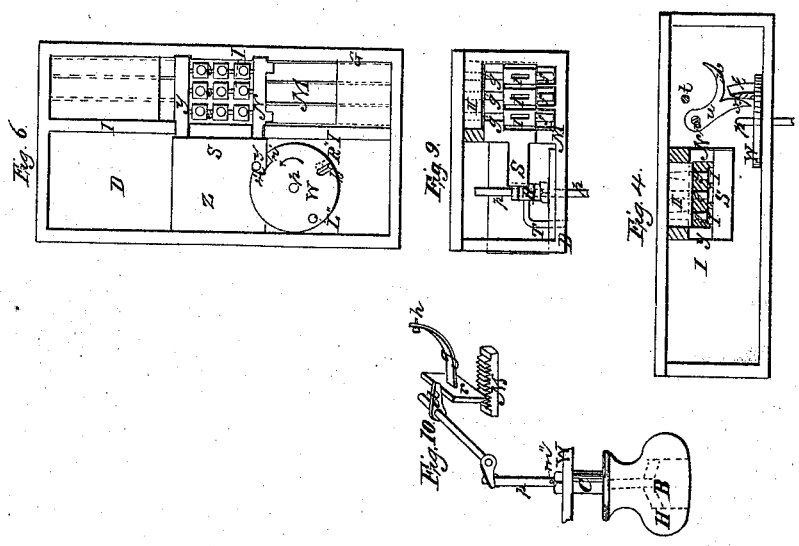
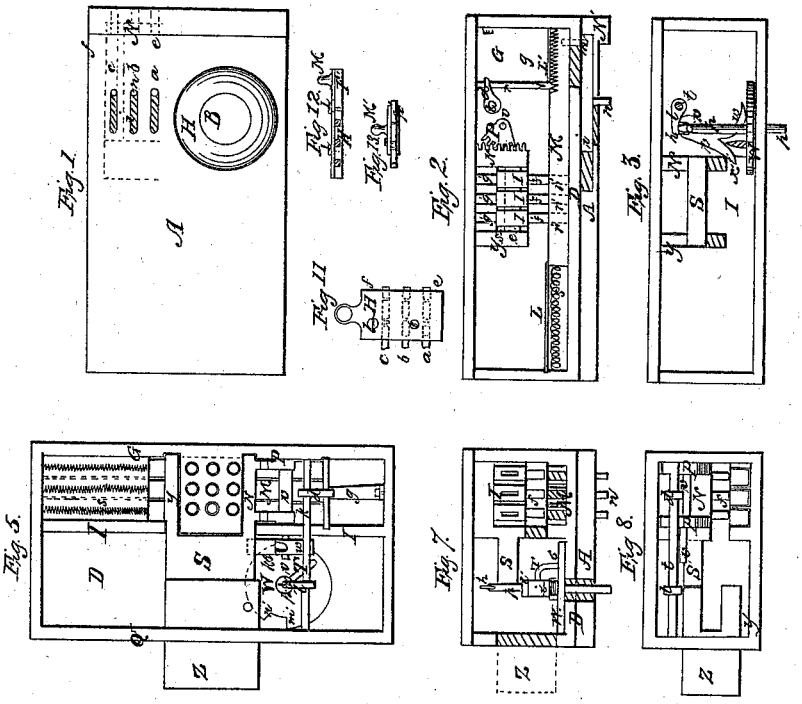
C. G. Mueller,

Lock.

No. 12,647. Patented Apr. 3, 1855.





UNITED STATES PATENT OFFICE.

C. GUSTAV MUELLER, OF CHARLESTON, SOUTH CAROLINA.

BANK-LOCK.

Specification of Letters Patent No. 12,647, dated April 3, 1855.

