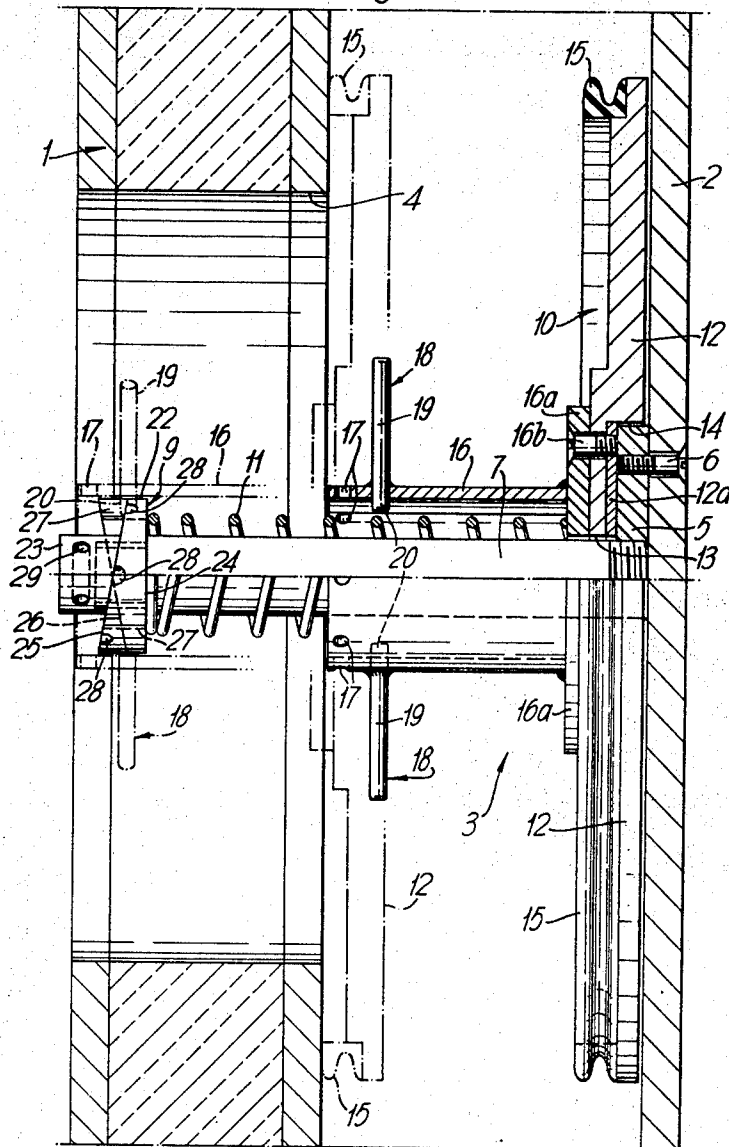


Fig. 1.



