Jan. 11, 1927. 1,613,755

D. E. HUNTER

SAFETY DEVICE FOR SAFE DOORS

Filed April 14, 1926 2 Sheets-Sheet 1

Fig. 1

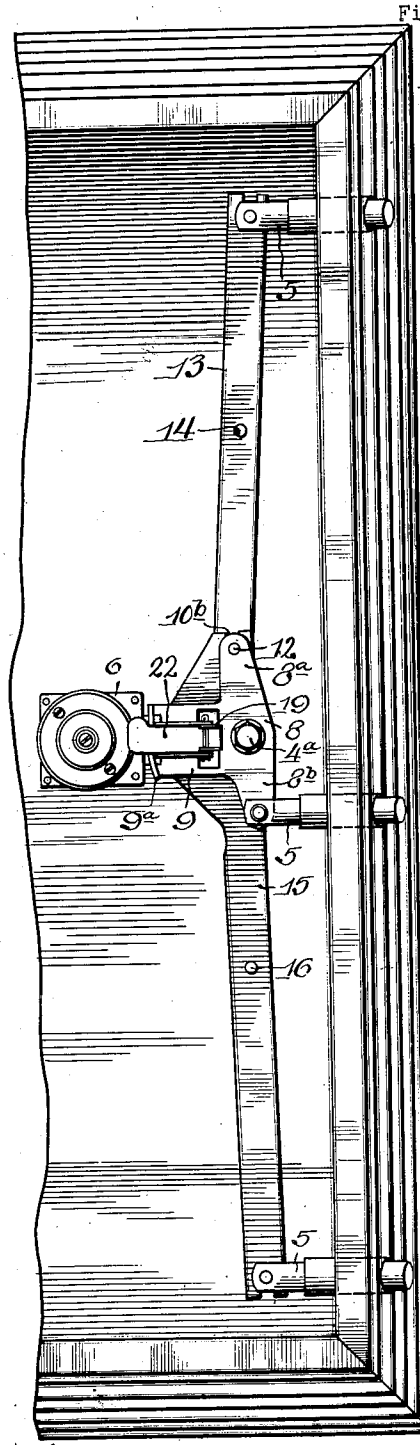


Fig. 2

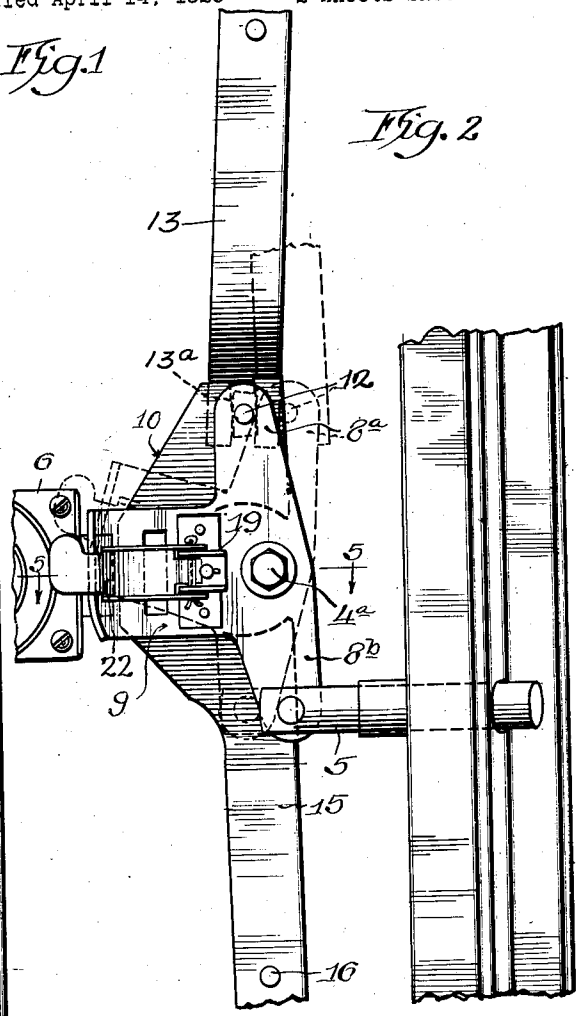


Fig. 3

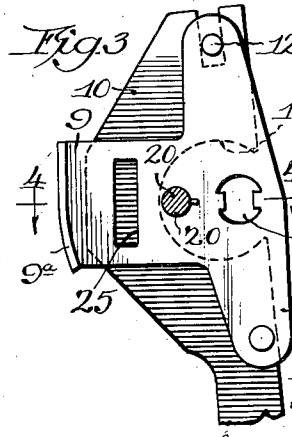
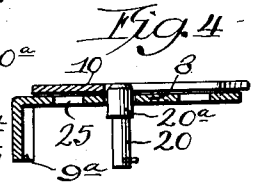


