

(No Model.)

2 Sheets—Sheet 1.

J. T. HOILE.
COMBINATION LOCK.

No. 513,325.

Patented Jan. 23, 1894.

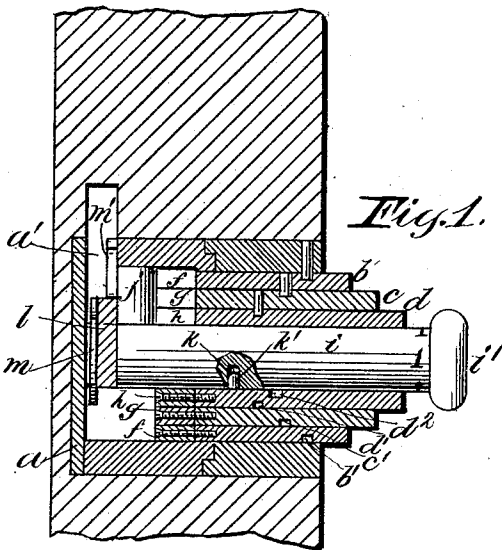


Fig. 1.

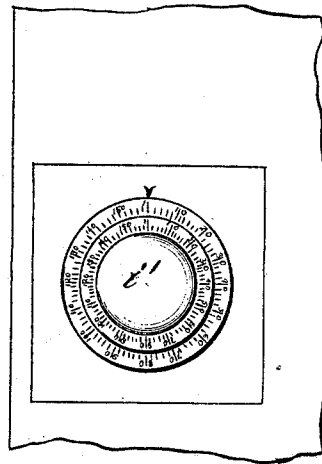


Fig. 2.

Fig. 3.

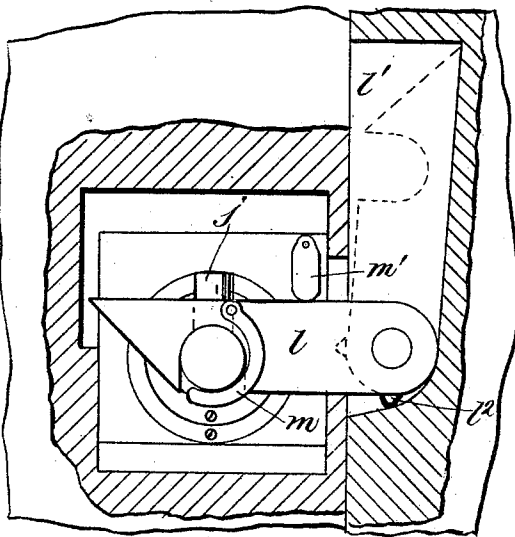


Fig. 4.

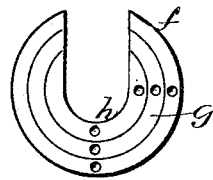
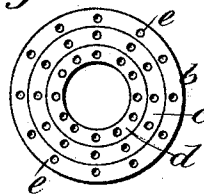


Fig. 5.



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(No Model.)

2 Sheets—Sheet 2.

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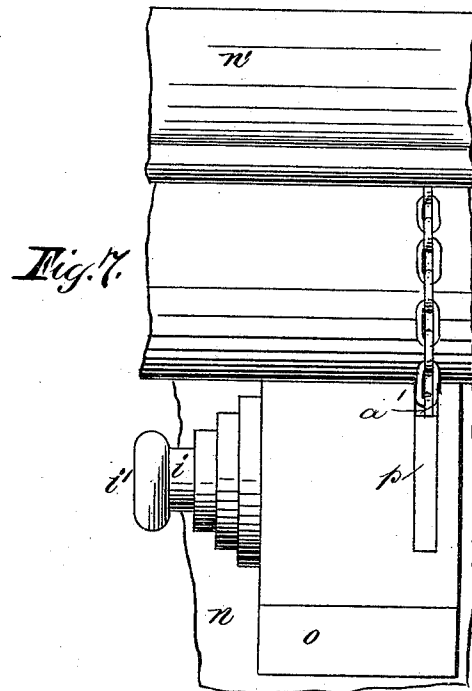
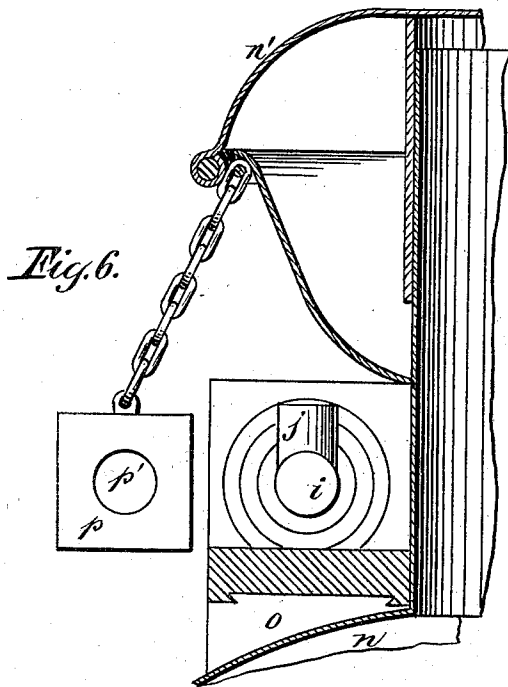


