

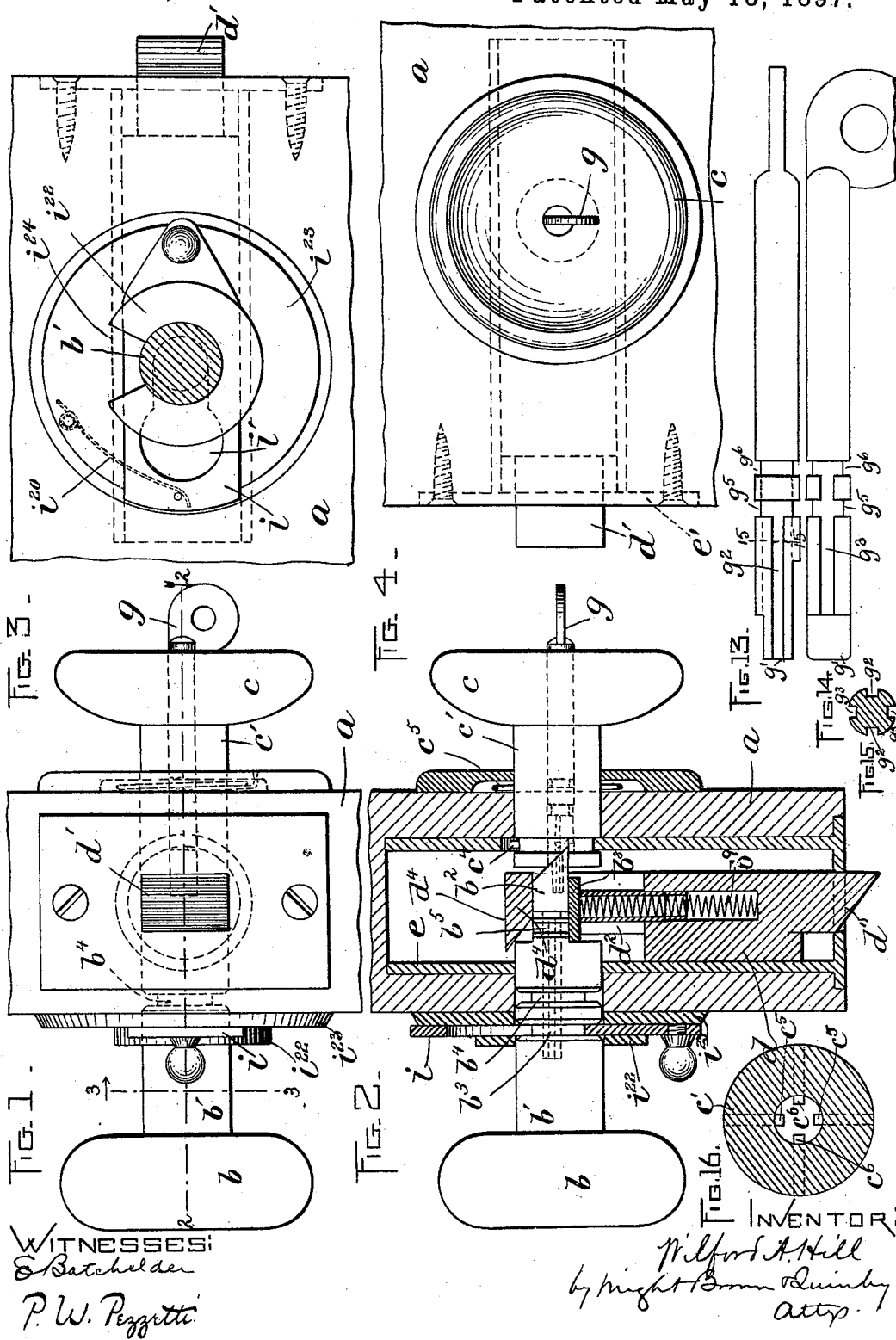
(No Model.)

2 Sheets—Sheet 1.

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KNOB LOCK.

No. 582,917.

Patented May 18, 1897.



