Aug. 18, 1959 H. D. ROLPH 2,899,819

TUBULAR LOCK

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Fig. 1.

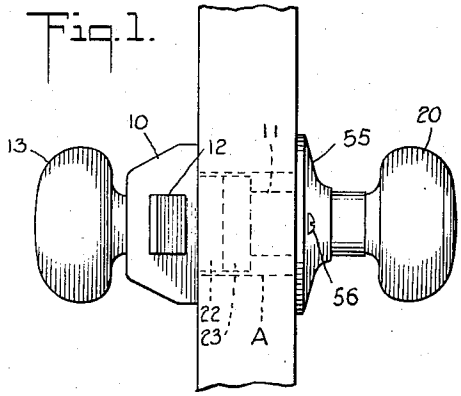


Fig. 2.

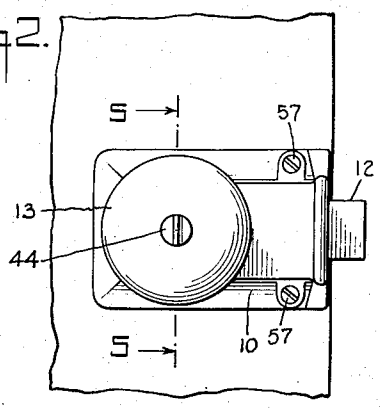


Fig. 3.

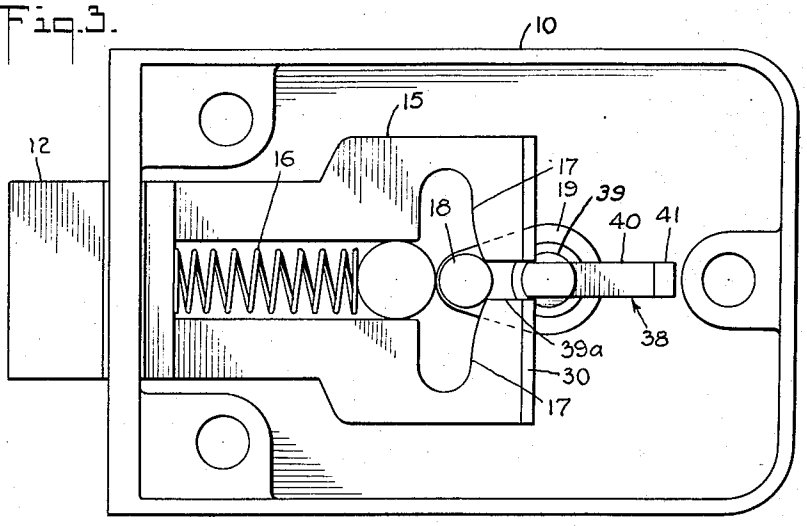
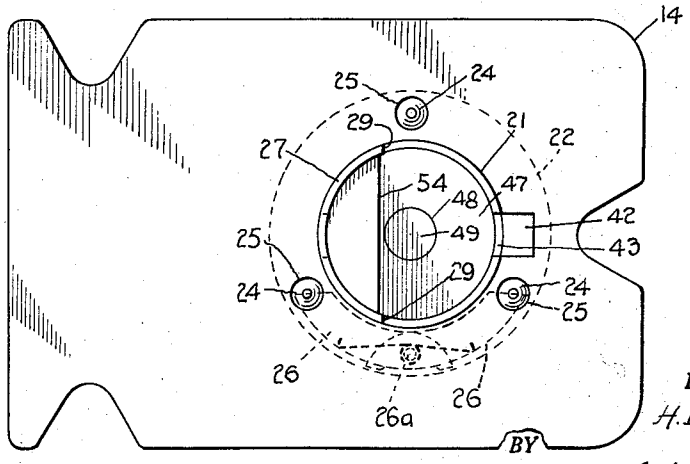


Fig. 4.