Fig. 4



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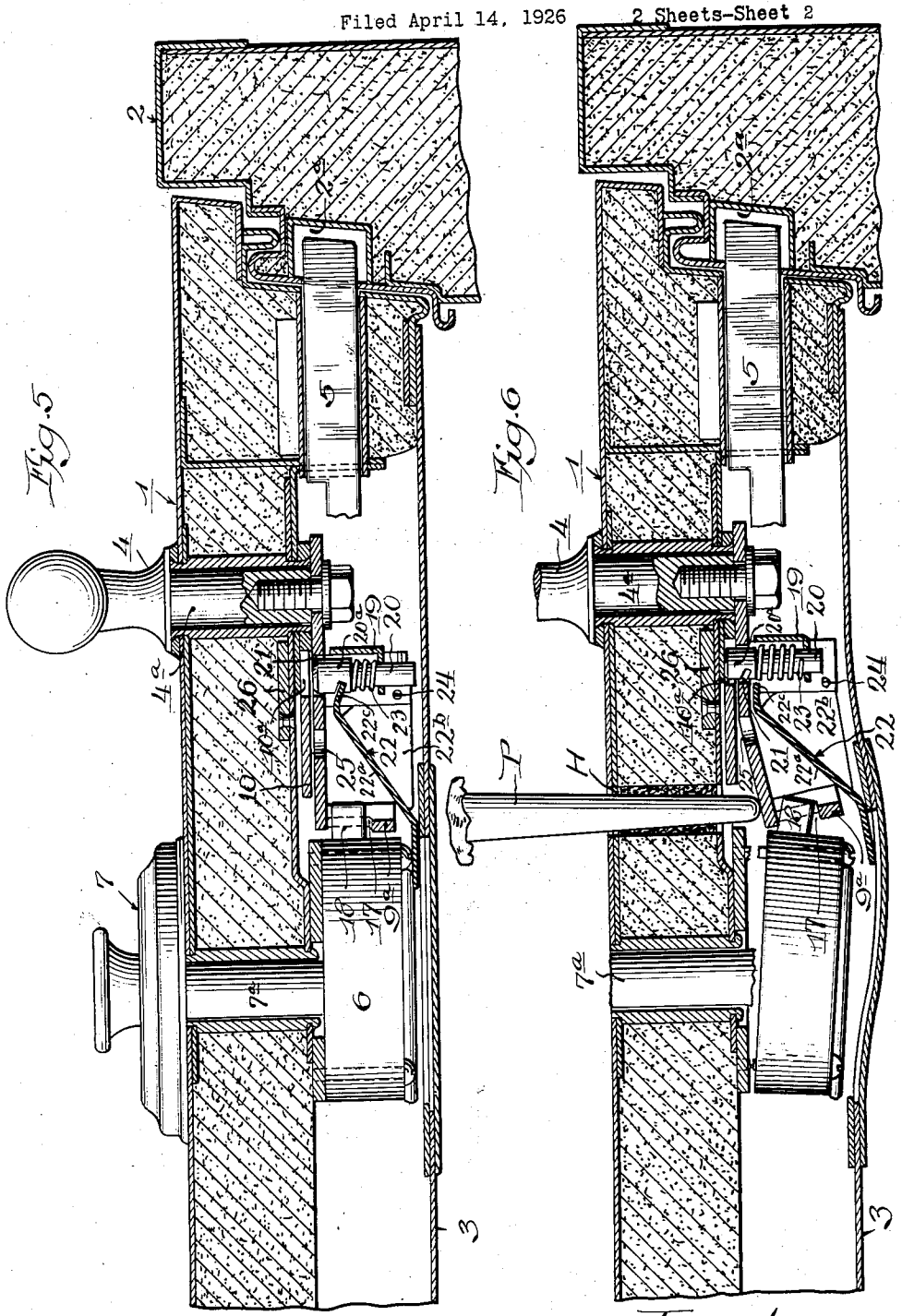
Offield Mekelhope Scott & Coale Attys

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SAFETY DEVICE FOR SAFE DOORS

Filed April 14, 1926 2 Sheets-Sheet 2



Witness:
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Patented Jan. 11, 1927. 1,613,755

UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR SAFE DOORS.

