

Oct. 30, 1934.

H. BIEMER

1,979,186

LOCK

Filed Nov. 14, 1932

2 Sheets-Sheet 1

FIG. 1.

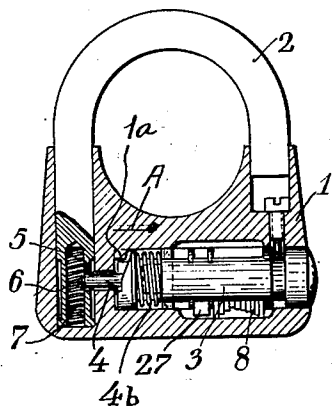


FIG. 2.

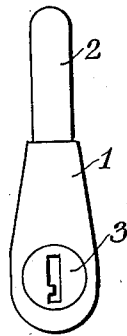


FIG. 3.

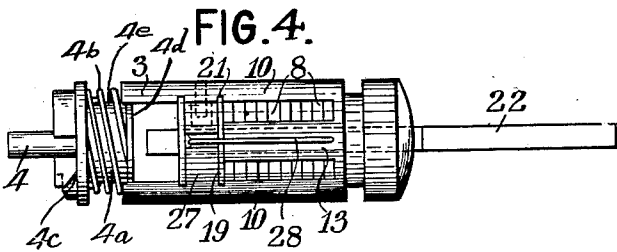
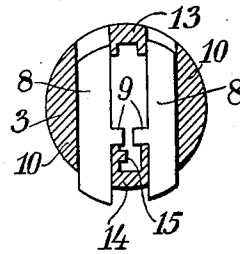


FIG. 4.

FIG. 6.

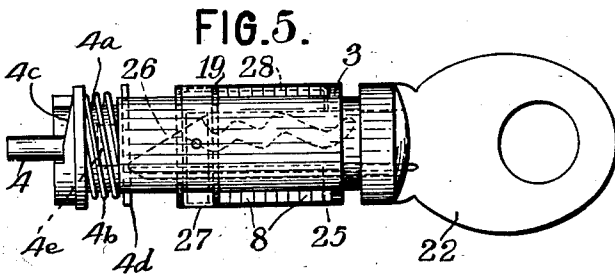
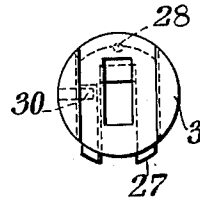


FIG. 5.

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FIG. 7. FIG. 8.

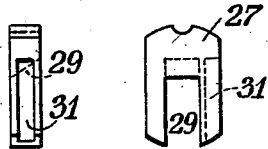


FIG. 11.

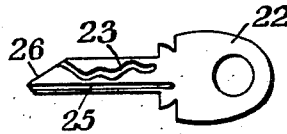


FIG. 9. FIG. 10.

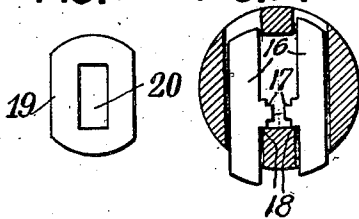


FIG. 12.

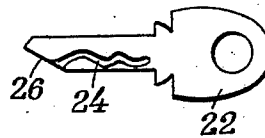
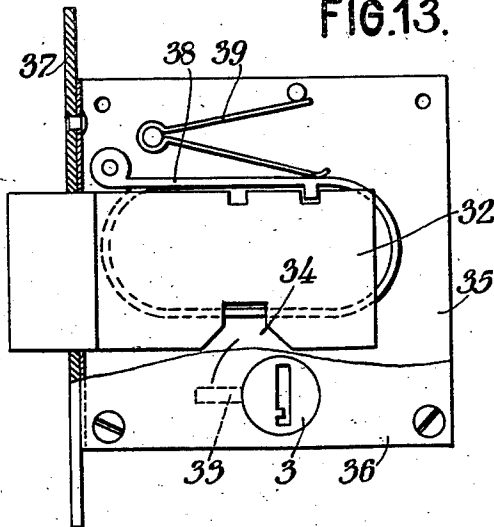


FIG. 13.



