

S. H. GILMAN.
Locking Knob-Latches.

No. 159,257.

Patented Feb. 2, 1875.

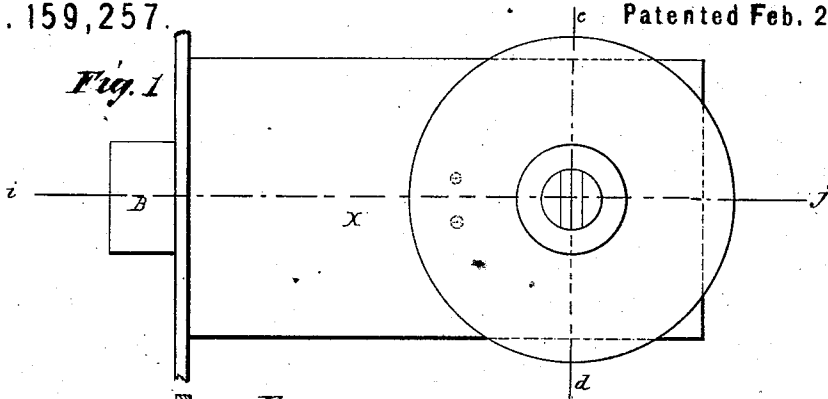


Fig. 2.

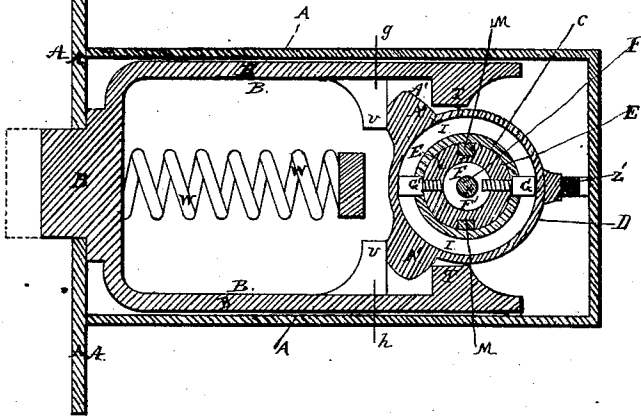
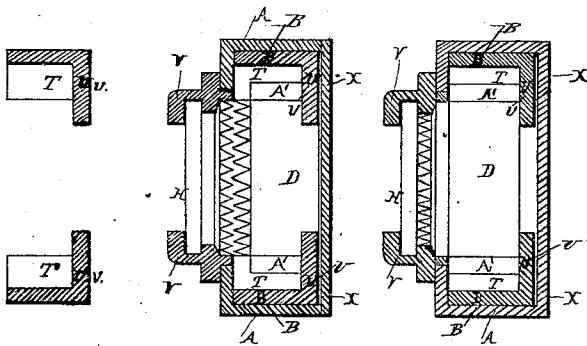


Fig. 3.

Fig. 4

Fig. 5.



