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Nagy et al.

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[45] **July 29, 1975**

[54] DOUBLE SPIN KNOB DOOR LOCK

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[52] **U.S. Cl.** **70/149;** 70/222; 70/DIG. 60; 292/169; 292/353

[51] **Int. Cl.²** **E05B 55/06;** E05B 3/04

[58] **Field of Search** ..... 70/149, 221, 222, 223, 70/224, DIG. 60; 292/169, 352, 353, 354

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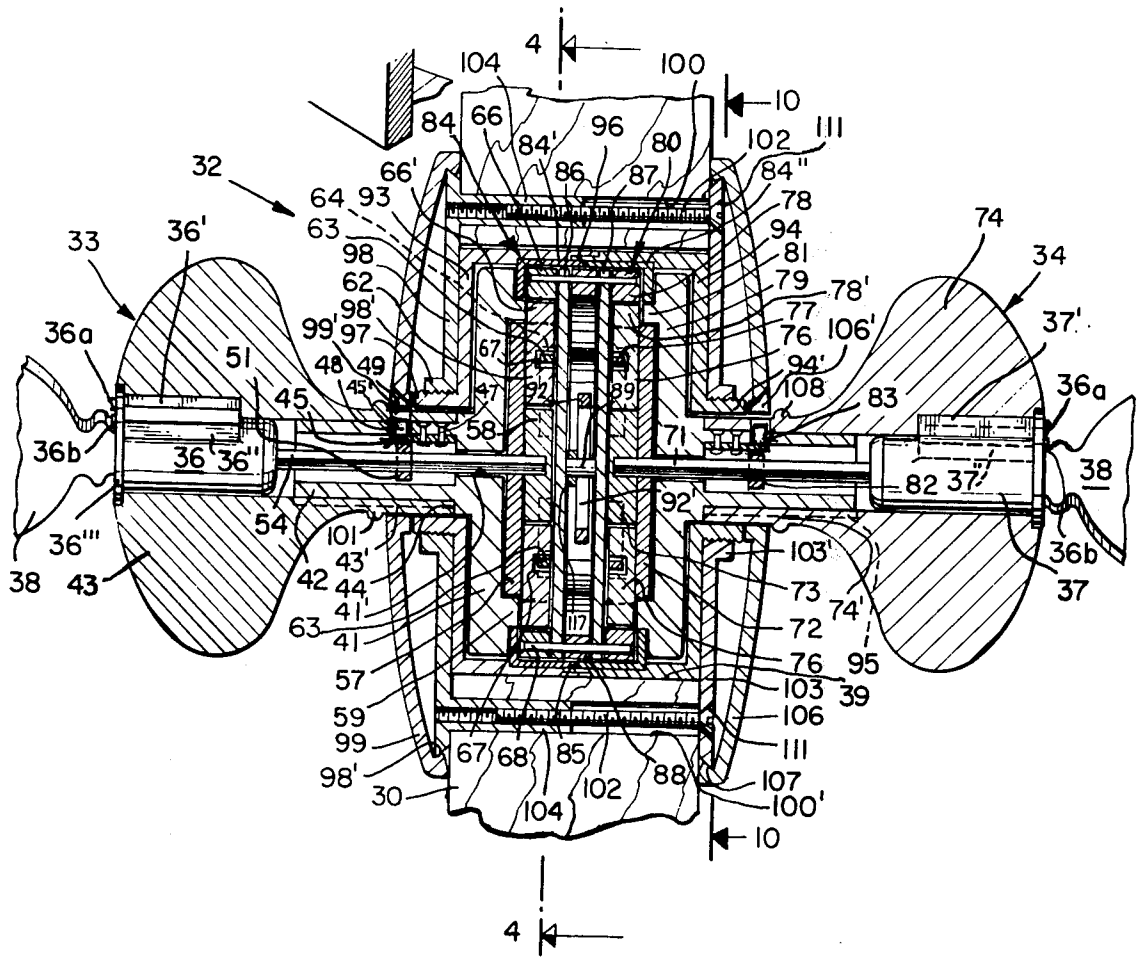
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Primary Examiner—Albert G. Craig, Jr.
Attorney, Agent, or Firm—Laforest S. Saulsbury

[57] **ABSTRACT**

This double spin knob door lock is so designed as to permit a door to be locked from the inside as well as from the outside. The lock bolt is blunt or squared and is always spring-biased to its extended or locking position and thus may bump against a bumper plate that is provided on the door frame adjacent the keeper plate when the door is moved toward closed position without first retracting the bolt. A lock cylinder is used on the inside knob that has two rows of tumblers or key removing positions, one for spin and one for bolt operation instead of a single tumbler row lock cylinder as used on the outside knob. The outside knob preferably has only a one row tumbler lock cylinder. The knobs can be removed from the door lock assembly by one who has both the key and a special tool to depress a catch lying in an open slot in the knob sleeve projection.

