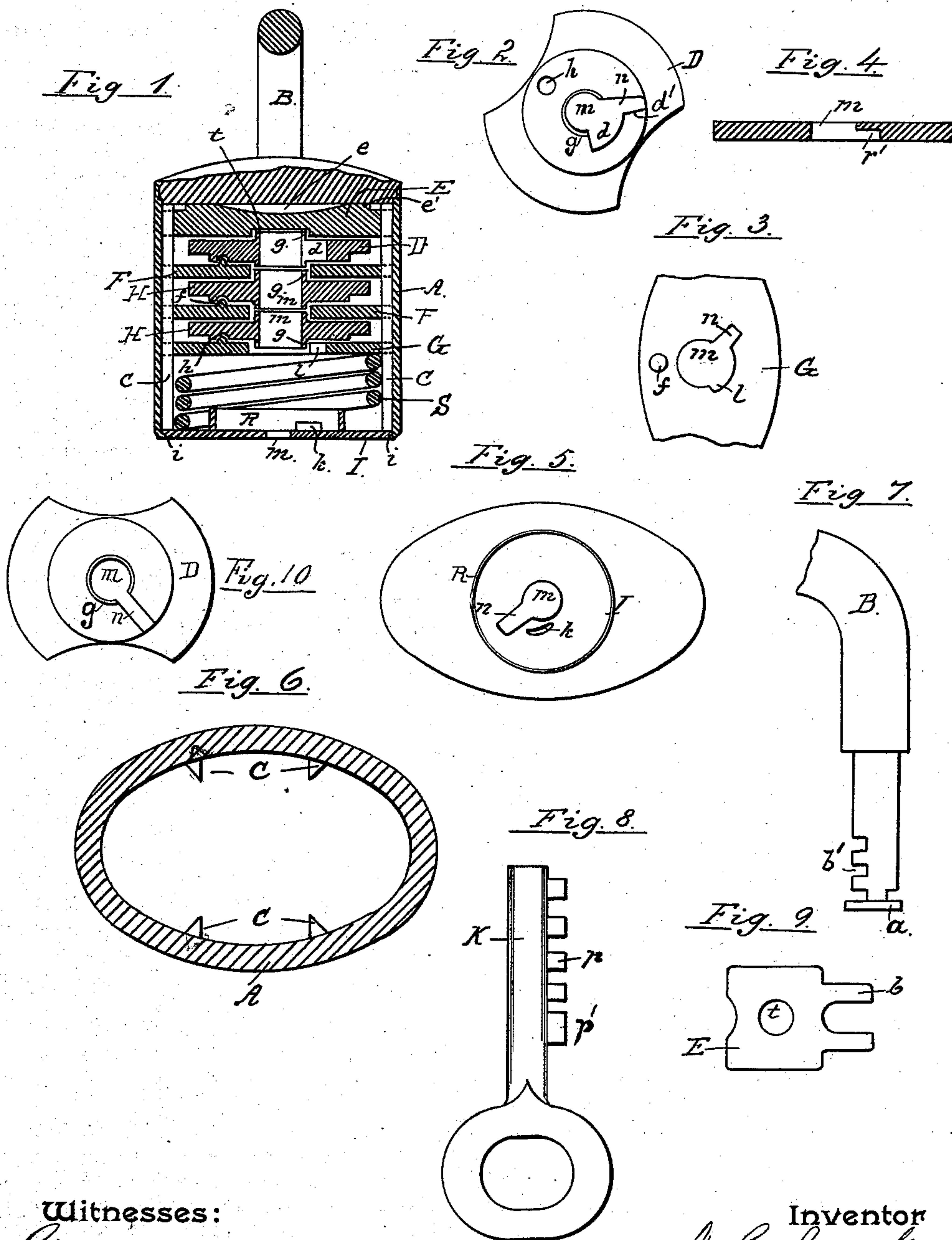


(No Model.)

J. B. AMWAKE.  
PADLOCK.

No. 413,799.

Patented Oct. 29, 1889.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## PADLOCK.

SPECIFICATION forming part of Letters Patent No. 413,799, dated October 29, 1889.

Application filed October 12, 1888. Serial No. 287,945. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB B. AMWAKE, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Padlocks, of which the following is a specification.

My invention relates to improvements in that class of locks in which a U-shaped hasp or shackle with notches cut in both arms thereof is held in the case by means of a number of movable tumblers resting upon stationary plates, the whole series of which are held together by means of a spiral spring resting on the bottom plate of the case; and the objects of my improvements are, first, to prevent lateral or rotary shifting of the tumblers on the stationary plates, and, second, to so construct the lock as to prevent the duplication of the key by unauthorized persons or the picking of the same with skeleton keys.

My invention consists in the combination of a number of stationary plates having hemispherical-shaped projections upon the upper faces thereof and tumblers resting upon said plates and provided with recesses on their under surfaces adapted to receive the projections on the upper faces of the stationary plates.

My invention consists, also, in forming an annular flange about the opening, through which the stem of the key passes on both the upper and lower faces of the tumblers, which engage in similar openings in the adjoining stationary plates.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical transverse section through the center of my lock; Fig. 2, a bottom plan view of one of the movable tumblers; Fig. 3, a bottom plan view of one of the bottom stationary plates; Fig. 4, a longitudinal vertical section through a bottom stationary plate of modified construction; Fig. 5, an inside plan view of the bottom plate of the case; Fig. 6, a horizontal section through the case; Fig. 7, a view of the end of the shackle which is permanently held in the case; Fig. 8, a side view of the key; Fig. 9, a reduced bottom plan view of the upper stationary plate, and Fig.

10 a plan view of one of the ordinary movable tumblers.

