2 Sheets--Sheet 1.

J. PIGOT.

Improvement in Combination-Locks.

No. 129,052. Patented July 16, 1872.

Fig. 1.

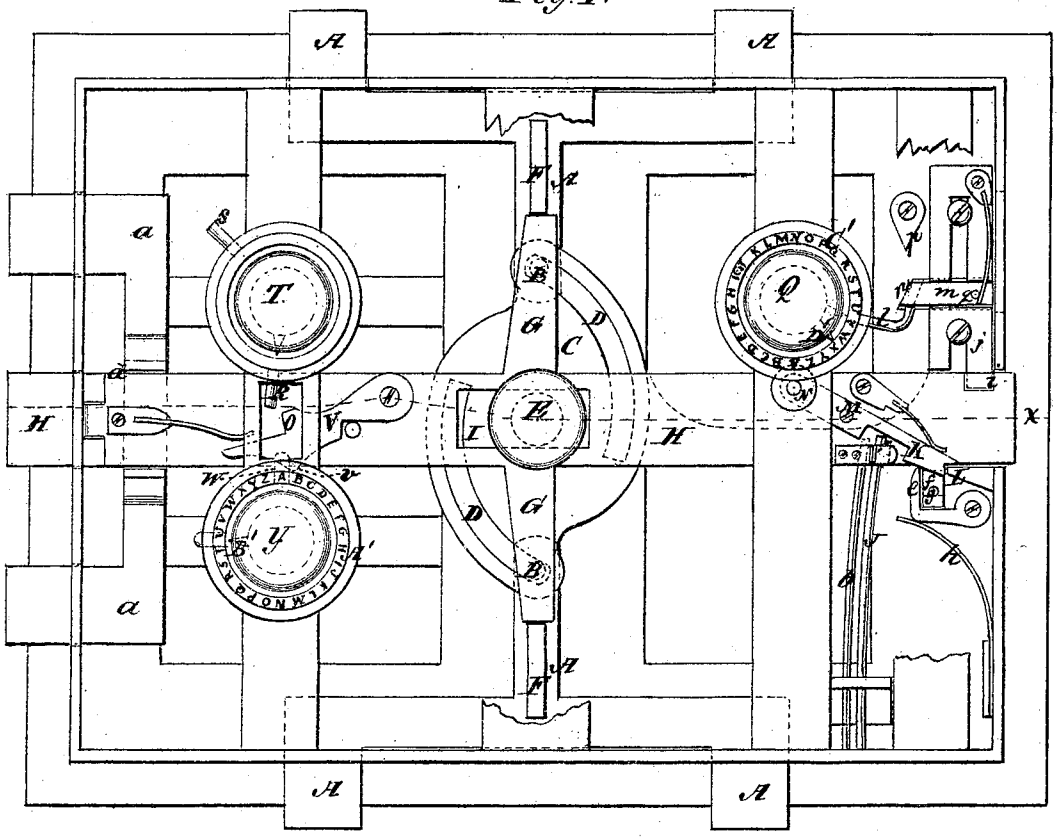
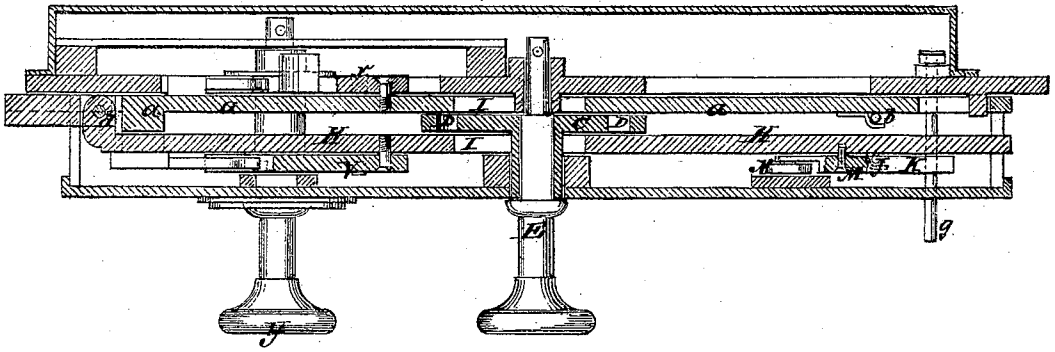


Fig. 2.



Witnesses:

E. Wolff.

N. A. Graham.

Inventor:

James Pigot.

PER Munn & Co.

Attorneys.

2 Sheets--Sheet 2.

J. PIGOT.

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Fig. 3.

