Nov. 6, 1928. 1,690,818

A. G. HATCH

LOCK

Filed Dec. 4, 1926

Fig. 1.

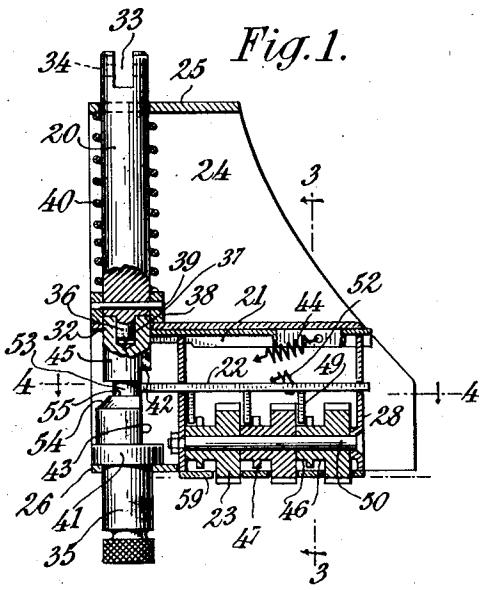


Fig. 2.

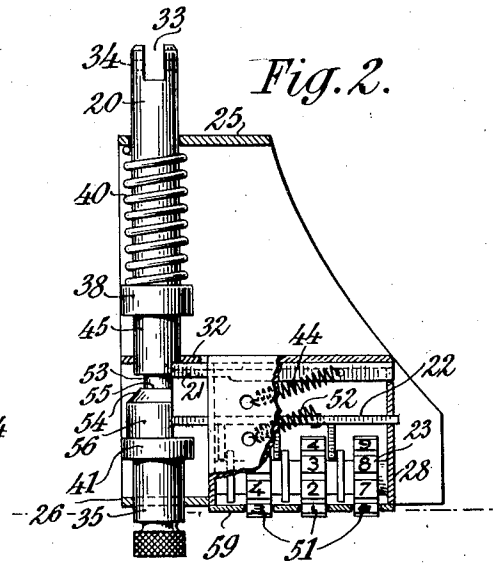


Fig. 4.

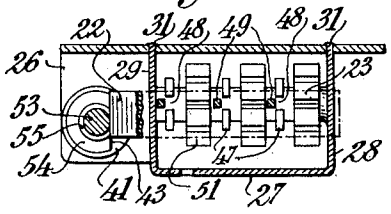


Fig. 3.

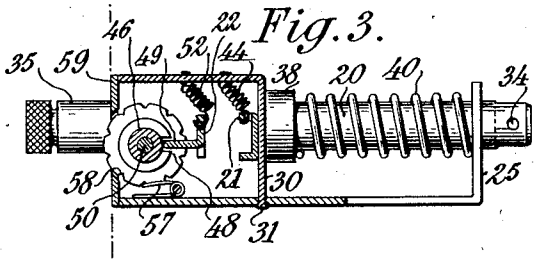


Fig. 5

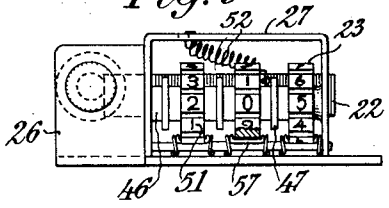


Fig. 6.

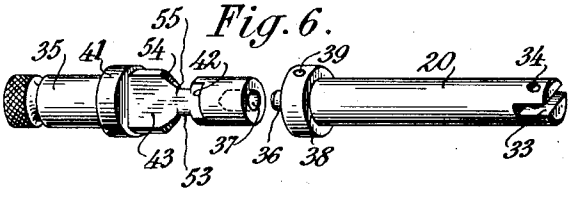
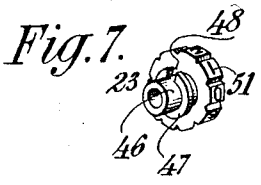


Fig. 7.



INVENTOR :

Alexander G. Hatch,

By Attorneys,

Fraser, Myers & Manley

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UNITED STATES PATENT OFFICE.