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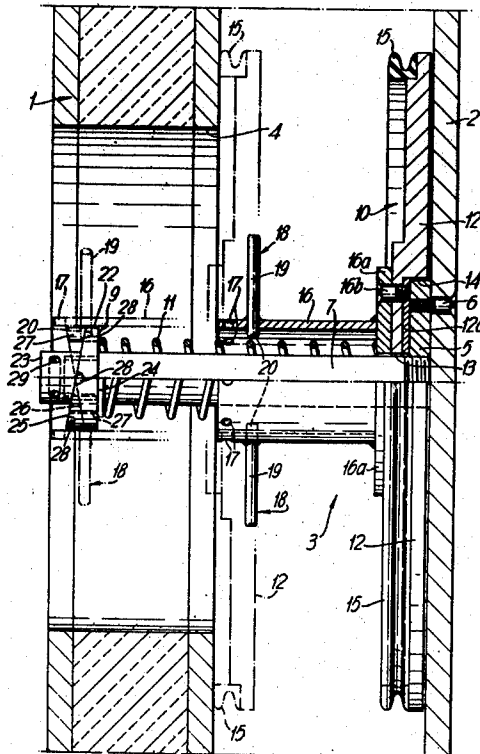
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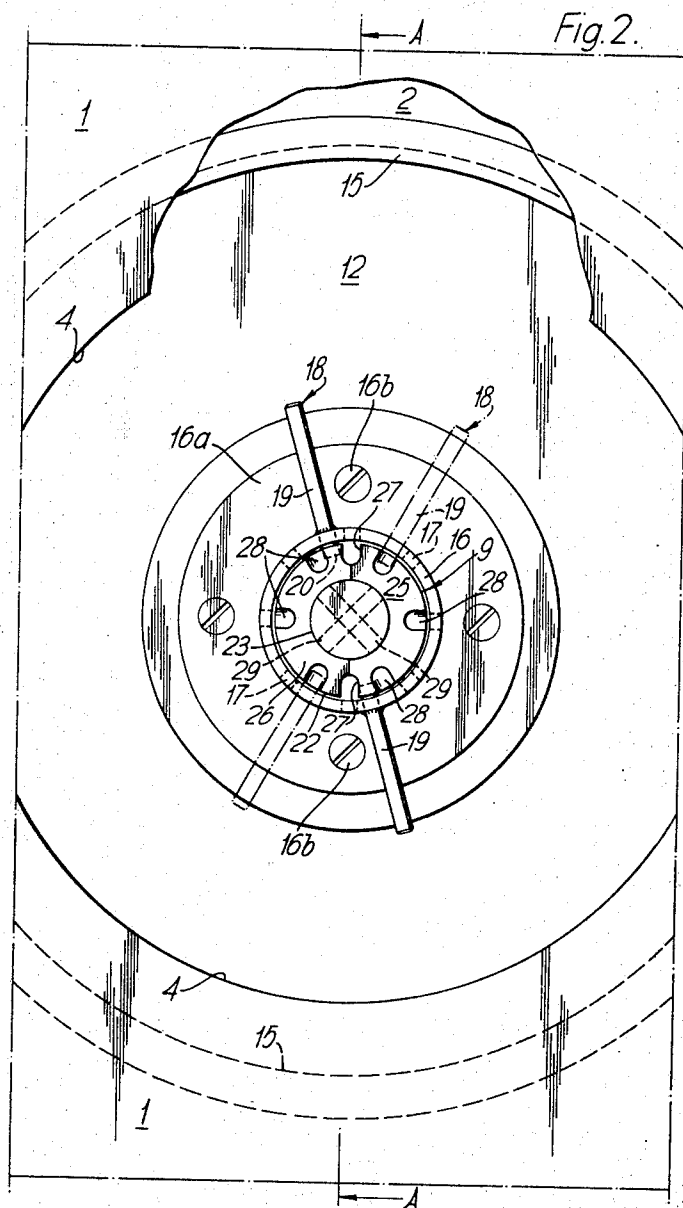
[56] **References Cited**
UNITED STATES PATENTS
2,157,731 5/1939 O'Reilly 220/25X
2,926,811 3/1960 Faust..... 220/25
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[54] **CLOSURE FOR APERTURES IN THE WALL OF A**
CONTAINER
10 Claims, 2 Drawing Figs.

[52] U.S. Cl..... 220/25,
220/40, 220/46
[51] Int. Cl..... B65d 45/00
[50] Field of Search..... 220/40, 25,
46, 55

ABSTRACT: A closure for an aperture provided in an outer wall of a container, particularly a container for refrigerated or cooled cargo, the closure being connected to the container and being movable between closed and open positions to allow temperature control of the contents of the container, said closure being slidably mounted on a spindle projecting from an internal wall of the container into the aperture in the container and being movable against a biasing force from an open position to a position in which it closes off said aperture and securing means for maintaining the closure in its closed position.





