Dec. 21, 1926. 1,611,712

E. M. BENHAM ET AL

LOCK

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Fig. 1.

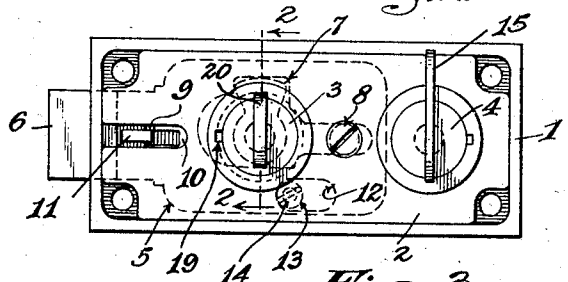


Fig. 2.

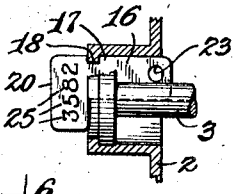


Fig. 3.

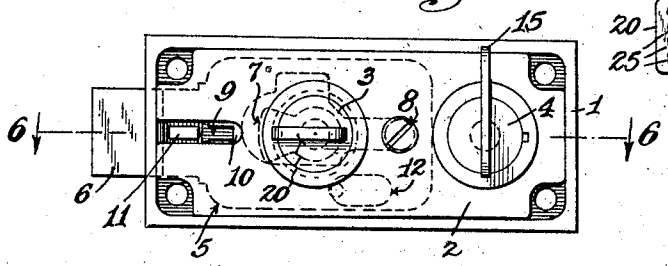


Fig. 4.

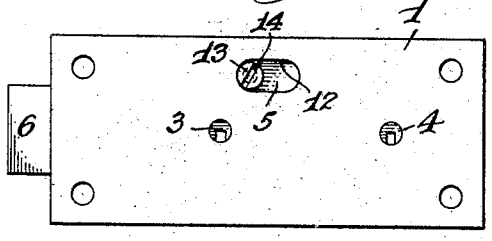


Fig. 5.

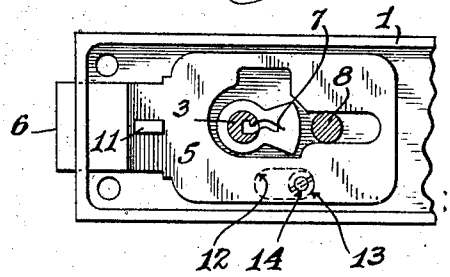


Fig. 6.

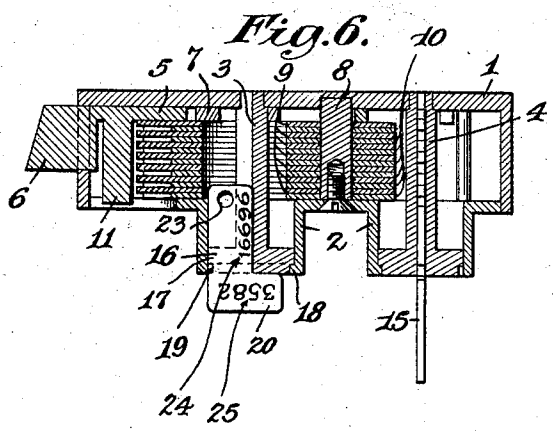
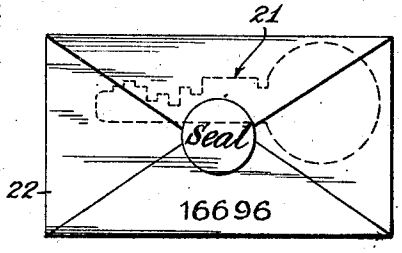


Fig. 7.



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Fig. 8.

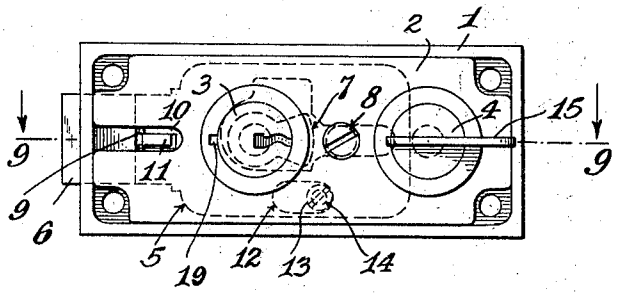


Fig. 9.

