Dec. 22, 1936. O. RITTERBUSCH 2,065,291

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Fig. 1.

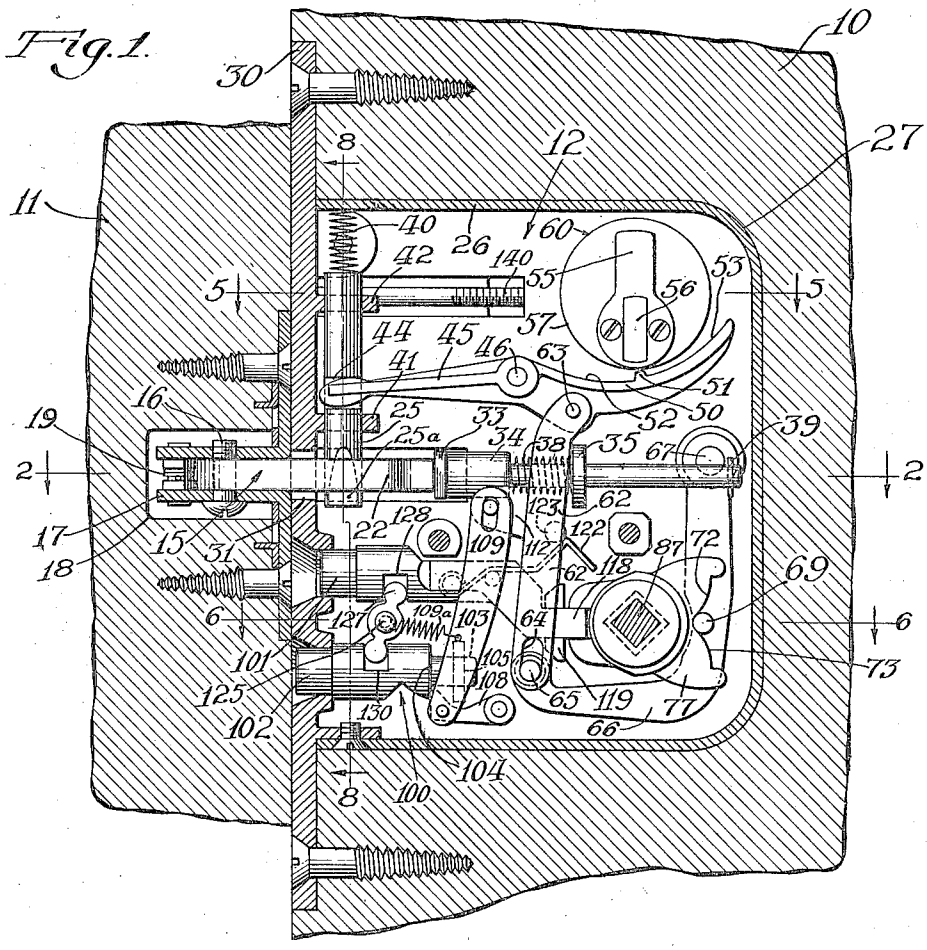
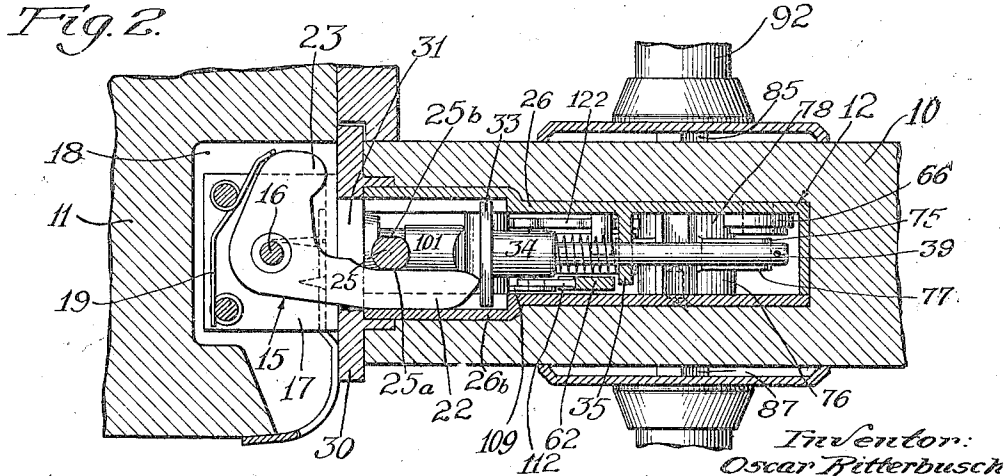


Fig. 2.



