Aug. 27, 1935. R. RIEBACK 2,012,693

DOORLOCK

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Fig. 1

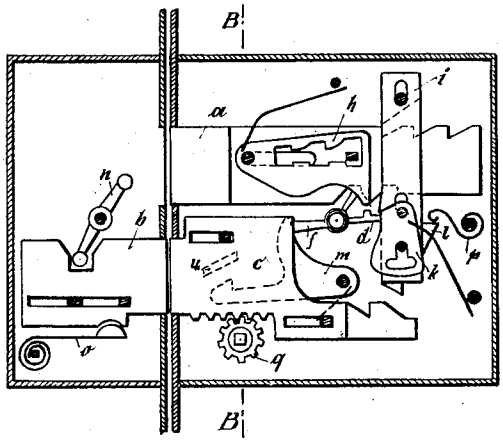


Fig. 2

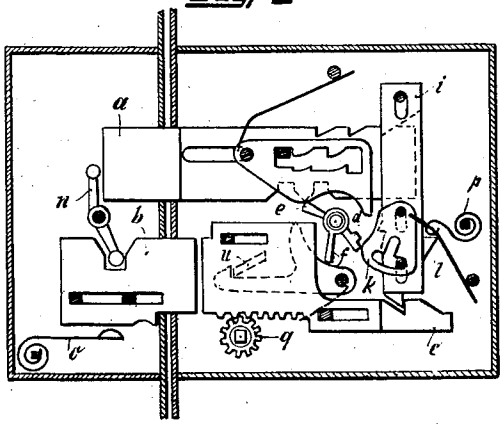
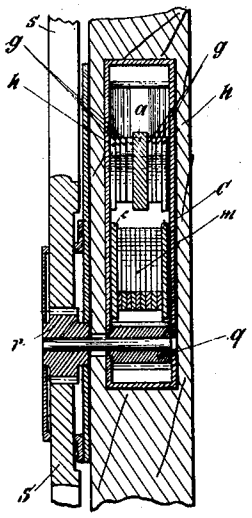


Fig. 3



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DOORLOCK

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Fig. 4

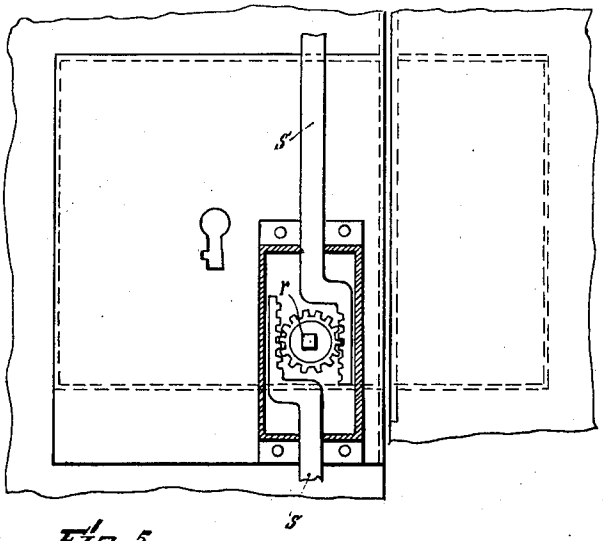


Fig. 5

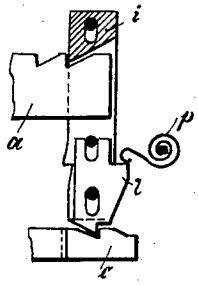


Fig. 6

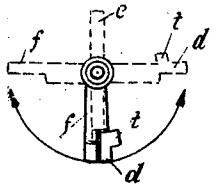


Fig. 7

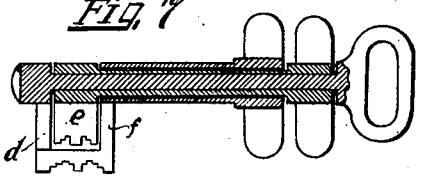
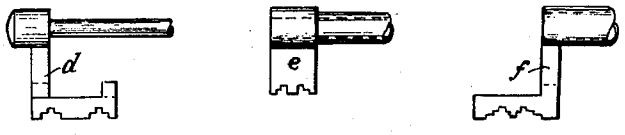


Fig. 8



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Patented Aug. 27, 1935 2,012,693

UNITED STATES PATENT OFFICE

2,012,693

DOORLOCK

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Application June 17, 1933, Serial No. 676,294
In Germany June 25, 1932

4 Claims. (Cl. 70—14)

This invention relates to a door lock with multiple bolting by means of transverse and flush bolts. In accordance with the present invention the main bolt is secured by means of two groups of Chubb-type tumblers, and a transverse bolt is connected, through a double lever mounted in a casing of the counter door leaf or of the door frame and a counter bolt located in engagement therewith, with an auxiliary bolt which can be fastened by means of tumblers and which in its turn acts on two vertically movable flush bolts.

