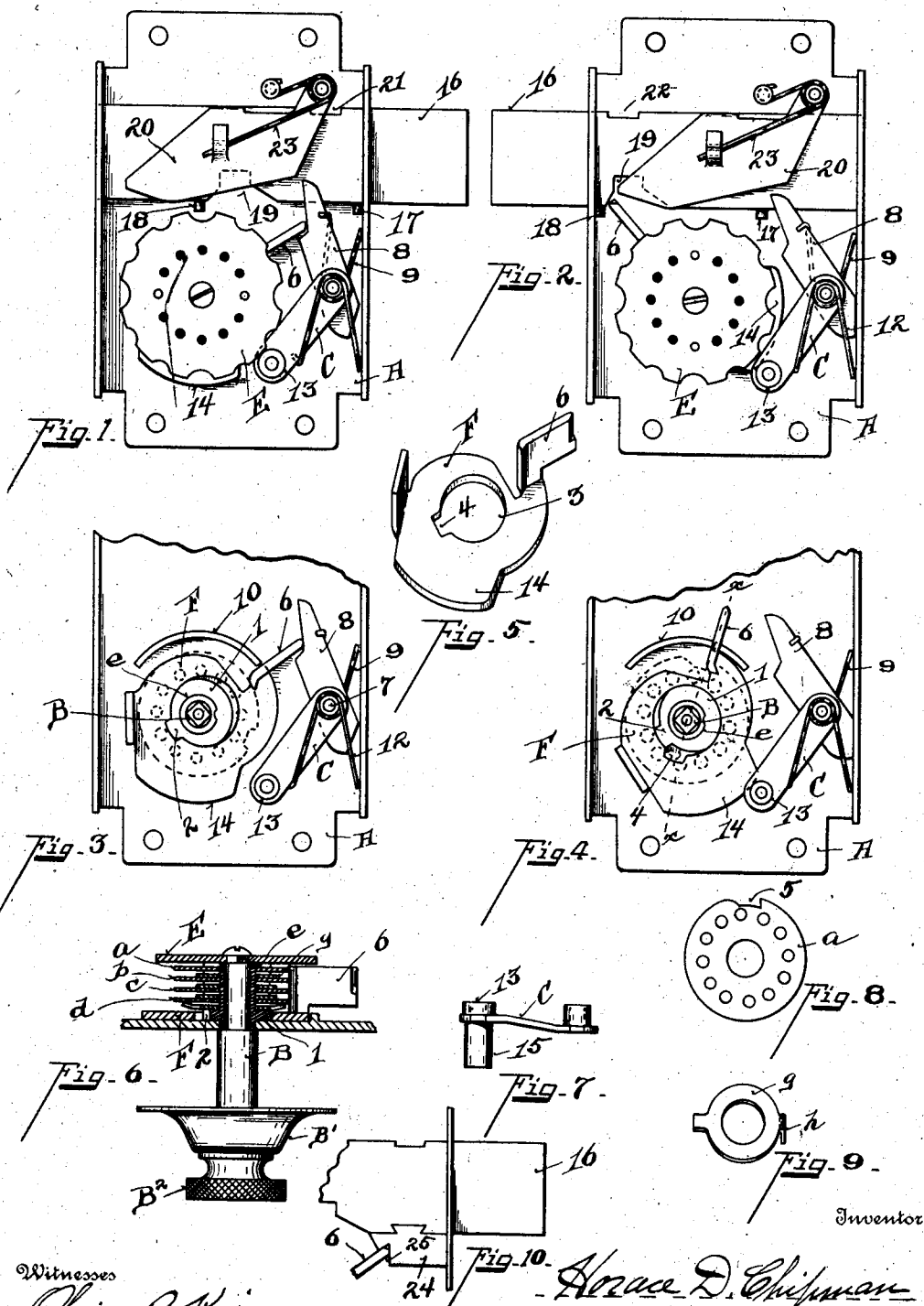


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PATENTED OCT. 30, 1906.

H. D. CHIPMAN.
LOCK.

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Witnesses

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HORACE D. CHIPMAN, OF HOME CITY, OHIO.

LOCK.