Application filed April 14, 1926. Serial No. 101,884.

This invention relates to improvement in safety devices for safe doors, and more particularly to means for rendering the doors of safes, and like receptacles or closures for valuables, proof against the less violent methods of safe-breaking employed by cracksmen.

The object of the invention is to provide a device associated with the locking mechanism carried on the safe door, and so constructed that it will be automatically actuated or released, in the burglar's attempt to force the combination lock, and thus prevent the door from being opened even though the forcing of the combination lock is successfully accomplished.

From the foregoing it will be noted that the safety device is not calculated to insure protection against experts skilled in manipulating the combination and thus opening the door without the use of tools, or even the more violent method of blowing the door from its hinges by heavy charges of explosive, but rather as a protection against the methods, in which tools are used to accomplish the result, this being the more common method, since it can be carried on without the same opportunity for detection that attends the use of explosives, and does not require the skill which the ordinary cracksman lacks. It may be assumed therefore, that in the majority of instances, the use of tools is resorted to, and hence the real protection of the present device resides in the fact that the door having failed to yield, the attempt would be abandoned, rather than to resort to other methods owing either to lack of time or fear of detection.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which a typical installation is shown, it being understood that it is applicable to any safe, vault, cabinet or other safe-keeping receptacle.

In the drawings:

Figure 1 is a general view in rear elevation of a safe door, with the rear cover plates removed to show the locking mechanism.

Figure 2 is an enlarged detail view in elevation of a portion of the door adjacent the locking mechanism.

Figure 3 is a view in elevation of the primary locking members with portions removed so that the construction can be more readily seen.

Figure 4 is a detail view in cross section taken on line 4—4 of Figure 3, showing the dead bolt in locking position.

Figure 5 is a detail view in cross section through the door and locking mechanism as taken on line 5—5 of Figure 2.

Figure 6 is a reproduction of Figure 4, showing the manner in which the parts of the locking mechanism are ruptured in an attempted forcing of the lock.

The door 1, is of the usual fire and theft proof construction of sheet steel, with an inner core of fire resisting material, although it may be of solid steel and of any weight and thickness, since the invention is not confined to any particular safe or cabinet construction. In Figure 1, only the portion of the door carrying the locking mechanism is shown, it being understood that it is hung to swing on hinges in the usual manner and to close the opening of the safe. Similarly in Figures 2, 5 and 6, a section only of the door frame 2 along the locking edge of the door is shown.

Mounted on the door is the locking mechanism, secured to the back face thereof, and preferably covered by the inner wall or back plate 3 of the door, as is the common practice. The locking mechanism consists of primary and secondary groups of locking devices, the primary including those parts which are operated by a handle 4, to throw the locking bolts 5, and the secondary group consisting of the combination lock casing 6, and the dial 7 on the outside of the door, which control the primary locking members.

Referring to the primary locking mechanism the handle 4 thereof extends through the door about midway the height and near the vertical locking edge of the door in the form of a stem 4^a. Fixed to the inner end of the stem 4^a is a rocker lever 8, which rotates with the stem. This rocker lever is generally T-shaped, with arms 8^a and 8^b extending vertically in opposite directions, and a somewhat broader arm or plate 9 extending laterally and toward the combination lock casing 6. Pivotally connected with the downwardly extending arm 8^b, is the center locking bolt 5, there being preferably three bolts operating conjunctively as will be presently seen.

Between the rocker lever 8, and the adjacent surface of the door is a laterally shiftable plate 10 for operating the upper

and lower bolts 5. This plate has a triangular shaped body portion lying immediately behind this rocker lever, but has no connection with the operating handle 4 or its stem 4ª, in fact it has a circular portion removed along its forward edge, and adjacent the stem 4ª so that it can be shifted without interference with the handle stem. This cut-out portion indicated at 10ª is clearly shown in Figure 3. The upper end of the triangular body plate 10, is connected with the arm 8ª of the rocker lever by means of a pin and slot connection, a pin 12 being carried by the lever arm, and a slot 10ᵇ being formed in the plate. Also connected with the upper arm 8ª of the rocker lever 8, is a bar 13, having a slot 13ª formed at its lower end which also engages the pin 12. This bar 13, is pivoted to the door midway of its ends at 14, and at its upper end has pivoted connection with the upper sliding bolt 5. Extending downwardly from the body of the plate 10 is an integral arm 15, connected at its lower end with the lower bolt 5, and pivoted intermediate its ends at 16, to the door. The action of the primary locking medium is clearly shown in Figure 2. By rotating the handle 4 in a clock-wise direction, (facing the rear of the door) the rocker lever 8 is turned through a small angle, throwing the upper arm 8ª in a forwardly direction (toward the edge of the door) and the lower arm in the opposite direction carrying with it the center bolt 5. This movement manifestly withdraws the bolt from locking engagement with its recess or locking detent 2ª in the door frame. Accompanying this rocking motion of the lever 8, there is a lateral shifting movement of the plate 10, its center of rotation being the pivot 16, centrally of the downward extending arm 15 thereof. This shifting movement is transmitted through the pin and slot connection of the end of the arm 8ª of the rocker lever 8, which throws the plate bodily forward, and the lower end of the arm 15 in the opposite direction, thus shifting the lower bolt 5, simultaneously with and in the same direction as the center bolt 5.

