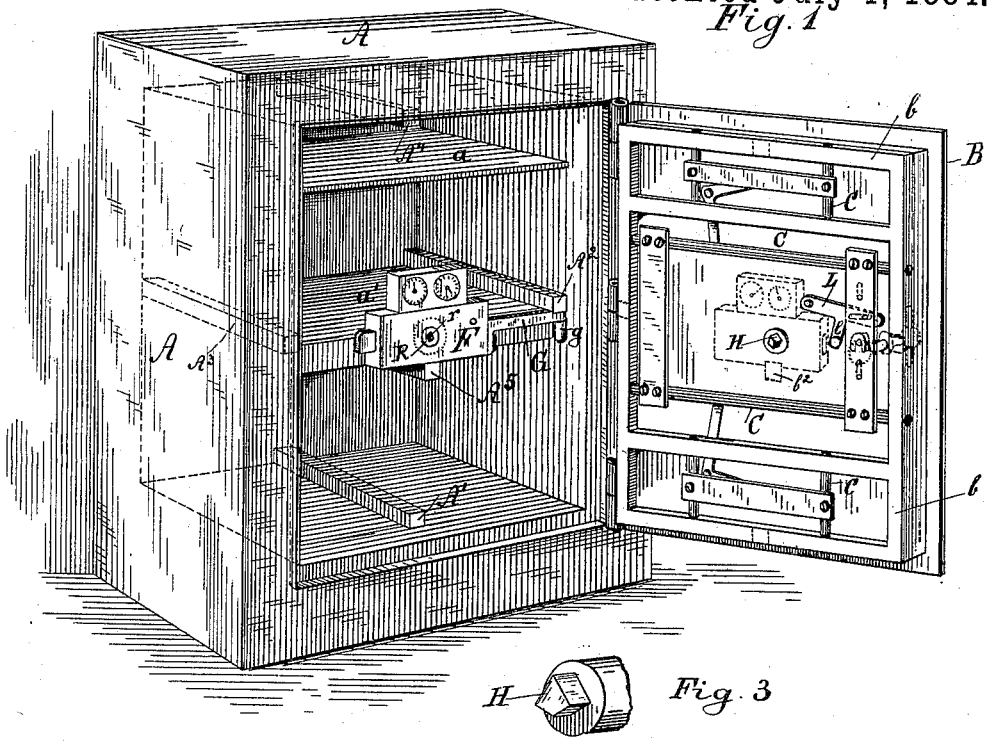
(No Model.)

# H. GROSS.

## SAFE LOCK.

No. 301,360. Patented July 1, 1884.

Fig. 1



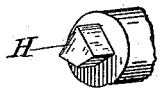




Fig. 3

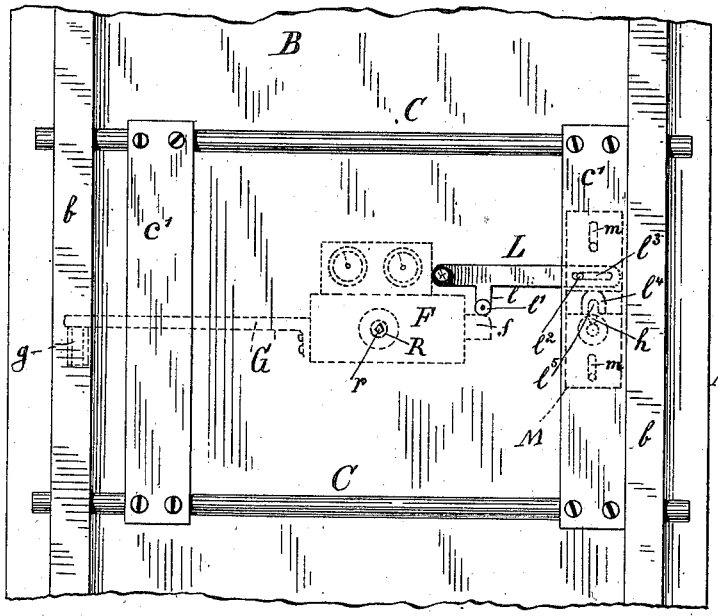



Fig. 2.

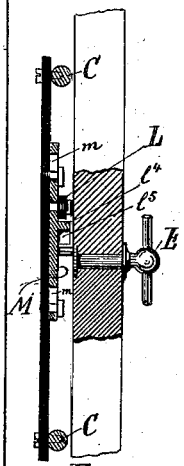



Fig. 4

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# UNITED STATES PATENT OFFICE.

HENRY GROSS, OF CHICAGO, ILLINOIS.

## SAFE-LOCK.

SPECIFICATION forming part of Letters Patent No. 301,360, dated July 1, 1884.

