April 9, 1968 J. V. PASTVA 3,377,091

ROLL UP DOOR LOCK

Filed Dec. 2, 1965 4 Sheets-Sheet 1

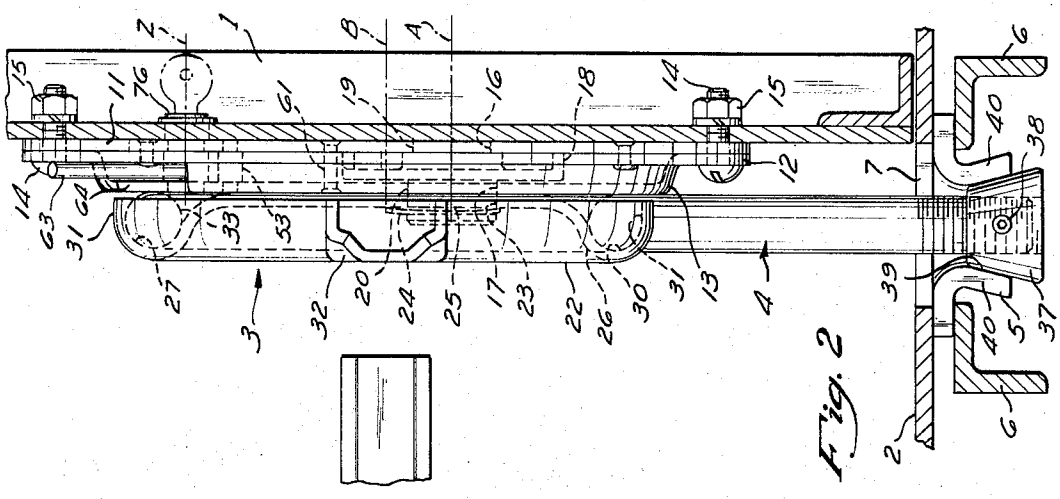


Fig. 2

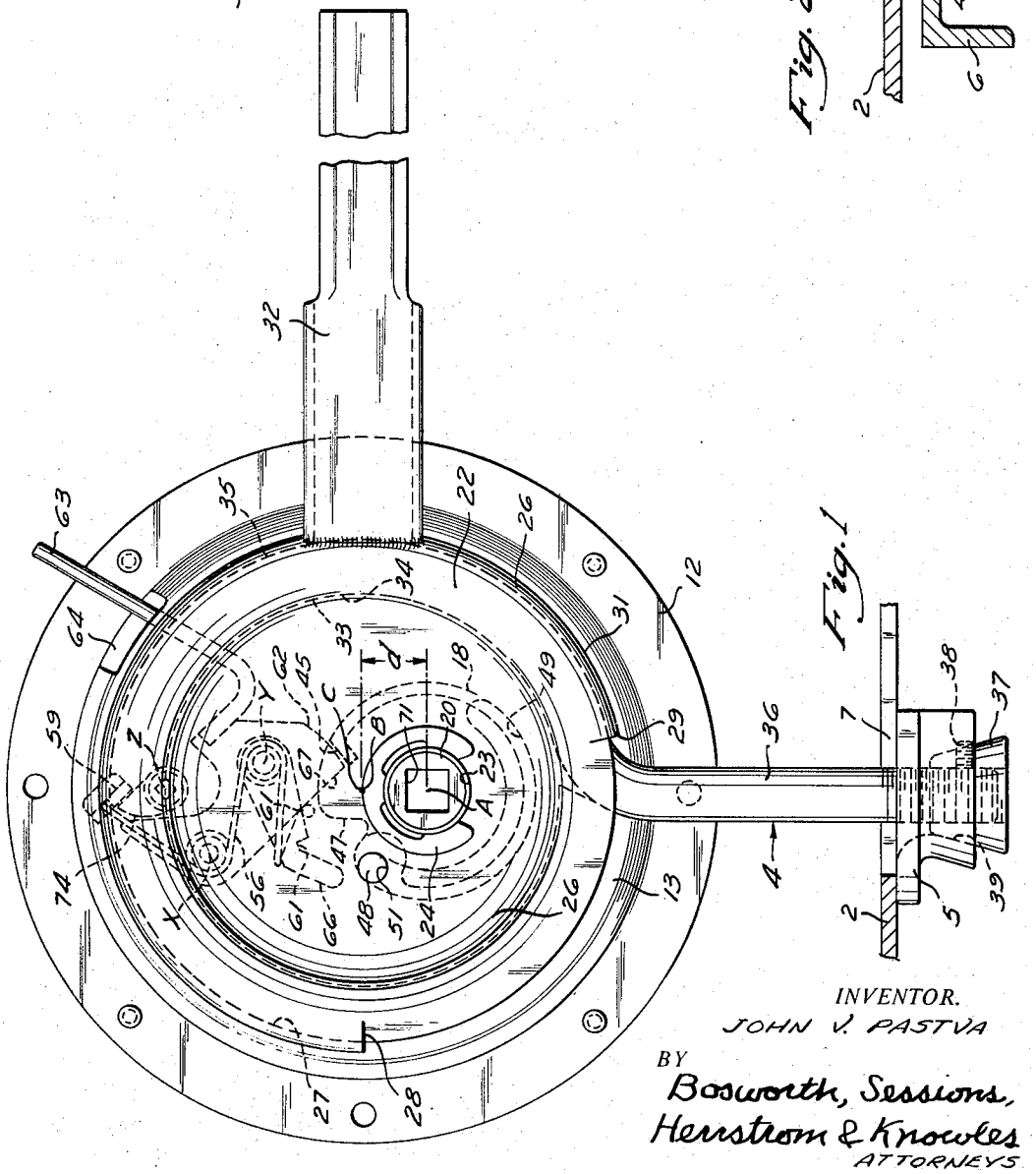


Fig. 1

INVENTOR.
JOHN V. PASTVA

BY
