United States Patent [19]

Gordon

[11] **3,874,550**

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[54] **ACCESS DOOR FOR CYLINDER**

[76] Inventor: **Jerry D. Gordon,** 10765 E. 11th St., Tulsa, Okla. 74119

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[21] Appl. No.: **372,395**

[52] **U.S. Cl.** **220/213,** 220/25; 138/92

[51] **Int. Cl.** **B65d 45/00**

[58] **Field of Search** 220/25; 138/92

[56] **References Cited**

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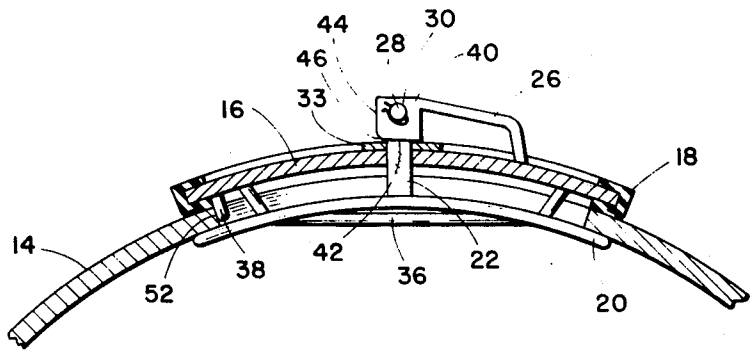
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Primary Examiner—William I. Price
Assistant Examiner—Steven M. Pollard
Attorney, Agent, or Firm—William S. Dorman

[57] **ABSTRACT**

An access door for a rectangular opening in the cylindrical wall of a cylinder comprising a curved rectangular plate of somewhat larger size than the opening in the cylinder, a gasket surrounding the side edges of the rectangular plate and providing a margin of gasket material along the side edge of the plate against the cylinder; the door also includes an arcuate, but somewhat resilient, locking band of substantially the same length as the rectangular plate; a short rod projects radially outwardly from the center of the locking band and projects through a hole in the center of the curved rectangular plate; on the end of the rod which projects through the curved plate is mounted a pivotal handle which is secured to the outer end of the rod by means of a set pin, the latter being held in place by means of a locking pin; the handle has a curved or cammed portion which bears against the outer curved surface of the curved rectangular plate and the hole in the handle through which the set pin passes is eccentrically positioned with respect to the cammed surface; thus, with the handle perpendicular to the curved rectangular plate, the band is in its maximum position away from the plate; with the handle turned against the curved rectangular plate in the opposite position, substantially 90° away from the position previously described, the band will be drawn to its closest position with respect to the plate; the plate is also provided with a pair of stiffening braces on the interior of the plate to prevent the latter from getting out of shape through mishandling, dropping, etc.; a pair of positioning pins or lugs are located on the interior surface of the plate adjacent the bottom edge.

