

No. 876,550.

PATENTED JAN. 14, 1908.

B. J. HOFHEINZ.
COMBINATION DOOR LOCK.
APPLICATION FILED DEC. 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

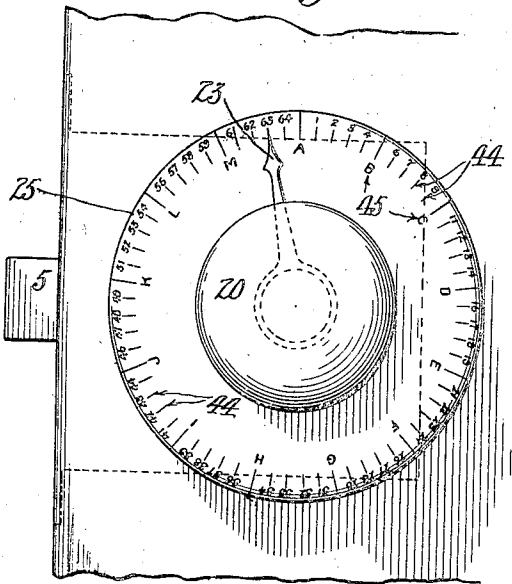


Fig. 2.

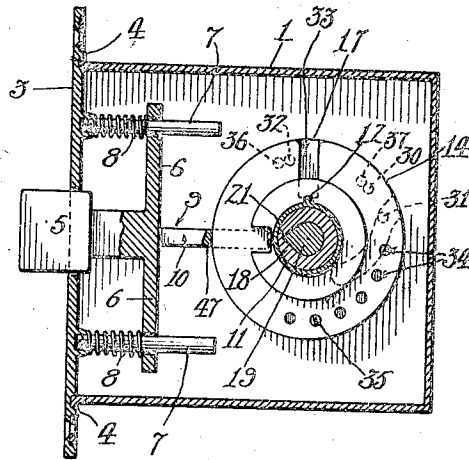


Fig. 3.

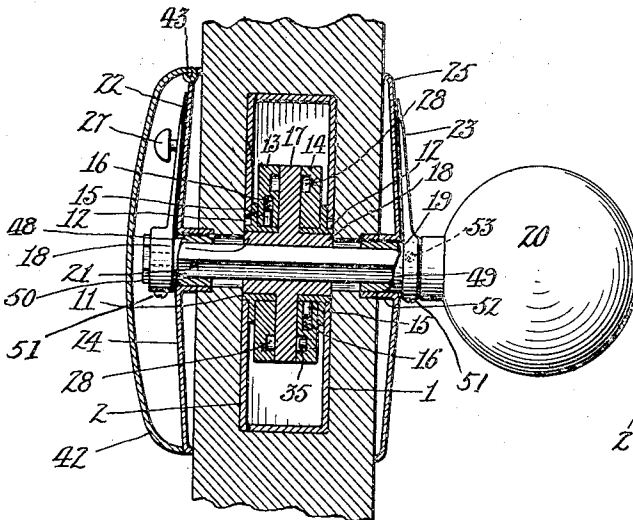
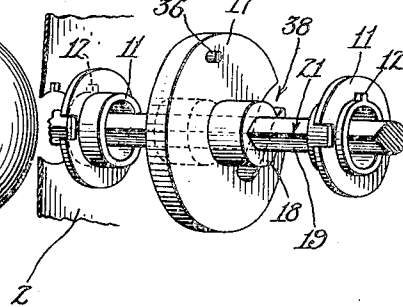


Fig. 4.



Witnesses:—
Frank C. Graham,
Isabel Hall,

Inventor,
Bruno J. Hofheinz.
By
Tourissand Lyon Huetclay & Kings
his Attorneys

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2 SHEETS—SHEET 2.

Fig. 5.