Application filed July 11, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY GROSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Burglar-Proof Safes, of which I do hereby declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a safe embodying my invention. Fig. 2 is an enlarged view of the inner side of the safe-door with the bolt mechanism thereon, and showing also the position of the isolated lock mechanism when the safe-door is closed and locked. Fig. 3 is a detail perspective view of the end of the knob-arbor. Fig. 4 is a detail view, in vertical section, of a part of the bolt-work of the safe-door.

The invention relates to burglar-proof safes of that general class wherein if the safe-door be closed and the bolt-work be projected by the usual operating-spindle so as to engage with the door-frame, the lock mechanism proper may then be actuated to dog the bolt-work and to hold it securely against retraction until such time as the lock mechanism is reversely operated, or, in other words, is restored to original position. The element of the lock mechanism proper which ordinarily effects the "dogging" of the bolt-work may be termed the "lock-bolt," and its office in this connection is the same, whether it forms part of a key-lock, a permutation-lock, a time-lock, or of a permutation and time lock combined. Whatever may be the special type of lock mechanism with which it is embodied, the relation of the lock-bolt to the bolt-work of the door must be such that in normal position it will allow the bolt-work to be freely actuated back and forth, while in locked position it will as effectually dog the bolt-work (whether directly or through intermediate elements) and prevent entirely its retraction. In the later art "permutation-locks" and "time-locks" (so called) have been attached separately to the back of the safe-door, each of said locks being provided with its distinct lock-bolt to be operated independently in obstructing the bolt-work; or, again, as shown by drawings, the permutation and time locks have been combined together in such wise that they might act in unison to control the movement of a single lock-bolt common to both locks, said lock-bolt serving as usual to dog the bolt-work of the safe-door. In whichever way the locks are organized it has been found by experience that a slight charge of dynamite, nitro-glycerine, or the like exploded against the outer face of the safe-door and in near proximity to the position of the lock or locks on the inner side thereof imparts a quick momentum to the door, sufficient to wrench the locks from place, or to start them from their fastenings so far that the lock-bolts are no longer in position to obstruct the bolt-work, which latter may thereupon be retracted and clandestine access attained to the safe interior. Heretofore attempt has been made to remedy this evil by isolating the time-lock from the safe door or walls, so that it should not be affected by sudden vibrations, and yet have its lock-bolt maintained in operative relation to dog the bolt-work of the safe; but it was the time-lock alone which was thus isolated, and the permutation or like lock, where such was employed, had still to be mounted, as usual, on the safe-door, and was necessarily exposed to its destructive vibrations. The time-lock, being self-actuating by its own gear-wheel train forming part thereof, could be easily mounted at some point other than the safe-door without in the least affecting its operation; but with the permutation-lock actuated entirely from the safe exterior this could not be, and the problem was to devise some means by which said lock could be completely isolated from the safe-door, as the time-lock had been, and could yet maintain its connection with the dial-plate mechanism on the exterior of the door, so as to unlock when said plate was set to the proper combinations. Again, as another source of difficulty, it was observed that powerful leverage applied to the external spindle of the bolt-work and communicated ultimately to the dogging lock-bolt of the lock mechanism proper had proven sufficient in some instances to wrench the locks from place, particularly when said locks were on the safe-door and had been started from their fastenings by sudden shock of explosion, as before described. If the locks were removed from the safe-door entirely, the evil would still be encountered, because even

in their new relation the power exerted on the spindle would be ultimately reflected on the dog or lock-bolt, and would tend to force the locks from their fastenings.

To remedy these several difficulties in the mounting of the safe-lock appliances and to improve the construction thereof is the object of my present invention, which consists of certain improvements in organization and combination of the parts of a burglar-proof-safe locking device, as hereinafter described, and defined by claims following.

Referring to the drawings, A designates the body of the safe, which is provided with the usual shelving, *a*, and with the door B, to the inner face of which is attached the bolt-frame *b*.

To the walls of the safe-body, at its top, bottom, and sides, are firmly secured the brace-bars A′, A², A³, and A⁴, which extend from back to front of the safe, said bars being in such position that their front ends shall abut against the bolt-frame of the door when said door is closed.

Beneath the shelf *a′*, and about the center of the safe-body, extends a center brace-bar, A⁵, the front end of which is adapted to bear against the seat or rest $b^2$ upon the back of the door. In event of an explosion against the outer face of the door, the force of such explosion will be resisted by the brace-bars extending through the safe, and the inward movement of the door, and consequent jar and tendency to displace the lock mechanism, will be guarded against. The number and arrangement of the brace-bars may be varied as circumstances require, although in every case it is desirable that the center brace be employed, as it sustains the door at its weakest point. Said brace-bars, constructed and arranged as above described, form no part of my invention, and are hereby disclaimed; but their use is advantageous, and may be resorted to whether the lock mechanism be secured directly to the back of the safe-door or be wholly isolated therefrom, as already detailed.