2 Claims, 4 Drawing Figures



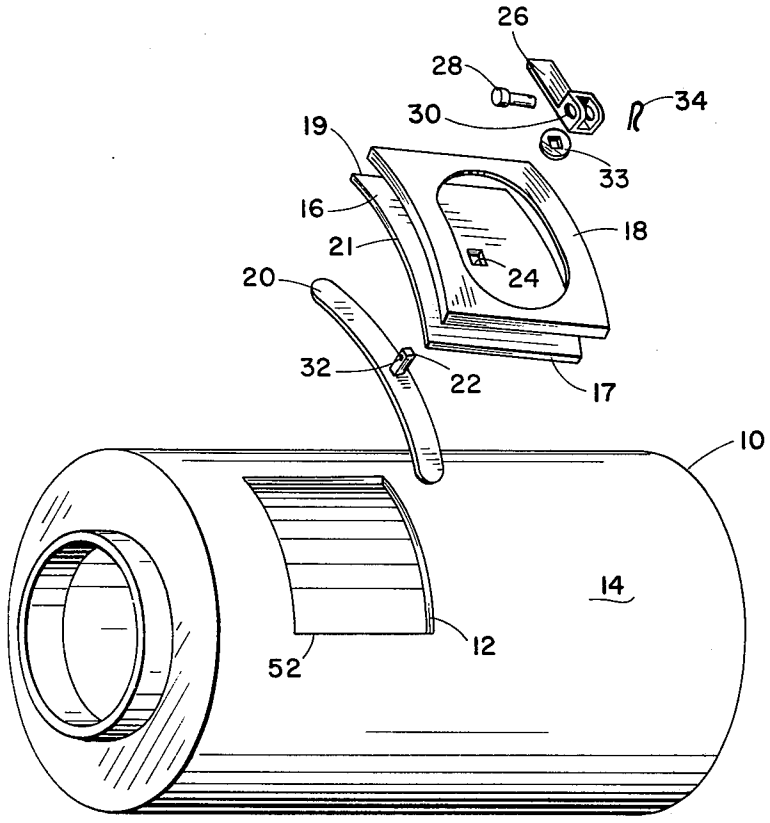

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Fig. 1

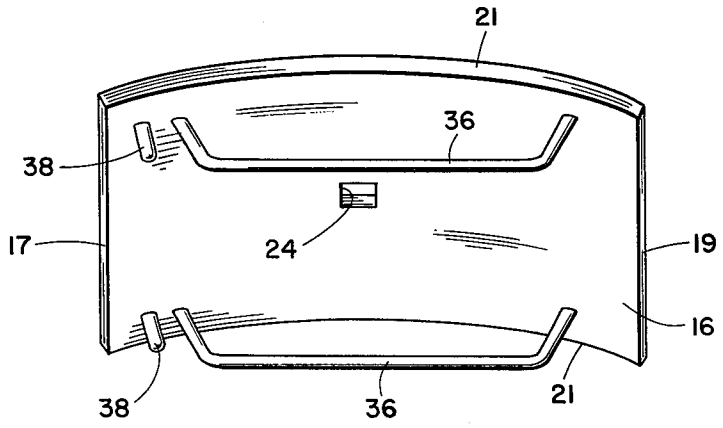

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Fig. 2

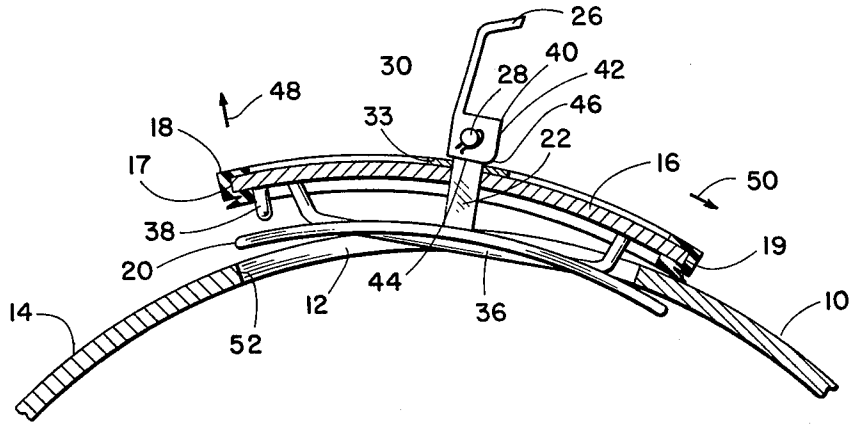

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Fig. 3

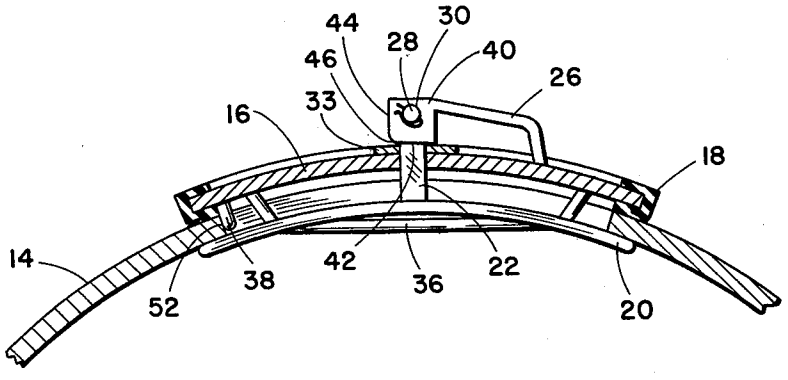

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Fig. 4

ACCESS DOOR FOR CYLINDER

CROSS-REFERENCE TO RELATED APPLICATION

This application discloses and claims an access door which is partly disclosed, but not claimed, in application Ser. No. 327,063, filed June 21, 1973, and entitled "AUTOMATIC BREADING DEVICE."

