

PATENT SPECIFICATION

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- (21) Application No. 12455/76 (22) Filed 29 Mar. 1976
(23) Complete Specification Filed 29 Mar. 1977
(44) Complete Specification Published 12 Mar. 1980
(51) INT. CL. ³ F16J 13/00
(52) Index at Acceptance
F2P 11E 13C 13X
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(19)



(54) CONTAINER CLOSURE AND LOCKING MECHANISM THEREFOR

(71) We, SHIPOWNERS REFRIG-
ERATED CARGO RESEARCH
ASSOCIATION, a company organised
under the laws of the United Kingdom, of
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3PD, do hereby declare the invention, for
which we pray that a patent may be granted
to us, and the method by which it is to be
performed, to be particularly described in
and by the following statement:

This invention relates to a cargo container
for perishable goods which have to be kept at
a controlled temperature, and in particular to
a closure for closing off the or each air aper-
ture in an end wall of the container.

Normally, such containers have two air
apertures, one near the top of the end wall
and one near the bottom, one acting as an air
inlet and the other as an air return, and these
apertures are put in communication with air
supply and return ducts by means of special
couplings. However, at certain times the con-
tainers have to be sealed off from atmos-
phere, for example when standing on a quay
or being lifted out of the hold of a ship, and it
is then that the closures come into operation.

Closures of the general type to which this
invention relates are well known and are
normally secured to a false wall or air screen
spaced inwardly from the end wall proper of
the container, in line with the aperture in the
end wall and normally spring biased to an
open position to enable passage of air
through the aperture. It is important for such
closures to have a simple mechanism to lock
them in their closed position, which mechan-
ism cannot be damaged during movement of
the closure from an open to a closed position,
and which can be fitted easily with a customs
seal.

This invention seeks to meet all the above
requirements.

According to the present invention, we
provide a closure for an aperture in a cargo
container, the closure including a disc or

closure member biased to an open position
but movable against said bias to a closed
position and a locking mechanism for secur-
ing the disc or closure member in said closed
position, the locking mechanism including a
fixed part and a part movable in a radial
direction extending at right angles to the
direction of movement of the disc between
locking and open positions of the locking
mechanism, and means to maintain the lock-
ing mechanism in each of its positions.

Also according to the present invention,
we provide, in a cargo container having an
aperture in a wall thereof, a closure for the
aperture supported by a fixture spaced
inwardly of the wall, the closure including a
disc or closure member biased to an open
position but movable against said bias to an
aperture closing position, and a locking
mechanism for securing the disc or closure
member in said aperture closing position, the
locking mechanism including a fixed part and
a part movable in a radial direction extending
at right angles to the direction of movement
of the disc between locking and open posi-
tions of the locking mechanism and means to
maintain the locking mechanism in each of its
positions.

Preferably, the closure includes a spindle
extending from said fixture into the aperture
along its central axis and on which spindle the
disc or closure member is axially slidable
against the bias of a spring and relative to
which it can rotate.

Preferably, the spindle includes at its free
end a cam latching head forming part of the
fixed part of the locking mechanism and with
which said part co-operates.

Preferably, the movable locking mechan-
ism part is supported in a housing forming a
portion of a casting which slides axially on
the spindle and relative to which the disc can
rotate and includes a holder, the inner end of
which terminates in a pin which can be
moved from a released position into a latch-

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ing position in which it is in engagement with a recess in the cam latching head.

Preferably, the holder adjacent its inner end is formed with two side-by-side annular grooves with which a spring-loaded detent ball can engage, the spring-loaded detent ball being shaped to engage snugly with one of said grooves but the force of the spring (urging the ball into engagement with said grooves) permitting the holder to be moved axially, such movement forcing the ball out of one groove and allowing it to be urged into engagement with the other.

Preferably, the holder has at its end remote from the pin a knurled operating knob for moving the holder between its two positions.

Preferably, the holder is formed with a further annular groove between its ends which, when the holder is moved to its latching position, moves into alignment with a slot formed in the housing for the holder to enable a customs seal to be placed in position.

Preferably, the cam latching head is provided with an inclined surface which will be struck by the pin on the holder to cause the holder to move to its open or released position in the event that the pin is inadvertently in its latching position as the closure is moved to its aperture closing position.