Witnesses.
James Martin Jr.
J. N. Campbell

Inventor.
Sam^l H. Gilman
Mason, Plavicki & Lawrence

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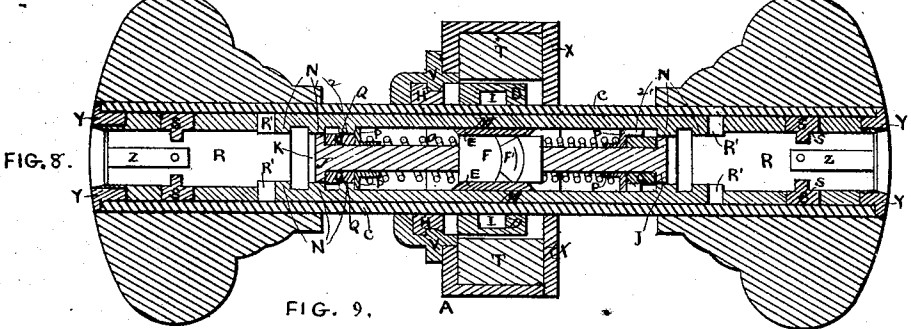
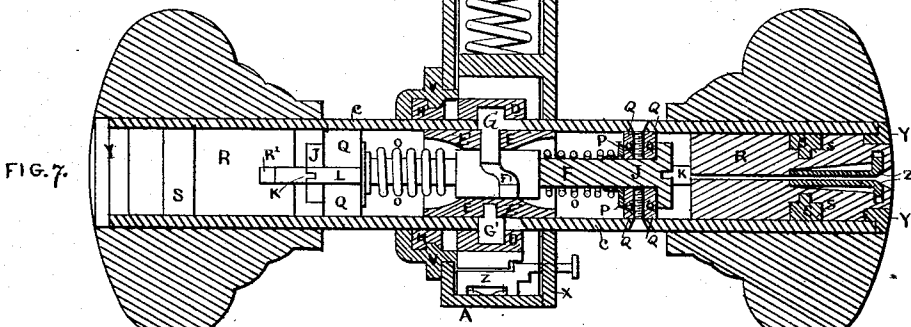
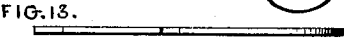
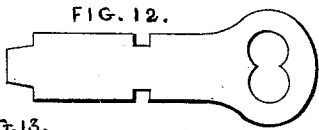
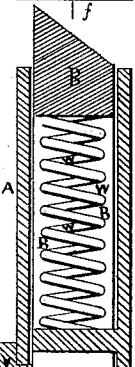
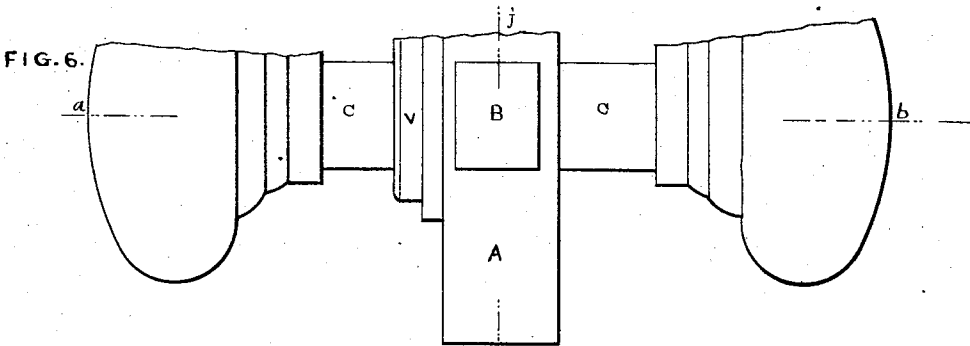


FIG. 9.

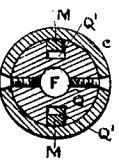


FIG. 10.

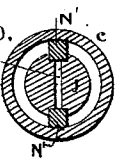


FIG. 11.