ALEXANDER G. HATCH, OF FARMINGTON, CONNECTICUT, ASSIGNOR TO THE SESAMEE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

LOCK.

Application filed December 4, 1926. Serial No. 152,536.

This invention relates to improvements in locks. Although intended to be of more or less general application, the invention is peculiarly adapted to be used as a lock for the drawers of an office desk, the elements of a vertical filing cabinet, and analogous articles.

One object of the invention is to provide an improved permutation lock which may be unlocked at will and left unlocked for a temporary period after the settable elements of the permutation mechanism have been moved out of their "release" relationship so as to conceal the combination, the parts of the mechanism being capable of being rendered effective at will as a lock without giving further attention to the permutation wheels.

Another object of the invention is to provide a permutation lock of which the lock-controlling element may be temporarily held fast in an ineffective position during which the remainder of the mechanism may be used as an ordinary latch and rendered effective or ineffective at will independently of the use of the setting elements of the permutation mechanism.

In the drawings illustrating the preferred form of the invention—

Figure 1 is a top view of the lock, parts thereof being illustrated in cross-section, the bolt-controlling bar being indicated in its "release" position.

Fig. 2 is a similar view, the bolt-controlling bar being indicated in its "locking" position.

Fig. 3 is a longitudinal sectional view of the lock, the section being taken along the line 3—3 of Fig. 1 and viewed in the direction indicated by the arrows.

Fig. 4 is a transverse sectional view of the lock, the section being taken along the line 4—4 of Fig. 1 and viewed in the direction indicated by the arrows.

Fig. 5 is a front view of the lock illustrated in Fig. 1, with the face plate removed.

Fig. 6 is a disassembled view in perspective of the separable parts of the bolt-controlling bar.

Fig. 7 is a perspective view of one of the permutation wheels.

In the form of the invention herein selected for purposes of illustration it comprises a bolt-controlling bar 20, a latch 21 for said bar, and a permutation mechanism comprising a locking element 22 and settable elements herein disclosed as permutation wheels 23, all appropriately assembled in a mounting element 24.

The mounting element may be constructed of any suitable material, and is herein disclosed as comprising a sheet-steel plate having upturned end portions 25, 26, to support the ends of the bar 20, and a housing plate 27 having downwardly turned portions 28, 29, 30, spaced extending portions of which may be passed through openings provided therefor in the plate 24 and upset as indicated at 31 (Figs. 3 and 4), whereby the parts of the housing may be firmly united.

The downwardly turned wall 30 may be extended beyond the wall 29, as indicated in Figs. 1 and 2, to form an intermediate support 32 for the bolt controlling bar.

The bar 20 might serve directly as a bolt or locking member, but in the preferred form of the invention as used to lock a tier of drawers or a number of elements of a filing cabinet, the various bolts or locking members may be controlled in their movements by any appropriate operating mechanism, all dependent upon the position of a single master element to which the bolt-controlling bar 20 may be connected in any suitable manner, as by means of a slot 33 in its end and a pin which may be passed through an opening 34 provided for such purpose. The specific means whereby the locking of the parts to be secured is effected constitutes no part of the present invention, which is confined to the lock mechanism. In the form herein disclosed it is intended that the ultimate bolts or locking members shall be rendered effective when the bar 20 is in the position indicated in Fig. 2, herein referred to as its "locking" position. It is intended that the ultimate bolts or locking members shall be ineffective when the bar 20 is in the position indicated in Fig. 1, herein referred to as its "release" position.

It will be obvious that the lock mechanism may have to be modified to meet the conditions and requirements of the particular lock-operating mechanism with which it is to be used.

As herein disclosed, a part of the bar 20, including a manipulator 35, is swiveled to the above-described slotted portion, in order that the manipulator and other directly connected parts of the bar may be free to be rotated, for reasons to be hereinafter explained, notwithstanding the lock-operating connec-

tion between the slotted part of the bar and the ultimate bolts or locking members controlled thereby.