No. 834,360.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HORACE D. CHIPMAN, a citizen of the United States, residing at Home City, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Locks, of which the following is a specification.

My invention relates to a permutation-lock.

The object of my invention is to provide a simple and efficient lock with the least possible parts and those parts structurally simple and adapted to fit compactly in the casing.

Another object of the invention is to provide a lock of the class in which no indicating figures are employed on the face of the lock, the indicating being of the click variety.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of the lock with the back plate removed, showing the bolt in locked position and its contained actuating mechanism in normal position. Fig. 2 is a similar view to that of Fig. 1, but showing the bolt in its unlocked position. Fig. 3 is a detailed plan view of the cam-plate in normal position. Fig. 4 is a similar view to that of Fig. 3, showing the cam-plate in partial actuating position. Fig. 5 is a perspective view of the cam-plate. Fig. 6 is a sectional view on line *z z*, Fig. 4. Fig. 7 is a detailed view of the indicator-lever. Fig. 8 is a plan view of one of the tumbler-plates. Fig. 9 is a perspective view of one of the actuating-plates between the tumbler-plates. Fig. 10 is a detailed view of the preferred form of locking mechanism for the bolt.

A represents the supporting-plate; B, the tumbler-shaft journaled therein; B', a shell on the front end of the shaft adapted to be secured to the door, and B² the knob for manipulating the tumbler-shaft. (See Fig. 6.)

a b c d represent tumblers journaled on sleeve *e*, fixed to plate A, within which sleeve the tumbler-shaft journals.

Between each of the tumblers is a transmission-plate *g*, provided with the downwardly depending lug *h*. (See Fig. 9.) E represents an indicating-disk adapted to engage the first of the series of tumblers. Plate E is provided with a series of peripheral notches against which the indicating-lever C tangentially bears. Thus far the construction is substantially the same as that shown

in Patent No. 590,131, granted to me September 14, 1897.

Sleeve *e* is provided with the flange 1, rigidly attached to plate A. The periphery of one-half of said flange describes a circle on sleeve *e* as a center, the other half of the periphery of said flange being cut away, and from this cut-away portion of the periphery there projects a lug 2, equal in length to the full radius of the flange. (See Figs. 3, 4, and 6.) F represents a cam-plate provided with an orifice 3 of a diameter equal to the full diameter of the flange 1 and lug 2, said orifice having a peripheral notch 4, adapted to be engaged by the lug 2. (See Fig. 5.) Plate F is placed on flange 1 as a bearing; but when notch 4 is opposite to lug 2 a spring (to be later described) presses plate F in a radial direction to engage said lug and notch, and thus lock plate F against rotation. The tumblers *a b c d* are provided with notches 5. (See Fig. 8.) Plate F is provided with a radial projection 6, the inner end of which overhangs the peripheries of said tumblers and the outer end of which projection is adapted to engage and throw the bolt. When these tumblers and notches 5 are alined by working the combination, mechanism is provided which throws the plate F laterally, so that the inner end of projection 6 falls into said alined notches and fixes plate F or connects it rotatively with the tumblers and tumbler-shaft, so that by rotating the tumbler-shaft in this position the bolt can be shot. The mechanism for thus shifting plate F is as follows:

7 represents a stud-shaft secured to frame A upon one side of the tumbler mechanism, (see Fig. 3,) upon which shaft is pivoted a spring-actuated depressing-finger 8, receiving tension from spring 9. In the normal position of plate F finger 8 bears against the outer edge of projection 6 and exerts a constant inward radial pressure upon said plate F, so that when said notches 5 are alined the finger 8 forces the projection 6 into interlocking engagement with the tumblers.

It will be noted from Figs. 4, 5, and 8 that the right-hand walls of notches 5 are abrupt and that the inner edge of projection 6 is turned to sharply engage these abrupt walls, so as to securely interlock the tumblers with projection 6 for the unlocking movement, which is in the left-hand direction of rotation. The left-hand walls of notches 5 are inclined outwardly, so that in the locking movement

the tumblers will be disengaged from their interlocking relation with the inner edge of projection 6 at the time the outer edge of projection 6 is brought to rest against the notched end of finger 8 in the position indicated in Fig. 3, the plate F being again shifted on its bearings to interlock lug 2 with the notch 4, and the tumblers can then be freely manipulated independent of the cam-plate F.

