May 28, 1940. J. F. CHING 2,202,086

DOOR LOCK

Filed Feb. 20, 1939 2 Sheets-Sheet 1

FIG. 1

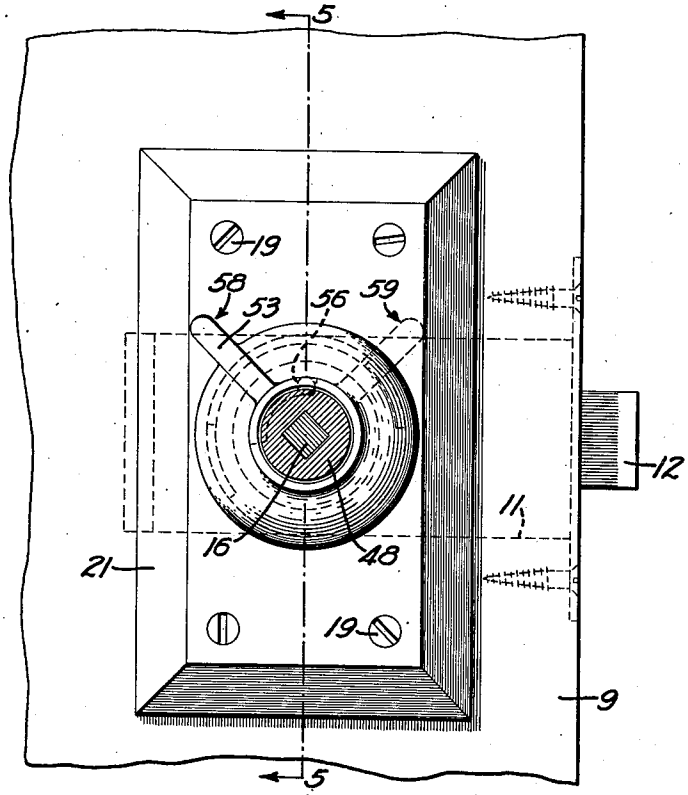


FIG. 2

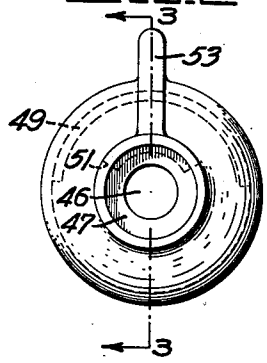


FIG. 3

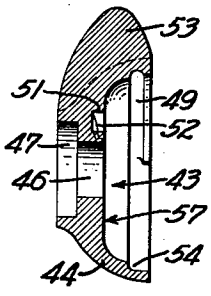
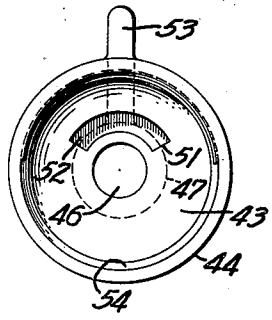