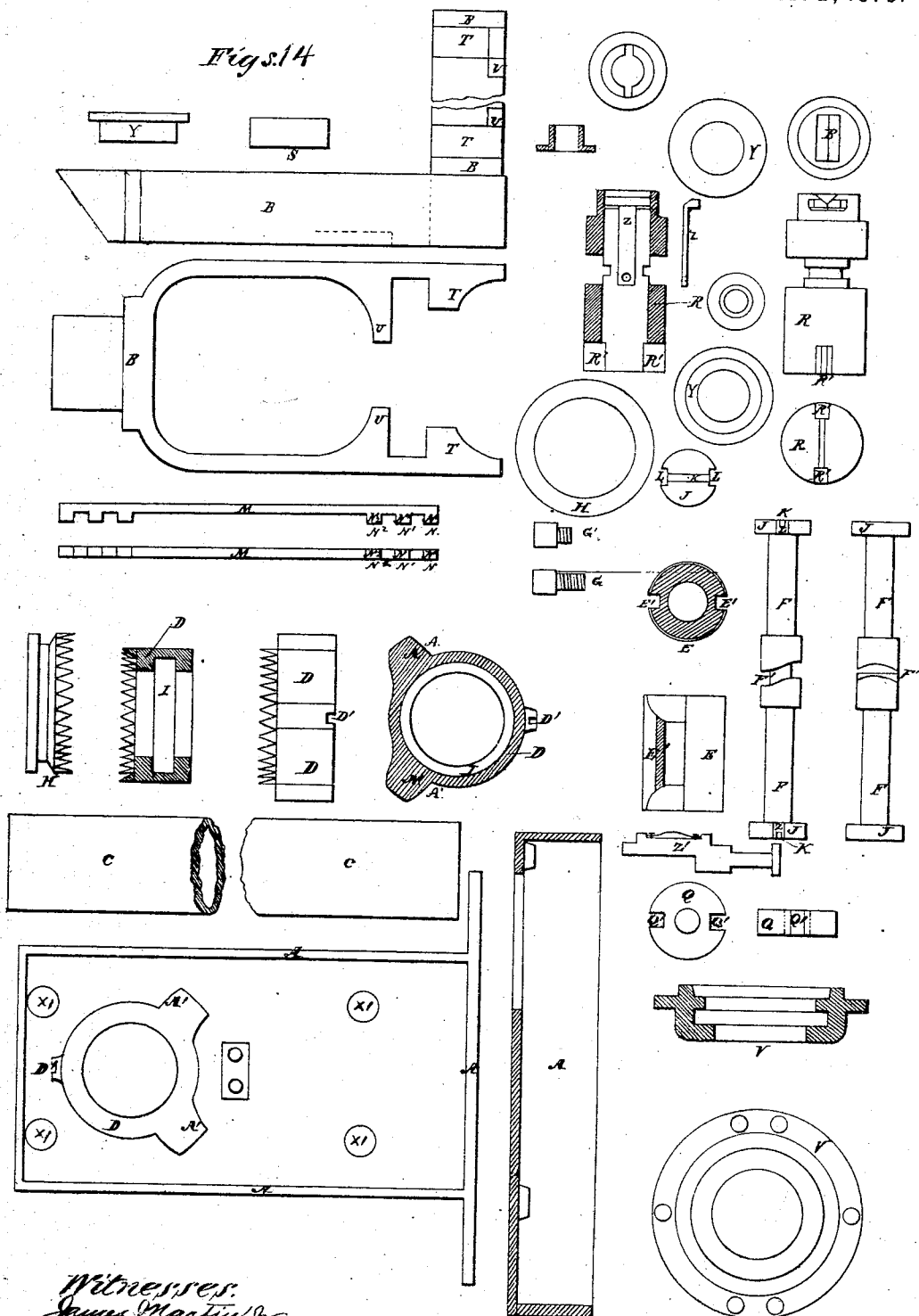
WITNESSES:
James Martin Jr.
J. W. Campbell.

INVENTOR:
Sam'l H. Gilman
Mason Trenchard Hammer.

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Lawrence H. G. L. - by
Mason Forman & Lawrence

UNITED STATES PATENT OFFICE.

SAMUEL H. GILMAN, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN LOCKING KNOB-LATCHES.

Specification forming part of Letters Patent No. **159,257**, dated February 2, 1875; application filed July 11, 1874.

To all whom it may concern:

Be it known that I, SAMUEL H. GILMAN, of New Orleans, parish of Orleans and State of Louisiana, have invented a new and useful Improvement in Mortise and Rim Locks for Doors, Drawers, and other purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a side elevation of the lock. Fig. 2 is a vertical section. Figs. 3, 4, and 5 are sectional views of portions of the lock. Fig. 6 is a front elevation of the lock. Fig. 7 is a central horizontal section on the line *a b* of the lock. Fig. 8 is a vertical longitudinal section on the line *c d* of the lock. Figs. 9, 10, and 11 are cross-sections through different parts of the knob and spindle. Figs. 12 and 13 show the key of the lock. Figs. 14 are detail views of the several parts of my lock.