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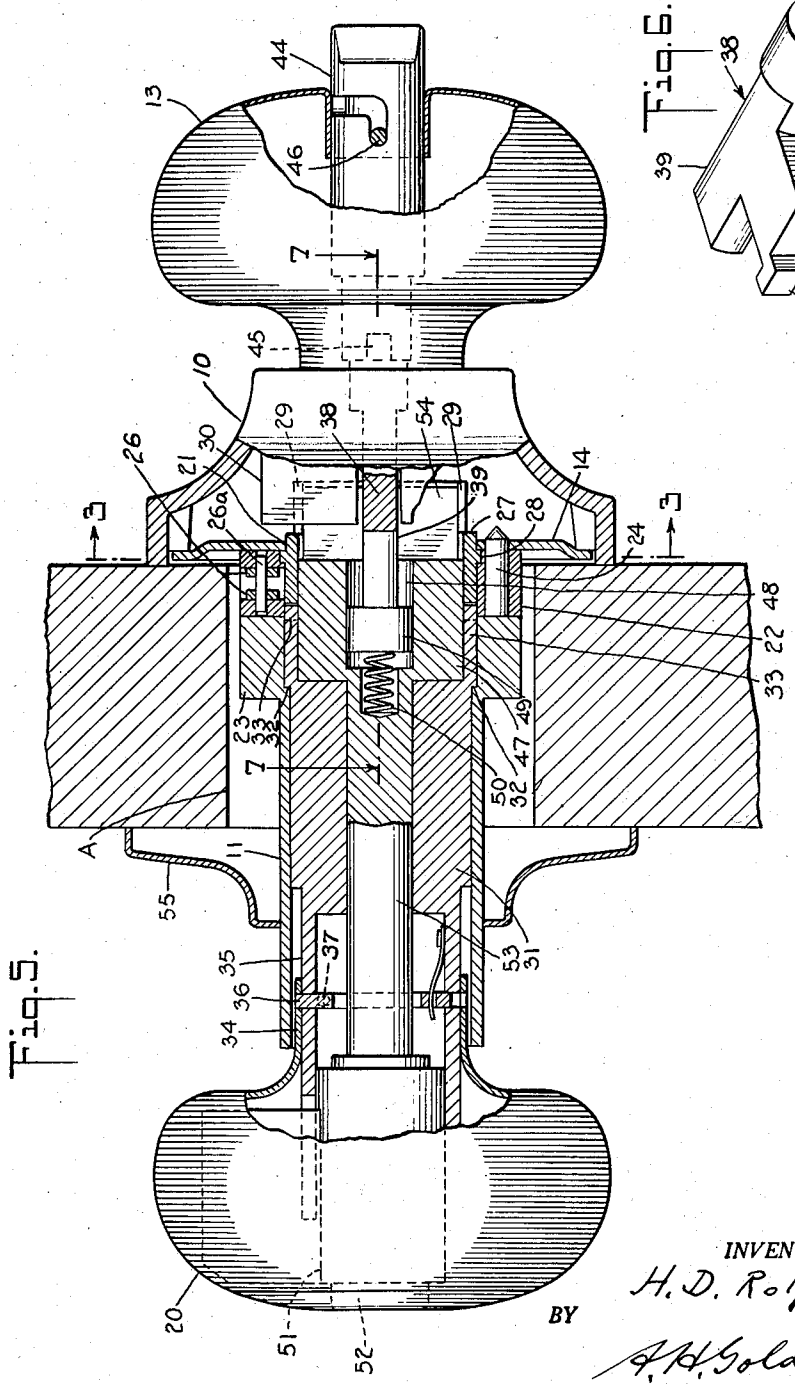


Fig. 5.

Fig. 6.

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TUBULAR LOCK

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Fig. 7.

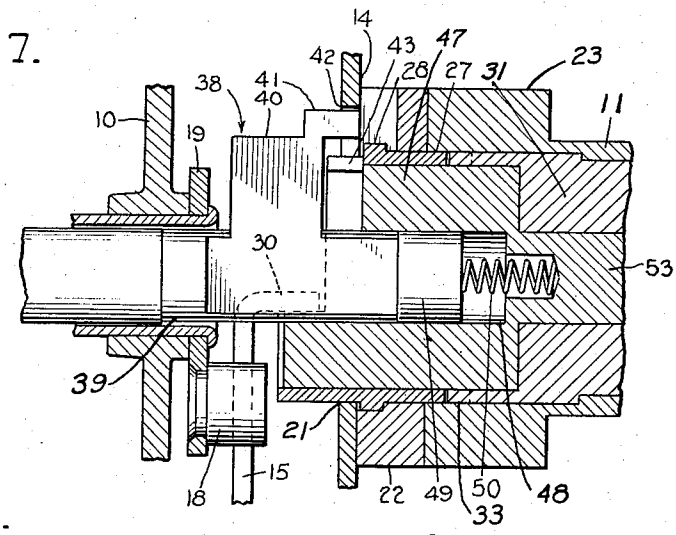


Fig. 8.

