June 14, 1949. H. CORDREY ET AL 2,473,052

KEYLESS LOCK

Filed May 24, 1948 2 Sheets-Sheet 1

Fig. 1.

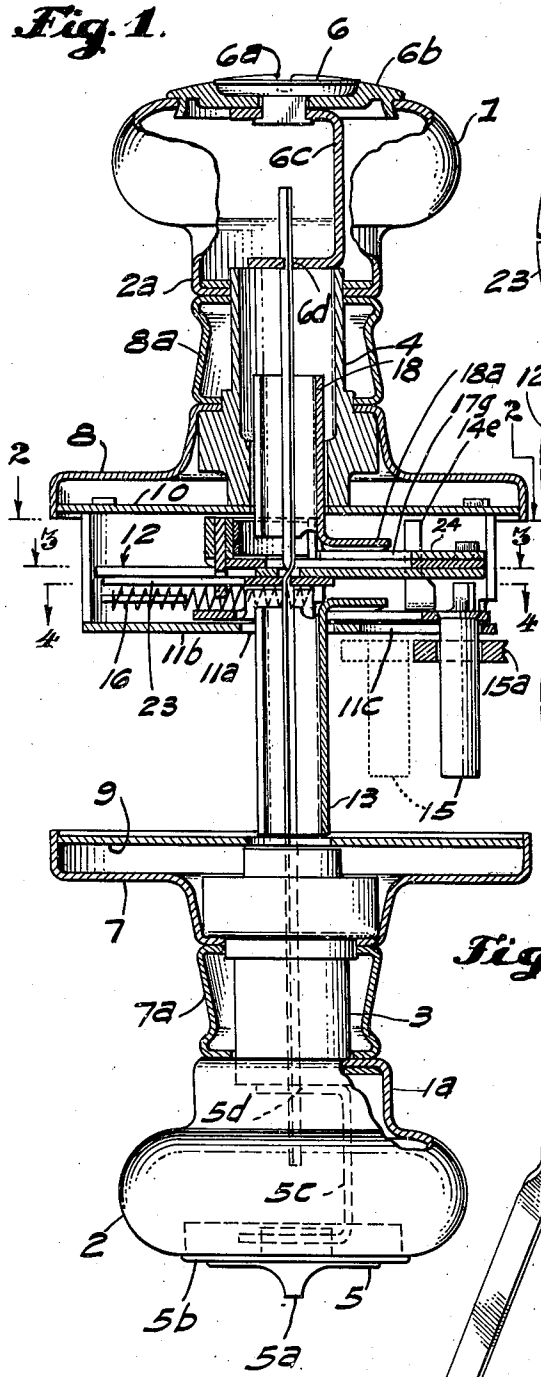


Fig. 2.

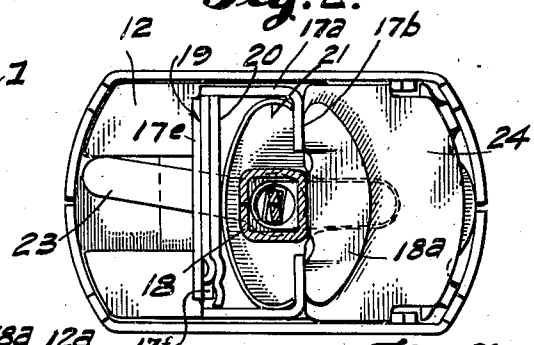


Fig. 3.

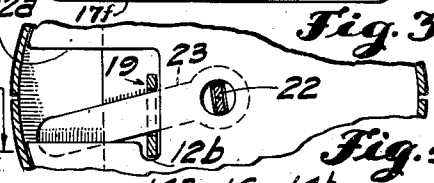


Fig. 4.

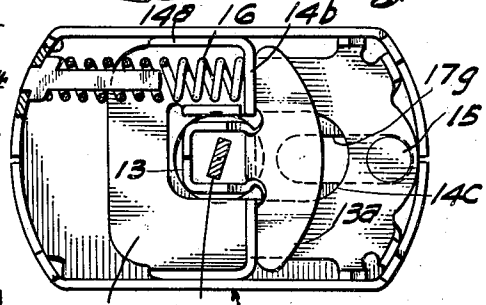


Fig. 5.