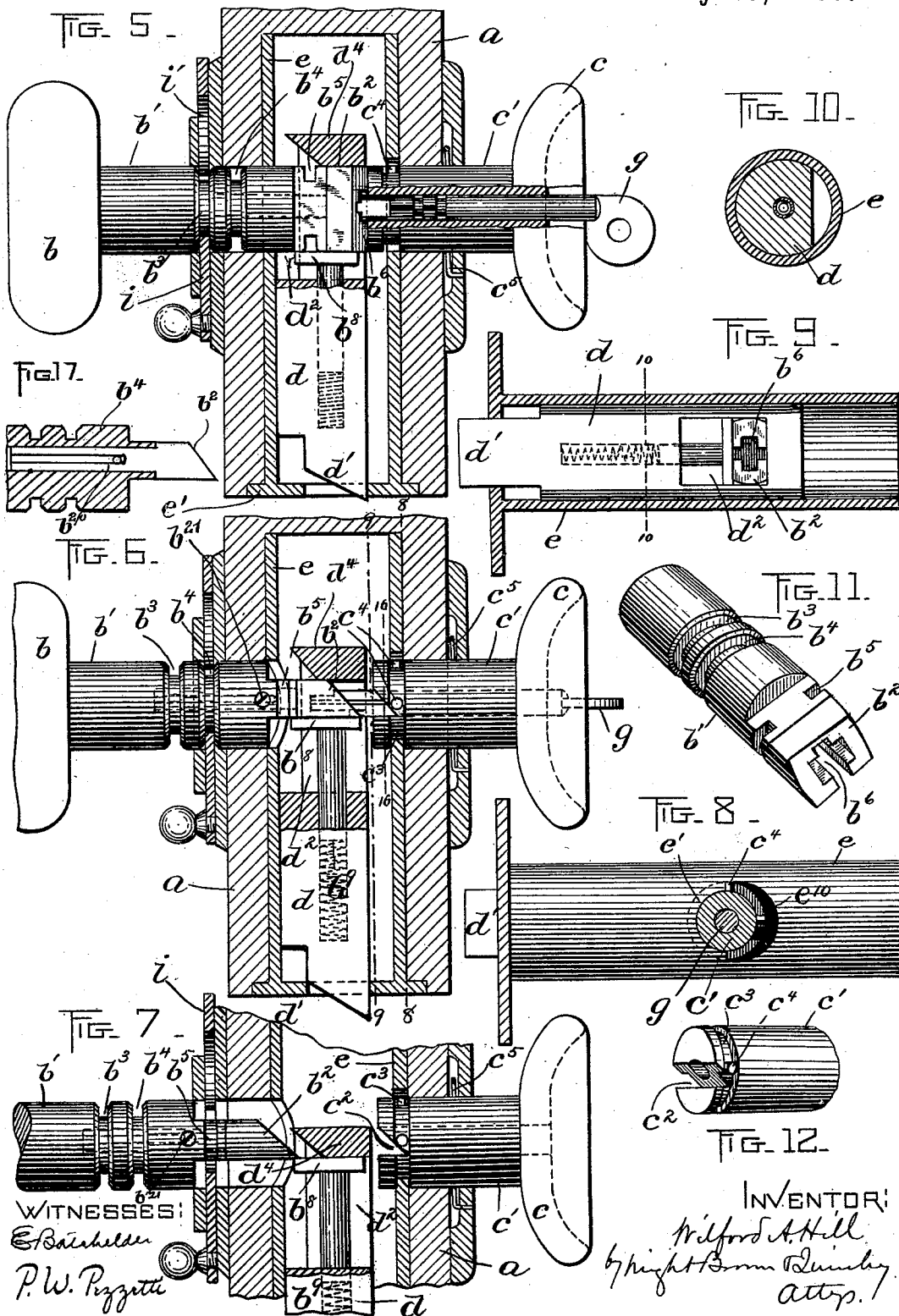
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UNITED STATES PATENT OFFICE.

WILFORD A. HILL, OF WALTHAM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOHN C. MILLER, OF MELROSE, MASSACHUSETTS.

KNOB-LOCK.

SPECIFICATION forming part of Letters Patent No. 582,917, dated May 18, 1897.

Application filed January 11, 1897. Serial No. 618,714. (No model.)