11 Claims, 17 Drawing Figures



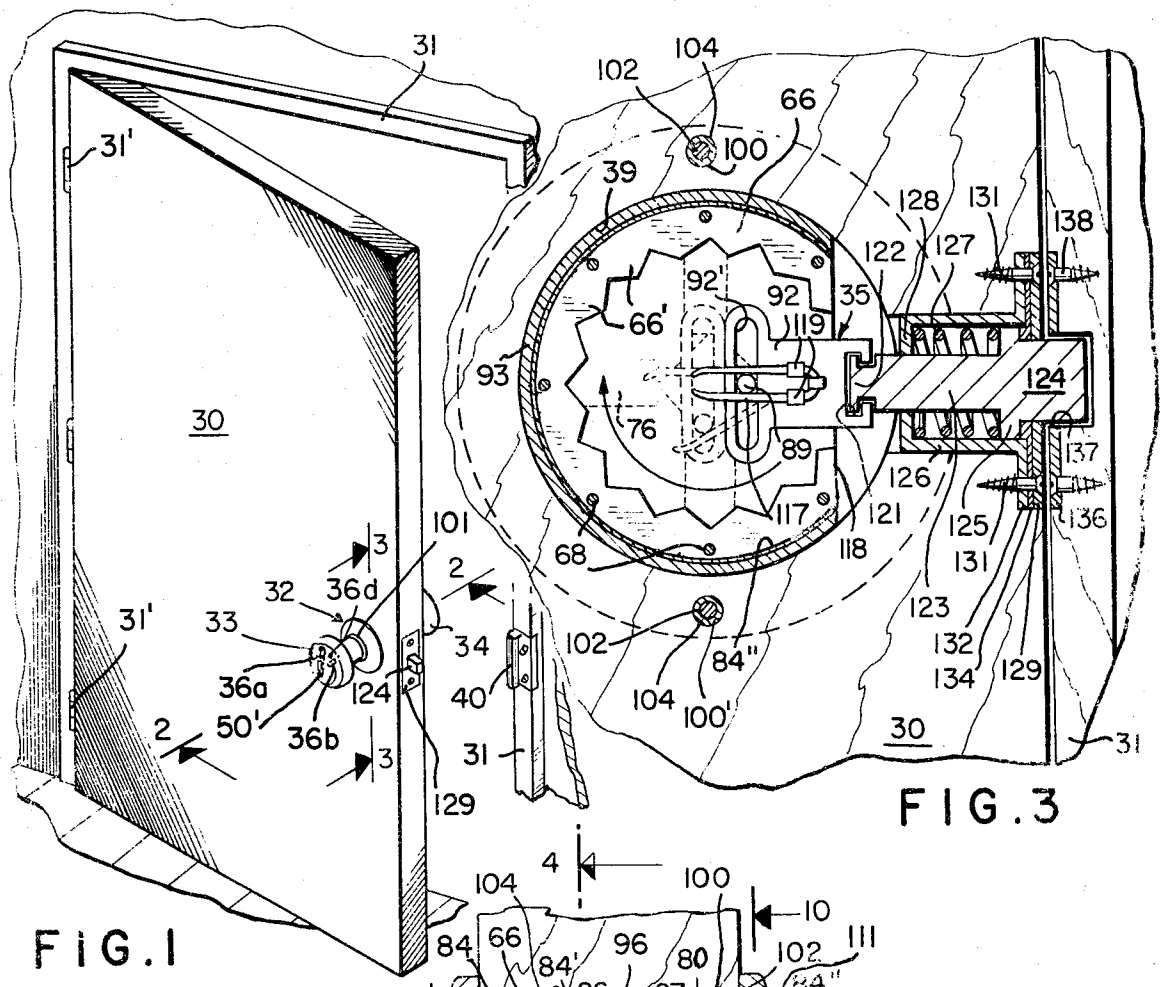


FIG. 1

FIG. 3

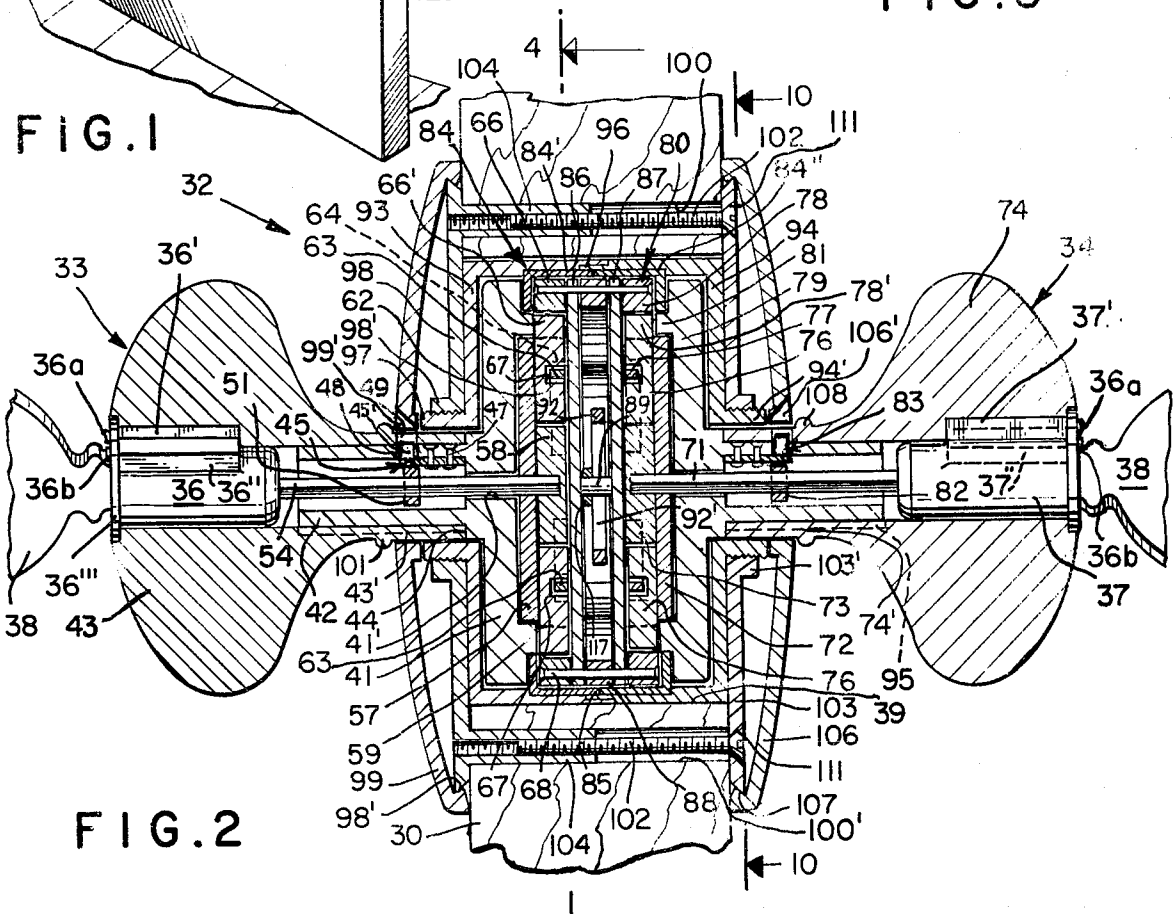
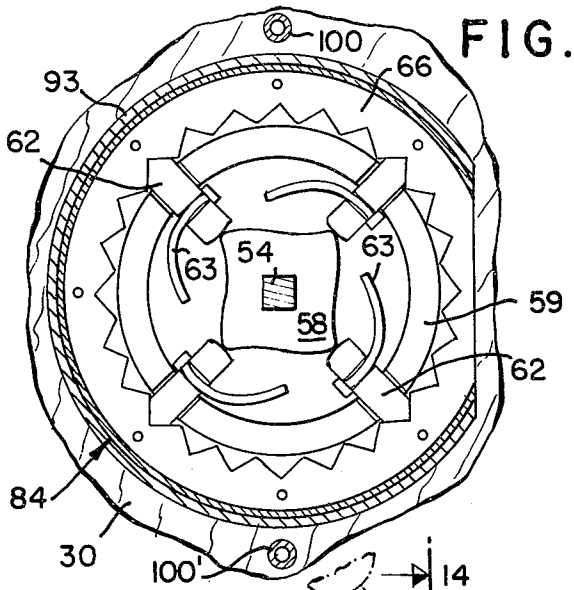


FIG. 2

FIG.4A



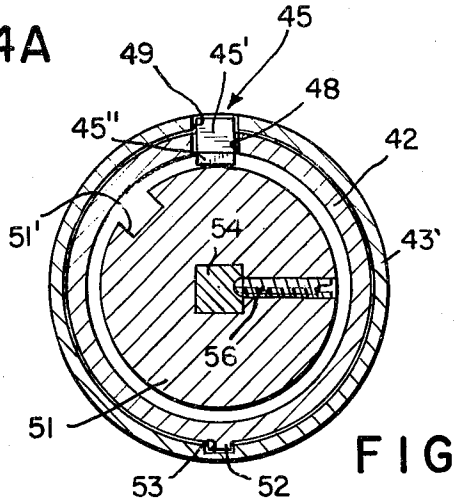
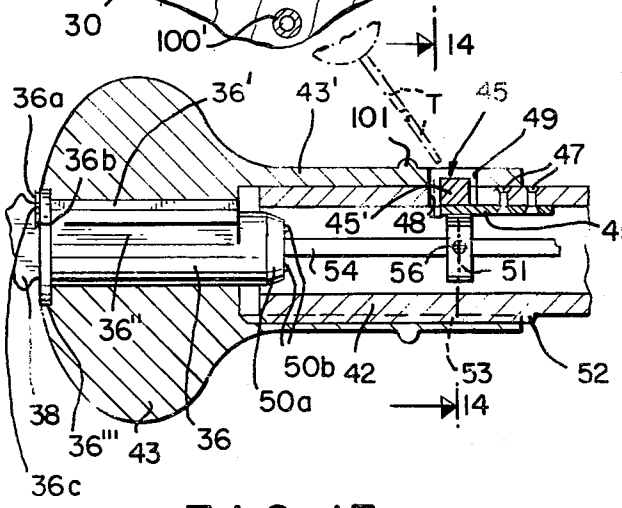