Bosworth, Sessions,
Herstrom & Knowles
ATTORNEYS

April 9, 1968 J. V. PASTVA 3,377,091

ROLL UP DOOR LOCK

Filed Dec. 2, 1965 4 Sheets-Sheet 2

Fig. 3

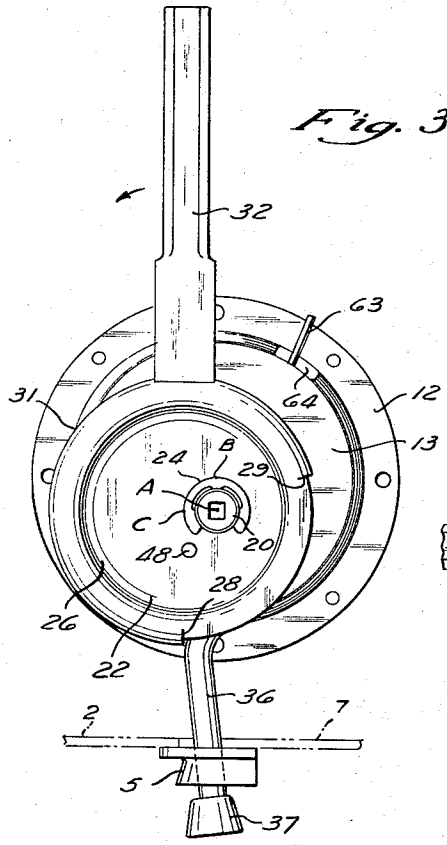
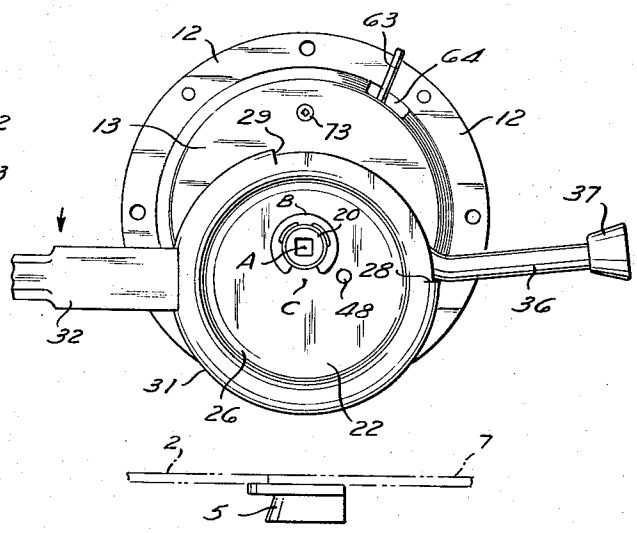