Fig. 8.

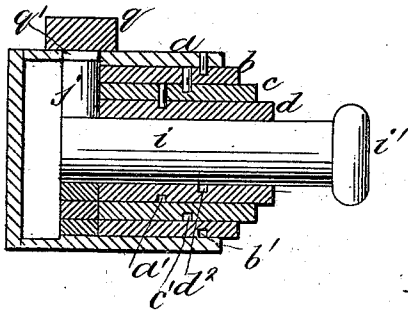


Fig. 9.

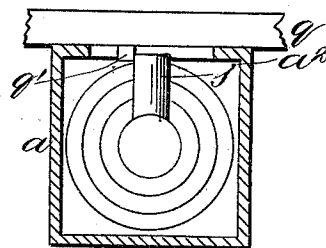
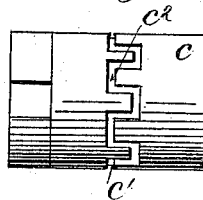


Fig. 10.



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UNITED STATES PATENT OFFICE.

JAMES T. HOILE, OF FARMINGDALE, NEW YORK.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 513,325, dated January 23, 1894.

Application filed July 26, 1893. Serial No. 481,570. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. HOILE, a citizen of the United States, and a resident of Farmingdale, in the county of Queens and State of New York, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

This invention relates to certain new and useful improvements in locks, and particularly to that class known as combination locks, having for its object the production of a lock which will be simple, strong and durable, which cannot be opened except by some one familiar with the combination; in which the combination may be readily changed, and which, with slight modifications, may be used to lock either sliding or swinging contact surfaces.

Having thus stated generally the object of my invention, I will proceed now to set forth its principle and the best mode in which I have contemplated applying that principle, and then will particularly point out and distinctly claim the part or improvement which I claim as my invention.

Referring to the accompanying drawings illustrating the principle of my said invention, and showing several modes of its application, in the several figures of which like parts are similarly designated, Figure 1, is a cross-section through one of my improved locks, showing the arrangement when applied to sliding contact surfaces. Fig. 2, is a front elevation thereof. Fig. 3, is a section through a door and its casing showing the rear of the lock and the engagement of the latch with the bolt. Fig. 4, is a rear view of the slotted combination plates. Fig. 5, is a similar view of the concentric tubes or barrels. Fig. 6, is a fragmentary section through a milk or other can showing my lock applied thereto. Fig. 7, is a similar side elevation thereof. Fig. 8, is a longitudinal section through a lock showing the arrangement I prefer to use for locking swinging contact surfaces. Fig. 9, is a rear elevation thereof, and Fig. 10, is an elevation of the second or middle tube or barrel, illustrating a modification thereof.

I will first explain my lock as applied to sliding contact surfaces, as shown in Figs. 1 to 5 of the drawings, although it will be understood that the principle of construction

and operation is the same in the various modifications which differ from each other in necessary details. As shown in said figures, the lock is applied to freight cars or other sliding doors, and the lock may be secured either in the door or in the casing as desired.

a, is the lock casing, the top and side walls of which, are provided with a transverse slot *a'*.