To all whom it may concern:

Be it known that I, WILFORD A. HILL, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Knob-Locks, of which the following is a specification.

This invention relates to a combined latch and lock the locking-bolt of which is operated by two knob-shanks, an outer and an inner, the shanks being separable and adapted to interlock, so that both will operate in unison and the rotation of either shank by its knob will retract the bolt, or to be separated, so that the rotation of only the inner knob and its shank will retract the bolt, the outer knob and shank being provided with a keyhole for the reception of a key which under certain conditions is adapted to retract the bolt when the outer knob is inoperative.

The invention consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 is a view of a portion of a door fitted with my improved lock. Fig. 2 is a horizontal sectional view of the same on the line 2 2 of Fig. 1. Fig. 3 is a transverse sectional view on the line 3 3 of Fig. 1. Fig. 4 is an end view showing the outside knob and the key inserted therein. Figs. 5, 6, and 7 are vertical sectional views showing the different relative positions of the parts. Fig. 8 is a section on the line 8 8 of Fig. 6. Fig. 9 is a section on the line 9 9 of Fig. 6. Fig. 10 is a section on the line 10 10 of Fig. 9. Figs. 11 and 12 are detail perspective views of the two knob-shanks. Figs. 13 and 14 represent views of the key. Fig. 15 represents a section on line 15 15, Fig. 13. Fig. 16 represents a transverse section of the outer knob-shank, taken on the line 16 16, Fig. 6. Fig. 17 represents a detached view of the clutch member of the inner knob-shank.

In the drawings, *a* represents a door to which my improved mechanism is applied, and *b* *c* represent the inner and outer knobs, attached, respectively, to shanks *b'* and *c'*. The inner shank *b'* is movable longitudinally and is provided with a series of grooves *b³* *b⁴* *b⁵*, each adapted to engage a movable locking-plate *i* on the inner side of the door, said plate being

preferably adapted to slide on the inner knob-rose and having a slot *i'*, which permits its movement into and out of engagement with either one of said grooves. The shank *c'* is journaled to rotate without provision for end-wise movement, and is provided with a longitudinal keyhole adapted to receive a key *g*. The inner ends of the two shanks are provided with interlocking clutch members, the shank *b'* having a wedge-shaped clutch member the face *b²* of which is inclined relatively to the axis of the shank and is provided with a recess *b⁶*, adapted to receive and fit the inner end of the key *g*, so that when the key is inserted in said recess and rotated it will rotate the shank *b'*. The clutch member of the shank *c'* is here shown as a notch or recess *c²*, formed to receive the apex of the wedge-shaped clutch member on the shank *b'*.

d represents the locking-bolt, which has a beveled outer portion *d'*, projecting through the edge of the door. Said bolt is movable longitudinally in a casing *e*, which is preferably cylindrical and is inserted in a circular mortise formed in the door, the casing being affixed to the door by screws passing through a flange on the outer end of the casing. The bolt *d* has an opening *d²*, which receives the wedge-shaped coupling member *b²*, and is provided in said opening with a spring-pressed follower *b³*, which is caused by a spring *b⁴* to bear yieldingly against one side of the wedge-shaped member *b²*, as indicated in Fig. 2. The rear portion *d⁴* of the bolt *d*, constituting the rear wall of the opening *d²*, is yieldingly pressed against the wedge-shaped member *b²* by the spring *b⁴*, the bolt being thus yieldingly projected as far as the wedge-shaped member *b²* will permit.

The follower *b³* and its spring *b⁴* are supported by the bolt *d*, so that when the bolt is removed the follower and spring remain connected with it, the operation of separating and assembling the parts of the lock being thus simplified.

The key *g* is provided with a flat-sided inner end portion *g'*, adapted to fit the recess *b⁶* in the inner shank, so that when the key and recess are engaged the rotation of the key will rotate the inner shank. The key is also provided with longitudinal grooves *g²* *g²* and

$g^3 g^3$ and with peripheral grooves $g^5 g^6$, the grooves g^2 extending from the inner end of the key to the groove g^5 , as shown in Fig. 13, while the grooves g^3 extend to the groove g^6 , as shown in Fig. 14.