To all whom it may concern:

Be it known that I, C. GUSTAV MUELLER, of Charleston, in the district of Charleston and State of South Carolina, have invented certain new and useful Improvements in Powder and Burglar Proof Locks; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part thereof, in which—

Figure 1, represents a front view of the lock. Fig. 2, represents a vertical side view of one of the compartments of the lock. Fig. 3, represents a rear view of one of the chambers of the lock. Fig. 4, represents a side view of the same chamber. Fig. 5, represents the back of the lock, its plate being removed, and the bolt thrown out, and secured. Fig. 6, represents a similar view with the bolt thrown back into the lock, and the position of its connected parts. Figs. 7, 8, and 9, are transverse sectional views across the lock, at various points. Fig. 10, is a perspective view of the knobs, and the several pieces more immediately connected with them.

Figs. 11, 12 and 13, represent three different views of the key.

Similar letters in the several figures, denote like parts.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings, first premising that the shape and size of the lock may depend upon the special use to which it is to be applied, and it may be a right or left hand lock, and with slight modifications be placed on the inside or outside of a vault door, or be embraced within the inner and outer plates of the door, without any change in its principle of construction, my object being to construct a cheap, yet strong and effective lock that shall be powder and burglar proof, and applicable to all the purposes for which such locks are used.

H, represents the handle which is used for throwing out and in the bolt Z, and for operating the other mechanism in the lock, as will be described. In the center of the knob H, is placed another smaller knob B, which may be flush with, or projected a litle beyond the knob H, but which can be depressed toward the lock about one fourth of an inch, and without which depression the knob H, cannot be turned, or the bolt thrown. The knob B, after it has been depressed, and released, flies back into its regular position again by the action of a spring *g*, Figs. 2, 5, 10, within the lock.

A, is the front plate of the lock, and is solid, except where the axis of the knob H, passes through it, and the narrow vertical openings, through which the pins or projections *n*, *n*, *n*, on the steel bars *i*, *i*, *i*, protrude. These vertical apertures in the front plate are regulated in size according to the size and inner mechanism of the lock. The pins *n*, *n*, *n*, can be moved up and down in these apertures, and the bars *i*, *i*, *i*, of which they are part constantly keep the apertures closed up, so that neither powder, instruments, or anything else can be introduced into the interior of the lock, and it is thus made powder and pick proof. There are springs *s s s*, Fig. 5, above the plates or bars *i i i* which operate indirectly on said bars for forcing them and the pins *n* attached to said bars back to their places, after the power by which they were previously moved up, has been withdrawn. It is obvious that instead of the projecting pins *i i i*, for operating the slides there may be depressions or holes in the bars into which the key or other instrument may be introduced for moving said bars. This would leave the front of the lock smooth and prevent the damaging of it, which might be done by breaking off the pins, when they are used. And if found essential these slides or bars, may be further protected by placing them farther in the lock, and reaching them through small tubes, with a key properly prepared for such an arrangement.

The lock is divided into two compartments by a plate I, which extends from its front to its back, as seen in Figs. 5, 6, and a vertical side view of one of the compartments is shown in Fig. 2. The bars *i i i*, move between the front plate A, and a second plate D, behind it, and a sideview of one of them with its projecting pin *n*, is seen in its position between the plates A, D, in Fig. 2. Behind the plate D, is another bar M, which is about two thirds of the height of the lock in length, and its movement is the same as that of the bars or plates *i*. The plate D, has at its base an opening or openings, of the same length as those in the plate A, but the highest points of the open-

ings in D, are below the lowest points of the openings in A, so as not to come opposite each other. Through the opening in D, protrudes a pin *m*, Fig. 2, which is a part of, or connected to the bar M, and fits into a suitable hole in the plate *i*, thus connecting the bars M, and *i*, by means of said pin *m*, so that the several parts shall have corresponding movements. When the pin *n*, is lifted, it carries with it plate *i*, and by means of the connecting pin *m*, it carries the bar M with it. The bars M, slide between the plates D, and L, L′, and are separated from each other by thin plates of metal (as seen in Fig. 5,) which serve as ways or guides for the movement of said bars M, of which three are shown.

