Sept. 20, 1971 T. F. HENNESSY 3,606,422

LOCK ASSEMBLY

Filed Sept. 4, 1968 2 Sheets-Sheet 1

Fig. 1

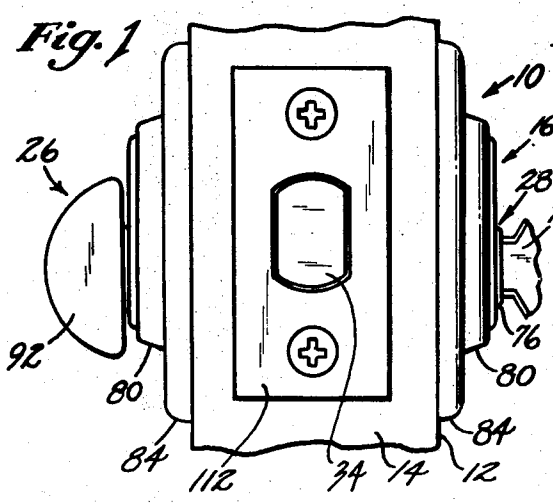


Fig. 4

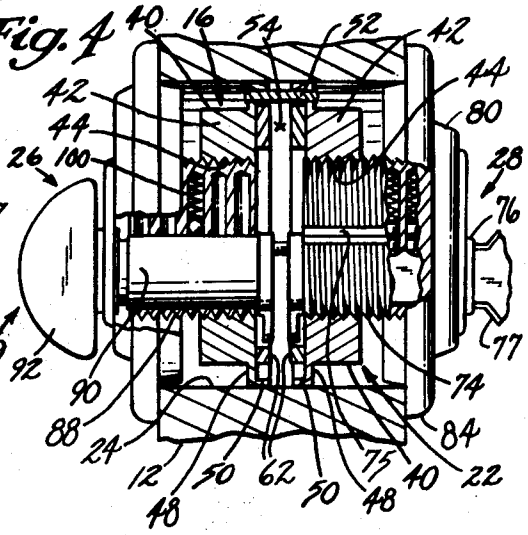


Fig. 2

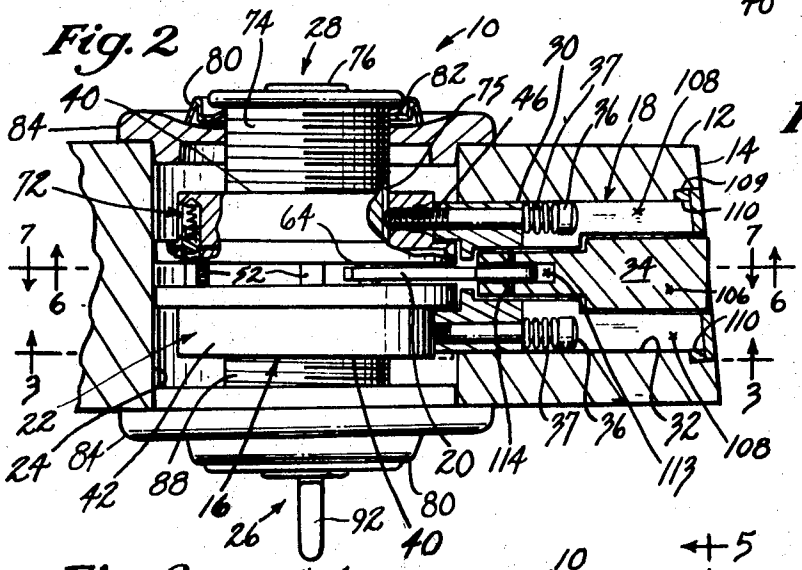


Fig 5

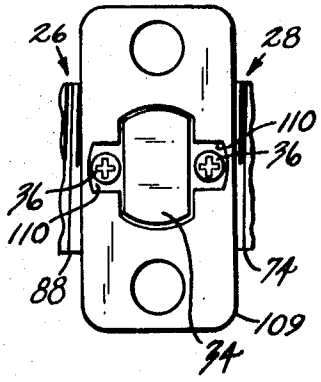
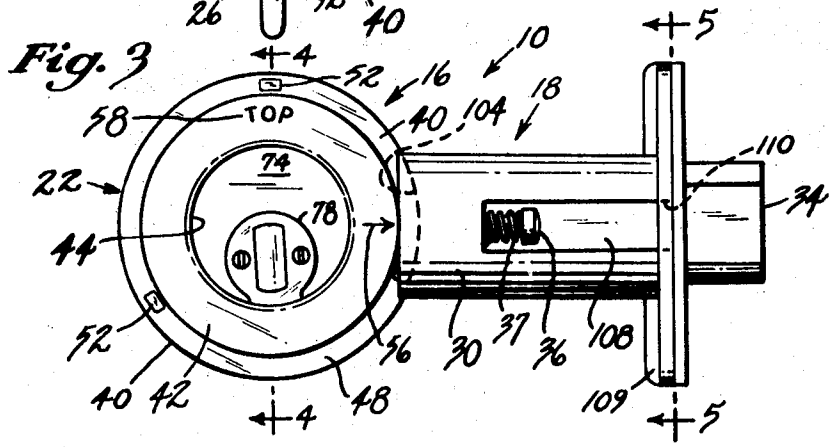