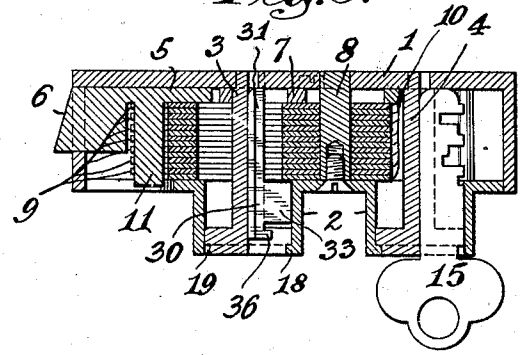


Fig. 11.

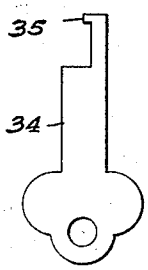
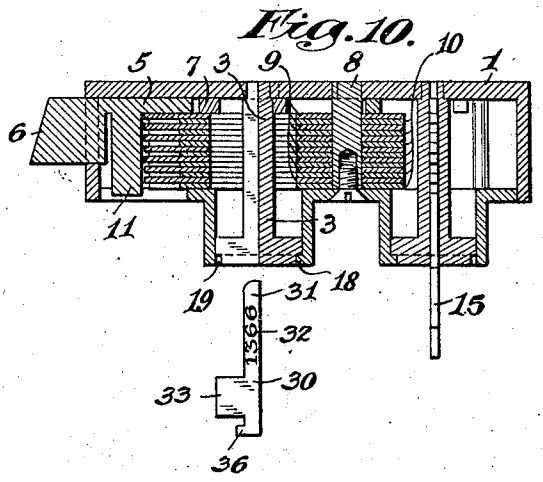


Fig. 10.



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UNITED STATES PATENT OFFICE.

EDGAR M. BENHAM, OF NORWOOD, AND GEORGE J. BAUER, OF MADISONVILLE, OHIO, ASSIGNORS TO THE MOSLER LOCK COMPANY, OF COVINGTON, KENTUCKY, A CORPORATION OF OHIO.

LOCK.

Application filed June 12, 1926. Serial No. 115,442.

This invention relates to locks, and more particularly relates to locks especially suited for use on safety deposit lock boxes, and to locks of the type which permits the customer's key to be retained in a sealed envelope from the time of shipment from the factory until the key is delivered to the customer.

In an application filed in the name of Edgar M. Benham, January 21, 1926, Serial No. 82,689, for improvements in locks, there is disclosed and claimed a lock of the general type referred to. In said lock, the serial number for the customer's key is marked on the rear of the nose of the bolt, and accordingly this serial number is readily ascertainable by the custodian and by others when the bolt is projected outward a slight distance, which is permissible, in order that the lock box could be shipped with the bolt bar projected far enough to hold the door against swinging open. This partial locking also prevented the opening of an unengaged lock box by unauthorized persons.

The principal object of our invention is to improve upon the said prior construction, particularly in providing for the concealment of the serial number for the customer's key until the time when it is desired to deliver the sealed key to the customer. A further object of this invention is to provide a lock which requires the use of the customer's key to unlock the same after the serial number of the customer's key has been ascertained. A further object of our invention is to provide a lock of the character described, which is simple, sturdy and durable in construction, and affords maximum protection and security against being disorganized or unlocked by an unauthorized person, or by means of unauthorized implements. Other objects of our invention will be in part obvious and in part pointed out hereinafter.