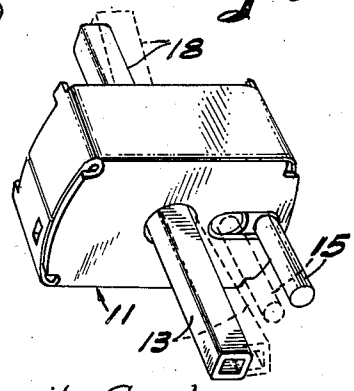
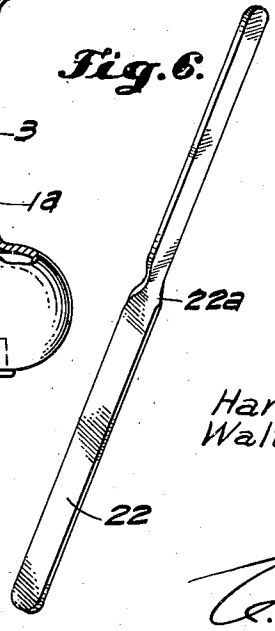


Fig. 6.



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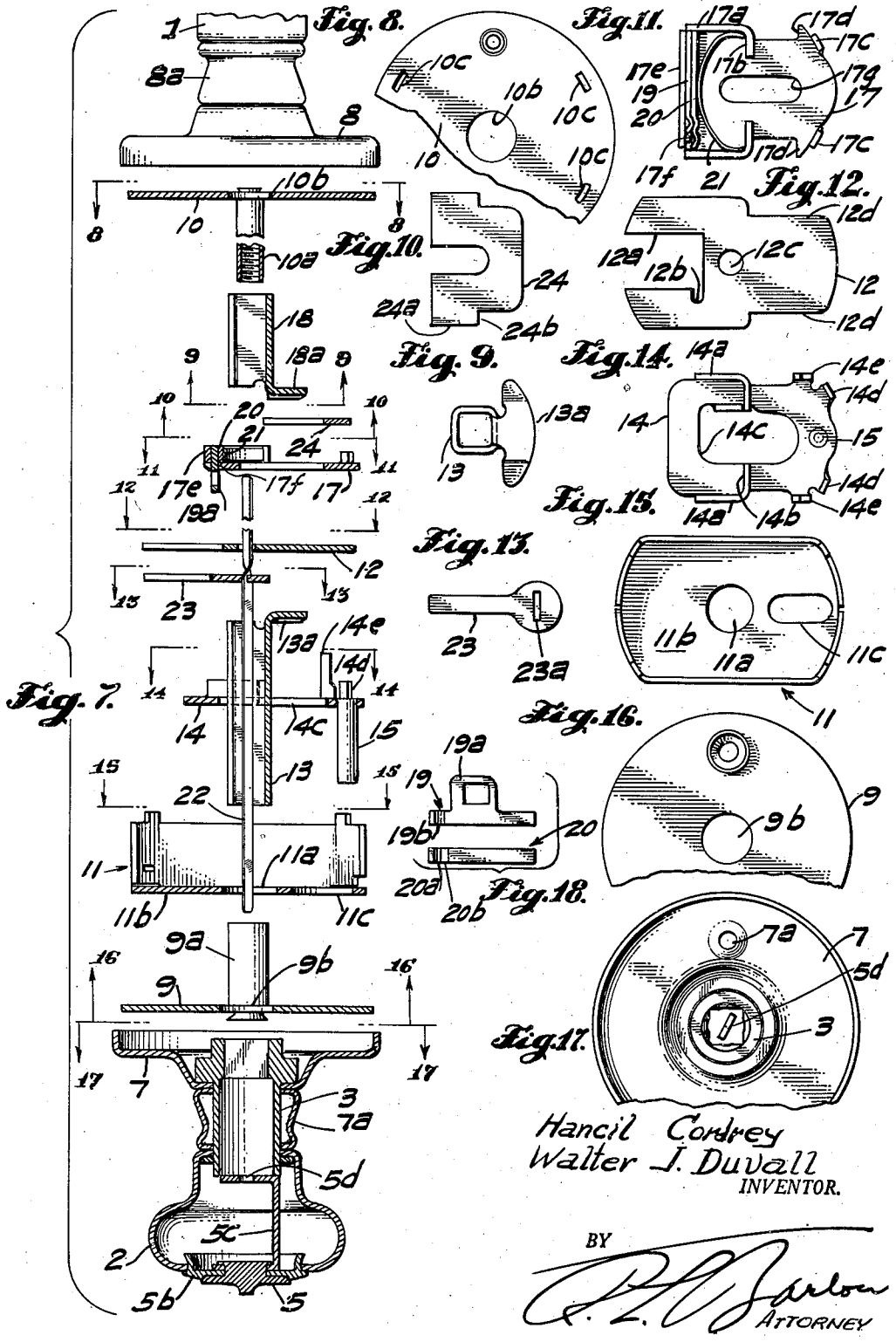
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KEYLESS LOCK