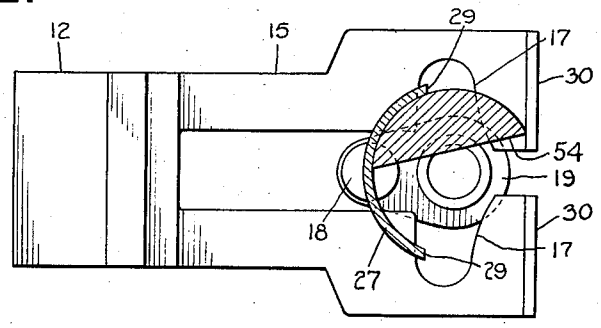
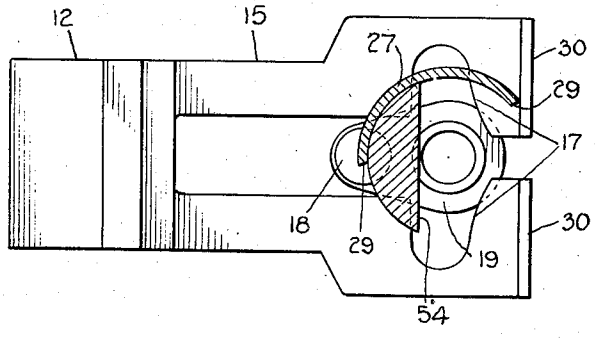


Fig. 9.



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TUBULAR LOCK

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Application March 11, 1955, Serial No. 493,675

15 Claims. (Cl. 70—146)

This invention relates to tubular locks. The locks of this class have been very satisfactory and are in rather extensive use, largely because they can be installed upon a door through a relatively simple procedure. The tubular construction of the locks enables them to be mounted merely in bores formed in the door, and the door need not be formed with a mortise opening for the lock. Some prior art locks do, however, utilize two casings, and the door must be formed with a bore for each casing. One casing carries inside and outside knob spindles and a latchbolt retractor, and is positioned in a bore extending transversely through the door. The other casing carries the latchbolt and is positioned in a bore in the front edge of the door. Thus, not only must the door have two bores to accept the prior art locks of the particular class, but the bores must be formed in particular aligned relation to one another in order that the lock may be installed properly. I have now conceived an extremely novel tubular lock structure that eliminates the need for two bores in the door, and that has other very considerable advantages over the prior art locks of this class, as will appear.

As a very important feature of my invention, I utilize in my novel tubular lock a lock case that carries a latchbolt and bolt retractor at one face of the door. Secured to the lock case is a tubular housing portion that is positioned in an opening formed through the door. This tubular housing portion supports a knob at the opposed face of the door with the spindle of the knob in position to coact with the bolt retractor. I prefer to equip the knob with a key plug for retracting the bolt when the knob is locked, this key plug being supported in position to coact with bolt retracting means that move on the lock case at the face of the door.

As a further feature of my invention, I preassemble the outside knob and knob spindle to the tubular housing portion. I then insert the knob, spindle, and housing portion as a unit into the door opening whereby to assemble this unit to the lock case at the opposed face of the door. I equip the lock case with detents that secure the tubular housing portion to the case, these detents thereby holding the spindle in interlocked relation to the bolt retractor on the case.

As a more particular feature of my invention, I am able to utilize in my novel lock structure a rather conventional lock case of the type that is mounted against the inside face of the door, and that has a bolt moving toward and away from retracted position. In order to utilize this rather conventional structure in my novel lock, I equip the lock case with a novel retractor for the bolt. I further equip the lock case with a mounting portion through which the tubular housing portion is assembled to the case, whereby to hold the outside knob spindle in interlocked relation to the retractor.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention.

Referring now to the drawings:

Fig. 1 shows my novel tubular lock installed on a door.

