LOCK FOR VENDING MACHINES OR THE LIKE

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6 Claims. (Cl. 70—205)

ABSTRACT OF THE DISCLOSURE

A lock comprising a tubular housing having a rotatable cup fitted within it and closing one end of the housing, said cup carrying or connected to bolt-operating means. A sleeve is fitted within the housing and extends concentrically around the cup. The sleeve carries lock mechanism which engages with the cup when the sleeve is fully retracted within the cup. When the lock mechanism has its latch retracted, it permits the sleeve to be partly advanced out of the housing by the bias of a spring located behind it. The cup and sleeve are coupled by a spline arrangement which permits axial movement of the sleeve relatively to the cup, and a second spline arrangement between the sleeve and housing permits the rotative movement of the coupled sleeve and cup when the sleeve is partly projected out of the housing, said second spline arrangement preventing such rotative movement of the sleeve while it is housed within the housing. The sleeve carries pivoted finger pieces which are housed within the housing while the sleeve is in its retracted position and which project laterally under spring bias when the sleeve is partly projected out of the housing.

This invention relates to locks, and more particularly to a type of lock adapted for use on the doors of vending machines, on the doors of appliance cabinets, for use in connection with switches and in many other environments.

One of the objects of the invention is to provide a lock of this character which cannot be readily picked or broken into and having a construction which prevents its from being readily wrenched or picked apart.

It is another object of the invention to provide a lock of this character in which the combination can be easily and speedily changed whenever required to thereby adapt the lock to a new key of different contour. This enables the lock to have its combination quickly changed whenever it is ascertained that pirating has taken place or is likely to occur because of the possession of a key which fits the lock by an unauthorized person.

It is an object of the invention to provide a lock in which an operating handle portion is housed or nested within an outer stationary casing while the lock is in a locked condition so that said handle portion thereby remains inaccessible, with such handle portion becoming extended to an accessible position when the lock is unlocked. It is another object of the invention to provide the handle part with retractible or foldable finger pieces which are of a disappearing type in that they are concealed in the casing while the lock is locked and which move to operative, hand-engaging positions when the lock is opened and its handle portion is extended out of the casing.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 is a longitudinal sectional view through a lock constructed according to the invention, with the lock shown in its closed and locked condition;
FIG. 2 is a similar sectional view, with the lock shown in its open condition;
FIG. 3 is an elevational view, on a smaller scale, of the lock in its open position, as seen from the right of FIG. 3;
FIG. 4 is a top plan view of the lock in open position;
FIG. 5 is a sectional view, taken substantially on the line 5—5 of FIG. 4, looking in the direction of the arrows;
FIG. 6 is a sectional view, taken substantially on the line 6—6 of FIG. 2, looking in the direction of the arrows;
FIG. 7 is a sectional view, taken substantially on the line 7—7 of FIG. 2, looking in the direction of the arrows, and
FIG. 8 is a detail view of the coupling member, showing the arrangement of the splines thereon.

Referring to the drawings, 1 indicates the stationary housing or casing of the lock, said housing or casing consisting of a cylindrical tubular body or sleeve provided at one end with a radial flange or facia 2 which is disposed against the face of a door or other element in which the housing is adapted to be fixedly mounted by any suitable mounting means.

The rear or back end of the housing 1 is closed by a wall 3 forming part of a cup-shaped member or operator 4 which is adapted for rotative movement to actuate a bolt, latch, linkage or other locking means which can be actuated by means of an extension, projection 5 or suitable linkage attached to or coupled in any suitable operable manner to the rotative cup-shaped member 4. Said member 4, while being rotatable, is held against axil movement relatively to the housing 1 by means of a retaining ring 6 that engages with grooves provided in the housing 1 and in the cup-shaped member 4 respectively. As above stated, this holds the cup-shaped member or operator 4 from axial displacement relatively to the housing 1 but permits the rotative movement of said member 4.

