(No Model.)

C. O. YALE.

LOCKING MECHANISM FOR SAFES.

No. 521,842. Patented June 26, 1894.

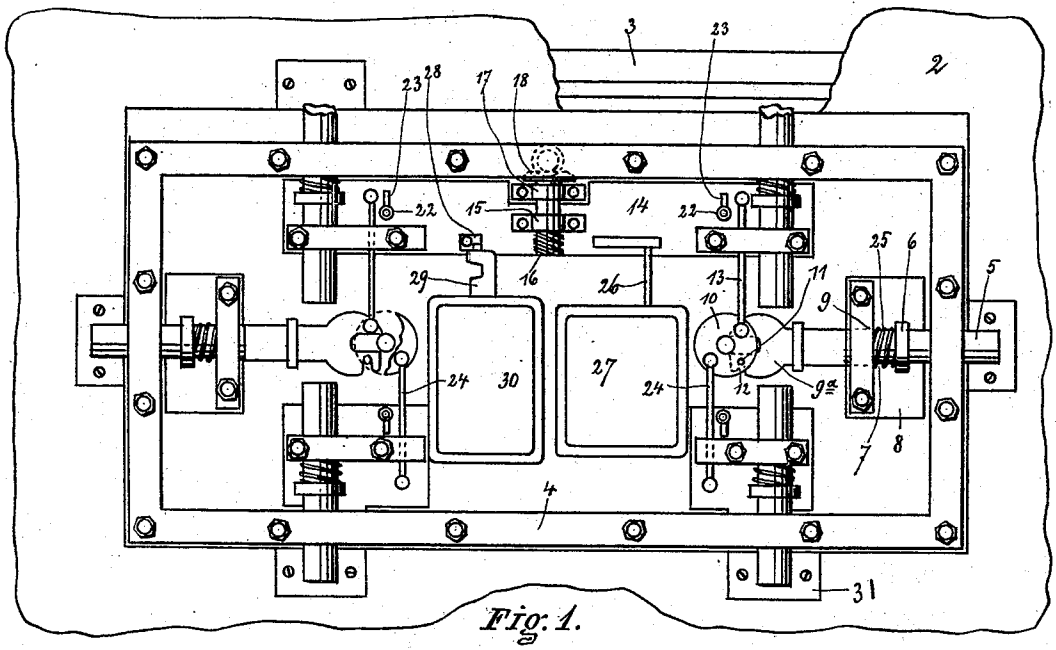


Fig. 1.

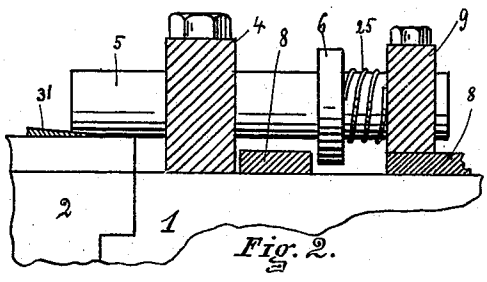


Fig. 2.

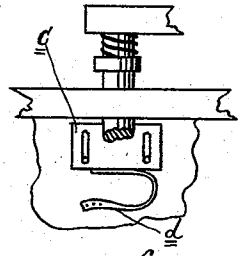
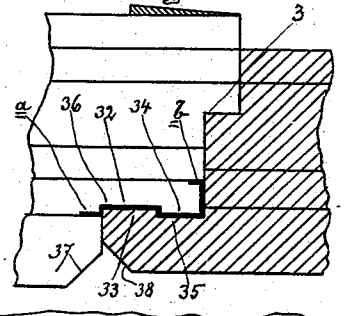


Fig. 6.

Fig. 5.



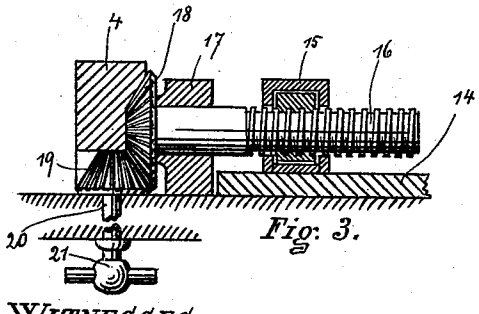


Fig. 3.

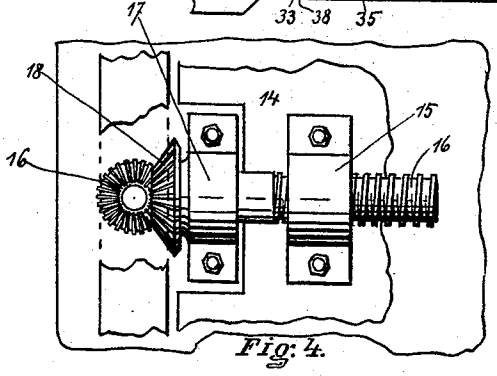


Fig. 4.