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Fig. 3.

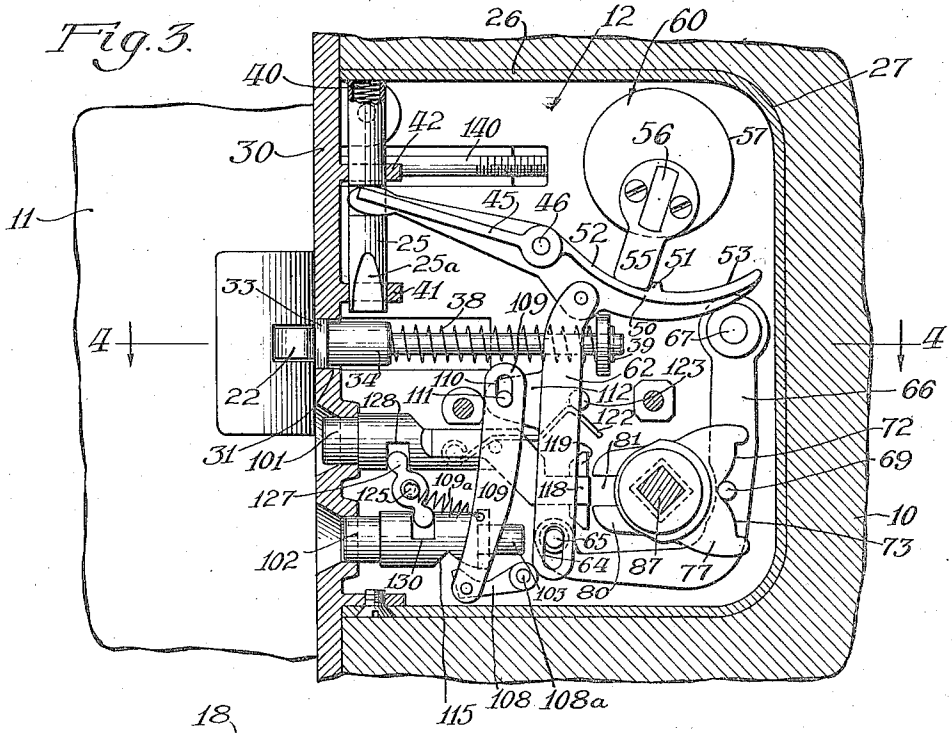
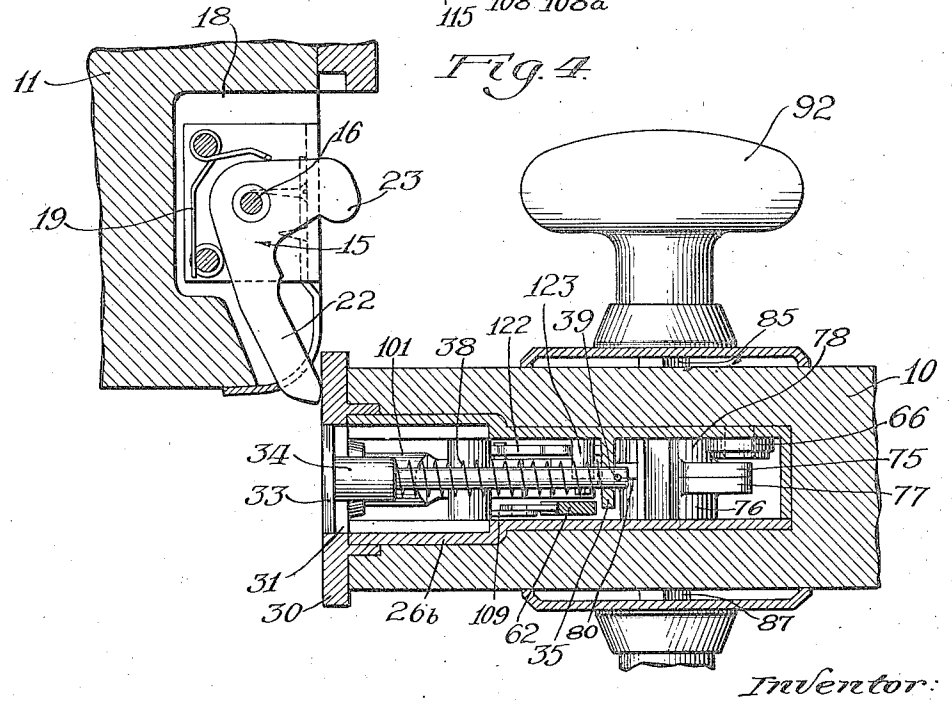


