Nov. 12, 1940. H. SÜSSER 2,221,664

SAFETY LOCK

Filed Nov. 26, 1937

Fig. 1.

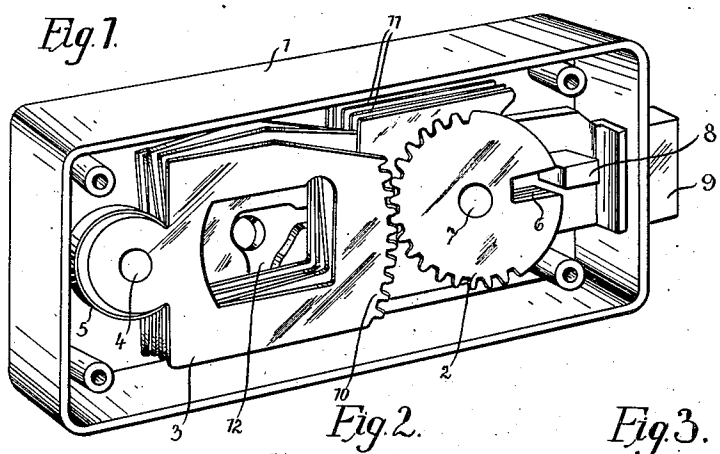


Fig. 2.

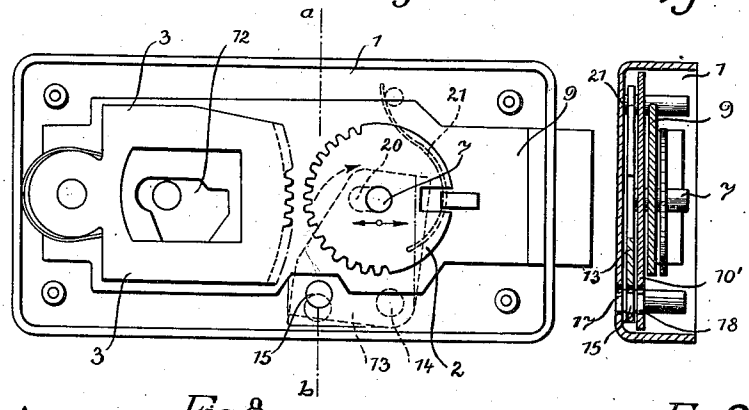


Fig. 3.

Fig. 4.

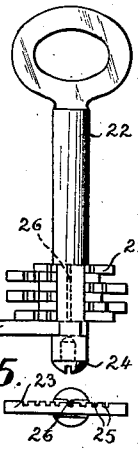


Fig. 6.

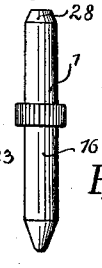


Fig. 8.

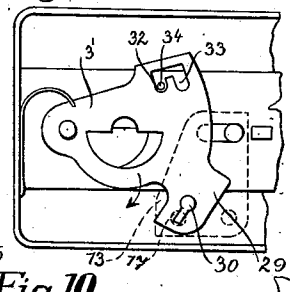


Fig. 9.

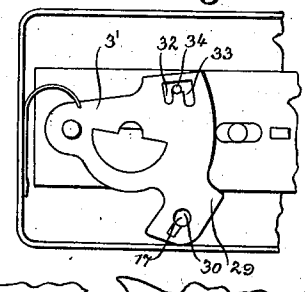


Fig. 10.

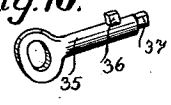


Fig. 5.

Fig. 7.



Fig. 11.

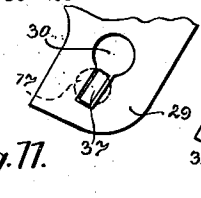
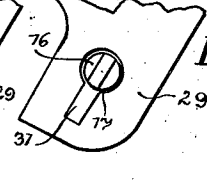


Fig. 12.



Witnesses:

Inventor

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UNITED STATES PATENT OFFICE

2,221,664

SAFETY LOCK

Hans Süsser, Moravska Ostrava, Czechoslovakia

Application November 26, 1937, Serial No. 176,667
In Czechoslovakia November 27, 1936

3 Claims. (Cl. 70—384)

This invention relates to a safety lock having a plurality of tumblers.

Safety locks having a plurality of tumblers and usually employed for securing cash-boxes, safes, etc. are open to the objection that they cannot be protected at present against being opened by unauthorized persons who are in possession of a carefully executed copy of the original key. Efforts have therefore been made to eliminate these drawbacks by providing a lock which permits modifications of the key bit without requiring changes in the lock itself or which can be adjusted so as to be manipulated by a correspondingly adjusted key bit.

