DOUBLE SPIN KNOB DOOR LOCK


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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
1 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 biasedly 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 interior 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 interior by key only as with the standard locks and as 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 spin knob 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 removable 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 22 1/2° 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 burglars 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 knowledgeable 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 the 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 tumblers 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 outside 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 tumblers 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 re-enter 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 displacement 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 described, 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 beneath 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 therewith.

The key cylinder lock 36 is tight fitted and secured in the 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 36c 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 50a fixed to the inner end of the part 50 by screws 50b. The outer flanged fixed cylinder part 36'' has an indication mark 36a 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 36c of the tumbler set formation 36' to turn the 45 degrees in a clockwise direction to an indicator mark 36b and into alignment 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 43 having been taken out of spin condition as when key 38 was aligned with mark 36a in the straight up position.

At an intermediate position on the flanged cylinder part is a small dot 36d 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 36b 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 thickening 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 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 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 comes to its stop position and certainly not in a counter-clockwise direction from its vertical position. The knob 43 cannot be removed from its assembly by turning 22½° to the dot mark 36d 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 36d, whereby the locks may be changed.

The square drive shaft 54 extends inwards from the lock cylinder 36 freely through a central round hole 41 in the body part 41 to have driving engagement with a cam track 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 easily 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 outwards by respective inwardly-curvatures 66 of cam tracks 63 that are inwards-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 on 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 their outer pointed ends 63′ with serrations 66′. FIG. 2 shows the 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 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 effectually 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 36d 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 36d 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 counterclockwise from the straight up spin position 45° to the mark 36b 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 to clockwise 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 drivenly 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 through 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 internally-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 overlapping 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 external 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 up from the externally-threaded 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 103a in which instead of a series of countersunk holes 111 for the screws 102, arcuate slots 112 are provided to thereby allow the plate 103a 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-
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 pin assemblies is turned and has the effect of keeping the pin 89 centralized in vertical slot 92'. The lock bolt piece 92 extends outwards 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 transverse-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 the 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 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 locked 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 tum-bler cylinder lock whereby 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 there-between, 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 serrations 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 camtracks, 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 in
their outwardly-extended and internally-serrated ring
engaging positions and in their inwardly-retracted posi-
tions.

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 pro-
jection and the hand knob thereof having a sleeve pro-
jection telescopically-overlapping the sleeve projection
of the body part and a depressible tool accessable
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 in-
cluding the serrated rings against unintended rotation
when the key bar means of the hand knob lock as-
semblies 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 projec-
tions of the casing parts and respectively adjustable
thereupon for flush tight clamping engagement with the
respective inner and outer faces of the door and fasten-
ing means extending through the door connecting the
attaching plates together and upon and to the respec-
tive 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 re-
spectively detachably secured to periphery of the af-
fection plates and respectively having central openings
for receiving the respective sleeve projections of the
hand knobs, and said hand knob sleeve projections re-
spectively having annular ribs extending thereabout
and engageable by the edges of the central opening of
the cover plates to prevent the easy removal and de-
tachment 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 in-
cluding 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 en-
geable 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 as-
semblies and may be released from the knob sleeves
only upon the use of the key for releasing the hand
knobs from the body part sleeves of the hand knob as-
semblies 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 an-
gled 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 effectivly
locking the door and the other position being to condi-
tion 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 clos-
ing 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 lock 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 therein, 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 projec-
tion 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 assem-
bly and so as to permit the knob to spin free of its as-
sembly, 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 hav-
ing an inwardly-extending sleeve projection telescopi-
cally overlying the sleeve projection of the body part,
said shaft extending through the sleeve projections, re-
leasable means carried on one of the sleeve projections
for normally interlocking the two sleeve projections to-
gether 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 may be removed from its assem-
ibly only by its key for repair or replacement of the cy-
cylinder lock and for the purpose of changing the keys
or the disassembly of the entire lock from the door.

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