Fig. 4.



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Fig. 5.

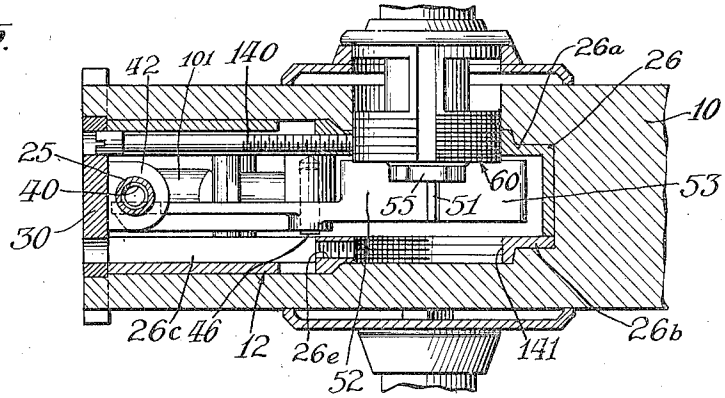


Fig. 6.

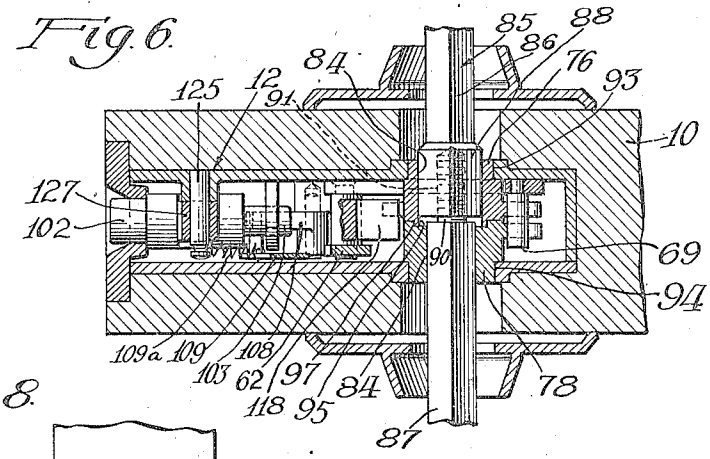


Fig. 8.

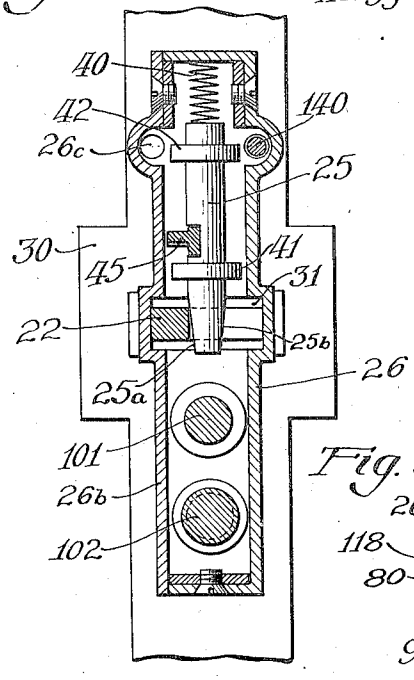


Fig. 7.