Fig. 4



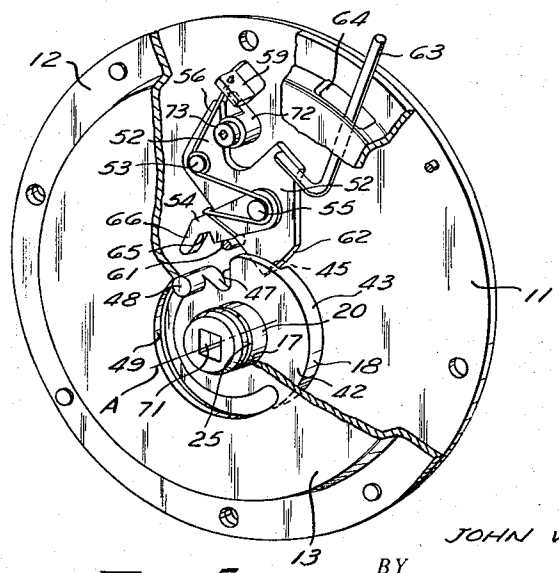


Fig. 5

INVENTOR.
JOHN V. PASTVA

BY
Bosworth, Sessions, Herstrom & Knowles
ATTORNEYS

April 9, 1968 J. V. PASTVA 3,377,091

ROLL UP DOOR LOCK

Filed Dec. 2, 1965 4 Sheets-Sheet 3

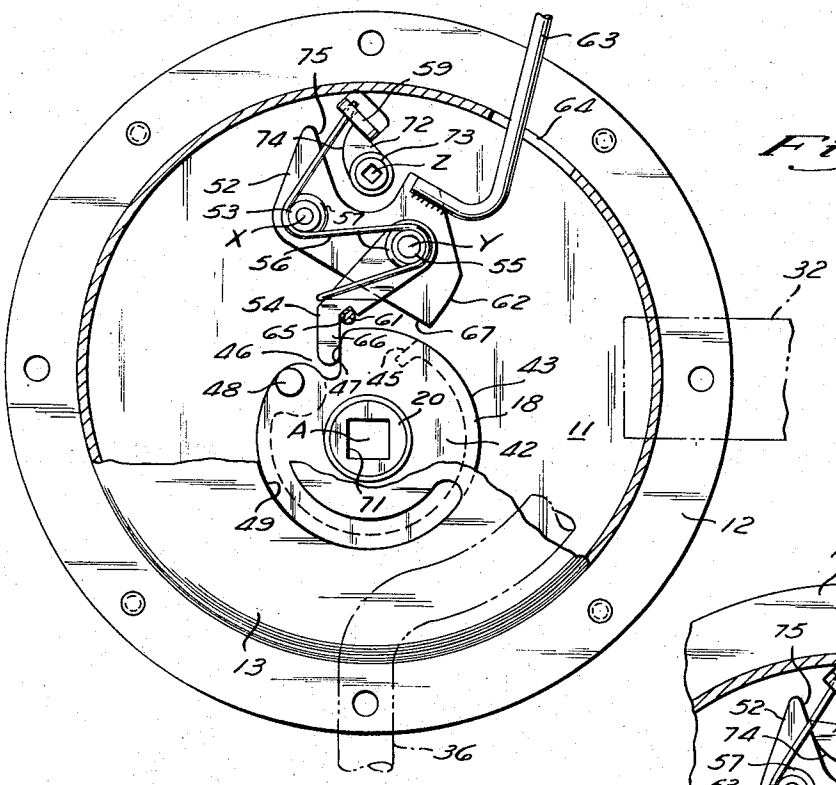


Fig. 6

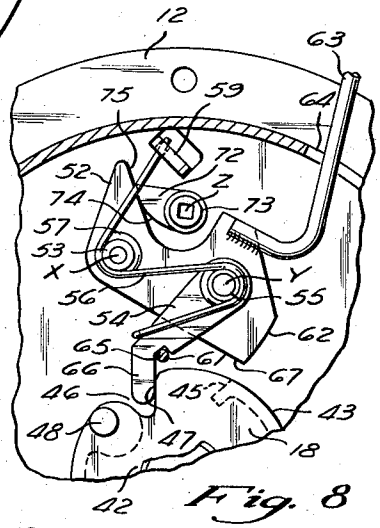


Fig. 8

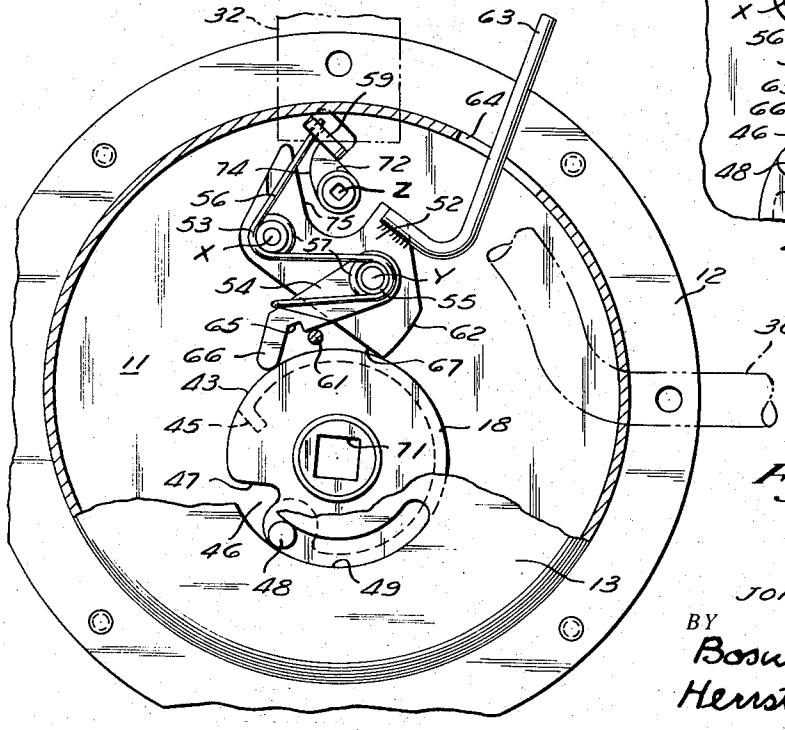


Fig. 7

INVENTOR.
JOHN V. PASTVA
BY
Bosworth, Sessions, Herstrom & Knowles
ATTORNEYS

April 9, 1968 J. V. PASTVA 3,377,091

ROLL UP DOOR LOCK

Filed Dec. 2, 1965 4 Sheets-Sheet 4

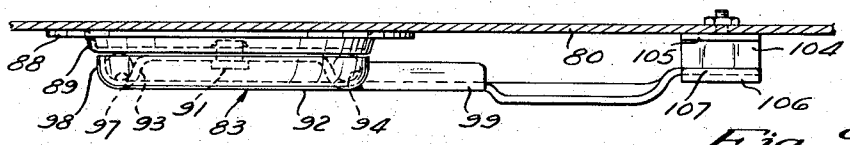


Fig. 9

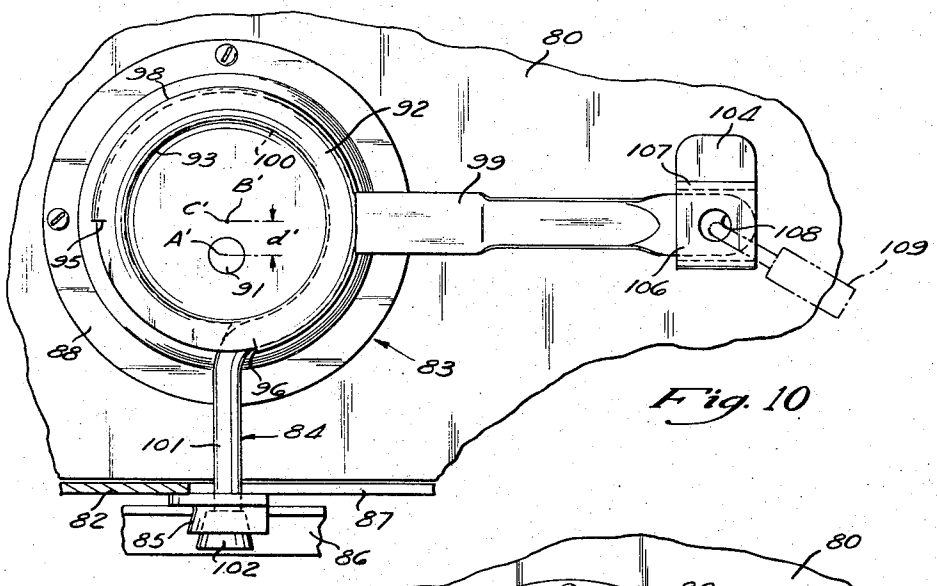


Fig. 10

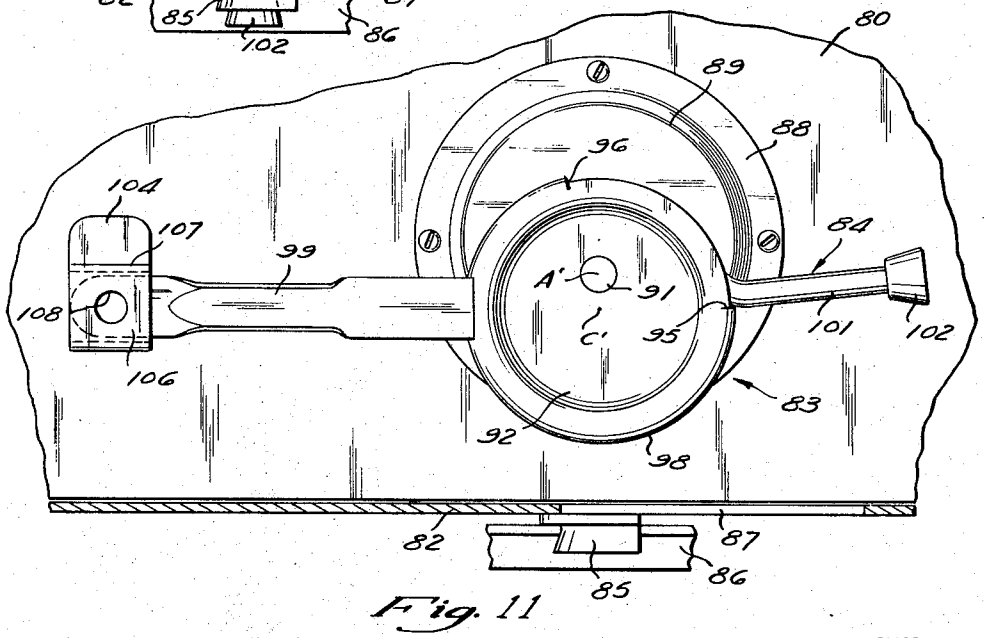


Fig. 11

INVENTOR.
JOHN V. PASTVA

BY
Bosworth, Sessions, Herrstrom & Knowles
ATTORNEYS

United States Patent Office

3,377,091

Patented Apr. 9, 1968

3,377,091

ROLL UP DOOR LOCK

John V. Pastva, Parma Heights, Ohio, assignor to The Eastern Company, Cleveland, Ohio, a corporation of Connecticut

Filed Dec. 2, 1965, Ser. No. 511,048
9 Claims. (Cl. 292—65)

ABSTRACT OF THE DISCLOSURE

A lock for locking two parts comprising a keeper member on one of the parts and a non-rotatable base member on the other of the parts, a latch member having a latch portion at one end and an opening spaced therefrom, and a movable member rotatably mounted on the base member and engaging the opening to permit eccentric relative rotation of the latch member, the movable member having means for positively moving the latch member toward and away from the keeper member on rotation of the movable member.

This invention relation to locks, and more particularly to locks of the type in which an arm that is swingably mounted on one part to be locked is adapted to engage a keeper member mounted on the other part to be locked.

It is an object of this invention to provide an improved lock of this type adapted to be quickly and easily installed and which is of rugged and durable character, comprising a relatively small number of parts adapted to be economically produced, most of them by pressing of sheet metal, and to be assembled readily.

Another object of this invention is to provide a lock of this character which is particularly adapted to lock a door that in opening moves away from a sill member or the like in a path which is planar at least for a portion of its travel near the sill member; such a door, for example, as a vehicle trailer body door of the roll-up type.

Another object of this invention is to provide a lock, such as a door lock, that is adapted to be actuated from either inside or outside the door.

A further object is the provision of such a lock which is adapted to be locked, so its latch arm is held in locking position, from either the inside or the outside of a door.