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an access door for a cylinder and, more particularly, an access door which can be properly positioned and locked in place.

2. The Prior Art

The feature of providing a curved door for an opening in a cylindrical member is shown to be old by Rasgorshek U.S. Pat. No. 291,771. Eccentrically mounted handles are also known in the art. The feature of using a gasket on a door is, of course, old. As far as the combination of features disclosed in the present invention, the prior art does not show or suggest the same.

SUMMARY OF THE INVENTION

The apparatus of the present invention involves a substantially rectangular and curved door adapted to fit over a substantially rectangular opening in the curved surface of a cylindrical member. The door includes a curved rectangular plate of somewhat larger size than the opening in the cylinder. The door is also provided with a gasket which surrounds the side edges of the door so as to bear against the cylinder when the door is properly positioned. Slidably mounted on the plate is a relatively rigid, but somewhat resilient, locking band which is arcuate in shape. A rod projects radially outward from the center of the locking band and is adapted to project through a hole in the curved plate. Preferably, the rod and the hole are square in cross section to prevent misalignment of the locking band. At any event, the rod projects through the hole and its outer end engages a handle which is secured to the outer end of the rod by means of a set pin. The set pin passes through holes in the handle and the hole in the rod. A locking pin can be inserted in the end of the set pin to hold the same in place. The holes in the handle are eccentrically positioned so that the handle acts as a cam to force the locking band into locking position when the curved plate is properly set over the opening in the cylindrical member. On the inner surface of the curved plate is mounted a pair of braces which are welded to the plate and which provide reinforcement to prevent the plate from getting out of shape through mishandling, dropping, etc. A pair of positioning pins or lugs are located on the interior surface of the curved plate adjacent the bottom edge.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded and perspective view of the cylinder, door and door components;

FIG. 2 is a perspective of the underside of the door without the gasket thereon;

FIG. 3 is a partial sectional view through the door and cylinder showing the door as it is inserted into the opening in the cylinder; and

FIG. 4 is a partial sectional view of the door and cylinder showing the door locking in position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in detail, FIG. 1 shows a cylinder **10** having a substantially rectangular opening **12** on the curved surface **14.** Also shown is a curved rectangular plate **16** of somewhat larger size than the opening **12,** but having substantially the same curvature as that of the cylinder **10.** The plate **16** is provided with a gasket **18** which is adapted to surround the side edges of the door and provide a margin of rubber or gasket material along the side edge of the door against the cylinder **10.** The plate **16** has a straight bottom edge **17** and an opposite straight top edge **19,** both edges being substantially parallel to the central axis of the cylinder **10** when the plate is in position against the cylinder. The plate **16** also has a pair of spaced and curved side edges, both identified by the reference numeral **21,** and lying in planes normal to the axis of the cylinder **10** when the plate **16** is positioned over the cylinder **10** as shown in FIGS. **3** and **4.** Cooperation with the plate **16** is a relatively rigid, but somewhat resilient, locking band **20** which is arcuate in shape and which is of substantially the same length as the length of the plate **16.** A rod **22** having a substantially square cross section, projects radially outward from the center of the locking band **20** and is adapted to project through a square hole **24** in the plate **16,** the square hole being of substantially the same size as the cross-sectional size of the rod **22.**

A handle **26** is secured to the outer end of the rod **22** by means of a set pin **28** which passes through holes **30** in the handle and a hole **32** in the rod **22.** A round washer **33** having a square hole in the center is mounted on the rod **22** between the handle **26** and the curved surface of the curved rectangular plate **16.** A locking pin **34** can be employed to hold the set pin **28** in place, if desired. With the handle in the position shown in FIG. **3,** the band **20** is in its maximum position away from the concave surface of the plate **16;** with the handle **26** in the folded-down position as shown in FIG. **4,** the band **20** is drawn to its closest position with respect to the plate **16.**

