United States Patent [19]

Nagy et al.

[11] **3,896,645**

[45] **July 29, 1975**

[54] **DOUBLE SPIN KNOB DOOR LOCK**

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[21] Appl. No.: **514,120**

[52] **U.S. Cl.** **70/149**; 70/223; 70/DIG. 60; 292/169; 292/348

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

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

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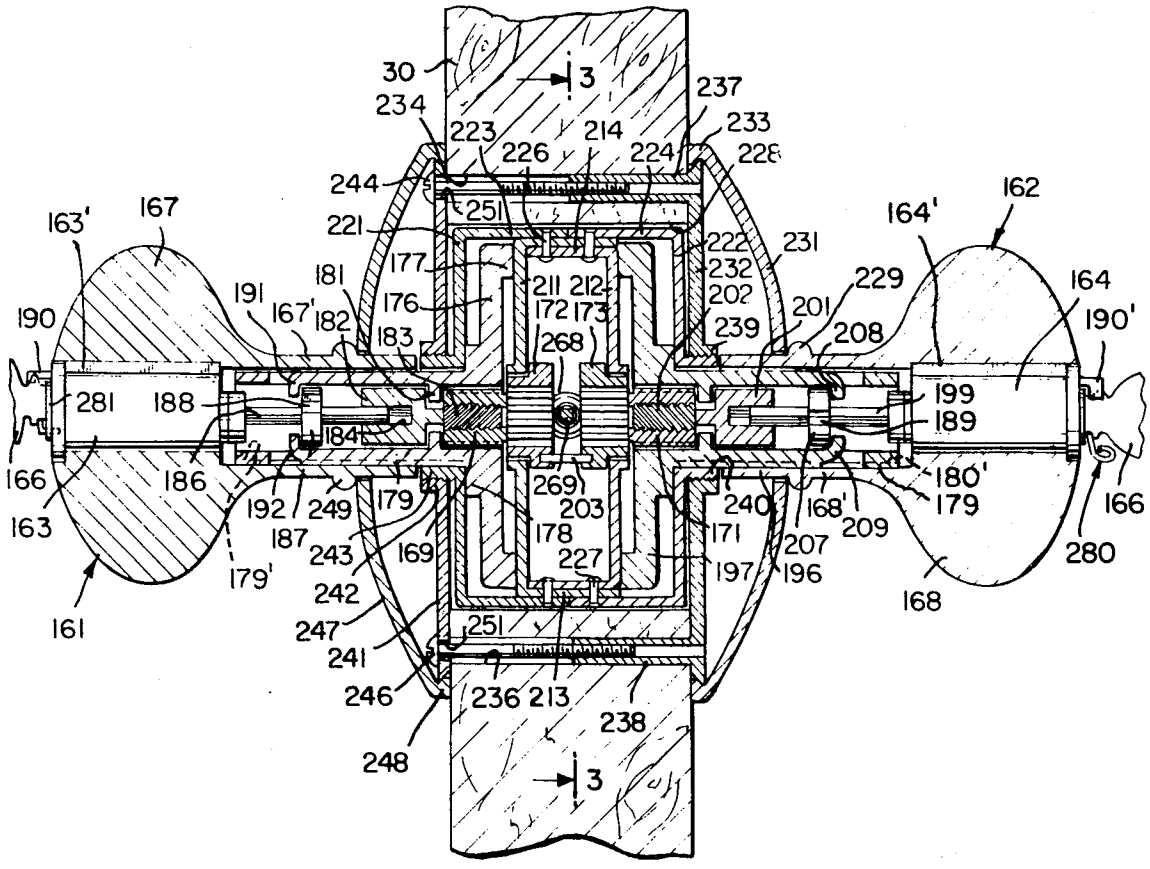
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Primary Examiner—Albert G. Craig, Jr.
Attorney, Agent, or Firm—Laforest S. Saulsbury; Polachek, Saulsbury & Hough

[57] **ABSTRACT**

This double spin knob door lock is formed of inside and outside spin knob assemblies which are both conditioned automatically for spin by the removal of the key. A blunt ended lock bolt is biased to an extended position from the door edge into a door frame keeper. In order to render the knob effective to retract the lock bolt, the key must be inserted and turned relative to and with the knob in a clockwise direction through 90°. Each of the knob assemblies have a tumbler lock cylinder with a shaft that is connected to a fast threaded work block that with the turn of a key is thrust forwardly to work an externally-splined nut into an internally-splined ring, that with the opposing ring of the other assembly, is joined in common with a crank pin that passes through a slot in the laterally extending lock bolt assembly so as to retract the same and unlock the door. The key can be kept in the inside knob when the occupant of the premises is home. A stiff-spring latch is provided upon the inside hand knob that enters a notch in the key to keep the key in the knob against easy removal. A resilient bumper is provided on the inner face of the door frame against which the blunt ended bolt will bump if an attempt is made to close the door with the bolt projected. The lock assemblies are so made that with removal of a stop on the front face of the lock cylinder the key can be used by turning in a counter clockwise direction to release the knob from its assembly so that the lock cylinders and key can be changed.