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Chula Vista, Calif.

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8 Claims. (Cl. 292—150)

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Our invention relates to keyless locks of the kind generally used inside a dwelling, as for instance for bathroom doors, which may be latched or secured in closed position from within by the occupant but in case of need may be opened from the outside.

Such locks are convenient for use also in rooms used by invalids or sick persons who like the feeling of privacy given by their ability to lock their doors, but yet the persons caring for them have the assurance that the room can be entered should the occupant be unable to reach the door by reason of sudden illness or it is necessary to care for them and undesirable to disturb them.

The lock of our invention is particularly designed as a variant of the latch set of our invention forming the subject of co-pending application Serial No. 22,133, filed April 20, 1948, and it is accordingly a principal object of our invention to provide a lock of the kind described in which many of the component parts of the lock may be used for the latch set or for the lock of this invention, so that the production equipment may be utilized in large degree to produce either form of lock.

It is an object of our invention to provide a keyless lock having inside and outside knobs by the turning of which the door may be opened from either side, and having a rotatable part fitted in the center of the inner knob effective to operate a member extending through both a spindle actuated by the inner knob and a spindle actuated by the outer knob to prevent operation of the lock by the outside door knob, but provided with an inconspicuous part mounted in the center of the outer knob and engaging said member by rotation of which part the lock may be released for operation by the outer knob.

It is a further object of the invention to provide a keyless lock having a shuttle plate operated by the inner door knob and a second shuttle plate operated by the outer door knob and means mounted on the inner door knob by operation of which said second shuttle plate may be locked against movement so that the latch cannot be operated by the outer door knob, and to provide an inconspicuous element on the outer door knob effective to release the second shuttle plate so that the latch may, if necessary, be operated by the outer door knob.

It is a further object of the invention to provide a keyless lock utilizing many of the constructional elements of a latch construction of our invention, thereby reducing to a minimum

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the special parts required to produce the novel lock of the present invention.

Another object of the invention is to produce a lock provided with a part mounted on the inner door knob by which it may be locked from the inside under normal conditions and released if necessary by manipulation of a part mounted on the outside door knob in which practically all operating mechanism may be produced from stamped and bent sheet metal, thus greatly reducing the cost of manufacture of the lock.

A further object of the invention is to produce a lock of the kind described in which all parts will function satisfactorily without requiring precision alignment of the component parts so that poor carpentry work or variations in thickness of doors on which the lock is to be mounted cannot cause failure of the lock to function properly.

Still further objects and features of the invention will hereinafter appear from the following description taken in conjunction with the accompanying drawings, which illustrate a preferred embodiment of the invention, but it is to be understood that various changes and modifications of parts may be made by those skilled in the art without departing from the scope of the invention as intended to be defined by the appended claims.