In the drawings, A represents the case, and C four vertical ribs formed on the inside of the case, which serve to prevent the stationary plates E, F, and G from turning. The lower stationary plate G is supported by a coiled spring S, resting upon the bottom plate I of the case and secured against lateral displacement by an annular rib R, formed on the bottom plate and about the outside of which it is coiled. In the top of the case there is an upper stationary plate E placed, provided with a centrally-located annular recess *t* in its under face and a circular ridge *e'* on its upper, inclosing the cavity *e*. The recess in the bottom of this plate E receives an annular flange *g* on the upper face of the tumbler next below it, while the circular ridge rests against the top of the case and reduces the extent of the upper bearing-surface of the plate against the top of the case, thereby avoiding many of the irregularities formed on the same in casting and increasing the probability of a good bearing between the two surfaces. Between the upper and lower stationary plates there are located intermediate stationary plates F, and between each two stationary plates there is interposed a tumbler which can be moved horizontally to engage with or disengage from the notches *b* in the arms of the hasp B. Upon the upper face of each stationary plate there is a hemispherical-shaped projection *f* formed, which engages with a corresponding recess or indentation *h* in the lower face of the tumbler resting upon it when the tumbler is disengaged from the hasp. As each plate and tumbler is supported by the plate or tumbler next below it and the whole upheld by the spring, the projections *f* are kept in engagement with the recesses by the upward pressure of the spring S. When the key is turned in the lock, the recesses are disengaged from the projections, the shape of those parts permitting the former to slide over the latter, gaining space to do so by the contraction of the spring occasioned by the downward pressure of the tumblers as they yield to the force exerted by the key.

There is a centrally-located circular opening *m* made through all the plates, excepting



the upper, and through all the tumblers and the bottom plate of the case, through which the stem *K* of the key passes when it is inserted in the lock, the wards *r* of the key passing through or engaging in slots *n*, radiating from the central openings *m*. An annular flange *g* is formed about the opening *m* on both the upper and lower faces of the tumblers, which are received by the corresponding opening in the stationary plates, and thus prevent lateral movement of the former.

In the nature of the case there is more or less lateral play of the stationary plates between the ribs *C* of the tumblers upon the stationary plates and of the whole with reference to the upper stationary plate *E*. This lateral play of the parts admits of the manipulation of the tumblers, either separately or together, by false keys, so that they may frequently be disengaged from the notches in the arms of the hasp or shackle. By the connection of each tumbler with the stationary plate above and below it by the annular flanges *g* on both faces thereof, including the similar connection of the upper tumbler with the top plate, there is mutual support against lateral movement afforded to each other by all the plates and tumblers, thus reducing to a minimum the possibility of any tampering with the tumblers, and this, in connection with the stop-slot in the lower stationary plate and the engagement of that in the upper tumbler *D*, affords unusual protection against the picking of the lock.

The slot *n* of the lower stationary plate is enlarged on the side toward which the key turns, as shown at *l*, to receive a stop *p'* on the key, and is of such extent as to permit the key to turn sufficiently to engage the tumblers with the notches in the arms of the shackle and then arrest its movement. The slot *n* of the upper tumbler *D* is provided with a similar enlargement *d*, which, unless the ward which engages it is of the full length of the slot, so as to engage the shoulder *d'*, permits the key to turn without moving that tumbler. The shoulder *d'* is enlarged in Fig. 2 of the drawings for the purpose of illustration, being in practice simply of sufficient size to catch the tip of the ward, so that unless that ward is of full length this tumbler will remain stationary as the key turns to open the lock, although all the other tumblers are disengaged from the notches in the arms of the hasp.

The shape of the openings in the ordinary stationary plate and tumbler is shown in Fig. 10. To fit these the stem of the key is made round and the wards of rectangular shape, that the parts may fit snugly in place when the key is in the lock. The enlargement in the slot *n* of the plate *G* may be made in only one face thereof, as shown at *r'*, Fig. 4, the

ward of the key corresponding thereto, or instead of enlarging the slots of the plates *G* a stop *k* may be formed on the inner face of the bottom plate of the case, as shown in Fig. 5.

When the tumblers are in the case, the slots *n* are so located as to coincide with the corresponding slots in the stationary plates when the former are in engagement with the notches in the arms of the hasp. After disengaging the tumblers from those notches the former are all returned to their locking position in turning the key, so as to bring the wards thereof opposite to the slots *n* to remove the key from the case. This, with the shape of the central opening *m* and the necessity of any arm or ward being long enough to engage the shoulder *d'* of the recessed tumbler, renders it almost impossible for the lock to be opened with any ordinary lock-pick or to readily obtain an impression of the lock.

To secure the bottom plate *I* of the lock in place, the under side of the edge is beveled, and after it is placed in the case the edge of the latter is riveted over it, so as to engage the bevels of the plate, as shown at *i*, Fig. 1.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the case, of vertically-movable plates secured therein provided with projections upon their bearing-surfaces, and rotary tumblers resting upon said plates, having indentations formed therein adapted to register with the said projections when the tumblers occupy certain positions, substantially as and for the purpose specified.

2. The combination, with the case, of a series of stationary plates having centrally-located openings through them, and rotary tumblers provided with annular flanges or ribs upon their upper and lower faces adapted to engage in the openings in the stationary plates between which they rest, the upper tumbler-bearing in the case being provided with a recess to receive the annular flange on the upper surface of the adjacent tumbler, substantially as and for the purpose specified.

3. In a padlock, the combination of the stationary plates provided with openings, and rotary tumblers having projections or ribs on their upper and lower faces adapted to be held in continuous engagement with the openings in the plates between which they rest, so that the entire series of plates and tumblers may be connected together, substantially as and for the purpose specified.

J. B. AMWAKE.

Witnesses:

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