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UNITED STATES PATENT OFFICE

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LOCK

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In Germany March 9, 1931

4 Claims. (Cl. 70-96)

This invention relates to a lock with a rotatable locking cylinder, which is distinguished by particularly simple construction, with particularly reliable protection of the lock against unauthorized opening.

A padlock and a door lock according to the present invention are diagrammatically illustrated by way of example in the accompanying drawings, in which

Figure 1 shows a longitudinal section through a padlock,

Figure 2 a front view thereof,

Figure 3 a cross section through the locking cylinder of the lock in a somewhat modified constructional form, also on a larger scale,

Figure 4 a plan of the locking cylinder of the lock on an enlarged scale, with the key inserted,

Figure 5 is an elevational view corresponding to Figure 4,

Figure 6 is an end view of the locking cylinder as seen from the inside of the lock.

Figures 7 to 10 show details on a larger scale.

Figures 11 and 12 are side views of the key showing opposite sides thereof, and

Figure 13 is an elevational view, partially in section, of a lock according to the invention in a somewhat modified form of construction.

In these drawings, 1 denotes the casing of a padlock, 2 the shackle at the top of the padlock, 3 a locking cylinder, and 4 a locking bolt, which, by entering an aperture 5 in a part 6 of the shackle 2 keeps the latter in the locked position. 7 is an opening spring, which throws up the shackle 2 when the locking bolt 4 is retracted.

In Figure 3 is shown plate tumblers 8, with lugs 9. These tumblers are arranged side by side in direct contact with one another in the locking cylinder 3 without a spring, as will be seen from Figures 1, 4 and 5, and are slidable in their longitudinal direction in the locking cylinder by means of guiding members 10 to 12, 13 and 14, the lugs 9 preventing the tumblers from dropping out.

There is preferably provided in the interior of the locking cylinder a guiding rib 15, the purpose of which will hereinafter be further described.

In place of the tumblers 8 with a lug 9 according to Figure 3, tumblers 16 with a lug 17 and an auxiliary lug 18, as shown in Figure 10, are also possible. With this form of the plate tumblers the key guide can be still more simply constructed relative to Fig. 3. The auxiliary lug 18 prevents the tumblers from falling out, while the lug 17 serves for raising the tumblers with the key.

It is obvious from Figure 5 that the tumbler

strips are mounted in longitudinal slots of the locking cylinder which are open on one side.

In order to prevent the tumblers 8 dropping out of the locking cylinder in the longitudinal direction thereof, a holding member 19 is provided, which preferably consists of a sheet metal plate with an aperture 20 in the middle, and is inserted in suitable grooves 21 in the locking cylinder. According to Fig. 4 the outer guide members 10 are extended in order to be able to receive a part carrying the locking bolt 4. This consists of a member 4a fitting between the extensions of 10 and a cam disc 4c. The cylindrical member 4a has flat lateral surfaces 4e and carries a spring 4b which is held by two projections 4d. On rotating the locking cylinder the part 4a, 4c is carried along, whereby the cam disc 4c is moved by a shoulder or projection 1a on the housing 1 in the direction A in opposition to the action of the spring 4b. The locking bolt is thereby withdrawn from the opening 5 and the hook 2 released for opening the lock.

In Figures 11 and 12 is shown a key 22 suitable for this lock, with lateral cam grooves 23 and 24 and a guiding groove 25. The latter ensures the key only being introduced into the locking cylinder in the correct position, which is the case when the guiding rib 15 engages in this groove.

On the front end of the key is provided an inclined surface 26, the object of which is to lift the lugs 9 or 17 when the key is being introduced, and to effect the introduction into the cam grooves 23 and 24.

The combination hereinbefore described already yields a very good and simple lock, which is cheap to manufacture and easy to mount.