CLOSURE FOR APERTURES IN THE WALL OF A CONTAINER

This invention relates to a closure for an aperture provided in a wall of a container and is more particularly, but not exclusively, concerned with containers for refrigerated cargo. Certain types of cargo, when they are transported from one place to another, are necessarily transported in a refrigerated container, and it is necessary, during transportation of the cargo, to maintain strict control of the temperature within the container. Hence, each container, apart from being provided with doors to enable the cargo to be transferred to and from the container, is provided with one and preferably two apertures in one wall of the container, so that the container may be connected up either to a portable refrigeration unit or to a permanent refrigeration unit provided, for example, on the transporting vehicle, such as a lorry or a railway truck or an aeroplane or a ship, or provided in a warehouse or on a quay. The present invention relates to a closure for these apertures which is simple to operate and provides a good seal.

According to the present invention, we provide a closure for an aperture in a wall of a container, said closure comprising a spindle adapted to be secured to a fixture within the container spaced from the wall of the container, and in registry with the aperture in the wall, so as to project from the fixture in an outward direction to lie substantially in the centre of the aperture, a closure member slidably mounted on the spindle, means biasing the closure member to an open position and securing means associated with the closure member and spindle whereby the closure member may be secured in a position which closes the aperture in the container wall.

Preferably, the spindle is secured to a base plate which is adapted to be secured to the fixture, which maybe the rear wall of an air duct within the container, and a ratchet head is secured to the spindle adjacent its end remote from the base plate, the ratchet head being provided with two identical inclined cam surfaces on its face remote from the base plate, whilst the closure member is provided with two fixing devices arranged to engage identical portions of the inclined faces to secure the closure member in its closed position.

Preferably the closure member comprises a circular plate of greater area than the aperture and having a gasket secured to one of its faces, and a substantially cylindrical sleeve arranged concentrically of the spindle projects outwardly from the plate, the internal dimensions of the sleeve being greater than the external dimensions of the ratchet plate. Preferably both the ratchet head and sleeve are of circular cross section, and each inclined cam surface on the ratchet head is semicircular, and provided with a series of seats thereon. To enable the closure member to be secured in different positions relative to the spindle—a pair of diametrically opposed pins is provided on the sleeve. Preferably the said pins are welded to the sleeve to project radially inwardly and outwardly thereof, the outwardly projecting parts being provided to enable the closure member to be moved between open and closed positions and the inwardly projecting parts providing part of the securing means. A pair of diametrically opposed slots is preferably provided in the periphery of the ratchet head, parallel to the axis of the spindle, and registering with the beginning of the cam surfaces and of a depth sufficient to allow the inwardly projecting parts of the pins to move through the slots when the closure member is closed. On rotating the closure member relative to the spindle, the pins can then be made to move up the cam surfaces engaging the required seats on the respective inclined cam surfaces on the ratchet head. The spring bias to the sealing member is preferably provided by a coil spring mounted on the spindle and bearing at one end against the ratchet head and its other end against the circular plate of the closure member.

Preferably, means are provided on the spindle and closure member to enable a Customs seal to be applied to the closure when it is closed.

The invention is now described with reference to the accompanying drawings in which :

FIG. 1 is a half section (on the line A-A of FIG. 2) elevation of a preferred embodiment of closure fitted to a container and

FIG. 2 is a partial front elevation showing a ratchet head.

Referring to FIG. 1, a front insulating wall of the container is shown generally at 1 and the rear wall of an air duct of the container is shown at 2. A closure 3 for a circular aperture 4 in the wall 1 of the container is shown in its open position in full lines and in its closed position in broken lines. The closure 3 includes a circular base plate 5 adapted to be secured, for example by screws 6, to the wall 2 of the air duct, and a spindle 7 projecting outwardly substantially concentrically of the aperture 4, from the centre of the base plate 5. The spindle may be secured to the base plate 5 in any known manner, and as shown, is screw-threadedly engaged in an aperture therein.