Other objects and advantages of the invention reside in the combinations or arrangements of parts and features of design and construction which provide simplicity and economy in manufacturing, servicing and repairing. The various objects will become apparent as the description proceeds, such description being made with reference to the accompanying drawings forming a part of the specification.

In the drawings:

FIGURE 1 is a front elevational view of one embodiment of the invention in which the lock is mounted on the inside of a roll-up vehicle body door, the lock being shown as locked, this lock being adapted to be actuated from either the inside or outside of a door and to be locked and unlocked from inside or outside a door;

FIGURE 2 is a side elevation of the lock of FIGURE 1 and to the same scale, a section being taken through the door and the sill supporting the lock;

FIGURE 3 is a front elevation to a smaller scale showing the actuating handle partially turned counterclockwise to unlocking position so the latch arm is partially disengaged from the keeper member;

FIGURE 4 is a view of the lock of FIGURE 1, to the same scale as FIGURE 3, showing the latch arm completely unlocked from the keeper member;

FIGURE 5 is a perspective to a scale larger than that of FIGURES 3 and 4 and somewhat smaller than that of

FIGURES 1 and 2, showing parts of the interior locking mechanism of the lock when the parts are positioned to lock the latch arm in the keeper member, parts being omitted and others being broken away for the sake of clearness;

FIGURE 6 is a front elevational view of the lock, parts being omitted and others broken away for the sake of clearness to show parts of the interior locking mechanism of the lock when the parts are initially positioned to release the latch arm;

FIGURE 7 is another view, corresponding generally to FIGURE 6, but showing the interior locking mechanism parts positioned during rotation of the latch arm of the lock;

FIGURE 8 is a fragmentary view, corresponding generally to FIGURES 6 and 7 and to the same scale, showing actuation of the interior locking mechanism from outside the door to release the latch arm;

FIGURE 9 is an elevation of another embodiment of the invention, from the top, shown as mounted on the outside of a roll-up door of a vehicle body;

FIGURE 10 is a front view of this embodiment with the latch arm in locking position; and

FIGURE 11 is another front elevation showing its latch arm in completely unlocked position.

As shown in FIGURES 1 and 2, the door **1**, which may be a conventional door such as a roll-up door on a truck trailer, is locked to the doorsill **2** by a lock **3** embodying the invention and having a latch member **4** that engages a lower keeper member **5** mounted on a cross member **6** that forms part of the frame and rear doorsill structures of the trailer body. Doorsill member **6** is slotted at **7** to prevent interference with latch member **4** as it swings.

Lock **3** comprises a back plate **11** to which is fixed a cover plate **12** having a raised center portion **13** that encloses interior locking mechanism to be described later. The back plate, the fixed cover plate, and the raised portion **13** of the cover plate are preferably all circular and concentric to each other, as shown. The base member formed of the back plate **11** and the cover plate **12** is rigidly fixed to the door **1** by bolts **14** and nuts **15**.

Both of these plates **11** and **12** have circular openings **16** and **17** that are coaxial about an axis A that is offset downwardly by a distance *d* in a vertical plane from the axis B about which the plates **11** and **12** are circular.

Mounted between the back plate **11** and the inside of the raised portion **13** of the cover plate **12** is a pivot member **18**, which also acts as a tumbler, having a circular pivot boss **19** that projects through opening **16** in the back plate **11** and a pivot boss **20** that projects through opening **17** in the cover plate **12**.

A movable cover **22** is rotatably mounted by its opening **23**, on the projecting boss **20** of member **18**, and is held in place axially by conventional restraining ring **24** snapped in groove **25** near the outer end of boss **20**. Cover **22**, which is preferably formed of pressed sheet metal, has a continuous outwardly-facing circular shoulder **26** forming part of an annular groove or channel **27** that is circular about an axis C. Axis C is offset from axis A by a distance equal to the distance *d* separating the axes A and B. Consequently, when the cover **22** is in the position shown in FIGURE 1 in which the lock **3** is locked, axis C essentially coincides with axis B.

As shown in FIGURE 1 in the illustrated embodiment, the outer periphery of annular groove **27** is interrupted over an arc of essentially 105° to define two shoulders **28** and **29**. Channel **27** therefore is defined by continuous outwardly-facing inner shoulder **26**, a continuous flange portion **30** that faces base plate **12** and a partial outer peripheral wall **31** having an inwardly-facing surface or shoulder that extends for essentially

255° around the periphery of cover **22** between shoulders **28** and **29**, all formed in cover **22**; and by the front face of plate **12**. An actuating handle **32** is rigidly fixed, as by welding, to movable cover **22**.

Latch member **4** comprises an eye-shaped portion **33**, having a circular inner opening **34** and a circular outer periphery **35**, from the lower portion of which projects a locking arm **36**. This eye-shaped portion **33** is of such size and cross-sectional configuration that it fits relatively closely, but loosely within the annular channel **27** between movable cover **22** and the raised portion **13** of fixed cover plate **12**, with arm **36** projecting out of the space between shoulders **28** and **29**.

The free end of arm **36** has adjustably threaded thereon a wedge member **37** fixed in place by set screw **38**. When the apparatus is locked, this wedge member engages keeper member **5**, which in plan has a U-shaped opening **39** that has upwardly-, inwardly-sloping sides **40** to fit and closely engage the correspondingly shaped sides of the wedge member **37**. Preferably, latch member **4** is formed of round-sectional bar stock that is bent to shape and has its end in the eye-portion welded to provide continuous metal at this location..