Fig. 2 is a side view of Fig. 1.

Fig. 3 is a view taken on the line 3—3 of Fig. 5 showing the lock case with the back plate removed.

Fig. 4 is a view facing the inner side of the back plate.

Fig. 5 is a longitudinal section taken on the line 5—5 of Fig. 2.

Fig. 6 shows the locking piece that I utilize in my lock.

Fig. 7 is a view on the line 7—7 of Fig. 5.

Fig. 8 is similar to a part of Fig. 3, but shows the key plug cam retracting the latch bolt.

Fig. 9 shows the outside retractor retracting the bolt.

Referring now more particularly to Figs. 1 and 5 of the drawings, the housing that I utilize in my novel lock includes a box-like portion **10** that I mount on the inside face of a door, and a tubular portion **11** that extends from the back of the portion **10** in an opening A formed through the door. The box-like portion **10** of the housing has a latchbolt **12** that moves between projected and retracted positions, and an inside knob **13** that rotates to retract the bolt. My invention enables me to utilize rather conventional parts for the housing portion **10** and bolt **12**, and in the construction that I illustrate these are actually parts of a conventional night latch, as will be realized by those skilled in the art. Thus, the housing portion **10** is actually a lock case having at its rear side a back plate **14** that is juxtaposed to the face of the door. As is well shown in Fig. 3, the latchbolt **12** has an integral plate-like tail portion **15** extending rearwardly within the lock case **10**. A spring **16** is so positioned in a slot in the latchbolt tail **15** as to press the bolt normally to projected position. The latchbolt tail **15** is formed near its inner end with a vertical slot having cam surfaces **17**. Coacting with cam surfaces **17** is a cam **18** that is attached to the inside knob **13** through an arm **19** whereby to rotate with the knob. I prefer to form the inside knob **13** with particular features that I shall describe in due course, but for the present it is necessary to observe merely that the knob rotates to retract latchbolt **12** in the usual way through cam **18**.

I utilize the tubular housing portion **11** in my extremely novel lock as a bearing sleeve through which I assemble an outside knob **20** relatively to the lock case **10**. For the particular purpose, I form the back plate **14** of the lock case **10** with a relatively large opening **21**, Figs. 4 and 5, in the axis of the inside knob **13**. Further, I equip the back plate **14** with a mounting portion **22** that extends about the opening **21**, this mounting portion **22** being preferably a cylindrical member attached to back plate **14**, as by screws or rivets. I form the tubular housing portion or bearing sleeve **11** with an inner end portion **23** that mates with the mounting portion **22**, this inner end portion **23** having a series of longitudinally extending pins **24** that engage in corresponding openings **25** in the mounting portion **22**. When the tubular housing **11** is in assembled position, the pins **24** hold it in axially aligned relation to the opening **21** in back plate **14**. I lock the tubular housing **11** in assembled position through yielding detents **26**, Figs. 4 and 5. I prefer to mount the detents **26** on a pivot **26a** to rotate in a slot in mounting portion **22**, with

these detents pressed by a spring whereby each detent engages in a notch in one of the pins 24.

Referring now to Figs. 4, 5 and 7, I further utilize mounting portion 22 to support a rotating bolt retractor 27 relatively to the back plate 14. This bolt retractor 27 has preferably the shape of a ring having on its outside surface a peripheral flange 28. The flange 28 is positioned rather loosely in a circular recess in the mounting portion 22, so that it can rotate while held between the mounting portion 22 and the outer surface of back plate 14. A part of the bolt retractor 27 extends through back plate opening 21 into the lock case 10, and is cut away to form a curved part having at its edges bolt retracting surfaces 29, Fig. 4. These surfaces 29 are juxtaposed to a flange 30 on the inner end of the latchbolt tail 15, Figs. 5, 8 and 9, so that the retractor 27 by rotating will retract the latchbolt, as may be seen in Fig. 9.