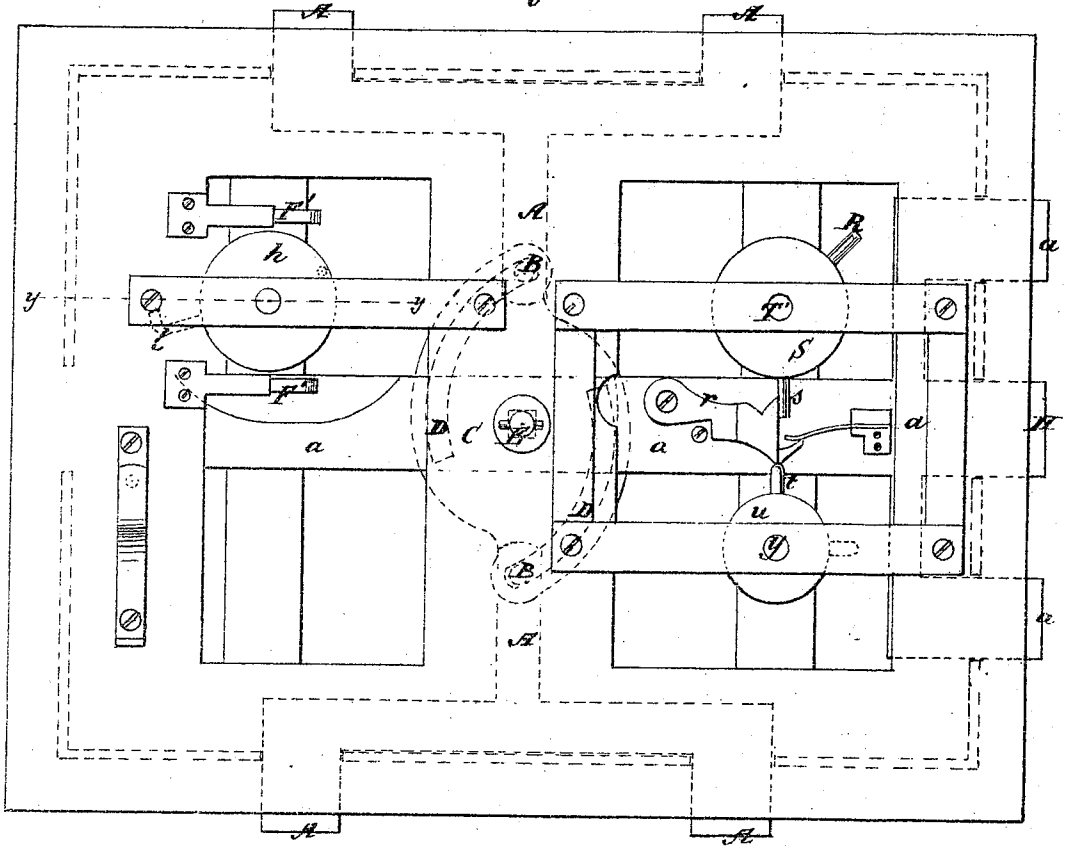


Fig. 4.

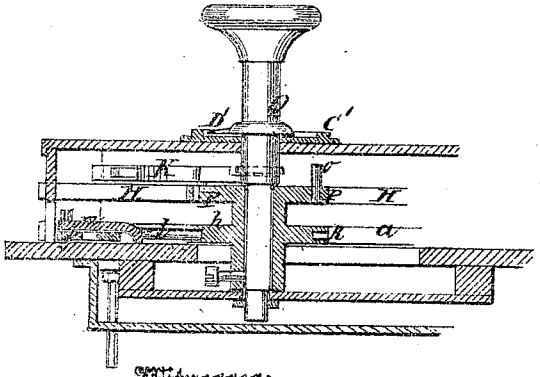
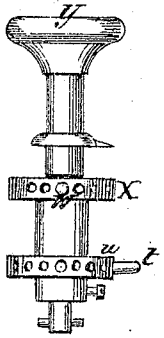


Fig. 5.



Witnesses:

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W. A. Graham

Inventor:

James Pigot.

Per Munn & Co

Attorneys.

UNITED STATES PATENT OFFICE.

JAMES PIGOT, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN COMBINATION LOCKS.

Specification forming part of Letters Patent No. 129,052, dated July 16, 1872.

Specification describing a new and Improved Combination Lock, invented by JAMES PIGOT, of Brooklyn, in the county of Kings and State of New York.