Similarly the bar 13, is shifted with the turning of the handle, through its pin and slot connection with the rocker lever to withdraw the upper bolt 5 from locking position. In this way the three locking bolts are shifted in unison into and out of locking position.

Considering now the laterally extending plate 9, of the rocker lever 8, the same manifestly swings with the rocker lever, and as clearly shown in Figure 2 moves in a general vertical direction adjacent the side of the lock casing 6, and in close proximity thereto. The outer edge of plate 9 is bent rearwardly at right angles to form a flange 9ª facing the lock casing. In this flange is formed a locking slot 17, so positioned as to register with and receive a bolt 18, extending from the lock casing 6, and shiftable endwise by the mechanism within said casing.

As is common in combination locks, the bolt is shiftable in either direction only when the locking mechanism is properly set by the setting of the dial in accordance with the combination, and therefore when the safe door is closed and the bolt thrown into locking position by the handle, the locking slot 17 in the plate is brought into position to receive the bolt 18 of the combination lock, this being done by turning the dial 7 when the combination is set to open, whereupon further turning sets the locking mechanism so that the bolt cannot be withdrawn without manipulating the dial in accordance with the combination.

For the most part the mechanisms described up to this point are in common practice in the construction of the safe doors, and hence what follows constitutes the improvement in the art.

At this point it will be well to refer to Figures 5 and 6, and note what would take place in an attempt to force the lock by well known methods. Figure 5 shows the door locked and the combination lock thrown off. Figure 6 shows the manner in which a cracksman would attack the locked safe. Being familiar with the mechanism, and the location of the parts, he would first drill a hole H through the door opposite the bolt 18, of the combination lock. Having done so he would then insert a drift pin P into the hole and with a hammer would drive the plate 9 rearwardly with force sufficient to tear the lock casing from the door, and release the bolt 18, from the plate 9, of the primary locking mechanism. This having been accomplished the door could be readily opened by turning the handle 4. If the door is made of steel which cannot be drilled, the dial 7, would be broken off, with a heavy blow of the hammer and using the drift pin against the stem 7ª, the entire lock casing would be torn loose and driven rearwardly, thus releasing the bolt 18 from the locking slot in the plate 9, as before.

With these illustrations the function of the safety device will be more readily understood. Supported on the rear face of the plate 9, of the rocker lever 8, is a bracket 19, located just to the left of the stem 4ª, this bracket consisting of a piece of sheet metal bent into U shape, with its open side facing toward the combination lock casing 6. Mounted within the bracket is a dead bolt 20, consisting of a steel pin, extending at right angles to the plate 9, and having an enlarged head 20ª fitting within an opening

21 through the plate. The pin is normally held against movement by a trigger 22 presently to be described. Acting on the bolt is a coil tension spring 23 surrounding the shank of the bolt behind its head, and adapted to throw the bolt forward at the instant it is released by the trigger 22. This trigger consists of a piece of sheet metal bent to form a strip 22^a extending obliquely from the head of the bolt in a rearward and lateral direction, to a point behind the lock casing 6. On either side of the strip 22^a are integral fins 22^b triangular in shape which are attached to the bracket 19 at their apexes by a cotter pin 24, so that the trigger is pivotally connected to the bracket. The forward end of the strip 22^a terminates in a tongue 22^c which engages a notch in the side of the head of the bolt 20, thus retaining it in non-operative position.