Disposed between the annular wall of the member or operator 4 and the interior of the housing 1 is an axially movable coupling member 8, which acts when the lock is in its locked condition, as shown in FIG. 1, to couple the member or operator 4 to the housing 1 and thereby prevents rotative movement of the member 4.

The coupling member 8 is in the form of a sleeve having an annular wall fitting closely in the spacing between the annular wall of the cup-shaped member 4 and the annular wall of the housing 1.

The wall of the coupling member 8 is recessed near its forward end at diametrically opposite points as shown at 9 and mounted in said recesses 9 are pivotal arms 10 constituting handles or finger pieces which facilitate the manual grasping of the outer or front part of the coupling member 8 when the lock is in its unlocked condition and such front part of the coupling member 8 is extended forwardly out of the housing 1 as seen in FIGS. 2 and 3. The arms or handles 10 are pivoted on pivot pins 11 (FIG. 1) and torsional springs 12 are provided by means of which the arms or handles are swung to projected or horizontal positions as shown in FIGS. 2 and 4 when the lock is in its unlocked position, wherein these arms or handles project radially from the coupling member 8 and enable said member to be readily grasped and manually rotated.

When the coupling member 8 is fully retracted or nested within the housing 1 in its locking position as shown in FIG. 1, the arms or handles 10, having been swung downwardly on their pivots so that they fit into the recesses 9, can enter into the housing 1 and be cov-
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er and concealed thereby. This arrangement provides for disappearing handles.

Provided on the exterior of the annular wall of the coupling member 8 is a plurality of teeth 27 provided with the splines 13, clearly seen in FIGS. 7 and 8. Formed on the inner face of the side wall of the housing or casing 1 is a smaller number of co-operating splines 14, four of the same being shown. In the locked condition of the lock, when the coupling member is in its retracted or nested position, as shown in FIG. 1, the splines 14 will fit in the spaces 33 between any of the splines 13, thus coupling the coupling member 8 to the housing 1 and preventing any rotative movement of the coupling member and hence the cup-shaped member 4 relatively to the housing. To facilitate the intermesh between the splines 13 and 14, the splines may be tapered or beveled at one end, substantially as shown at 15 in FIG. 8.

On the exterior of the cup-shaped member 4 are provided four ribs or vertical splines 16 which engage with complementary grooves 17 formed in the coupling member 8. There is interengagement between the ribs or splines 16 and the grooves 17 at all times. That is to say, the ribs or splines 16 maintain engagement with the grooves 17 regardless of whether the coupling member 8 is advanced or retracted.

Located within and carried by the coupling member 8 is an inner sleeve or cylinder 28 constituting a jacket for the locking mechanism and which is attached to the coupling member 8 by means of the counter-sunk screw 21 (FIG. 5).

Contained within the inner sleeve 20 is the lock mechanism 24. This locking mechanism 24 is preferably, although not necessarily, of a construction similar to that disclosed in my pending application for patent Ser. No. 355,011, filed Mar. 26, 1964. Such type of locking mechanism is one in which the combination can be speedily and easily changed whenever it is desired to enable the lock to be operated by a selected key. Thus, a feature of the present construction resides in the fact that when the rotatability exists of the lock being opened by a person or persons having unauthorized possession of a suitable key, the combination of the lock can be changed and this without difficulty or extensive effort so that a new and different key will be required to open the lock.

In a lock of this kind a plurality of wafer-like disk-shaped elements are employed, such elements being provided in their peripheral edge with a plurality of notches. By the alignment of selected ones of the notches in the several elements, a certain combination is set for the acceptance of a specific key. Thus, all that the lock requires for the setting of a desired combination, is the manual rotative adjustment of the several elements to selected positions according to the contour of the key to be employed. This can be done by finger operation and without the use of tools while the lock assembly is out of the sleeve 20. The structural details of a lock of this kind are more specifically shown and described in my said pending application Ser. No. 355,011.