In accordance with our invention, a plug is secured in the master key tube, which can be revolved to operate the bolt cam, but the plug cannot be removed until this cam has been turned to such an extent that the bolt bar has been fully projected and the master tumblers upset. This plug has a stem concealed in the key tube. On the stem is marked the serial number of the customer's key for that particular lock. The plug cannot set up the master tumblers and, therefore, the proper customer's key corresponding to the serial number on the plug must be secured before the lock can be opened after the plug has been removed. The bolt bar is permitted a limited movement by means of the plug when it is supplied with a finger portion, or by means of a dummy key when the plug in a modified form is wholly submerged in the key tube, this movement permitting the unlocking of the lock and the projection of the bolt a sufficient distance to make fast the door on which the lock is mounted. Preferably, the lock is also provided with a guard key and guard mechanism, whereby the manipulation of the proper guard key is required before the lock may be fully unlocked by means of either a plug with a finger portion, a dummy key, or by the customer's key.

In order that a clearer understanding of our invention may be had, attention is hereby directed to the accompanying drawings, forming a part of this application and illustrating certain possible embodiments of our invention.

Referring to the drawings, Fig. 1 is a top elevation of a lock embodying our invention in a preferred form, the lock being shown with the bolt partially projected, following the turning of the guard key and the turning of the plug provided with a finger portion; this shows the limit of movement permitted the bolt before its release for full outward projection; Fig. 2 is a sectional view of a detail thereof, showing the plug seated in a portion of the master key tube, the view being taken on the line 2—2 of Fig. 1; Fig. 3 is a view similar to Fig. 1, showing the bolt fully projected, following further turning of the plug, this additional projection being permitted only after release of the bolt bar therefor; Fig. 4 is a rear elevation of the lock, showing the means which normally limit the projection of the bolt bar; Fig. 5 is a sectional view of the lock, showing the bolt bar in its case; Fig. 6 is a sectional view of the lock fully projected by means of the plug, and is taken on the line 6—6 of Fig. 3; Fig. 7 is a rear elevation of a sealed envelope, showing in dash lines the customer's key contained therein, the envelope being marked with the serial number of this key; Fig. 8 is a top elevation of a lock of modified construction, in that the plug is entirely

submerged in the master key tube, the lock being shown in fully unlocked condition; Fig. 9 is a sectional view of the same, and is taken on the line 9—9 of Fig. 8; Fig. 10 is a view similar to Fig. 9, but shows the lock in fully locked condition after release of the bolt bar and the turning of the guard key and the master key tube; the plug being shown removed from the master key tube; and Fig. 11 is a side elevation of a special key, whereby the master key tube may be rotated and the plug removed therefrom.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings, the construction illustrated resembles the construction of lock disclosed in Patent No. 1,522,572 to Edgar M. Benham, issued January 13, 1925, for lock, in that the lock comprises a suitable case or housing 1, provided with a suitable cover plate 2, cooperating to support a key tube 3 for the master or customer's key, and a key tube 4 for a guard key. On the inside of the housing against the bottom is slidably mounted the bolt bar 5, which is provided with a bolt 6 projecting from the case. 7 indicates the cam secured for rotation with the master key tube 3, whereby the bolt bar may be reciprocated. Within the casing are pivotally mounted, in alternate relationship on the post 8, a set of master tumblers 9 and a set of guard tumblers 10. Each of these tumblers has a recessed nose which cooperates with the locking stump 11 on the bolt bar, to govern the locking and unlocking of the lock. The master tumblers extend further than the guard tumblers, so that the guard tumblers are released by the locking stump on outward projection of the bolt, while the master tumblers may still be in engagement with the stump and retained thereby in alignment therewith.

The back face of the lock case 1 is provided with an aperture 12, in which is disposed the head 13 of a screw 14, which is in threaded engagement with the bolt bar 5. The relative positions and sizes of the aperture 12 and screw head 13 are such as to permit the projection of the bolt bar into fully unlocked position and only sufficient forward projection of the bolt bar to take the locking stump out of engagement with the guard tumblers, but not out of engagement with the master tumblers. This partial movement is sufficient to enable the door on which the lock is mounted to be secured against being opened without retracting the bolt bar.