Fig. 3



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Fig. 6

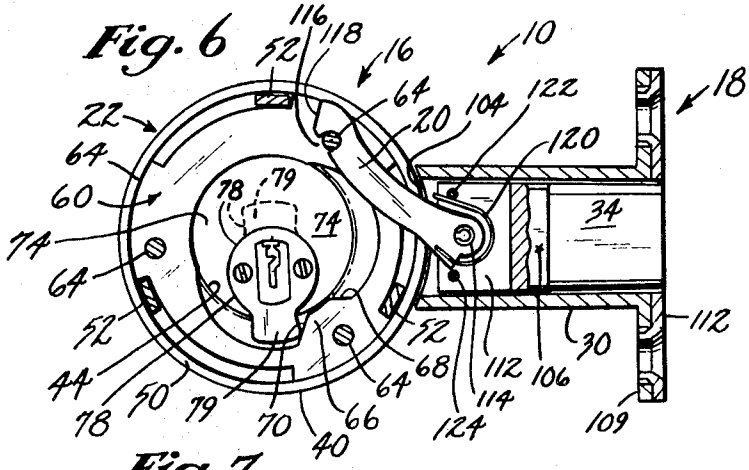


Fig. 7

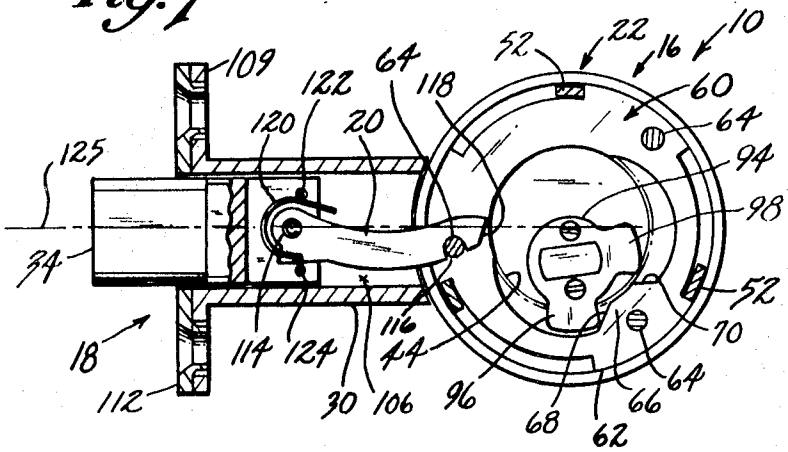


Fig. 8

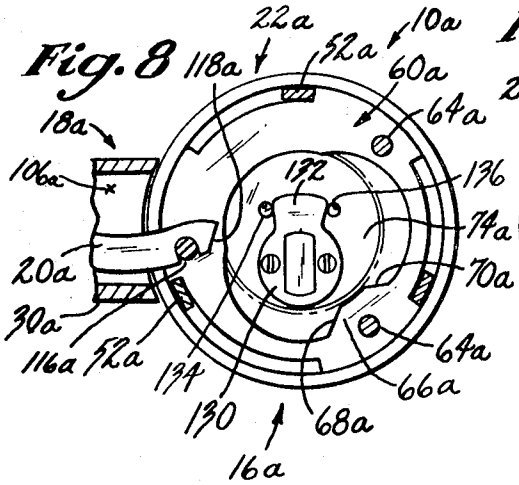
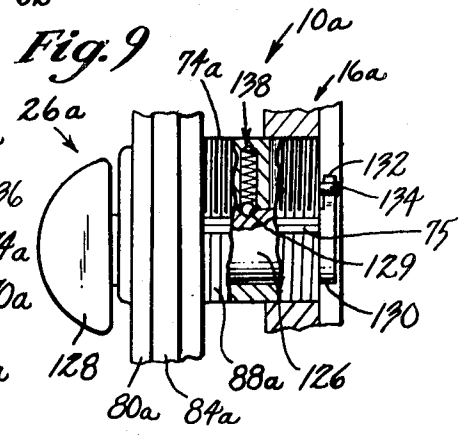