In my improved lock there are two vertical bolts, one at the upper side and one at the lower side, which are thrown out and in by a cam-plate with eccentric grooves on the spindle of a knob located at about the center of the lock; and there are two horizontal bolts, both of which are thrown out for locking by springs, and they are both thrown back, one at a time, by a knob-spindle, when a pawl is brought into the path of a revolving pin by a tappet operated by another knob-spindle, which is set for adjusting the retracting-pawl, to be so acted on by the retracting-spindle and its pin, according to the lettered dial, in connection with the pawl-setting spindle, each bolt having a separate tappet on the setting-spindle for adjusting its pawl, and the same in regard to the retracting-spindle. Each horizontal bolt is also provided with a drop-pawl for locking it when thrown out, and another spindle is required for lifting these drop-pawls to allow the bolts to be withdrawn, and the position of the spindle when the lifting devices are in contact and have lifted the drop-pawls are indicated by another dial. One of the horizontal bolts when thrown out prevents the other from being drawn back for unlocking, and must be drawn back first, and when drawn back is held by a spring-catch; then the other is drawn back and is held by the vertically-moving bolts, which are immediately drawn back by the cam. This horizontal bolt last withdrawn is thrown forward by its spring as soon as the vertical bolts are thrown by the cam, but the other horizontal bolt is not thrown forward until the spring-catch which holds it back is detached by a push-pin. When the first horizontal bolt is thrown forward it locks the vertical bars by projections which come behind the inner ends of them, and when said bolt moves back in unlocking it is locked in that position by the vertical bolts which come behind projections on it in unlocking, all as hereinafter more particularly described.

Figure 1 is a front elevation of the lock with the front plate removed. Fig. 2 is a horizontal section of the same on the line *x x*. Fig. 3 is an inside elevation of the lock with the plate removed. Fig. 4 is a section on the line *y y* of Fig. 3; and Fig. 5 is a side elevation of the spindle and disks thereon for setting the retracting-pawls by which the horizontal bars are drawn back.

Similar letters of reference indicate corresponding parts.

A represents the vertical bolts, which at the inner end have a pin, B, connecting them with the cam-plate C by the eccentric-grooves D. This cam-plate is attached to the spindle of the central knob E, and throws the said bolts out and in by the turning of the said knob spindle. These bolts A have a projection, F, by which they are locked against being withdrawn when thrown out by the arms G of the horizontal bolt H. This bolt H has a long slot, I, through which knob-spindle E passes, and by which the bolt is allowed to slide forward and back. This bolt H is thrown forward for locking by a spring, J, and is locked in that position by the falling pawl K with a notched end which drops upon a stop, L. This pawl is pivoted to the bolt at M, and at its upper end carries a friction-wheel, N, which is acted on by a pin, O, of a disk, P, on the knob-spindle Q, to lift the pawl K and free the bolt to allow of its being thrown back for unlocking. The said bolt is thrown back by the pin R of a disk, S, on the retracting-spindle T, acting on the shoulder O of a retracting-pawl, V, but before this shoulder can be so acted on the pawl is raised into the path of the said pin by the tappet W of a disk, *x*, on the pawl, setting knob-spindle *y*, which tappet acts on the point *v* of said pawl, which is so fine that a very slight turn of the spindle *y* will throw off and let the pawl fall so as not to be acted on by the pin R.

It must be understood that in unlocking this bolt does not move back until the other horizontal bolt *a* has been moved back. This bolt *a*, like the other, is thrown out for locking by a spring, *b*, but it cannot be thrown till after H has been thrown, as the shoulder of the latter at *d* prevents; and it is also held by the catch-pawl *e* until detached by the inclined block *f* and push-pin *g*, the latter projecting out through the front plate. The catch-pawl *e* has a spring, *h*, constantly pressing it against the bolt and the push-pin, and its inclined block are constantly pressed outward away from the catch-pawl so that the latter drops into the notch of the bolt automatically whenever the bolt moves back far enough. When the bolt *a* has been thrown outward by its

