2 Sheets. Sheet 1.

J. C. Hintz. Jr.,

Permutation Lock.

No. 108,481. Patented Oct. 18. 1870.

Fig. 5.

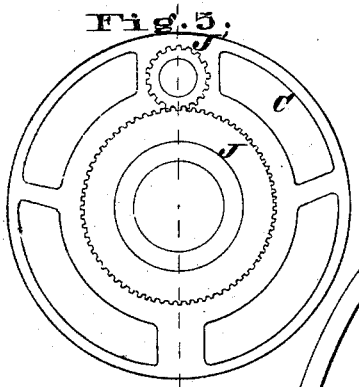


Fig. 1.

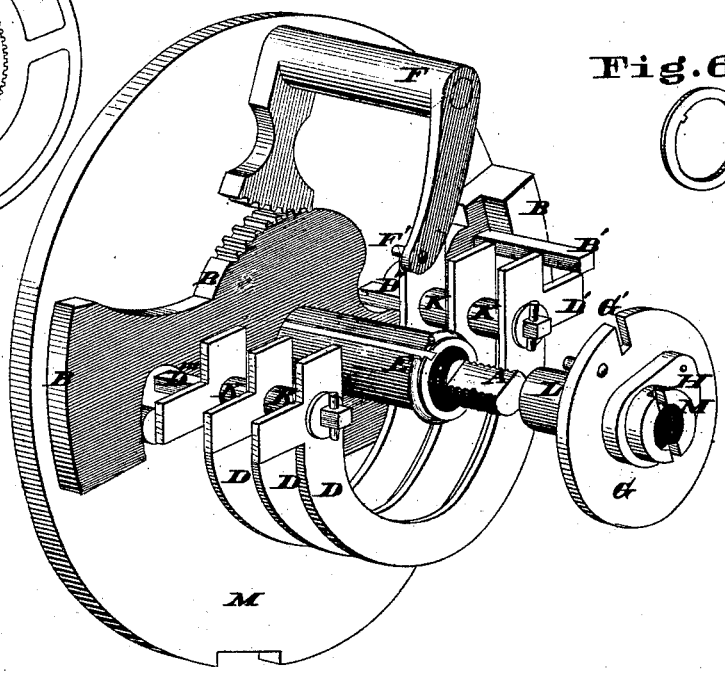


Fig. 6.

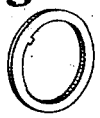


Fig. 2.

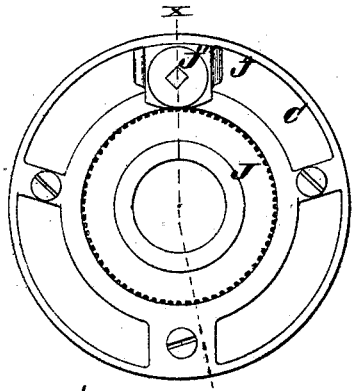


Fig. 3.

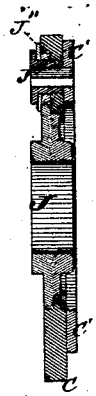
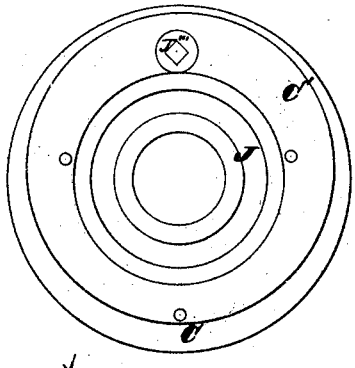


Fig. 4.



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Wm. A. Gillis.

S. S. Morris

Inventor.

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2 Sheets. Sheet 2.

J. C. Hintz Jr.,

Permutation Lock.

No. 103,481. Patented Oct. 18. 1870.

Fig. 7.

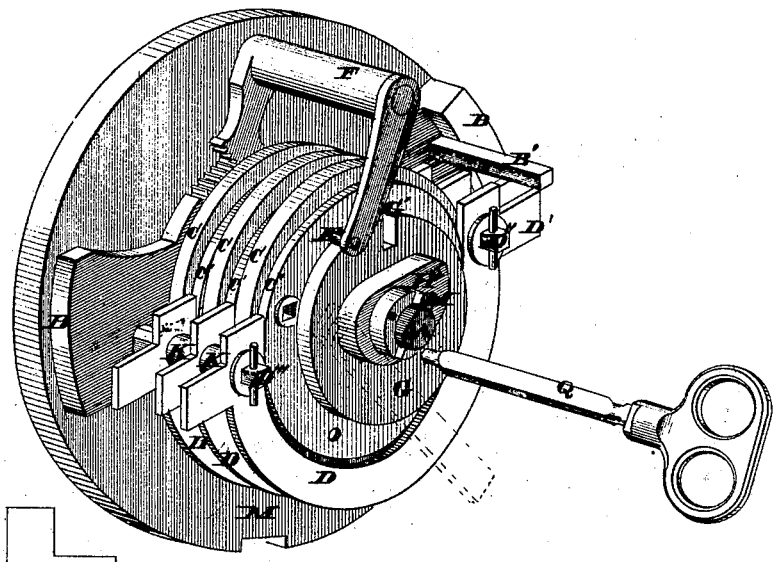


Fig. 9.