The parts are arranged so that, as shown in FIGURE 1, when actuating handle **32** is turned to its extreme horizontal position in clockwise direction when the lock is viewed by facing the cover **22**, the arm **36** of the latch member **4** is essentially vertical and its wedge member **37** is locked in the keeper member **5**. When the handle **32** is moved in a counterclockwise direction for about 90°, the eccentric mounting of the movable cover **22** on boss **20** causes the end of the arm **36** to move initially downwardly, as shown in FIGURE 3, to a position where its wedge member **37** is completely disengaged from the keeper member **5** but its arm **4** extends through member **5**.

Continued counterclockwise movement of the handle and cover **22** until the handle extends generally horizontally essentially 180° from its original position, as shown in FIGURE 4, causes shoulder **28** of member **22** to engage the arm **36** of latch member **4** adjacent the eye-shaped portion and move the arm **36** in a counterclockwise direction entirely out of keeper member **5** until the arm **36** is in a generally horizontal position, shown in FIGURE 4. The lock is now completely unlocked and the door **1** can be moved upwardly to any desired position.

Assuming that the door is closed and handle **32** positioned as in FIGURE 4, the latch member **4** can be engaged with keeper **5** by turning the handle **32** clockwise. After the handle has been turned clockwise approximately 90° so it is essentially vertical, the shoulder **29** of cover **22** engages the portion of arm **36** downwardly, if the arm has not already moved downwardly under the influence of gravity. On movement of the handle **32** clockwise to its original horizontal position, the shoulder **29** positively moves the arm **36** clockwise until its wedge member **37** fully seats in the opening **39** of keeper member **5**, as shown in FIGURE 1.

This embodiment of the invention also includes means permitting the apparatus **3** to be actuated from outside the door, and also means permitting the apparatus to be unlocked by a key outside the door.

Furthermore, when the cover **22** is turned to its locking position either from inside the door or outside the door, internal locking mechanism automatically locks the lock **3** in its locked position so that it must be unlocked from inside the door or from outside the door with a key.

To accomplish these objectives, the above described member **18** (FIGURES 5, 6 and 7) that rotatably supports cover **22** is itself rotatably mounted on bosses **19** and **20** journalled in back plate **11** and fixed cover plate **12**. Member **18** also has a radial wall **42** carrying a generally axial peripheral wall **43** that is circular around axis

A for a major portion of the periphery of the member **18**; this wall **43** is interrupted and terminates in a locking wall **45**. Radial wall **42** has a notch **46** with a bearing surface **47**.

The radial wall **42** adjacent notch **46** carries a pin **48** extending through slot **49** in fixed cover plate **12** centered on axis A, and into an opening **51** in the movable cover **22**. Therefore pin **48** causes member **18** to rotate as the cover **22** rotates, and also by its contact with the ends of slot **49** limits the amount the cover **22** can rotate.

A tumbler-locking member **52** is pivotally mounted about an axis X between back plate **11** and cover plate **12**, by a pin **53** secured in coaxial openings in the plates **11** and **12**. A trigger member **54** is pivotally mounted about an axis Y on a pivot pin **55** on member **52**. Axis Y is substantially offset relative to axis X, and trigger member **54** extends generally opposite to the direction that member **52** extends.

Tumbler-locking member **52** is biased for movement toward the member **18**, and trigger member **54** is also biased on member **52** for movement toward member **18**, by a spring **56**. The spring, of generally Z-shaped configuration, has helical bearing portions **57** surrounding pin **53** and (is U-shaped to loop about) pin **55**, to locate the spring; one end of the spring engages a lug **59** fixed to the back plate **11** inside the raised portion **13** of the fixed cover plate, and the other end bears against the trigger member **54** to urge it toward member **18**.

When lock **3** is locked (FIGURES 1 and 5) trigger member **54** normally bears against a pin **61** fixed to and projecting outwardly from the fixed cover plate **12**, and the tumbler-locking member **52** is in its extreme clockwise position in which its locking surface **62** engages the locking surface **45** of the member **18** to lock member **18** against counterclockwise rotation. Since pin **48** of member **18** engages cover **22** it also locks cover **22** against counterclockwise movement which would permit opening of the lock **3**.

The tumbler-locking member **52** has a releasing handle **63** that extends generally radially outwardly through slot **64** in raised portion **13** of fixed cover plate **12**. When handle **63** is moved to the left in FIGURES 1, 3–5, the member **52** pivots about its pin **53** until a notch **65** of trigger member **54** engages the pin **61** to hold temporarily the tumbler-locking member **52** in a position in which its surface **62** clears surface **45** of the member **18**; notch **46** in member **18** provides necessary clearance (FIGURE 6). Handle **32** can now be turned counterclockwise to unlock the apparatus **3** as previously described; when handle **32** is partly turned counterclockwise, movable cover **22** turns tumbler member **18** until its bearing surface **47** engages a projecting finger portion **66** of trigger member **54** (FIGURE 6) and raises member **54** so its notch **65** disengages from pin **61**. While biasing spring **56** urges the tumbler-locking member **52** clockwise, it cannot lock member **18** because its lower edge **67** (FIGURE 7) rides on the outer circular axially-extending wall **43** of tumbler member **18** throughout the remaining angular movement of member **18** to its position corresponding to the position of cover plate **22** shown in FIGURE 4.