10 Claims, 11 Drawing Figures



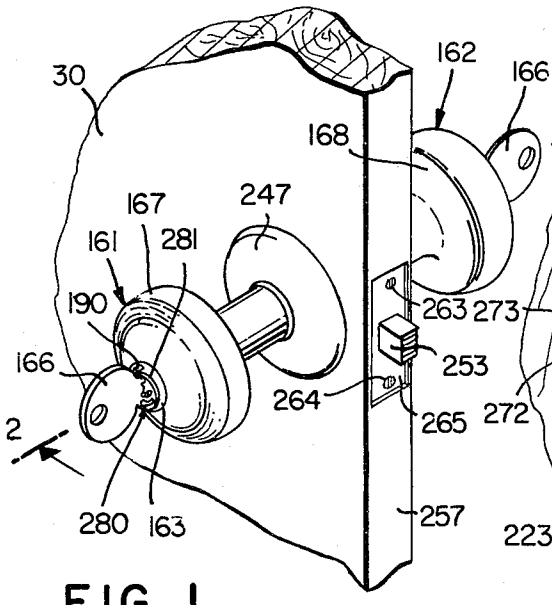


FIG. 1

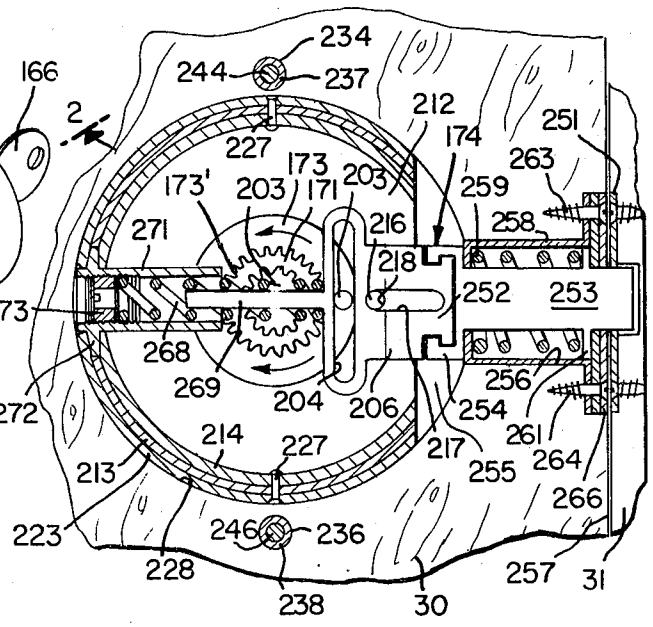


FIG. 3

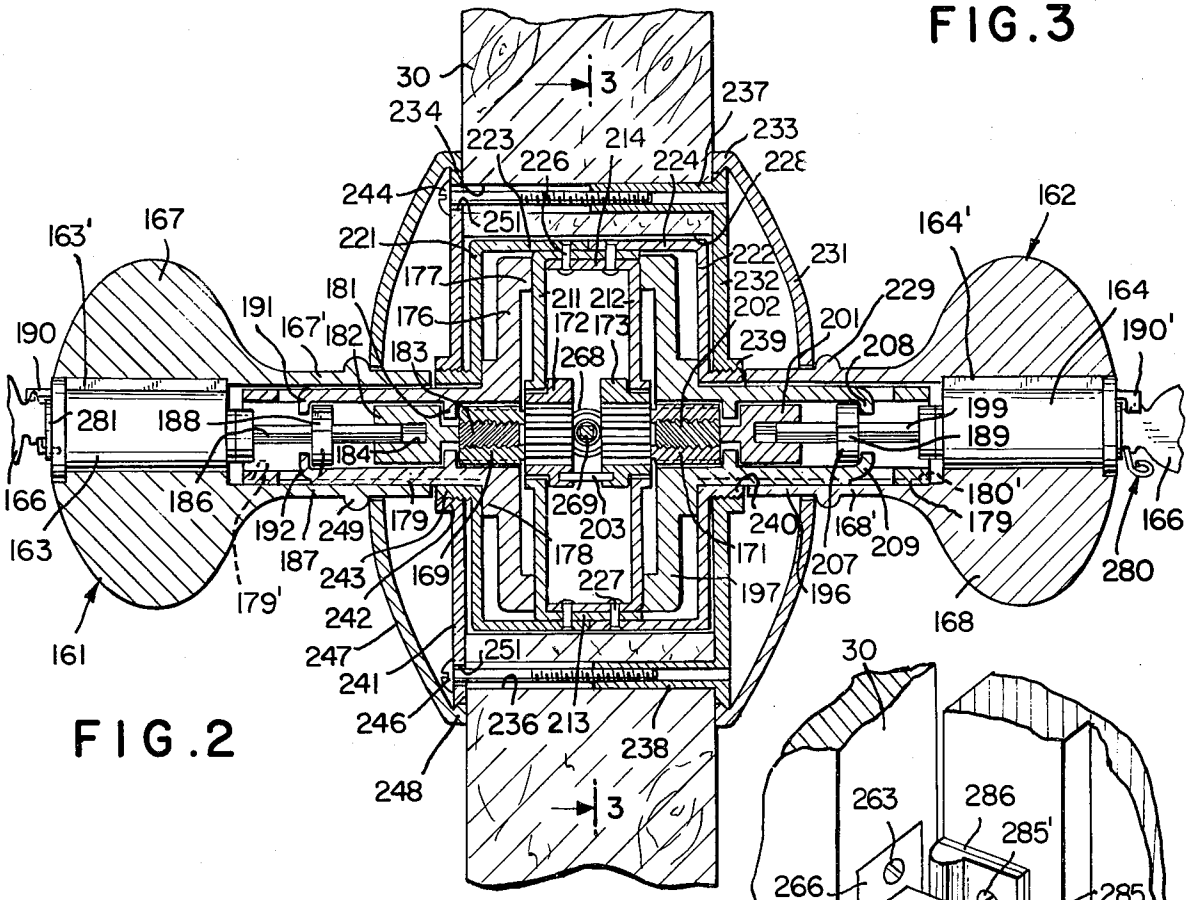


FIG. 2

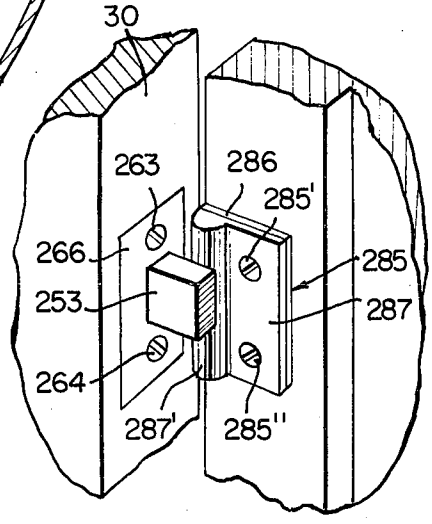


FIG. 11

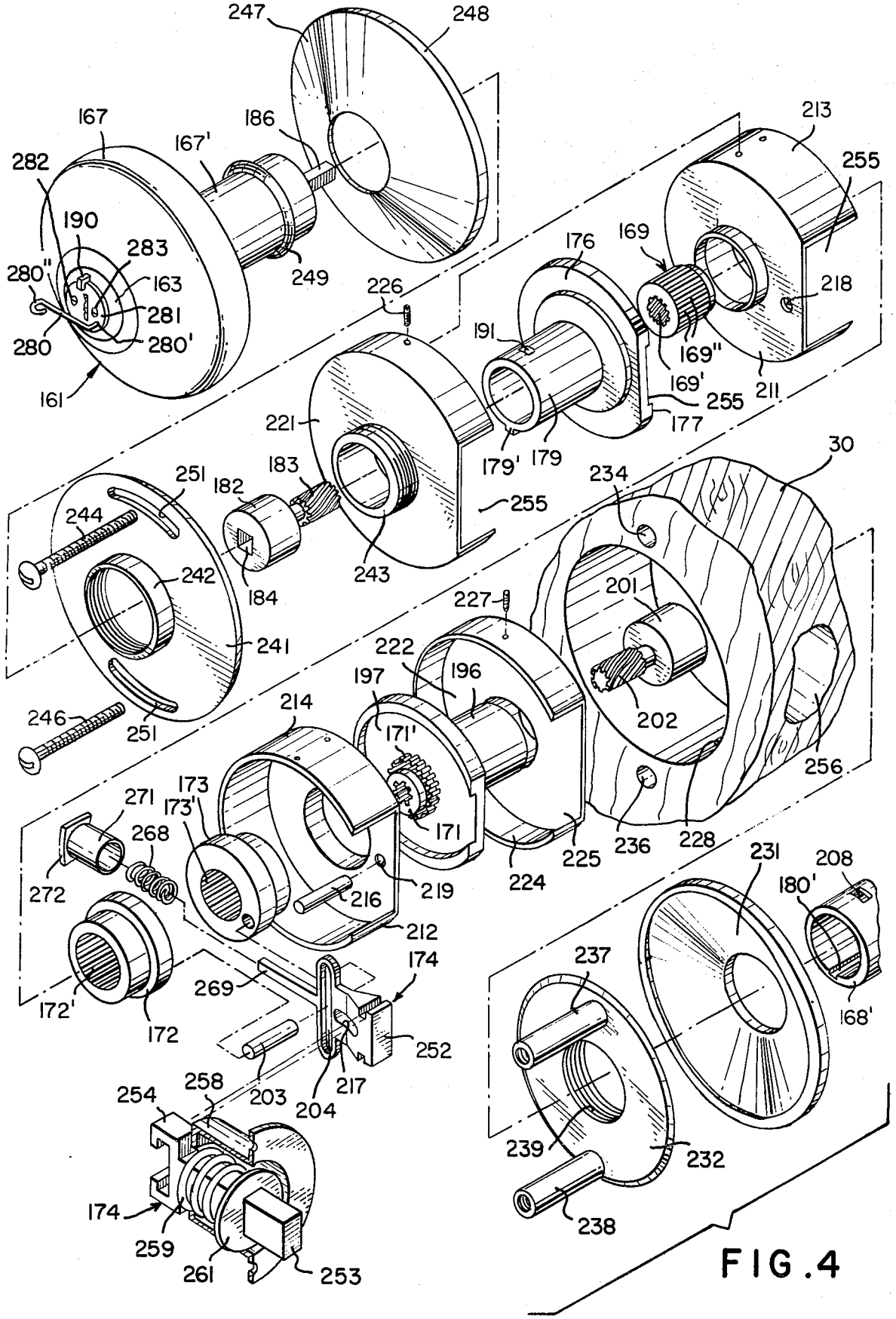

247
248
167
186
167'
282
190
283
280"
163
281
280
280'
161
249
213
255
176
169
218
226
191
169"
169'
255
211
177
221
179'
179
255
30
234
251
183
182
244
242
184
243
241
227
201
222
196
197
246
251
214
171'
202
256
173
173'
271
171
268
272
216
219
224
225
236
228
212
231
208
180'
174
269
237
172'
172
252
168'
258
254
203
204
217
239
232
174
259
261
253
238