The outer shank c' is provided with two studs $c^5 c^5$, Fig. 16, arranged to coincide with and enter the grooves g^5 , and with two studs $c^6 c^6$, arranged to coincide with the groove g^6 when the inner shank b' is in the position shown in Fig. 6. The studs c^5 also coincide with and enter the longitudinal grooves g^5 and the studs c^6 the longitudinal grooves g^2 when the key is being inserted. Said studs and longitudinal grooves therefore prevent the key from being turned until its grooves $g^5 g^6$ coincide with the studs $c^5 c^6$, the grooves $g^5 g^6$ then permitting the rotation of the key. When the inner shank is in its inner position, (shown in Figs. 1, 2, and 5,) the key cannot be inserted far enough to bring the grooves $g^5 g^6$ into coincidence with the studs $c^5 c^6$. Hence the key cannot be turned until the inner shank is moved to the position shown in Fig. 6, the grooves $g^5 g^6$ then coinciding with the studs $c^5 c^6$. It will be seen that the grooves in the key and the studs in the outer shank require a predetermined position of the key relatively to the shank before the key can be turned, and therefore provides for the desired individuality of each lock and key, a slight variation in the arrangement of the studs in two different locks preventing the same key from operating both, it being necessary that the arrangement of the peripheral grooves in the key conform exactly to the arrangement of the studs in the outer shank.

The operation of the described mechanism is as follows: When the inner shank b' is pushed inwardly and engaged with the outer shank c' , as shown in Fig. 2, a rotation of either knob will cause the retraction of the bolt d , the coupling member b^2 of the inner shank being oblong in cross-section, so that a quarter-rotation of the shanks will retract the bolt, as indicated in Fig. 5. When the inner shank is drawn outwardly to the position shown in Fig. 6, the clutch members of the two shanks are separated, so that the rotation of the outer knob will not affect the bolt. The bolt can be retracted, therefore, from the outside of the door only by the use of the key g , which can only be used when the inner shank is in this position, as above described. When the inner shank is moved to the extreme outward position, (shown in Fig. 7,) its clutch member b^2 permits the bolt d to be projected and brings its inner end portion d^1 into a position to obstruct the keyhole, so that the bolt cannot be retracted from the outside by any means, the portion d^1 constituting a stop preventing the insertion of the key or any other instrument into the recess b^6 . It will be seen that when the keyhole is thus obstructed the bolt is at its maximum projection and effectively fastens the door. The studs $c^5 c^6$ in the outer shank serve

also to so contract the key-opening through said shank as to prevent the insertion of an effective wire or other appliance intended to fraudulently unlock the door. A spring c^3 is connected with the outer shank c' and normally holds a pin c^1 on said shank against a stop-shoulder e' on the casing e , as shown in Fig. 8. The casing has a segmental slot e^{10} at one side of the shoulder e' , which permits the shank c' to make a half-rotation. The shoulder e' projects into a groove c^3 in the shank c' and prevents longitudinal movement of said shank and its removal from the door. The inner shank should be provided with suitable stops to limit its outward and inward movements. I prefer to make the coupling member b^2 on the inner shank in a separate piece and connect it adjustably with said shank to compensate for variations in the thickness of different doors. In Fig. 17 I show the said member b^2 provided with a split stem b^{20} , adapted to be engaged and held at various longitudinal adjustments by a set-screw b^{21} , Fig. 6, which may have a conical inner end adapted to enter the slot in the stem b^{20} and spread the latter. The locking-plate i may be provided with a spring i^{20} , Fig. 3, adapted to yieldingly hold said plate in its operative position. The said locking-plate slides in a grooved boss i^{22} , formed on a plate i^{23} , affixed to the door. Said boss is preferably cut away at one side, forming an opening i^{24} , Fig. 3, through which the grooves in the inner shank may be seen when said shank is being adjusted.

I do not limit myself to the employment of interlocking clutch members on the shanks $b' c'$, as the said members may be dispensed with in case it is desired to operate the lock only by means of a key.