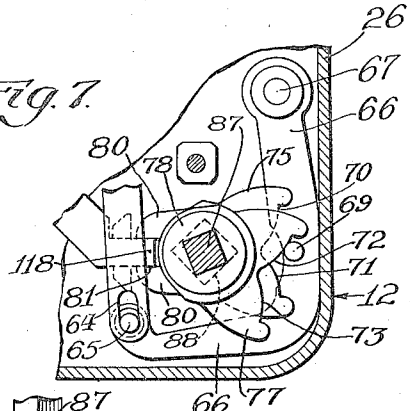
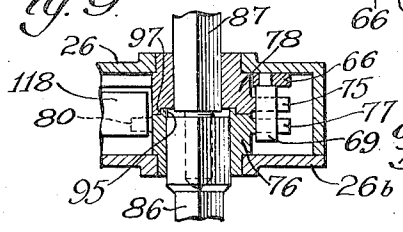


Fig. 9.



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Patented Dec. 22, 1936

2,065,291

UNITED STATES PATENT OFFICE

2,065,291

LOCK

Oscar Ritterbusch, Chicago, Ill.

Application September 24, 1934, Serial No. 745,261

4 Claims. (Cl. 70—14)

The invention relates to locks and is particularly adapted to be embodied in locks of the type shown and described in U. S. Letters Patent 1,907,267 granted to me May 2, 1933.

A primary object of the invention is to provide an improved lock which, because of its construction, prevents rattling of the door in which it is mounted. In other words, when the door in which the improved lock is mounted is in its closed position, the lock insures that there will be no movement of the door relative to the door frame until the door is opened manually.

Another object of the invention is to provide a lock of the kind described with an improved night latch mechanism.

Still another object of the invention is to provide an improved lock which may be adjusted so that it may be mounted in any door no matter whether the door is hinged on its left hand side or right hand side and no matter whether the door opens inwardly or outwardly or whether the lock is to be actuated by a key from the inner or the outer side of the door or from both sides.

Still another object of the invention is to provide an improved lock of the type described which may be unlocked by a key from at least one side thereof and may be adjusted so that it may be actuated from either side without the aid of the key.

Other objects of the invention will become apparent as the following detailed description progresses, reference being had to the accompanying drawings, in which—

Fig. 1 is a vertical longitudinal section taken through a lock which embodies the invention, the lock being shown mounted in a door which is hinged in a suitable door frame.

Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1.

Fig. 3 is a section taken on the same line as Fig. 1 but showing parts of the lock in changed positions, the keeper of the lock and the door frame being shown in elevation.

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 3 and indicates that the door has been opened a short distance.

Fig. 5 is a section taken on line 5—5 of Fig. 1.

Fig. 6 is a section taken on line 6—6 of Fig. 1.

Fig. 7 is a fragmentary section taken substantially on the same line as Fig. 1 but showing certain parts in changed positions.

Fig. 8 is a fragmentary section taken on line 8—8 of Fig. 1, and

Fig. 9 is a fragmentary section taken substantially on the same line as Fig. 6 but showing certain parts interchanged to adjust the lock.

Referring for the present to Figs. 1 to 8, inclusive, wherein a preferred embodiment of the invention is illustrated, the reference character 10 designates a door which is mounted in a door frame 11 by hinges (not shown). The door 10 is equipped with the improved lock which is designated generally by the reference character 12.

The lock 12 comprises a keeper 15 which is pivoted by a pin 16 in a fabricated housing member 17, the member 17 being fixed in a recess 18 provided in the door frame 11. A spring 19 mounted in the housing member 17 tends to rotate the keeper 15 in a clockwise direction (Fig. 2) so that the keeper 15 will occupy the position wherein it is shown in Fig. 4 when the door 10 is in its open position.

The keeper 15 is pivoted intermediate its ends and comprises arms 22 and 23, the arm 22 being engaged by a bolt or wedge member 25 when the door is in its closed position (Figs. 2 and 8).