The isolation of the permutation or like lock from the door, so as to be free from its vibrations and yet be in position to be actuated, as usual, from the safe exterior, is accomplished as follows: Through the bolt-frame B pass the bolts *b*, connected together by the tie-bars *c c′*, and operated by means of the turning spindle E. The lock mechanism F may be of any approved construction, the drawings being a conventional representation of a permutation-lock having a time-lock attachment co-operating therewith to control the movement of a lock-bolt common to both. This lock mechanism F is sustained by the bracket G, hinged to the safe-wall, as at *g*, so that it is entirely isolated from the door, and its position relative to the catch-lever L is such (as shown by the dotted lines in the drawings) that when the door of the safe is shut, and the bolt-work is thrown by spindle E, if the lock-bolt *f* be shot, it will come beneath the depending portion *l* of catch-lever L, slightly lifting said lever and effectually dogging the bolt-work. At the same time it will be observed that the lifting movement of lever L will have caused the spindle E to become wholly disengaged from its connection with the bolt-work, so that said spindle may be freely rotated without impediment, and furnishes no purchase in event of any effort made to pry the lock from its fastenings.

Other means of supporting the lock mechanism than that shown may be adopted; but I prefer the hinged bracket, as it enables the mechanism to be swung to one side and out of the way when the safe is opened.

To the inner face of the safe-door, in substantially the position shown, is pivoted the catch-lever L, having the depending lug *l*, carrying a stud, *l′*, with friction-roller thereon, the outer end of this lever being provided with a pin, $l^2$, moving in a horizontal slot of the vertically-sliding plate M. This sliding plate M, which is secured to the tie-bar by means of the pins which pass through the vertical slots *m*, carries on its back the lug $l^4$, having a yoke-shaped groove, $l^5$, which is adapted to catch over the stud *h*, carried by the inner end of the turning spindle. When the lock-bar *f* of the locking mechanism is drawn within its case, the catch-lever L will drop, whereupon if the operating-spindle be rotated the stud *h* will catch into the yoke-shaped groove $l^5$ of the lug $l^4$, and thus bring the spindle E into operative connection with the bolt-work of the safe. On the other hand, if the lock-bar be shot out, it will lift the catch-lever L, and so disconnect the bolt-work from the turning spindle. By this means during the time that the safe is closed and the lock-bolt is projected from its case the spindle E remains entirely disconnected from the bolt-work, and cannot be used to force the lock mechanism from its fastenings by pressure exerted ultimately on the lock-bolt, as has heretofore occurred.

The sleeve or core R, upon which the tumblers of the permutation-lock are carried, is furnished with an opening, *r*, adapted to receive the end of the usual arbor, H, which arbor, instead of being fastened to the core or tumbler-cylinder, as usual, is separated therefrom, though adapted to fit into and to co-operate with said tumbler-cylinder. The socket in the tumbler-cylinder should be enough deeper than the arbor entering therein to allow for vibration of said arbor to and fro under effect of any sudden momentum imparted to the safe-door by explosion or otherwise without permitting said arbor to come in contact with the bottom of the socket. Except for this precaution, the momentum might cause the arbor to start the lock mechanism from its supports, and so to relieve the bolt-work from the dogging action of the lock-bolt. Upon its exterior the arbor H carries the usual dial-plate, by which the

tumblers of the permutation-lock can be brought into desired position for withdrawing the lock-bolt, as well understood.

The opening *r* and the end of the arbor H are made of irregular shape, as shown, so that the arbor can enter the tumbler-sleeve only in one position, thus securing certainty of action, which could not be the case were the arbor free to enter the sleeve in different positions. By this means a permutation or like lock actuated from the exterior of the safe may be wholly isolated from the safe-door, and yet remain within proper control. It is obvious that the same beneficial results are obtained as well when a time-lock attachment is used in conjunction with the permutation-lock, as shown by drawings, as when the permutation or like lock is alone employed to dog the bolt-work of the door.

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

1. The combination, with the safe-door and its bolt-work, of the permutation-lock wholly isolated from the safe-door, and the detached dial-arbor mounted on the safe-door in position to engage with the permutation-lock, substantially as described.

2. The combination, with the permutation-lock isolated entirely from the safe-door and having its tumbler-sleeve provided with an irregular opening or socket, of the knob-arbor mounted on the safe-door in position to operate the lock-tumblers, said arbor being shaped to fit the socket, substantially as described.

3. The combination, with the safe-door and its bolt-work, of the sliding plate M, mounted on said bolt-work, the spindle to operate said bolt-work, the same being detachably joined to the said plate M, and wholly disconnected therefrom when the safe is locked, the catch-lever L, and the lock-bolt of the lock mechanism proper, substantially as set forth.

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