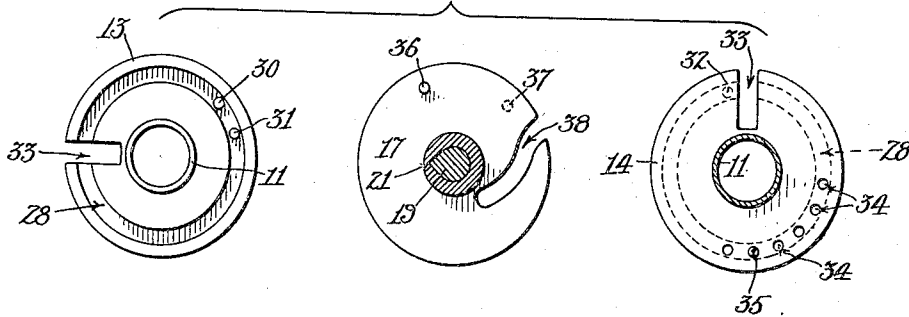


Fig. 6.

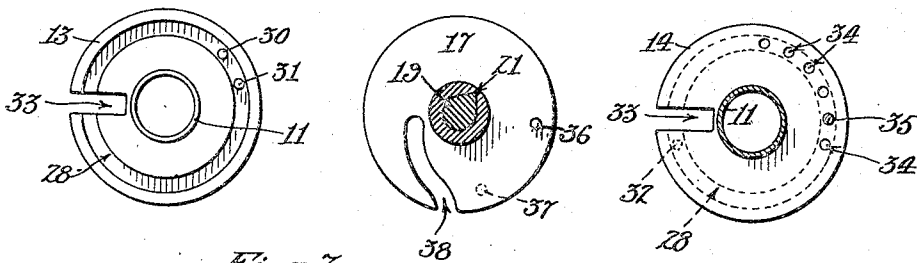


Fig. 7.

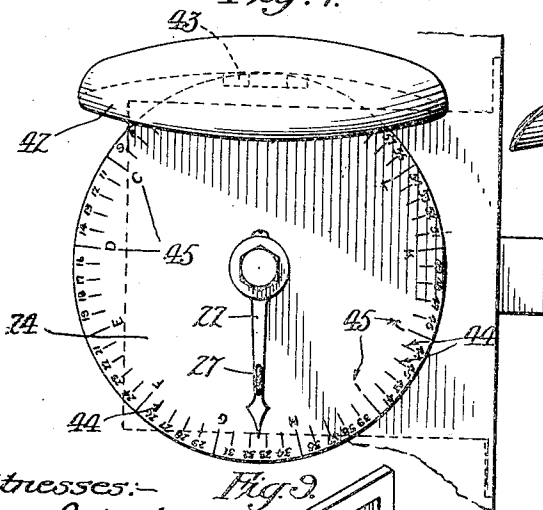
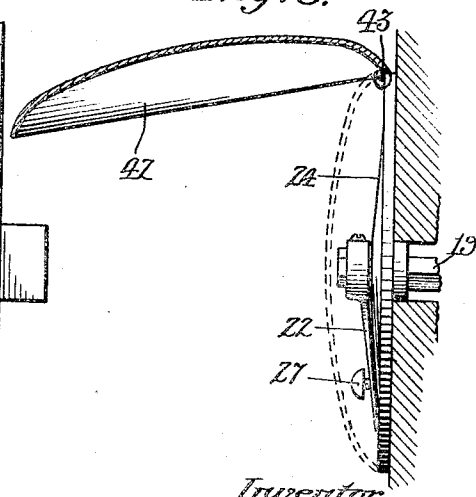
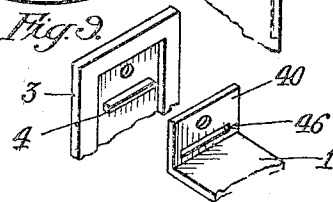


Fig. 8.



Witnesses:-
Frank L. Mahan
Isabel Hall.

Fig. 9.



Inventor,
Bruno J. Hofheinz.
By
Tommie, Dym, Mackley & Knight
his Attorney

UNITED STATES PATENT OFFICE.