FIG. 4



INVENTOR

BY John F. Ching

Harry J. Sweeney

ATTORNEY

May 28, 1940. J. F. CHING 2,202,086

DOOR LOCK

Filed Feb. 20, 1939 2 Sheets-Sheet 2

FIG. 5

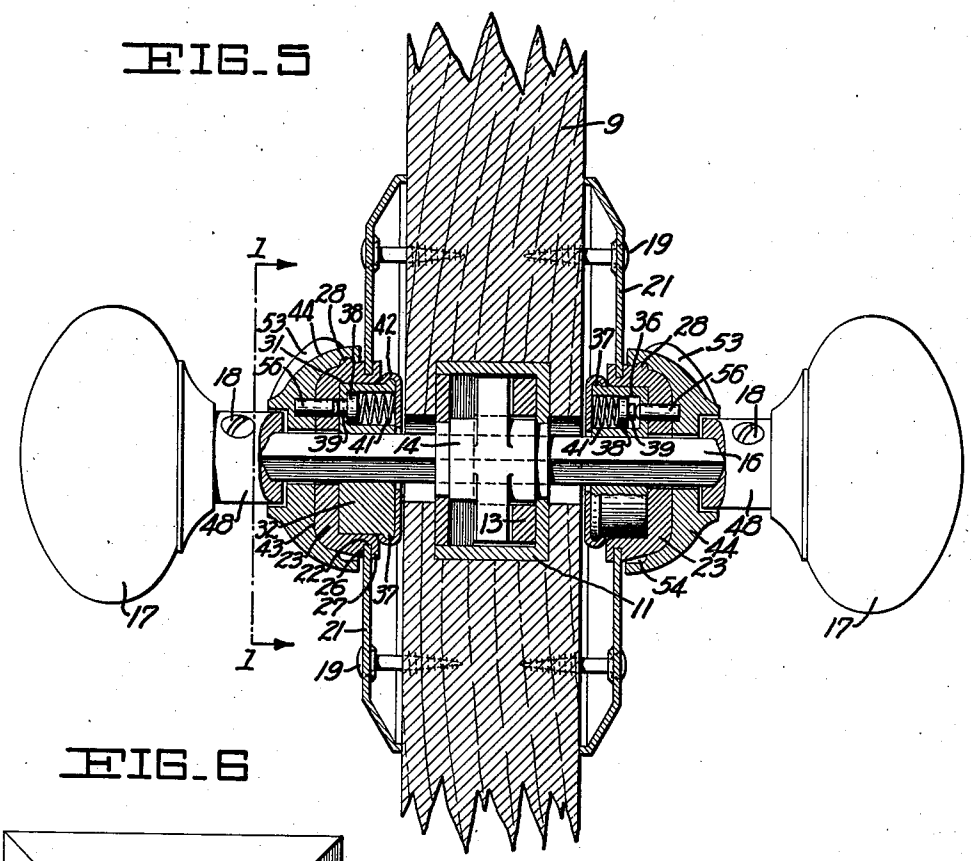


FIG. 6

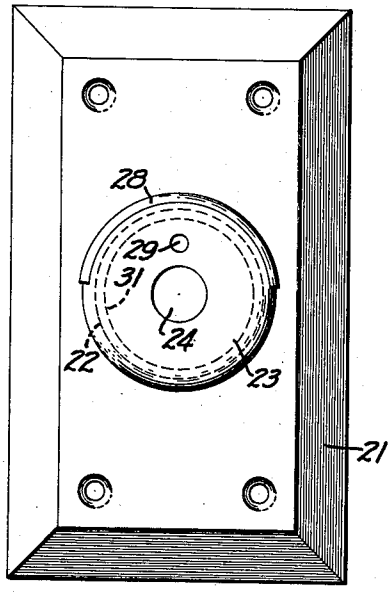


FIG. 7

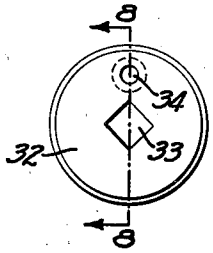
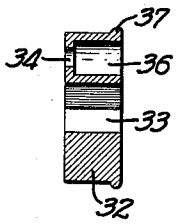


FIG. 8



INVENTOR

BY John F. Ching

Harry Edmonds

ATTORNEY

Patented May 28, 1940 2,202,086

UNITED STATES PATENT OFFICE

2,202,086

DOOR LOCK

John F. Ching, Berkeley, Calif.

Application February 20, 1939, Serial No. 257,409

4 Claims. (Cl. 292—359)

This invention relates to locks to prevent the opening of doors.

An object of the invention is to provide an improved construction for keyless door locks.

Another object of the invention is to provide a lock for doors whose mechanism is entirely concentric with the knob shaft.

A further object of the invention is to provide a locking mechanism for doors which may be quickly incorporated in door latches not originally provided with locking means.

The invention possesses other objects and features of advantage some of which, together with the foregoing, will be specifically set forth in the detailed description of the invention hereunto annexed. It is to be understood that the invention is not to be limited to the specific form thereof herein shown and described as various other embodiments thereof may be employed within the scope of the appended claims.

Referring to the drawings:

Figure 1 is a front elevational view of a section of a door showing my improved door lock mounted thereon. Portions of the view are shown in vertical section and the plane in which the view is taken is indicated by the line 1—1 of Figure 5.

Figure 2 is a front elevational view of the lock knob.

Figure 3 is a vertical sectional view of the locking knob. The plane in which the view is taken is indicated by the line 3—3 of Figure 2.

Figure 4 is a rear elevational view of the lock knob.

Figure 5 is a vertical sectional view of the structure shown in Figure 1. Portions of the view are shown in elevation for the sake of clearness and the sectional portion of the view is taken in the plane indicated by the line 5—5 of Figure 1.

Figure 6 is a front elevational view of the escutcheon plate.

Figure 7 is a front elevational view of the shaft rotor.

Figure 8 is a vertical sectional view of the shaft rotor. The plane of section is indicated by the line 8—8 of Figure 7.

In detail, the door, indicated by the numeral 9, is provided with the usual latch mechanism consisting of the housing 11, which is mortised into an edge of the door, containing the retractible latch bolt 12 having the usual tail piece 13 engaged by the cam 14 which is actuated by the shaft 16 upon rotation of either knob 17 secured, by setscrews 18, to the ends of the shaft 16. The mechanism described so far constitutes the standard parts found in most common door latches.