The object of my invention is to make a lock the bolt of which is attached and detached from the spindle and knob of the door or drawer, so that the knob shall, when in connection with the bolt, be capable of moving the bolt, and when not in connection with it, and the bolt is locked, shall be capable of unlimited revolution independent of the bolt, in either a right or left direction, both on the inside and outside of the door, the construction also being such that the connection with and disconnection from the bolt and the knob are effected by inserting the key through the knob only, there being no key-hole through which dust and damp can enter in the lock itself, and the key-hole in the knob is such that it automatically closes when the key is withdrawn. Further, the key may be entered in any plane of the circle of the knob, and with either edge up and turned in either direction, and the lock is either a right or left hand one, and its construction is such that it can be locked at will on one side of the door, so that neither its own key, nor any other instrument, can unlock it from the other side; and, finally, it is capable of having at least one hundred and fifty thousand changes, which will render it impossible almost to pick or unlock it with skeleton-keys, or with any device but a key fitted to its combination.

A is the case or shell of the lock, and contains the bolt B, the hub D, and the spiral bolt-spring W and small dog Z, and receives the spindle *c* transversely through it. B is the latch and bolt, all in one piece, divided, after it enters the shell, into two branches, each of which fits the shell on three of its sides, and is guided by it. Each of these branches is extended to form the legs T, by which the bolt is drawn into the shell, and the locking-legs U, by which it is fastened out of the shell. This bolt can be increased to the full height of the case A without changing any other part of the lock. *c* is a hollow spindle, carrying on its outside, and fast to it, the wedge-toothed clutch-wheel H, which corresponds in its diameter and form of tooth to the loose hub D. It also contains within it the key-hole pieces R, the key-shaft F, the dogs M, traveler E, key-shaft boxes Q, spiral dog-springs O, and collars P. The hub D is constructed with two arms, A', which work in front of the legs T when the bolt B is unlocked, and is thrown behind the locking-legs U when the bolt B is locked. It has on one side teeth to fit clutch H, and has a groove, I, on its inside. E is a traveler on the center of the key-shaft F, and fitting the inner diameter of hollow spindle *c*. It has two longitudinal slots, E', for the free movement of the dogs M, and holds the two screw-pins G and G'. F is the double-ended key-shaft, held in place and revolving in the box Q. Each head J has a transverse key-slot, K, and on each side of each head a longitudinal dog-slot, L, for the middle teeth N' of the dogs M. The central portion is enlarged in length where the traveler E works, and has in that part a square groove, F', entirely around its circumference. This groove deviates from a right line and returns again to the starting-point, the exact distance that the hub D is to be moved laterally on the spindle *c*. Ordinarily this distance will be one-eighth of an inch, and there will be, therefore, in this groove two opposite points from which the key-shaft F can be turned, and either way it is turned the groove will move forward a tooth fitting it. G G' are two screw-pins fast in the traveler E, with their heads extending out through the shell of the spindle *c* into the internal groove I of the hub D. G