The wedge member 25 is disposed in a housing 26 which, in turn, is disposed in a recess 27 formed in the free edge of the door 10. The housing 26 comprises a striker plate 30 provided with a slot 31 through which the arm 22 may pass to engage the wedge member 25 and a plate 33, the plate 33 being carried by a plunger 34 which is slidably journaled in a lug 35 provided in the housing 26. A spring 38 yieldingly urges the plunger 34 and the plate 33 to the left (Figs. 1, 2, 3 and 4). A pin 39 projecting through the right hand end (Fig. 1) of the plunger 34 is engageable with the lug 35 to limit displacement of the plunger 34 to the left (Fig. 1). The construction is such that when the door is opened, the plate 33 is displaced into the slot 31 by the spring 38 (Figs. 3 and 4.) It will be noted that when the door 10 is in its closed position, the arm 22 engaging the plate 33 holds the plunger 34 in its retracted position against the action of the spring 38. Obviously, the plate 33 will remain in engagement with the arm 22 during the initial opening of the door 10 until the plate 33 is disposed in the slot 31 (Fig. 4).

The plunger 25 is urged yieldingly in a downward direction by a helical spring 40 interposed between the upper edge of the wedge member 25 and the housing 26. The wedge member 25 is slidably journaled in lugs 41 and 42 provided in the housing 26.

A notch 44 formed in the wedge member 25 is

engaged by the free end of a lever 45 which is pivoted by a pin 46 in the housing 26. The lever 45 is provided with an integral sweep section 50 which is divided in two parts by a lug 51. One sweep section surface is designated by the reference character 52 and the other by the reference character 53. When the lock is adjusted as illustrated in Figs. 1 to 8, inclusive, each of the sweep surfaces 52 and 53 will cooperate with a lever 55 mounted on one end of a plug 56 rotatably journaled in a barrel 57 of a tumbler lock which is designated generally by the reference character 60 (Figs. 1 and 5). The tumbler lock 60 is actuated by any suitable key and its construction is such that when the door is in its closed position, the lever 55 occupies the position wherein it is shown in Fig. 1. However, if certain latch mechanism hereinafter described has been adjusted so that the door can only be opened from the outer side by actuating the tumbler lock 60, its key (not shown) is inserted in the tumbler lock and rotated to rotate the lever 55 in either direction so that the free end of the lever 55 will ride upon the sweep surface 52 or 53 and displace the lever 45 in a clockwise direction (Fig. 1) to lift the wedge member 25 against the action of the spring 40. The key (not shown) is rotated until the lever 55 abuts against the lug 51, whereupon the wedge member 25 will occupy the position wherein it is shown in Fig. 3.

A link 62 has one end pivoted to the sweep section 50 by a pin 63, the other end of the link being provided with a slot 64 in which a pin 65 rides. The pin 65 projects from the free end of an L-shaped lever or crank 66 which is pivoted on a pin 67 projecting into the housing 26. A pin 69 projecting from the lever 66 intermediate its ends is engageable by cam surfaces 70, 71, 72 and 73. The cam surfaces 70 and 71 are formed on a lug 75 which is formed integral with a sleeve 76 (Figs. 6 and 7). The cam surfaces 72 and 73 are formed upon a lug 77 which is formed integral with a sleeve 78. Normally, the lugs 75 and 77 are alined with each other as illustrated in Fig. 1 so that the pin 69 rests between the cam surfaces 70 and 71 and between the cam surfaces 72 and 73. The lever 66 then occupies the position wherein it is shown in Fig. 1. However, it will be readily understood that if the sleeve 78 is angularly displaced in a clockwise direction (Fig. 7), the cam surface 72 will displace the pin 69 to the right (Fig. 7) so that the lever 66 will be angularly displaced in a counter-clockwise direction (Fig. 7). It is also obvious that the sleeve 78 may be displaced in a counter-clockwise direction (Fig. 7) to have the cam surface 73 displace the pin 69 and the lever 66 into the positions wherein they are shown in Fig. 7. Likewise, the sleeve 76 may be rotated in either direction to bring the pin 69 and the lever 66 into the positions wherein they are shown in Fig. 7.

Formed integral with the sleeve 76 are lugs 80 which provide a slot 81, the purpose of which will presently appear.

Extending through polygonal holes 83 and 84 formed in the sleeves 76 and 78, respectively, is a spindle 85 which is of well known construction and preferably comprises spindle elements 86 and 87, the spindle element 87 is square in cross-section to engage slidably the hole 84. The spindle element 86 has an enlarged squared end 88 which slidably engages the hole 84. The spindle element 87 has its inner end 90 reduced in diameter, the reduced end 90 being screw-threaded into a socket 91 formed in the squared end 88 of the spindle element 86. A door knob 92 is secured in any suitable manner to the outer end of the spindle element 85, a similar door knob (not shown) being secured to the outer end of the spindle element 87.

