

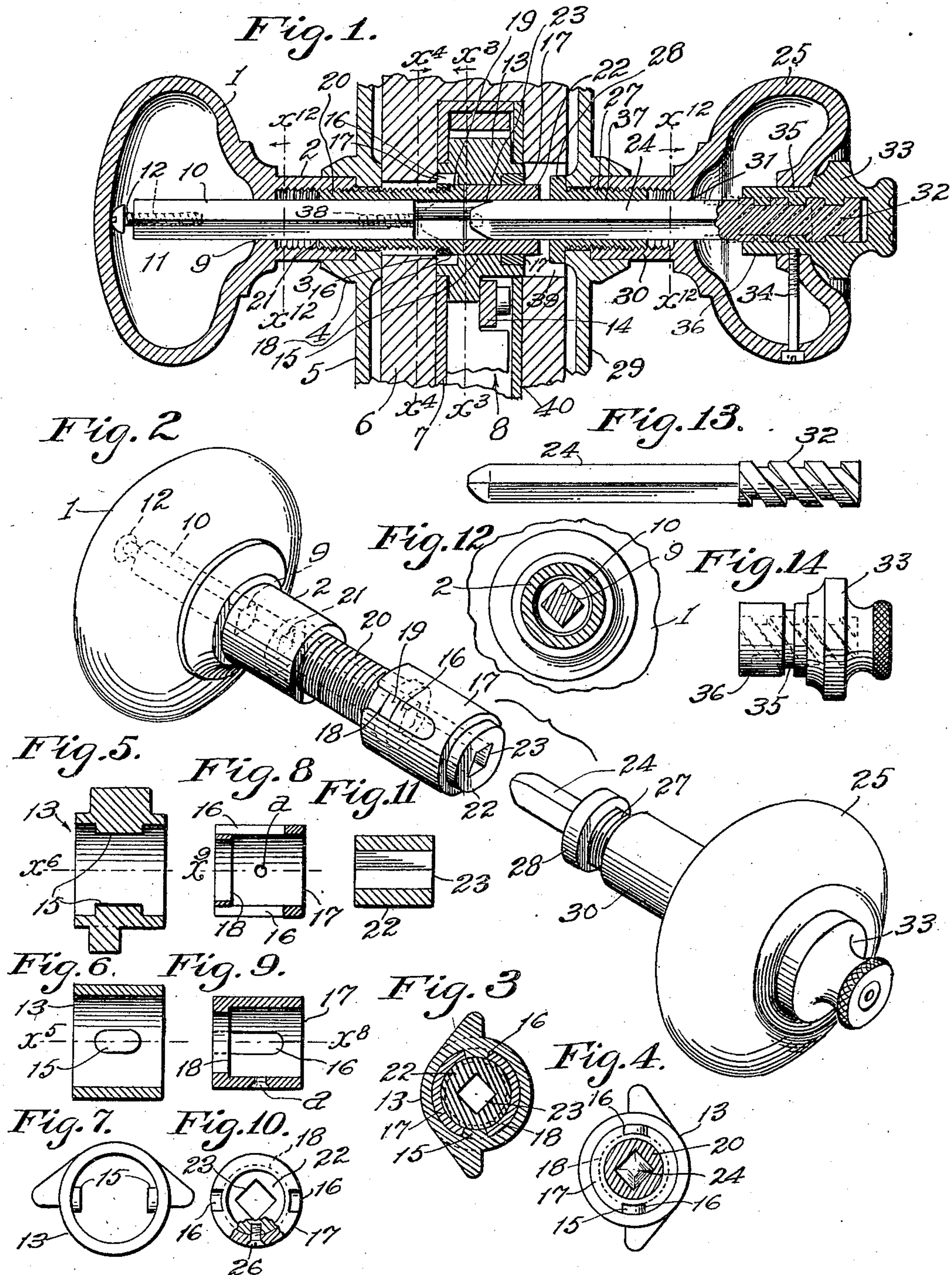
W. H. THOMAS.

KNOB LOCK.

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934,702.

Patented Sept. 21, 1909.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## KNOB-LOCK.

934,702.

Specification of Letters Patent. Patented Sept. 21, 1909.

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*To all whom it may concern:*

Be it known that I, WILLIAM HARRY THOMAS, a citizen of the United States, residing at Whittier, in the county of Los Angeles and State of California, have invented a new and useful Knob-Lock, of which the following is a specification.

An object of this invention is to provide a novel device for door-locks whereby the knobs will be secured to the door without the use of any exposed screws except such as may be employed for fastening the inside escutcheon to the door; and in which the external knob is positively secured against withdrawal by means wholly concealed and inaccessible from the outside of the door.