On top of each bar M, is a spiral spring *s*, which presses them down when no power is applied to keep them up. The lower parts of the bars M, have rack teeth (Figs. 2, 10,) cut in them, which in length should be a little more than the openings through which *n*, and *m* are protruded. *r′*, *r′*, *r′*, Fig. 2, represent round holes drilled into the bars M, large enough to receive and contain the horizontal slides *f′ f′ f′*, which will be hereafter described more particularly. The bars M, beyond what has been mentioned are solid.

In Fig. 10, is represented, in perspective, the knob H and its several devices in place for operating the bars M. C, is the axis of the knob H, and passes through plates A, and D, and through this axis which is hollow, is fitted a rod *p* which connects the inside or small knob B, with the interior mechanism of the lock. A pin *m″* passing through the rod *p*, serves to keep the knob B, from moving out beyond a certain distance, which should be about flush with the knob H. *z*, is a pivot on the rod *p* by which a thin short piece of metal *h*, is attached to it, and which rests loosely in an opening in lever *l*, which is attached to a rod *t*, which extends from one side of the lock to the other, and is supported in the plates Q and G (Fig. 5,) passing through an opening in the plate I. Opposite to the collective center of the bars M, on the rod or shaft *t*, there is placed another lever *d*, which extends downward, and rests on or against a steel plate *r*, which is movable in grooves cut in the plates I, G, (Figs. 2, 5). This plate *r*, is connected at its center with a spring *g*, which is permanently attached to the bottom of the lock, by a screw *h″*. The spring works loosely in an opening in plate *r*, through which it extends, and it presses the plate *r*, toward or against the lever *d*. When unrestrained by any external pressure the spring *g*, keeps the plate *r* (which has its edge next the bars M, wedge shaped) about one fourth of an inch distant from the bars M, opposite the upper of the rack teeth, as seen in Fig. 2. When in this position as the plate *r*, presses against the lever or arm *d*, so will the lever or arm *l* press against the rod *p*, and when the knob B is forced out by *p*, to its greatest extent, it will be flush with the knob H. From this arrangement of parts it is obvious that if the knob B, is pressed in, the rod *p* will press against the arm or lever, which partially burning the shaft *t*, will cause the lever *d*, to press the plate *r*, down into the rack teeth in M, it making no difference into what position the bars M may have been lifted. When this has been done (and it must be done before the knob H can be turned in order to throw back the bolt) every one of the bars M, and the bars *i*, *i*, *i*, with which they are connected are rendered entirely immovable, and cannot therefore be made to produce any friction on the inner side of the lock, as long as they are thus held by the plate *r*; and as the horizontal slides *f′ f′ f′* (Fig. 2) which have to be forced into the holes in the bars M, are a short distance from the surface of the bars M, before the knob H is turned, it follows that these slides *f′*, cannot be pushed or pressed against the bars M, before they have been fastened by the plate *r*, thus making any friction between the bars M, and slides *f′* impossible, and consequently making the picking of the lock just as impossible, for locks can only be picked by producing friction between the parts, and ascertaining how the various parts fit each other, and at what points or elevations. An expert lock picker first ascertains with his implements the avenues to the bolt, by raising and lowering, or by pressing against, the parts to feel which yield, and which are rigid, and at what particular positions they are thus yielding or rigid and so discovers his way to the bolt. Now by fastening rigidly the bars M, in my lock, I remove any and every possibility of arriving at the particular part that holds them from moving, as nothing will move those parts but the key that placed them there.