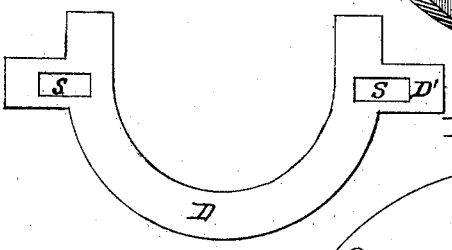
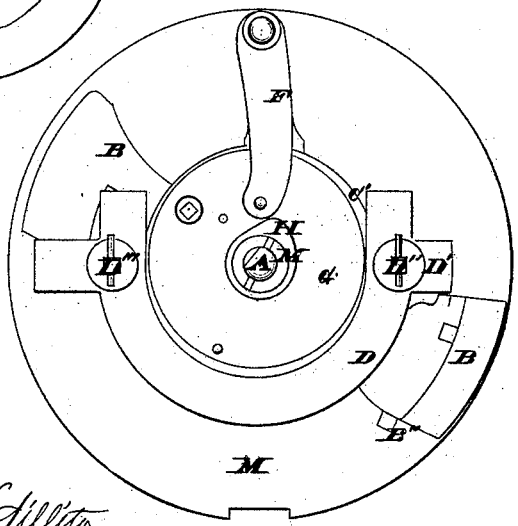


Fig. 8.



Attest.
Thos. A. Gillett
S. L. Morris

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United States Patent Office.

JULIUS C. HINTZ, JR., OF CINCINNATI, OHIO.

Letters Patent No. 108,481, dated October 18, 1870.

IMPROVEMENT IN PERMUTATION-LOCKS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JULIUS C. HINTZ, JR., of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improved Permutation-Lock; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making part of this specification, in which—

Figure 1 is a perspective view, with the permutation-wheels removed, and the sleeved disk G drawn out from the arbor A.

Figure 2 is a plan of the reverse side of a permutation-wheel.

Figure 3 is a section, through the line *x x*, in fig. 2.

Figure 4 is a plan of front of same, showing cam *c'* on its face.

Figure 5 is a plan of reverse side of same, with cap J″ and screw J‴ removed, so as to show pinion J'.

Figure 6 is a view of the keyed washers which separate the permutation-wheels.

Figure 7 is a perspective view, locked.

Figure 8 is a front elevation, unlocked, and the sleeved disk G removed.

Figure 9 is a view of a part, detached.

The objects of my improvements are—

First, greater security against burglars; and

Second, greater simplicity and consequent economy.

Similar letters refer to similar parts throughout the drawing.

A is a spindle, attached to the knob or handle, and passing through the lock.

E is a sleeve, rigidly fastened at the outer end to the lock-case.

The spindle turns easily inside this sleeve, and at its inner end is a male screw, which works in a female screw inside the sleeve L, and over which the disk G is rigidly attached.

The inner end of the screw is flattened on one side, as shown in fig. 1.

The carrying-dog H, which may be of any convenient shape, fits neatly over this part of the spindle, and has a pin passing through it, riveted on the outside, and which fits in an appropriate recess in the face of the disk G, fig. 7.

This, together with the nut M, which is screwed on the spindle A, and binds the carrying-dog to its place, prevents the screw from working when it is desired to operate the lock by the spindle

C C C are the permutation-wheels, which work loosely over the sleeve E, through which the spindle runs.

They have the usual connecting-pins or projections upon their faces for the purpose of moving each other.

The disk G has also such a pin, which interlocks with a similar one upon the face of the wheel contiguous to it.

This pin in the disk G is shown in the drawing; the similar ones in the wheels are not shown.

A longitudinal groove is made in the sleeve E, shown in fig. 1.

Metallic washers, each having a projection fitting neatly in this groove, are placed around the said sleeve, one between each two of the permutation-wheels.

These wheels each have a wheel, J, and pinion, J', fig. 5, for the purpose of changing the combination of the lock.

Both wheel J and pinion J' sit in recesses respectively provided for them, and in which they turn easily.

The pinions are secured in their places by clamps J″.

Through the clamp, pinion, and the body of the permutation-wheel a bolt, J‴, is passed, having a head, which binds the clamp J″.

The lower end of the bolt J‴ is a male screw, and fits into a female screw cut into the permutation-wheels below the pinion-seat.

Through this bolt, longitudinally, there is a square hole, in which the key Q, which is to be used in changing the combination, fits, clearly shown in fig. 2.

The cog-wheels J sit neatly in their places without being otherwise fastened.