It will be readily understood that if the knob 92 is turned in either direction, the spindle element 82 will turn to an equal angle and that this movement will cause one of the cam surfaces 70 or 71 to displace the pin 69 and the lever 66 from the positions wherein they are shown in Fig. 1 to the positions wherein they are shown in Fig. 7. It will also be understood that if the knob (not shown) secured to the spindle element 87 is rotated in either direction, the spindle element 87 will cause one of the cam surfaces 72 or 73 to displace the pin 69 and the lever 66 from the position wherein they are shown in Fig. 1 to the position wherein they are shown in Fig. 7. It will be further understood that such rotation of the spindle element 87 does not rotate the spindle element 86 as the screw-threaded end 90 of the spindle element 87 simply revolves and advances or recedes a short distance in the socket 91.

Referring to Fig. 6, it will be noted that the sleeve 76 has one end rotatably journaled in a hole 93 formed in the housing 26. The sleeve 78 has one end journaled in a hole 94 which is also formed in the housing 26. The sleeve 76 has an annular flange 95 projecting from its inner end, which flange 95 is rotatably journaled in a depression 97 formed in the inner end of the sleeve 78.

If either of the spindle elements 86 or 87 is rotated so that the lever 66 is displaced from the position wherein it is shown in Fig. 1 to the position wherein it is shown in Fig. 7, the link 62 displaces the lever 45 from the position wherein it is shown in Fig. 1 to the position wherein it is shown in Fig. 3, although in the case of Fig. 3, the lever 45 has been displaced through operation of the tumbler block 60 instead of by rotation of either of the spindle elements 86 and 87.

The lock is provided with improved latch mechanism 100 which is sometimes referred to as a "night latch". The latching mechanism 100 preferably comprises two plungers 101 and 102 which have their outer ends slidably journaled in the striker plate 30 (Fig. 1). The inner end of the plunger 102 is of reduced diameter as indicated at 103 so that an annular shoulder 104 is provided. The end 103 is slidably journaled in a lug 105 projecting into the housing 26. The shoulder 104 is engageable by a pawl 108 pivoted on a pin 108a projecting into the housing 26. A lever 109 has one of its ends pivoted to the free end of the pawl 108, the other end of the lever 109 being provided with a slot 110 in which a pin 111 rides. The pin 111 projects from a lug 112 formed integral with the link 62.

The plunger 102 is provided with a notch 115 providing clearance for the free end of the pawl 108 when the several parts are in the positions wherein they are shown in Fig. 3.

It will be noted that the inner end of the plunger 101 is bent to provide a tongue 118 which is adapted to enter the slot 81. The tongue 118 is slidably journaled in lugs 119 projecting inwardly from a wall of the housing 26.

Secured to the plunger 101 is a detent 122

formed from spring metal. The detent 122 engages a pin 123 projecting from a wall of the housing 26, the construction being such that the detent 122 co-operates with the pin 123 and yieldingly holds the plunger 101 in either its retarded position of its extended position.

Disposed intermediate the plungers 101 and 102 and pivoted on a pin 125 projecting into the housing 126 is a lever 127. One end of the lever 127 engages a notch 128 formed in the plunger 101. The other end of the lever 127 engages a notch 130 formed in the plunger 102. The arrangement is such that if either of the plungers 101 or 102 is pushed manually into its retracted position, the other plunger moves into its extended position. Thus, when the plunger 102 is pushed from the extended position wherein it is shown in Fig. 1, to the retracted position wherein it is shown in Fig. 3, the lever 127 pushes the plunger 101 from the retracted position wherein it is shown in Fig. 1 to its extended position wherein it is shown in Fig. 3.

A spring 109*a* extends between the pin 125 and the lever 109 and yieldingly urges the lever 109 in a clockwise direction around the pin 111.