In the drawings:

Fig. 1 is an extended longitudinal section through the lock of the invention, drawn to a scale considerably larger than full size, some portions being broken away and others being shown in side elevation.

Fig. 2 is a transverse section on line 2—2 of Fig. 1, portions being shown in side elevation.

Fig. 3 is a fragmentary cross section on line 3—3 of Fig. 1.

Fig. 4 is a cross section on line 4—4 of Fig. 1, some parts being shown in elevation.

Fig. 5 is a perspective view of a casing containing the operative parts of the mechanism, dotted portions showing parts in adjusted positions.

Fig. 6 is a perspective view of an actuating member extending from one door knob to the other.

Fig. 7 is an exploded view showing the component parts of the lock, some of the parts being shown broken through to reduce their length. Some parts are shown in vertical midsection and in elevation.

Fig. 8 is a fragmentary elevational view on

line 8—8 of Fig. 7 of a plate mounted in the outer door knob assembly.

Fig. 9 is a full elevational view on line 9—9 of Fig. 7 showing the inner end of tubular operating stems extending from the door knob assemblies into the casing.

Fig. 10 is a full elevational view on line 10—10 of Fig. 7 of a plate fitted to one shuttle plate to prevent relative movement of two shuttle plates operated by the door knobs.

Fig. 11 is a full elevational view on line 11—11 of Fig. 7 of a shuttle plate operated by the outer door knob.

Fig. 12 is a full elevational view on line 12—12 of Fig. 7 showing a partition plate mounted in the casing and to which one shuttle plate may be locked. In this view the locking shaft shown in Fig. 7 is omitted.

Fig. 13 is a full elevational view on line 13—13 of Fig. 7 showing an operating finger mounted on the locking shaft shown in Fig. 6.

Fig. 14 is a full elevational view on line 14—14 of Fig. 7 showing the shuttle member per se operated by the inner door knob.

Fig. 15 is a full elevational view on line 15—15 of Fig. 7 showing the casing per se in which the shuttle members and locking means are mounted.

Fig. 16 is a fragmentary view on line 16—16 of Fig. 7 showing a plate enclosing the inner door knob assembly.

Fig. 17 is a fragmentary view on line 17—17 of Fig. 7 showing the inside of the inside door knob assembly. Fig. 18 is a detail view showing locking means shown assembled in Fig. 11.

Much of the description of our improved lock which follows will describe parts used in our improved latch set to which reference has been made but additional parts made use of in this invention will be fully described and distinguished.

Referring now to the drawings, the numeral 1 indicates the outer knob and the numeral 2 indicates the inner knob. The knobs are similarly formed, each comprising a shell 1a and 2a rigidly connected to cores 3 and 4 having a squared hole therethrough which is a loose but operative fit with tubular spindles later described.

In the center of each knob is a rotatable part, in the case of the inner door knob 2 the part 5 is formed with a projecting ridge 5a which may be readily grasped between the thumb and forefinger, while in the case of the outer knob the rotatable part 6 is provided with a deep groove 6a extending diametrically across it so that it may be readily turned by the edge of a coin or the like article.

The rotatable parts 5 and 6 are otherwise identical comprising short tubular portions 5b and 6b mounting the rotatable parts in central recesses in the door knobs and held against axial movement therein in any suitable manner, and a U-shaped portion 5c and a similarly shaped portion 6c having one arm of each secured to and turned by the rotatable parts 5 and 6 while the other arm of each extends within the shell of the door knobs and is provided with a slot 5d, 6d extending across the longitudinal axis of the lock for a purpose later made clear.

Each door knob assembly includes the usual escutcheon plate 7 and 8 and ornamental extension pieces 7a, 8a enclosing cores 3 and 4 between the door knobs and escutcheon plates.

The inner door knob assembly is completed by a plate 9 which fits closely in the escutcheon plate 7 and is provided with two tubular stubs 9a arranged on the diameter of plate 9 at distances

from a central hole 9b in the plate. The tubular stubs 9a may be alined with threaded holes in the escutcheon plate 10 to receive lock holding screws later referred to.