Referring again to Figure 6, let it be assumed that the cracksman performs the same operations as before described. Now it will be seen that as the plate 9 is driven rearwardly, the edge of the flange 9^a thereof, strikes the trigger, rotating it about its pivot point, and withdrawing the tongue 22^c from the bolt, which is instantly released and thrown forward into the circular cut-out portion 10^a in the plate 10, and near its inner edge. Thus, in spite of the fact that the lock casing is broken away and its bolt 18 freed from the locking slot in the plate 9, the handle 4, will not turn, for the reason that the plate 10 cannot be shifted, and hence the bolt 5 cannot be withdrawn. In short the very act of rupturing the lock casing, releases the dead bolt and effectually prevents the primary locking mechanism from functioning.

In order that the plate 9 will bend or flex along a predetermined line, to actuate the trigger as described, the plate is weakened along a transverse line, between the end flange 9^a and the bolt 20, by forming a slot 25 in the plate (Figure 3).

To prevent the cracksman from forcing the dead bolt out of locking position, assuming he is aware what has prevented his unsuccessful entry, a drill proof plate 26 may be applied in front the head of the bolt, so a hole cannot be drilled through and the bolt pushed back.

It may be assumed that once the dead bolt is released the door must remain locked until the bolt can be withdrawn. This may require some time and effort, but this would manifestly be warranted so long as the attempted burglary has been thwarted and the contents of the safe preserved.

The advantage of the safety device aside from its certainty of action and protection afforded in its use, is its simplicity and ready adaptability to all classes of safes, vaults and safe-keeping receptacles, which makes increased protection possible with but little added cost.

As already intimated, the arrangement of locking mechanisms and the manner of applying the safety device, may be variously changed and modified without departing from the spirit of the invention and for that reason I do not wish to be limited in the use and application except in so far as specified in the appended claims.

I claim as my invention:

1. In a safe keeping receptacle, the combination of a closure, primary locking mechanism for said closure comprising a shiftable bolt and a manually operative lever connected with said bolt, secondary locking mechanism having a bolt adapted to be thrown into locking engagement with said lever, an auxiliary spring-actuated bolt mounted on said lever, and a trigger normally holding said auxiliary bolt in non-locking position and adapted to be actuated to release said bolt when said lever is deflected from a position of locking engagement with said bolt of the secondary locking mechanism.

2. In a safe keeping receptacle, the combination of a closure, primary locking mechanism for said closure comprising a bolt and a manually rotative lever operatively connected with said bolt, secondary locking mechanism including a lock casing and a bolt shiftable into and out of the path of said lever, a spring-actuated dead bolt carried by said lever, and a trigger normally holding said dead bolt in non-locking position and having a portion extending adjacent said lock casing, and the portion of said lever engaged by the bolt of said secondary locking mechanism, whereby said trigger is actuated to release said dead bolt to lock said primary locking mechanism upon the disruption of said lock casing or the deflection of said lever from a position to be engaged by said secondary locking bolt.

3. In a safe keeping receptacle, the combination with manually operated locking mechanism for the closure thereof comprising an external handle, an internal rocker lever and locking bolts operatively connected with said rocker lever, of secondary locking mechanism comprising a combination lock casing having a shiftable bolt adapted to be shifted into and out of the path of said lever, a spring actuated bolt carried by said lever, and a trigger normally holding said bolt in retracted position, and adapted to be tripped by the forcible deflection of said lever to release said bolt to lock said lever against movement.

4. In a safe keeping receptacle, the combination with manually operated locking mechanism for the closure thereof comprising an external handle, an internal rocker lever and locking bolts operatively connected

with said rocker lever, of secondary locking mechanism comprising a combination lock casing having a shiftable bolt, adapted for locking engagement with an arm of said lever, a spring-actuated bolt mounted on said lever, a trigger normally retaining said bolt out of locking position and having a finger extending adjacent said combination lock casing and said arm, whereby said trigger is actuated to release said spring-actuated bolt when said arm is forcibly deflected from locking engagement with the bolt of said combination lock.

5. In a safe keeping receptacle, the combination of a closure, primary locking mechanism for said closure comprising a bolt and a manually rotative lever operatively connected with said bolt and having slotted end portion, secondary locking mechanism comprising a bolt adapted to be shifted into and out of locking engagement with a free end portion of said lever, a spring-actuated dead bolt mounted on said lever adjacent its free end portion, a trigger mounted on said lever and normally retaining said dead bolt in non-operative position, said trigger having a portion lying adjacent the slotted end portion of said lever and adapted to be actuated to release said dead bolt to lock said primary locking mechanism upon the deflection of the free end portion of said lever from its locking position with the secondary locking bolt, and means insuring the deflection of said free end portion of said lever to actuate said trigger.

Signed at Muskegon, Mich., this 30th day of March, 1926.

DAVID E. HUNTER.