The axis C, of the knob H is square, beyond plate D (Fig. 7) and on its square part has a circular plate W, which of course moves with the knob. On the rod *p*, behind the plate W, is attached a steel arm T, by means of a collar R, around the rod, and which can be turned around on the rod *p*, while it is prevented from sliding either way horizontally on the rod by the flanges *i′*, *i′*. The plate W has a hole VI, in it, as seen in Fig. 6, into which the arm T, fits; and at the two extreme points, to which the hole VI, can be brought by the turning of the plate W, there are holes about one fourth of an inch deep in the first plate D of the lock, of the same diameter as the hole in the plate W. The arm T, is of

such a length, as to be able to rest with its point in either hole of plate D, when the hole VI has been brought opposite to either, and when the rod p, with its knob B, is flush with the knob H, as seen in Fig. 10. When the arm T, rests in either of these holes in plate D, the plate W, of course is immovable, and this position exists at the two extreme points L″, and R″, Fig. 6, or in other words when the lock is in its entirely locked or entirely unlocked state. During the intervening movement, and in order to make the knob H, movable, the knob B, is pressed upon, and this will lift the arm T, out of the hole in plate D of the lock, but it will remain in the hole VI, and thus be carried around until it comes to the second hole, into which it will drop, if the pressure on the knob B, is removed, by the action of the spring g, before described. This contrivance completes the fastening of the bars M, by plate r partially before, and during the turning of the knob B.

The plate W, is not entirely circular, that part of it between the dotted radial lines (Fig. 6) being of smaller diameter than the remaining portion. This leaves the point m' farther from the center than n', say about one fourth of an inch for a purpose to be described.

Figs. 5 and 6, shows the bolt z, from the back. y is a projecting point on it, upon which the circular plate W, by means of its two points n' and m', acts, to move the bolt out of the lock or into it. On turning the knob H, and by it the plate W, in the direction of the arrow Fig. 6, the point n', will be brought to act on the pin or point y, and will thus move the bolt out of the lock. When the bolt is out of its fullest extent, the point n' will clear itself of the projection y, and will pass it. Fig. 5, shows the position of plate W, and of the bolt z, after the latter has been moved forward, and after n', has passed the projection y. By reversing the motion of the knob, the point m', being longer, or projecting from the center of motion farther, will throw back the bolt into its original position. The plate W, (Fig. 5) after throwing out the bolt, can be moved say one eighth of a circle more, when it is stopped by a screw in the front plate of the lock, which prevents it from turning farther. This one eighth circular movement is intended to operate other mechanism in the lock, and as above said, is applied while the bolt is out, and at rest, the special purpose of which will be hereafter explained.

The plate W, (Figs. 3, 4, 5 and 6,) has a projection k on its surface which works the forked lever U. The projection k, is so arranged that it will not come up to and touch the fork x, before the point n', has cleared itself of point y, after throwing out the bolt z. But when this does take place, then the projection k, will move up the fork x. Now by reversing the motion of the plate W (by turning the knob H) the projection k will first press down fork w, of the lever U, and on continuing the motion, the bolt z, will again be thrown into, or inside of the lock. It will be perceived in Figs. 2, 4, 5, that the lever U, is secured to the axis v, the ends of which rest in plates I, and G. Inside of these plates, and close to each are attached segment wheels P (Fig. 2) on the aforesaid shaft v, which catch into and work forward and backward the rack N, which is the lower part of the plate marked S, N, y, (Figs. 5, and 4.). The upper and lower part of said plate (marked N, and y) are shaped as plates, and the part S, is a square piece of metal which connects N and y—that part S, being only about half the width of those N and y. This connection is on the side of plate I, which has an opening cut into it, sufficiently large to allow of the moving of N, S, y, forward and back for—say—one half inch. The part S, projects into a compartment, as far as the extent of the movement of the bolt, will admit, while N, S, y, slides in the square opening in plate I. N and y have grooves, in the plate G, (Figs. 5, 6) which correspond in depth to the opening in plate I. In Figs. 4 and 5, is shown a plate marked II, with hole drilled through it with great care as to symmetry, which serve for a purpose to be described. The plate II, is attached permanently to plate G (Fig. 5) and extends across to the plate I. It is about half an inch thick more or less, and its height is such that it just fits between N and y (Figs. 3, 4, 5,) and consequently N, and y, can be moved over the plate II. When the projection k moves up the lever U, this result will be produced viz the moving of N, y, over II; and when the projection k, depresses the lever U, the plates N, and y, will be withdrawn from plate II.