Door locks equipped with swinging bolts in addition to the ordinary transverse bolts are known. However, the bar bolts are operated together with the locking bolt, so that on the locking of the lock bolt the bar bolts are also drawn back and consequently the lock is completely opened. Locks are also known that are locked by means of a transverse bolt secured by means of tumblers and are locked by means of keys having several webs. In such locks, however, the tumblers of the main bolt do not work together with those of the transverse bolt through one web but each web engages only one bolt by means of tumblers.

The lock according to the invention is shown in the accompanying drawings.

Fig. 1 shows the lock in the "open" position, the lock cover being removed.

Fig. 2 shows the lock in the "locked" position.

Fig. 3 shows a section through the lock according to the line B—B of Fig. 1.

Fig. 4 shows the arrangement of the flush bolt at the side of the door.

Fig. 5 shows the engagement in the auxiliary bolt of the locking catch located on the transverse bolt.

Figs. 6–8 show the key, the forms of the key webs, and their positions.

The main bolt *a* is secured by means of the ordinary tumblers *g*, and also by means of two lateral tumblers *h* and a transverse bolt *i*. The transverse bolt *i* is secured by means of tumblers *k*, as shown in Fig. 2. When locking the lock, the tumblers *k* of the transverse bolt *i* must first be disengaged by means of the web *d*, and then the transverse bolt *i*, and, through it the lateral tumblers *h* must be simultaneously pressed up by means of the lug *t* of the key web *d*. Afterwards the tumblers *g* are disengaged by means of the web *e* and the main bolt *a* pressed forward during its first revolution. On the conclusion of the second revolution of the web *e* (Fig. 2), the main bolt *a* strikes against a double lever which is rotatably mounted in the casing of the counter door leaf or of the door frame and which is in engagement with a counter bolt.

The double lever *n* presses the counter bolt *b* out of the striking plate into the lock casing. During its movement the counter bolt *b* drives an auxiliary bolt *c* before it. When the auxiliary bolt *c* is pressed back the tumblers *m*, which are rotatably mounted on a bolt fixed in the casing of the lock, engage automatically behind a nose *u* of the auxiliary bolt *c*. Simultaneously a locking catch *l* adjustably arranged on the transverse bolt *i* snaps into a notch which is provided on the shaft of the auxiliary bolt *c*, as shown in Figs. 2 and 5. The auxiliary bolt *c* is provided on its lower edge with a rack which is in engagement with a toothed wheel *q*. The toothed wheel *q* is mounted on a common shaft with a toothed wheel *r*. The toothed wheel *r* engages racks of the flush bolts *s*, which are arranged on the inside of the door. Consequently, when the auxiliary bolt *c* is pressed back, the door is locked above and below by means of the bar bolts *s*. As long as the main bolt *a* is locked, it is not possible to move the counter bolt *b* or the auxiliary bolt *c* by moving the racks *s*.

However, when the lock is opened, the counter bolt *b* and the auxiliary bolt *c* are not taken along by the main bolt *a* as was the case during the locking operation. Both remain in the "locked" position. As during locking, first the web *d* disengages the tumblers *k* and the transverse bolt *i*, and the lateral tumblers *k* are pressed up in order to press back by means of the web *e* the main bolt *a*, the ordinary tumblers *g* being disengaged. In order to press back the counter bolt *b* out of the lock casing and to draw back the racks *s*, the tumblers *k* must be disengaged by means of the web *d* and the transverse bolt *i* must remain pressed up or be lifted out anew by means of the locking catch *l*. Afterwards the third web *f* disengages the tumblers *m* and the auxiliary bolt *c* is pushed forward. The counter bolt *b* and the racks *s* are thus also pressed back.

The lock is thus locked by means of two webs but can be opened only by means of three webs. In order to prevent the springing forward of the counter bolt *b* owing to vibration, it is held by a spring *o*. The locking catch *l* is pressed down by a spring *p* and by means of it the transverse bolt *i* is also pressed down. The lateral tumblers *h* are not moved by the web *e* but by the lug *t* of the web *d*.

The advantages of the invention over safety locks of known kind are as follows:

The main bolt *a* is secured, not only by the ordinary tumblers *g*, but also by both a transverse bolt *i*, which is likewise secured by means of tumblers *k*, and two lateral tumblers *h*, the locking notches of which correspond to the locking projection of the transverse bolt *i* in such a manner that they must be disengaged simultaneously with the transverse bolt *i* by means of a special web *d*. A slight inaccuracy in the lug *t* on the web *d* prevents the locking of the main bolt *a* even when the tumblers *k* are correctly disen-

gaged. If the lug *t* is too high, the transverse bolt *i* cannot be liberated because the tumblers *h* prematurely impede the transverse bolt *i*. If the lug *t* is too low the tumbler *h* is not disengaged on account of a premature impeding by the transverse bolt *i*. When the main bolt *a* is pushed forward into the strike plate, a counter bolt *b* is pressed out of the strike plate into the lock casing, and when the counter bolt *b* is pressed forward into the lock casing the flush bolt *s* arranged on the inside of the door is moved into the preliminary locking position by means of an auxiliary bolt *c* and a toothed-wheel transmission device so that the two leaves of the door are locked in relation to each other by the two bolts *a* and *b* that engage over each other.