As stated above, in Figs. 1 and 2, the door 10 is shown in its closed position. It will be noted that the arm 22 extends through the slot 31 and holds the plunger 34 in a retracted position. It will also be noted that a tapered surface 25*a* at the lower end of the wedge member 25 engages the arm 22 and cooperates with a wall of the housing 26 to clamp the arm 22 firmly between the wedge member 25 and the wall of the housing. As best shown in Fig. 2, the arm 22 also bears against an edge of the opening 31 when the door is in its closed position. The combination of these features insures that the door will not rattle. It may be mentioned, further, that the wedge member 25 will be urged downwardly by the spring 40 to insure that the arm 22 is engaged both by the tapered or cam surface 25*a* and by the adjacent wall of the housing 26.

The wedge member 25 is provided with a tapered surface 25*b* diametrically opposite the tapered surface 25*a*. The purpose of this construction will presently appear.

Now, if it is assumed that the apparatus of the lock is adjusted as illustrated in Figs. 1 and 2, it will be understood that the door can not be opened by rotating the knob 92 on the outer side of the door as the tongue 118 of the plunger 101 projects into the slot 81 and prevents the sleeve 76 from rotating. This, of course, prevents rotation of the spindle element 86 and the knob 92. However, one may open the door from the inside by turning the knob (not shown) on the spindle element 87 so that either of the cam surfaces 72 or 73 will displace the pin 69 and the lever 66 from the positions in which they are shown in Fig. 1 to the positions wherein they are shown in Fig. 7 whereupon, the link 62 angularly displaces the lever 45 in a clockwise direction so that the wedge member 25 is lifted out of the path of the arm 22. The door is then pulled and as it opens, the keeper 15 swings from the position wherein it is shown in Fig. 2 to the position wherein it is shown in Fig. 4. It will be noted that when the keeper 15 assumes the position wherein it is shown in Fig. 4, the arm 23 projects into the path of the striker plate 30 so that when the door is closed subsequently, the striker plate 30 will engage the arm 23 and displace the keeper 15 in a counter-clockwise direction (Fig. 4) so that the arm 22 will pass into the slot 31. When the arm 22 enters the slot 31, it pushes the plate 33 and the plunger 34 inwardly against the action of the spring 38. Meanwhile, the wedge member 25 has been resting on the forward end of the plunger 34 and when the plate 33 passes from beneath the wedge member 25 it drops down until the cam surface 25*a* holds the arm 22 snugly against the adjacent wall of the housing 26.

Now, if it is assumed that the improved lock is adjusted as illustrated in Figs. 1 and 2 and it is desired to open the door from its outer side, the key (not shown) for the tumbler lock 60 must be employed to actuate the lock 60 in such manner that the lever 55 engages the sweep portion 50, as described above, and causes the arm 45 to lift the wedge member 25 out of the path of the arm 22. It is possible to do this as the lost motion connection between the link 62 and the lever 66 permits the link 62 to move downwardly without displacing the lever 66.

It will be noted that when the lock is adjusted as illustrated in Figs. 1 and 2 and the door is opened either by utilizing the key (not shown) from the outer side of the door or by turning the knob (not shown) on the inner side of the door, the link 62 moves downwardly so that the pawl 108 is withdrawn from engagement with the shoulder 104. The plunger 102 may then be displaced manually, when the door is open, from the position wherein it is shown in Fig. 1 to the position wherein it is shown in Fig. 3 so that the door may be opened from either side by the corresponding door knob. The function of the pawl 108 is to prevent unauthorized persons from inserting an instrument between the door and its frame to push the plunger 102 back when it has been left in the position wherein it is shown in Fig. 1 to lock the door from the outer side.

As best shown in Fig. 5, the barrel 57 of the tumbler lock 60 is screw-threaded into a wall of the housing 26 and is held against rotation by a screw 140 which also extends through a wall of the housing 26. This wall is identified by the reference character 26*a*. Disposed opposite the wall 26*a* is a wall or cover plate 26*b* also forming part of the housing 26. The wall 26*b* is provided with a screw-threaded opening 141 adapted to receive the tumbler lock 60. The wall 26*b* is also provided with a bore 26*c* which is screw-threaded at its inner end as indicated at 26*e*. The bore 26*c* and the screw thread 26*e* are adapted to receive the screw 140 to secure the tumbler lock 60 in the screw-threaded opening 141 if it is so desired. The purpose of this construction will now be explained.