A suitable guard key 15 is provided, whereby the guard tumblers may be set up. When the lock is shipped from the factory, a plug 16 is mounted in the master key tube 3 and the screw 14 is in place. This plug is provided with a shoulder 17, which seats beneath an annular shoulder or flange 18 formed in the cover plate about the key tube 3. This flange 18 has a nick 19, which permits the plug to be removed from the key tube only after it has been turned to fully project the bolt bar. However, this bolt bar cannot be fully projected until the screw 14 is removed therefrom, and, moreover, such full projection of the bolt bar will upset the master tumblers, thereby preventing the unlocking of the lock until these tumblers have been set up again, and this requires the manipulation of the proper customer's key. Plug 16, in the preferred modification, presents a finger portion 20 on the outside of the lock, whereby this plug may be turned to rotate the key tube 3 and to operate the bolt bar to a limited extent while the screw 14 is in place, and to fully project the bolt bar when this screw is removed. The serial number of the proper customer's key for the lock is marked on a portion of the plug which is concealed within the key tube 3, so that it cannot be ascertained until the plug is removed. The customer's key 21 is preferably shipped from the factory in a sealed envelope 22, on which the serial number of the key is marked.

It will be apparent from the above that the lock may be unlocked and partially locked by means of the guard key 15 and the plug 17, and the customer's key is not necessary for this purpose.

When the customer is to be given his key, the screw 14 is removed and the plug 17 is turned to fully project the bolt bar. The plug may now be removed through the nick 19, the serial number ascertained, and the envelope containing the customer's key obtained, and this key delivered to the customer. After the plug has once been removed, it cannot be used to unlock the lock, because it does not operate to set up the master tumblers. Thereafter it is necessary to apply both the guard key and the customer's key to unlock the lock.

It will be noted that when the lock is fully locked, the length of aperture 12 does not permit replacement of the screw 14. Should this screw be replaced when the lock has been unlocked by means of the customer's key, it will prevent the full locking of the lock by means of the customer's key, and accordingly will prevent the removal of this key from its key tube, due to the engagement of a portion of the key beneath the shoulder 18.

As a matter of convenience, the plug may be provided with a hole 23, to permit the plug to be attached to a key ring. This plug not only carries the serial number of the proper customer's key, as at 24, but also may be marked with the box number to which the lock is applied, as at 25.

As a modification of the above construc-

tion, instead of providing the plug with a finger portion 20 presented outside of the lock, the plug 30 may be normally hidden entirely within the key tube 3. Such modification is shown in Figs. 8, 9 and 10 of the drawings. In this modification, the plug 30 has a stem portion 31, on the side of which is marked the serial number of the customer's key, as at 32. The plug also has a projection 33, which seats behind the shoulder 18 of the cover plate nose. With a plug of this type, a special key 34 may be provided to turn the key tube 3 to reciprocate the bolt bar to the limited extent permitted when the screw 14 is in place, and to project the bolt bar fully when this screw is removed. This key may be provided with a hook 35 at its end, which may be engaged under a hook 36 formed in the outer end of the plug, so that when the key tube 3 has been turned to place the bolt bar in fully locked position, the plug can be removed easily and conveniently from the key tube by means of the key 34; otherwise, the operation is the same as described for the preferred modification.

As many changes could be made in the above construction and as many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What we claim is:—

1. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position.

2. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug having a portion provided with a key-designating mark concealed within the key tube.

3. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug having a portion provided with a key-designating mark concealed within the key tube, said temporary means being adjustable to permit rotation of the key tube into full locking position to permit removal of the plug and the disclosure of the key-designating mark thereon.

4. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug having a portion provided with a key-designating mark concealed within the key tube and seating in the key-way of the tube, and having a finger portion outside of the key tube whereby the key tube may be turned.

5. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug having a portion provided with a key-designating mark concealed within the key tube, and also provided with a box-designating mark.

6. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug having a portion provided with a key-designating mark concealed within the key tube and having a perforation for a key ring, or the like.