b, *c*, and *d*, are concentric tubes or barrels, flush at the rear, and projecting slightly beyond each other at their front ends, the faces of which are engraved or stamped with a suitable scale or characters, as shown, while the casing *a*, is at some point provided with the usual arrow, groove or marker at which the combinations are made. Each of the tubes or barrels *b*, *c*, and *d*, is provided with a peripheral groove *b'*, *c'*, *d'*, and are held against longitudinal displacement by pins or projections entering said grooves, as clearly illustrated. The inner tube *d*, is also provided with a number of recesses, or with a continuous groove *d''*, on its inner face for a purpose to be hereinafter explained. The rear faces of these tubes or barrels *b*, *c*, and *d*, are tapped with a number of circumferential screw-holes *e*, and in certain of these holes are screwed or otherwise secured, the slotted combination rings or plates *f*, *g*, and *h*. Passing through the tube *d*, is the bolt comprising the cylindrical stem *i*, and the head or handle *i'*, and provided near its inner end with the lug, projection or bit *j*, normally directly in the rear of the combination plates *f*, *g*, and *h*, and beyond said lug or bit *j*, the cylindrical stem *i*, rearwardly extends. The said stem is provided with a recess *k*, within which loosely fits the pin *k'*. The forwardly projecting end of stem *i*, may be inscribed with characters or a scale, to facilitate the opening of the lock, if desired. It will now be apparent that each of the barrels *b*, *c*, and *d*, is capable of an independent rotary motion and that when revolved they carry with them the slotted combination plates *f*, *g*, and *h*, also that the bolt is independently rotatable, and when the slots in the said combination plates are coincident the bolt may be drawn forwardly, the lug entering the slots.

The latch *l*, may be of the usual construction, pivoted to the other sliding contact sur-

face, having the under side of its free end beveled, and provided with a recess or cut-out, adapted to engage and surround the stem i of the bolt. For freight cars, it is frequently objectionable to have the latch protruding as it is liable to scratch or damage the freight while being loaded or unloaded, and I therefore recess the door or casing at l' , and when the door is open, swing the latch l , on its pivot into said recess and out of the way. A projection l^2 , on the latch enables me to restore it to its normal position when desired.

The operation of my invention is as follows:—Assume that the combination desired is 10, 20 and 30. Access is had to the interior of the lock and the outer barrel b , is turned until the figure 10, is in line with the arrow or other mark on its casing a ; the combination plate f , is then put in position with the slot uppermost, and attached to the barrel by screws. The same operation is followed with the other barrels, and combination plates, at the desired figures, the lock secured in position in the door or casing and the barrels b , c , and d , turned to throw the slots in the combination plates out of line. Now when the door is slid to and closed, the latch l , will enter the slot a' , in the lock casing, striking and riding over the projecting rearward end of the bolt, and the recess or cut-out in said latch will surround the bolt, firmly locking the door. When it is desired to open the door, the combination is made, bringing the slots in combination plates into alignment; the bolt is then pulled outwardly, and the lug or bit j , enters said slots. The forward movement of said bolt is arrested, however, before the same has been entirely withdrawn from the latch l , by the dropping or falling of the loose pin k' , in the stem i , into the groove, or one of the recesses d^2 , of barrel d , and the door is still locked. All the barrels and the bolt are now turned half way around, when the pin k' , will drop by gravity into the recess k , in the bolt, permitting the latter to resume its forward movement and be withdrawn from the latch l .

To render the lock unpickable, and to prevent the latch from being raised above the bolt by the insertion of a knife, or other thin instrument between the door and its casing, I prefer to pivot to the latch l , the hook arm m , which is normally held by gravity in the position shown in Fig. 3, and when the door is closed and the latch rides over the bolt, the hook m , will strike said bolt and be swung backwardly resuming its normal position, as soon as the bolt engages the recess in the latch, passing under said bolt and preventing the latch from being lifted. Manifestly other devices may be employed for the same purpose, to operate separately or conjointly. For instance, I have also shown in Fig. 3, a pivoted plate m' , adapted to be struck by the latch and swung on its pivot a sufficient height to permit the latch to engage with the bolt, falling at once to its normal position when

this act is effected and securely holding the latch in its engaged relation. This plate obviously can be arranged to act upon any desired part of the latch, at either side of the recess therein, or directly above the same.

In Figs. 6 and 7, I have shown my lock applied to a milk can, and in these figures, n , is the can breast and n' , the cover. The lock is secured preferably to the breast in any suitable manner, as by building up a platform o , to which the lock is secured either by soldering, riveting or dovetailing and riveting, &c. The keeper p , is attached by a chain or otherwise to the can top n' , and is adapted to enter the slot a' , in the lock casing a , when the bolt is withdrawn, as previously described. Said bolt is then pushed inwardly, its rear end passing through the central aperture q' , in the keeper, securely locking the cover in place.

Figs. 8 and 9, illustrate a modification of my lock applied to swinging contact surfaces, and in this construction there is no necessity for the rearward prolongation of the stem i , of the bolt beyond the lug j , and the transverse slot a' , of the lock casing, is replaced with the channel or slot a^2 , above which is mounted an ordinary spring bolt q , having a depending lug q' , working in the slot a^2 . When the combination is off, and in locked position the bit or lug j , of the lock bolt will be out of line with the lug q' , of spring bolt q , but when the combination is made and the lock bolt drawn into the slotted combination plates b , c , and d , it is thereby brought into line with lug q' , and by turning said lock bolt, the spring bolt q , is withdrawn from engagement with its keeper on the door casing, and the door free to open. If desired, the spring bolt q' , may be provided with two depending lugs, instead of one, insuring the operation of the device.