A spring-biased latch for the lock mechanism 24 is shown at 22, the same in its extended or locked position being shown in FIG. 1. Said latch is controlled by the turning of the proper key in the lock. The latch 22 when extended, projects radially through the sleeve 20 through an opening 23 therein.

The latch 22, when in its projected position shown in FIG. 1, extends under or behind an annular shoulder 25 provided on the inside of the annular wall of the cup-shaped member 4. It will be obvious that when the latch 22 is advanced and engages under the shoulder 25, as shown in FIG. 1, the coupling member 8 and the attached inner sleeve 20, will be held in a fully retracted or nested position within the housing 1. Moreover, at this time the coupling member 8, being retracted within the housing 1, will have its splines 13 in mesh with those shown at 14 and therefore the parts 8 and 20 will be held against rotative movement.

The forward part of the sleeve 20 is closed by an inserted plug 27 provided with a key slot 28 in which a proper key is inserted to enter into the lock mechanism 24 to operate the same to retract the latch 22.

The operation of the lock is substantially as follows: In its locked position, the lock appears as shown in FIG. 1. It will be there seen that at this time the various moveable parts of the device are all housed or nested within the housing 1 and the exposed face of the lock as defined by the facia or flange 2 is perfectly smooth and unbroken.

When a proper key is inserted into the lock through the key slot 28 and enters into the lock mechanism 24 and is turned, the latch 22 will be retracted to the position shown in FIG. 2, whereupon a compression spring 30 located behind the inner sleeve 20, will force said sleeve and the attached coupling member 8 forwardly or to the advanced position of FIGS. 2 and 3, such forward propulsion of the parts 8 and 20, being limited by the contact of the splines 13 with a shoulder 31 on the interior of the housing or casing 1. As the parts 20 and 8 reach their advanced or projected position shown in FIGS. 2 and 3, the arms or handles 10 will swing outwardly under the bias of the springs 32 that reach their lateral extended positions as shown in FIGS. 2 and 3, thereby forming lateral finger-pieces or handles and affording a firm and powerful grip on the part 20 to rotate the same and thus, through the rotation of the cup-shaped member 4, to actuate any means which may be attached to said member 4.

As the coupling member 8 moves to the above-described advanced position under the impulse of the spring 30, the splines 13 become disengaged from the splines 14 and hence the coupling member 8 can then be freely rotated by the hand engaging the extended part of said member. Since the coupling member 8 remains coupled to the cup-shaped member 4 through engagement of the ribs or splines 16 with the grooves 17, and the coupling member is now disengaged from the housing or casing 1, the rotation of the coupling member 8 will rotate the cup 4 and any latch, bolt or linkage attached to or directly or indirectly coupled to the cup 4 will accordingly be actuated. Such element may be a bolt mechanism, a switch part or any other element or thing to be protected by a lock of this character.

Since the grooves or spaces 33 between the splines 13 are many, it will be apparent that the parts 8 and 20 of the lock can be pushed back into nested position within the housing at any time in the rotation of the parts 8 and 20 since the splines 14 can engage with any four of the grooves 33 then aligned with them or located adjacent to them. The latch 22 will also take under any portion of the annular shoulder 25 when the parts 8 and 20 are retracted or nested.

When the lock is in its locked condition, it presents a smooth, unbroken face. The handles 10 are normally concealed and protected since they are manually tucked into the housing 1 when the parts 8 and 20 are retracted or nested and the handles only become accessible when the lock is in its unlocked condition.

By the removal of the screw 21, which is accessible only when the lock is open, the part 20 can be detached from the part 8 and part 20 and then drawn out, thus enabling the lock mechanism to become available and easily removed for a change of its combination or for its replacement.