An annular aerofoil may be supported on the (or each) closure member to improve air flow past the closure member(s). This aerofoil is the subject of our co-pending application No. 12456/76 (Serial No. 1539123).

The means for moving the closure member to its aperture closing position and the construction of the cam latching head are otherwise largely as described in our U.K. Patent No. 1,188,240.

A preferred embodiment of the invention is now described by way of example with reference to the accompanying drawings, in which:-

FIGURE 1 is a section through a closure member located on a false wall at the end of a container and shown in its open position;

FIGURE 2 is a scrap view similar to Figure 1 but showing the closure member in a closed position;

FIGURE 3 is an end view of a cam latching head, and

FIGURE 4 is an elevation of the cam latching head.

Referring to the drawings, an end wall proper of a container is shown at 1 in which is located an aperture 3, the inner periphery of which is rounded off at 5. Spaced inwardly of the end wall proper 1 is a false end wall 7 which may be of any desired thickness (see Figure 1, where plywood is shown in the upper half, and metal sheet in the lower half) and which defines with the wall 1 an air dis-

tribution space 9 extending across the whole of the front of the container. This space 9 normally communicates with a further space (not shown) defined by the bottom and a false bottom on the container so that conditioning air can pass to the whole of the interior of the container and in particular to the back. The space 9 also communicates at its top with the top of the container so that used air can be returned normally through a further aperture such as the aperture 3 to a suitable conditioning plant.

A support disc 11 is secured to the wall 7 by studs 13 and as shown is dished at 15 for location in a small opening 17 in the wall 7 and extending from the disc 11 into the aperture 3 is a spindle 19 on the end of which is fixed part 21 of a locking mechanism to be described later. Rotatably and slidably mounted on the spindle 19 is a closure member or disc 23 for closing off the aperture 3, the disc being biased to its open position as shown in Figure 1 by means of a coil spring 25 surrounding the spindle 19 and having its inner end confined by and abutting against the mechanism 21.

The outer end of the spring 25 bears against an annular member 27 which itself is located in an annular groove 29 formed in a generally annular casting 31 which itself can slide axially on the spindle 19, a self-lubricating annular seal 33 being trapped between the member 27 and the casting 31. The casting 31 passes through a central aperture in the disc 23 which is located on the casting by two self-lubricating annular rings 35 and 37, the ring 35 being located by an inclined surface 39 on the casting 31 and the ring 37 being locked in position by a circlip 41. Being of a self-lubricating nature, the rings 35 and 37 allow the disc 23 to rotate relative to the casting 31 to permit the rotational movement of the disc relative to the spindle 19.

The casting 31 supports two diametrically opposed locking pins 43 and 45, the former being fixed and the latter being supported for radial sliding movement relative to the spindle 19 in a holder 47 carried by a housing 49 forming part of the casting 31. The pin 45 is shown in its withdrawn position in Figure 1 and when it is desired to move the closure to its closed position as shown in Figure 2, the closure is pulled by hand so that the pins 43 and 45 pass through axial passageways 51 formed in a cam latching head 53 of the fixed part 21 of the locking mechanism. During movement of the pins 43 and 45 through the passageways 51, the casting 31 cannot be rotated relative to the spindle 19 but after moving through these passageways, the casting 31 can be rotated clockwise, so that the pins, when the closure is released, bear, under the influence of the spring 25, against two diametrically opposed inclined cam sur-

faces 55, the surfaces of which are interrupted by pairs of diametrically opposed notches 57, in any one of which the pins can rest. It will be appreciated that the further the casting 31 is rotated in a clockwise direction, the more the disc will be moved towards the wall 1 and the more a peripheral seal 24 carried by it will be compressed into sealing engagement with the inner face of the wall 1.

Supported on the disc 23 by means of four equally spaced pillars 61, the cross-section of which is illustrated at 63 in Figure 2, is an annular aerofoil 65 having a generally concave surface 67 and a convex rear face 69. This aerofoil directs air flowing into the container through the aperture 3 into the space 9 in the most efficient manner to ensure rapid passage of the air to the interior of the container, which means that the distance between the walls 1 and 7 can be kept to a minimum to keep the useful stowage space within the container to a maximum.

