June 16, 1936. H. DENULL 2,044,381

LOCK WITH BOLT OPERATING MECHANISM REMAINING PERMANENTLY IN THE CASE

Filed Feb. 3, 1933

FIG. 1.

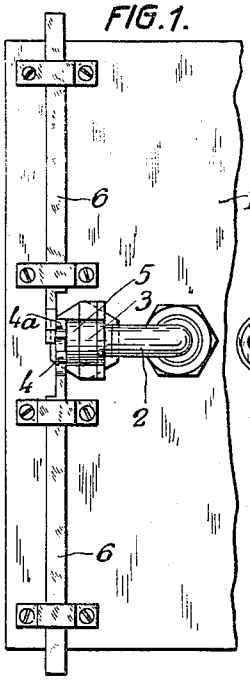


FIG. 2.

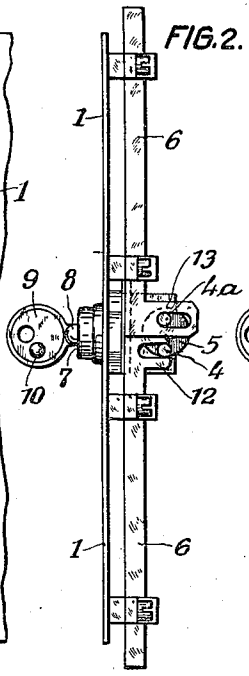


FIG. 3.

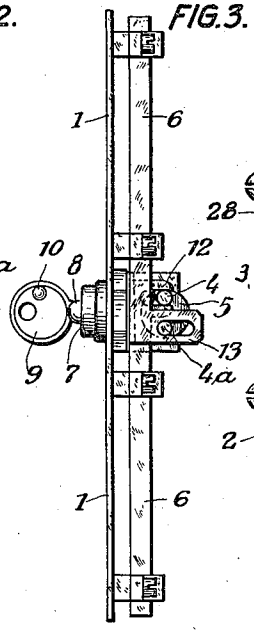


FIG. 4.

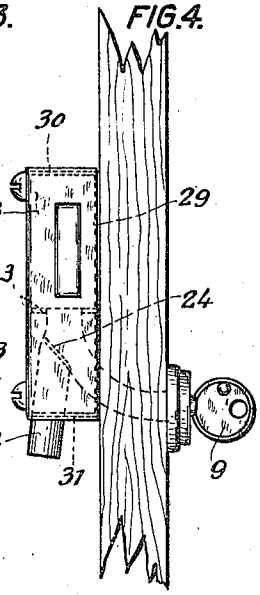


FIG. 8

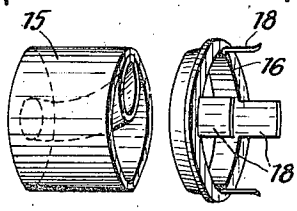


FIG. 5.

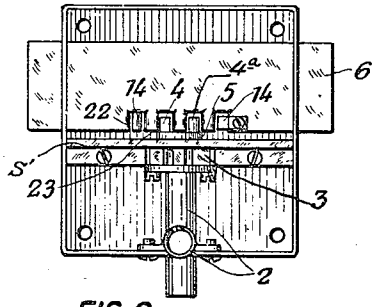


FIG. 7.

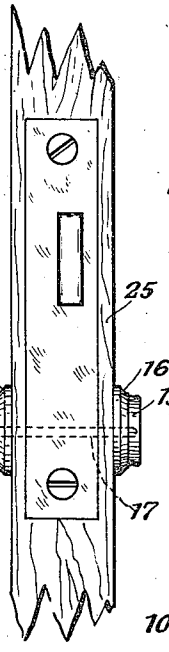
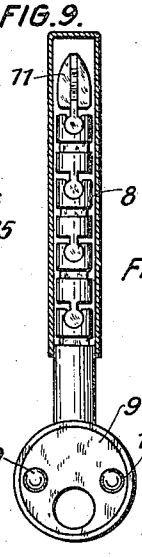


FIG. 9.



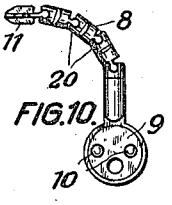
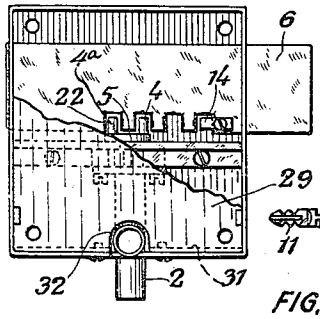


FIG. 6.



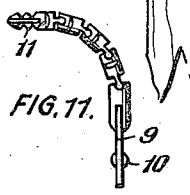


FIG. 12.