FIG.14



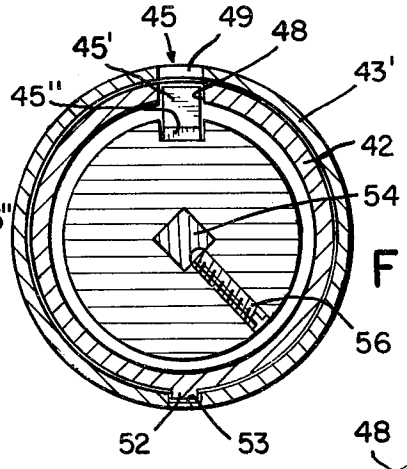


FIG.15

FIG.13

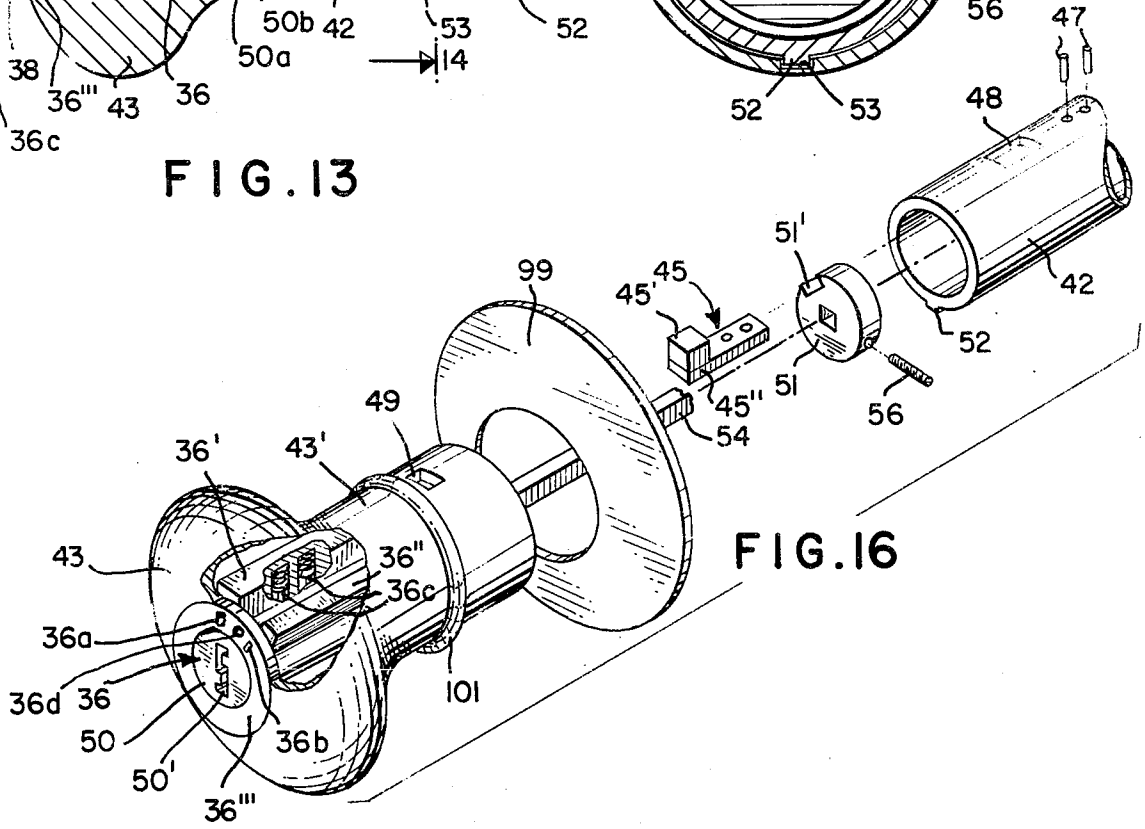


FIG.16

FIG. 5

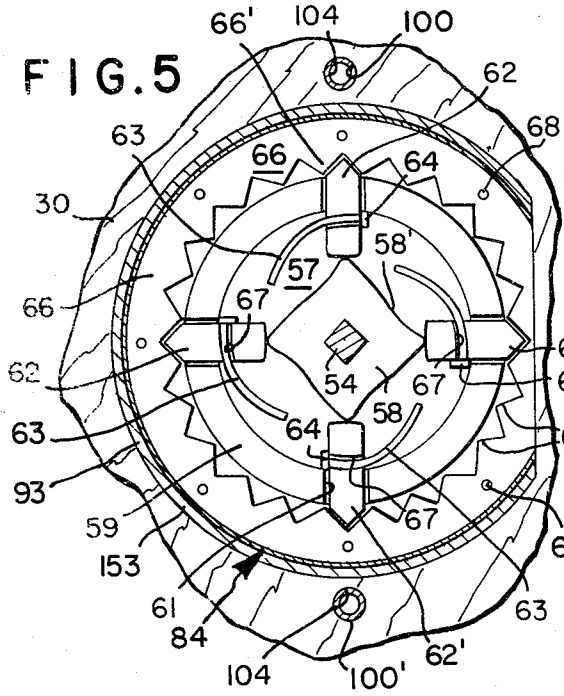


FIG. 4

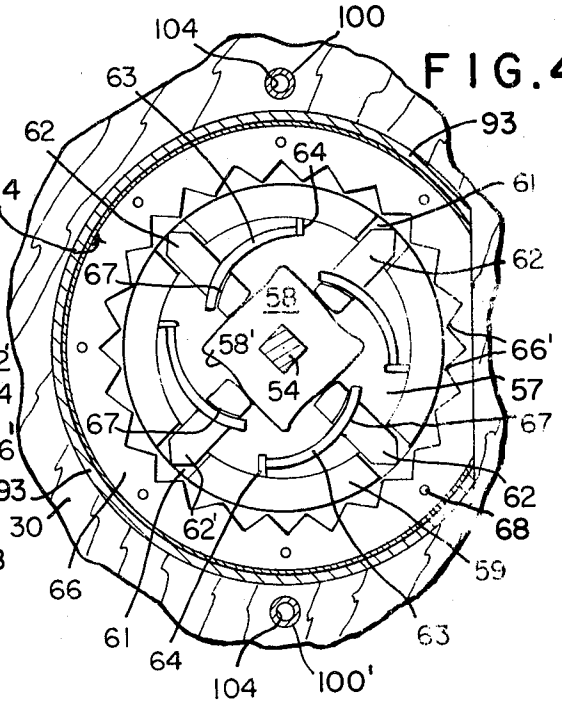


FIG. 6

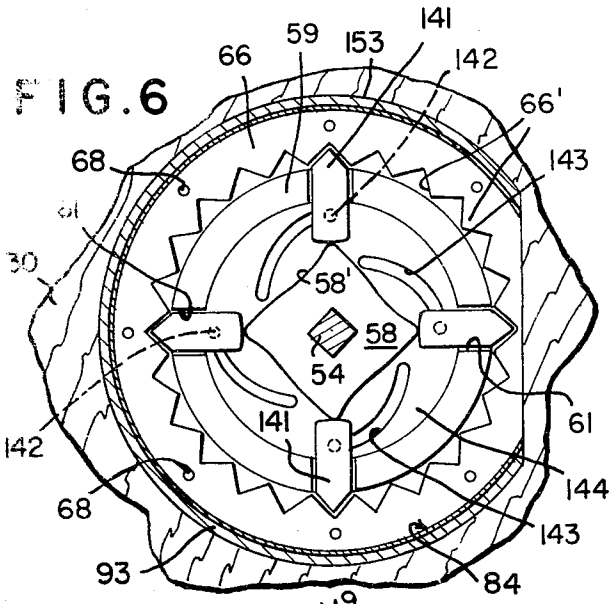


FIG. 7

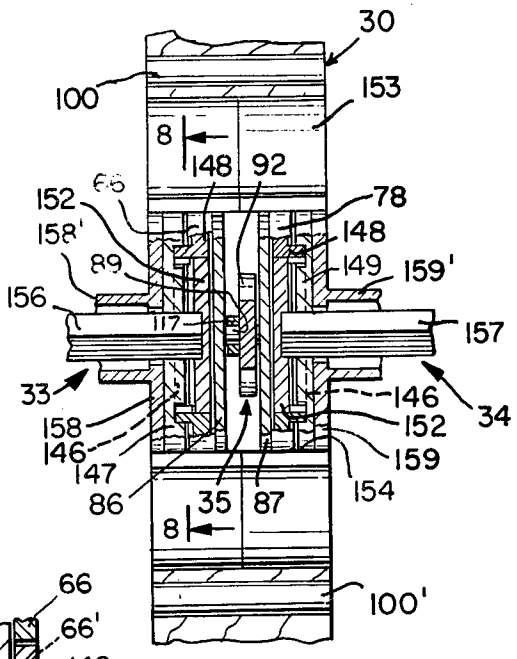


FIG. 8

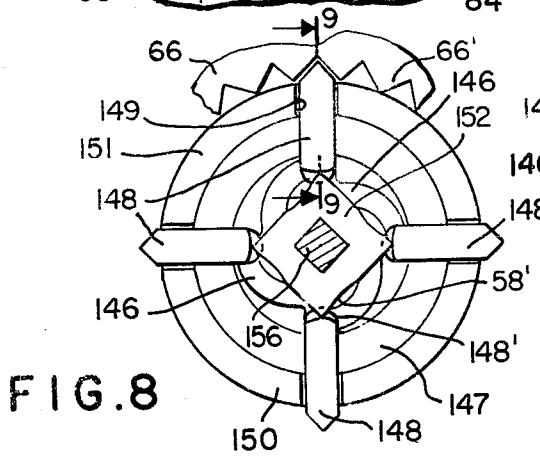
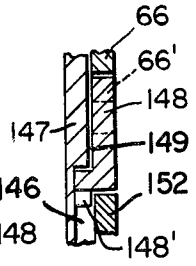


FIG. 9



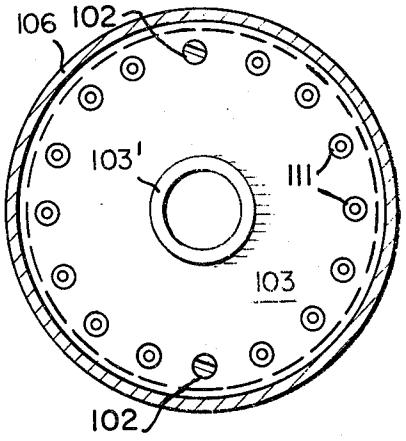
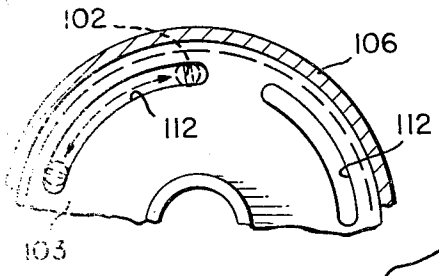


FIG. 10

FIG. 11



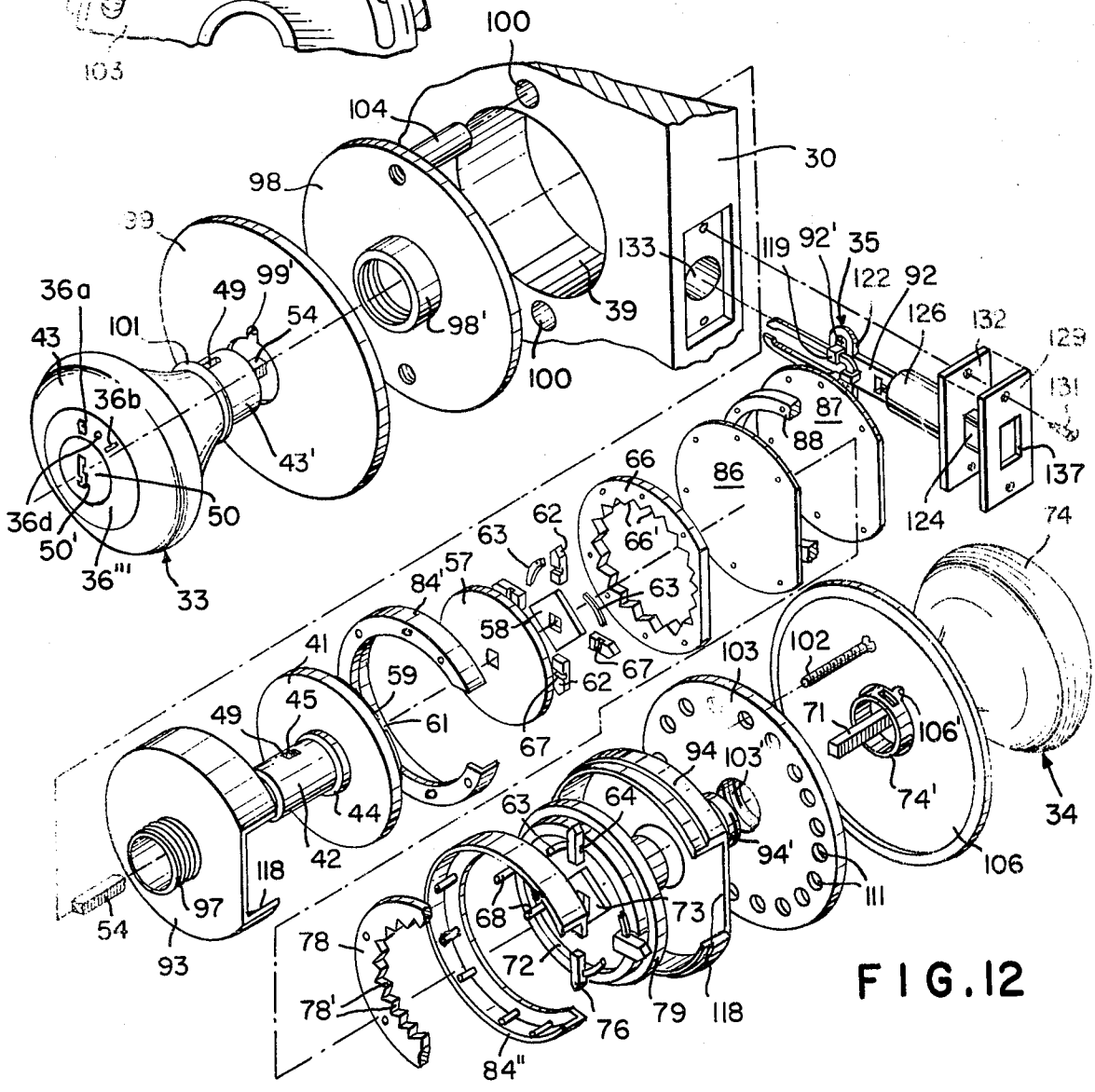


FIG. 12

DOUBLE SPIN KNOB DOOR LOCK

This invention relates to a double spin door knob lock.