I claim—

1. A door lock and latch comprising knob-shanks having interlocking clutch members at their inner ends, the inner shank being longitudinally movable, and the outer confined against longitudinal movement and provided with a keyhole; a bolt directly engaged with the inner shank, and free from direct engagement with the outer shank; and means for engaging the inner shank with the door in different positions, namely, first, when interlocked with the outer shank, so that rotation of either knob will retract the bolt, and secondly, when separated from the outer shank, so that rotation of the outer knob will not retract the bolt, the inner shank having a key-engaging cavity coinciding with the keyhole in the outer shank, so that when the inner shank is in its second position it may be rotated to retract the bolt by a key inserted in the outer shank.

2. A door lock and latch comprising an inner and an outer shank, the inner shank being longitudinally movable and the outer provided with a keyhole, a bolt engaged only with the inner shank, and means for engaging the inner shank with the door in different

positions, one of which makes the bolt operative by a key inserted in the outer shank, while the other makes the bolt inoperative by the key.

5 3. A door lock and latch comprising an inner and an outer knob-shank, the inner shank being longitudinally movable, and the outer confined against longitudinal movement, means for engaging the inner shank with
10 the door in different positions, and a spring-projected bolt engaged with the inner shank and bearing yieldingly against it, the said inner shank being formed so that a longitudinal change of position of the shank effects
15 a longitudinal change of position of the bolt.

4. A door lock and latch comprising an inner and an outer knob-shank, the inner shank being longitudinally movable and the outer confined against longitudinal movement, and
20 provided with a keyhole, said inner shank being formed to permit a varying projection of the bolt, and a stop movable with the bolt and held in position to obstruct the keyhole and prevent the use of the key when the bolt
25 is at its maximum projection; means for engaging the inner shank with the door in different positions; and a spring-projected bolt engaged with the inner shank and bearing yieldingly against it.

30 5. A door lock and latch comprising an inner knob-shank having a series of locking-grooves between its ends and the knob, said inner shank being longitudinally movable; an outer shank confined against longitudinal
35 movement, and having a longitudinal keyhole; a movable locking device or detent adapted to engage either of said grooves to hold the inner shank in different positions; and a bolt yieldingly pressed against the inner
40 shank and projected in accordance with the longitudinal adjustment of the said shank, said bolt having a stop which obstructs the keyhole in the outer shank when the bolt is fully projected.

45 6. A door lock and latch comprising an inner knob-shank having a wedge-shaped clutch member at its inner end and a series of locking-grooves between its ends and the knob, said inner shank being longitudinally
50 movable, an outer shank having a recess to engage said clutch member and a longitudinal keyhole, a locking device to engage said

grooves and hold the inner shank in different positions, and a bolt yieldingly pressed
55 against the wedge-shaped end of the inner shank and projected in accordance with the longitudinal adjustment of said shank, said bolt having a stop which obstructs the keyhole in the outer shank when the bolt is fully
60 projected.

7. A door lock and latch comprising an inner and an outer shank, the inner shank being longitudinally movable and provided with a key-receiving recess, and the outer
65 provided with a keyhole and with studs projecting into the keyhole, means for engaging the inner shank with the door in different positions, and a key having longitudinal and peripheral grooves adapted to coöperate as described with said studs.

8. A door lock and latch comprising an inner and an outer shank having interlocking clutch members at their inner ends, one of said members being longitudinally adjustable to compensate for differences in the thickness of different doors.

9. A door lock and latch comprising an outer and an inner shank, one of said shanks being longitudinally movable, and a bolt having a slot or opening to receive said movable shank and a spring-pressed follower carried by the bolt and located in said opening.

10. A door lock and latch comprising an outer and an inner shank, the former having a series of grooves, a bolt operated by said
85 inner shank, a sliding locking-plate adapted to engage either of said grooves, and a guide for said plate having a slight opening to expose the grooves in the shank.

11. A door lock and latch comprising an
90 outer and an inner shank, the former having a series of grooves, a bolt operated by said inner shank, a sliding locking-plate adapted to engage either of said grooves, and a spring which yieldingly holds the locking-plate in
95 engagement with the inner shank.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 29th day of December, A. D. 1896.

WILFORD A. HILL.

Witnesses:

JOHN C. MILLER,
E. BATCHELDER.