The mechanism I will now describe constitutes the improved lock of my invention to be used with the type of door latch set forth above and is particularly intended for use on interior doors or the inner side of outlet doors. The structure of Figure 5 shows an inner door and is provided with duplicate locks, but since both lock mechanisms are identical only one will be described in detail. Secured to a face of the door by wood screws 19 is an escutcheon plate 21 having a central opening 22 in which is positioned a cylindrical hub 23 having an aperture 24 therein through which the shaft 16 passes and in which the latter is freely rotatable. The hub 23 is provided with a shoulder 26, engaging one surface of the escutcheon plate bordering the opening 22, and with an extension which is spun over to form a flange 27 engaging the opposite surface of the escutcheon plate bordering the opening 22 so as to securely fix the hub to the escutcheon plate and against rotation in the opening 22. The hub is also provided, as is best shown in Figure 6, with an arcuate ridge 28, which extends through not quite 180 degrees of arc on the periphery of the hub, with a lock pin aperture 29, which is radially spaced from and parallels the axis of the shaft aperture 24, and with a circular recess 31 which is axially concentric with the aperture 24 and which opens toward the door 9.

Rotatably positioned in the recess 31 is a cylindrical rotor 32, best shown in Figures 7 and 8, which has a central rectangular opening 33, to receive the square shaft 16, a lock pin aperture 34, which is radially offset from the axis of the rotor a distance equal to the offset of the aperture 29 from the central axis of the hub 23, a recess 36 which is concentric with the aperture 34, and a peripheral bead 37 which is located at one end of the rotor. The square shaft 16 fitting in the square opening 33 of the rotor provides a driving connection between the shaft and rotor so that when the shaft is rotated the rotor will also be rotated in the recess 31. Mounted in the recess 36, for movement axially thereof, is a plunger 38 having a stub extension 39 which enters and extends through the lock pin aperture 34, and a coil spring 41, contained in the recess 36, has one end engaging the plunger 38 and the other end engaging a circular disk 42 having a central opening through which the shaft 16 passes and whose peripheral portion is spun over the bead 37 of the rotor so as to secure the disk to the rotor and to

retain the plunger 38 and the spring 41 in the recess 36.

Positioned concentrically with the hub 23, and having a complemental recess 43 into which the hub fits, is a lock knob 44 having, as is best shown in Figures 2, 3 and 4, a central bore 46, through which the shaft 16 passes and in which the latter is freely rotatable, and a concentric circular recess 47 which receives the shank 48 of the knob 17. Within the recess 43 is an arcuate groove 49, complemental with and into which the ridge 28 of the hub fits, and an arcuate cam recess 51 whose bottom 52 gradually slopes along its length in a direction parallel with the axis of the bore 46, that is, the cam recess 51 is deeper at one end than at the other. The mean radius of the cam recess 51 coincides with the axes of the lock pin apertures 29 and 34 of the hub 23 and the rotor 32 respectively. A radially extending operating handle 53 is also provided on the lock knob. As will be seen in Figures 3 and 4, the groove 49 extends slightly less than 180 degrees around the periphery of the recess 43, the remainder 54 of said periphery which continues from the ends of the groove being recessed and open toward the rear end of the lock knob. Prior to connecting the lock knob 44 and the hub 23, a lock pin 56 is slipped into the alined lock pin apertures 29 and 34. The lock knob is then placed over the hub with the operating handle 53 pointing downwardly. In this position, the ridge 28 of the hub enters the recessed portion 54 of the knob and the lock pin 56 contacting the surface 57 of the knob will be pushed inwardly, against the tension of the spring 41, until its outer end coincides with the outer end surface of the hub. The knob is then rotated through an arc of about 180 degrees whereupon the ridge 28 of the hub will enter the complementary groove 49 therefor in the knob and the lock pin 56 upon coming into registry with an end of the cam recess 51 will snap outwardly thereinto. It will be seen therefore that the lock knob and the hub are secured together against relative axial movement by the intermeshed ridge 28 and groove 49 and that subsequent rotary movement of the knob on the hub is limited due to the fact that the lock pin is confined in the cam recess 51. It will also be seen that the lock knob and hub may not thereafter be separated unless the entire mechanism is disassembled to remove the rotor 32 from the hub recess 31 so that the end of the lock pin may be withdrawn from the cam recess 51 whereupon the lock knob and hub may be relatively rotated to disengage the ridge 28 from its mating groove 49.