It is the principal object of the present invention to provide a spin knob door lock in which the knob on the inside of the door can be conditioned so as to spin as key is removed therefrom and upon one leaving premises whereby burglars or intruders who may have entered the premises through a window and are inside will be prevented from escaping through this door, and the normal path of exit, and thereby place on obstacle in the burglar's way of escape.

It is another object of the invention to provide a double spin knob door lock, which, when the door is locked disengages both the inside and the outside door knobs from the lock bolt so that both knobs are conditioned to spin and become ineffective to operate upon the lock bolt to retract it, this lock bolt being normally biasingly extended and retained in the door frame keeper whereby only one having the key can take the knobs out of spin to make the knobs effective to retract the lock bolt and unlock the door so it can be opened.

It is another object of the invention to provide a spin knob door lock having a key cylinder in each of the door lock knobs which serves not only to spin lock the knob so that it is ineffective to retract the lock bolt, but also serves as the means for locking the knobs upon their internal body parts of the lock whereby these knobs can be removed only by one who has the key at times when it is desired that the cylinder lying therein need to be replaced by a cylinder that will take a different key or to change the locks.

It is still another object of the invention to provide a spin knob door lock which can be locked on the inside as one leaves his apartment or premises wherein the one key lock cylinder for the inside knob will have two rows of tumblers so that the key can be turned between two positions and removed at each position to allow the inside lock at least to be left either in condition of spin or in a non-spin condition so that the knob can retract the lock bolt and the door opened and closed from the inside without key as with the standard locks and as for the purpose of reaching for delivered milk or a newspaper and a bumper plate engagable by the extended bolt to keep the door from closing shut at these times.

It is a further object of the invention to provide a double spin knob lock with a simple means for fixedly securing the door lock in the door that include attachment plates secured between the surfaces of the door and threaded onto the internal structure of the lock to have flush tight engagement therewith and finally joined by screws extending through the body of the door, cover plates snap fitted over the attachment plates to cover the screws and render them inaccessible and rib means surrounding the sleeve projection of the knob for keeping them from being detached without first removing the knob by key as set forth above in a prior object.

Still further objects of the invention are to provide a double spin knob door lock, having the above objects in mind, which is of simple construction, inexpensive to manufacture, has a minimum number of parts, easy to install in the door, of pleasing appearance, effective and efficient in operation.

For a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in

which: FIG. 1 is a perspective view of a door to an apartment, dwelling or other premises that is hingedly mounted in a door frame opening to swing between open and closed positions, the door being partially opened and embodying the double knob spin lock of the present invention with a blunted lock bolt that is engagable with a bumper plate.

FIG. 2 is an enlarged longitudinal sectional view taken through the door and double knob spin lock as viewed generally on lines 2—2 of FIG. 1.

FIG. 3 is an enlarged fragmentary vertical sectional view of the double spin knob door lock door and frame with the lock bolt in engagement with the lock bolt keeper plate on the door, as viewed on lines 3—3 of FIG. 1, with dotted lines illustrating the key bars extended into the internally serrated ring preparatory to use of a knob to retract the lock bolt.

FIG. 4 is a transverse sectional view taken generally on lines 4—4 of FIG. 2 but with the key removed or in its upright position preparatory to use so that the key bars are positively retracted, and the knob made free to spin and unable to retract the lock bolt, the door being in effect locked from the inside with the lock bolt being extended into the door frame keeper by its biasing spring.

FIG. 4A is a similar transverse sectional view with the key having been turned through 45 degrees so the key bars have been extended to engage the internally-serrated ring preparatory to the turning of the knob to retract the lock bolt or when the key is removed from the second row of tumblers of the to make the inside knob useful to open and closed door without key.

FIG. 5 is a similar transverse sectional view of the double spin door knob lock as generally viewed on lines 4—4 of FIG. 2 with the key having been turned 90° so that the radial key bars have been extended into the internally-serrated ring by the curved cam tracks and the lock bolt fully retracted from the frame keeper plate so the door can be opened with the inside knob.

FIG. 6 is a transverse sectional view similar to FIGS. 4, 4A and 5 but of a modified form wherein the radial key bars are retracted by arcuate cam slots rather than by cam bars, the key bars having engaged the internally-serrated ring as in FIG. 5 and the lock bolt retracted so that the door can be opened.

FIG. 7 is a fragmental vertical sectional view looking into the lock bolt opening of another modified form of the invention that is more compact than the prior forms and adapted for use with doors of less thickness than the standard entrance doors.

FIG. 8 is a fragmentary vertical sectional view of the more compact lock of FIG. 7 taken on lines 8—8 thereof and wherein the cam tracks are depressed in the body parts.

FIG. 9 is a fragmentary vertical sectional view taken on lines 9—9 and along one radial key bar in engagement with its internally-serrated ring.

FIG. 10 is a vertical sectional view taken on lines 10—10 of FIG. 2 of the outside knob attaching plates, the inner plate having a series of circumferentially-spaced screw holes, any one of which may receive the long screws used to assemble the spin knob door lock to the door.

FIG. 11 is a fragmentary vertical sectional view similar to FIG. 10 of a modified screw attaching plates wherein the long attaching screws will be extended

through arcuate slots rather than any of a series of holes.

FIG. 12 is an exploded and perspective view of the several parts of both the inside and outside spin lock assemblies of FIG. 2 and illustrating the manner in which the parts are assembled to one another and into the door.

FIG. 13 is an enlarged fragmentary longitudinal sectional view of the inside door knob and key cylinder assembly of FIG. 2 and to show how the hand knob is removably and key retained upon the body part sleeve and how it is released by the key and a special icepick-like tool.

FIG. 14 is an enlarged transverse sectional view taken on lines 14—14 of FIG. 13 with the knob key shaft latch stop member turned to a normal work position so that the recess into which the latch can be depressed is out of radial alignment with the hand knob retaining latch.

FIG. 15 is an enlarged transverse sectional view similar to FIG. 14 wherein the knob key shaft latch stop member has been turned by the key through 22½° or one-eighth turn so that latch can at the same time can be depressed into the stop recess by the special tool and the hand knob removed from the lock body part.

FIG. 16 is an enlarged exploded and perspective view of the hand knob parts including the door knob and its sleeve, the knob key shaft latch stop, a fragment of the internal body part sleeves that internally supports the depressible latch.

Referring now particularly to the Figures, 30 represents a door for an apartment, dwelling house, closet space or any other type of enclosure wherein it is desirable to have the door locked on the inside upon one leaving the premises thereby to prevent easy exit access for burlars or intruders and removal of goods once they had entered by window and/or other illegal way. This door 30 closes upon the frame opening 31 and is preferably hinged by use of tamper proof hinges 31' which are substantially concealed between the door edge and the door frame to prevent access to the attaching screws and hinge pins fixed so that they cannot be pulled. With a lock of the present type and such a tamper proof hinge the door cannot be readily removed from the opening without destruction. Such a hinge that the hinge pin cannot be removed when the door is closed has been invented by us and covered by our U.S. Pat. No. 3,733,649, issued May 22, 1973, for a tamper proof door butt hinge assembly. Thus, the burglar would have to leave through the window or other access through which he entered and would not be given opportunity to gain access to other apartments of the building which would be easy for him who would be knowledgable of the standard locks and the simple way they are unlatched by a shim or similar instrument.

The present spin knob door lock as generally indicated at 32, FIG. 1, is installed in a lock hole 39 in the door at the opening edge thereof at the same location as a standard knob door lock and in general works the same way but has the feature by which the door 30 can be locked on the inside as well as upon tht outside as when the occupant leaves the apartment and wherein the lock inside can be conditioned on the inside for normal use to open and close the door from the inside as to reach for a paper or even step out into the hall without door being swung locked behind you. The blunt lock bolt bumps against the door frame when the grip on the inside door knob is released and hence the occupant is warned of the need of a key before leaving the apartment and hence the door cannot be closed behind him by wind from the interior of the apartment without his command. The press buttons in this edge of the door used with standard locks are not needed with the present lock and yet the same result or effect prevails with the present lock. The danger of one leaving with a key pushing the wrong button as with standard locks is not present with spin type lock of this invention. The lock of this invention, the lock bolt itself, as will be apparent, may be pushed but not any press buttons.