The holder 47 has a knurled operating knob 71 at its outer end and adjacent its inner end are two annular grooves 73 and 75, each arranged to co-operate with a spring-loaded detent ball 77. This ball 77 maintains the holder either in the position shown in Figure 1 or in its innermost position shown in Figure 2, it merely being necessary to push the holder in or out to change its position. Normally the holder will only be pushed to its Figure 2 or innermost position when it is desired to lock the closure in its closed Figure 2 position, in which case the pin 45 will engage in a suitable aperture 79 in the cam latching head 53. Once in this position, an annular groove 81 in the holder 47 will be brought into line with a passageway 83 formed in the housing 49 to enable a metallic tape or wire customs seal 85 to be passed through the aligned aperture and groove. An important advantage of the holder 47 and its associated movable pin 45 over prior art constructions is that if the pin has been inadvertently left in its Figure 2 position and the closure is moved to a closed position, the tip of the pin 45 will strike the inclined ramp 87 in the passageway 51 so as to move the holder 47 radially outwards to its Figure 1 position.

Although the above description has been with reference to a cargo container provided with a closure, it is to be understood that the invention also extends to a closure per se. Although the closure would normally be marketed in conjunction with a container, it is envisaged that there could be a market for the closures on their own for fitting to existing containers or for replacing damaged or worn out closures of containers.

WHAT WE CLAIM IS:-

1. A closure for an aperture in a cargo container, the closure including a disc or closure member biased to an open position

but moveable against said bias to a closed position and a locking mechanism for securing the disc or closure member in said closed position, the locking mechanism including a fixed part and a part moveable in a radial direction extending at right angles to the direction of movement of the disc between locking and open positions of the locking mechanism, and means to maintain the locking mechanism in each of its positions.

2. In a cargo container having an aperture in a wall thereof, a closure for the aperture supported by a fixture spaced inwardly of the wall, the closure including a disc or closure member biased to an open position but moveable against said bias to an aperture closing position, a locking mechanism for securing the disc or closure member in said aperture closing position, the locking mechanism including a fixed part and a part moveable in a radial direction extending at right angles to the direction of movement of the disc between its locking and open positions and means to maintain the locking mechanism in each of its positions.

3. The invention as claimed in claim 1 or 2 wherein the closure includes a spindle extending longitudinally in the direction of movement of the disc and on which spindle the disc is axially slideable against the bias of a spring and relative to which it can rotate.

4. The invention as claimed in claim 3 wherein the spindle includes at its free end a cam latching head forming part of the fixed part of the locking mechanism and with which said part moveable in a radial direction co-operates.

5. The invention as claimed in claim 4 wherein the movable locking mechanism part is supported in a housing forming a portion of a casting which slides axially on the spindle and relative to which the disc can rotate and includes a holder, the inner end of which terminates in a pin which can be moved from a release position into a latching position in which it is in engagement with a recess in the cam latching head.

6. The invention as claimed in claim 5 wherein the holder adjacent its inner end is formed with two side-by-side annular grooves with which a spring-loaded detent ball can engage, the spring-loaded detent ball being shaped to engage snugly with one of said grooves but the force of the spring (urging the ball into engagement with said grooves), permitting the holder to be moved axially, such movement forcing the ball out of one groove and allowing it to be urged into engagement with the other.

7. The invention as claimed in claim 5 or 6 wherein the holder has at its end remote from the pin a knurled operating nob for moving the holder between its two positions.

8. The invention as claimed in claim 5, 6 or 7 wherein the holder is formed with a



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faces 55, the surfaces of which are interrupted by pairs of diametrically opposed notches 57, in any one of which the pins can rest. It will be appreciated that the further the casting 31 is rotated in a clockwise direction, the more the disc will be moved towards the wall 1 and the more a peripheral seal 24 carried by it will be compressed into sealing engagement with the inner face of the wall 1.

Supported on the disc 23 by means of four equally spaced pillars 61, the cross-section of which is illustrated at 63 in Figure 2, is an annular aerofoil 65 having a generally concave surface 67 and a convex rear face 69. This aerofoil directs air flowing into the container through the aperture 3 into the space 9 in the most efficient manner to ensure rapid passage of the air to the interior of the container, which means that the distance between the walls 1 and 7 can be kept to a minimum to keep the useful stowage space within the container to a maximum.