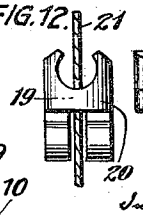
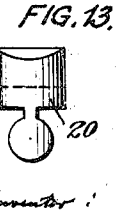


FIG. 13.



Inventor:
Hans Denull

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LOCK WITH BOLT OPERATING MECHANISM REMAINING PERMANENTLY IN THE CASE

Hans Denull, Berlin-Charlottenburg, Germany, assignor to Heinrich Goldbeck, Berlin, Germany

Application February 3, 1933, Serial No. 655,099
In Germany February 6, 1932

3 Claims. (Cl. 70—14)

This invention relates to a lock with a bolt operating mechanism remaining permanently in the case and characterized chiefly by the fact that the fulcrum of the bolt operating mechanism lies parallel or substantially parallel to the door plane.

The key hole on one side of the door is preferably perpendicular and on the other side parallel or approximately parallel to the door plane. Both key holes unite anterior to the bolt operating mechanism to form a single key hole and at the point of junction a guide flap is provided which can be alternately turned towards the one or the other side by the key.

The key guide, particularly that which is perpendicular to the door plane, may also be divided in that one portion is accommodated within the lock case and the other in a separate sleeve inserted in the door.

Further features of the invention are hereinafter set forth.

Several embodiments of the invention are illustrated by way of example in the accompanying drawing in which:—

Fig. 1 shows in elevation the inner side of part of an automatic machine door with lock, comprising a bolt actuating mechanism with a horizontal fulcrum, and in operative position.

Fig. 2 is an end view of Fig. 1.

Fig. 3 is an end view of Fig. 1, the bolt actuating mechanism being in inoperative position.

Fig. 4 shows in end view a lock with bolt actuating mechanism with vertical fulcrum fitted on the inner side of a door.

Fig. 5 shows in rear elevation the lock case of the construction illustrated in Fig. 4 with the cover plate removed, the lock bolt being in inoperative position.

Fig. 6 is a similar view to Fig. 5, the cover plate being, however, only partly broken away and the lock bolt being in operative position.

Fig. 7 shows in end view a mortise lock in a door with separately removable key guide sleeves on both sides, the fulcrum of the bolt actuating mechanism extending perpendicularly to the door plane.

Fig. 8 is a perspective view showing a guide sleeve with exchangeable guide ring.

Fig. 9 shows the key in elevation with its shank in straight position and covered by a shank protecting sleeve shown in longitudinal section.

Fig. 10 shows in elevation the key in bent position.

Fig. 11 is a similar view to Fig. 9, the key being turned through 90°.

Fig. 12 shows in elevation a key shank element with central bore through which the connecting wire is threaded.

Fig. 13 is a similar view to Fig. 12 showing the element being turned about its axis through an angle of 90°.

According to Fig. 1 a key guide or channel 2 is provided on the door 1 of the automatic machine and closed at one end by a lock casing 3 of any suitable construction by means of a rotatable connecting disc 5 having projections or pins 4 and 4a for the bolts 6. An aperture 7 is provided in the other end of the key guide 2 for insertion of a key with flexible shank 8. To enable the key to be inserted in the proper manner it has on its handle portion 9 feeler knobs 10 which must be always upwardly directed in order to allow an easy and perfect entrance of the key bit 11 into the cylindrical lock illustrated in the drawing and an abutment of the bit 11 against the rotary disc 5.

The rotary disc 5 with the connecting pins 4 and 4a for operating the bolts 6 is preferably separately mounted for example as shown in Fig. 1 in cheek bearings or according to Fig. 5 in a bridge s' which in the form shown in Fig. 5 divides the case of the lock into a key guiding compartment and a bolt compartment and also supports the lock casing 3 and the key guide 2. If the bolts 6 are in locking position according to Fig. 1, they cannot be unintentionally shifted back even when employing force because they are opposed by the two connecting pins 4 and 4a of the rotary disc 5. The bit 11 of the key penetrates into a central bore in the connecting disc 5 and on being turned rotates the latter and shifts the bolts 6.

As shown in Fig. 3 the ends of the bolts overlap when in inoperative position, one pin of the rotary disc being longer than the other and preferably diametrically oppositely situated to enable both bolts to be moved simultaneously. One bolt engages by means of a fork 12 one of the pins of the rotary disc and the other bolt engages by means of an elongated aperture in an arm 13 the second and longer connecting pin 4a of the rotary disc 5. The ends of the bolts 6 are in this manner guided one past the other entirely free from friction, the ends of the elongated hole of the arm 13 forming an abutment for pin 4a and limiting the rotary movement of the rotary disc 5.