When movable cover **22** is turned clockwise toward locking position shown in FIGURE 1, the edge **67** of the tumbler-locking member moves on the circular wall **43** of the member **18** until the surface **45** of the member **18** clears the surface **62** of the tumbler-locking member **52**, when the spring **56** moves the locking member **52** clockwise so its locking surface **62** is adjacent surface **45** on tumbler **18**. Tumbler **18**, and movable cover plate **22** are then locked against counterclockwise turning and the latch member **4** is locked into engagement with keeper **5**.

The member **18** has a coaxial square cross-sectioned opening **71** that is accessible and permits entry from outside the door of a crank having a matching square cross section member. Rotation of the crank handle in the

proper direction then will permit opening of the door lock from outside the door once the tumbler-locking member **52** has been released.

The illustrated means for releasing the tumbler-locking member from outside the door comprises a cam member **72** (FIGURES 1, 5–8) that is mounted between the back plate **11** and the raised portion **13** of the fixed cover plate **12** for at least partial rotation about an axis Z parallel to axes A and X. This cam member has a portion **73**, accessible from the outside of the door, that permits it to be turned about its axis; it also has a curved cam portion **74** that, on rotation of the cam member, engages a surface **75** (FIGURE 8) on tumbler-locking member **52** offset from and so related to the pivot axis X of member **52** that member **52** rotates counterclockwise about axis X sufficiently to lift its locking surface **62** out of engagement with the bearing surface **45** of the member **18** and to engage trigger member **54** with pin **61**, thus releasing the member **18** and the movable cover plate **22** for rotation. Cam member **72** preferably is locked, and rotated when unlocked, from outside the door by suitable key-locking means **76** such as a conventional key-operated pillar lock, or other types of conventional locking mechanisms could be used, including those utilizing padlocks.

After the cam member **72** has been unlocked from the outside and has been rotated to release the tumbler-locking member **52** from the tumbler member **18**, the apparatus can be locked or unlocked from the outside by a crank or the like that engages the square hole **71** in the tumbler member **18**.

The embodiment of FIGURES 9, 10 and 11 shows a modification operating on a similar principle in which, however, the lock is mounted on the outside of a roll-up door on a truck trailer and is locked by a separate lock such as a padlock.

In this modification, the truck trailer door **80** is locked to the doorsill **82** by a lock **83** having a latch member **84** that engages a keeper member **85** mounted on cross member **86** that extends across the trailer body at its rear end. Cross member **86** is slotted at **87** to clear latch arm **84** when it swings.

The lock **83** comprises a circular backplate **88**, preferably formed of pressed sheet metal, fixed to the outside of the door **1** and having a raised portion **89** coaxial with the center of the plate **88**. The backplate **88** carries a pivot member **91** circular about a fixed axis A′ that is offset downwardly by a distance *d′* in a vertical plane from the axis B′ about which the plate **88** and its raised portion **89** are circular.

A movable cover **92**, preferably formed of pressed sheet metal, is rotatably mounted on pivot member **91**, being held in place axially by suitable means. Cover **92** has a continuous outwardly-facing circular shoulder **93** circular about an axis C′. Axis C′ is offset from axis A by a distance equal to the distance *d′* separating the axes A′ and B′. Consequently, when the movable cover **92** is in the locked position shown in FIGURE 10, axis C′ essentially coincides with axis A′.

The outer periphery of the annular channel **94** of cover **92** is interrupted to define two shoulders **95** and **96**. Channel **94** thus is defined by a continuous outwardly-facing inner shoulder **93**, a continuous flange portion **97** and an inwardly-facing outer shoulder on partial wall **98** on member **92**; and by back plate **88**. An actuating handle **99** is rigidly fixed to movable cover **92**.

The latch member **84** is like latch member **4** of the previous embodiment and similarly formed of round bar stock. It has an eye-shaped portion **100** from the lower portion of which projects a latch arm **101**. This eye-shaped portion fits relatively closely but loosely within the channel **94** with arm **101** projecting out of the space between the shoulders **95** and **96**.

Arm **101** has adjustably mounted on its free end a wedge member **102** that, when the apparatus is locked, engages the keeper member **85** which in plan has a U-shaped opening with sloping sides that closely engages the sloping sides of wedge member **102**.

When, as shown in FIGURE 10, the actuating handle **99** is turned clockwise to its extreme horizontal position when the lock is viewed by one facing the cover **92**, the arm **101** is essentially vertical and the wedge member **102** closely engages the keeper member **85** and the apparatus is locked. When the handle is moved counterclockwise for about 90°, the eccentric mounting of the cover **92** on pivot member **91** causes the end of arm **101** initially to move downwardly as in the previous embodiment to a maximum position where its wedge member **102** disengages from keeper member **85**.

Continued counterclockwise movement of the handle **99** until it extends generally horizontally essentially 180° from its original position, as shown in FIGURE 11, causes the shoulder **95** of the cover **92** to engage the arm **101** of the latch member and move it counterclockwise entirely out of keeper member **85** until the arm moves to an opposite generally horizontal position, as shown in FIGURE 11. The lock is now completely unlocked and the door **80** can be opened by raising to any desired position.