The outer door knob assembly is completed by a plate 10 fitting tightly in the escutcheon plate 8 and provided with two interiorly thread stems 10a riveted thereto and positioned to telescope into tubular stubs 9a. The plate 10 also is provided with a center hole 10b alined with hole 9b.

The described construction of the door knob assemblies is effective to firmly clamp them in position on doors of different thickness when holding machine screws, not shown, are inserted through the holes 7a in the inner escutcheon plate into the interiorly threaded stems 10a extending into the tubular stems 9a and drawn up tight.

The latch operating mechanism is contained in a small casing 11 provided with a central hole 11a in its side plate 11b which is toward knob 2 and alined with the holes in plates 9 and 10, and with a slot 11c between the hole 11a and extending toward the end of the casing in the direction of the vertical edge of the door. It should be stated that the casing is oblong in form and arranged with its greater length perpendicular to the vertical edge of the door frame. The longer sides of the casing 5 are parallel and all edges of the side walls lie in a plane parallel to the side plate 11b. A plurality of lugs 11a project from the edges of the casing and take into slots 10c in plate 10 to close the casing.

The casing is divided into two chambers by a partition plate 12 extending parallel to the plate 11b and formed, as shown in Fig. 12, to be substantially the width, at one end, of the inside of the casing. A wide slot 12a is cut in the wide end of the partition plate 12 and a lateral cut out 12b is provided in one side wall of slot 12a. A center hole 12c is provided in the partition plate, and the edges of the plate cut away at 12d to provide a pair of spaces between the edges of the casing and of the partition plate at the end opposite the slot 12a.

An outer tubular stem 13 of square cross section is located in the casing chamber toward the inside knob 2, a double operating cam 13a being carried by the stem 13 and located so as to be movable in a plane parallel to the inner face plate 11b of the casing. The outer end of the stem 13 engages in the square opening in the core held in the inner handle 2.

Between the cam 13a and plate 11b a shuttle plate 14, shown in Fig. 14, is located. This shuttle plate is of the width of the inside of the casing but of lesser length. Side lugs 14a are bent up at right angles to shuttle plate 14 to serve as guides to insure easy sliding movement of the shuttle against the side walls of the casing. The lugs 14a are turned inwardly at about the center of the shuttle plate to form abutments 14b against which act the ends of the double cam 13a carried on the stem 13. A slot 14c is formed in the shuttle plate through which the stem 13 passes, this slot being elongated to permit the shuttle plate to be moved relatively thereto.

At the end opposite lugs 14a spacing lugs 14d are struck out of the plate and bent at right angles thereto and are of the same height as lugs 14a and serve with those lugs to properly space the shuttle plate to insure its free movement in the casing. At the end of the shuttle plate sides a pair of fingers 14e are struck up at right angles and project through and beyond the spaces pro-

vided by cut away portions 12d of the partition plate.

A pin 15 is riveted to the shuttle plate 14 to extend through the slot 11c in side plate 11b of the casing and operates a bolt or latch structure 15a, a fragment of which is shown in Fig. 1.

A helical compression spring 16 is arranged between the inner wall of the casing and one of the abutments as shown in Fig. 1, the spring being located in operating position in the manner described in our application already referred to.

A second shuttle plate 17 (Fig. 11) is positioned on the side of the partition plate 12 opposite to shuttle plate 14. Shuttle plate 17 is provided with side lugs 17a providing abutments 17b as in the case of shuttle plate 14. At the end of the plate opposite to lugs 17a spacing lugs 17c are bent at right angles to the plate and are of the same height as lugs 17a thus serving to space the shuttle plate from plate 10, for free movement. At the ends of the sides of plate 17 opposite lugs 17a laterally extending lugs 17d are provided which engage under the forwardly projecting ends of fingers 14e of shuttle plate 14.

An inturned flange 17e is provided across the end of the shuttle plate 17 opposite from lugs 17c and a slot 17f is formed across the shuttle plate immediately below flange 17e.