The present spin knob lock 32 generally comprises two spin knob assemblies 33 and 34, each of which with a key are separately operable upon a centrally door lock bolt assembly 35, by the turning of the hand knob assemblies 33 or 34 to open the door either from the inside or outside, as will become apparent the outside knob is normally maintained in a spin or locked condition and the door opened only by key. When the knobs of the lock assemblies have not been made free of the lock bolt assembly 35 by their respective key lock tumbler cylinders 36 and 37 with the key 38, the door knobs are conditioned for non-spin and connected to the lock bolt so the same can be retracted and the door opened. The same key 38 is used for the inside knob 33 as for the outside knob 34, whereby the occupant upon leaving the apartment would with the key 38 first free inside for spin condition if it had been left in the non-spin condition as would be usual so that the door could be opened from the inside at any time without the key being left in the lock and while the occupant was home. This latter condition of being able to open the door from the inside has been made possible by the use of a two row tumbler lock cylinder 36 with the inside door knob assembly 33 when the key 38 can be inserted in either of two positions angled from each other and withdrawn from the same, one position to condition the assembly for spin and the other position to condition the assembly for non-spin. Such a double position two row cylinder lock can be used with the outide door knob assembly 34 but it is preferable for the safety of occupants to have but the one position cylinder lock 37 with but one tumbler set extension 37', for this outside assembly 34 so that the knob thereof will be automatically left in a condition of spin when the key is withdrawn and thus allow the occupant to close the door without the need of a key as is usual with standard door lock. Of course, if desired the double position lock assembly can be used on the outside but the occupant would be required to use the key to lock the door on the outside before leaving therefrom. It will be found that the occupant will be given adequate warning for the need of the key in his possession upon leaving the apartment and there is really no need of having an apartment door conditioned for free opening from the outside at anytime. This is only necessary from the inside so that the family cannot be locked inside without key should there be but one key. But often the occupants if more than one will each have a key. How all this is done will be more apparent as the description proceeds.

Since each of the inside and outside door knob assemblies 33 and 34 are, except for the different cylinder locks that are used, generally of the same construction, only the inside spin knob assembly 33 will be de-

scribed in the most detail manner. The two knob assemblies **33** and **34** axially oppose one another in the door with the lock bolt assembly **35** extending laterally between them and each knob assembly being actionable upon the lock bolt assembly **35** when the key **38** is used and conditioned for engagement therewith so that the lock bolt can be retracted to permit the opening of the door. The lock bolt assembly **35** is always spring-biased to a locking position and thus may engage a bumper plate **40** on the inner face of the door frame **31** adjacent the door keeper **136** upon release of the hand knob and will thus warn the occupant of the need for a key on leaving the apartment so that he may reenter later. He would do better to at this point to fish for the key and use it in the outside assembly to release the lock bolt and finally lock the door from the outside in this manner with the key.

The inside door knob assembly **33** has a main body part **41** of circular shape with an elongated sleeve projection **42** that extends outwardly therefrom and on which a door knob **43** is detachably and telescopically fitted by its sleeve formation **43'** that comes to a stop against axial displacemnt therefrom by a biased upwardly, block spring latch **45** fixed to the inner surface of the body sleeve projection **42** by rivets **47**, FIG. **2**, 13 to **16**. The spring latch **45** including a cubical-shape block **45'** and a leaf spring **45''** through which rivets **47** extend, is biased toward an upward position through a square hole **48** in the main body sleeve projection **42** into a square catch hole **49** in the knob sleeve formation **43'**. This spring latch **45** is upwardly extended and normally held by its spring **45''** in the catch hole **49** in the hand knob sleeve formation **43'** and the knob **43** thereby is normally locked to the body part **41** and against axial displacement therefrom. Through a hole **99'** in a convex cover plate **99**, later discribed, an icepick-like special tool T can be extended to depress the block head **45'** of the spring latch **45** free of the square hole **49** in the hand knob sleeve formation **43'** provided the key **38** has been inserted in key hole **50** of the lock cylinder **36** to turn a round stop **51** on drive shaft **54** lying below the spring latch **45** so as to vertically align its peripheral slot **51'** therewith to receive the latch when depressed thereinto, FIG. **15**. With this procedure the knob **43** can be pulled from the assembly to replace the lock cylinder **36** for a change of keys.

The drive connection of the hand knob **43** with the main body part **41** is effected through a spline formation **52** on the outer surface of the sleeve projection **42** of the body part **41**, FIG. **13** and extended into a key way slot **53** in the inner surface of the knob sleeve formation **43'**. Since the knob and body parts are splined to one another in this manner, rotational dependency is not made of the spring latch **45** to make the drive connection therebetween.

The key cylinder lock **36** is tight fitted and secured in the inside knob **43** against outward displacement therefrom in normal use and has two rows of tumbler sets formations **36'** and **36''** angled **45** degrees apart from each other as best seen in FIGS. **2, 13** and **16**. This lock cylinder **36** further includes an inner key receiving part **50** with a key slot **50'** and that can be rotated in its outer flanged cylinder part **36'''** through which the key receiving part **50** extends, FIG. **16**, when the key is inserted in the key hole **38''** and matched up with tumblers **36***c* in either of the tumbler formations **36'** and **36''**. The forwardly-extending, multi-sided or square drive shaft **54** that is drivingly connected to the internal rotatable key receiving part **50** and held against axial displacement therefrom by an end cap **50***a* fixed to the inner end of the part **50** by screws **50***b*. The outer flanged fixed cylinder part **36'''** has an indication mark **36***a* to assist with alignment of the key **36** with the slot **50'** into which the key is inserted for release of the inner rotatable part **50** of the lock cylinder **36** and raising tumblers **36***c* of the tumbler set formation **36'** to turn the **45** degrees in a clockwise direction to an indicator mark **36***b* and into alginment with the tumblers of tumbler set formation **36''** at which point the key **38** can be removed to but the lock in condition so that the lock bolt can be retracted by the hand knob nd the having been taken out of spin condition as when key **38** was aligned with mark **36***a* in the straight up position. At an intermediate position on the flanged cylinder part is a small dot **36***d* that can help to locate the slot **51'** of the key shaft round stop **51** beneath the spring latch **45** at a time when the knob **43** is to be removed by key **38** and icepick tool T for the changing of lock cylinder and key. The further turning of the key **38** and inner rotatable part **50** in a clockwise direction and the knob **43** will be stopped at about 90° from the vertical position by the cessation of the retracting movement of the lock bolt assembly **35** according to the arrangement of the parts and manner as will be more apparent as the description proceeds. When the key **38** has turned the lock cylinder inner part **50** clockwise through about **45** degrees or to a position indicated by mark **36***b* upon the lock flanged cylinder part **36'''** the tumblers in the inner part will have become aligned with the tumblers in the outer cylinder lock part in the tumbler set formation **36''**. In this position the key **38** can also be withdrawn and the cylinder inner part **50** left locked in the **45** degrees position for the purpose of conditioning the door lock so that this inside knob **43** is left locked in the position to allow the knob to be used to turn through another 45° or so to open the door from the inside without key and the knob in a non-spin condition as with standard locks so as to permit the normal opening and closing of the door by the knob from the inside so as to pick up a newspaper or to let one into the apartment. The key **38** will not be used again upon knob **43** until the occupant desires to have the inner tumblers of the lock cylinder inner part **51** aligned with the outer tumblers of the vertical tumbler set formation **36'** as when leaving the apartment to put the inside knob **43** in a spin free condition and render it unusable at this time to retract the lock bolt assembly **35**. The inside knob **43** cannot turn from the vertical position even with the key **38** much more than 90° because the lock bolt **35** come to its stop position and certainly not in a counterclockwise direction from its vertical position. The knob **43** cannot be removed from its assembly by turning 22½° to the dot mark **36***d* and then only with the use of the icepick tool T. Thus, the knob **43** is always key locked upon its spin lock assembly **33** and can only be removed with consent of the holder of the key **38**. This is done only at times when the lock and keys for the door are to be changed.

The spring latch **45** stays raised by the spring action of its leaf spring part **45''** above its lock cylinder shaft round stop **51** as the key **38** and knob **43** turn in a clockwise direction and only when the key is available and you have the special tool T can you remove the hand knob **43**. The round stop is held in its axial loca-

tion upon the square shaft **54** under the spring latch **45** by a set screw **56** which is threaded through of the stop **51** to engage one face of the square shaft **54.** It should now be apparent how the knob **43** is key locked on the inside door knob assembly **33** and only can one remove the knob **43** by having the key **38** and turning the key **38** and the inner key receiving part **50** in a clockwise direction to the dot mark **36***d*, whereby the locks may be changed.

The square drive shaft **54** extends inwardly from the lock cylinder **36** freely through a central round hole **41'** in the body part **41** to have driving engagement with a cam tracks supporting disc **57** and a substantially square-shaped lock cam plate **58** to be turned therewith. The inner end of the square shaft **54** can be axially disengaged from cam track supporting disc **57** and cam plate **58** when the knob **43** is removed to change the lock cylinder **36** but when in engagement therewith serves to drive both the disc and plate together and independently of the body part **41** except through a cam-operated radially-extending key bars drive connection therewith which will be understood as the description proceeds.