A violent pressing away of the leaf, the cutting out of the flat strip, or the pressing back of the bolt located in the fixed leaf at the front are, therefore, impossible. Neither the counter bolt *b* nor the swing bolt *s* can be operated in any way as long as the main bolt *a* is locked. Only after the locking of the main bolt *a* can the counter bolt *b* and the bolt *s* be pressed back by the preparatory locking of an auxiliary bolt *c* after preliminary disengagement of the tumblers *m* and locking catch *b* by means of a second and third web. The lock is consequently locked by means of two webs and the door is trebly bolted. The lock is secured by means of five different kinds of safety devices, and, indeed, by means of the ordinary tumblers *g* and the tumblers *h*, by the transverse bolt *i* secured by tumblers, by the main bolt *a*, by the locking catch *l* and the tumblers *m* of the auxiliary bolt *c*.

According to the present invention two bolts of a door lock are so arranged that they move simultaneously in opposite directions when locking. During unlocking the movement in the opposite direction takes place step by step and by special movements of the key. One bolt is placed in the lock, the other in the casing. This reciprocal movement when locking is effected by any suitable means e. g. by a roller equipped with two noses or by means of a double lever, as shown in the drawings, one arm of this lever being pushed by one end of one of the bolts, the other arm of the lever engaging the other bolt. The latter consists of two parts, an ordinary bolt and an auxiliary bolt.

Furthermore, preferably a transverse bolt is provided which is pressed downward by means of a spring so that it blocks the two main bolts in both positions, locked and unlocked. In order to move (locking and unlocking) the main bolts it is necessary first to lift this transverse bolt.

Preferably two groups of tumblers are provided for the main bolt which pushes the lever, the auxiliary part of the other main bolt being provided with another group of tumblers. The transverse bolt has also a group of tumblers.

One group of the tumblers of the main bolt which push the lever should be moved simultaneously with the transverse bolt.

The key for the door-lock described must have three nested webs mounted around the same axis of rotation and each web connected with a special handle for moving it.

Locking is accomplished by two movements of the key, and is controlled by two webs (each by one) and both in the same ordinary direction for locking. Unlocking is done by three rotations of the key, the first by a movement of one web in the direction of locking, the second and third by movements of the second and third web in the opposite direction.

I claim:

1. A door lock comprising a lock case and a keeper, a main bolt with notches for the key, an auxiliary bolt, a transverse bolt, said three bolts being in the lock case, each of them secured by tumblers, a lever in said keeper, a counter bolt engaging one arm of said lever, the free arm of said lever in said keeper touching the main bolt in the locked position, the free end of the counter bolt touching the end of said auxiliary bolt which is directed towards the keeper, a connection between the other end of the auxiliary bolt and one end of the transverse bolt, a tooth on the other end of the transverse bolt engaging the end of the main bolt directed towards the interior of the lock case.

2. A door lock comprising a lock case and a keeper, a main bolt with notches for the key, an auxiliary bolt, a transverse bolt, said three bolts being in the lock case, each of them secured by tumblers, a lever in the keeper, a counter bolt engaging one arm of said lever, the free arm of said lever in said keeper touching the main bolt in the locked position, the free end of the counter bolt touching the end of said auxiliary bolt which is directed towards the keeper, a connection between the other end of the auxiliary bolt and one end of the transverse bolt corresponding to the keeper bolt, a tooth on the other end of the transverse bolt engaging the end of the main bolt directed towards the interior of the lock case, and a spring actuating the transverse bolt and pressing it into engagement with the main bolt and the auxiliary bolt.

3. A door lock comprising a lock case and a keeper, a main bolt with notches for the key, an auxiliary bolt, a transverse bolt, said three bolts being in the lock case, a lever in said keeper, a counter bolt engaging one arm of said lever, the free arm of said lever in said keeper touching the main bolt in the locked position, the free end of the counter bolt touching the end of the auxiliary bolt which is directed towards the keeper, a tooth on the other end of the auxiliary bolt engaging a tooth on the end of the transverse bolt, a tooth on the other end of the transverse bolt engaging a tooth on the end of the main bolt directed towards the interior of the lock case, two groups of tumblers for the main bolt pushing said lever, one group of tumblers for the auxiliary bolt, and one group of tumblers for the transverse bolt.

4. A door lock comprising a lock case and a keeper, a main bolt with notches for the key, an auxiliary bolt, a transverse bolt, said three bolts being in the lock case, a lever in the keeper, a counter bolt engaging one arm of said lever, the free arm of said lever in said keeper touching the main bolt in the locked position, the free end of the counter bolt touching the end of the auxiliary bolt which is directed towards the keeper, a tooth on the other end of the auxiliary bolt engaging a tooth on the end of the transverse bolt, a tooth on the other end of the transverse bolt engaging a tooth on the end of the main bolt directed towards the interior of the lock case, two groups of tumblers for the main bolt pushing the lever, one group of said tumblers cooperating with the transverse bolt, one group of tumblers for the auxiliary bolt, and one group of tumblers for the transverse bolt.

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