One form of swivel joint adapted for use as a part of this invention, as illustrated in Figs. 1 and 2, comprises a cylindrical portion 36 extending from the slotted portion of the bar 20 into a socket 37 provided therefor in a part of the bar extending rearwardly from the manipulator 35. Surrounding the slotted portion of the bar 20, and preferably extending slightly beyond the end from which the cylindrical projection 36 extends, is a sleeve 38 which may be secured to the bar by a cross-pin or key 39. This sleeve serves as an abutment for one end of a helical spring 40, which may surround the slotted portion of the bar. This spring may be maintained in a state of compression between said abutment and the support 25, thereby normally tending to hold the bar in its "release" position and to restore it to such position when moved therefrom. The sleeve 38 also serves as a stop to arrest the movement of the bar at the end of its movement to its "release" position.

Separation of the relatively swiveled portions of the bar 20 when in "release" position, as indicated in Fig. 1, may be prevented by a cylindrical portion 41, movement of which is limited by the bar support 26.

One satisfactory means whereby the bar may be arrested and held fast in its "locking" position by the latch 21 is illustrated in Figs. 1 and 2 of the drawing. It comprises a keeper disclosed as a shoulder 42 at one extremity of a depression 43 in the bar, said shoulder being so disposed that when the bar is moved to the position indicated in Fig. 2 with its depressed portion directed towards the latch, the latch may be moved into the depression by means of a spring 44, one end of which may be secured to the latch and the other end secured to some portion of the housing or othed fixed part of the mounting member.

As clearly illustrated, the latch 21 may be mounted for endwise movement through slots provided for such purpose in the walls 28 and 29 of the housing.

The contacting portions of the latch and the depressed portion of the bar may be of such form as to serve as a cam mechanism whereby, on rotation of the manipulator 35, the latch 21 may be moved against the effort of its spring, thereby permitting the cylindrical portion 45 of the bar to be moved under the end of the latch, after which the bar may be freely moved from its "locking" to its "release" position by the spring 40.

The purpose of the permutation mechanism is to prevent the above-described lock-releasing rotation of the bolt-controlling element comprising the manipulator and directly connected parts of the bar except by one familiar with the combination. Referring to Figs. 1, 2 and 4 of the drawings, it will be seen that, if the locking element 22 is maintained in the position indicated in Fig. 2 when the bar and latch are in the relationship indicated in that figure, rotation of the bolt-controlling element will be prevented, thereby making it impossible to release the bolt-controlling bar from the latch. As a means whereby the parts of the mechanism may be thus held in a locked relationship, each of the permutation wheels 23 is provided with a movement-obstructing element cooperating with a movement-obstructing element on the locking element 22, whereby movement of the latter is prevented except when the permutation wheels have been set in a predetermined relationship. In the conventional showing herein used for purposes of illustration, each of the permutation wheels is provided with an extended hub portion 46 having intermediate its ends an outwardly extended flange 47 slotted as at 48 (see Figs. 3 and 7). To cooperate with these flanges 47 the locking element 22 may be provided with fingers 49 corresponding in number with the permutation wheels used in the mechanism. Each of the fingers 49 may be so disposed as to lie to the left of the flange of one of the permutation wheels when the locking element is in the position indicated in Figs. 1 and 2, whereby, unless the permutation wheels are so set as to bring the slots 48 of all of the permutation wheels in alignment with the respective fingers 49, the locking element will be held fast.

As herein disclosed, the locking element 22 when positioned as illustrated in Figs. 1 and 2 has one end extended into contact with the base of the depression 43 in the bar 20 which terminates in the keeper 42. The adjacent portions of the bar and locking element when in the relative positions indicated in Fig. 2 are such as to prevent any rotational movement of the bolt-controlling element comprising the manipulator and directly connected parts of the bar if endwise movement of the locking element is prevented. This interlocking engagement prevents the release of the bar without first setting the permutation elements in a predetermined relation such as to bring the slots 48 into alignment with the fingers 49.

To provide for a release of the bar the permutation wheels 23 are mounted for rotation about a shaft 50, the ends of which may be mounted in the end walls 28, 29 of the housing.