In the second form of construction shown in Figs. 4 to 6 the connecting pins 4 and 4a of the rotary disc 5 engage successively in teeth provided in the bolt 6 in such a manner that the movement of the rotary disc effects a continual

movement of the bolt. The stroke of the bolt during the locking and unlocking movement is limited by abutments 14 of any suitable construction, against which abutments the one or the other pin 4 and 4a of the rotary disc 5 abuts so that the movement of the rotary disc 5 and of the bolt 6 is arrested. During the shifting of the bolt, that is during the turning of the key, the rotary disc 5, as above mentioned, is rotated by the key bit 11 around its axis or the axis of the key guide so that one of its projections or pins always passes out of a tooth of the slide bolt 6 in order to continue the movement of the bolt with the opposite or following projection or pin until the movement is checked by one of the abutments 14 preferably arranged in the last tooth.

The bolt illustrated in Figs. 4 to 6 can in this manner act towards either side, that is can be employed as locking towards the right or the left.

Fig. 4 also shows that key guides 2 are provided both on the outer and inner sides of the door, which guides unite to form a single guide leading to the lock 3 as can be seen from Figs. 1, 4 and 5. At the point of junction of these two guides a guide flap 24 (Fig. 4) may be provided which can be swung over to one side or the other by the key.

As shown in Fig. 4, the lock case 28 is closed on the side of the door by a cover plate 29 which prevents boring into the case. This cover plate 29 is bent to form flanges 30, 31 at each end. These flanges 30, 31 are resiliently held in the casing 28 and slightly longer than the depth of the case so that the cover plate 29 does not bear against the inner side of the lock proper or against the inner parts of the case and can not therefore impede the function of these parts. The cover plate has an aperture 32 for the outwardly extending guide channel 2. Such a cover plate requires no additional means for fixing, but its resilient flanges 30, 31 hold it reliably in a certain position on the lock case. The screw connections hitherto necessary are therefore entirely omitted. The cover plate can be removed merely by inserting a tool, such as a screw driver in recesses provided for this purpose and prising it out of the case owing to the cover plate 29 being held in the case merely by the friction of the flanges 30, 31.

It is further pointed out that, when the key is removed, the rotary disc 5 is connected to the lock in such a manner that neither the disc nor the lock can move. It is evident that the rotary disc 5 can be provided with more than two connecting pins 4 and 4a.

Figs. 7 and 8 show a third form of construction wherein the lock is constructed as a mortise lock. The key guide is interrupted on each side of the door in order to enable the lock to be inserted in the wood lining without in any way superficially damaging the door frame. It is only necessary to mortise the frame at the point where the lock is to be inserted and the apertures provided in the door for accommodating the cover sleeves 15 are covered by guide rings 16 without screws. These guide rings 16 are anchored in the manner hereinafter described when the sleeves 15 provided with the continued key guide 2 are pressed into the guide rings in the corresponding door apertures. According to the thickness and strength of the door the cover sleeve 15 projects more or less from the guide rings 16. The two opposite sleeves 15 are interconnected and held together by means of long bolts 17 extending through the mortise lock.

The guide rings 16 are first inserted in the door openings, whereupon the sleeves 15 are slipped into the rings. These rings 16 have resilient clamps 18 which are pressed outwards into the wood of the door frame when the sleeve is forced therein so that the rings 16 and sleeves 15 are automatically anchored in the door frame as the clamp 18 not only grips into the wood but also exerts considerable frictional resistance on the periphery of the sleeves 15.

A key for operating the lock according to the invention is illustrated in Figs. 9 to 13 of the accompanying drawing. This key consists of a shank portion composed of individual elements connected by cardan joints, which elements are reinforced to form a complete unit by resilient means, such as wires 21 extending through central bores 19 in the individual elements and connecting the key bit, which is preferably of cross-shaped cross section, with the key handle.

The interengagement of the individual elements 20 is clearly shown on the drawing and Figs. 9 to 13 show that it is possible to turn the key shank 3 in all directions. Such a key can withstand strong bending and torsional stresses without any danger of breaking.

I claim:—

1. A lock, comprising in combination a case, a rotatable bolt operating mechanism permanently in said case, said mechanism having its fulcrum substantially parallel to the door plane, key guides one on each side of the door leading to said bolt operating mechanism, the guide on one side of the door being perpendicular to the door plane and that on the other side of the door being substantially parallel to the door plane.

2. A lock as specified in claim 1, comprising in combination with the case, a key guide leading to said case and extending on one side of the door perpendicularly and on the other side parallel to the plane of the door, said guide being divided into two parts, one part located in said case, and a sleeve inserted in the door carrying the other guide part.

3. A lock as specified in claim 1, comprising in combination with the case and the rotatable bolt actuating mechanism, two key guides leading to said case uniting to form a single guide anterior to said bolt actuating mechanism, so that the key always enters the bolt actuating mechanism from the same point.

HANS DENULL.