BRUNO J. HOFHEINZ, OF LOS ANGELES, CALIFORNIA.

COMBINATION DOOR-LOCK.

No. 876,550.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed December 12, 1906. Serial No. 347,555.

To all whom it may concern:

Be it known that I, BRUNO J. HOFHEINZ, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Combination Door-Lock, of which the following is a specification.

The main object of this invention is to provide a keyless or combination door lock particularly adapted for use in stores and in other places.

A further object of the invention is to provide a lock of this character which will provide for a large number of combinations and therefore comparative safety with a minimum number of parts.

The accompanying drawings illustrate the invention:—

Figure 1 is a front elevation of the lock. Fig. 2 is a vertical section in the plane just outside of the operating tumbler. Fig. 3 is a vertical section on the axis of the lock. Fig. 4 is a perspective view of the main or operating tumbler and adjacent parts. Fig. 5 is a view showing in side elevation the three tumblers separated to show the relative angular position thereof when the first tumbler only has been moved to unlocking position. Fig. 6 is a similar view showing the position of the tumblers when the second tumbler has been brought to unlocking position. Fig. 7 is a front elevation of an index dial formed with a hinged cover. Fig. 8 is a side elevation of the dial showing part of the door in section and showing the cover plate in section and in open position. Fig. 9 is a detail perspective illustrating the attachment of the face plate.

The lock comprises a case formed as a rectangular box member 1 open on one side and at the face plate end, the said side being closed by a cap plate 2 and the said end being closed by a face plate 3 which is secured to the case 1 by upset ribs or projections 4, which extend through transverse slots 46 in flanges 40 extending from the box shaped member 1.

5 designates the bolt, having arms 6, sliding on rods 7 extending inwardly from the face plate, said bolt being retracted by springs 8 which surround said rods and engage said arms. Said bolt has a projection 9 to be engaged and operated by the tumbler means 17 hereinafter described, said projection having a slot or opening 10, forming a bridge 47 at the outer end thereof. The case 1 and cap plate 2 are provided with

holes for the reception of sleeves 11 which are held from turning by means of keys 12. These sleeves serve as non-rotative bearings or supports for the two outer tumblers 13, 14 which are frictionally held thereon by spring brake means consisting of pressure pins 15 therein pressed against the sleeve 9 by springs 16. The central or operating tumbler 17 extends and works between the outer tumblers 13, 14 the said tumblers 13, 17, 14 being mounted end to end in close order or in direct contact and said tumbler 17 is carried by a hub 18 secured to or engaging with the spindle or arbor 19 of the lock, in such manner that when the arbor is turned by its knob 20 or by other means, it will operate this central tumbler. The operating arbor 19 is preferably formed with an angle or ridge 21 along one edge and is provided with index arms or points 22, 23 which, in the rotation of the arbor, pass over the faces of the dials 24, 25 on the inner and outer sides of the door, said dials being suitably marked as hereinafter described, to enable the lock to be operated by any one knowing the combination. The index device 22 is or may be exposed at the inner side of the door and is provided with a manual operating means 27, for example, a pin, on the index arm and having a portion to be grasped by the fingers. At the outside of the door the handle is operated by the knob 20 aforesaid.

The tumblers 13, 14, 17 are provided with interengaging means for controlling the operation of the tumblers in unlocking the lock. For this purpose each of the outer tumblers has an annular groove 28 in its face next to the central tumbler. In the said groove of the outer tumbler 13 are secured two pins or projections 30, 31. In the annular groove 28 of the other outer tumbler 14 is secured a fixed pin or projection 32, and there also are provided in said groove a series of threaded holes 34 for the reception of a shiftable screw pin or projecting member 35, these holes being spaced apart in definite order and representing a certain fraction of one revolution of the operating arbor. Each of the tumblers 13, 14, has a slot or notch 33 extending radially inward to form a passageway for the reception of the projection 9 on the bolt when such tumblers are brought to such unlocked position. The central tumbler has two pins 36, 37, respectively on opposite sides working in the

grooves 28 of the respective outer tumblers and adapted to engage the respective pins on said outer tumblers. Said central tumbler also has a slot 38 extending inward in an obliquely inclined direction to receive and operate the projection 9 of the bolt when the latter has been forced into the slots in the tumblers by means of the bolt retracting springs, as hereinafter described, the opening 10 of projection 9 enabling the tumbler 17 to move into it, and enabling the bridge 47 to work down into the slot 38.