Fig. 9



United States Patent Office 3,606,422 Patented Sept. 20, 1971

3,606,422

LOCK ASSEMBLY

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Filed Sept. 4, 1968, Ser. No. 757,311
Int. Cl. E05b 9/08, 65/06; E05c 1/06
U.S. Cl. 292—139 25 Claims

ABSTRACT OF THE DISCLOSURE

A reversible cylindrical lock assembly having an operating unit including a cylindrical casing containing a rotary operating ring, a bolt unit having a housing supporting a movable deadbolt, and an operating link providing motion transmission connection between the ring and the bolt. Manually operable inner and outer operating assemblies mounted on the casing impart rotational movement to the ring to move the bolt to projected and retracted positions. Fasteners releasably secure the bolt unit to the operating unit and also secure the operating assemblies to the latter unit. These fasteners are inaccessible when the bolt is projected and in engagement with an associated strike.

BACKGROUND OF THE INVENTION

This invention relates in general to locks and deals more particularly with an improved lock assembly of cylindrical type.

The general aim of the present invention is to provide an improved lock assembly of the aforesaid type for convienient assembly with doors of either hand to provide a high degree of security.

SUMMARY OF THE INVENTION

In accordance with the present invention an improved lock assembly is provided for a door having an opening extending transversely therethrough and another opening in the edge thereof intersecting the transverse opening. The assembly includes an operating unit having a casing adapted to be received in the transverse opening and containing a bolt actuating mechanism which includes a rotary part or operating ring. The assembly also includes a bolt unit adapted to be received in the other opening and having a bolt therein arranged for movement between projected and retracted positions relative thereto. A connecting means operably associated with the bolt releasably engages the actuating mechanism to provide rigid motion transmission connection therebetween when the lock assembly is assembled with the door. At least one operating assembly mounted at one end of the transverse opening is provided for manually moving the operating mechanism to positions corresponding to projected and retracted positions of the bolt. A single fastener may be provided to secure the two units in assembly with each other and with the door and to retain the operating assembly in assembled relation with the operating unit so that the lock assembly cannot be removed from the door when the door is secured in a closed position by the bolt.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an edge view of a portion of a door and shows lock assembly embodying the present invention in assembly with the door.

FIG. 2 is a plan view of the lock assembly of FIG. 1.

FIG. 3 is a sectional view through the lock assembly taken generally along the line 3—3 of FIG. 2, the adjacent operating assembly being removed for clarity of illustration.

FIG. 4 is a sectional view through the lock assembly and the door taken generally along the line 4—4 of FIG. 3.

FIG. 5 is a fragmentary sectional view taken generally along the line 5—5 of FIG. 3.

FIG. 6 is a sectional view taken generally along the line 6—6 of FIG. 2.

FIG. 7 is a sectional view taken generally along the line 7—7 of FIG. 2.

FIG. 8 is a fragmentary sectional view similar to FIG. 7, but shows another embodiment of the invention.

FIG. 9 is a fragmentary view similar to FIG. 4, but shows the embodiment of FIG. 8.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and particularly to FIGS. 1–4, a lock assembly embodying the present invention is indicated generally at **10**. The lock assembly **10** is of a reversible cylindrical type for assembly with doors of either hand and is shown assembled in the right-hand edge portion of a door **12** having its adjacent edge **14** beveled or inclined as shown in FIG. 2. The lock assembly comprises a cylindrical operating unit **16**, a bolt unit **18** and a link **20** providing a motion transmitting connection therebetween.

The operating unit **16**, includes a cylindrical casing indicated generally at **22** received in a cylindrical opening **24** which extends transversely through the door **12**. The casing **22** houses a bolt actuating mechanism, hereinafter described, and has manually operable inner and outer operating assemblies mounted thereon and generally indicated at **26** and **28**, respectively, for operating the actuating mechanism.

The bolt unit includes a hollow housing **30** received in an opening **32** which extends through the edge **14** and communicates with the opening **24**. A bolt or deadbolt **34** is slidably movable in the housing **30** to projected and retracted positions relative to the edge **14** for engagement with a strike (not shown). Fasteners **36**, **36** and associated springs **37**, **37** secure the operating unit **16** and the bolt unit **18** in assembly with each other and with the door **12** and also serve to secure the operating assemblies **26** and **28** in mounted position on the operating unit, as will be hereinafter further discussed.