In Figs. 1 to 8, inclusive, the lock 12 is mounted in the door 10 in such manner that the key (not shown) is inserted into the tumbler lock 60 from the outer side of the door. The door swings inwardly. Now, if it is desired to have the door swing in the same direction but to have it controlled by a key from the inside, the tumbler lock 60 may be placed in the threaded hole 141 and secured by the screw 140 which is then inserted in the bore 26*c*. The lever 55 will then co-operate with the sweep surconstruction will now be explained.

When the tumbler lock 60 is removed from the wall 26*a* and placed in the screw-threaded opening 141 of the wall 26*b*, the spindle elements 86 and 87 and the sleeves 76 and 78 must

also be reversed as illustrated in Fig. 9. The operation of the lock 12 will then be as described above but the key will be inserted in the tumbler lock 60 from the inner side of the door. It will be noted that it is not necessary to reverse or adjust the keeper 15. Of course, either side of the door may be the outer side, the terms "outer" and "inner" are simply used to facilitate the description of the operation of the lock. However, when the door swings in a clockwise direction (Figs. 2 and 4) the keeper 15 is also reversed from the position wherein it is shown in Fig. 2. In other words, the arm 23 will then project in the direction opposite to that in which it is shown in Fig. 2. The arm 22 then co-operates with the bevelled or tapered surface 25b.

If it is desired to have the door 10 controlled with a key on each side thereof, the tumbler lock 60 is left in the position wherein it is shown in Fig. 5 and an additional lock of the same type, or the equivalent, is inserted in the opening 141 of the housing wall 26b. The other lock will have a lever (not shown) corresponding to the lever 55 and co-operating with the sweep surfaces 52 and 53. The spindle elements 86 and 87 may be made integral or secured to each other rigidly in any suitable manner. The sleeves 76 and 78 will also be in one piece or secured to each other rigidly in any suitable manner.

It will be noted from an inspection of Figs. 2, 5, 6 and 8 that the vertical plane passing through the center line of the plunger 34 passes through the center line of the wedge member 25 and the center line of the pin 16 as well as through the longitudinal axes of the plungers 101 and 102. This plane is also the central longitudinal plane of the housing 26 and extends centrally through the sweep surfaces 52 and 53. In other words, the lock is constructed to a large extent symmetrically about the vertical plane which passes through the longitudinal axes of the plunger 34 and the pin 16. This construction is exceedingly important as it permits the lock to be mounted in a door to meet the conditions under which the door is hinged and the direction in which it swings.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of my invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as permissible, in view of the prior art.

I claim:

1. A door lock adapted to engage a keeper movably mounted in a door frame, comprising: a lock housing mounted in a door, a wedge member movably mounted in the housing and engageable with said keeper to latch the door by a wedging action, a lever for displacing said wedge member, a cylinder lock for actuating said lever independently, a spindle provided with cams, a crank adapted to be operated by said cams, a link operatively connecting said crank and lever, a night latch mechanism adapted to lock said spindle, and means on said link for preventing release of said night latch mechanism when the keeper is engaged by the wedge member.

2. A device as specified in claim 1, in which the wedge member is equipped with a spring serving to yieldingly urge the member into engagement with the keeper.

3. A door lock adapted to engage a keeper movably mounted in a door frame comprising: a lock housing mounted in a door, a wedge member movably mounted in the housing and engageable with said keeper to latch the door by a wedging action, a lever for displacing said wedge member, a cylinder lock for actuating said lever independently, a spindle provided with cams, a crank operated by said cams, a link operatively connecting said crank and lever, a night latch mechanism to lock said spindle, and means controlled by said link for preventing release of said night latch mechanism when said keeper is engaged by said wedge member.

4. A door lock adapted to engage a keeper mounted in a door frame comprising: a lock housing mounted in a door, a bolt member movably mounted in the housing and engageable with said keeper to latch the door, a lever for displacing said bolt member, a cylinder lock for actuating said lever independently, a spindle provided with cams, a crank operated by said cams, a link operatively connecting said crank and said lever, a night latch member to lock said spindle, and means controlled by said link for preventing release of said night latch mechanism when said keeper is engaged by said bolt member.

OSCAR RITTERBUSCH.