The inner face of the main body part **41** has an annular rib **59** that has four radially-extending slots **61** that are 90° apart, see FIGS. **4,** 4A and **5** in which key bars **62** are respectively worked radially inwardly and outwardly by respective inwardly curved work cam tracks **63** that are inwardly-spaced from the inner face of cam track disc **57** and are respectively secured by their enlarged ends **64** thereto. These cam tracks **63** are spaced 90° apart upon the cam disc **57** and being secured thereto are turned therewith as when the key **38** is inserted in its key slot **50'** and the lock drive shaft **54** is turned. Radial key bars **62** that are slidable in the body rib slots **61** and upon the inner face of the body part **41,** have respectively curved work slots **67** on their inner faces to accommodate the curved work cam tracks **63** and by which the key bars **62** are radially worked in or out, for connection with or disconnection from by their outer pointed ends **62'** with serrations **66'** of an internally-serrated ring **66** that surrounds the body rib **59** and the pointed ends of the key bars **61** as best seen in FIGS. **2, 4,** 4A and **5.** The key **38,** square shaft **54,** cam track disc **57** and the inwardly curved arcuate cam tracks **63** are turned clockwise through but **45** degrees as from retracted positions shown in FIG. **4** to extended position of FIG. 4A, wherein the pointed key bar ends **62'** connect with the ring serrations **66'.** All the while the key is straight or removed have been returned counterclockwise the bars will be disconnected so that the knob **43** can run free of the ring **66** and spin to effectively lock door on the inside. When the key bars **62** are retracted as shown in FIG. **4,** the key slot **50'** will extend straight up, FIGS. **1** and **16.** If the key **38** is inserted in the slot **50'** and the inner lock part **50** turned clockwise 45° to mark **36***d* the key bars **62** are thereby extended to connect with serrations **66'** and place the knob **43** in condition to be turned clockwise a further 45° so as to retract the door lock bolt assembly **35** in a manner which will become more apparent as the description proceeds. The knob **43** may be held while the key **38** is turned counterclockwise to retract the key bars **61** from the ring serrations **66'** and to spin lock the door by allowing the knob to spin from the lock bolt and render it ineffective to open the door. The retraction of the lock bolt assembly **35** to open the door can be and is effected only by the knob and when the key bars **62** are extended into the ring serrations **66'** as shown in FIGS. 4A and **5.**

The square cam plate **58** does not work the key bars **61,** this done wholly by the cam tracks **63,** but does back up the key bars **61** when extended engagement of its corner points with inner ends of the bars to hold the bars extended and the flat side edges of the cam plates therewith when the bars are retracted, whereby to take off the strain from the curved cam tracks **63.** The radial movement of the key bars **61** is done positively and the key bars are positively locked in both their extended and retracted positions. For the key bars **61** to be maintained in locking engagement with the serrated ring **66** without the key **38** the second tumbler set projection **36''** is provided on the lock cylinder **36** FIG. 4A and the key **38** has been withdrawn when the inner lock cylinder part **50** has been turned 45° from the straight up position of FIG. **4,** for alignment with the indication mark **36***d* and lock cylinder tumbler set formation **36'''.** At this time the knob **43** can be turned the further 45° to FIG. **5** position without the insertion as the key **38** to retract the lock bolt **35** and open the door from the inside to leave, let someone in or just to pick up a newspaper or bottle of milk. The key **38** need only be used again to retract the key bars **61** by turning counterclockwise **45** degrees from the position of FIG. 4A to that of FIG. **4** to place knob **43** in condition of spin as when leaving the apartment and thereby render the lock ineffective and prevent the opening of the door from the inside by burglars or intruders who may have entered the apartment or premises through a window when one is gone therefrom. The key **38** has thus been removed and the inside knob **43** having been released from the lock bolt assembly **35,** the knob **43** is no longer usable until the key is again inserted in the knob **43** as when the occupant returns to his apartment to again condition the knob with the **38** to turn clockwise from the straight up spin position 45° to the mark **36***b* position so the knob can be used from the inside again. With standard locks, both inside and outside knobs are usually turnable to the right or clockwise to open a door and that will be the case with present spin knob door lock. It should be evident that the inside knob **43** with this present lock is turned clockwise to right to open the door and as the description proceeds in will be evident that the outside knob will be turned with the key inserted clockwise and to the right to open the door but with the key removed from the outside knob will always be left in the spin condition.

On viewing FIG. **2,** it should be readily apparent that the outside spin lock assembly **34** is constructed similarly to the spin lock knob assembly **33** that has just been described. The same key **38** fits the cylinder lock **37** that is similarly drivingly connected by a square shaft **71** to a cam track support disc **72** and a square cam plate **73** and both be turned by the inner lock part of lock cylinder **37** while holding the knob **74** so as to move pointed radially-extended key bars **76** by its curved cam tracks **77** so as to retract the key bars **76** from engagement a second internally-serrated ring **78** having serrated teeth **78',** all similar to the ring **66** above described. These serrated rings **66** and **78** are part of a turnable common lock bolt operating mechanism **80** for the lock bolt assembly **35** and are secured together by circumferentially-spaced long rivets **86** FIG. **2.** The outside hand knob assembly **34** has a main

body part 79 with an annular inwardly-extending rib 81 providing radial slots similar to slot 61 of body part 41 through which the radially-extending key bars 76 are guided. The hand knob 74 is sleeve coupled to the body part 79 by its sleeve 74' and spline connected as above described with reference to the knob 43 of the spin lock knob assembly 33 and body part sleeve 42 as indicated at 85. The key driven square shaft 71 has a round stop 82 with peripheral slot as with slot 51' that can be aligned by key turned 22½° to the right with upwardly biased spring latch 83 to hold the spring in aligned sleeve projection holes on the body part 79 and knob 74, so that the knob 74 is thereby held against axial removal from the internal spin lock assembly 34 and its body part 79 without a key 38 and a special tool that has access through a hole 106' in cover plate 106 as described above in connection with removal of hand knob 43.

It should be apparent that once the occupant has made the inside knob 33 free to spin that retraction of the lock bolt assembly 35 from inside the premises cannot be effected and the door is in effect locked since its key bars 62 have been positively retracted. The outside knob 74 is always left in the spin condition with the same key 38, upon the occupant returning to the apartment, being inserted into the outside key cylinder lock 37, key bars 76 are extended into the serrated ring 78 and its serrations 78' of the lock bolt operating mechanism 80 as shown in FIG. 4A and the knob 74 turned clockwise to retract the lock bolt assembly 35 and open the door from the outside FIG. 4. With the spin assemblies 33 and 34 out of engagement with lock bolt assembly 35 and knob made free to spin they are made ineffective to open the door from both the inner and outer sides thereof so that one cannot pass therethrough without a key from either side thereof.

The lock bolt assembly 35 taken with its serrated ring operating mechanism becomes a separately-contained unit confined at its periphery an inwardly-flanged partial ring 84 open at the door edge and made of two parts 84' and 84'', FIG. 2, and butt welded together at 85 to provide a casing about the operating mechanism 80 and its internally-serrated rings 66 and 78, and the lock bolt assembly 35. Assembled in the serrated ring mechanism to internally enclose the key bars 62 upon the body part 41, is a closure plate 86, and with the serrated ring 78 and facing the body part 73 of the hand knob assembly 34, is a closure plate 87 that encloses the key bars 76 upon the body part 79. A spacing ring 88 is provided between the plates 86 and 87 to provide for a space through which the lock bolt assembly 35 may be worked.

A drive pin 89 is fixed between the inner faces of the plates 86 and 87 and extends through a vertically-extending slot 92' of an inner lock bolt piece 92 of the lock bolt assembly 35. The parts including the internal-serrated rings 66 and 78, the closure plates 86 and 87 and the center spacing ring 88, that all held together by long rivets 68, and the pin 89, constitute the common lock bolt operating mechanism 80.

The inwardly-flanged partial ring 84 is fixedly held between casing parts 93 and 94 that are overlapped and centrally screw fitted together at 96. The lock bolt assembly 35 is contained in the inwardly-flanged cylindrical ring 84 and the ring 84 is thus held against rotation by the casing parts 93 and 94. The internally-serrated rings 66 and 78, plates 86 and 87, spacing ring 88 and pin 89 as a unit can be turned by either one of the hand knob spin lock assemblies 33 and 34 with the inwardly-extending flanges of the partial ring 84 to guide its rotation and hold it against axial displacement within the door lock 32. The casing parts 93 and 94 enclose the spin assembly body parts 41 and 79 and hold the body parts against axial separation from the lock bolt operating mechanism 80 and provide for a completed assembly that can be installed as a unit in to the door lock hole 39.

The casing part 93 has a short central externally-threaded sleeve projection 97 onto which an attaching plate 98 is threaded by its internally-threaded sleeve projection 98' for flush engagement with the inner side face of the door 30 and about through opening 39 in the door in which the spin lock 32 is assembled and about top and bottom fastening screws and sleeve holes 100. The outer periphery of the attaching plate 98 is beveled at 98' to have tight gripping engagement of an cooperating internally-beveled convex cover plate 99 that is snap fitted thereover. In order to prevent further removal of the convex cover plate 99 from the spin lock assembly 34, a rib 101 is provided externally about the hand knob sleeve projection 43' of the hand knob 43 to keep the plate 99 from being backed off from the screw fastened attaching plate 98 and the side face of the door. Attaching screws 102 extend between this attaching plate 98 and an outer face peripherally beveled attaching plate 103 that is threaded by its short internally-threaded sleeve portion 103' onto an outwardly-extending threaded short sleeve projection 94' of the casing part 94. Attaching plate 98 has top and bottom, inwardly extending internally-threaded sleeve projections 104 for receiving fastening screws 102 extending inwardly from the outside attaching plate 103 to firmly fix the lock assembly with the door lock hole 39.