The operating unit **16** is reversible and symmetrical, the casing **22** being formed by two substantially identical parts **40**, **40**. Each part **40** has a generally cylindrical body portion **42** and a coaxial bore **44** therethrough which is threaded to receive either of the operating assemblies **26** and **28**. A horizontally disposed threaded opening **46** extends radially inwardly through each body portion **42** for receiving an associated fastener **36**, as shown in FIG. 2. At its inner end each part **40** also includes an annular flange **48** terminating in an inwardly projecting cylindrical wall **50**. The two parts **40**, **40** are secured in assembled coaxial alignment and axially spaced relation by a plurality of circumaxially disposed spacers **52**, **52** staked to and extending axially betweent he flanges **48**, **48** adjacent the walls **50**, **50**. The parts **40**, **40** are spaced apart a distance substantially equal to the thickness of the link **20** and cooperate to form a generally cylindrical chamber **54** therebetween, best shown in FIG. 4. To aid in assembling the operating unit **16** with the door **12** a positioning arrow **56** is imprinted on the side surface of each part **40** to indicate the location of the threaded openings **46**, **46**. The word "top" is also imprinted on the side surface of each part **40**, as indicated at **58** in FIG. 2, to assure assembly in proper orientation with respect to the door.

The bolt operating mechanism includes an operating ring which is contained in and supported for rotation about a generally transversely extending axis by the operating

unit casing and has at least one cam abutment associated with its inner periphery. In the illustrated embodiment **10**, the operating ring indicated generally at **60** comprises a pair of substantially identical coaxially aligned and axially spaced ring members **62, 62** retained in assembled relation by a plurality of circumaxially spaced cylindrical pins **64, 64** which extend therebetween.

Each ring member **62** has an outside diameter substantially equal to the diameter of the chamber **54** and includes a cam abutment **66** on its inner periphery which has abutment surfaces **68** and **70**, as shown in FIGS. 6 and 7. Sectors of the outer periphery of each ring member **62** are relieved or cut away to accommodate the spacers **52, 52** and to permit limited rotation of the operating ring **60** with the chamber **54**. Each ring member **62** is supported for rotation in peripheral engagement with an associated wall **50** so that the operating ring **60** is movable to positions corresponding to retracted and projected positions of the bolt **34**, shown in FIGS. 6 and 7 respectively, the spacers **52, 52** serving as stops to limit ring rotation. A detent mechanism indicated generally at **72** in FIG. 2 and associated with one part **40** engages a recess in an associated ring member **62** when the operating ring **60** is in its bolt retracted position to releasably retain the ring in the latter position and thereby prevent the deadbolt **34** from being moved to projected position by vibration or by shock force applied to the door.

The operating assemblies may vary in form and may be employed in various combinations to attain desired deadbolt functions. However, as shown at least one of the assemblies is provided with a rotary part or cam supported for rotation about a generally transversely extending axis and having its axis eccentric to the axis of the operating ring or generally parallel to the axis of the operating ring and spaced therefrom. The rotary part includes at least one radial lug or cam lobe for engaging the cam abutment on the ring to actuate the bolt mechanism. Thus, for example, a deadlock made in accordance with the present invention may have a single active operating assembly positioned on one side of an associated door for actuating the deadbolt and an inactive or a dummy assembly associated with the opposite side of the door and which does not operably engage the bolt actuating mechanism.

The illustrated lock **10** includes active inner and outer operating assemblies, the outer assembly **28** being a conventional pin tumbler lock cylinder assembly symmetrical about a vertical axial plane so that it may be assembled with the operating unit **16** on either side of a door. The cylinder assembly **28** includes a cylindrical shell **74** which is externally threaded for engaging an associated internally threaded bore **44** and has axially extending grooves **75, 75** formed in diametrically opposite sides thereof. A rotary part or key plug **76** extends through the shell **74** eccentric to the axis thereof to receive a key **77**. At its inner end the key plug carries a cam **78** which includes a generally radially extending cam lobe or lug **79** for engaging an associated cam abutment **66**. An annular collar **80**, which includes an integral spring washer **82**, and a rose **84** surrounds the shell **74** as best shown in FIG. 2.