In use, the free end of the spindle 7 will lie just outside the outer face of the front wall 1 of the container. A ratchet head 9 is screw-threadedly engaged on the free end of the spindle 7, although it could of course be secured to the spindle in any other known manner, for example by means of welding, shrinking or other securing means, or alternatively, it may be formed integral with the spindle. A closure member 10 is mounted on the spindle for sliding movement relative thereto and is biased away from the ratchet head 9 by means of a coil spring 11. The closure member 10 comprises a substantially circular plate 12 having a diameter somewhat larger than that of the aperture 4 so as to completely cover the aperture even if it is slightly offset therefrom, and has an aperture 13 therein of sufficient diameter to accommodate the spindle 7. A recess 14 is provided in the rear face of the plate 12 to accommodate the base plate 5 when the closure is open. A sealing gasket 15 is secured around the front periphery of the plate 12 to form a suitable seal with the rear face of the wall 1 surrounding the aperture 4. The sealing gasket 15 is made of any suitable resilient material such as foam rubber. A substantially cylindrical sleeve 16 having an annular plate 16a welded to its end is secured to the circular plate 12 by means of screws 16b passing through registering apertures in the plates 16a and 12 and engaging in threaded holes in a further annular plate 12a located in the recess 14 in the plate 12. The sleeve 16 is substantially half as long as the spindle 7, and when the circular aperture 13 in the plate 12, together with the apertures in the plates 16a and 12a thus locate the sleeve 16 for sliding movement along the spindle 7 against the bias of the spring 11, one end of which bears against the plate 16a. The internal diameter of the sleeve 16 is slightly greater than the external diameter of the ratchet head 9 to enable the sleeve to be slid over the ratchet head 9. At least two pairs of diametrically opposed apertures 17 are provided in the wall of the sleeve 16 and two diametrically opposed pins 18 are secured to the sleeve, and have a radially outwardly projecting part 19 and a radially inwardly projecting part 20.

Referring to FIGS. 1 and 2, the ratchet head 9 is circular in cross section, and has an internally screw threaded sleeve portion 21 (FIG. 1) which engages on a screw thread provided on the free end of the spindle 7, a solid flange portion 22, and an outwardly extending boss 23. The face of the flange portion 22 facing the closure member 10 (hereinafter referred to as the rear face 24) forms a suitable bearing face for the other end of the spring 11 and the front face of the flange portion 22 is divided into two identical oppositely inclined semicircular cam surfaces 25 and 26. A pair of diametrically opposed slots 27 are provided in the flange portion 22, the depth of the slots being sufficient to allow the radially inwardly projecting parts 20 of the pins 18 to pass through them. The slots 27 are arranged at the beginning of each cam surface 25 and 26. The two cam surfaces 25 and 26 are inclined at an angle of approximately 10° to either side of a plane normal to the longitudinal axis of the spindle 7, the arrangement being that, beginning at 6 o'clock in FIG. 2 on the cam surface and moving round the cam surface 26 clockwise, the cam surface is upwardly inclined until 12 o'clock, whereupon, in the region of the slot 27, a step down is provided onto the cam surface 25, which,

on further clockwise movement, is upwardly inclined until the slot 27 at 6 o'clock, where there is a step down onto the cam surface 26 again. A plurality of notches 28 is provided in each of the cam surfaces 25 and 26 around their periphery, the notches providing suitable seats for the radially inwardly projecting parts 20 of the pins 18. It will be noticed that each notch on each cam surface is diametrically opposite a similar notch on the other cam surface. It will thus be appreciated that to move the closure against the spring bias from the open position shown in full lines in FIG. 1 to a closed position shown in broken lines, it will be necessary for the closure to be pulled outwardly by means of the pins 18 against the spring bias and for the parts 20 of the pins 18 to pass through the slots 27, whereupon the whole closure can be rotated about the axis of the spindle 7 by applying a clockwise twisting action to the sleeve 16 via the parts 19, thereby causing the parts 20 of the pins 18 to ride up the cam surfaces 25 and 26. As rotation of the closure member continues in a clockwise direction, so the closure member, due to cam action, will be brought nearer to the rear face of the wall 1 of the container, and when sufficient compression of the sealing gasket 15 has occurred, the parts 20 of the pins 18 can be located in one of the sets of diametrically opposed notches 28 thereby locking the closure member in a closed position. It will be appreciated that any pair of diametrically opposed notches 27 or any diametrically opposite parts of the cam surfaces 25 and 26 will be equally spaced from the base plate of the closure member, and hence, at all times, the spring will cause the parts 20 to bear against the notches or cam surfaces with an equal force.