FIG. 4

FIG. 9

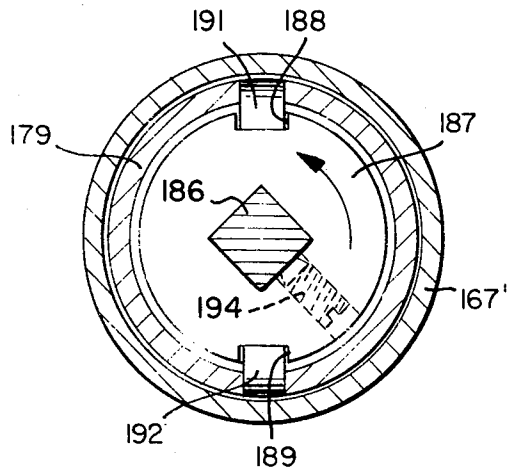


FIG. 7

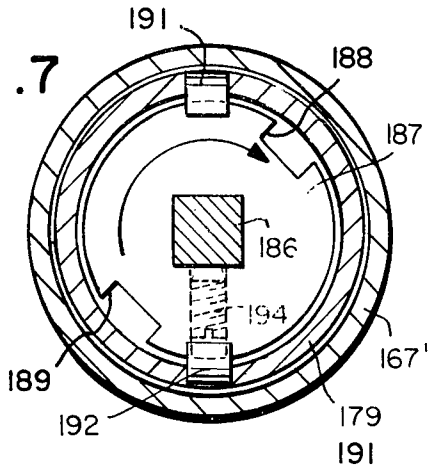


FIG. 8

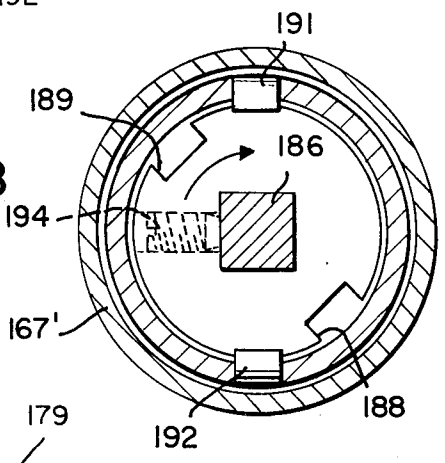
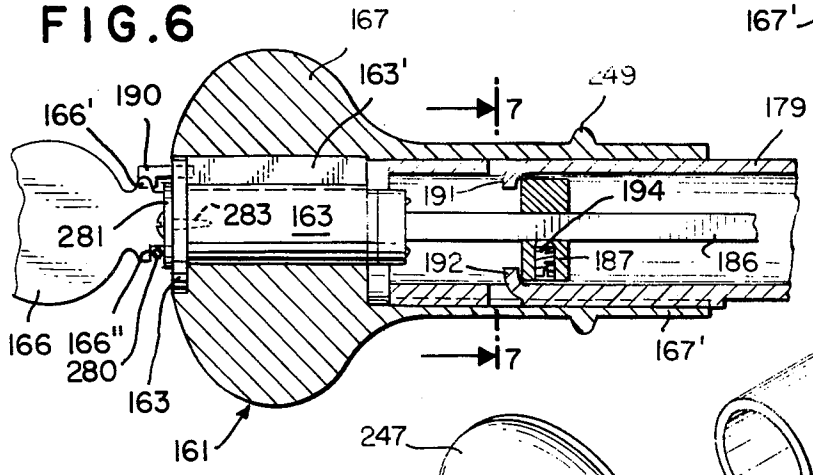
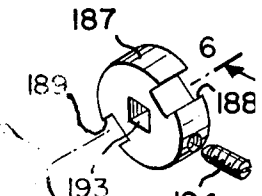
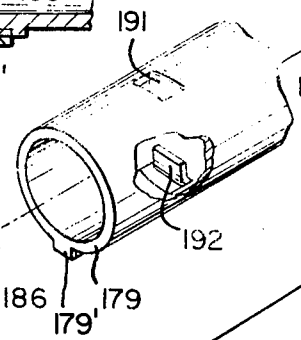
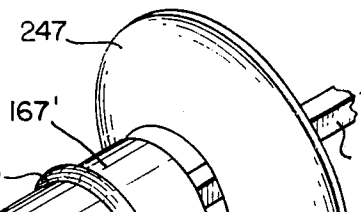


FIG. 6









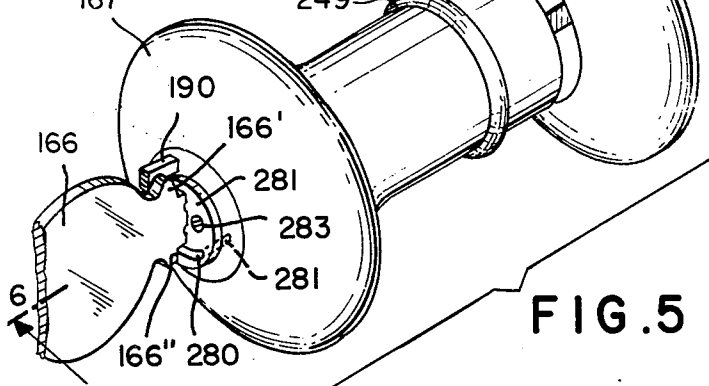
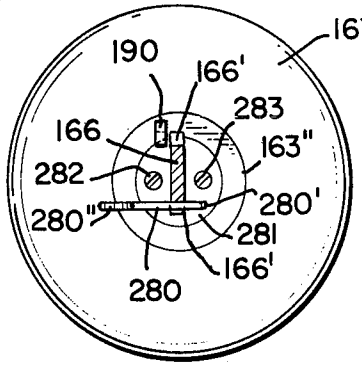


FIG. 5

FIG. 10



DOUBLE SPIN KNOB DOOR LOCK

This invention relates to a double spin knob door lock.

It is the principal object of this invention to provide a a door lock in which the inside door knob can be rendered ineffective to open the door from the inside knob as one leaves his premises whereby a burglar or anyone illegally entering the premises will be deprived of this easy and usual path of escape from the premises.

It is another object of the invention to provide a door lock wherein both the inside and outside door knobs can be left in a condition of spin and ineffective to open the door from either side thereof without the use of the proper key.

It is another object of the invention to provide a spin knob door lock in which the key will be fixedly attached by a latch upon the inside knob against easy removal so that it will always be easily accessible to the occupant as he leaves the premises and at the same time as the key is removed from the inside knob, the knob will be left automatically in a condition of spin and the occupant will not have forgotten to take the key with him for re-entry from the outside, it being necessary for the key to be removed from inside door lock to have it locked from the inside.

It is still another object of the invention to provide a double spin knob door lock in which the locking and unlocking engagement with the laterally-extended lock bolt assembly is positively effected both in the locking and unlocking operations and not done through springs as made dependent upon springs, the only spring means used being carried by the laterally-extended lock bolt assembly for its own activation and the knob assemblies being at each time positively connected therewith and not dependent upon the lock bolt spring.

It is a further object of the invention to provide a double spin knob door lock in which when the door is locked both inside and outside door knobs are left in a condition of spin but wherein when door is locked from the outside and the key is left in the inside knob the knob can be used in the same manner as with standard locks to open and close the door to pick up a newspaper, mail or to let someone in the household.

It is still a further object of the invention to provide a double spin knob door lock in which a blunt ended lock bolt assembly is worked by two knob assemblies that normally need a key to retract the lock bolt and will before allowing the door to be fully closed bump against a resilient bumper upon the door frame edge to keep the door from closing without key and to warn the occupant as he leaves of the need to take the key from the inside knob thereby leaving it in a spin condition and so that he will have to take the key to turn the outside knob to allow the door to close to the outside and so that he will be assured of having the key with him when he returns to get in.

It is a still further object of the invention to provide a double spin knob door lock in which the knobs are key locked to the assemblies and can be removed only by the key and the removal of key stop on the lock cylinder to allow the key to turn in a counter clockwise-direction and align inwardly stuck prongs of a body part sleeve with notches of a member on the key lock cylinder shaft for axial removal of the knob whereby the lock cylinder and key can be changed.

Still further object of the invention is to provide a double spin knob door lock, having the above objects

in mind, which is simple of construction, easy to foolproof install the lock upon the door, inexpensive to manufacture, has a minimum of parts, formable into a unit, 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 fragmentary perspective view of a door in which the spline type spin knob door lock of the present invention has been installed.

FIG. **2** is an enlarged longitudinal sectional view of the spin knob door lock as generally viewed on line **2—2** of FIG. **1.**

FIG. **3** is a vertical transverse sectional view of the spin knob door lock as generally viewed on line **3—3** of FIG. **1.**

FIG. **4** is a perspective and exploded view of the spin lock with the parts in formation as they are assembled upon one another.

FIG. **5** is an enlarged fragmentary, perspective and exploded view of one hand knob assembly wherein the hand knob is key locked to its assemblies and is removable therefrom for the purpose of changing the lock cylinder and its key only by the use of its key.

