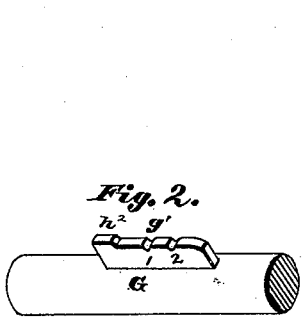
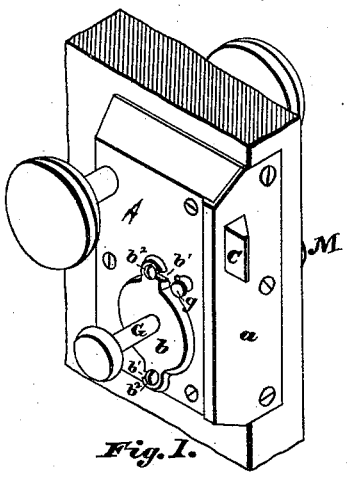
(Model.)

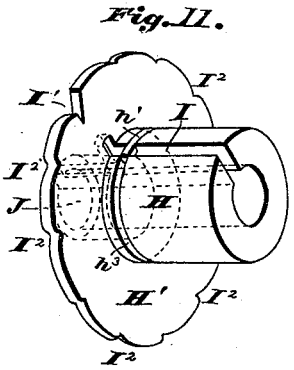
# F. E. YOUNG.

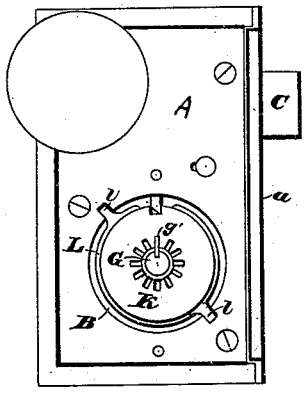
## COMBINATION LOCK.

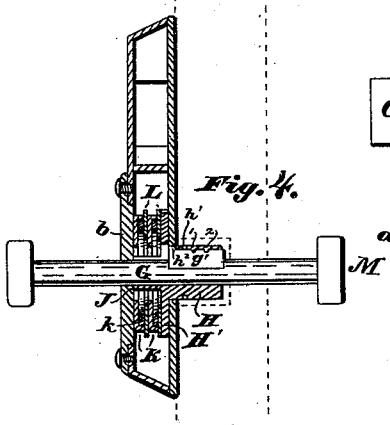
No. 420,528. Patented Feb. 4, 1890.

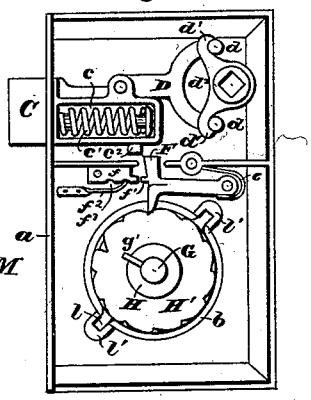


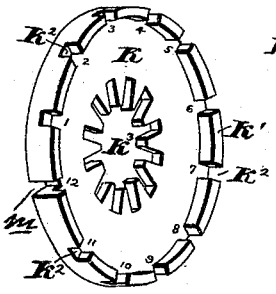



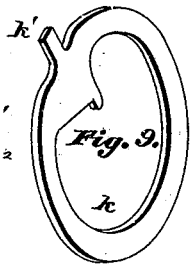



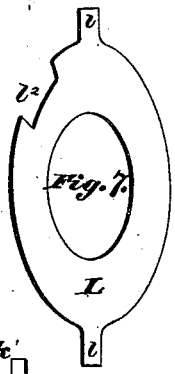



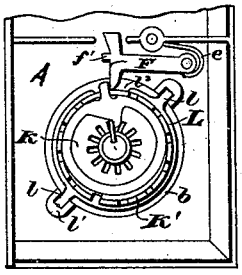



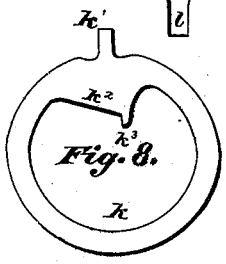




WITNESSES:

A. J. Fulmer

L. C. Wise

INVENTOR

Frank E. Young

BY Bond & Wise

ATTORNEY

# UNITED STATES PATENT OFFICE.

FRANK E. YOUNG, OF CANTON, OHIO.

## COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 420,528, dated February 4, 1890.

Application filed May 2, 1887. Serial No. 236,868. (Model.)

*To all whom it may concern:*

Be it known that I, FRANK E. YOUNG, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Combination-Locks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon, in which—

Figure 1 is a perspective view of the lock proper. Fig. 2 is a detached view of a portion of the spindle, showing the key web or blade attached thereto. Fig. 3 is a front side elevation showing the disk-shutter removed. Fig. 4 is a longitudinal section of the lock, showing spindle and the different parts belonging thereto in proper position. Fig. 5 is a rear side view showing plate removed. Fig. 6 is a rear view showing cylinder with fixed wheel and friction-plate removed. Fig. 7 is a detached view of the friction-plate. Fig. 8 is a side view of stop-washer. Fig. 9 is a perspective view of stop-washer. Fig. 10 is a detached perspective view of one of the loose wheels. Fig. 11 is a detached perspective view of the cylinder and fixed wheel.

The present invention has relation to combination-locks designed and calculated to be used upon doors, safes, and bureaus; and its nature consists in the different parts and combination of parts hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, A represents the case or shell, which may be substantially of the form shown in the drawings, reference being had to the purpose for which it is designed to be used. The face-plate *a* is formed separate and securely attached to the case A, and is provided with an aperture for the passage of the bolt. The case A is provided with apertures for the passage of screws to attach the lock proper to a door or the place it is to occupy. The opening B in the case A is closed with the disk-shutter *b*. Said shutter is provided with the hooked notches $b'$, which engage the screws $b^2$. The sliding bolt C is located in the top or upper portion of the case A, and is provided with the longitudinal slot *c*, which is for the purpose of receiving the spring $c'$, said spring being for the purpose of actuating the bolt C. To the bolt C is pivotally attached the yoke D, said yoke being provided with the projections or lugs *d*, which projections or lugs are for the purpose of engaging the hooked extremities $d'$, located on the dog $d^2$.

For the purpose of placing the bolt-spindle E close to the rear edge of the case A, the hooked extremities $d'$ are so shaped that they will be located forward of the bolt-spindle, whereby the hooked extremities will give the bolt C a longer reciprocating motion. The yoke D and the bolt C are pivotally connected for the purpose of allowing either one of the hooked extremities $d'$ to throw the bolt back while the other extremity passes or moves to the opposite direction when the dog $d^2$ is operated by the spindle-knob.

The bolt C is provided with the lug $c^2$, which is for the purpose of engaging the detent F and locking the bolt C. The detent F is provided with the spring *e*, which is for the purpose of actuating said detent.

For the purpose of locking the detent F in a given or fixed position, the sliding bar *f* is provided, which engages the lug $f'$ on the detent F, said sliding bar *f* being held in a given or fixed position by means of the spring $f^2$, engaging the notches $f^3$, said bar *f* being operated by the knob *g*.

The rotary sliding spindle G is provided with the web or blade $g'$, which is rigidly attached to said spindle G, and is provided with the notches or recesses 1 and 2, which are for the purpose of engaging the spring $h'$ and holding said spindle stationary in the cylinder H, the spring $h'$ being so adjusted that the spindle G can be forced back and forth, so as to engage with the desired notch or recess in the web or blade $g'$. The web or blade is also provided with the stop $h^2$, which is for the purpose of limiting the outward movement of the sliding spindle G, the inward movement being limited by the inner end of the bit or blade abutting against the disk-shutter *b*.

The cylinder H is substantially of the form shown in Fig. 11, and is provided with the wheel H′, which is preferably formed integral therewith. Said cylinder is located on the sliding spindle G, as shown in Fig. 4, and is

provided with a cleft or slot I, which is for the purpose of allowing the web or blade $g'$ to slide endwise in the cylinder.