When it is required to reopen the aperture in the container wall, the parts 20 of the pins 18 are removed from the seats in the cam surfaces in which they are engaged by pulling on the outwardly projecting parts 19 of the pins 18 against the bias of the spring 11 and then rotating the closure member anticlockwise until the parts 20 of the pins 18 register with the slots 27. The parts 20 can pass through the slots 27 and the closure member can return to its own position shown in full lines under the bias of the spring 11.

The boss 23 on the ratchet head extends outwardly from the centre of the cam surfaces 25 and 26 substantially as an extension of the spindle 7 and is provided with at least two diametral passages 29 adapted to register with the apertures 17 in the sleeve 16 when the closure member is closed. In this manner, a Customs seal can be passed through the registering passages and apertures.

Preferably, the rear wall 2 of the air duct is hinged or portable to allow removal of the closure.

We claim:

1. In a cargo container having an aperture in a wall thereof, a closure for the aperture comprising a spindle secured to a fixture within the container spaced inwardly from said wall, so as to project from the fixture in an outward direction toward the aperture to lie substantially in the centre of the aperture, a closure member slidably mounted on the spindle, biasing means

biasing the closure member to a first position in which the aperture is open, means permitting the closure member to be moved against the bias of said biasing means from said first position to a second position in which the aperture is closed, and securing means associated with the closure member and spindle whereby the closure member may be secured in the second position.

2. A cargo container as defined in claim 1, in which the closure member in being moved from the first position to the second position is moved away from the fixture.

3. A cargo container as defined in claim 1 wherein the spindle is secured to a base plate which is adapted to be mounted on a rear wall of an air duct within the container.

4. A cargo container as defined in claim 3, including a latching head secured to the spindle adjacent its end remote from the base plate, said latching head being provided with two identical inclined surfaces on its face remote from the base plate, while the closure member is provided with two fixing devices arranged to engage identical portions of the inclined surfaces to secure the closure member in its closed position.

5. A cargo container as defined in claim 4, in which the closure member comprises a circular plate of greater area than the aperture and has a gasket secured to its operative face, and a substantially cylindrical sleeve arranged concentrically of the spindle and projecting outwardly from the circular plate, the internal dimensions of the sleeve being greater than the external dimensions of the latching head.

6. A cargo container as defined in claim 5, in which both the latching head and the sleeve are of circular cross section and each inclined surface on the latching head is semicircular.

7. A cargo container as defined in claim 6, in which the inclined surfaces are each provided with a series of seats thereon forming part of the securing means, and the remainder of the securing means include a pair of diametrically opposed pins provided on the sleeve.

8. A cargo container as defined in claim 7, in which the pins are secured to the sleeve to project radially inwardly and outwardly therefrom, the inwardly projecting parts being arranged to engage in two opposite seats, and the outwardly projecting parts providing the means permitting the closure member to be moved against the bias of the biasing means.

9. A cargo container as defined in claim 8, in which a pair of diametrically opposed slots is provided in the periphery of the latching head, said slots being parallel to the axis of the spindle and registering with the beginning of the inclined surfaces and being of a depth sufficient to allow the inwardly projecting parts of the pins to move through the slots to enable the closure member to be closed.

10. A cargo container as defined in claim 5 in which the biasing means for the closure member is provided by a coil spring mounted on the spindle and bearing at one end against the latching head and at its other end against the circular plate.

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