FIG. **6** is a fragmentary longitudinal sectional view taken generally upon line **6—6** of FIG. **5** and assuming that the parts would be assembled upon one another.

FIG. **7** is an enlarged cross-sectional view taken on line **7—7** of FIG. **6** with the hand knob key locked upon the sleeve projection of the assembly body part.

FIG. **8** is an enlarged cross-sectional view similar to FIG. **7** wherein the diametrically notched knob lock member has been turned clockwise through 90° from the position shown in FIG. **7** by the key to retract the lock bolt.

FIG. **9** is an enlarged cross-sectional view similar to FIG. **7** wherein the diametrically-notched lock member has been turned clockwise through 45° from position shown in FIG. **7** to align the notches with the inwardly struck prongs to allow the hand knob to be axially removed.

FIG. **10** is front elevational view of the heavy spring bar lock device attached to from face of the lock cylinder to enter a notch in the key underedge and to retain it inserted in the inside knob.

FIG. **11** is a perspective and exploded view of the door edge and bolt protruding therefrom and bumper plate which it may engage to prevent final closing of the door.

The hand knob assembly **161** has a main body part **176** with an annular peripheral rib **177** on its inner face. This main body part **176** has a stepped shoulder **178** on its opposite face from which there extends a sleeve projection **179** on which the hand knob **167** through its sleeve projection **167'** is telescopically mounted and key locked. Within this sleeve projection **179** of the body part **176** is an inwardly-extending flange **181** and against which an operating block **182** is restrained against inward displacement. This block **182** has a reduced diameter threaded projection **183** of fast threads that will work upon corresponding to internal fast threads within the externally-splined nut **169** with splines **169'** so as to extend the splined nut member **169** into the internally-splined ring **172** with splines **172.** The operating block **182** has a central hole **184** of

square section for receiving a square section drive shaft 186 that extends from the lock cylinder 163 and which is turned upon inserting key 166 into the cylinder lock 163 and turning in a clockwise direction through a predetermined angle thereby to effect the rotation of the operating block 182 with its reduced diameter thread portion 183 to effect the thrusting of the internally-threaded, externally-splined nut 169 into and out of the internally-splined ring 172 of the lock bolt assembly 174.

The hand knob 167 with its lock cylinder device 163 is secured to the sleeve projection 179 of body part 176 in a locked manner as best disclosed in FIGS. 2, 5 to 8 of the drawings. The square shaft 186 carries a hand knob notched lock member 187 having diametrically opposed notches 188 and 189. When the notched hand knob lock member 187 is turned to the position shown in FIG. 7 the notches 188 and 189 are out of registry with inwardly struck lug or prongs 191 and 192, FIG. 5, extending inwardly from near the outer end of the sleeve extension 179 of the body part 176. This notched lock member 187 is secured on the square shaft 186 in driving relationship therewith by the shaft 186 extending through a square hole 193 and held against axial displacement thereon by a set screw 194 as the lock cylinder 163 and its square shaft 186 are turned in a clockwise direction by the key 166 through 90°, FIG. 8, the externally splined nut 169 is thrust into the internally-splined ring 172 and the lock bolt assembly 174 is retracted in a manner to be described to permit the door to be opened. If the notched lock member 187 is turned through 45° to the left or counter clockwise to the position of FIG. 9 it would be put into registry with the inwardly struck prongs 191 and 192 so that the knob 167 can be axially removed from the sleeve projection 179 of the body part 178 and the lock cylinder 163 can be replaced by another lock cylinder for another key.

The key 166 is normally held against counter clockwise turning for the purpose of preventing accidental axial removal of the knob 167 from the knob assembly 161 by a boss or portrusion 190 or 190' provided upon the outer face of the lock cylinder 163 or 164 above the key hole slot and engageable by a key wing projection 166' when the key is inserted in vertical manner with its key edge aligning the tumblers of the cylinder tumbler. The boss 190 can be a piece of solder that can be melted of the cylinder 163 away to allow key to remove cylinder.

The outside knob assembly 162 has its knob 168 similarly secured by its sleeve projection 168' to extension 196 of the main body part 197 that opposes the body part 176. The knob 168 has a cylinder lock 164 with a tumbler projection 164' of the inside assembly 161 that can be operated by the same key 166 used for spin locking the inner side of the door.

When the key 166 thus turns the notched lock member 187 counterclockwise from the position shown in FIG. 7 to the position of FIG. 9 to align the notches 188 and 189 respectively with respective prongs 191 and 192, the knob can be pulled axially and removed.

The front face of the cylinder 163 also has a soldered-on projection 190 to prevent counter clockwise turning of the iner part 163' and key 166. The lock cylinder 164 has a swuare shaft 199 turned thereby that has a slide fit engagement with a turnable operating block 201 that has a reduced diameter fast threaded projection 202 which serves to thrust internally-threaded and externally-splined operating nut 171 by its external splines 171' for engagement with internally-splined ring 173 having splines 173' that operates the lock bolt assembly 174 which in turn lies between the two opposing internally-splined rings 172 and 173 and interconnected by a crank pin 203 that runs through a vertically-extending slot 204 of an inner lock bolt piece 206, FIG. 3, of the lock bolt assembly 174.

On the lock cylinder shaft 199 is a notched lock member 207 similar to the notched lock member 187 above described and secured thereto by another set screw 194 and having opposing notches provided in its periphery corresponding to notches 188 and 189 and the sleeve projection 196 of the body part member 197 has opposing inwardly struck prongs 208 and 209 corresponding to the respective prongs 191 and 192 on the opposite knob assembly so that when the key is turned in a counter clockwise direction with solder projection 190 removed from the face of lock cylinder 164 so that the notches of the lock member 207 are aligned with the inwardly struck prongs 208 and 209 the knob 168 can be removed for the purpose of replacing the cylinder 164 with a cylinder of a different key tumbler combination. The key 166 is turned in a clockwise direction to retract the lock bolt assembly 174.

The internally-splined rings 172 and 173 having internal splines 172' and 173' and that are respectively shouldered and their respective lesser diameters respectively journaled into opposing case supporting members 211 and 212 that respectively have peripheral flanges 213 and 214 that overlie one another and which provide an enclosure for the lock bolt assembly 174. Extending between these support members 211 and 212 is a long pin 216 that laterally supports the lock bolt piece 206 by extending through a laterally-extending elongated slot 217 of the lock bolt piece 206 in a manner best seen in FIG. 3. The long steadying pin 216 at its ends extends into a hole 218 of the case support member 211 and into a hole 219 of the opposite casing support member 212, FIG. 4.