To the cylinder H is attached the spring $h'$, said spring being located substantially as shown in Fig. 11, and is held in proper position by means of the groove $h^3$.

The fixed wheel H′ is provided upon its periphery with the master-notch I′, and also the counting-notches $I^2$, said counting-notches being for the purpose of transmitting to the hand of the operator an intermitting sensation, so as to count the combination. The cylinder H is also provided with the collar or sleeve J, which is for the purpose of providing a bearing for the wheels K, said wheels being located substantially as shown in Fig. 4.

The loose wheels K are substantially of the form shown in Fig. 10, and are provided with the flange K′, said flange being provided with the notches $K^2$, the number of said notches corresponding with the number of notches $I^2$ on the periphery of the fixed wheel H′. The wheels K are also provided with the radiating notches $K^3$, which correspond in number and position with the notches $K^2$, said radiating notches being for the purpose of receiving the web or blade $g'$ and cause the wheel to rotate with the spindle G.

The wheels K are each provided with a central aperture for the purpose of receiving the cylinder H, through which cylinder the spindle G passes. The notches $K^3$ radiate from the center aperture toward and on a line with the notches $K^2$ in the flange of the wheels K.

The stop-washer $k$ is substantially of the form shown in Figs. 8 and 9, and is so formed that when placed in the wheel K it is free to slide, so as to protrude or retract the pin $k'$, said stop-washer $k$ being laterally held in position by means of the flange K′. The stop-washer is also provided with the cam $k^2$ and pin $k^3$, which are for the purposes hereinafter described.

The friction-plate L may be substantially of the form shown in Fig. 7, and, as shown, is provided with the pins $l$, which are for the purpose of entering the cleft or slot in the posts $l'$ of the case A, and thereby preventing said friction-plate from rotating. The friction-plate L is also provided with the notch or recess $l^2$, which is for the purpose of permitting the detent F to operate, as hereinafter described.

The operations of my invention are as follows: To change or set the combination, the screws $b^2$ are loosened, and the disk-shutter rotated until it is disengaged from said screws, when, together with the sliding spindle G, cylinder H, wheels H′ and K, the stop-washers and friction-plate L are withdrawn from the lock-case A inwardly until the knob M comes in contact with the outside of the door. The pins $k'$ are then placed in the desired notches in the flanges of the wheels K. The parts above mentioned are then replaced in the case A, as shown in Fig. 4, and the disk-shutter $b$ fastened by means of the screws $b^2$.

For the purpose of holding the detent F up out of the way while changing the combination and replacing different parts in the case A, as above described, the sliding bar $f$ is pushed back until it engages the lug $f'$, said detent being first elevated to its highest point by rotating the spindle-knob. When the parts are replaced, the sliding bar $f$ is withdrawn and the detent F allowed to descend and rest upon the periphery of the wheels H′ and K K, and the spindle G pushed or pulled outwardly until the stop $h^2$ comes in contact with the spring $h'$. The spindle G and cylinder H can then be rotated in either direction independent of the wheels K. The spindle G is pushed or pulled inwardly until the spring $h'$ engages the notch or recess 1 in the web or blade $g'$, said web or blade being then in proper position to strike the cam $k^2$ of the stop-washer $k$ and protrude the stop pin $k'$ and engage the pin $k^3$, thereby communicating rotary motion to the first wheel K until the stop-pin strikes the detent F. Then the spindle G is rotated in the opposite direction, the operator counting off the number corresponding to the number of the notch in the wheel K, in which the stop-pin $k'$ is placed. The counting is done by means of the intermittent sensation communicated to the hand of the operator by means of the detent dropping into the notches $I^2$, formed in the fixed wheel H′. It will be understood that pins may be used in place of the notches $I^2$, if desired. It will be seen that if the proper number of notches have been counted and the spindle pushed or pulled inwardly the web or blade $g'$ will enter the radiating notch corresponding to the master-notch $m$ on the first wheel K, and the master-notches on the wheels K and H′ will be in register and rotate together in either direction. When the spindle G has been pulled or pushed inwardly until the spring $h'$ engages notch 2 of the web or blade $g'$, the end of the web or blade will be in proper position to strike the cam $h^2$ and protrude the stop-pin $k'$ of the stop-washer located in the second wheel K and engage the pin $k^3$, thereby communicating rotary motion to the second wheel K until the stop-pin strikes the detent F. The spindle G is then rotated in the opposite direction, the operator counting off the number corresponding to the number of the notch in the second wheel K, in which the stop-pin $k$ is placed. This brings the master-notch of the second wheel K in register with the master-notch of the fixed wheel H′ and the first loose wheel K. The spindle G is pushed or pulled inwardly and the wheels all rotate together with the spindle in either direction. The master-notches I′ and $m$, all being in register, the spindle G is rotated until the detent F drops into said master-notches, thereby releasing the sliding bolt C.