The shuttle plate 17 is provided with an elongated opening 17g through which passes an outer tubular stem 18 of square cross section carrying a double cam 18a at the end positioned within the casing 11 in position to bear against abutments 17b when the stem is rotated in either direction. The stem extends outwardly through opening 17g and its outer end engages in the squared opening in core 4 of outer door knob 1.

It will be seen by reference to our earlier application that all the parts described thus far and located in the casing 11 may be utilized to assemble the latch described in that application; the parts to be now described are added when it is desired to provide the features of the present invention in a keyless lock.

Two small strips forming a shuttle locking slide 19 and a locking slide retainer 20, shown in Fig. 18, are arranged below flange 17e of shuttle 17 and are held in position thereagainst by bowed spring 21 the ends of which rest upon the backs of the abutments 17b. The shuttle locking slide 19 is formed with a slotted lateral extension 19a extending through slot 17f in shuttle 17. The slot 17f is longer than the extension 19a and the locking slide 19 is of less length than the distance between flanges 17a so that the extension 19a may be slid by means later described back and forth in the slot. Retainer 20 is a close fit between flanges 17a. The locking slide is formed at one end with a V shaped joggle 19b and the retainer 20 with two similar joggles 20a and 20b to hold the locking slide 19 either in locked or unlocked position under the resilient pressure of spring 21. When assembling the parts in casing 11 partition plate 12 is positioned with cut out 12b on the opposite side of the casing to spring 16 and since the partition plate fits against the ends of the casing is held against movement. The movement of the locking slide in one direction engages an edge of lateral projection 19a into cut out 12b thereby preventing movement of shuttle 17 by locking it to the partition plate, and movement of the locking slide in the opposite direction moves the lateral extension clear of cut out 12b and into the slot 12a of the partition plate which slot is

wider than the extension thus freeing shuttle 17 for to and from movement in the casing.

An operating strip 22 utilizable as a locking shaft, Fig. 6, is engaged at each end in the slots 5d and 6d of U shaped portions 5c and 6c turned by rotation of the rotatable parts 5 and 6. The strip passes through the hollow stems 13 and 18 and all other operating parts so far described without contacting them.

To operate the locking slide an operating arm 23, Fig. 13, provided with a slot 23a closely fitting strip 22, is mounted on the strip with its end projecting through the slot in lateral extension 19a. To correctly position the arm 23 on the strip the latter is given a twist at 22a intermediate its length.

It will be observed that the effect of turning the strip by member 5 will serve to lock the door from the inside against operation of the lock by turning the outside door knob 1 but that the locking slide may be released by turning rotatable member 6 fitted in the outer door knob which manner of operation accomplishes basic feature of this invention, however the occupant of the room may still operate the lock by turning the inner door knob since shuttle plate fingers 14e merely move away from lateral projections 17d on locked shuttle plate 17 and the occupant of the room might therefore feel uncertain that he had in fact locked the door against opening by the outer door knob.

To lock shuttles 14 and 17 together so that the inner knob will be held against turning after the member 5a has been turned to locked position, a shuttle locking spacer 24, Fig. 10, is mounted so that upward movement of fingers 14e is prevented. The member 24 is formed as a plate positioned against the outer face of shuttle plate 17. The member 24 is of a width as shown at 24a, extending from side to side of the casing and the depth of this wide portion is such as to provide shoulders 24b fitting over the projecting ends of fingers 14e, thus when shuttle 17 is locked against movement shuttle 14 is also locked and neither handle can be turned until the lock is released by turning strip 22 by operating either rotatable member 5 or 6.

It is pointed out that all operating parts have an easy fit with one another so that considerable misalignment of parts is permissible, without deleterious effect on the functioning of the lock.