The holder 47 has a knurled operating knob 71 at its outer end and adjacent its inner end are two annular grooves 73 and 75, each arranged to co-operate with a spring-loaded detent ball 77. This ball 77 maintains the holder either in the position shown in Figure 1 or in its innermost position shown in Figure 2, it merely being necessary to push the holder in or out to change its position. Normally the holder will only be pushed to its Figure 2 or innermost position when it is desired to lock the closure in its closed Figure 2 position, in which case the pin 45 will engage in a suitable aperture 79 in the cam latching head 53. Once in this position, an annular groove 81 in the holder 47 will be brought into line with a passageway 83 formed in the housing 49 to enable a metallic tape or wire customs seal 85 to be passed through the aligned aperture and groove. An important advantage of the holder 47 and its associated movable pin 45 over prior art constructions is that if the pin has been inadvertently left in its Figure 2 position and the closure is moved to a closed position, the tip of the pin 45 will strike the inclined ramp 87 in the passageway 51 so as to move the holder 47 radially outwards to its Figure 1 position.

Although the above description has been with reference to a cargo container provided with a closure, it is to be understood that the invention also extends to a closure per se. Although the closure would normally be marketed in conjunction with a container, it is envisaged that there could be a market for the closures on their own for fitting to existing containers or for replacing damaged or worn out closures of containers.

WHAT WE CLAIM IS:-

1. A closure for an aperture in a cargo container, the closure including a disc or closure member biased to an open position

but moveable against said bias to a closed position and a locking mechanism for securing the disc or closure member in said closed position, the locking mechanism including a fixed part and a part moveable in a radial direction extending at right angles to the direction of movement of the disc between locking and open positions of the locking mechanism, and means to maintain the locking mechanism in each of its positions.

2. In a cargo container having an aperture in a wall thereof, a closure for the aperture supported by a fixture spaced inwardly of the wall, the closure including a disc or closure member biased to an open position but moveable against said bias to an aperture closing position, a locking mechanism for securing the disc or closure member in said aperture closing position, the locking mechanism including a fixed part and a part moveable in a radial direction extending at right angles to the direction of movement of the disc between its locking and open positions and means to maintain the locking mechanism in each of its positions.

3. The invention as claimed in claim 1 or 2 wherein the closure includes a spindle extending longitudinally in the direction of movement of the disc and on which spindle the disc is axially slideable against the bias of a spring and relative to which it can rotate.

4. The invention as claimed in claim 3 wherein the spindle includes at its free end a cam latching head forming part of the fixed part of the locking mechanism and with which said part moveable in a radial direction co-operates.

5. The invention as claimed in claim 4 wherein the movable locking mechanism part is supported in a housing forming a portion of a casting which slides axially on the spindle and relative to which the disc can rotate and includes a holder, the inner end of which terminates in a pin which can be moved from a release position into a latching position in which it is in engagement with a recess in the cam latching head.

6. The invention as claimed in claim 5 wherein the holder adjacent its inner end is formed with two side-by-side annular grooves with which a spring-loaded detent ball can engage, the spring-loaded detent ball being shaped to engage snugly with one of said grooves but the force of the spring (urging the ball into engagement with said grooves), permitting the holder to be moved axially, such movement forcing the ball out of one groove and allowing it to be urged into engagement with the other.

7. The invention as claimed in claim 5 or 6 wherein the holder has at its end remote from the pin a knurled operating nob for moving the holder between its two positions.

8. The invention as claimed in claim 5, 6 or 7 wherein the holder is formed with a

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5 further annular groove between its ends
which, when the holder is moved to its latch-
ing position, moves into alignment with a slot
formed in the housing for the holder to
enable a customs seal to be placed in posi-
tion.

10 9. The invention as claimed in any of
claims 5 to 8 wherein the cam latching head is
provided with an inclined surface which will
be struck by the pin on the holder to cause
the holder to move to its open or released
position in the event that the pin is inadver-
tently in its latching position as the closure is
moved to its aperture closing position.

15 10. The invention as claimed in any one
of the preceding claims wherein an annular
aerofoil is supported on the closure member
to improve air flow past the closure member.

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Printed for Her Majesty's Stationery Office,
by Croydon Printing Company Limited, Croydon, Surrey, 1980.
Published by The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.