Another object is to provide readily and accurately adjustable means for securing the knobs to the lock in doors of various thicknesses, thus to avoid any looseness or play of the knobs or spindle, and doing away with all washers.

Another object is to provide means operable from the inside of the door to instantly and readily free the outside knob from operative engagement with the lock mechanism, thus to prevent the use of such knob for drawing the latch-bolt; and to provide for readily and conveniently connecting the knob with the lock mechanism so that the latch may be drawn by turning the outside knob.

The invention is applicable in any form of door-lock provided with a latch-bolt, and is especially desirable in doors designed to be entered by means of a latch-key.

Other objects are cheapness, simplicity and attractive appearance.

Further objects and advantages may appear from the subjoined detailed description.

I do not limit the invention to any specific form of construction.

The accompanying drawings illustrate the invention in the form at present deemed most desirable.

Figure 1 is a fragmental perspective view of a lock embodying this invention and mounted in a door, a fragment of which is shown. Fig. 2 is a perspective view of the outside and inside knobs detached from each other, and omitting the lock and latch mechanism, the escutcheon plates and the door. The hub-coupling and spindle-socket are shown. Fig. 3 is a section on line  $x^3$ , Fig. 1, showing

ing the lock-hub with its coupling and spindle-socket on the plane indicated by  $x^3$ . The other parts of the lock are omitted. Fig. 4 is a section on line  $x^4$ , Fig. 1, showing the lock-hub in end elevation and omitting the door, the lock-case, and other parts of the lock. Fig. 5 is an axial section of the lock-hub on the same plane as Fig. 1 indicated at  $x^5$ , Fig. 6, and omitting its coupling and spindle-socket. Fig. 6 is an axial section of the lock-hub on line  $x^6$ , Fig. 5. Fig. 7 is an end elevation of the lock-hub. Fig. 8 is a section of the hub-coupling on same plane as Fig. 1. Fig. 9 is an axial section of the hub-coupling on line  $x^9$ , Fig. 8. Fig. 10 is an end elevation of the hub-coupling with the inner spindle-socket fastened in place. The lower portion of the view is broken to expose the fastening. Fig. 11 is a section of the inner spindle hub-socket on same plane as Fig. 1. Fig. 12 is a fragmental view in section at  $x^{12}$ , indicated on either side of Fig. 1. Fig. 13 is a view of the reciprocating spindle-section detached. Fig. 14 is a view of the knob-nut to operate said spindle-section.

1 is the outside knob provided with an internally-threaded stem 2 having a cylindrical portion seated in a circular seat 3 in a boss 4 of the outside escutcheon 5 which is fastened by the usual means, not shown, to the door 6 in which the mortise lock-case 7 containing the usual or any form of lock-mechanism indicated in a general way at 8, is mounted in the usual way. Said outside knob 1 is provided with an angular seat in the form of an orifice 9 to receive a spindle section 10 and with a cavity 11 to receive said spindle section when the same is inserted through the stem 2 and the angular seat 9, thus accommodating a considerable length of spindle that may be adjusted in or out as desirable for applying the lock and knob to doors of different thicknesses. Said spindle-section may be provided with an adjusting screw 12 screwed into the end of the spindle and adapted to engage the inside wall of the cavity of the hollow knob 1, thus to determine the point at which the inner end of the outer spindle-section 10 will stand when the spindle is fully inserted into the knob. The lock-hub is composed of three pieces, the outer member 13, the hub-coupling 17, and a socket 22, which when assembled are adapted to connect the spindle



for operating the hub-lever 14 of the lock. The element 13 is provided internally with means in the form of one or more oblong lugs 15 to engage in slots 16 of said hub-coupling 17 which has a cylindrical bore and is provided with an internal shoulder 18 to engage the head 19 of the externally-threaded sleeve 20 having an axial perforation 21 to fit the angular spindle section 10 which may be inserted therein after the sleeve 20 has been screwed into the internally screw-threaded knob-stem 2.

22 is the inner spindle hub-socket having an axial perforation 23 corresponding to the inner ends of the spindle sections 10 and 24. The socket 22 is fixed against rotation relative to the coupling 17 by suitable means, as a screw 26 inserted through a hole *a* in the coupling and screwed into the socket-piece 22. This construction is provided in order to allow rotation of the outer knob-sleeve 20 relative to the hub 13 at all times except when the angular portion of the spindle 24 is inserted into the axial perforation 21 of said sleeve 20, and yet to allow the spindle 24 to at all times operate the lock-hub 13 through the medium of the socket-piece 22, the screw 26, the coupling 17, and lugs 15 engaging in the slot 16 of the coupling. The shoulder 18 prevents the sleeve 20 from being withdrawn outwardly from the lock-hub 13 which is held in place by the lock-case 7.