An outwardly dished cover plate 106 is snap fitted at its periphery over beveled peripheral edge 107 of the attaching plate 103. Hand knob 74 is provided with an annular rib 108 to further keep the cover plate 106 from being released from the attaching plate 103 and an access had to the heads of long attaching screws 102. The internally-threaded sleeve projections 104 are provided upon and extend inwardly from the attaching plate 98 and receive the fastening screws 102 that are extended into countersunk holes 111 in outside attaching plate 103. In order that the attaching plate 103 can be adapted to the sleeve projections 104 of the attaching plate 98, a series of circumferentially-spaced counter-sunk holes 111 are provided in the plate 103, FIGS. 2, 10 and 12 so that the attaching plate 103 can be brought into a screw tight fit against the outer face of the door before threading the fastening screws 102 into the top and bottom sleeve projections 104.

In FIG. 11, there is shown a modified form of an attaching plate 103*a* in which instead of a series of countersunk holes 111 for the screws 102, arcuate slots 112 are provided to thereby allow the plate 103*a* to be tightened against the outside door face and adjusted so as to accommodate the attaching screws 102 at their top and bottom sleeve-receiving locations.

As can be best seen in FIG. 12, diametrically-opposite vertically space small parallel holes 100 and 100' are provided above and below large through opening 39 and vertically-spaced from one another in the door to accommodate respectively the respective internally-threaded sleeve projections 104 of the inside at-

taching plate **98**. The attaching plate **98** will have been threaded completely onto the internal casing part **93** so that the assemblage from inside of the door can be made by extending the sleeve projections **104** of the attaching plate **98** into the holes **100** and **100'**. Thereafter, the assemblage from the outer side of the door may be threaded into place and once the attaching plate **103** has been brought home on the threaded sleeve portion **94'** of the casing part **94**, the attaching screws **102** will be threaded into the sleeve projections **104** within the vertically-spaced holes **100** and **100'**.

The lock bolt piece **92** of the lock bolt assembly **35** is retained in assembly by pin **89** and is generally of T-shape with the elongated slot **92'** being in the spread of the T, FIG. **3**. A hairpin like spring **117** is passed over opposite sides of the work pin **89**, secured between the closure plates **86** and **87**, and will be spread at one leg or the other as the hand knob of one of the spin assemblies is turned and has the effect of keeping the pin **89** centralized in vertical slot **92'**. The lock bolt piece **92** extends outwardly through an opening **118** cut away from one side of the assembled lock bolt operating parts, FIG. **3**. Several of the parts are so cut away, as can be readily seen in FIG. **21**, to provide this opening **118** for the lateral movement of the lock bolt piece **92**. The hairpin like spring is anchored to the face of the inner lock bolt piece **92**. The hairpin like spring is anchored to the face of the inner lock bolt piece **92** by bosses **119**.

The outer end of the lock bolt piece **92** is transversely-grooved at **121** to accommodate a T-shaped projection **122** of a solid lock bolt **123** which has a dead bolt-like blunt end head **124** extending outwardly from a flange portion **125** thereof. A compression spring retaining casing **126** surrounds the lock bolt **123** and a compression spring **127** thereabout that reacts between an inwardly turned end **128** of the casing and the flange **125** of the lock bolt **123**. This lock bolt **123** is held in place within the spring casing **126** by a screw attached retaining plate **129** fastened by screws **131** that extend through a flange **132** of the spring retaining casing **126** so as to fix the lock bolt **123** and the casing **126** in assembled position in a hole **133** extending laterally from the edge of the door **30** to the central lock opening **39**. This hole **133** as best seen in FIG. **12** accommodates the spring casing **126** and outwardly of this hole the door edge is recessed to accommodate the flange **132**, a gasket **134** and retaining plate **129** along with the fastening screws **131**. This blunt end bolt head **124** enters in the usual fashion, a keeper plate **136** with hole **137** and fitted into the door jamb frame **31** and retained by screws **138** FIG. **3**. The door frame material is recessed to accommodate the extended blunt head **124** of the lock bolt **123** through keeper plate opening **137**. The hair pin spring **117** on the inner lock bolt piece **92** takes up any lost motion in the connection between the bolt piece **92** and the lock bolt **123** as well as stabilizes the lock piece **92**, pin **89** and the parts to which it is connected. The bolt compression spring **127** in spring casing **126** normally maintains the lock bolt **123** in its outwardly-extended position for locking engagement with the door jamb keeper plate **136** in the door frame opening **31**. Any turning of the knob **4** or **74** to open the door is made against **43** action of spring **127**. The knobs **43**, the lock bolt **123** is held against inward displacement by the pin **89** centered as shown in full in FIG. **3** or **74** can be turned at any time to withdraw the lock bolt **123** so long as the key has been used in the cylinder lock to extend the key bars **62** or **76** into their respective serrated rings **68** and **78**. When both of the knobs have been released from the serrated rings by the key **38**, the knobs will spin freely and are no longer available for operating the lock bolt **123**. The inside door knob **43** as explained above by the use of two tumbler cylinder lock sets **36'** and **36''** can be left in either spin or non-spin condition, but the outside knob **74** having only one tumbler cylinder set **37'** is always left in a spin condition. This outside knob **74** may also be a two tumbler set lock cylinder by use of additional tumbler set **37''** shown in phantom in FIG. **2** and then the door could be fixed for free opening outside as well as on the inside in the manner explained above.

In FIG. **6**, there is shown a slightly modified form of the invention in which key bars **141** are worked radial slots **61** by the use of follower pins **142** extending into arcuate-shaped cam slots **143** in a cam disc **144** that is turned by the square key shaft **54** along with the square cam plate **58** in the same manner as above described in connection with first form of the invention. Key bars **141** are thereby released from serrations **66'** of the internally-serrated ring **66** connected by the rivets **68** to the turnable common lock bolt operating mechanism **80** in the same manner as above described. The operation of the lock will be generally carried out in the same manner as above described and the spin lock assembly **34** at the outside of the door will be of the same cam slot construction. The bars **141** are positively worked and locked in both directions without need of springs, the same as with the first form of the invention of FIGS. **2**, **4**, **4A** and **5**. Except for the cam disc **144** and follower pin **142** all other parts of the lock will be the same.

In FIGS. **7**, **8** and **9**, there is shown a still further form of the invention in which an effort has been made to bring the lock assembly to a minimum thickness so that it may fit a thin door, such as in closet doors. Some of the same numbering as above is being used for some of the parts. Arcuate-shaped grooves **146** are formed in the surface of work disc **147**. Key bars **148** are slidable through radial slots **149** formed in annular projection rib **151** of either body part **158** or **159** so that they will be disengaged from serrations in the internally-serrated rings **66** and **78**. The key bars **148** are urged into the serrations and held in place when engaging the serrated rings by corners of a square-shaped retaining plate **152**. Inner end tips **148'** of key bars **148** are used to keep the bars **148** in place in grooves **146** and against the work disc **147** by the inner ends of key bars lying under the edges and corners of the square retaining plate **152**.

The lock assemblages of FIGS. **6** and **7** are held within a container assembly **153** having a front opening **154** through which the lock bolt assembly **35** is retracted by drive pin **89** connected between inner plates **86** and **87** that are in turn connected to the serrated rings **66** and **78**. The grooved work plates **147** and **149** are the body parts to which are respectively connected respective spin lock knobs **43** and **74** are attached by their respective square lock cylinder shafts. The operation of this spin lock assembly is the same as above described except that the structural parts are of slightly different design and shape and assembled for compactness within a narrow or thin door structure. The same attaching plates **98** and **103** along with attaching screws **102** can be used for securing the assemblage in the

door in the same manner as above described and the cover plates **99** and **106** likewise attached to the plates **98** and **103** to enclose them in the same manner. The attaching plates will be extended over body parts **158** and **159** that are square fitted respective cylinder shafts **156** and **157** and have respectively sleeve projections **158'** and **159'** upon which the hand knobs **43** and **74** may be assembled with or without the knob lock feature that has been earlier described in connection FIGS. **2, 13** to **16.**

This thin spin lock assembly can be used on closet doors to prevent an intruder from entering a closet without a key, the outside knob being with a two tumbler cylinder lock whereby by key **38** can be conditioned for spin as upon one leaving the house or non-spin while at home.

Once a door is opened from the inside of the apartment, the blunt lock bolt **123** will be extended and upon the same having been put in condition for spin will bump against the protective rubber bumper **40** as seen in FIG. **1** on attempting to close the door. If one stays inside the knob **43** can be turned again to the right to retract the bolt and close the door. Otherwise to close the door from the outside the occupant will have to release the bolt from bumper **40** and close the door thus one is reminded to have the key when he leaves. He will thus be warned from the bumping of the bolt **123** upon bumper **40** of the need to have the key **38** when he leaves the apartment. The outside knob **74** is always left conditioned for removal of the key **38** spin and the key **38** has to be used to retract the lock bolt **123** to enter the apartment. A two tumbler set lock can be used on the outside as well as on the inside but there will be a greater chance for the door to be left unlocked from the outside even though locked on the inside to keep intruders who have entered by window from leaving through the apartment door and which has been the principal object of this invention. Further, by this construction the press buttons in the edge of the door as characteristic of standard locks are dispensed with and by this lock with the use of a key substantially the same features of the non-spin standard lock can be had and with safety. Also, it will be apparent that angle-sided live lock bolt has to be replace with a blunt lock bolt locked in its extended position by the work pin **89** being on center as seen in FIG. **3** and cannot be retracted by a shim extended between the door edge and frame either from inside or outside to open the door.