Lying outwardly respectively of the main body parts 176 and 197 that are turned by their respective knobs 167 and 168 are respective opposing outer casing members 221 and 222 which respectively have opposing and inwardly extending flanges 223 and 224 that abut one another and overlie the flanges 213 and 214 of their respective inner support members 211 and 212 and are connected to the same by peripheral rows of rivets 226 for the inturned flange 223 of casing member 221 and rivets 227 for the inturned flange 224 of casing member 222. In this manner the support and casing parts and the internally splined rings 172 and 173 are placed into a unitary assemblage that carries the respective knob asemblies 161 and 162 all of which can be assembled as a unit into a large hole 228 provided for this purpose in the door 30, FIGS. 2 and 4. Once the door knob assemblies 161 and 162 are joined together by the casing members 221 and 222 and the unit inserted into the opening 228 of the door 30 and held therein by a flush fitting attaching plate member 232 having a beveled peripheral edge. A rounded cover plate 231 is turned inwardly about its outer periphery at 233 by which it is snapped over the beveled edge of the attaching plate 232 and made fixed thereto. An annular rib formation 229 is provided upon the exterior of the sleeve projection 168' to further hold cover plate

231 against outward axial displacement from the attaching plate 231. Extending inwardly from this flat attaching plate 232 outwardly of the inner periphery of the opening 228 of the door and adapted to extend through small holes 234 and 236 disposed respectively above and below the opening 228 in the door, are inwardly-extending, internally-threaded sleeve projections 237 and 238, FIGS. 2 and 4. Attaching plate 232 has an internally-threaded sleeve projection 239 into which there is fitted an externally-threaded sleeve projection 240 of the outer casing member 222. In this manner, the combined knob assemblies and the unit casing members 221 and 222 are secured to the outside attaching plate 232 and when so joined the inside knob assembly 161 and the casing member can be extended with the outside attaching plate 232 into the opening 228 the door from outside of and made ready for the attachment of the unit to the inside of the door.

On the inner side of the door the attachment of the casing unit is made by another flat and peripherally beveled attaching plate 241. This plate 241 has an internally-threaded short sleeve projection 242 by which the plate 241 is threaded onto a longer externally-threaded sleeve projection 243 of the inside casing member 221. When the attaching plate 241 has been threaded sufficiently to bring the outer attaching plate 232 flush against the outer side of the door, long attaching screws 244 and 246 are threaded respectively into internally-threaded from the attaching plate 241 sleeve projections 237 and 238 extending inwardly from the outer attaching cover plate 241 is threaded onto a longer externally-threaded sleeve projection 243 of the inside casing member 221. When the attaching plate 241 has been threaded sufficiently to bring the outer attaching plate 232 flush against the outer side of the door, long attaching screws 244 and 246 are threaded respectively into internally-threaded from the attaching plate 241 sleeve projections 237 and 238 extending inwardly from the outer attaching cover plate 232 whereby the unit including the casing member 221 and 222 and the knob assemblies 161 and 162 will be held tightly supported within the door.

In order to cover the screws 244 and 246 and finish off the inside of the door a separable rounded cover plate 247 is connected to beveled peripheral edge of the plate 241 by its inturned edge 248. This cover plate 247 has a central hole that receives the extension 167' of the hand knob 167 that is locked as above described upon the sleeve projection 179 of the main body part 176. An annular rib formation 249 is provided upon the exterior of the sleeve projection 167' of knob 167 to further hold the cover plate 247 against outward displacement from the attaching plate 241.

The attaching plate 241 as best seen in FIG. 4 has diametrically-opposed elongated arcuate slots 251 to allow the attaching plate 241 when being threaded onto the outwardly-extending threaded sleeve projection of the outer casing member 221 to come to a tight stop so that the screws 244 and 246 can be extended through the holes 234 and 236 in the door and into the respective internally-threaded sleeve projections 237 and 238 of the outer attaching plate 232 that received the fastening screws 244 and 246.

The driving connection between the sleeve projection 167' of the inside knob 167 and the sleeve projection 179 of the body part 176, the sleeve projection 179 of the body part 176 is effected by a spline 180 while a spline 180' effects the connection of the outside knob 168 and the body part 197, FIG. 2.

The shiftable exteriorly-splined fast nut 169 into which the fast thread projection 183 of the operation block 182 that has fast interior threads 169' and its external splines 169'' are extended into internal splines 172' of the ring 172 for driving engagement therewith and to retract the lock bolt assembly 174 by the pin 203. This is the manner in which the lock bolt assembly 174 is worked from the inside when the key 166 has been inserted to the lock cylinder 163 and turned through 90° in a clockwise direction. Otherwise when the key 166 has been turned to or removed from the straight up position the hand knob assembly 161 on the inner side of the door is free to spin, detached from the lock bolt assembly 174 and door is in effect locked from the inside to prevent the easy escape of the burglar from the premises. The knob 167 is thus ineffective and unable to serve to retract lock bolt assemby 174 that will be kept home in the keeper 251 in the door frame 31, FIG. 3.

The inner lock bolt piece 206 has a T-projection 252 to which is connected an outer lock bolt piece 253 by its slotted head portion 254, FIG. 3.

The outer opposing casing members 221 and 222, the inner casing support members 211 and 212 and body parts 176 and 197 are cut away at their sides as indicated at 255 to accommodate the lock bolt assembly 174 to allow the same to be extended and retracted through a lateral opening 256 extending radially from the door lock unit receiving opening 228 and through the edge face 257 of the door 30. This lateral opening 256 accommodates a bolt piece mounting casing 258 for the blunt-end lock bolt piece 253 and a heavy duty return spring 259 that reacts against the a flange 261 upon the bolt piece 253 and the inturned flange 262 on the bolt piece casing 258.

This bolt piece casing 258 is held within the radially-extending opening 256 by screws 263 and 264 that extend through a retainer plate 265 and into the body of the door. Bolt piece 253 is like a dead bolt latch with a blunt outer end and without an angle face that would permit opening of a door by a shim extended of the edge of a closed door.