27 is an externally-threaded sleeve provided with a head 28 to engage the inside of the inner escutcheon 29 and screwed into the hollow cylindrical internally-threaded stem 30 of the inner knob 25 which is provided with an angular seat in the form of an orifice 31 through which the spindle 24 extends so as to be nonrotatable relative to the inner knob 25 in the same manner that the spindle section 10 is nonrotatable relative to the knob 1.

The spindle section 24 has a screw-threaded portion 32 at its outer end, and is operable by a nut 33 extending axially into the hollow knob 25 and rotatably connected with said knob by means of a stop in the form of a screw 34 screwed into a portion of said inner knob and extending into an annular groove 35 which extends around the inner cylindrical portion 36 of the nut 33, so that said nut is rotatable relative to the hollow knob 25 and to the spindle section 24, whereby when the nut 33 is rotated independently of the knob 25, it will drive the spindle 24 endwise first in one and then in the other direction, as the case may be, for the purpose of inserting the angular inner end of the inner spindle section 24 into the angular axial perforation 21 of the outer spindle-sleeve 20, thus to rotatably connect the outer knob with the spindle-socket 22 so that rotation of the outer knob will cause rotation of

the lock-hub 13, thus to operate the hub-lever and withdraw the latch-bolt, not shown.

The sleeve 27 is provided with an angular longitudinal perforation 37 through which the inner spindle 24 extends and moves axially under the impulse of the nut 33. The inner end of said spindle 24 is preferably tapered so as to readily insert into the axial perforations of the hub-socket 22 and outer spindle-sleeve 20.

To assemble the lock in the door after the same has been mortised and bored therefor, the lock-case 7 with the lock-mechanism contained therein will be inserted into the mortise, and then the sleeve 20 will be inserted from the inside of the door through the hub 13 and through the outside escutcheon 5 where it will project into the outer knob-seat 3. Then the spindle of the inner knob or any other instrument capable of preventing rotation of the sleeve 20, will be inserted into the axial perforation of said sleeve to prevent the same from turning. Then the outer knob 1 will be screwed onto the outer end of the sleeve 20 until the head of the sleeve is drawn snugly against the shoulder 18 of the hub-coupling 17, and the stem 2 of the knob is snugly seated in the knob-seat 3. Then the outer spindle-section 10 will be inserted into the outer spindle-seat 20 and through the spindle-seat 9 in the knob, and thence into the cavity of the knob. Then the spindle 24 and the nut 33 will be withdrawn from the inner knob 25, the screw 34 being loosened for that purpose, whereupon said inner knob may be fastened in place on the inner escutcheon 29 by inserting the inner spindle-sleeve 27 outward through the escutcheon 29, and screwing the same into the screw-threaded portion of the knob 25 until the head 28 of said sleeve snugly engages the inside of the escutcheon and the knob-stem 30 snugly engages the seat 38 therefor in the inner escutcheon.

The outer connecting member or sleeve 20 is ordinarily constructed of greater length than the inner connecting member or sleeve 27; the purpose being to provide an adjustability of the space between the head 19 and the cylindrical internally-threaded portion of the outer knob 1, which adjustability is not required for the connection of the inner knob to the inner escutcheon. In Fig. 1 dotted lines indicate the position of the ends of the inner spindle-section 24 when the outer knob is connected to draw the latch-bolt, not shown.

The outer spindle-section 10 may be provided with a screw-threaded seat 38, or with any other suitable means by which engagement with an instrument may be had for the purpose of withdrawing the spindle-section 10 from the lock in case it is desired to remove the same from the door. Then the in-



ner escutcheon may be fastened in place, and thereupon the spindle 24 may be inserted through the knob 25 and sleeve 27 and into the hub-socket 22. Then the nut may be  
 5 again fastened in place by tightening the screw 34, whereupon the spindle 24 may be inserted into and withdrawn from the angular axial perforation of the sleeve 20 by rotating the nut 33.

10 It is to be understood that the angular formation of the spindle-sections 10 and 24, and the angular seats and perforations 9, 21, 23, 31 and 37, may be of any desirable or convenient form or character; the purpose  
 15 being simply to prevent relative rotation of the parts connected by the spindle-sections. Said seats, perforations and spindle-sections may be square, hexagonal, triangular, elliptical, oval, or of any other cross-sectional  
 20 form requisite for the purpose.