The connecting-pins, by which the wheels operate each other, are attached to the cog-wheels, so that they may be revolved without moving the remaining parts of the combination-wheels, when the screw-bolt J‴ is loosened, as afterward explained.

When the screw-bolt J‴ is tightened, the cog-wheels and pinions do not move separately.

There is a cam upon the face of each permutation-wheel, whose diameter is one-fourth of an inch less than that of the wheel, and placed one-eighth of an inch eccentric to the periphery of the wheel.

D D D are yokes suspended upon square pins, D″ D‴, projecting from the lock-case, with tubular washers, K, between them, in the manner clearly shown in fig. 1.

The distance of the arms of the yoke from each other is equal to the diameter of the cams.

D' are arms upon the yokes D, which sustain the projecting pin B', which is permanently attached to the rear or weighted end of the bolt B.

Other similar shaped arms are shown upon the other ends of the yokes, but their only object is symmetry.

The holes S in the arms of the yokes, through which the square pins pass, are slotted laterally, so as to permit as much play as the eccentricity of the cams may require.

The upper edges of the arms D' are made a scin-

tilla too low to support or come in contact with the pin B′, except when the pin F′ falls into the notch G′.

When locked, the periphery of the disk G, by contact with the pin F, always sustains the bolt at such a position that the pin B′ is just above the arms D′, except when the pin F′ is above or in the notch G′.

And, in order that the pin F′, in its fall, may be as noiseless as possible, the edge of the disk G is chamfered slightly for a very small distance on each side of the notch G′.

When the arms D′ are withdrawn and the notch G′ presented to the pin F′, the bolt falls by its own gravity.

The bolt B plays loosely on the sleeve E. It is formed so as not to interfere, throughout its range of motion, with the square pins D″ D‴. It receives its motion, through the link F, from the disk G, by means of the catch F′, which interlocks in the slot G′ of the disk G, and of the cogs on the rear arm of the link, which gear into the cogs on the bolt.

B″ is a stop which limits the downward fall of the bolt B.

The knob, not shown in the drawing, has the usual dial, and correspondingly-fixed mark on the stationary ring surrounding the dial, for the purpose of indicating the location of the permutation-wheels.

The operation is as follows:

Assuming it to be locked, and it be desired to open it, the knob is turned as many full revolutions to the left as there are combination-wheels, and so much of an additional revolution as will bring the first number, on which the lock is set, on the dial opposite the mark provided on the stationary ring; the knob is then turned to the right as many full revolutions, less one, as there are combination-wheels, and so much of an additional revolution as will bring the second number on which the lock is set on the dial opposite the mark on the stationary ring; the knob is then turned to the left as many full revolutions, less two, as there are combination-wheels, and so much of an additional revolution as will bring the third number, on which the lock is set, on the dial, opposite the mark on the stationary ring.

The first operation above described has set the wheel nearest the bolt, the second has set the wheel second from the bolt, and the third has set the wheel third from the bolt.

If there be only three wheels the lock is now set, and it may be opened by turning the knob slowly to the right until the notch G′ of the disk G is immediately under the pin F′ of the link F, when the pin will fall into the notch, by the rear end of the bolt, which is for that purpose weighted, falling by its own gravity; the previously-described operations having separately withdrawn, by the operations of the cams C′, the arms D′, from underneath the projecting pin B′.

The combination cannot be disarranged when the bolt is withdrawn.

To disarrange when locked, turn the knob three or more times to the left.

To change the combination, select a number on the dial for every combination-wheel.

Assuming that there are three wheels, and it is desired to set the lock to any three given numbers, arrange the wheels upon the combination previously set; then insert the key Q into the appropriate hole in the bolt J‴, inside of the lock, until the little stump, which is not new and not shown in the drawing, has entirely entered the clutch of the key; turn the key a quarter circle to the left, which will loosen the pinion J′, and permit wheel and pinion to revolve together.

If the knob be now turned, the connecting-pins or projections by which the permutation-wheels move each other being upon the wheels J, and the pinions J′ free to revolve, the wheels J will revolve, while the cams C′, and all the portions of the permutation-wheels C, to which they are rigidly attached, will remain stationary.

If, now, the process previously described for opening the lock be gone through, varied only by stopping during the additional revolutions at the newly-selected numbers, the combination will be changed, as desired, but as soon as the last wheel of the combination is set, and before attempting to move the bolt, the pinion J′ must be tightened, and the key Q withdrawn.

Having thus described my invention,

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

1. In combination with wheel C and cam C′, the pinion J′, wheel J, clamp J″, and bolt J‴, when constructed and arranged for operation as herein described.

2. In combination with wheel C and cam C′, the yokes D, provided with slots S, and mounted on pins D″ D‴.

3. The yokes D, provided with slots S and arms D′, and arranged to move laterally on pins D″ D‴, in combination with the projecting pin B′ and bolt B.

J. C. HINTZ, JR.

Witnesses:

WM. H. SILLITO,

S. S. MORRIS.