Once the door has been closed, the handle **99** can be turned clockwise to its original position shown in FIGURE 10. Initial clockwise turning of the handle for about 90° causes the shoulder **96** of cover **92** to engage the latch arm **101** if it has not already moved downwardly by gravity. Continuing clockwise turning of the handle **99** to its original horizontal position causes shoulder **96** positively to move arm **101** clockwise until its wedge member **102** moves to its extreme limit of travel in the opening of keeper member **85**, as shown in FIGURE 10.

In this embodiment of the invention, clamps **104** receive the end of handle **99** when in the above generally horizontal positions. Each clamp **104** is generally U-shaped in cross section, having a back wall **105** by which it is fixed to the door and a front wall **106** the upper edge of which is inwardly turned at **107**. When the end of the handle **99** is received in the clamp, it is securely held between the back and front walls and under the inturned edge. If desired, each clamp may have an opening **108** in its front wall that matches a corresponding opening in the handle. The hasp of a suitable lock, such as a padlock **109** shown in broken lines in FIGURE 10, may then be passed through both openings to lock the handle either in the locked or unlocked position.

From the foregoing description and explanation of structures and modes of operation of two embodiments of the invention, it is apparent that the lock of this invention is particularly well adapted for use on doors that open by pulling away from a sill member or the like in a substantially planar path, as occurs with roll-up doors; and that when used in such environment, the latch arm of this lock can be wedged firmly against the keeper member to prevent opening of the door and yet can be readily removed from contact with the keeper member by a partial rotation of a member carrying the keeper member and then completely released by further rotation. It is also apparent that most of the parts of the lock can be made of relatively inexpensive sheet metal and the latch member of readily available bar or rod stock, yet the structure is such that the lock is strong and resists unauthorized entry. Furthermore, the lock requires relatively few parts and can be readily and easily assembled. It can be made in designs which permit it to be mounted on the inside of a door and actuated from either the inside or the outside, and also to be unlocked from inside or outside the door; or it can be made so it can be mounted on and actuated from the outside of a door.

The principles of the present invention may be utilized in various ways, modifications other than those indicated being contemplated. It is to be understood that the em-

bodiments shown in the drawings and described above are given merely for the purposes of explanation and illustration, without intending to limit the scope of the claims to the specific details enclosed.

What is claimed is:

1. A lock adapted to lock two parts against relative movement, said lock comprising a keeper member on one of said parts, a base member on the other of said parts, a movable member having a circular outwardly-facing shoulder extending generally transversely of said base member and a flange portion adjacent said shoulder and spaced generally transversely from said base member, said shoulder and said flange portion cooperating to form with said base member a circular channel, means rotatably mounting said movable member on said base member for rotation about an axis spaced radially on said movable member from the axis about which said shoulder is circular, a latch member having a latch arm adapted to engage said keeper member and an eye-shaped portion rotatably fitting in said channel, means for rotating said movable member about its axis of rotation, first means on said movable member adapted to engage said latch member to move said latch arm out of said keeper member after said movable member has been partially rotated in one direction, and second means on said movable member angularly spaced from said first means adapted to engage said latch member to move said latch arm into said keeper member when said movable member is rotated in the other direction.

2. A lock according to claim 1 in which said axis of rotation of said movable member is spaced on said movable member from said axis about which said channel is circular in the direction extending toward said keeper member when said latch arm is engaged with said keeper member.

3. A lock according to claim 1 comprising means for rotating said movable member about its axis of rotation from the side of said lock at which said movable member is located and from the side of said lock at which said base member is located.

4. A lock according to claim 1 comprising a tumbler member rotatable about said axis of rotation of said movable member and fixed for rotation with said movable member, releasable locking means operating between said tumbler member and said base member for locking said tumbler member and said movable member against rotation in the direction that will cause said latch arm to move out of said keeper member, and means for releasing said releasable locking means.

5. A lock according to claim 4 comprising means for releasing said releasable locking means from the side of said lock at which said rotatable member is located and from the side of said lock at which said base member is located.

6. A lock according to claim 5 comprising means for rotating said movable member about its axis of rotation from the side of said lock at which said movable member is located and from the side of said lock at which said base member is located.

7. A lock according to claim 4 in which when said tumbler member and the movable member that rotates with it are rotated to the angular position thereof in which said latch portion engages said keeper member, said releasable locking means engages said tumbler member to prevent rotation of said tumbler member and said movable member in the direction that will cause said latch portion to move out of said keeper member.

8. A lock according to claim 7 in which said releasable locking means permits rotation of said tumbler member and the movable member connected thereto in the direction to remove said latch portion from said keeper member, after said releasable locking means has been disengaged from said tumbler member by said means for releasing said locking means.

9. A lock according to claim 1 in which said movable member is a generally pan-shaped sheet metal member having formed at its periphery a groove that faces said base member and is defined by said circular outwardly-facing shoulder, said flange portion, and an outer wall portion that is removed over an angular portion of its periphery to define two shoulders constituting said first and second means for engaging said latch member.

References Cited

UNITED STATES PATENTS

2,729,089	1/1956	Pelein	295—36 X
3,061,347	10/1962	Schueter	292—111
3,191,244	6/1965	Burke	292—111 X
3,103,805	9/1963	Crosswell.	

MARVIN A. CHAMPION, *Primary Examiner.*

JOHN R. MOSES, *Assistant Examiner.*