For rotating the bolt retractor 27, I utilize a knob spindle 31 that is preassembled, together with the outside knob 20, relatively to the tubular housing or bearing sleeve 11. As best seen in Fig. 5, the spindle 31 has near its inner end a shoulder 32 that is engaged with a shoulder on the bearing sleeve 11 to hold the spindle against outward movement relatively to the sleeve. Thereby the bearing sleeve 11, when assembled to the lock case 10, holds the spindle 31 relatively to bolt retractor 27. Spindle 31 when thus held is interlocked with the bolt retractor 27 through lugs 33 that engage in slots in the retractor, so that the spindle can rotate the retractor.

I prefer to assemble the outside knob 20 to the spindle 31 through a rather conventional arrangement. Thus, a sleeve portion 34 of the knob 20 slides to assembled position on a tubular outer end portion 35 of the spindle and is retained in position by a spring pressed dog 36, as will be understood by those skilled in the art. The bearing sleeve 11 extends over the dog 36 so that the dog is normally inaccessible and cannot be depressed to allow removal of the knob 20. However, the bearing sleeve 11 has an opening 37, indicated by dotted lines in Fig. 5, that allows access to the dog 36 when knob 20 rotates to bolt retracting position, so that the knob can then be removed.

The structure that I have thus far described is novel in itself and has very considerable advantages when utilized without locking means. Nevertheless, I do contribute locking means that are adapted to prevent retracting movement of the latchbolt 12 through rotation of the outside knob 20. For the particular purpose, I utilize an extremely novel locking piece 38 that is well shown in Figs. 5, 6 and 7. This locking piece 38 is formed with a shaft portion 39 that slides in the axis of the inside and outside knobs 13 and 20. Since the locking piece 38 extends past the latchbolt tail 15, I form the tail 15 with a slot 39*a*, Fig. 3, that enables the latchbolt tail and locking piece to move freely relatively to one another. I shall describe in due course the details whereby I support the locking piece 38, but it will be best first to observe that the locking piece has a lateral portion 40 that extends rearwardly in the lock case past one edge of the bolt retracting ring 27, as is best shown in Fig. 7. A lug 41 on the laterally extending portion 40 is positioned in a slot 42 that extends through parts of the back plate 14 and the mounting portion 22 on the back plate, thereby holding the locking piece 38 against rotation while allowing the locking piece to slide in the knob axis.

Referring to Figs. 4 and 7, I further form in the edge of the bolt retractor 27 a slot 43 that is aligned relatively to the lateral portion 40 of the locking piece when the retractor 27 is in a position corresponding to the projected position of the latchbolt 12. It will be seen, therefore, that the lateral portion 40 of the locking piece 38 can move into the slot 43 through a sliding movement of the locking piece, thus dogging the bolt retractor 27 so that the outside knob 20 cannot rotate to retract the bolt.

To move the locking piece 38 to locking position, I equip the inside knob 13 with a push button 44, best seen in Fig. 5, that slides in the knob axis. This push button 44 is engaged with the outer end of shaft portion 39 of locking piece 38, and supports this end through a pivot 45. For holding the locking piece 38 in locking position, I show the push button 44 formed with an angular slot that is engaged with a pin 46 on knob 13. I support the opposed end of the locking piece 38 on the outside knob spindle 31 through the intermediary of a key plug cam 47 that is mounted in a bore in the end of spindle 31. I utilize the key plug cam 47 for reasons that I shall presently describe, and it is important here to understand principally that one end of the locking piece 38 is supported relatively to the spindle 31. I form the key plug cam 47 with an axial bore 48 in which the locking piece 38 slides, and in this bore is a sliding member 49 that is pressed by a coil spring 50 against the locking piece 38 for moving it to release position.

I further utilize in my novel lock a lock cylinder 51, in the outside knob 20, Fig. 5, through which the latchbolt 12 can be retracted when the locking piece 38 is in locked position. The particular construction of the lock cylinder 51 and the means through which it is assembled to the knob 20 are not important to an understanding of my invention, and it is necessary to know merely that this cylinder has a key plug 52 that can be rotated relatively to the cylinder through the use of the proper key. The key plug 52 has an extension 53 in the axis of knob spindle 31, this extension 53 having upon its end the key plug cam 47. It will be observed that a part of the key plug cam 47 extends axially beyond the knob spindle 31. This part of cam 47 thereby extends through the interior of the bolt retracting ring 27 and into the lock case 10 when the bearing sleeve 31 is assembled to the case 10. The part of the cam 47 that is within the lock case 10 is cut away to form a bolt retracting surface 54, Figs. 4 and 5, that is juxtaposed to the flange 30 on the latchbolt tail 15. Through this arrangement, the key plug 52 can retract the latchbolt 12 independently of outside knob 20, as may be seen in Fig. 8, and it is possible to retract the bolt from the outside of the door when the knob is locked.