The dials 24, 25 are marked in circular order with graduations or divisions 44 corresponding to definite fractions of a circumference, for example 65 divisions, and indicated by numbers, and at certain intervals around the dials are placed other marks, indicated for example by letters as shown at 45, the distance between the successive letter marks representing a multiple of the distance between the successive number marks. The letter marks are the starting points used in setting or resetting the combination originally, and the numbered marks are used in setting and also in unlocking the lock. At one or both sides of the door or lock, the indicating dial may be provided with a cover consisting of a shell 42 hinged to the dial at 43 so as to be capable of being lifted or turned up, disclosing the internal dial, and in this form a short shaft 48 is used, taking the place of the hub of the knob.

The operation is as follows:—Assuming that the lock is in locked position and that it is desired to open the same, the knob or handle 20 is turned two or more times to the right, thereby gathering the several tumblers by means of the pins on said tumblers, and when the tumblers have all been picked up in this manner, which will be the case after four revolutions, this rotation is stopped when the index arm points to the first number of the combination. This operation leaves the slot 33 in the tumbler 13 opposite to or in register with the projection 9 of the bolt. Pin 37 on tumbler 17 is in contact with pin 30 of tumbler 13 and pin 36 of tumbler 17 is in contact with pin 32 of tumbler 14. The rotation is then reversed, the index arm being turned back to the next number of the combination, the pin 36 on the central tumbler then engaging with the pin 35 on the tumbler 14 to turn the same along with the central tumbler, and when the index arm is brought to the second number of the combination the slot 33 in this tumbler 14 will be in register with the projection 9 of the bolt. The knob may then be turned in the original direction until the third number of the combination is reached, whereupon the outer end of the slot 38 in the central tumbler will be in register with the projection 9 of the bolt, and the bolt springs 8 will

then force the bolt projection 9 slightly into the outer end of the slot, but the shape of the slot is such that the retraction of the bolt by this means is not sufficient to release or unlock the bolt and to unlock the bolt it is necessary to again reverse the movement of the knob, thereby enabling the bolt spring to push the projection 9 down into the slot, and in such operation retract the bolt the outer wall of the oblique slot in the operating tumbler 17 serving in this retraction to positively engage and retract the bolt in case the spring should fail to work to full extent. In the opposite motion of the knob this oblique slot 38 protracts the bolt and then by further operation of the knob in the usual manner the tumblers are disordered and the device thereby locked. It will be noted that in this device there are only three tumblers, but there are four rotative movements, thereby obtaining additional security, for if an unauthorized party were attempting to open the lock he would not be able to do so unless he stopped the device just when the outer end of the slot 38 is brought into register with the bolt projection. If he should turn the knob further the device would be locked and could not be unlocked without beginning the whole operation anew. The indicators on the dial are numbered in reverse direction on opposite sides so as to correspond to the same rotative direction.

The setting of the combination or the resetting thereof is effected by moving the shiftable pin 35 into any one of the series of holes 34 in the tumbler 14, thus determining the movement that is to be made in the operation of the tumbler 17 from a given point. This in itself will give but few combinations, but a large increase in the number of combinations to be obtained is effected by securing the index arms by a screw 51 to the shaft 48 on the arbor, enabling it to be adjusted to any one of the series of lettered starting points, the initial tumbler 13 being at that time set with the slot directed toward a definite point, for example toward the bolt. As an aid in setting the combination or in finding the combination by authorized persons, the arbor 19 preferably has one side formed with an edge or angle 21, as aforesaid, serving as an indicator, this form of arbor also serving to carry with the arbor in its rotation, the operating member 17 which is formed with an opening to fit the arbor. The end of the arbor is covered by a threaded screw 50 which normally conceals the indicating edge, thus safeguarding the lock. The knob is fastened by a screw 53 concealed by the hub of the index arm. The center of the indicating dial is cupped in as at 52 to hold the knob-hub or axle 49. A screw hole for receiving the screw 53 should be provided at each end of the arbor or spindle, to enable the end to be screwed on in this man-