Fig. 9, represents the bolt Z from below, in the same position as it is shown from behind in Fig. 6. In this same Fig. 9, N, S, y, is also shown from below as it is shown sidewise in Fig. 4. The bolt Z, has a square opening at its back part, which slides over and fits exactly onto plate S. The first movement of the knob H, throws out this bolt Z, without effecting the part N, S, y. But after the bolt is out, then the part N S, y, is thrown into the position shown in Fig. 3. Then the piece S, is thrown behind the extreme back of the bolt Z, as seen from below in Fig. 8, and from behind in Fig. 5.

Fig. 6, represents the bolt Z, and piece S (the latter in dotted lines) in the same positions as Fig. 9, represents it from below, and

it will be seen that it is impossible to slide back the bolt unless the piece S, has first been removed from behind it, which can only be done after the proper key has been applied to open the lock. To N, and y, are attached, in a line with S, though not quite so wide as S, and at equal distances, three steel rods e', Fig. 6 (though they may be more or less in number than three) the length and breadth of which are shown in dotted lines in Fig. 2,—their thickness is seen in Fig. 6. To these rods e', e', e', are attached horizontal sliding pins f', I, g', (Fig. 9,) the ends f', and g', of which are round, and the center part I, square; in their centers they have an oblong opening, by means of which they are snugly hung on the rods e', and they can be moved up and down on the rods. The holes in plate II Fig. 5, are drilled in a line opposite to each of the ends g', g', g', of these horizontal sliding pins; and the holes in the bars M, M, M, are opposite to the ends f', f', f', of the horizontal sliding pins. When the plate N, S, y, is moved to the back of the lock, as shown in Fig. 3, it will carry with it the horizontal sliding pins just spoken of, and these pins will then be pushed into, and rest in the holes of the plate II (Fig. 2.) When in this position their ends f', f', f', are then say one sixteenth of an inch distant from the vertical bars M, M, M, and the holes r', in said bars M, being opposite to f', (when said bars are at their lowest position, and when the horizontal sliding pins rest in the lower holes of plate II, into which they will be pushed unless lifted by exterior force) the ends f' will on moving the plate N, S, y forward (as in Fig. 4) be pushed, (after having passed over the distance intervening between them and the bars—$\frac{1}{16}$ of an inch as above stated) into the holes r' of bars M (see Fig. 2). While the ends f', rest in the bars M, the moving upward of the latter will also give a corresponding motion to the horizontal slides of which f', are the ends. The bars M, are lifted, by the lifting pins n, and it is the key which effects this. The key has a bit for each pin n, and said bits are capable of being extended to such lengths as will correspond with each hole in plate II, or in other words, the distance vertically of said holes, being marked on each bit of the key, and each bit being adjustable to either of these distances, the key is therefore capable of lifting (by being applied to the pins n) the horizontal slides f' I, g', from the positions they occupy into other positions. Assuming that, by means of a key such as described the horizontal pins have been lifted to either of its positions, the ends g' will by moving the plate N S, y, to the back of the lock (as in Figs. 2, 3,) be pushed into such holes of plate II, to which they may have been brought opposite to, or in line with. If then the key is withdrawn from the pins n n n, the pressure of the springs s (Figs. 2, 5) will bring the bars M, into their original position, as shown from the rear in Fig. 5. As the ends f' of the horizontal pins f' I, g' cannot be pushed through the solid portion of the bars M, it follows that these bars have to be lifted to exactly the same height again to which they were lifted first by the key, in order to bring the hole in each bar again directly opposite to each end of the horizontal pins f', to admit of moving the plate N, S, y, back again, and of course forcing f', into the holes of the bars. The key can then be withdrawn and as the springs s can act again, they will of course press down the bars M, which will carry down with them the horizontal pins and bring these again into the same original position shown in Fig. 6. After this the key may be altered to suit the operator or user—that is, the length of one or more bits may be altered which of course will effect a different location of the horizontal pins in plate II, and thus almost any number of changes may be made in the lock. Having locked the lock with a certain combination of bits, the slightest variation from that combination will make the opening or unlocking, with the key, impossible.