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LOCKING MECHANISM FOR SAFES.

SPECIFICATION forming part of Letters Patent No. 521,842, dated June 26, 1894.

Application filed January 29, 1892. Serial No. 419,630. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. YALE, of the city, county, and State of New York, have invented certain new and useful Improvements in Locking Mechanisms for Safes and Vaults; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates to improved tight locking mechanism for safe or vault doors.

In the drawings which accompany and form part of this specification and in which similar letters and figures of reference refer to corresponding parts in the several views, Figure 1 shows the inside view of a safe or vault door together with a portion of the surrounding jamb and my locking mechanism mounted thereon. Fig. 2 shows in detail one of the locking bolts together with portions of the jamb and door and bolt carrying mechanism shown mostly in section. Fig. 3 shows a gearing and screw for operating the bolts together with a broken out section of the door. Fig. 4 shows a plan view of the devices shown in Fig. 3. Fig. 5 shows a cross section of a portion of the door and jamb and the packing introduced between the jamb and door. Fig. 6 shows a modified form of construction of the wedge plate on which the bolts engage.

Referring more particularly to the reference numerals and letters marked on the drawings in a more particular description of the device, 1 indicates the door which engages with the jamb 2 by suitable receding offsets 3 shown in detail in Fig. 5. On the inner face of the door is mounted a bolt bar 4 provided with suitable openings through which operate the locking bolts 5 of which six are shown in Fig. 1. The bolts are preferably cylindrical in shape and provided with a collar 6 which engages within an opening 7 in movable throw bar 8. The rear portion of the bolt engages in bolt holding clasps 9 secured on the bar 8. Of the bolts at the end of the door, the throw-bars 8 are provided with an extension 9^a which extends to pivoted disk 10 pivoted at its center to the door and provided with a fixed pin 11 engaging in the slot 12 in the extension 9^a. The disk 10 is connected by connecting rod 13 with the main operating bar 14. On the main throw bar 14 is provided a nut carrying projection 15 in which engages screw 16 which at its opposite end runs in the bearing 17. Secured to the door, on the end of the screw 16, is provided a beveled gear 18, which is engaged by beveled gear 19 mounted on a shaft 20 extending to the outside of the door and provided with suitable handle 21. The bar 14 is secured to the inner face of the door by suitable set screws or headed pins 22 engaging in slotted openings 23 in bar 14. The several bolts on the opposite side of the door from the main throw bar are actuated by connecting rods 24 operating from the disks 10, there being two throw bars provided on this side of the door, one for each bolt; but the connection and construction of the bolts with plates is the same in each of the instances.

Between the bolt clasp 9 and the collar 6 thereof is introduced a spring 25, which furnishes a yielding connection between the bolt and the throw bars whereby the several bolts are enabled to obtain a firm and even bearing of all the bolts on the jamb. Each of the several bolts is independently movable with reference to the throw-bar and is limited in its independent movement by the collar 6 on the bolt coming in contact with the opposite sides of the slot in the throw-bar into which the side of the collar projects.

Secured firmly to the main throw bar 14 is provided a projection 26 which extends to and is operated upon by a time lock in box 27 to secure the bolts in the manner now common. There is also provided on throw bar 14 a projection 28 which is adapted to be engaged by an arm 29 projecting from and operated and controlled by combination lock 30. The arm 29 is provided with a notched opening that will receive the projection 28 when the bolts are drawn so that they may be locked by the combination lock in open position or the lock arm 29 may be raised to its proper position as shown in Fig. 1 in re-setting the combination of the lock. The several bolts engage upon the wedge shaped bolt plates 31 secured upon the jamb in proper

position to be engaged by the several bolts, the thin edge of the bolt plates being toward the door opening and toward the bolt.

The jamb of the door is provided with steps or offsets for receiving the door, the edge of which is also provided with corresponding steps or offsets. One of the steps of the jamb is preferably provided with a groove as shown at 32 adapted to receive a corresponding tongue 33 on the door and leaving on the outer end of the offset a tongue 34 which is adapted to engage in the corresponding groove 35 in the jamb.

The walls of the safe or jamb are preferably built up of layers and between the edges of adjacent layers are introduced the turned edges [*a* and *b*] of a strip of packing 36 which lines or covers the groove 32 and the tongue 34 and passes around the end of one of the layers. This packing is preferably of soft metal although any other suitable packing may be provided, and when the door is fully drawn into the jamb by the bolt mechanism described it becomes firmly embedded in the packing and provides a joint that is a complete barrier to liquid or gaseous explosives. The packing 36, is placed upon the jamb by being secured at the edge *a* in the shape of a plain metal strip, it is then swaged into the depression or groove 32, on the offset of the jamb and the edge *b* is finally inserted in the groove which receives it. In swaging the packing into the depression or groove 32, in the face of the offset, there is a certain amount of elasticity to the packing which tends to raise it from the bottom of the groove 32, except when the door is in contact with it, this elasticity or yielding is taken advantage of in this construction to produce a liquid and gas tight joint.