When the door 30 is unlocked either from the inside or from the outside, by the use of key 166 neither of the assemblies 161 and 162 can spin, and with either one or both of the externally-splined, fast internally-threaded nuts 169 and 171 inwardly extended of or respective engagement with ring nuts 172 and 173, the lock bolt assembly 174 can be retracted thereby to open the door 30. This is effected through the pin 203 working in the vertical slot 204 of the inner lock bolt piece 206 and against the action of the lock bolt return spring 259 surrounding the lock bolt piece 253. The key 166 will have extended the nut 169 or 171 into the rings 172 and 173 while holding the knob 167 or 169 and then turning knob clockwise, the pin 203 with key 166 will retract lock bolt assembly 174.

To steady the slotted lock bolt piece 206 and to assist in the return of the lock bolt assembly 174 toward the door frame 31 and into keeper 251, there is provided an adjustable additive compression spring 268, FIG. 3 that surrounds a rod extension 269 that projects rearwardly from the slotted inner lock bolt piece 206 and into a spring guide sleeve container 271 carried by its end flange 272 between the inner case support mem-

bers **213** and **214** and the unit casing members **221** and **222** as best seen in FIG. **3** in the assembly opposite to the open side **255** thereof and aligned therewith. The effective strength of the spring **268** and retraction movement of the rod and the lock bolt assembly is adjustable by a stop nut **273** threaded into the end of the spring guide sleeve container **271** and in this manner the best pressure for the lock bolt assembly for its working relationship with the door frame keeper **251** can be adjusted. The rod extension **269** may serve as a stop upon engagement therewith to limit the retraction movement and the turning of the knob much beyond 90°.

The fast threaded splined nuts **169** and **171** are respectively spline connected with and retractable into the body part members **176** and **197** respectively, by their respective fast thread projections **183** and **202** of the respective key lock cylinder-operated blocks **182** and **201** with the nuts **169** and **171** retracted as shown in FIG. **2,** the door will be effectively locked from both the inside and the outside, since both of the hand knob assemblies **161** and **162** can spin freely.

It should now be apparent that the lock bolt assembly **174** can be operated either from the inside or outside of the door upon the nuts **169** or **171** being extended for spline engagement with the splined ring **172** or with splined ring **173** but only by the use of key **166,** can the lock bolt be retracted and the door opened. It is thus still possible for the door to remain unlocked in effect on the inside and yet locked on the outside and this is done by leaving the key **166** in the knob **168.** It is thus possible in this same manner for the door to be spin locked only on the inside so that one cannot get out and still permit the door to be unlocked from the outside, all of this is effected by use of the keys to positively disengage the lock bolt knobs to spin so that the door cannot be opened from one side and as well as upon the outside leaving the apartment or premises so that a burglar who has entered through a window and may attempt to leave the apartment through the usual exit door. Thus the burglar will be locked inside of the apartment and must leave through the window opening he entered and stand a greater chance of being identified. The same key that locks the outer side of the door will also lock the inner side of the door and when the door is to be locked from both sides, both knob assemblies **161** and **162** are free to spin. If one wants to use two different keys, it is just a matter of pulling the knobs and seeing that a different key lock cylinder is used in the one of knobs that will take a different key.

In order that the inside knob can be used in the normal fashion of a standard door lock while the occupant is in the premises, the key **166** when left in the inside knob **167** cannot be easily removed from the lock cylinder **163** as by a small child or even the occupant as he leaves the premises. A short heavy spring bar **280** is anchored at its end **280'** against twist or turn to a round attaching plate **281** that is fixed by screws **282** and **283** to the front face of the rotatable inside part **163''** of the lock cylinder **163** on the inside knob **167,** FIG. **10.** The key **166** is cut into its under edge to provide a notch edge or catch portion **166'** that laterally receives the spring bar **280** and will normally keep the key inserted. The outer free end of the bar **280** is fashioned into a loop end shape **280''** that serves as a press knob which can with effort be thumb depressed by the occupant to release the key **166** as he leave the premises. This short heavy spring latch bar **280** normally swings with the key and in no way interferes with its normal turning movement to retract the lock bolt by use of the knob **167.** The outside and stationary part of the lock cylinder is indicated at **163'''** FIGS. **5, 6** and **10.** The key will always be present when the occupant is ready to leave the premises but at the same time will serve when the occupant is in the premises to keep the knob conditioned for use to be turned to retract the lock bolt and to open door to pick up a newspaper, mail or to let someone in and without conditioning the inside knob for spin that would normally lock the door from the inside. The occupant must depress the spring bar with his thumb to have the key for use to retract the lock bolt assembly **174** from the outside and to leave the outside knob in a condition spin and key **166** available for the occupant to take with him.

The key **166** is held in the inside knob **167** by this spring bar **280** by its tension urged into a mating notch **166'** in the underside of the key blade **166** to inadvertently prevent removing the key **166** from inside spin lock door knob **167** unless there is a deliberate desire to do. The looped end **280''** is best depressed with the thumb to release the key **166.** With the key **166** removed from the door knob the inside knob can spin and the door will in effect be spin knob locked from both sides.

Since the lock bolt assembly **174** will be normally extended under the action of its compression spring **259** and when released from its door frame keeper **251,** the blunt end of the lock bolt **253** will extend as shown in FIGS. **1** and **11** so that the door **30** cannot be readily closed and the bolt **253** would bump sidewise against the door frame **31** and after a time would do damage to the door frame except that there has been provided a bumper plate **285** secured by screws **285'** and **285''** and which consists of a metal bottom plate **268** to which there has been bonded on its outer face a raised resilient rubber cover portion **287** having an enlarged rib **287'** that runs along adjacent the inside edge of the door frame **31** to receive the bump of the blunt bolt **253** and keeps the door from fully closing. This will remind the occupant upon his leaving the premises of his need for the to take key **166** from the inside knob **167** by depressing the spring latch bar **280** if he has not already done so, and will be required to place the key in the outside knob **168** to turn the knob so as to retract the lock bolt **253** from the bumper plate and finally close the door. Thus the door with his withdrawal of the key from the outside knob **168** will leave both inside and outside knobs **167** and **168** in a condition of spin and the door lock and he will be on the outside of the door with key in his possession. The door is left locked on the inside so that a burglar who entered by a window cannot leave from the premises through the door.