I equip my novel lock with a conventional outside rose 55 that is secured against the outer face of the door through screws 56, Fig. 1. This rose 55 slides on the tubular bearing sleeve 11 and is therefore adjustable to enable the lock to be installed on doors of different thicknesses. It is possible to preassemble outside rose 55 on the bearing sleeve 11 before the outside knob 20 is assembled to the bearing sleeve, but this rose naturally can be assembled later because the spring pressed dog 36 enables the knob 20 to be removed for this purpose.

It will be understood that the lock case 10 will be secured against the inside surface of the door through the usual screws 57, Fig. 2. The latch bolt 12 will then be in position to coact with a strike, and the mounting portion 22 on the back plate 14 will be aligned with the opening A that has previously been formed in the door. To complete the installation of the lock, the bearing sleeve 11 will be inserted from the outer side of the door through the opening A so that the pins 24 on the bearing sleeve enter the openings 25 in the mounting portion 22 on the lock case. The dogs 26 will then engage the pins 24 to lock the bearing sleeve 11 in assembled position. The bearing sleeve 11 when locked in this way holds the knob spindle 31 in interlocked relation to bolt retractor 27, and also holds the key plug cam 47 in position to coact with the latchbolt tail 15. Moreover, the key plug cam 47 then supports the locking piece 38 at one end.

With the lock thus assembled, the screws 56 are applied to mount the outside rose 55 on the door. It will be observed, of course, that the dogs 26 that hold the lock assembled are positioned within the bore A in the door and are not accessible. Normally, therefore, the

bearing sleeve 11 cannot be disassembled relatively to the lock case 10. However, should it be necessary to remove the lock from the door, this can be done after removing the screws 57 that hold lock case 10, so that the entire lock can be moved axially inward a short distance. This movement will place the dogs 26 in an accessible position at the inner face of the door, thus enabling the dogs to be manipulated to release the pins 24 on bearing sleeve 11.

I believe that those skilled in the art will realize that I have contributed an extremely novel lock having very considerable advantages over the prior locks of the particular class. Through my novel concept, I am able to contribute a lock having the very desirable features of the usual tubular lock, but that requires for its installation merely a single bore formed through the door. I am able to do this, moreover, while utilizing a conventional lock case as a part of my lock. I believe, therefore, that the considerable value of my invention will be fully appreciated.

I now claim:

1. In a lock of the class described, a lock case having a bolt, a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a mounting portion for the bearing sleeve on one side of the lock case, coacting means on said mounting portion and bearing sleeve through which the sleeve and spindle are held in aligned relation to the lock case when the sleeve is in assembled position relatively to the mounting portion of the case, a bolt retracting cam on the lock case, and releasable detents acting between the bearing sleeve and mounting portion to lock the bearing sleeve in assembled relation to the lock case with the spindle in position to retract the bolt through said cam.

2. In a lock of the class described, a lock case having a bolt, a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a key plug carried by the outside knob and normally locked to said knob, said key plug having beyond the knob spindle a cam that is rotated by the key plug when the plug is released relatively to the knob, a mounting portion for the bearing sleeve on one side of the lock case, coacting means on said mounting portion and bearing sleeve through which the sleeve, spindle, and key plug are held in aligned relation to the lock case when the sleeve is in assembled position relatively to the mounting portion of the lock case, a cam on the lock case for the knob spindle, detents acting between the bearing sleeve and mounting portion to lock the sleeve in assembled relation to the lock case with the spindle in position to retract the bolt through its cam, and said key plug cam by its position beyond the knob spindle lying in retracting relation to the bolt when the sleeve is locked in assembled position.