According to the invention, this object is attained by dividing the tumblers of the lock into tumbler plates for the bolt and tumbler plates for the key, so that when the connection of these two kinds of tumbler plates ceases the tumbler plates for the key can be adjusted according to the key bit.

By way of example, several forms of the invention are illustrated in the accompanying drawing, in which Figure 1 is a perspective view of a lock according to the invention with the cover removed; Fig. 2, a view of the inside of the lock showing the divided tumblers; Fig. 3, a cross section on the line *a*—*b*, of Fig. 2; Fig. 4, a top view of the key; Fig. 5, a cross section of the key; Fig. 6, a view of the bolt; Fig. 7, a top view thereof; Fig. 8, a view of a modification of the key tumblers; Fig. 9, a view of the tumblers in displaced position; Fig. 10, a view of another form of key; and Figs. 11 and 12 are views on an enlarged scale of the continuation of the key tumbler in different positions.

Referring to the drawing, the lock comprises a casing 1 in which, according to the invention, the tumblers 2 for the bolt 9 and the tumblers 3 for the key are arranged. The tumblers 3 are rotatably disposed on the pin 4 and subjected to the action of the springs 5, and the tumblers 2 are provided with notches 6 positioned on the pin 7 on plate 13 and jointly displaceable in the direction of the projection 8 of the bolt 9. The tumblers 3 possess the usual recesses for the key bit. The tumblers 2 as well as the tumblers 3 having intermeshing teeth 10, so that motion of the tumblers 3 by means of a key causes therefore motion of the tumblers 2 and engagement of the notch 6 by the projection 8, whereby opening of the lock becomes possible. Between the tumblers 2 spacing plates 11 are provided on the pin 7 and extend over and beyond the points of engagement of the tumblers 2 and 3 to prevent them from driving each other by friction. The bolt 9 is provided with the clearance 12 which receives the ends of the key bit which by their rotation displace the bolt in known manner.

The tumblers 2 are displaceably arranged in the casing 1, as stated, to permit interruption of the meshing of the teeth 10 of both kinds of tumblers. In the construction shown, the pin 7 of the tumblers 2 is secured to an arm 13 which can be moved about the pin 14 as a pivot against the action of the spring 21 and possesses an opening 15 for the reception of a bolt 16, as shown in Fig. 6. As indicated in Figs. 2 and 3, the opening 15 of the arm 13 coincides with an opening 17 in the casing 1 and with an opening 18 of a covering plate 10', so that the arm 13 is moved when the bolt 16 is inserted in the opening 17 of the casing 1. This causes displacement of the pin 7 of the tumblers 2 in the longitudinal opening 20 of the covering plate 10' in the direction of the bolt motion, as indicated by arrows in Fig. 2, since the pin 7 is integral with the arm 13 which can be swung about the pin 14. The engagement of the teeth 10 of the tumblers 2, 3 is thus interrupted. In Fig. 2 the arm 13 is indicated by a broken line while the dash-and-dot line shows the position of the arm after removal of the bolt 16 from the lock.

To permit variation of the bit of the key 22 as required, it comprises a plurality of bars 23 which can be held after adjustment in a recess of the stem by known means, such as the screw 24. The bars 23 possess on one side the grooves 25 which are engaged by guide bar 26 of the stem of the key, so that the bar 23 inserted in this position is secured against displacement in slot and kep fashion. The last bar 27 which is adapted to engage the key sweep 12 of the bolt is so constructed that it can be moved relative to the stem of the key from one side only. The clamping screw 24 can be rotated by the bolt 16 whose one end 28 is flat and can serve as screw driver, as indicated in Fig. 6.

The operation of the lock is exactly the same as that of any other lock provided with tumblers. When the key is turned, the tumblers 3, against the action of the spring 5, will be moved according to the key bit, the meshing 10 will cause also motion of the tumblers 2, so that the bolt 9 operated through the key sweep 12 can be projected and the projection 8 withdrawn from the notches 6 of the tumblers 2.

The tumblers 3 contacted by the key 22 can be adjusted for a key of a different bit as follows:

The door of the container holding the lock is

opened, and by means of the key the bolt 9 of the lock is partly projected, so that the projection 8 of the bolt 9 is still positioned in the notches 6 of the tumblers 2 which are thus held in unlocking position, as shown in Fig. 2. Then the bolt 16 is inserted from within the inclosure in the opening 17 of the casing 1 as shown in Fig. 3. By the conical end of the bolt 16 the arm 13, against the action of the spring 21, is moved into the position indicated by a broken line in Fig. 2, whereby also the pin 7 disposed on the arm 13 is displaced toward the right in the direction of the arrows, in consequence whereof the tumblers 2 arranged on the pin 7 will be displaced in the direction of the projection 8, so that the engagement of the two sets of tumblers 2 and 3 is interrupted. When the tumblers are in this position, the key 22 can be turned to project the bolt 9 completely and permit withdrawal of the key from the lock. The tumblers 3 are absolutely free, while the tumblers 2 are held in bolt unlocking position and secured by the projection 8. The bolt 16 remains in the lock to maintain the tumblers 2, 3 in spaced position.