In our U.S. Pat. No. 3,733,649 issued May 22, 1973 is disclosed tamper proof butt hinge assembly that can be used with door lock and will prevent this burglar from disengaging the hinge side of the door as well as the lock side thereof.

It should be further apparent that a double spin knob lock has been provided that is positive locked and positively unlocked without the use or dependency made up springs except for the lock bolt spring and that this is done positive through a fast threaded nuts and splines. It should also be apparent that in this spin knob type of door, the door can be used in substantially the

same way as a door fitted with standard lock assembly. Also that the knobs are key locked to their assemblies.

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

We claim:

1. A double spin hand knob door lock comprising two axially-opposing hand knob assemblies, a casing assembly for joining the hand knob assemblies together and adapted to be inserted therewith as a unit into a cutout lock opening in the door adjacent the edge thereof, said casing having and opening adjacent the door edge, one of said hand knob assemblies extending from the inner side of the door and the other hand knob assembly extending from the outer side of the door, each of said hand knob assemblies including a body part journaled in the casing assembly and a hand knob extending outwardly from the body part to turn the same, a tumbler lock cylinder fixed within the hand knob and having a drive shaft extending inwardly therefrom, an operating block journaled in the body part and having a fast-threaded projection thereon, an externally-splined nut journaled in the body part and threadedly connected to the fast threaded block projection to be positively thrust inwardly when the lock cylinder and its shaft are turned by the key, an internally-splined ring journaled in the casing assembly and receiving the externally-splined nut when thrust thereinto by the turning of the fast threaded block, a lock bolt assembly laterally-adjustable through the opening in the casing assembly and the door edge between retracted and extended lock positions with respect to the door edge, a crank pin extending between the internally-splined rings of the both assemblies and operatively connected to the lock bolt assembly to positively retract and extend the same, and means for securing the casing assembly in the cutout lock opening of the door, the hand knob of each of the hand knob assmblies, upon the externally-splined fast thread nut being retracted from its cooperating ring by the lock cylinder and its shaft, being free to spin thereby effectively locking the door from the inner and outer sides thereof, the inner side as well as the outer side.

2. A double spin hand knob door lock as defined in claim 1, biasing spring means reacting between the door and the lock bolt assembly for normally maintaining the lock bolt assembly in its extended position in engagement with a door frame keeper, the connection of said crank pin with the laterally-extending lock bolt assembly including a vertically-extending slot on its inner end and said crank pin extending through said lock bolt slot and into the internally-splined rings.

3. A double spin hand knob door lock as defined in claim 2, and said laterally-extending lock bolt assembly having an longitudinally extending slot intermediately forwardly of its vertically-extending slot, a long steadying pin extending between the casing unit parts and the longitudinally-extending slot in the lock bolt assembly.

4. A double spin hand knob door lock as defined in claim 2 and said laterally-extending lock bolt assembly having a rearwardly-extending rod extension to limit the retraction movement of the lock bolt assembly, a compression spring surrounding the rod, a guide sleeve container therefor secured to the rear end of the casing unit and extending forwardly therefrom to receive the rod extension of the lock bolt assembly and an adjustable stop threaded into the rear end of the guide sleeve container and is to limit the retraction movement of the lock bolt assembly and to adjust the compression of the rod extension spring thereof.

5. A double spin hand knob door lock as defined in claim 1 and said casing assembly comprising two splined ring support members in which the internally splined rings are respectively journaled with said crank pin interconnecting the same, said ring support members having inwardly-extending flanges respectively overlying one another, outer casing members having inwardly-extending flanges opposing one another and means securing together the inwardly-extending flanges of the ring support members and the outer casing members.

6. A double spin hand knob door lock as defined in claim 5, and said outer casing members respectively having externally-threaded outwardly-extending central sleeve projections, said means for securing the casing assembly to the lock opening in the door including attaching plates having central internally-threaded projections threaded upon the externally-threaded projection of the outer casing members and brought into tight flush engagement with the side faces of the door and screw fastening means extending through the door and between the peripheries of the attaching plates.

7. A double spin hand knob door lock as defined in claim 6, and each of said body parts having outwardly-extending sleeve projections and the hand knob having a sleeve projection overlying the sleeve projection of the body part, said attaching plates being beveled on their outer periphery and cover plates extending over the knob sleeve projection and snapped fitted at their outer peripheries for engagement with the beveled peripheries of the screw retained attaching plates and annular rib formations on the knob sleeve projections to hold the cover plates in tight engagement with attaching plates and to prevent their detactment therefrom.

8. A double spin hand knob door lock as defined in claim 1, and at least one of the hand knob assemblies having its body part provided with an outwardly-extending sleeve projection and having diametrically-opposite inwardly-struck prongs therealong, said hand knob having an inwardly-extending sleeve projection telescopically-fitted over the body part sleeve projection, a round notched lock member for the hand knob fixed to the tumbler lock cylinder drive shaft in rear of the inwardly struck prongs and having notches on the surface thereof and angular-spaced from one another to accommodate respectively the respective prongs and to permit by the turning of the key in the lock cylinder and the drive shaft in a counter clockwise direction the axially removal of the hand knob and its sleeve projection from the hand knob assembly, and removable stop means provided upon the lock cylinder normally to prevent the counter clockwise turning of the key and the removal of the hand knob from its assembly, whereby the hand knob can be replaced with another tumbler lock cylinder and key, or the disassembly of the lock from the door.

9. A double spin hand knob door lock as defined in claim 1 and said tumbler lock cylinder on the inside knob assembly having an inner turnable part with a key slot, said key adapted to fit the key slot to align the tumblers thereof to permit the turning of the lock cylinder shaft and to effect the engagement of the knob assembly with the lock bolt assembly so as to retract the

same, a depressible spring latch bar for preventing the easy extraction of the key from its lock slot and means anchoring the bar to the front face of the inner turnable lock part to extend laterally thereacross and below the underedge to receive the spring latch bar, whereby the key may be retained in its slot until needed by the occupant.

10. A double spin hand knob door lock as defined in claim **1** and a door frame for housing the door, said lock bolt being live and having a blunted end normally biased to its extended position beyond the door edge, a bolt keeper in the jamb of the door frame for receiving the lock bolt blunted end, and a bumper plate formed of resilient material secured to the door frame at the elevation of the bolt keeper against which the blunted lock bolt end may strike when attempting to close the door with the bolt projected.

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