3. In a lock of the class described, a lock case having a bolt, a bearing sleeve, a mounting portion for the bearing sleeve on one side of the lock case, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a key plug carried by the outside knob and normally locked to said knob, longitudinally extending pins on said bearing sleeve, said mounting portion of the lock case having openings in which said pins engage when the sleeve is assembled to said portion, a cam on said key plug positioned beyond the knob spindle and rotating relatively to the knob spindle when the key plug is released, a cam on the lock case for the knob spindle, detents coacting with said pins to lock the sleeve in assembled relation to the lock case with the spindle in position to retract the bolt through its cam, and said key plug cam by its position beyond the knob spindle lying in retracting relation to the bolt when said sleeve is locked by the detents in assembled position.

4. In a lock of the class described, a lock case having a bolt, a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a mounting portion for the bearing sleeve on one side of the lock case, a bolt retractor mounted for rotation on the mounting portion of the lock case, coacting means on said mounting portion and bearing sleeve through which the knob spindle is held in aligned relation to the bolt retractor when the sleeve is assembled to said mounting portion, detents acting between the bearing sleeve and mounting portion to lock the sleeve in assembled relation to the lock case, and said bearing sleeve when locked by the detents holding the knob spindle in interlocked relation to said bolt retractor whereby the spindle retracts the bolt through said retractor.

5. In a lock of the class described, a lock case having a bolt, a mounting portion on one side of the lock case, a bolt retractor mounted on said mounting portion for rotation relatively to the lock case, a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, detents securing the bearing sleeve to the mounting portion of the lock case whereby to assemble the knob and spindle to the lock case, means through which the knob spindle when in assembled position interlocks relatively to the bolt retractor for rotating the retractor, and said bolt retractor formed with surfaces through which it acts when rotated by the knob spindle to retract the bolt.

6. In a lock of the class described, a lock case having a bolt, a mounting portion on one side of the lock case, a bolt retractor mounted through said mounting portion for rotation relatively to the lock case, an outside knob and knob spindle, a key plug carried by the outside knob and normally locked to said knob, detents securing the bearing sleeve to the mounting portion of the lock case whereby to hold the spindle and key plug in assembled relation to the lock case, said spindle when in assembled position interlocking with the bolt retractor whereby to act through the retractor to retract the bolt, a cam on said key plug in position to retract the bolt when the key plug is in assembled position, a locking piece, means whereby the key plug when in assembled position is in supporting relation to the locking piece with the locking piece adapted to move on the key plug toward and away from a locking position, a push piece for moving the locking piece to locking position, and a part on said locking piece dogging the said bolt retractor relatively to the mounting portion of the lock case when the locking piece is in locking position whereby to lock the ouside knob.

7. In a lock of the class described, a lock case having a bolt, a mounting portion on one side of the lock case, a bolt retractor mounted through said mounting portion for rotation relatively to the lock case, a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a key plug carried by said outside knob, a cam on said key plug, detents securing the bearing sleeve to the mounting portion of the lock case whereby to assemble the knob, spindle and key plug relatively to the lock case with the key plug cam in position to retract the bolt, means through which the knob spindle when in assembled position interlocks relatively to the bolt retractor whereby to retract the bolt through said retractor, and locking means that in locking position coact with the rotating retractor whereby to lock the outside spindle through its interlocked relation to the retractor.

8. In a lock of the class described, a lock case of the type adapted to be fitted against the face of a door and having a bolt and bolt operating means, an outside knob assembly including a bearing extending transversely toward the lock case through a bore in the door, a knob and knob spindle rotating on said bearing and forming parts of said assembly, a mounting portion for the bearing secured on the side of the lock case fitted against the door, said mounting portion through said bearing holding said

knob assembly in aligned relation to the lock case, and releasable detents acting between the bearing and said mounting portion to lock the knob assembly to the lock case with the spindle in coacting relation to the bolt operating means.

9. In a lock of the class described, a lock case having lock operating means, an outside lock operating assembly including a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a key plug carried by the outside knob and forming a part of said assembly, a mounting portion for the bearing sleeve on one side of the lock case, means through which the mounting portion coacts with the bearing sleeve when the lock operating assembly is assembled to the lock case whereby to support said assembly on the lock case, said assembly when so supported holding the spindle and key plug in position to actuate the lock operating means, and releasable detents acting between the bearing sleeve and mounting portion to lock the sleeve in said assembled relation to the lock case.