ner. The cover plate serves also as a push plate for the door, particularly when the device is used on a double acting door, the cover plate being thus provided at both sides.

5 What I claim is:—

1. A door lock comprising an operating spindle, an operating tumbler carried by said spindle and having projections on opposite sides, said tumbler also having an obliquely inwardly extending slot, a tumbler rotatably mounted on each side of said operating tumbler and provided with projections to engage the projections of the operating tumbler, and having a radially inwardly extending slot, and a bolt mounted to move radially to and from the spindle and having a projection to engage and work in the slots of the tumblers.

2. A door lock comprising an operating spindle, an operating tumbler carried by said spindle and having projections on opposite sides, said tumbler also having an obliquely inwardly extending slot, a tumbler rotatably mounted on each side of said operating tumbler and provided with projections to engage the projections of the operating tumbler, and having a radially inwardly extending slot, and a bolt mounted to move radially to and from the spindle and having a projection to engage and work in the slots of the tumblers, and spring means for pressing the bolt to force its projection into said slots, the projection of the bolt having a bridge portion to work in the slot of the operating tumbler.

3. A door lock comprising an operating spindle, an operating tumbler carried by said spindle and having projections on opposite sides, said tumbler also having an obliquely inwardly extending slot, a tumbler rotatably mounted on each side of said operating tumbler and provided with projections to engage the projections of the operating tumbler, and having a radially inwardly extending slot, and a bolt mounted to move radially to and from the spindle and having a projection to engage and work in the slots of the tumblers, and dial and index means to indicate the angular position of the lock spindle.

4. A door lock comprising an operating spindle, an operating tumbler carried by said spindle and having projections on opposite sides, said tumbler also having an obliquely inwardly extending slot, a tumbler rotatably mounted on each side of said operating tumbler and provided with projections to engage the projections of the

operating tumbler, and having a radially inwardly extending slot, and a bolt mounted to move radially to and from the spindle and having a projection to engage and work in the slots of the tumblers, and dial and index means to indicate the angular position of the lock spindle, one of the operated tumblers having one of its projections adjustably mounted thereon to change the angular position thereof.

5. In a combination door lock, three tumblers mounted in close order end to end, and separate supporting arbors for said tumblers, the arbors for the two outer tumblers having flanges for holding the tumblers together.

6. In a combination door lock, three tumblers mounted end to end, and separate supporting arbors for said tumblers, and spring brake means frictionally resisting movement of two of the tumblers.

7. In a combination lock, an operating tumbler having an oblique slot, and tumblers operated by the operating tumbler and each having a radial slot, a bolt having a portion directly engaging said tumblers to enter the slots therein, and spring means for pressing the bolt against the tumblers.

8. A combination door lock comprising an operating tumbler having an oblique slot and two tumblers operated by said operating tumbler and having radial slots, said tumblers having projections to control the operated tumblers from the operating tumbler, and a bolt provided with means for pressing against the tumblers, whereby alternate operation of the operating tumbler in opposite directions brings the operated tumblers and the operating tumbler into position with the slots opposite the engaging portion of the bolt, and then, by again reversing the motion, retracts the bolt by operation of the oblique slot in the operating tumbler.

9. A lock case having its face member provided with two inwardly extending rods, a bolt having arms slidably engaging the said rods, and springs surrounding the rods and engaging the arms of the bolt to retract the bolt.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 3rd day of December, 1906.

BRUNO J. HOFHEINZ.

In presence of—

ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.