The knobs may be removed from the escutcheon-plates without dismantling the lock by simply loosening the screw 34 to release the nut 33, whereupon said nut and  
 25 its spindle-section 24 may be withdrawn. Thereupon an instrument may be inserted through the knob 25, the sleeves and the hub, into a screw-threaded hole 38 provided in the outer spindle 10, whereupon the outer  
 30 spindle 10 may be withdrawn. Then the spindle-section 24 or some like instrument may be inserted into the member 20 to prevent the same from rotating, while the outer knob 1 is unscrewed from the end thereof.  
 35 Then the spindle-section 24 may again be withdrawn and some instrument, not shown, provided at its end with an angular portion to prevent rotation of the member 27, may be inserted through the knob 25 and into  
 40 the member 27; the instrument being so constructed as not to interfere with the rotation of the knob 25 after the instrument has been inserted. Then said knob 25 may be unscrewed from the member 27 while such  
 45 member is held from rotation by such instrument, not shown. Thus both knobs may be removed by a person having access to the inside of the door while the removal of either knob is impossible to a person not having  
 50 such access.

To dismantle the lock, the inner escutcheon may be first removed, thus withdrawing the spindle-section 24 from the hub, whereupon the hub-coupling 17 and its bushing or  
 55 spindle-socket 23 may be withdrawn from the main body of the hub 13, and then the spindle-section 10 may be withdrawn by any suitable instrument, and the member 20 may then be held against rotation while the outside knob is unscrewed therefrom. Thereupon the member 20 may be withdrawn outward through the hub and the boring in the door and the orifice 39 in the door, thus leaving the lock-case free to be withdrawn from  
 65 its mortise 40.

The knobs are reversible so that they may be applied to doors opening to the right and left; the sectional hub being so constructed that all that is necessary to reverse the lock so as to reverse the knobs is simply to withdraw the coupling 17 with its bushing 23 and insert it from the other side of the door. Then the knobs may be fastened in place as before except that they are on the opposite sides of the door from that shown in Fig. 1. Then the spindle 24 may be inserted into and withdrawn from the member 20, thus locking and unlocking the knobs relative to each other.

I claim:—

1. The combination with a hub comprising an outer member and a hub-coupling having an internal shoulder and an angular spindle-socket, of a knob, a member rotatably mounted in said hub and provided with a head to engage said shoulder and nonrotatably connected with the knob, and a spindle-section nonrotatably connected with the hub and adapted to move into and out of engagement with said member to rotate the knob and to allow the knob to rotate independently thereof.

2. The combination with a hub, of an inner knob, a nut rotatably mounted through the center of the inner knob and held against reciprocation, a spindle slidingly mounted in the hub and knob and adapted for rotating the hub, a screw extending from the spindle into the nut, an outer knob rotatably mounted relative to the hub and having a socket to receive the end of the spindle, so that by operating the nut in the inner knob the spindle is reciprocated to connect and disconnect the outer knob from the hub.

3. The combination with a hub, of an inner knob, a nut rotatably mounted through the center of the inner knob and held against reciprocation, a spindle slidingly mounted in the hub and knob and adapted for rotating the hub, a screw extending from the spindle into the nut, a socket rotatably mounted relative to the hub, and an outer knob extensibly mounted on the socket, so that by operating the nut in the inner knob the spindle is reciprocated to connect and disconnect the outer knob from the hub.

4. The combination with a hub, a knob rotatable relative thereto, another knob, a spindle connecting said other knob to the hub to prevent relative rotation therebetween, the same being provided with a screw-threaded portion and a nut on said screw-threaded portion and carried by said other knob and adapted to move the spindle to alternately connect and disconnect the hub and said first-named knob.

5. A knob-lock comprising a hub, a spindle slidingly and non-rotatably mounted in the hub, a screw upon the outer end of the spindle, an inner knob nonrotatably mounted



ed upon the spindle, a nut extending through the center of the inner knob and rotatably mounted and held against reciprocation and screw-seated upon the spindle, a socket rotatably mounted relative to the hub and adapted to receive the spindle nonrotatably, the inner end of the spindle being beveled so as to find its way into the socket; an outer knob adjustably and nonrotatably mounted upon the socket, so that by manipulating the nut in the inner knob the spindle may be reciprocated to connect and disconnect the outer knob to the hub.

6. The combination with a knob, of a nut mounted to rotate in said knob, a stop to prevent endwise movement of the nut, and a spindle nonrotatably connected with the knob and provided with a screw-threaded portion for operation by the nut.

7. The combination with a lock-hub pro-

vided with one or more internally-projecting lugs, of a coupling provided with an internal shoulder and with longitudinal slots to receive said lugs, and inserted in said hub, a sleeve provided with a head in said coupling and engaging said shoulder, a socket-piece inserted in the coupling, means securing the socket-piece in the coupling, and a spindle movable endwise in the socket-piece to engage and disengage the sleeve to connect and disconnect the sleeve and hub to prevent and to allow relative rotation of said hub and sleeve.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 22d day of January, 1908.

W. H. THOMAS.

In presence of—

JAMES P. TOWNSEND,

M. BEULAH TOWNSEND.