While various changes can be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the invention as defined by the appended claims.

We claim:

1. A double spin knob door lock comprising two axially-opposing key-operated hand knob assemblies, assembled casing parts enclosing portion of the hand knob assemblies and adapted to fit within a cutout lock opening in a door, as a unit one of the hand knob assemblies extending from inside of the door and the other hand knob assembly extending from outside of the door, each of said hand knob assemblies having a hand knob and an internal main body part connected to the hand knob to be turnable therewith, radially adjustable key bar means on body part, a key-operated tumbler lock cylinder extending axially through the hand knob and a square operating shaft extending inwardly therefrom and through the main body part and freely turnable therein, a turnable cam-track supporting member connected to the shaft to be driven thereby and having cam-track thereon, said cam-track supporting member turnable relative of the main body part independently thereof to positively radially-adjust the key bar means on the body part, said cam track supporting means having a square opening with which said tumbler lock square operating shaft drivingly engages to turn the turnable cam-track supporting means and the said cam-track operable upon the radially-adjustable key bar means to positively thrust the key bar means radially-outwardly or positively-inwardly as a door key is inserted into the key-operated tumbler lock cylinder and the square shaft turned thereby, an internally-serrated ring lying inwardly of the main body part with serrations with which the key bar means will have drive engagement when the key bar on cam-track supporting means is radially-outwardly adjusted by the turning of the tumbler lock cylinder, a drive plate disposed inwardly of and lying adjacent to the serrated ring, a spacing ring disposed between the drive plates of the two opposing assemblies to provide space therebetween, means for securing together the spacing ring, the serrated rings and the drive plates of the associated hand knob assemblies to provide a common lock bolt operating mechanism, means for mounting the common lock bolt operating mechanism in axial relationship with and between the hand knob assemblies and in said casing parts for rotation with respect thereto, a lock bolt assembly extending laterally from the common lock bolt operating mechanism, and adapted to extend through the side edge of the door for engagement with a door frame keeper plate in the door frame opening, said lateral lock bolt assembly having a vertically-extending slot, a work pin extending between the drive plates of the common lock bolt operating mechanism and through the vertically-extending slot of the lock bolt assembly to retract and extend the same and means for securing the assembled casing enclosing parts and the hand knob assemblies upon the door whereby the door will be locked from both sides thereof by virtue of the key bar means of the hand knob assemblies being retracted radially-inwardly out of engagement from their serrated rings of the common lock bolt operating mechanism and the hand knobs of both inside and outside knob assemblies left free to spin upon the door.

2. A double spin knob door lock as defined in claim **1** and said radially-extending guide means of each hand knob assembly including a plurality of radially-extending guide slots on the body part angularly spaced from one another and the key bar means including a plurality of key bars radially adjustable on the inner face of the cam-track supporting means of the door knob assembly angular-spaced from one another thereabout and respectively radially slidable in the respective guide slots said cam track means including a plurality of cam tracks carried upon the turnable cam-track supporting means angularly spaced from one another and respectively operably connected with the respective key bars, a substantially square-shaped cam lobe plate having alternate raised corner and side cam edge portions engageably with the inner ends of the key bars as they are thrust outwardly and retracted inwardly by the turning of the cam-track disc to further positively retain their adjusted positions along with their cam-tracks, said cam lobe plate lying centrally flush against

the inner face of the cam-track supporting means and likewise drivingly connected to the cylinder tumbler lock square shaft to operate in unison with the cam-track supporting, whereby to hold the key bars both iin their outwardly-extended and internally-serrated ring engaging positions and in their inwardly-retracted positions.

3. A double spin knob door lock as defined in claim **1** and the body part of at least one of the hand knob assemblies including an outwardly-extending sleeve projection and the hand knob thereof having a sleeve projection telescopically-overlapping the sleeve projection of the body part and a depressable tool accessible spring latch carried on one of the sleeve projections and engageable with the other sleeve projections for interlocking the two sleeve projections together and means on the lock cylinder square shaft and operable by the door key inserted into the lock cylinder and the turning of the square shaft thereof to render the spring latch operable for releasing the hand knob with key lock cylinder from the body part sleeve projection, whereby the hand knob of the assembly will be key locked upon the body part be releasable from the body part for repair or replacement of the cylinder tumbler lock of the hand knob.

4. A double spin knob door lock as defined in claim **1** and a hair pin-like spring fixedly carried upon one side of the laterally extending lock bolt assembly with its arms extending respectively inwardly under and over the work pin in the vertically-extending slot thereof to normally centralize the pin therein and to hold the common lock bolt operating mechanism including the serrated rings against unintended rotation when the key bar means of the hand knob lock assemblies is free thereof and the door knobs free to spin.

5. A double spin knob lock as defined in claim **1** and said means for securing the casing parts and hand knob assemblies to the door wherein the casing parts have outwardly-extending externally-threaded central sleeve projections and attaching plates respectively having internally-threaded sleeve portions, and said attaching plates being threaded onto the threaded sleeve projections of the casing parts and respectively adjustable thereupon for flush tight clamping engagement with the respective inner and outer faces of the door and fastening means extending through the door connecting the attaching plates together and upon and to the respective inner and outer faces of the door.

6. A double spin knob door lock as defined in claim **5** and said hand knobs assemblies respectively having inwardly-extending sleeve projections, cover plates respectively detachably secured to periphery of the attaching plates and respectively having central openings for receiving the respective sleeve projections of the hand knobs, and said hand knob sleeve projections respectively having annular ribs extending thereabout and engageable by the edges of the central opening of the cover plates to prevent the easy removal and detachment of the cover plates from the attaching plates and the backing off of the same onto the hand knob sleeve projections.

7. A double spin knob lock as defined in claim **6** and the body part of each of the hand knob assemblies including an outwardly-extending sleeve projection, and the hand knob having a sleeve projection telescopically overlying the sleeve projection of the body part, and spring latch releasable means carried on one of the sleeve projections of each hand knob assembly and engageable with the other sleeve for interlocking the two sleeve projections of the assembly together, and means on the square shaft of each of the cylinder tumbler locks of each hand knob assembly and operable by the door key inserted into the cylinder tumbler lock and the turning of the square shaft thereof to release the means between the hand knob from the body part, whereby the outer cover plates will be backed up by the annular ribbed key locked hand knob upon their assemblies and may be released from the knob sleeves only upon the use of the key use for releasing the hand knobs from the body part sleeves of the hand knob assemblies and thereby key locked with the hand knobs thereupon.

8. A double spin knob lock as defined in claim **1** and at least the cylinder tumbler lock of one of the hand knob assembly having two tumbler set projections angled apart from each other to allow for the insertion and withdrawal of the key at either of two positions on the face of the knob, one position being to condition the assembly for the spinning of the knob for effectively locking the door and the other position being to condition the assembly for turning the knob at any time by leaving the key bar means in engagement with the internally-serrated ring, whereby the door may be opened without the use of the key.

9. A double spin lock door lock as defined in claim **1** and biasing means normally extending the lock bolt assembly out of the edge of the door into the door frame keeper and a bumper plate secured to the door frame adjacent to the door frame keeper and adapted to be struck by the side of the lock bolt assembly upon the door being directed from the inside toward its closing position, whereby to warn the occupant for the need of a key upon leaving the premises upon the need for a key to be used upon the outside knob assembly to finally close the door and condition the outside knob to spin freely and in effect lock the door.

10. A double hand knob door lock comprising two axially-opposing hand knob assemblies adapted to fit with a cutout lock opening in a door, one of said hand knob assemblies extending from inner side of the door and the other hand knob assembly extending from outer side of the door, at least one of said hand knob assemblies including a hand knob and a key-operated cylinder tumbler lock fitted therein, a spring-biased lock bolt assembly extending laterally from between the hand knob assemblies within the opening and through the edge of the door for engagement with a door jamb plate in a door frame, a common lock bolt operating mechanism rotatably mounted in the door opening between the two hand knob assemblies, said spring-biased lock bolt assembly having a vertically-extending slot, a pin carried by the common bolt operating mechanism extended through the vertically-extending slot in the bolt assembly to retract the lock bolt assembly, each of said hand knob assemblies being respectively connected to the common bolt operating mechanism to rotate the same and selectively operable to retract the lock bolt assembly by one or the other of the hand knob assemblies, the said one key-operated hand knob assembly further having a body part with a radially-extending key bar guide slot thereon, a radially adjustable key bar operable in the body part key bar guide slot, cam means turnable on the body part and connected to the key bar to positively extend and re-

tract the key bar, said rotatable common bolt operating mechanism having radially-inwardly extending projection means for engagement of the key bar therewith, and a shaft extending from the key-operated cylinder tumbler lock in the hand knob to the cam means and operable by a key to turn the same so as to extend or retract the key bar into engagement with the radially-inwardly projection means whereby the one hand knob can be operated by a key to retract the lock bolt assembly and so as to permit the knob to spin free of its assembly, thereby effectively locking the door.

11. A double hand knob door lock as defined in claim 10 and said body part having an outwardly-extending sleeve projection and the key operated hand knob having an inwardly-extending sleeve projection telescopically overlying the sleeve projection of the body part, said shaft extending through the sleeve projections, releasable means carried on one of the sleeve projections for normally interlocking the two sleeve projections together and said shaft having a tumbler means operable therewith to keep the releasable means engaged but permitting disengagement only by use of the key that turns the shaft whereby the knob will be key locked upon its assembly and mey be removed from its assembly only by its key for repair or replacement of the cyclinder lock and for the purpose of changing the keys or the disassembly of the entire lock from the door.

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