The edge of the door jamb surrounding the door opening is preferably cut off or beveled, as shown at 37, and the edge of the door is also beveled, as shown at 38; but the bevels do not terminate at the bottom of the groove at the same line, thus presenting a joint that is proof against wedges.

The operation of the device is substantially as follows: The bolts are thrown or drawn by rotating handle 21 in either one direction or the other, depending on whether the bolts are to be thrown or drawn. The rotation of the handle 21 rotates the gear 19, which rotates the gear 18, which rotates the screw 16 and either forces nut 15 from bearing 17 carrying throw bar 14 away from bolt bar 4 or carrying the bar toward it, depending on whether the bolts are to be thrown or drawn. As the bolts are thrown they become engaged on wedge plates 31, located on the jamb, and as each bolt comes to a firm bearing on the plate the further throw of the bolt ceases and the further movement of the throw bar is permitted by the compression of the springs 25. Thus it will be seen that if all the bolts should not come to a firm bearing at the same instant the bolt that came first to a firm bearing would not hinder the other bolts being projected until they obtained a firm bearing. When the projected bolts come to a firm bearing and the throw bar is further thrown, the collar 6 of the bolt becomes removed from the end of the slotted opening in the bar in which it engages, as will be noticed in Fig. 2. It will be seen that the bolts are now engaged to hold the packing 36 in a compressed condition between the tongues and grooves 32 and 34 stretch it in such a manner as to insure a perfect packed joint with no play between the parts. This packing may be made to extend over the entire face of the several slips, and if made of brass or copper or other metal would furnish a handsome finish for the steps. When the bolts are drawn the collar 6 becomes engaged against the shoulder at the end of the slotted opening in the bar and the bolt is forcibly withdrawn. When the bolts are projected they are secured in locked position either by time lock 27 engaging on projection 26 or by lock arm 29 of combination lock 30 or by both. The bolts may be drawn by rotating the handle 21 in the opposite direction from that to lock the bolts when the locks are freed to permit the bolts to be drawn. The several bolts are all simultaneously thrown or drawn by the connecting mechanisms heretofore described and which will be readily understood without specific description.

In the modified form of construction shown in Fig. 6 is provided a wedge plate *c* being the same as 31 except that it is provided with slotted opening to allow it to play backward and forward from the door opening. The plate *c* is backed by spring *d* which holds it normally in its position nearest to the door opening. When the bolt is projected onto the plate *c* and comes to a firm bearing thereon, the plate *c* will then slide with the bolt on the jamb to permit the bolt to be further projected while the other locking bolts come to firm bearing on their several wedging plates. The sliding plates *c* and spring may be used either in connection with the bolt having spring 25 or without such spring. The locking bolts may be provided with a beveled end to engage on the wedge plates 31, if found desirable.

It is evident that many alterations and changes in and from the construction described, other than those mentioned, may be made without departing from the equivalents of my construction.

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

1. The combination of two or more independently movable locking bolts, of a throw-bar for simultaneously operating the bolts, a shoulder on each bolt adapted to engage the throw-bar in positively withdrawing the bolt, and a spring introduced between the throw-bar and bolt and exerting pressure in the direction of the throw of the bolt whereby each bolt is capable of independently yielding as

the bolt work is being locked, substantially as set forth.

2. The combination in locking mechanism, of a throw-bar, two or more independently movable locking bolts, each having a shoulder adapted to engage the throw-bar in drawing the bolts, a spring for each bolt introduced between the throw bar and bolt and exerting pressure in the direction of the throw of the bolt, whereby each bolt is capable of independently yielding with reference to the throwing mechanism, and a wedging face on the jamb for each bolt to engage upon, substantially as set forth.

3. The combination of two or more locking bolts, mechanism for simultaneously operating the bolts constructed to confine the bolts within independent limits of movement with reference thereto, a spring for each bolt introduced between the operating mechanism and bolt and operating to project the bolt with reference to the operating mechanism, substantially as set forth.

4. The combination with a jamb receding by steps from the face inwardly, of a step having a groove therein and a sheet metal packing secured at one edge by being tucked into a narrow groove provided therefor, the packing conforming to the face of the step and to the groove therein and having its opposite edge secured on the side of the step by being tucked into a narrow groove or recess provided therefor, and a door receding by steps, and having tongues adapted to enter the groove of the steps on the jamb, substantially as set forth.

In witness whereof I have affixed my signature in presence of two witnesses.

CHARLES O. YALE.

Witnesses:

GEORGE HASELTINE,

JONATHAN MARSHALL.