When it is desired to use the lock as a catch

or day-lock only, the detent F is fastened down by means of the sliding bar $f$ and lug $f'$.

To lock the door on the combinations, the spindle is first slightly rotated and at the same time pushed or pulled outwardly.

It will be understood that the number of wheels K and their different parts may be increased, if desired.

It will be seen that the pin of the stop-washer $k$ will retract by the weight of the washer, and not engage with the detent F unless protruded by the web or blade $g'$. In case the pin $k'$ protrudes below, it will not interfere with the movements of the wheels K, as there is nothing to come in contact with them.

The friction-plates L are for the purpose of holding the wheels K in a given position, and not allowing them to rotate except when the web or blade $g'$ comes in contact with the stop-washer or radiating notches in said wheels K.

It will be seen that the movements of the spindle G may be reversed by reversing the stop-washers in the wheels K.

The disk-shutter $b$ fits in the circular opening B in the case A, and is provided with an overlapping flange $b^3$.

The disk-shutter $b$ is so adjusted that when placed in proper position it will press against the adjacent loose wheel K, and said wheel against the adjacent friction-plate L, and said plate against the first loose wheel K, and said loose wheel K against the next friction-plate. Said friction-plate presses against the fixed wheel H', which prevents the loose wheels K from rotating except when the web or blade $g'$ is engaged with the wheels or washers, as above described.

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

1. The herein-described lock, consisting of the case A, the disk-shutter $b$, the bolt C, the yoke D, the dog $d^2$, bolt-spindle E, the detent F, sliding spindle G, cylinder H, provided with the fixed wheel H' and spring $h'$, the wheels K, stop-washers $k$, and the friction-plate L, substantially as and for the purpose specified.

2. The spindle G, provided with the web or blade $g'$, having the notches 1 and 2 and the stop $h^2$, the cylinder H, provided with a cleft or slot I, the annular groove $h^3$, and the spring $h'$, located in said groove and adapted to engage the notches on the web or blade $g'$, substantially as and for the purpose specified.

3. The combination of the sliding spindle G, having mounted thereon the cylinder H, the wheels H' and K, the web or blade $g'$, adapted to engage the radiating notches $k^3$ and thereby communicate rotary motion to the wheels K, substantially as and for the purpose specified.

4. The combination of the stop-washers $k$, provided with the stop-pin $k'$, the cam $k^2$, the pin $k^3$, and the wheels H' and K, substantially as and for the purpose specified.

5. The disk-shutter $b$, provided with the hooked notches $b'$, adapted to press against the adjacent loose wheel K and hold the said wheels K and friction-plates L in proper position when disengaged from the web or blade $g'$, substantially as and for the purpose specified.

6. The stop-washer $k$, provided with the stop-pin $k'$, the cam $k^2$, and the pin $k^3$, substantially as and for the purpose specified.

7. The wheels K, provided with the flange K', having notches $K^2$ and the radiating notches $K^3$, in combination with the stop-washer $k$, the cylinder H, having the sleeve J, and the sliding spindle G, provided with the web or blade $g'$, substantially as and for the purpose specified.

8. The disk-shutter $b$, provided with the hooked notches $b'$ and the overlapping flange $b^3$, in combination with the circular opening B, screws $b^2$, and case A, substantially as and for the purpose specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

FRANK E. YOUNG.

Witnesses:
L. C. WISE,
FRED W. BOND.