has its foot in the groove F' of the key-shaft F . H is a wedged-tooth clutch-wheel fast on the spindle c , and corresponding in diameter and shape of its teeth with the hub D , to which it is attached when the bolt B is unlocked, and from which it is detached when the bolt B is locked. I is the internal groove in the hub D , into which the heads of the screw-pins G and G' extend. J is the head of each end of the key-shaft F , containing one transverse key-slot, K , across the center of its face and a longitudinal dog-slot, L , through its two sides at the terminating points of the key-slot K , to receive the tooth N of the dogs. (The slots L are in all the figures filled by the teeth N^1 .) M are the sliding dogs, which hold the key-guides R and shaft F in position, each having six teeth, $N N^1 N^2$, three at each end of the respective dogs. o are spiral springs, which, through the collars P , hold the dogs M in position when not pressed back by the key. The said loose collars P are on the key-shaft F , and are pressed against the teeth N^2 by the spiral springs o . Q are boxes or pillar-blocks, which support the key-shaft F , and are fastened in position by screws through the shell of the spindle c . R are key-guides, held in position relative to that of the key-shaft F by the teeth N of the dogs M working in slots made across their inner ends. S are the key-guards or wards, and may be placed at any point between the dog-slot in the inner and the shoulder at the outer end of the key-guide, and there may be one or more; and they may be of different thicknesses and projections into the key-hole passages. T are two legs on the bolt B , against which the arms A' of the hub D press to throw the bolt B back into the shell A of the lock. U are two locking-legs on the bolt B , behind which the hub D and its arms A' are thrown by turning the key-shaft F and holding the bolt B fast out of the shell A . V is a cap bolted to the shell A , with a tongue and groove fitting a tongue and groove of the clutch H , to keep the spindle in position end-wise. This cap is made in two pieces, in order to get it into the tongue and groove of the clutch H . W is a spring to keep the bolt out. X is the cover to the shell A . Y are the stoppers in the ends of the spindle c . Z are automatic key-hole guards for keeping the holes closed when the key is out, and hugging the key snugly when in, so that no dust or damp can enter the lock. They are formed by two lips attached to two spring-tongues, which are fitted into recesses in the sides of the key-passage in the key-guides R , where the ends of the tongues are fastened by a screw in each. These springs keep its lips constantly pressed together, and, their mouths being V -shaped, a slight pressure of its key opens them for its passage. These lips and their attaching-springs, being fastened to the key-guides R , turn with it in locking or unlocking the bolt of the lock. The outer face or edges of these lips is concealed behind an inward projection on the extreme outer end

of the key-guide R , which is flush with the face-circle of the knob. This inward projection is for the purpose of covering the spaces behind each lip, which are open when the lips are closed, and which are occupied by the lips when the key is in the lock, and they are by it (the key) pressed back. Z' is a small dog on the inside of the door-lock, which serves to lock the hub D when pushed in or drawn out, as the lock may be used as a right or left hand lock. This is for the convenience of locking the door without using the key, the knobs only being locked, and the bolt left free to be pushed in by shutting the door. When so locked, it is unlocked from the outside by turning its key one entire revolution, the first half of which pushes the dog Z out by the hub D , and the second half-revolution carries the hub D back into the clutch H , leaving the hub-spindle and knobs and bolt free to work. X' shows the positions of several holes through the lock to fasten it to the door when used as a rim-lock.

The operation is as follows: In all the drawings except Figs. 4 and 7 the parts are shown as unlocked and in position for the bolt to be drawn back by turning the knobs either way. Now, to lock the bolt B , the key, Figs. 12 and 13, has a shoulder on each side near the end, so that when pressed into the bottom of the key-slot in the head J of the key-shaft F , these shoulders will have forced back the dogs M exactly far enough to push the teeth N and N^1 , respectively, out of the slots R' in the key-guard R and key-shaft heads J . Then, if the notches in the shaft of the key fit the key-guards or wards S , the key guide and shaft will revolve, and move the screw-pin G , traveler E , and hub D one-eighth of one inch out of the clutch H , and into the range of, and behind, the legs U on the bolt B , and prevent the bolt from being pushed back into the lock. To complete the locking of the bolt, one-half a turn must be made with the key, when the springs O will stop it by pushing the teeth of the dogs M back into the respective slots as soon as they come in range. The bolt B is now locked, and the spindle c is entirely free to revolve in either direction, the heads of the pins G & G' moving around free in the groove I inside of the hub D . This free rotary movement of the spindle when a door is locked will prevent any straining of the lock, through the knobs, in trying the door. To lock a door on one side so that it cannot be unlocked from the other side even with its own key, turn the key one-fourth or any larger fractional part of its whole movement, (one-half a revolution,) stopping short of the cut through the guard S , at which point only it can be withdrawn, and leave it in the lock, when, the key-guide R on the opposite side not having moved from the fact that its dog-teeth N are pushed farther into it, and it does not present its key-passage in the same plane as the key-slot K in the head J of the key-shaft F , neither can the dogs M be pushed

back by any means, because there are no slots in line for their teeth to enter either head J of the key-shaft, or opposite key-guide. When the door is full locked, and the key withdrawn, then, to unlock it, it is quite immaterial in what radiuses of the circle the key hole or passage in the key-guide R is found, because the clutch H is equally ready in all parts of the circle to receive the hub D, and hold it to the spindle *c*.