The inner operating assembly **26** comprises a thumbturn cylinder which has an externally threaded and grooved shell **88** substantially identical to shell **74**. However, a rotary part or spindle **90** which has an associated thumb plate **92** at its outer end is provided in place of the key plug **76**. A cam **94** fastened to the inner end of the spindle **90** has two angularly spaced and generally radially extending cam lobes or lugs **96** and **98** which receive an associated cam abutment **66** therebetween as best shown in FIG. 7. The spindle **90** is retained in selected angular position by a spring-ball mechanism indicated generally at **100**, assembled in one of the pin tumbler chambers in the shell **88** and in frictional engagement with the spindle. Like the assembly **28**, the assembly **26** also includes a collar **80** and a rose **84**.

Further considering the bolt unit **18**, this unit is also

reversible being symmetrical about a horizontal median plane. The housing **30** is preferably generally cylindrical being adapted to be received in the opening **32**. The inner end of the housing **30** has an arcuate face **104** for complementary engagement with the flanges **48, 48** of the casing parts **40, 40**. As viewed from above (FIG. 2), the housing **30** has a stepped bore **106** which extends therethrough for receiving the deadbolt **34** in complementary sliding engagement therein. Axially extending recesses **108, 108** in the housing **30** communicate with opposite sides of the bore **106** to accommodate the fasteners **36, 36** extend inwardly through the housing. A generally rectangular plate **109** at the outer end of the housing **30** and inclined to the axis thereof complements the bevel of the edge **14** and has an opening therein through which the outer end of the bolt **34** projects. Openings **110, 110** through the plate **109** on opposite sides of the deadbolt each respectively communicate with a recess **108** to permit access to an associated one of the fasteners **36, 36** when the bolt unit **18** is assembled in the opening **32**. A face plate **112** is provided for positioning adjacent the plate **109** to conceal the openings **110, 110** when the lock unit **10** is assembled with the door **12**. The outer or free end of the deadbolt **34** projects through an opening in the face plate **112**.

The link **20** has an arcuate configuration, as shown, and is pivotally connected to the inner end of the deadbolt **34** which is bifurcated to form a clevis **113**, a pivot pin **114** providing the connection therebetween, as best shown in FIG. 2. A hook formed at the inner end of the line **20** by a downwardly opening recess **116** engages an associated pin **64** on the operating ring **60** to establish operable connection therewith. At its inner end the link **20** has an upwardly and inwardly inclined surface **118** which aids in assembly of the bolt unit with the operating unit as will be hereinafter discussed. The link **20** is biased downwardly or in a clockwise direction as it appears in FIG. 7 by a spring **120** associated with the outer end of the link and bearing against a pin **122** which extends transversely of the clevis **113** above the pivot pin **114**. Another pin **124** extends transversely of the clevis **113** below the link **20** to limit the travel of the link in the latter direction when the bolt unit **18** is out of assembly with the operating unit **16**.

Preparatory to installing the lock **10** on the door **12**, the cylindrical opening **24** is bored transversely through the door **12**. Thereafter, the opening **32**, which is also preferably cylindrical, is bored from the edge **14** to communicate with the opening **24** and generally normal to the axis thereof. A generally rectangular mortise is also formed in the edge **14** surrounding the opening **32** to receive the plate **109** and the face plate **112**, as best shown in FIG. 2.

One of the operating assemblies may be assembled with the operating unit **16** before the latter unit is assembled with the door. When the deadlock is made in accordance with the illustrated embodiment **10**, it is preferable that the inner operating assembly **26** be first assembled with the operating unit **16**, since such preassembly simplifies engagement of the cam lobes **96** and **98** with an associated cam abutment **66**. The operating unit **16** is inserted in the opening **24** from the inner side of the door properly oriented with respect to the door and with the arows **56, 56** pointing in a direction normal to the edge **14**. Thereafter, the housing **30** is inserted in the opening **32** and moved to its position of assembly with the operating unit **16**. One of the fasteners **36, 36** is inserted through the opening **110** and threaded into an associated opening **46** to engage shell **88** in its associated groove **75**.

Preparatory to connecting the deadbolt **34** to the operating mechanism the thumb turn **92** is manipulated to rotate the operating ring **60** to a position corresponding to its projected bolt position, as it appears in FIG. 7. When the ring **60** is in the latter position, it should be

noted that a pin **64** is generally aligned with the cylindrical opening **32** and below the axis thereof. The deadbolt **34** and its associated link **20** are inserted into the housing bore **106**. When the link surface **118** engages the pin **64** aligned with the opening **32** the link **20** is biased upwardly and into hooked engagement with the latter pin.