The bit of the key 22 can then be altered at will by loosening the screw 24 and displacing the bars 23, preferably by first removing the last bar 27 from the stem and pushing the other bars provided with grooves 25 into the position formerly occupied by the bar 27. Adjustment is effected by moving up another groove 25 of the bars 23 on the guide 26. When all bars 23 have been relatively adjusted as desired, the screw 24, after insertion of the fixed bar 27, is tightened, and the key will now have an entirely different bit.

The adjusted bit is then inserted in the freely movable tumblers 3 and the key partly turned so that it is positioned vertically to the tumblers 3 which are thus perfectly adapted to the newly adjusted bit. When the bolt 16 is withdrawn from the opening 17, the arm 13, owing to the action of the spring 21, will be moved again into initial position at which the tumblers 2 and 3 are in engagement through their teeth 10. In spite of its adjustment, the key 22 can nevertheless be used for this new position of the tumblers and is the only one by means of which the lock can be manipulated.

To provide for safe adjustment of the tumblers a key tumbler 3' pivoted on the casing and disposed on the bolt 9 is formed without toothed segment, as shown in Fig. 8, and possesses a continuation 29 for covering the opening 17 in the casing for the bolt 16. The continuation 29 has an opening 30 which downwardly narrows into a slot 31, and the tumbler 3' must be so moved that the opening 30 registers with the opening 17 before the bolt 16 can be inserted. This position of the tumbler 3' is shown in Figs. 9 and 12.

The tumbler 3' may further be provided in its upper portion with recesses or notches 32, 33 which are engaged by a pin 34 of the bolt 9 to secure it in both opening and closing positions and to prevent unintentional inward or outward motion of the bolt during adjustment of the tumbler 3' which like all other tumblers 3 is moved in known manner by the key bit.

The bolt 16 may, furthermore, be replaced by a key 35 shown in Fig. 10. The key 35, in addition to its usual bit 36 for moving the arm 13, possesses at the free end of its stem a projection 37 which drops into the slot 31 of the opening 30 of the continuation 29 and thus prevents further turning of the key 35, the projection 37 being so long and thin as to be able to enter also the smaller openings produced by the covering of the plates. When therefore the tumbler 3' is moved into the position shown in Fig. 9 at which the opening 17 is in register with the opening 30, the key 35 can be inserted in both these openings and turned to move the arm 13 and thereby interrupt the engagement between the tumblers 3 and 2. When after withdrawal of the key 22 whose bit is to be adjusted the tumblers for the key are released, the tumbler 3' is moved up by spring action, so that the projection 37 is placed in the position shown in Fig. 11 and rotation of the key 35 is absolutely prevented.

The adjustment of the key bit and the setting of the tumblers in accordance with the altered bit can be carried out in the manner described while the receptacle to which the lock is attached is open. Since the bit of the key comprises a plurality of individual bars which can be adjusted and the lock possesses a corresponding number of tumblers, both the key and the lock may be altered within very wide limits. Without the aid of an expert the owner of such a lock may alter the key at any time, for instance every day, and thus obtain maximum protection.

In the construction shown the key has a double bit, though keys having a single bit may be used also, in which case bars differing in length are inserted in the stem and held therein.

A lock according to the invention is particularly suited for safes, etc. manipulated by a changing staff, because it contains within itself the means for rendering impressions taken of a key or keys absolutely worthless.

I claim:

1. A safety lock, comprising an apertured casing, a lock bolt displaceable in the casing, movably disposed tumblers to be operated by a key, recessed rotatable tumblers for the bolt, arms movably arranged in the casing for supporting said recessed tumblers, a projection on said bolt cooperating with said recessed tumblers, a toothing on each tumbler on the sides facing each other to bring a tumbler for the lock and a tumbler for the key into engagement, means for adjusting said arms to bring said toothings into and out of engagement and an additional tumbler to be operated by the key for said adjusting means.

2. A safety lock according to claim 1, in which the additional tumbler is formed of a plate having no teeth and a recessed continuation on said plate for cooperation with the adjusting means.

3. A safety lock according to claim 1, in which a pin of the bolt cooperates with the additional tumbler for securing it in one or the other operative position.

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