10. In a lock of the class described, a lock case having locking mechanism therein, an outside knob assembly including a bearing, a mounting portion for the bearing on the lock case, a series of pins on said bearing engaged with said mounting portion of the case whereby to mount the knob assembly in aligned relation to the lock case, and releasable detents coacting with said pins to lock the bearing in assembled relation to the lock case.

11. In a lock of the class described, a lock case of the type adapted to be fitted against the face of a door and having a bolt, an outside knob assembly including a bearing extending transversely toward the case through a bore in the door, a mounting portion for the bearing secured on the side of the lock case fitted against the door, a series of pins on said bearing, said mounting portion having openings in which said pins are engaged to hold said knob assembly in aligned relation to the lock case, and releasable detents on said mounting portion and engaged with said pins to lock the bearing in assembled relation to the lock case.

12. In a lock of the class described, a lock case having lock operating means, an outside lock operating assembly including a bearing sleeve, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, a key plug carried by the outside knob, a cam on said key plug forming a part of said outside lock operating assembly, a mounting portion for the bearing sleeve on one side of the lock case, a series of longitudinally extending pins on said bearing sleeve, the mounting portion on the lock case having openings in which said pins are engaged to mount the lock operating assembly on the lock case with the spindle and key plug cam in position to actuate the lock operating means, and yielding detents acting between the mounting portion and the pins to lock the bearing sleeve in assembled relation to the lock case.

13. In a lock of the class described, a lock case having lock operating means therein, an inside knob on the lock case for actuating said lock operating means, a pushbutton mounted on said knob for movement between locking and release positions, an outside knob assembly including an outside knob and knob spindle, a key plug carried by the outside knob and forming a part of said assembly, means for supporting the knob assembly in assembled position on the lock case, comprising releasable detents for locking said assembly relatively to the case with the key plug and spindle in position to actuate the lock operating means, and a spring acting between the key plug and pushbutton when the key plug is in assembled position to press the pushbutton toward release position.

14. In a lock of the class described, a lock case of the type adapted to be fitted against the face of a door and having lock operating means, an inside knob rotating on the lock case to actuate the lock operating means, a pushbutton mounted on said knob for movement between locking and release positions, an outside knob assembly including a bearing sleeve extending transversely toward the lock case through a bore in the door, an outside knob and knob spindle assembled to said bearing sleeve for rotation relatively thereto, means through which the pushbutton when in locking position locks the outside knob spindle, a key plug carried by the outside knob, a mounting portion for the bearing sleeve secured on the side of the lock case fitted against the door, said mounting portion through said bearing sleeve holding said knob assembly in aligned relation to the lock case with the spindle and key plug in position to actuate the lock operating means, releasable detents acting between the bearing sleeve and mounting portion to lock the outside knob assembly in assembled relation to the lock case, and a spring acting between the key plug and pushbutton when said knob assembly is locked by said detents in assembled position to press the pushbutton toward release position.

15. In a lock of the class described, a lock case having a bolt, a mounting portion on one side of the lock case, said case adapted to be applied to the inside face of a door with its mounting portion in aligned relation to an opening in the door, a ring mounted to rotate on said mounting portion, an outside knob and knob spindle, a bearing sleeve on which said outside knob and knob spindle rotate, said bearing sleeve extending into the opening in the door and having an end portion formed with surfaces that mate with surfaces on said mounting portion of the lock case, means acting between said end portion of the bearing sleeve and the mounting portion of the lock case to hold said surfaces in mating relation to one another whereby to support said sleeve in predetermined position relatively to said mounting portion, said end portion of the bearing sleeve formed with a bearing surface on which the inner end of the spindle rotates while in interlocked relation to said ring, retracting surfaces on said ring whereby the ring when rotated by the spindle retracts the bolt, an inside knob mounted on the lock case for rotation, and a cam mounted on the lock case and actuated by the inside knob for retracting the bolt independently of the said ring.

References Cited in the file of this patent

UNITED STATES PATENTS

1,060,413	Augenbraun	Apr. 29, 1913
1,559,037	Floyd	Oct. 27, 1925
1,653,512	Schlage	Dec. 20, 1927
1,991,031	Schlage	Feb. 12, 1935

FOREIGN PATENTS

15,126	Great Britain	July 22, 1905