Oct. 18, 1927. 1,646,216

B. D. RAINES ET AL

LOCK

Filed Feb. 9, 1925

Fig. 1.

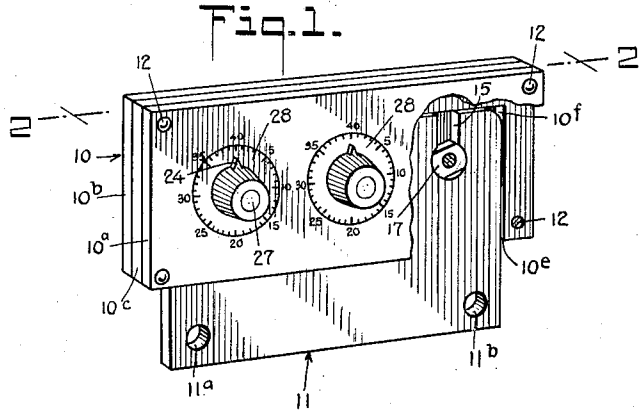


Fig. 2.

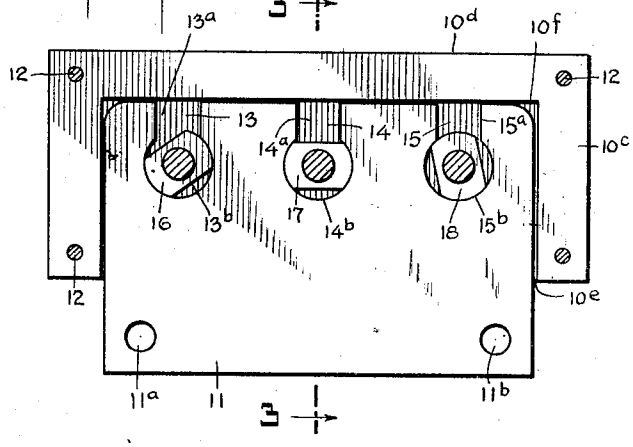


Fig. 3.

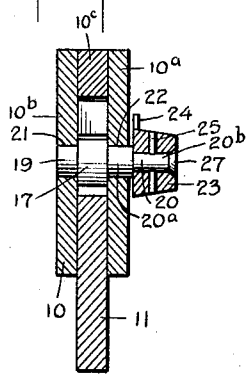
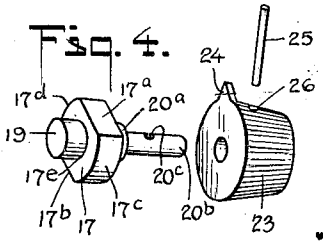


Fig. 4.



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UNITED STATES PATENT OFFICE.

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LOCK.

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This invention relates to locks.

An object of our invention is the provision of a lock which is proof against tampering and which may be opened by the authorized person or persons without the use of a key.

In the preferred form of our lock, constructed to be applied to trunks, suitcases and the like, also to the ends of a strap, chain or the like, the lock comprises a plate member and a casing member for receiving the aforesaid plate member, said plate member being provided with two or more openings, each opening comprising a rectilinear slot communicating at its inner end with a circular or other curved slot, the casing member being provided with locking members corresponding in number to the aforesaid openings of the plate member, each locking member including an element disposed within said casing and having oppositely disposed rectilinear sides spaced from one another at a distance to permit freedom of movement in its rectilinear slot, the opposite sides of the locking unit being circular or otherwise curvedly shaped and at spaced distances from one another to permit rotating movement within the circular slot.

Each locking unit is mounted on a stud projecting exteriorly of the casing member, and on the exterior end of each stud is mounted a knurled head or other suitable manipulating member, carrying an indicator or equivalent and suitable means for variably positioning such head on its shaft. A series of numbered or other designated dials is provided on the outer face of the casing member for the respective indicators.

The knowledge required by authorized parties of the setting of the indicators to position the locking units to effect the opening and conversely the closure, safeguards locks embodying our invention from successful tampering and provides a reliable and simple lock which is opened and closed without the use of a key.

We are aware that it has been heretofore proposed to provide a catch comprising a single rotating member having oppositely disposed curved faces and oppositely disposed straight faces, such catch being arranged to be received within an opening comprising a rectilinear portion and a curved portion, but such single catch is not comprised within our invention for the reason that the same is not a lock in that no knowledge of the position of opening and closing of such catch is required by reason of the opening and closing of the catch being attained upon mere rotation of its single catch. In contrast therewith, our lock requires the knowledge of the proper setting of the respective locking members similar to the opening of a combinational lock of a safe, whereby a lock embodying our invention is protected against theft and unauthorized opening to a degree comparable to the security of a safe.

Further features and objects of our invention will be more fully understood from the following detail description and the accompanying drawings, in which:—

Fig. 1 is a perspective front view of a lock comprising our invention, including a casing member and a plate member, a portion of the front plate of the casing member being broken away to show otherwise hidden parts;

Fig. 2 is a sectional elevation on line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation on line 3—3 of Fig. 2; and

Fig. 4 is an exploded detail view in perspective of a locking unit and its associate parts.