10 10 represents a segmental guide attached to plate A. (See Figs. 3 and 4.) It is curved in the arc of movement of projection 6. Projection 6 is notched out on its side adjacent to guide 10. In normal or locked position with lug 2 engaged into notch 4 the unnotched portion of the edge of projection 6 abuts against the right-hand end of guide 10, as shown in Fig. 3, holding plate F against rotation. When the combination is worked and projection 6 drops into the alined notches 5, the notched portion of projection 6 is brought in line concentrically with guide 10, so that in the locking and unlocking movement projection 6 moves in its arc of travel on the guideway formed by the rib 10. C represents an indicator-lever pivoted on stud 7, having a spring 12 for normally pressing the lever toward plate E. 13 represents a roller pivoted to the free end of lever C and engaging the notches in the indicating-disk E.

30 It is desirable to throw out lever C during the unlocking movement, and to accomplish this plate F is provided with a cam-like projection 14, adapted to engage the downwardly-extending stem 15 on the free end of lever C (see Fig. 7) to throw out lever C at the proper time, disengaging the roller 13 from the notches of the indicating-disks E.

35 16 represents the sliding bolt supported by frame A. It is provided with stop-lugs 17 18 for limiting its movements. It is also provided with notch 19, into which the outer edge of projection 6 engages for shifting the bolt when the combination has been worked and the inner end of projection 6 has dropped into the alined notches 5 of the tumblers.

45 In order to prevent the bolt from being actuated independent of the tumbler mechanism, I provide a guard-plate 20, pivotally supported upon frame A and having a downwardly-projecting lug adapted to be engaged into the notches 21 22, formed in the upper end of bolt 16 at positions corresponding to its limit of movements in opposite directions.

55 23 represents a spring for normally holding guard 20 in engaging position with the notch of bolt 16. The forward end of the guard 20 is made with an inclined edge, (see Figs. 1 and 2,) adapting the same to be readily engaged by the projection 6 for disengaging the guard from its interlocking relation with bolt 16. The forward end of bolt 16 is provided with an extension 24 on its lower edge, provided with a notch 25, adapted to be engaged by the outer edge of projection 6 to form a

supplemental lock against independent bolt manipulation.

From this description it will be seen that the bolt 16 cannot be shifted except by the engagement of projection 6 into notch 19 of bolts 16.

The operation of working the lock through the operation of the tumbler mechanism will also be understood from the foregoing description.

There are many ways of changing the details of this lock without departing from the characteristic features of the invention; but a prominent feature of the invention is the plate F, formed with a projection, the inner edge of which is adapted to engage into the alined tumbler-notches and the outer edge of which projection is adapted to engage and shift the bolt through the manipulation of this tumbler-shaft.

Having described my invention, I claim—

1. In combination with the tumbler mechanism and bolt of a permutation-lock, a swiveled plate having a projection, the opposite ends of which are adapted to engage the alined tumbler-notches and the bolt when the combination is worked, and means for actuating said plate in connection with the tumbler manipulation, substantially as described.

2. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a plate, said shaft passing through said plate and tumblers, said plate having a projection, the inner end of which overhangs the tumbler peripheries, a bolt having a member adapted to be engaged by the outer end of the projection, means for shifting said plate for automatically engaging the projection with the tumbler-notches when alined, and means on the bolt adapted to guard said bolt member when locked and adapted to be engaged and actuated by the outer end of the projection in the unlocking movement, whereby the bolt cannot be thrown independent of the manipulation of the actuating-shaft, substantially as described.

3. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate having a projection adapted to engage into the alined tumbler-notches and to engage and disengage the bolt, and means for automatically forcing said projection into engagement with the alined tumbler-notches whereby the plate and tumblers are fixed together rotatively on the operating-shaft when the combination is worked, substantially as described.

4. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate having a projection the inner end of which is adapted to engage into the alined tumbler-notches, the outer end being adapted to engage and shift the bolt, means for automatically forcing said

projection into engagement with the alined notches for the unlocking movement, and means for disengaging the projection from the notches in the locking movement, substantially as described.

5. In a permutation-lock, a bolt, an operating-shaft, a series of notched tumblers actuated thereby, a plate, a projection thereon adapted to engage into the alined notches and to operatively engage the bolt, means for automatically forcing the projection into engagement with the notches when alined whereby said plate and tumblers are fixed to rotate with said operating-shaft, means for disengaging the projection from the notches when it is disengaged from the bolt, and means for holding the projection against rotation when the notches are out of alinement, substantially as described.

6. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate through which the shaft passes, a projection on the plate overhanging the periphery of the tumblers, the inner end of said projection being adapted to engage into the alined tumbler-notches, the outer ends being adapted to operatively engage the bolt, means for automatically shifting the plate when the notches are alined, and means for automatically locking the plate against rotation when said tumblers are out of alinement, substantially as described.

7. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate supported normally loose relative to the shaft and adapted to be fixed thereto when the tumbler-notches are alined for rotating the said tumblers and plates in unison in the bolt-throwing movement, means for shifting said plate when the tumbler-notches are alined, a projection on the plate, the inner end which engages the tumbler-notches when alined and the outer end of which is adapted to engage the bolt, and means for disengaging said projection from the tumbler-notches, substantially as described.

8. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate supported normally loose and eccentric relative to the shaft, a projection on the plate adapted to engage the notches of the tumblers when alined and adapted to engage and throw the bolt, means for shifting said plate from its eccentric to a concentric position relative to the shaft in the bolt-throwing operation, and means for disengaging said projection from the notches and restoring the plate to normal eccentric position, substantially as described.

9. In a permutation-lock, a rotating shaft, a series of notched tumblers actuated thereby, a bolt, a plate having a projection adapted to engage the alined notches and to engage and throw the bolt, the said plate being

supported normally loose and eccentric to the shaft, a tension-arm having a stop, said arm being inclined toward the arc of movement of the outer edge of the projection in the unlocking, the notches having inclined shoulders adapted to disassociate them from the inner edge of the projection when its outer edge is held by the stop on said arm, the said arm being adapted to bear inwardly on said projection to shift the plate inward when the notches are alined in the bolt-throwing movement, substantially as described.

10. In a permutation-lock, a bolt, an operating-shaft, notched tumblers actuated thereby, a plate through which said shaft passes, a member having a bearing for the plate in its rotative movement, and an interlock for said plate when the bolt is in locking position, and means on the plate adapted to automatically engage the alined tumbler-notches and to operatively engage said bolt, substantially as described.

11. In a permutation-lock, a bolt, an operating-shaft, notched tumblers actuated thereby, a plate through which said shaft passes, a member forming a bearing for the plate in its rotative movement and an interlock for said plate when the bolt is in locking position, means forcing said plate normally toward its concentric bearing, whereby it is rotatively seated thereon when the tumbler-notches are alined, and a member on the plate adapted to automatically interlock with the alined tumbler-notches and to operatively engage the bolt, substantially as described.

12. In a permutation-lock, a bolt, an operating-shaft, notched tumblers actuated thereby, a plate through which said shaft passes, a member forming a bearing for the plate in its rotative movement, and an interlock for said plate when the bolt is in locking position, means forcing said plate normally toward its concentric position whereby it is rotatively seated thereon when the tumbler-notches are alined, means on the plate adapted to automatically engage the alined tumbler-notches and to operatively engage the bolt, and a segmental guide adapted to be engaged by said means when the plate is in its rotative position for operating the bolt, substantially as described.

13. In a permutation-lock, an operating-shaft, a casing, a series of notched tumblers actuated thereby, a bolt, a plate having a projection overhanging the peripheries of the tumblers, the inner end of which is adapted to engage into the notches when alined, the outer end being adapted to engage the bolt, and a segmental guide formed between the projection and the casing, substantially as described.