7. In a lock of the character described, in combination, a casing having a key tube rotatable therein and having a nose presenting an inwardly directed lip about the key tube extending into the key-way thereof, said lip having a slit in alignment with the key-way when the key tube is in full locking position, and a plug disposed in said key-way and having a shoulder positioned beneath the lip of the casing nose, whereby the plug is retained in the key tube against removal therefrom except when the key tube is in full locking position.

8. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, and a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug being entirely submerged in the key tube and provided with a key-designating mark concealed in the key tube.

9. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing

rotation of the key tube into full locking position, a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug being entirely submerged in the key tube and provided with a key-designating mark concealed in the key tube, and a special key for rotating the key tube while said plug is submerged therein.

10. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug being being entirely submerged in the key tube and provided with a key-designating mark concealed in the key tube, said plug having a hook at its outer end, and a special key insertable in said key tube and having a hook engageable beneath the hook of the plug, whereby the plug may be removed from the key tube when the key tube is in full locking position.

11. In a lock of the character described, in combination, a casing having a key tube rotatable therein, temporary means preventing rotation of the key tube into full locking position, a plug disposed in the key tube and secured therein against removal except when the key tube is in full locking position, said plug being entirely submerged in the key tube and provided with a key-designating mark concealed in the key tube, said plug having a hook at its outer end, and a special key insertable in said key tube and having a hook engageable beneath the hook of the plug, whereby the plug may be removed from the key tube when the key tube is in full locking position, said key having also a portion engageable in the key-way of the key tube while the plug is submerged therein, whereby the key tube may be rotated.

12. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, and a plug secured in said key tube against removal therefrom except when the key tube is in full locking position.

13. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, and a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, said plug carrying a key-designating mark concealed within the key tube.

14. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, said plug carrying a key-designating mark concealed within the key tube, and a guard tumbler dominating movement of the bolt bar.

15. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, and a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, said plug carrying a key-designating mark concealed within the key tube, said temporary means being adjustable to permit full projection of the bolt bar with accompanying rotation of the key tube into full locking position permitting removal of the plug and the ascertainment of the key-designating mark carried thereon.

16. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, and a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, said plug carrying a key-designating mark concealed within the key tube, said temporary means being adjustable to permit full projection of the bolt bar with accompanying rotation of the key tube into full locking position permitting removal of the plug and the ascertainment of the key-designating mark carried thereon, and a master tumbler dogging the bolt bar when the bolt bar is fully projected and the key tube rotated into position permitting removal of the plug.

17. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar,

whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, said plug carrying a key-designating mark concealed within the key tube, said temporary means being adjustable to permit full projection of the bolt bar with accompanying rotation of the key tube into full locking position permitting removal of the plug and the ascertainment of the key-designating mark carried thereon, and a master tumbler dogging the bolt bar when the bolt bar is fully projected and the key tube rotated into position permitting removal of the plug, said master tumbler being operable from said key tube and said plug blocking the entrance of a key into said key tube, whereby the key for operating the master tumbler may not be placed in operative position in the key tube until said plug has been removed therefrom and the master tumbler upset.

18. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, a master tumbler coacting with the bolt bar, and a guard tumbler coacting with the bolt bar, said temporary means permitting sufficient projection of the bolt bar to release the guard tumbler and preventing sufficient projection of the bolt bar to release the master tumbler.

19. In a lock of the character described, in combination, a casing, a bolt bar slidable in the casing, a rotatable key tube, a cam coacting with said key tube and bolt bar, whereby rotation of the key tube reciprocates said bolt bar, temporary means preventing full projection of the bolt bar, whereby rotation of the key tube into full locking position is prevented, a plug secured in said key tube against removal therefrom except when the key tube is in full locking position, a master tumbler coacting with the bolt bar, and a guard tumbler coacting with the bolt bar, said temporary means permitting sufficient projection of the bolt bar to release the guard tumbler and preventing sufficient projection of the bolt bar to release the master tumbler, said temporary means comprising a screw secured to the bolt bar for movement therewith and having a stop portion seated in a slot in the lock casing.

This specification signed this 7th day of June, 1926.

EDGAR M. BENHAM.
GEORGE J. BAUER.