When the key **77** is partially inserted in the key plug **76** the other operating assembly **28** may be freely threaded into the operating unit **16** using the key as a wrench. The key slot is adjusted to a vertically oriented position and it will be noted that the spring washers **82, 82** permit the operating assemblies to be adjusted to properly aligned positions after each rose **84** has been brought into engagement with an associated side of the door **12**. The other fastener **36** is next threaded into and through the other opening **46** to bring the end of the latter fastener into engagement with the shell **74** within its groove **75**. Thus, in addition to securing the bolt unit in assembly with the operating unit the fasteners **36, 36** serve to prevent the operating assemblies **26** and **28** from being threaded out of assembly with the operating unit **16**. The springs **37, 37** urge the bolt unit **18** toward engagement with the operating unit **16**. The door and lock assembly is completed by fastening the face plate **112** in the mortise in the edge **14**.

The lock unit **10** may be removed from the door **12** by performing the aforesaid operations in reverse order. However, it should be noted that the link **20** is disengaged from the operating ring **60** by rotating the entire operating unit **16** within the opening **22** in a counterclockwise direction as it appears in FIG. 7.

Considering now the operation of the lock **10** and referring again to FIGS. 6 and 7, the lock unit **10** is shown in FIG. 6 in an unlocked or bolt retracted condition, the position of the cam **78** when the key **77** is in its shed position being indicated by broken lines. The deadbolt **34** is moved to its projected position and locked in the latter position by rotating the key **77** in a counterclockwise direction from its shed position through 180° to its limit and reversing and withdrawing the key. This operating causes the cam lobe **79** to engage the cam abutment surface **68** to rotate the ring **60** to the position shown in FIG. 7. When the deadbolt **34** is in its projected position the pin **64** associated with the link **20** is disposed below an imaginary line **125** which passes through the axes of the pivot pin **114** and of the operating unit **16**, as shown in FIG. 7. In the illustrated embodiment the angular position of the latter pin **64** is approximately 5° below the line **125** when the deadbolt **34** is in its projected position. Thus, the unit **10** is positively deadlocked. That is, force exerted on the deadbolt **34** in the direction of the operating unit **16** will tend to urge the ring member **60** to rotate in a counterclockwise direction to its limit, as shown in FIG. 7, to maintain the deadbolt **34** in its projected or deadlocked condition. Reverse rotation of the key **77**, or rotation in a clockwise direction, through 180° from the shed position causes the cam lobe **79** to engage the abutment surface **70** to return the ring member **60** to the position as shown in FIG. 6, after which the key may be reversed and withdrawn leaving the lock in its unlocked condition. It should be noted that when the key plug **76** is in the shed position, the cam **78** is in an inactive position out of engagement with the cam abutment **66** so that the bolt mechanism may be freely actuated by the thumb turn independently of the operating assembly **28**.

When the bolt is in the projected position, as it appears in FIG. 7, rotation of the thumb turn **92** in a counterclockwise direction through 90° to its limit moves the deadbolt **34** to its retracted position. Reverse rotation of the thumb turn from the latter position 90° to its limit moves the deadbolt to projected position.

As previously noted, operating assemblies may be employed in various combinations to obtain desired bolt functions. For some purposes, it is desirable to provide a deadlock which may be locked from the outside of the door only, but which may be unlocked from either side at all times. In FIGS. 8 and 9 another lock assembly or deadlock embodying the invention and arranged to function in the aforedescribed manner is indicated generally at **10*a***. The deadlock **10*a*** is similar in most respects to the deadlock **10**, previously discussed, and parts thereof which are substantially identical to parts previously described bear the same reference numerals with a suffix letter *a* and will not be further described.

The deadlock **10*a*** includes an operating unit **16*a***, a bolt unit **18*a*** and a link **20*a*** providing motion transmission connection therebetween. The outer operating assembly may, for example, be substantially identical to the outer operating assembly or lock cylinder **28** of the lock **10**. However, the inner operating assembly designated generally at **26*a*** differs somewhat from the inner operating assembly **26**. Like the assembly **26** the assembly **26*a*** is symmetrical about a vertical axial plane so that it is reversible for installation on doors of either hand. The assembly **26*a*** includes a shell **74*a*** substantially identical to the shell **74**. However, a rotary spindle **126** which has an associated thumb plate **128** at its outer end and a recess **129** in its peripheral surface is provided in place of the generally similar spindle **90**. A cam **130** secured to the inner end of the spindle **126** includes a single radially extending lobe **132**. In FIG. 8 the cam **130** is shown in an inactive position out of engagement with the cam abutment **66*a***, the operating ring **60*a*** being shown in bolt projection position. Rotation of the thumb plate **128** in a counterclockwise direction through 180° to its limit causes the cam lobe **132** to engage the abutment surface **70*a*** to move the operating ring **60*a*** to its bolt retracted position.