14. In a permutation-lock, a casing, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate having a

projection overhanging the periphery of the tumblers, the inner end being adapted to be engaged into the notches when alined, the outer end being adapted to engage the bolt, the said plate being supported normally eccentric relative to the shaft and held against rotation when the notches are out of alinement, and means adapted to shift the projection into engagement with the notches when alined, and to shift the plate to concentric position relative to the shaft, whereby it can be turned with the shaft in the bolt-throwing operation, substantially as described.

15 15. In a permutation-lock, a casing, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate having a projection overhanging the periphery of the tumblers, the inner end being adapted to be engaged into the notches when alined, the outer end being adapted to engage the bolt, the said plate being supported normally eccentric relative to the shaft and held against rotation when the notches are out of alinement, means adapted to shift the projection into engagement with the notches when alined, and to shift the plate to concentric position relative to the shaft, whereby it can be turned with the shaft in the bolt-throwing operation, and a segmental guide on the casing adapted to be engaged by the projection in its concentric position and against which the projection is adapted to be locked in its eccentric position of the plate, substantially as described.

16. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a bolt-actuating plate normally held eccentrically relative to the shaft against rotation, means for shifting said plate to a position concentric to the shaft and fixing it to the shaft when the notches are alined for the bolt-throwing operation, means for shifting said plate back to eccentric, locked position when the notches are out of alinement, and a member on the plate adapted to engage into the alined tumbler-notches for throwing the bolt when said plate is fixed to said shaft, substantially as described.

17. In a permutation-lock, an operating-shaft, a series of notched tumblers actuated thereby, a bolt, a plate having a member overhanging the periphery of the tumblers, the inner end being adapted to engage into the notches when alined the outer end being adapted to engage the bolt, means for holding said plate normally eccentric relative to the shaft, a tension device adapted to press the member into the notches when alined, shifting the plate to position concentric relative to the shaft, and adapted to stop the plate against rotation in one direction, whereby the inclined edges of the notches will shift the plate to eccentric position, substantially as described.

18. In a permutation-lock, an operating-shaft, a series of tumblers actuated thereby, a bolt, a bolt-actuating plate normally eccentric relative to the shaft, and means for shifting said plate to concentric position and fixing it to the tumblers when alined for the bolt operation, substantially as described.

19. In a permutation-lock, a bolt, a casing, a sleeve fixed to the casing, a series of tumblers on the sleeve, a shaft passing through the sleeve, one of said tumblers being fixed to said shaft so as to rotate therewith, a bearing-collar on the sleeve, a bolt-actuating plate mounted on said collar, the said collar and plate having a bearing concentric to the shaft and interlocking surfaces eccentric to the shaft, means for shifting said plate to concentric position and fixing it to the tumblers when alined for the bolt-throwing operation, means on the plate for operatively engaging the bolt, and means for shifting said plate to the eccentric position, whereby it is interlocked against rotation when the tumblers are out of alinement, substantially as described.

20. In a permutation-lock, a bolt, a casing, a sleeve fixed to the casing, a series of notched tumblers on the sleeve, a shaft passing through the sleeve, one of said tumblers being fixed to said shaft so as to rotate therewith, a bearing-collar on the sleeve, a bolt-actuating plate on said collar, said collar and plate having bearing-surfaces concentric to the shaft, and interlocking surfaces eccentric to the shaft, a member on the plate adapted to engage the bolt, a spring-arm adapted to shift said member into engagement with the tumbler-notches when alined, and means for shifting said plate to its eccentric, interlocked position after the locking operation, substantially as described.

21. In a permutation-lock, a bolt, an operating-shaft, a series of notched tumblers actuated thereby, an indicating-disk fixed to the shaft, a plate, having a member adapted to engage the bolt and to engage into the notches of the tumbler when alined, said plate being held normally eccentric of the shaft and locked against rotation when the tumbler-notches are out of alinement, means for shifting said plate to eccentric position and engaging the key into the tumbler-notches when alined, a notch-indicating arm engaging the indicating-disk yieldingly, and a projection on the bolt-operating plate, adapted to disengage said indicating-arm from its disk when the plate member is engaged with the tumblers for the bolt-throwing operation, substantially as described.

In testimony whereof I have hereunto set my hand.

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