As a substitute for the plug at 27, a separate locking mechanism, such as a group of tumblers or wards, can be used as indicated in dotted lines at 56 in FIG. 1. This results in the production of two separate locks or locking means located in axial alignment or in tandem, both of which can have its combination changed as desired, and a single key of the required length and contour as needed for both locks, can be used to open them.
Having thus described an embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A lock comprising, a plurality of concentric sleeves in nested relationship, the outermost one of the sleeves constituting a lock casing, the innermost sleeve containing a lock mechanism including a latch controlled thereby, one of the s'eeves being an intermediate sleeve, means coupling the inner and intermediate sleeves together, a rotatable cup closing one end of the outer sleeve, said cup having a shoulder under which the latch engages when the latch is advanced and the sleeves are completely nested, spring means for advancing the joined inner and intermediate sleeves partly out of the housing when the latch is disengaged from the shoulder, spline means for maintaining the cup and intermediate sleeve in constant coupled relation and spline means for coupling the intermediate sleeve to the housing on'y when the intermediate sleeve and the attached inner sleeve are fully nested within the housing.

2. A lock as defined by claim 1, including folding handles carried by the intermediate sleeve, said handles being disposed within the housing when the intermediate sleeve is retracted therein, and projecting laterally from the intermediate sleeve when the same is partly extended out of the housing.

3. A lock comprising, a cylindrical stationary housing, a sleeve slidable axially of the housing and capable of being fully housed therein or caused to partly project out of the housing, a cup-shaped rotatable closure for the rear end of the housing, the sleeve having an attached tubular part slidable within the cup-shaped closure, a lock mechanism contained within said tubular part, a latch controlled by said lock mechanism and extending out of the tubular part, a shoulder on the cup-shaped closure behind which the latch engages when the sleeve is fully retracted into the housing, a spring behind the tubular part for urging the sleeve partly out of the housing, spline means on the sleeve and cup-shaped closure to constantly couple the sleeve to said closure but permit the axial movement of the sleeve and spline means on the sleeve and housing for coupling the sleeve and housing together only when the sleeve is in a fully retracted position within the housing.

4. A lock as defined by claim 3, wherein the sleeve is provided with the projecting, foldable handles movable to project laterally of the sleeve but only when the sleeve is advanced to partly project out of the housing.

5. A lock comprising, a cylindrical housing, a sleeve slidable axially of the housing, a rotatable closure for the rear end of the housing, lock mechanism including a latch controlled by said mechanism, means on the closure for engagement with the latch when the latch is advanced, spring means for advancing the sleeve to position a forward part of it out of the housing when the latch is retracted, means for providing a constant spring bias between the sleeve and closure while permitting limited axial movement of the sleeve relative to the housing, means for coupling the sleeve to the housing only when the sleeve is fully retracted into the housing, a pair of diametrically opposite spring-biased handles carried by the sleeve and extendable to project laterally of the sleeve when the sleeve has its forward part projecting out of the housing, said handles being foldable to fit within the housing when the sleeve is fully retracted into the housing.

6. A lock including an outer stationary cylindrical housing, a tubular member contained therein and axially slidable to a limited extent relatively to the housing, a rotatable operator at the rear of the housing, spline means coupling the operator and the tubular member together in a manner to permit them to be rotated together while permitting axial movement of the tubular member relatively to the operator, spline means consisting of elements fixedly provided on the tubular member and housing respectively for coupling the tubular member and housing together only when the tubular member is retracted into the housing, the second mentioned spline means consisting of interfitting elements arranged around the housing and tubular member respectively and disposed in such relation that they engage and permit the tubular members to be fully nested within the housing at various points in the rotative movement of the tubular member relative to the housing, foldable handles carried by the tubular member, said handles being housed within the housing when the tubular member is nested therein, the handles being extended laterally from the tubular member when the same is partly extended out of the housing.

References Cited

UNITED STATES PATENTS
3,234,765 2/1966 Kerr 70—208
3,285,043 11/1966 Dauenbaugh 70—208
3,299,678 1/1967 Spencer 70—208
3,302,434 2/1967 Dauenbaugh 70—208

FOREIGN PATENTS
613,940 5/1935 Germany.

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