Referring to the drawings, the casing member 10 and plate member 11 may be of any suitable form and construction as desired, and is varied in accordance with the nature of the article to which the lock is applied. In the form of the invention shown in the drawings, the casing member 10 and plate member 11 are adapted for attachment to a suitcase, or trunk or to the opposite ends of a strap or chain and for such purpose, the casing member 10 is substantially flat and formed of the front plate 10^a, rear plate 10^b and one or more spacing angle plates 10^c extending about the opposite ends and the top 10^d of the casing member 10, thereby providing for the opening 10^e at the bottom of the casing 10 and the clearance 10^f within the casing 10 for the reception of the plate member 11.

The aforesaid parts of the casing member 10 are secured to one another by the rivets 12, bolts, set screws or the like. The casing member is applied to one of the movable

parts of the suitcase, trunk, strap, chains or the like in any approved manner, as will be understood by those skilled in the art.

The plate member 11 is provided on one side with the openings 11^a, 11^b, for the reception of the rivets, bolts or the like for securing the plate member to the other relatively movable part of the suitcase, trunk, strap, chain or the like. At an opposite side of the plate member 11 are formed the openings 13, 14, 15. The opening 13 comprises the outer rectilinear slot 13^a communicating at its inner end with the inner circular slot 13^b. The openings 14, 15 include similar rectilinear slots 14^a, 15^a respectively and circular slots 14^b and 15^b respectively.

Such slots 13, 14, 15 correspond in number and in spacing from one another to the number and spacing of the locking units 16, 17, 18 respectively. The locking units, 16, 17, 18 are preferably of uniform construction, to effect economy in manufacture and assembly. One of the aforesaid locking units, for example the locking unit 16, is illustrated in detail in Fig. 4 and includes the oppositely disposed flat sides 17^a, 17^b and the oppositely disposed curved sides 17^c, 17^d. Within the body of the locking unit 17 is provided the opening 17^e through which is received the end 19 of the stud shaft 20. The end 19 of the shaft 20 extends rearwardly of the locking unit 16, see Fig. 3, to be received within the bearing opening 21 in the rear plate 10^b of the casing 10, and the shaft 20 is enlarged as is indicated at 20^a, in advance of the location of the locking member 16 on the shaft 20, to be received within the bearing opening 22 of the front plate 10^a of the casing 10. The forward end 20^b of the shaft 20 may be reduced in diameter to receive the knurled head 23 or equivalent, provided with the indicator or pointer 24. The knurled head 23 is locked to the end portion 20^b of the shaft 20 in any suitable manner, as by means of the pin 25 passing through the opening 26 in the knurled head 23 and also through the opening 20^c of the shaft 20. The front terminus of the forward portion 20^b of the shaft 20 may be swaged to be brought flush within a countersunk front opening of the head 23, as is indicated at 27.

On the front plate 10^a of the casing member 10, we provide a dial 28 for each locking unit, each dial 28 being located circularly with respect to the axis of the shaft 20 of its locking unit. The dials may be applied by decalcomania or by stamping or embossing.

In the manufacture of locks embodying our invention, the different combinations of the individual locks are attained by varying the locations of the openings 20^c on the respective shafts 20 of the respective locking units and accordingly the positions of the respective indicators 24 of the several locking units are correspondingly varied relative to the numbering or other designation of the dials 28. One example of such setting for the indicators 24 of the three locking units of the lock is shown in Fig. 1 (one of the knurled heads 24 and its dial 28 being omitted) and as will be apparent from the corresponding positions of the locking units 16, 17 as shown in Fig. 2, the knowledge of the settings of the three locking units, is required in order to effect the separation of the lock parts from one another and likewise the closure of the lock. It will be observed that it is necessary that all of the locking units, which may extend in number from two to as larger a number as may be desired, be simultaneously set in substantial parallelism of their oppositely disposed rectilinear sides with the direction of length of the rectilinear slots 13^a, 14^a, 15^a, etc. before the desired opening of the lock can be had. Similar information must be known when it is desired to effect closure of the lock.

In lieu of a pin and opening connection for the head 23 and its stud 20, a frictional fit as by a conical taper with or without grooves at the end of the stud 20 and corresponding projections on the inner face of the opening of the head 23, may be employed, to provide for a more ready change of the combination of the lock units.

Whereas, we have described our invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

We claim:—

1. A lock comprising a plurality of separable lock members, one of said members being provided with a set of recesses, each recess comprising a substantially rectilinearly extending slot and a curvedly extending slot communicating with said rectilinearly extending slot, a set of locking devices, carried by another of said separable members, each of said locking devices including an element having a pair of oppositely disposed flat sides and a pair of oppositely disposed curved sides, indicating means carried on the exposed face of said another separable member and indicators mounted exteriorly of said exposed face and respectively removably secured to said locking elements.

2. In a lock, a pair of separable lock members, one of said lock members being provided with a set of recesses, said recesses being substantially parallel to one another, each recess including a substantially rectilinearly extending slot and a circularly extending slot communicating with its rectilinearly extending slot, a set of corresponding locking devices rotatably mounted in the other of said removable lock mem-

bers, each locking device comprising a locking element having oppositely disposed rectilinear sides and oppositely disposed arcuate sides, a shaft for each locking element, a manipulating head removably secured to its shaft and disposed exteriorly of said other separable lock member, an indicator carried by said head, and a scaled dial for each indicator and disposed on an exposed face of said other removable lock member.

In testimony whereof we have signed this specification this 2nd day of February, 1925.

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