The periphery of each permutation wheel may be divided up into differentiated portions in any appropriate manner, as by the application of numerals from zero to nine, as indicated at 51 (Fig. 2), which may bear any desired relationship to the slots 48 in the movement-obstructing flanges. On setting these wheels in accordance with a known combination dependent upon a relation between the numerals and the slots, the slots may be brought into alignment with the fingers 49

on the locking element, after which said locking element may be freely moved out of its movement-obstructing relationship with said bolt controlling element. If desired, the contacting portions of the bolt-controlling element and the locking element may be of such relative form as to serve as a camming device whereby rotation of the bolt-controlling element by the manipulator 35 to release the bolt-controlling bar from the latch 21 will also move the locking element out of its movement-obstructing relation with the bar. Preferably the camming relation between the bolt-controlling element and the locking element will be of such extent as to cause the fingers 49 to be passed completely through the slots 48 in the respective movement-obstructing flanges of the permutation wheels to a position between said flanges and the setting elements of the wheels, after which, if desired, before permitting forward movement of the bar 20 by the spring 40, the permutation wheels may be moved out of their set position so as to prevent a return of the locking element to its movement-obstructing relationship with the bolt-controlling element.

If desired, the locking element 22 may be mounted for endwise movement by having its end portions passed through slots provided therefor in the end walls 28, 29 of the housing, and said element may be provided with a spring 52 (Figs. 2 and 3), one end of which may be attached to the element and the other end attached to the housing or other fixed part of the mounting element. This spring may be so disposed as to normally maintain the locking element 22 in its movement-obstructing relationship with the bar 20, and may be capable of restoring said element to such position when moved therefrom, if free.

In order that the locking element 22 may be restored to its normal position illustrated in Fig. 1, after the bar 20 has been released from the latch and moved to its "release" position irrespective of the rotational position of the manipulator and directly connected parts, the bolt-controlling element is provided with a clearance way, herein disclosed as a groove 53, which permits its free rotation to any desired position irrespective of the condition of the permutation mechanism, so long as the bar is in its "release" position. If desired, the portion of the bolt-controlling element adjacent the clearance way 53 may be gradually reduced by a sloping or chamfered portion 54 whereby the return of the locking element 22 by its spring 52, when cammed out of its movement-obstructing position as a result of a rotational movement of the bolt-controlling bar, may be gradually effected as the bar is moved forward by the spring 40.

Preferably the chamfer 54 will be of such inclination and extent as to leave a relatively shallow shoulder 55 such as will obstruct inward movement of the bolt-controlling element from the position indicated in Fig. 1 to the position indicated in Fig. 2, even when the locking element 22 is free, without first rotating the bolt-controlling element to the position in which its keeper is directed towards the latch 21, whereby, on inward movement of the bolt-controlling element, the latch will be snapped into its locking relation with the bar.

It will be clear from the foregoing description of the invention that, on setting the permutation wheels in accordance with the "releasing" combination when the parts of the mechanism are in "locking" relationship as indicated in Fig. 2, the bar may be released from the latch by a rotational movement of the bolt-controlling element, whereby the cylindrical portion of the bar is moved under the end of the latch, after which the bar may be moved forward by the spring 40. During the rotational movement of the bolt-controlling element the locking element 22 will be moved against the opposing effort of its spring until the cylindrical portion 56 of the bolt-controlling element is forced under the end of the locking element, and on forward movement of the bar this element will be gradually moved to normal position by its spring as the chamfered portion 54 is moved under the end of the locking element. As soon as the bar has been moved to its "release" position, and irrespective of the rotational position of the bolt-controlling element, the permutation wheels may, if desired, be moved out of set relation so as to conceal the combination. The mechanism may be permitted to remain in this condition until it is again desired to lock the drawers or cabinet elements to which the lock is applied, which may be effected without disturbing the permutation wheels by merely rotating the bolt-controlling element until a point is reached at which it can be pressed inwardly so as to permit the latch to be snapped into engagement with the keeper.