spring *b* the vertical plate *j* drops into the notch *i* in its upper edge, and locks it there until it is lifted out again, which is done by the same spindle Q, that sets the pawl K, for releasing bolt H, but by a separate operation, and by another disk, *h*, on it, said disk having a pin, *l*, which comes under a sliding-bar, *m*, on said vertical plate *j*, when the knob-spindle is turned properly and lifts it out of notch *i*. To insure the escape of this bar quickly at the proper time, so that only a slight change of the knob, spindle, and disk is needed in shifting the combination, this catch-bar *m* is made to slide transversely in the plate *j*, and the end *n* fronting the disk and beveled, as shown, is caused to come against the heart-shaped piece *p*, whereby it is pushed backward and thrown off the pin *l*. A spring, *q*, throws it forward again. This plate *j* being lifted up and held by the pin *l* and knob-spindle Q, the bolt *a* is ready to be thrown back; but before this can be done, its retracting-pawl *r*, like the one *v* for bolt H, must be brought up into the path of pin *s* of disk S on the retracting knob-spindle T by the tappet *t* of a disk, *u*, on the pawl-setting spindle *y*, as shown in Fig. 3; then, by turning spindle T, the same as in throwing the bolt H, bolt *a* can be thrown back, and when so thrown back it is caught by the catch *e* and held to allow bolt H, which is locked by it when thrown out, to be thrown back, and when H is back the vertical bolts A are drawn back by the knob-spindle E, and its lugs F come in front—that is to say, to the left—of the arms G of said bolt H, and secures it in the back or unlocked position. The disks *x* and *u* of the pawl-setting knob-spindle *y* have twenty-six different holes, into either of which their tappets may be shifted, and a dial, A′, with the letters of the alphabet on the front plate of the lock, and a pointer, B′, on the knob-spindle, are used to show upon the outside when the pawls are lifted, and the disks P *h* are similarly arranged for shifting their pins *o l*, and a lettered dial, C′, is provided with the spindle for indicating by any chosen letters when the pins are in the right position, the same being prearranged in the disks relatively to said letters.

It will thus be seen that any combination of four letters can be used to guide the operator in actuating the lock, and as many different combinations of four numbers may be had as twenty-six numbers are capable of.

Supposing the lock to be locked by the letters U S O A; to unlock it the knob-spindle *y* will be turned so that its pointer B′ will point to U on dial A′: the retracting-pawl *r* of bolt *a* will then be lifted up ready to throw said bolt back; then, spindle Q will be turned till its pointer D′ points to S, on dial C′, when the vertical plate *j* will be lifted out of notch *i*, and the said bolt *a* may be thrown back by turning the retracting spindle T; then, spindle Q being turned till pointer D′ points to O, the drop-pawl K will be lifted off from stop L, and spindle *y* being turned so that its pointer points to A, the drop-pawl V of bar H will be lifted into the path of pin R, and said bolt H may be withdrawn by the spindle T, and at the same time the vertical bolts A may be withdrawn by the spindle E, and the lock will be opened. A couple of snap-springs, F′, are combined with the disk *h* to deceive one attempting to pick the lock, by the clicking or snapping noises made by them, which would naturally be supposed to indicate the movements of important elements of the lock, and thus mislead to futile efforts; and in connection with this it should be noted that the said disks and their pins and tappets work entirely free of everything when not adjusted by the combination, and make no noise that can aid a lock-picker in his work.

I propose to make the lock open at the bottom, and to place a water-trough in the door of the safe below it, so that powder or other explosive material introduced into the lock for blowing it up will fall into the water, and thus be prevented from exploding.

It will be observed that the devices for holding the locking-pawl K and plate *j* to free the bolts, and also the devices for holding up the retracting-pawls are very sensitive, and unless carefully adjusted the lock will not work, thus greatly adding to the efficiency of the lock.

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

1. The combination of the vertical bolts A and horizontal bolts H and *a*, the bolt H being arranged to lock the vertical bolts when thrown out, and the latter to lock the bolt H when withdrawn, all substantially as specified.

2. The combination of one or more retracting-pawls, V or *r*, a retracting-spindle, T, and one or more pins, a spindle, and one or more tappets and disks for setting said retracting-pawls, with one or more locking-bolts H or *a*, the said disks for the setting tappets being arranged for shifting the tappets in accordance with a lettered dial for shifting the combinations, all substantially as specified.

3. The combination with the bolts H *a* of the locking drop-pawl K, holding plate *j*, spindle Q, disks P *h*, and pins *o l*, the latter being adjustable in said disks, substantially as specified.

4. The combination of the bolts H *a* and the several devices for retracting and setting the same, and the locking-pawls and the several devices for setting them, all constructed and arranged as herein shown and described, to operate as specified.

5. The combination with the vertical holding-plate *j* and lifting-pin *l* of the sliding-bar *m* and heart-shaped tripper *p*, substantially as specified.

6. The combination with bolt *a* and its spring *b* of the catch-pawl *e*, inclined block *f*, and push-pin *z*, substantially as specified.

JAMES PIGOT.

Witnesses:
ANSON P. THAYER,
T. B. MOSHER.