Both sides of the key being exactly alike, it cannot be put in wrong, and as the key cannot be withdrawn except when the bolt is full locked or full unlocked, in both of which cases the notches in the edges of the key-shaft are at the extreme of its lateral throw, therefore it is immaterial which way the key is turned, either to lock or unlock the bolt.

The teeth of the clutch H and hub D may be V-shaped, as here shown, or the connection may be made by holes in one, and pins or cogs to correspond in the other, and one or two V-shaped teeth or cogs in one will produce the same result as to have the circumference of each full, as here shown; but I prefer the latter, which is the most certain and durable.

For thin doors and cheap locks the case A may be reduced to one-half inch width or thickness by reducing the width of the hub D and bolt B.

When this lock is made for bureau or other drawers, or doors which are to be opened from one side, and only one knob is required, all of the spindle *c*, and the mechanism within it on one side of the shell A, may be cut off.

The key changes are made, first, by variations in the thickness of the heads J; second, the distance between the bottoms of the key and the outside of the teeth N; third, the position of the key-guards S; fourth, the thickness and projections of the guard S; fifth, the number of the guards S; and, sixth, by the length of the teeth N. These points will give upward of one hundred and fifty thousand variations of key to open them all.

What I claim as my invention is—

1. The endless groove F' around the key-shaft F, deviating from a right line in one-half of its circumference sufficient to throw the hub D the distance of its entire lateral movement, and deviating back to its starting-point on the other half of its circumference, the two lateral extremes of the groove being similar or precisely the same, all for the purpose of rendering it impossible to turn the key in either direction without obtaining the desired

result, substantially as described, and for the purpose set forth.

2. The hub D, constructed with two arms, A', toothed on the whole circumference of one side of its circular portion to match the clutch-wheel H, and an interior groove, I, all being loose on the spindle *c*, on which it has a circular and a lateral movement, moving with the spindle when attached to it by the clutch H, and, when moved laterally out of the clutch H, held fast by the locking-legs U, and the spindle left free to revolve in it, substantially as described, and for the purpose set forth.

3. The clutch H, fastened on spindle *c*, with a groove around its circumference and collar, forming one side of the groove, both groove and collar fitting the interior of the cap V, for the purpose of holding the revolving hollow spindle *c* in its proper lateral position, substantially as and for the purpose described.

4. The two lips at the mouth of the key-hole, facing each other, and having their outer edges circular, in combination with the spindle of the knobs, the said lips being held together by two spring-tongues extending into the key-guide, and fastened to it at their inner ends, so as to press the lips constantly together, and against each other, and against the side of the key when it is pushed in between them, as shown and described.

5. The double-headed key-shaft F, with slots in the sides of its heads for locking it, and with the irregular groove around its central part, all substantially as described, and for the purpose set forth.

6. The traveler E, sliding on the central part of the key-shaft F, and carrying the two cogs G and G', for the purpose of holding in position and moving the hub D, all substantially as described, and for the purpose set forth.

7. The dogs M, with their teeth N at each end, for locking the shaft F and key-guide R, substantially as described, and for the purpose set forth.

8. The combination of the key-guide R and key-guards S with the key-shaft F and dogs M, substantially as described, and for the purpose set forth.

9. The combination of the key-shaft F with the traveler E and hub D, and clutch H, substantially as described, and for the purpose set forth.

SAMUEL H. GILMAN.

Witnesses:

M. W. CHAPMAN,
CHAUNCEY TYLER.