A pin **134** projects axially outwardly from the shell **74*a*** in the path of rotation of the cam lobe **132** to prevent rotation of the thumb plate **128** in the reverse or clockwise direction from its inactive position as it appears in FIG. 8 and thereby prevents movement of the operating ring **60*a*** to bolt projected position. An opening **136** is provided on the opposite side of the cam lobe **132** for receiving the pin **136** when the operating assembly **16*a*** is assembled with a door of opposite hand. The assembly **26*a*** is provided with a spring ball detent mechanism indicated generally at **138** received in a pin tumbler chamber in the shell **74*a***. This detent mechanism engages the recess **129** when the cam **130** is in its inactive position and serves to releasably retain the spindle **126** in the latter position so that the outer operating assembly may operate freely and independently of the inner operating assembly **26*a***.

I claim:

1. A lock assembly for a door having an opening extending transversely therethrough and another opening in the edge thereof intersecting the transverse opening, said lock assembly comprising a bolt unit adapted to be received in said other opening and including a bolt movable to projected and retracted positions, an operating unit including a casing adapted to be received in said transverse opening and having a bolt actuating mechanism contained therein, said actuating mechanism comprising an operating ring having a cam abutment thereon and supported for axial rotation in said casing between first and second positions corresponding to projected and retracted positions of said bolt, connecting means operably associated with said bolt and releasably engageable with said actuating mechanism to provide rigid motion transmission connection therebetween, and inner and outer operating assemblies mounted on said casing at opposite ends of said transverse opening, at least one of said assemblies including a manually rotatable part having its axis eccentric to the axis of said operating ring, said part having a pair of angularly spaced and generally radially extending lugs thereon receiving said cam abutment therebetween for engaging said cam abutment to

move said mechanism to said first and second positions, respectively, in response to rotation of said part in one and the opposite direction.

2. A lock assembly for a door having an opening extending transversely therethrough and another opening in the edge thereof intersecting the transverse opening, said lock assembly comprising a bolt unit adapted to be received in said other opening and including a bolt movable to projected and retracted positions, an operating unit including a casing adapted to be received in said transverse opening and having a bolt actuating mechanism contained therein, said actuating mechanism comprising a pair of axially spaced ring members and a plurality of circumaxially spaced axially extending pins connecting sadi ring members, said ring members being supported in said casing for axial rotation in unison between first and second positions corresponding to projected and retracted positions of said bolt, at least one of said ring members having a cam abutment thereon, a link connected to said bolt and releasably engageable with an associated one of said pins to provide rigid motion transmission connection between said bolt and said actuating mechanism, and inner and outer operating assemblies mounted on said casing at opposite ends of said transverse opening, at least one of said assemblies having a manually rotatable part including at least one radially extending lug for engaging said cam abutment to move said mechanism to said first and second positions respectively in response to rotation of said part in one and the opposite direction.

3. A lock assembly for a door having an opening extending transversely therethrough and another opening in the edge thereof intersecting the transverse opening, said lock assembly comprising a bolt unit having a housing adapted to be received in said other opening and including a bolt supported in said housing for movement to projected and retracted positions relative thereto, an operating unit including a casing adapted to be received in said transverse opening and having a bolt actuating mechanism contained therein, said actuating mechanism comprising an operating ring supported in said casing for rotation about a generally transversely extending axis between first and second positions corresponding to projected and retracted positions of said bolt and having a cam abutment thereon, connecting means operably associated with said bolt and releasably engageable with said actuating mechanism when said bolt is assembled in the door to provide motion transmission connection between said bolt and said actuating mechanism, at least one operating assembly adapted for counting at one end of said transverse opening and including a manually rotatable part supported for rotation about a generally transversely extending axis, said part having at least one radially extending lug for engaging said cam abutment to move said mechanism to said first and second positions, respectively, in response to rotation of said part in one and the opposite direction.

4. A lock assembly as set forth in claim 3 wherein said rotatable part includes a pair of angularly spaced and radially extending lugs thereon receiving said cam abutment therebetween.

5. A lock assembly as set forth in claim 3 wherein said casing includes at least one wall partially defining a cylindrical chamber therein, said operating ring being supported in said chamber by said one wall for rotation in peripheral engagement therewith.