In a particularly advantageous form of construction, however, an additional protective member 27 is also provided, which is subject to the action of a spring 28. In the constructional example shown, the same consists of a U-shaped body, and has a surface, namely the inclined surface 29, which is adapted to be engaged by the inclined surface 26 of the key. Upon the key being introduced into the locking cylinder the inclined surface 26 acts upon the inclined surface 29, and, when the key is completely inserted, the protective member 27 is drawn back into the opening position, that is to say, into the interior of the locking cylinder, against the action of the spring 28, as will be seen from Figures 4 and 5. From Figure 6 it will be seen how this protective member normally protrudes from the locking cylinder 3 under the action of the spring 28 and

secures the locking cylinder in the lock casing, so that even by shaking or knocking, whereby under some circumstances a certain ordering of the tumblers 8 might take place, the locking cylinder always remains secured in the lock casing. A pin 30 is provided, which engages in a groove 31 in the protective member, and prevents the latter from dropping out of the locking cylinder.

In the case of the lock shown in Figure 13, a locking cylinder 3 is provided exactly in the form hereinbefore described. 32 denotes a locking bar. 33 and 34 are means for connecting the locking cylinder with the locking bar. The parts 35, 36 and 37 form the lock casing, and 38 and 39 are parts of the protective device.

With a lock of the present construction it is possible to keep the locking cylinder exceedingly short, and nevertheless to maintain great safety of the lock. There may for example be lodged as many as twenty tumblers or more upon a locking cylinder length of 1 centimetre.

A further advantage of the present construction consists in the fact that the lateral cam grooves of the key, even when the lock has been in use for a long time, cannot become damaged or worn out, as is the case when the tumblers are subject to spring pressure. A failure of the lock on this ground therefore cannot occur. On the other hand this difficulty cannot arise by employing the supplementary protective member subject to spring action, because this is not moved by the lateral cam grooves but by the inclined front surface of the key. The key is not however liable to be damaged at this point, owing to its comparatively broad surface, and owing to the large bearing surface of the protective member thereon. The lock is of course not restricted to the constructional forms illustrated, but the essential part of this lock, namely the locking cylinder with all its parts, may be employed in locks of all kinds into which a rotatable locking cylinder can be fitted.

What I claim is:—

1. A lock, consisting of a lock casing, a locking cylinder having a longitudinal key-way and beside the same at each side a longitudinal slot open on one side, grooves opening into the slots through the outer walls thereof, a plurality of plate tumblers arranged in the longitudinal slots without a spring and lying with their broad side directly on one another and having lateral lugs which extend into the key-way and a holding member inserted in the grooves in the outer walls of the slots and closing the longitudinal slots at their

open end and holding the tumblers in the longitudinal direction of the locking cylinder.

2. A lock, consisting of a lock casing, a locking cylinder having a longitudinal key-way and beside the same at each side a longitudinal slot open on one side, a plurality of plate tumblers arranged in the longitudinal slots without a spring and lying with their broad side directly on one another and having lateral lugs which extend into the key-way, a holding member closing the longitudinal slots at their open end and holding the tumblers in the longitudinal direction of the locking cylinder, a locking bolt, a cam disc carried with the inner end of the bolt, a cylindrical member carried with the same disc and having flat lateral surfaces engaging between extensions of the outer walls of the longitudinal slots and adapted to be turned together with the locking cylinder by means of a key.

3. A lock, consisting of a lock casing, a locking cylinder having a longitudinal key-way and beside the same at each side a longitudinal slot open on one side, a plurality of plate tumblers arranged in the longitudinal slots without a spring and lying with their broad side directly on one another and having lateral broad auxiliary lugs and narrower lugs thereon which extend into the key-way, and a holding member closing the longitudinal slots at their open end and holding the tumblers in the longitudinal direction of the locking cylinder.

4. A lock, consisting of a lock casing, a locking cylinder having a longitudinal key-way and beside the same at each side a longitudinal slot open on one side, a plurality of plate tumblers arranged in the longitudinal slots without a spring and lying with their broad side directly on one another and having lateral lugs which extend into the key-way, a holding member closing the longitudinal slots at their open end and holding the tumblers in the longitudinal direction of the locking cylinder, a supplementary protective member arranged between the extensions of the outer walls of the longitudinal slots in front of the holding member closing the longitudinal slots, and a rod shaped spring mounted in a longitudinal groove on the periphery of the locking cylinder and acting on the protective member, the latter having relatively large guiding surfaces adapted to be engaged by an inclined surface at the front end of the key for the purpose of bringing the protective member into the opening position.

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