Should it be desired to temporarily make use of the mechanism as a simple latch independently of the locking mechanism, this may be readily done in the following manner. Starting first with the mechanism in the relationship indicated in Fig. 2, after setting the permutation wheels in accordance with the combination and rotating the bolt-controlling element to release the bar from the latch, the operator may secure the locking element in an ineffective position with respect to the bar by moving the permutation wheels out of set relation before permitting the manipulator to be moved forward by the spring 40. With the mechanism in this condition the bar may be moved at will into its "locking" position and held by the latch, and may at will be released from the latch independently of the use of the permutation mechanism. When it is again desired to con-

dition the mechanism for operation as a lock, all that is necessary is to again move the permutation wheels to their set position so as to permit the locking element to be moved by its spring to normal position, after which the permutation wheels may be again moved out of their set positions.

In order to facilitate the positioning of the permutation wheels in accordance with any desired combination, each permutation wheel may, if desired, be provided with a spring pawl 57, as indicated in Figs. 3 and 5, adapted to be moved into engagement with one of a series of notches 58 in the periphery of the wheel, whereby they may be brought to rest in any one of a number of positions, in only one of which the notch 48 will register with the finger 49.

It will be apparent that the simple form of permutation mechanism herein disclosed for purposes of illustration may be regarded as a conventional representation of any such mechanism which would be appropriate to serve the intended purpose.

The lock may be secured by suitable fastening devices to any part of the desk, cabinet or other furniture or article in connection with which it is intended to be used. Preferably it will be secured to some part which is accessible only when the drawers, cabinet elements or other parts to be locked, have been released by the lock mechanism. The lock may be provided with a face plate indicated at 59 in Figs. 1 and 2, or, if used on metal furniture, the face of the part to which the lock is to be applied may be perforated to receive the manipulator 35 and slotted to receive the permutation wheels 23, and the lock as a whole secured in place within the structure, using a portion of its enclosure as a face plate for the lock, as indicated by the broken lines extended from the surface of the face plate 29, indicated in Figs. 1, 2 and 3.

The invention is not intended to be limited to the specific form herein disclosed for purposes of illustration but should be regarded as including modifications and variations thereof within the scope of the appended claims.

What I claim is:

1. A lock comprising a bolt-controlling element oppositely movable from an effective to an ineffective position, and vice versa, a holding means whereby said element may be maintained in its effective position but from which it may be detached as a result of a releasing movement of said element differing from its movement towards and away from its effective position, and a permutation mechanism including a locking element and a plurality of variably settable elements having movement-obstructing portions whereby said locking element may be held by said settable elements either in a position such as to obstruct such releasing movement of said bolt-controlling element or in a non-obstructive position with respect thereto, the settable elements of said permutation mechanism being settable in a predetermined relationship such as to permit free movement of said locking element from either of said positions to the other.

2. A lock, as defined by claim 1, in which the bolt-controlling element and the locking element have mutually engageable portions so disposed and proportioned as to serve as a cam mechanism, when said bolt-controlling element is in its effective position in an engaging relation with said holding means, whereby a releasing movement of said bolt-controlling element, when said locking element is free, may be caused to move said locking element from its position of movement-obstructing relationship with said bolt-controlling element to the other of the two positions in which it may be held fast by the settable elements of the permutation mechanism.

3. A lock comprising a bolt-controlling element so mounted as to be rotatable and also movable endwise from a "locking" position to a "release" position and vice versa, when free, a latch by which said bolt-controlling element may be held fast in its "locking" position, an operating connection between said bolt-controlling element and said latch whereby a rotary movement of the former will cause it to be released from the latter, and a permutation mechanism comprising a locking element and a plurality of variably settable elements having movement-obstructing portions whereby said locking element may be held in either of two positions in one of which it obstructs the latch-releasing movement of said bolt-controlling element without interfering with its endwise movement, and in the other of which it has no effect upon the movements of said bolt-controlling element, the settable elements of said permutation mechanism being settable in a predetermined relation such as to permit said locking element to be moved from either of its two positions to the other.