As shown in the left-hand portion of Figure 5, the lock pin 56 is fully retracted, that is, its outer end is seated in the deepest portion of the cam groove 51 and the operating handle 53 is positioned as shown by the solid lines 58 of Figure 1. This allows the knob 17, the shaft 16 and the rotor 32 carried thereby to be freely rotated so as to retract the latch bolt 12 to open the door. However, when the door is closed and the operating handle is moved clockwise to the position indicated by the dotted lines 59 of Figure 1, the sloping bottom 52 of the cam groove 51 will be moved across the end of the lock pin until the pin is resting in the shallow end of the groove. This action will cause the lock pin 56 to be projected axially into the aperture 34 of the rotor and will simultaneously move the plunger 38 along the recess 36 compressing the spring 41 in so doing. This latter position of the lock pin is shown in the right-hand portion of Figure 5 and it will be seen that the normally rotatable rotor is now secured, against rotation, to the fixed hub 23 by the lock pin. Thus neither knob 17 may be rotated and the door is securely locked. Returning of the operating handle 53 to the position 58 of Figure 1 will allow the compressed spring 41 to move the plunger 38 so that the stub extension 39 thereof enters the rotor aperture 34 and pushes the end of the lock pin therefrom, the lock pin being then retracted since its outer end will be alined with and may pass into the deepest end of the cam recess 51.

It will be apparent, upon inspection of the drawings, that the improved lock of my invention may be quickly attached to any existing common door latch since none of the existing structure requires alteration of any kind, the only operation that is necessary is to remove the existing knob 17, replace the existing escutcheon plate with the escutcheon plate 21 bearing, as an integral unit, my improved lock, and replace the existing knob 17. It will also be seen that by providing both knobs of a door with my improved lock, as is shown in Figure 5, the door may be locked from either side so as to prevent entry of a person from the adjoining room, or both locks may be set so that the respective persons occupying adjoining rooms may not enter the respective rooms without their mutual consent.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a door lock, including a shaft rotatable to move a latch bolt, a fixed member having therein a lock element spaced from the axis of said shaft, a rotor on and rotatable with said shaft having a lock element therein movable therewith in an orbit about the axis of said shaft and registrable with the lock element of said fixed member during said movement, a lock pin movable through the lock element of said fixed member and into the lock element of said rotor to secure said fixed member and said rotor together against relative rotation, and pressure actuated means for moving said lock pin out of the lock element of said rotor.

2. In a door lock, including a shaft rotatable to move a latch bolt, a fixed hub concentric with said shaft, said hub having an axially offset aperture therein, a rotor journaled in said hub, secured for rotation with said shaft and having therein an axially offset aperture registrable with the hub aperture, a lock pin slidable in said hub aperture to enter said rotor aperture whereby said hub and rotor are locked together against relative rotation, a lock knob concentric with and journaled for rotary motion on said hub, means securing said lock knob and said hub together against axial displacement, a cam on said lock knob engaging an end of said lock pin whereby upon rotary motion of said lock knob said lock pin will be moved into said rotor aperture, and spring-pressed means in said rotor for moving said lock pin out of said rotor aperture.

3. In a door lock, including a shaft rotatable to move a latch bolt, a fixed hub concentric with said shaft, said hub having an axially offset aperture therein, a rotor journaled in said hub, secured for rotation with said shaft and having therein an axially offset aperture registrable with the hub aperture, a lock pin slidable in said hub aperture to enter said rotor aperture whereby said hub and rotor are locked together against relative rotation, a lock knob concentric with and journaled for rotary motion on said hub, means

securing said lock knob and said hub together against axial displacement, a cam on said lock knob engaging an end of said lock pin whereby upon rotary motion of said lock knob said lock pin will be moved into said rotor aperture, a plunger slidably mounted in said rotor to enter said rotor aperture, and a spring engaging said plunger to urge the latter into said rotor aperture.

4. In a door lock, including a shaft rotatable to move a latch bolt, a fixed hub concentric with said shaft, said hub having an axially offset aperture therein, a peripheral ridge extending partially therearound and a recess therein concentric with said shaft, a rotor journaled in said hub recess and secured for rotation with said shaft, said hub having an axially offset aperture therein registrable upon rotary motion of said rotor with the hub aperture and provided with an enlarged concentric recess, a plunger slidably mounted in said recess and having a stub extension to enter said rotor aperture, a spring in said rotor recess engaging said plunger to urge the stub extension thereof into said rotor aperture, a cover plate on said rotor closing said rotor recess and engaged by said spring, a lock pin slidably mounted in said hub aperture, one end of said lock pin being capable of entry into said rotor aperture to lock the hub and rotor together against relative rotation, a lock knob journaled on said hub, said lock knob having therein a groove, complemental to and in which the peripheral ridge of the hub is slidably engaged, and an arcuate recess having a depth gradually increasing from end to end and having its mean radius equal to the offset distance of the hub and rotor apertures from the axis of said shaft, and an end of said lock pin being in engagement with the bottom of said recess.

JOHN F. CHING.