As best shown in FIG. **2,** a pair of braces **36** are welded to the interior of the plate **16** for the purpose of providing reinforcement to prevent the plate from getting out of shape through mishandling, dropping, etc. The major straight portions of these reinforcing braces **36** are substantially chordal with respect to the central axis of the cylinder **10** when the plate **16** is in the closed position shown in FIG. **4.** A pair of positioning pins **38** are also located on the interior surface of the plate adjacent the bottom edge **17.**

The handle **26** has a cam member **40** formed by a first relatively flat portion **42** connecting with a second relatively flat portion **44** by means of the rounded portion **46.** The holes **30** in the handle **26** are closer to the flat portion **44** than they are to the flat portion **42** to effect the camming action to be described below.

Turning now to a consideration of FIG. **3,** the door **16,** with gasket **18,** band **20,** handle **26,** etc., attached, is inserted into the opening **12** by tipping the lower end of the plate **16** slightly upwardly as shown by the arrow **48** so that the upper edge **19** of the plate is outside of the cylinder **10** and the upper end of the locking band **20** is inside the cylinder. The door is moved upwardly (towards the right as shown by the arrow **50**) from this position until the lower end of the locking band **20** can

pass beyond the lower edge **52** of the opening **12.** At this point, the lower end of the door **16** is moved radially inward towards the cylinder opposite to the direction of the arrow **48** so that the door now lies flat against the curved surface **14** of the cylinder. The door is now moved downwardly (towards the left) until the positioning lugs **38** comes to rest against the lower edge **52** of the opening **12.** At this point, the door is properly positioned and the handle **26** is rotated clockwise to lock the door in position as shown in FIG. **4.** The locking action takes place, of course, by virtue of the fact that the ends of the locking band **20** are urged against the inside of the cylinder **10** adjacent the centers of the upper and lower edges of the opening **12.**

The locking action is effected by the cam **40** on the handle **26.** The cam **40** bears against the convex surface of the rectangular plate **16,** or more properly, against the washer **33** which is interposed between the handle and the plate. Since the holes **30** in the handle **26** are closer to the flat portion **44** of the cam, when the handle is turned clockwise until the flat portion **42** is against the washer **33,** the rod **22** will be drawn out radially to its maximum extent and the locking band **20** will be at its closest position with respect to the concave surface of the curved rectangular plate **16.**

Whereas the present invention has been descrived in particular relation to the drawings set forth herein, it should be understood that other and further modifications, apart from those shown or suggested herein, may be made within the spirit and scope of this invention.

What is claimed is:

1. An access door for a rectangular opening in the cylindrical wall of a cylindrical member comprising a substantially rectangular and curved plate having substantially the same curvature as that of the cylindrical wall and having a size somewhat larger than the opening in the rectangular wall, said curved rectangular plate being further defined by a pair of spaced and straight end edges parallel to the axis of the cylindrical member and a pair of curved side edges spaced from each other and lying in planes normal to the central axis of the cylindrical member, a curved and resilient locking band radially slidably mounted against the concave face of said curved rectangular plate and being disposed generally parallel to the curved side edges of said locking plate, said curved locking band having a length substantially equal to the distance between the end edges of said plate, a substantially radial rod connected to the center of said locking band and passing through a hole adjacent the center of said plate, a handle mounted on the outer end of said rod adjacent the convex surface of said plate, said handle being mounted on said rod by means of a set pin passing through suitable holes in said handle and said rod, said handle having a cam member adapted to bear against the convex surface of said plate, said holes being mounted eccentrically in said cam member, a gasket surrounding the edges of said curved rectangular plate and adapted to be positioned between said plate and said cylinder when said plate is in position, a pair of stiffening braces secured to the concave surface of said plate and being spaced from each other, said stiffening braces being substantially chordal with respect to the central axis of said cylindrical member and a pair of positioning lugs projecting radially inward towards the central axis of said cylindrical member and being located adjacent one edge of said curved rectangular plate.

2. An access door for a cylindrical member as set forth in claim **1** wherein the rod is substantially rectangular in cross section and wherein the central hole in said curved rectangular plate is square and of substantially the same size as the cross sectional size of said rod.

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