4. A lock comprising a bolt-controlling element so mounted that it may be either rotated or moved endwise when free, a latch by which its endwise movement may be prevented, an operating connection between said bolt-controlling element and said latch whereby a rotary movement of the former will cause it to be released from the latter, and a permutation mechanism by which the rotation of said bolt-controlling element when in a position such that its endwise movement may be prevented by said latch, may be made dependent upon a setting of said mechanism, said bolt-controlling element latch and permutation mechanism having their mutually cooperative parts so disposed and proportioned that said bolt-controlling element, when free, may be moved

to a position from which neither said latch nor said permutation mechanism is capable of obstructing either its rotation or its endwise movement.

5. The combination with a bolt-controlling element so mounted as to be both rotatable and movable endwise from a "holding" to a "release" position and vice versa, when free, said bolt controlling element having a laterally-disposed portion adapted to serve as a keeper, of a latch movable into engaging relation with said keeper when said bolt-controlling element is in its "holding" position with said keeper in its latch-receiving position, thereby preventing a direct return of said bolt-controlling element to its "release" position, said element and said latch having portions so related as to serve as a cam mechanism whereby said latch may be moved out of its engaging relation with said keeper as a result of a rotation of said bolt-controlling element, thereby releasing the latter and permitting it to be returned to its "release" position, and a permutation lock mechanism to control the rotational movement of said bolt-controlling element, having independently settable dial wheels.

6. The combination with a rotatable and endwise movable bolt-controlling element a portion of which has a cylindrical surface concentric with its axis of endwise movement and a depression in said cylindrical portion terminating in a shoulder adapted to serve as a keeper, of a latch movable into engaging relation with said keeper when said bolt-controlling element is so positioned as to bring said depression into its latch-receiving position, the latch end and the base of the latch-receiving depression being so formed as to serve as a cam device whereby on rotation of said bolt-controlling element said latch may be moved out of said depression and held retracted by said cylindrical surface, thereby permitting free endwise movement of said bolt-controlling element until said depression is again returned to its latch-receiving position.

7. A lock comprising a bolt-controlling element so mounted as to be rotatable and also movable endwise from a "locking" position to a "release" position and vice versa, when free, a latch by which said bolt-controlling element may be held fast in its "locking" position, an operating connection between said bolt-controlling element and said latch whereby a rotary movement of the former will cause it to be released from the latter, and a permutation mechanism comprising a locking element, capable of being moved to a position such as to prevent a latch-releasing rotation of said bolt-controlling element without interfering with its endwise movement, and settable elements having movement-obstructing portions by which said locking element may be held fast in its effective position, the bolt-controlling element being provided with a clearanceway so disposed as to be brought into a cooperative relation with the locking element, when the bolt-controlling element is moved to its "release" position, thereby permitting free rotation of said bolt-controlling element when so positioned without regard to the position of said locking element.

8. A lock comprising a bolt-controlling element movable from an effective to an ineffective position, and vice versa, a spring latch by which it may be maintained in its effective position, an operating connection between said bolt-controlling element and said latch whereby the former may be detached from the latter as a result of a releasing movement of the former differing from its movement towards and away from its effective position, and a permutation mechanism including a locking element and a plurality of variably settable elements having movement-obstructing portions whereby said locking element may be held by said settable elements either in a position having a relationship with said bolt-controlling element such as to obstruct its latch-releasing movement only, or in a non-obstructive position with respect to said bolt-controlling element, the settable elements of said permutation mechanism being settable in a predetermined relation such as to permit free movement of said locking element from either of said positions to the other.

9. A lock comprising a bolt-controlling element movable from an effective to an ineffective position, and vice versa, a spring latch by which it may be maintained in its effective position, an operating connection between said bolt-controlling element and said latch whereby the former may be detached from the latter as a result of a releasing movement of the former differing from its movement towards and away from its effective position, and a permutation mechanism by which such lock-releasing movement of said bolt-controlling element, when in an engaging relation with said latch, may be made dependent upon a predetermined setting of said mechanism, said bolt-controlling element, latch and permutation mechanism having their mutually cooperative parts so formed and proportioned that said bolt-controlling element may be freely moved from its ineffective position to its effective position in engagement with said latch irrespective of the relative positions of the parts of said permutation mechanism.

In witness whereof, I have hereunto signed my name.

ALEXANDER G. HATCH.