We claim:

1. A keyless lock having an inner door knob assembly, an outer door knob assembly, tubular cores secured to each door knob, separate operating stems engaging with said cores, a casing intermediate said door knob assemblies, a pair of shuttle plates arranged in said casing and guided for movement in parallel planes to one another, one being operated by one stem and the other shuttle plate by the other stem, the latch of the lock being directly operated by one shuttle plate and indirectly by the other shuttle plate through the first mentioned shuttle plate, locking means comprising an operable member mouned on each door knob assembly; a locking and unlocking member extending between and engaged by the operable members; a stationary plate positioned in said casing between said shuttle plates; and locking means carried by one of said shuttle plates and operated by the operable member mounted on one door knob to lock said shuttle plate carrying the locking means to the stationary plate and prevent operation of the lock by the other door knob until release

of said locking means by actuation of said operable member mounted on either door knob assembly.

2. A keyless lock as set forth in claim 1 and in which said operable members are mounted in the center of each door knob, the member mounted in the inner door knob being actuated by the fingers while the member in the outer door knob cannot be operated without the use of an instrument.

3. A keyless lock as set forth in claim 2 having tubular operating stems and in which the locking and unlocking member is arranged to extend through said tubular stems and parts secured to the operable members in each door knob effective to rotate the locking and unlocking member.

4. A keyless lock as set forth in claim 2 having tubular operating stems and in which the locking and unlocking member comprises a flat strip arranged to extend through said tublar stems, and U shaped members having one arm secured to rotatable operable members mounted in each door knob and having a slot in the other arm into which the end of said strip is fitted.

5. A keyless lock as set forth in claim 1 and in which the locking means carried on one shuttle plate comprise a strip guided for and restrained for to and from movement transversely of said plate and having a lateral extension projecting therefrom, a slot in the stationary plate in which said extension is positioned and in which it is free to move with movement of the shuttle plate, a cut out in the side wall of the slot into which said extension may be moved to lock the shuttle plate against movement relatively to the stationary plate; and means carried by the locking and unlocking member effective to move said strip into locked and unlocked position.

6. A keyless lock as set forth in claim 5 and in which the lateral extension of said strip is provided with an opening, an operating arm secured on the locking and unlocking member projecting into said opening and being effective to displace the strip when the member is actuated.

7. A keyless lock of the kind described having locking means comprising an outer knob, a member held against axial movement on said knob but rotatably mounted thereon; an inner door knob, a member held against axial movement on said inner door knob but rotatably mounted thereon; a locking and unlocking member extending between said rotatably mounted members; a casing intermediate said door knobs; a stationary plate mounted in said casing and dividing said casing into two compartments; a

first shuttle plate having projecting abutments thereon, mounted for movement in a plane parallel to said stationary plate; a stem rotated by said inner door knob projecting into the casing; a cam secured to the end of the stem within the casing and engageable against said abutments to displace said shuttle plate and actuate the latch of said lock; fingers projecting from said shuttle plate past the stationary plate; a second shuttle plate in said casing in the second compartment, lateral extensions of said second shuttle plate engaging below the fingers of the first shuttle plate; abutments projecting from the face of the second shuttle plate; a shuttle locking spacer plate having portions fitting between the projecting fingers of the first shuttle plate and the abutments projecting from the second shuttle plate and effective to cause simultaneous movement of both shuttle plates; a stem operable by the outside handle extending into said casing; a cam carried by the end of said stem within said casing and engageable with the abutments on said second shuttle plate, the construction being such that the lock is operable by turning either door knob; and means mounted on said second shuttle plate effective to lock said second shuttle plate to said stationary plate; and an operative connection between the locking and unlocking member and said locking means.

8. A keyless lock as set forth in claim 7 and in which said locking means mounted on the second shuttle plate comprise: a reciprocable slide; a laterally projecting flange of said shuttle plate guiding said slide; a bowed spring having its ends supported on the back of said abutments and effective to resiliently hold said slide against the flange; a locking bar held against to and from movement on said shuttle plate and arranged between said spring and the slide, and cooperating configurations on said locking bar and slide effective to retain the slide in locked and unlocked position; and an arm secured to said locking and unlocking member and extending into operative engagement with said slide.

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