In Fig. 10, I have shown a modification of one of the barrels, and preferably the middle or second barrel c , the slot c' , of which is at some point provided with the right angled deflections c^2 , preferably two or three in number. When this modification is used, the barrel containing the same should be manipulated first, in making the combination, and the projecting pin of the barrel b , moves through the groove c' , until one of the deflections is encountered; the barrel c , is then moved in or out, the pin or barrel b , following the groove c^2 , until the proper character is reached, when the other barrels may be brought in combination, and the lock put in its unlocked position. If desired, all the barrels may contain this modification, but I have found one ordinarily sufficient.

Having thus described the principle of my invention, and its application to various uses, it will be at once apparent that it is capable of use in a wide field, and by employing my lock, with such structural changes as are within a mechanic's skill, and as may be necessary, the device can be used as a safe lock by the addition of a link or lever extending

from the handle controlling the bolts, and engaging with the bolt of my lock, which, when locked, holds said link and the handle in their locked position. Again, the forward end of the lock casing *a*, may be made too small to admit the outward movement of projection *j*, on the bolt, except at some one point (as shown in Fig. 8), necessitating the making of the combination always at that point, and preventing the accidental discovery of said combination in other positions.

Still another application of the principle of my invention which will suggest itself to a practical mechanic is as follows:—Each barrel *b*, *c*, and *d*, may be provided with an annular shoulder bearing the characters, arranged back of one another and projecting through the casing. By this arrangement, the barrels can be turned from the side instead of from the front, and the lock with the addition of a bow can be used as a pad-lock. The bit *j* may also be arranged to screw into stem *i*, of the bolt, and by having a number of screw-holes in the stem, the position of the lug may be varied to form new combinations.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination locks, the combination with a lock casing, of a plurality of concentric and independently rotatable barrels, each provided with an adjustable slotted combination plate at its rear end, an independently rotatable bolt passing through the inner barrel and adapted to be moved longitudinally into and out of locking position, and carrying a bit, adapted on said movement to enter the aligned slots in the combination plates, substantially as described.

2. In combination locks, a plurality of concentric and independently rotatable barrels, projecting beyond one another, and bearing characters at their forward ends, a plurality of slotted combination plates, each adapted to be secured to the barrels in varying positions, a bolt passing through the inner barrel and combination plate, and provided with a lug or bit adapted to enter the slots in the said plates when in alignment, and a stop adapted to prevent said motion being completed until the barrels and bolt have been turned to another position, substantially as described.

3. In combination locks, a casing, a plurality of concentric and independently rotatable barrels, each provided with a slotted combination plate at its rear end, a rotary and longitudinally movable locking bolt passing through the inner barrel, and provided with a bit to be drawn into the aligned slots of the combination plates by the longitudinal movement of the bolt, and a latch or keeper for engaging said bolt when in locked position, substantially as described.

4. In combination locks, a casing, a series of concentric and independently rotatable barrels, each provided with a slotted combination plate at its rear end, a rotary and longitudinally movable bolt passing through the inner barrel and provided with a bit adapted to be drawn within the aligned slots of the combination plates, a latch or keeper adapted to engage said bolt, and means for preventing the release thereof except by withdrawal of the bolt, substantially as described.

5. In combination locks, a casing, a spring bolt or catch provided with a lug or projection, a series of concentric and independently rotatable barrels, each having a slotted combination plate at its rear end, an independently rotatable and longitudinally movable bolt passing through the inner barrel and carrying a lug or bit which is normally out of line with the lug on the spring bolt and is adapted to be drawn within the aligned slots in the combination plates, into operative relation with said lug, substantially as described.

6. In combination locks, a casing, a plurality of concentric and independently rotatable barrels, a suitable number of said barrels being provided with a circumferential groove having a series of angular deflections, within which groove a pin from the next outer barrel or the lock casing depends, a rotary and longitudinally movable bolt, and means for holding said bolt in its locked position, and allowing the same to be moved to its unlocked position, substantially as described.

Signed at New York, in the county of New York and State of New York, this 24th day of July, A. D. 1893.

JAMES T. HOILE.

Witnesses:

FREDERIC CARRAGAN,
EUGENE V. MYERS.