Figs. 11, 12, and 13, represent different views of the key. F′, is a plate which contains grooves, in which fit, so as to be movable at pleasure, the bits p', p', p'. These bits have small rills cut into them at equal distances, and which are regulated according to the plate II in the lock. H′, is a plate which is secured to plate F′ by two screws l' l' and thus the bits p' are contained between the two plates H′, and F′. The openings in plate F′, through which the screws l' l', extends are say one eighth of an inch long, so that plate F′ can be moved to and fro. On the inner side of plate F′, there are small projections, which when the cuts in the bits p', are brought in a line with them, can be pushed into said cuts and thus fasten the bits. By moving plate F, in one direction its projections will be withdrawn from the incisions of the bits p', and they can then be drawn out to vary their length or change their combination, and the bits may be marked with letters, figures, or lines, so that the combination may be recorded, and when this has been done they can again be fastened by returning the plate F, to its first position. M′, is a small knob on plate F, which facilitates the handling of the latter—the key in its entirety being very small indeed, for even a very large lock.

The manner of locking the lock is as follows: After the key has been given a shape to suit its user, it is applied below the

pins *n*, *n*, *n*, and it is then moved upward, which causes the bits to slide up the pins the distance for which they were set. When the points *e*, *f*, of the key have reached the top of the projection N′ (Figs. 1, 2) the key is pressed at its foot close to the front plate A, of the lock, and rests on the projection N′, where it will remain of itself without holding it with the hand. The knob B, is then pressed down with the thumb, and by means of the fingers of the same hand, the knob H is turned around until the bolt is thrown out, the thumb is removed from B, and it returns to its former position. The key is then removed, and the locking is completed. To unlock again the key is introduced as before, the thumb applied to B, and the motion of the knob H reversed.

If the person in charge of the key, wishes to change its combination after he has locked the lock with it, to make it almost an impossibility for any other person into whose hands the key might fall to open the lock with it, he should note carefully the shape which he gave to it at the operation of locking, as otherwise he would have as little probability of unlocking the lock, as any other person, not having the right shape of the key, would have. The key may be so made as to require weeks before the whole combinations could be gone through with.

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

1. A key provided with extension bits, the individual length of each of which can be altered at pleasure, and still be applicable to the lock, as described.

2. I also claim the arrangement of the plates M, and slides *f*′, for preventing any friction, and so as to prevent the possibility of feeling how the plates or slides are connected, as set forth.

3. I also claim the bars M having saw-toothed racks, as arranged with the sliding bars *i*, and the projecting pins *m*, for operating them from the outside of the lock as described.

4. I also claim the arrangement of the horizontal changeable sliding pins which are moved by the bars M, the rack, toothed wheels or segments, and forked lever U, which is moved by the projection on the circular plate W, as set forth.

5. I also claim as arranged the bars M, and the stationary plate II, for holding the pins when they are withdrawn from said bars, as described.

6. I also claim the arrangement of the knob, the collor R with its bent arm T, and the circular plate W, for turning and holding said plate, substantially as described.

7. I also claim as arranged the rod *p* of the inner knob, the lever *l*, shaft *t*, lever *d*, plate *r*, and its spring *g*, for connecting said knob with the bars M, and operating them as set forth.

C. GUSTAV MUELLER.

Witnesses:

C. A. BREWSTER,

A. B. STOUGHTON.