6. A lock assembly as set forth in claim 3 wherein said operating ring comprises a pair of axially spaced ring members and a plurality of circumaxially spaced axially extending pins connecting said ring members for rotation in unison and said connecting means comprises a link connected to said bolt and releasably engageable with an associated one of said pins.

7. A lock assembly as set forth in claim 3 wherein said connecting means comprises a link pivotally connected to said bolt and said operating ring.

8. A lock assembly as set forth in claim 3 including another operating assembly mounted at the other end of said transverse opening and having another manually rotatable part rotatable in one and the opposite direction for engaging and moving said mechanism only to said second position in response to rotation of said other part in said opposite direction.

9. A lock assembly as set forth in claim 8 wherein said other part is rotatable to an inactive position out of engagement with said actuating mechanism and said assembly includes means for releasably retaining said other part in said inactive position, said one part being operable independently of said other part when said other part is in said inactive position.

10. A lock assembly as set forth in claim 3 wherein said one operating assembly is a lock cylinder.

11. A lock assembly as set forth in claim 3 wherein said one operating assembly is a thumb turn cylinder.

12. A lock assembly as set forth in claim 3 including detent means for releasably retaining said actuating mechanism in said second position.

13. A lock assembly as set forth in claim 3 wherein said operating unit is symmetrical about a median plane therethrough.

14. A lock assembly as set forth in claim 3 wherein said bolt unit is symmetrical about a median plane therethrough.

15. A lock assembly as set forth in claim 3 wherein the openings in the door are generally cylindrical and wherein said housing and said casing are generally cylindrical and adapted to respectively complement associated portions of the other opening and the transverse opening.

16. A lock assembly as set forth in claim 3 wherein said rotatable part axis is generally parallel to and spaced from said operating ring axis.

17. A lock assembly as set forth in claim 3 wherein said connecting means comprises a link providing rigid motion transmission connection between said bolt and said actuating mechanism.

18. A lock assembly as set forth in claim 7 wherein said operating ring pivotal connection is angularly displaced in said one direction beyond an imaginary line extending through said ring axis and the axis of said bolt pivotal connection when said ring is in said first position and said bolt is projected.

19. A lock assembly as set forth in claim 7 wherein said link includes a hook portion and said assembly includes an axially extending pin carried by said operating ring and eccentric to the axis thereof and biasing means for urging said hook portion into connected engagement with said pin.

20. A lock assembly as set forth in claim 18 including means for camming said link into connected engagement with said pin when said actuating mechanism is supported in said transverse opening and said bolt unit is inserted in said other opening and moved toward said actuating mechanism.

21. A lock assembly as set forth in claim 18 wherein said bolt is a deadbolt.

22. A lock assembly as set forth in claim 20 wherein said camming means comprises a cam surface defined by said link.

23. A lock assembly for a door having an opening extending transversely therethrough and another opening in the edge thereof intersecting the transverse opening, said lock assembly comprising a bolt unit having a housing adapted to be received in said other opening and including a bolt movable to projected and retracted positions relative to said housing, an operating unit including a casing adapted to be received in said transverse opening and having a bolt actuating mechanism contained therein and movable to first and second positions corresponding to projected and retracted positions of said bolt, connecting means operably associated with said bolt and releasably engageable with said actuating mechanism to

provide rigid motion transmission connection therebetween, at least one operating assembly mounted on said casing at one end of said transverse opening, said one assembly having a manually rotatable part for operably engaging and moving said mechanism to said first and second positions respectively in response to rotation of said part in one and the opposite direction, and a fastener disposed in said other opening extending through said housing and said casing and engaging said one assembly to releasably secure said housing, said casing and said one assembly in assembled relation with each other and with the door, said fastener being accessible through said other opening and inaccessible when said lock assembly is assembled with the door and the door is in a closed position with said bolt in projected position and in engagement with an associated strike.

24. A lock assembly as set forth in claim **23** including a spring acting between said fastener and said housing for biasing said housing toward said casing.

25. A lock assembly as set forth in claim **24** wherein said fastener is a screw threadably engaging said casing.

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70—129, 380, 451; 292—336.5

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,606,422 Dated September 20, 1971

Inventor(s) Thomas F. Hennessy

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 2, line 59, "betweent he" should read --between the--,

Col. 3, line 15, "with" should read --within--,

Col. 4, line 12, after "36, 36" insert --which--,

Col. 4, line 64, "arows" should read --arrows--,

Col. 7, line 14, "sadi" should read --said--.

Signed and sealed this 21st day of March 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents