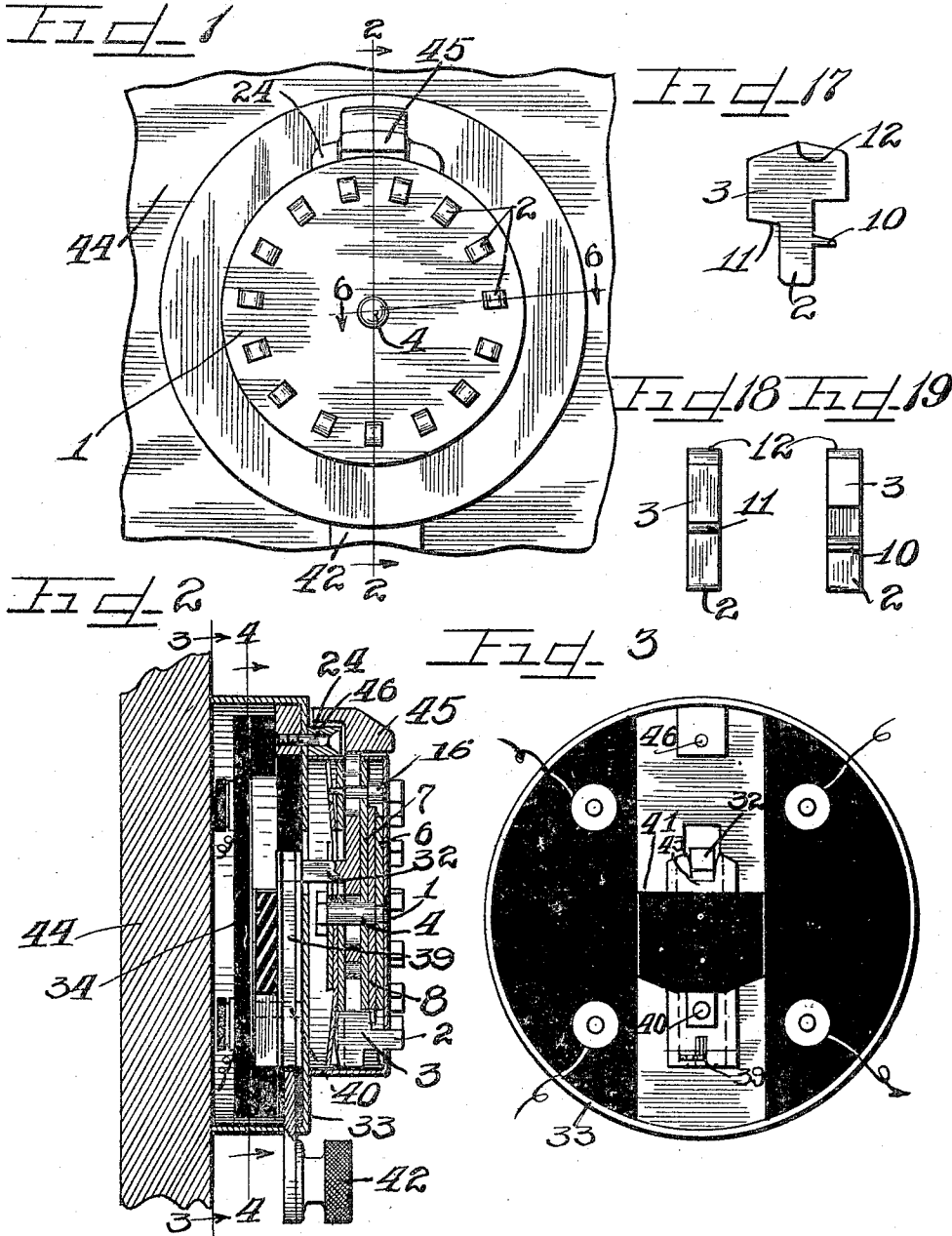


1,229,269.

Patented June 12, 1917.
 5 SHEETS—SHEET 1.



Witnesses
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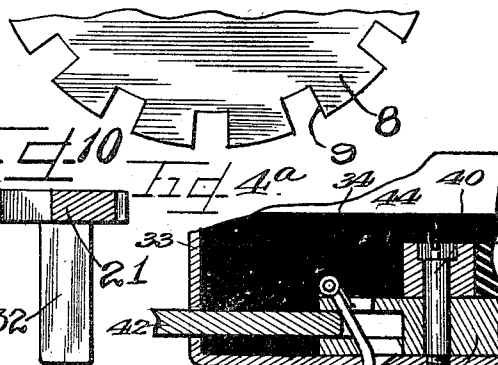
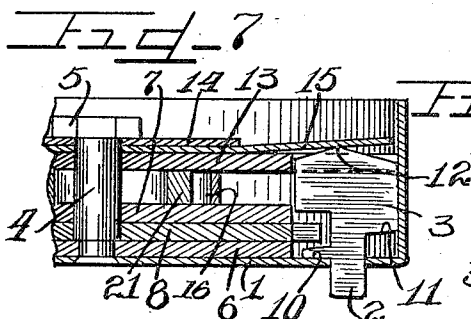
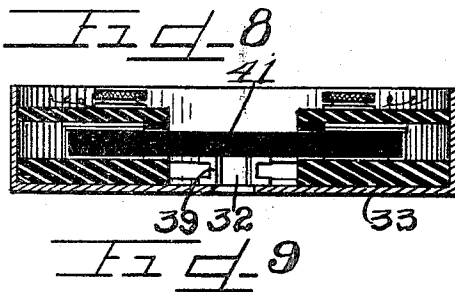
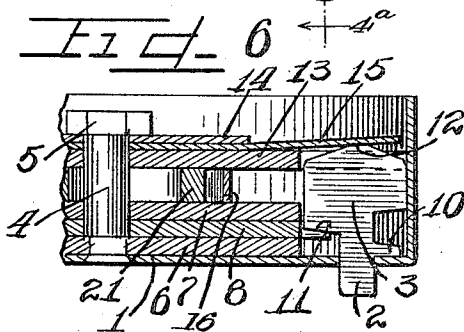
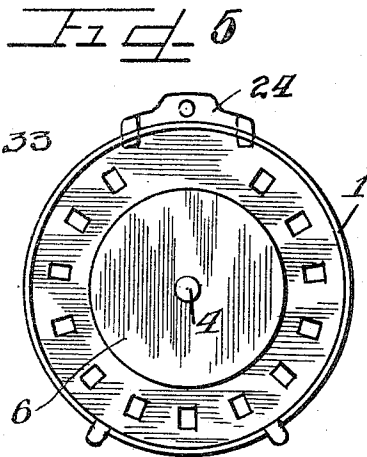
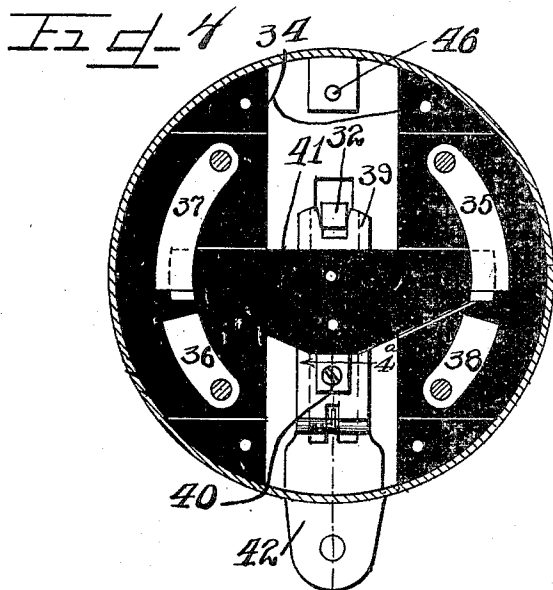
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 KEYLESS LOCK.
 APPLICATION FILED OCT. 31, 1913.

1,229,269.

Patented June 12, 1917.

5 SHEETS—SHEET 2.



WITNESSES

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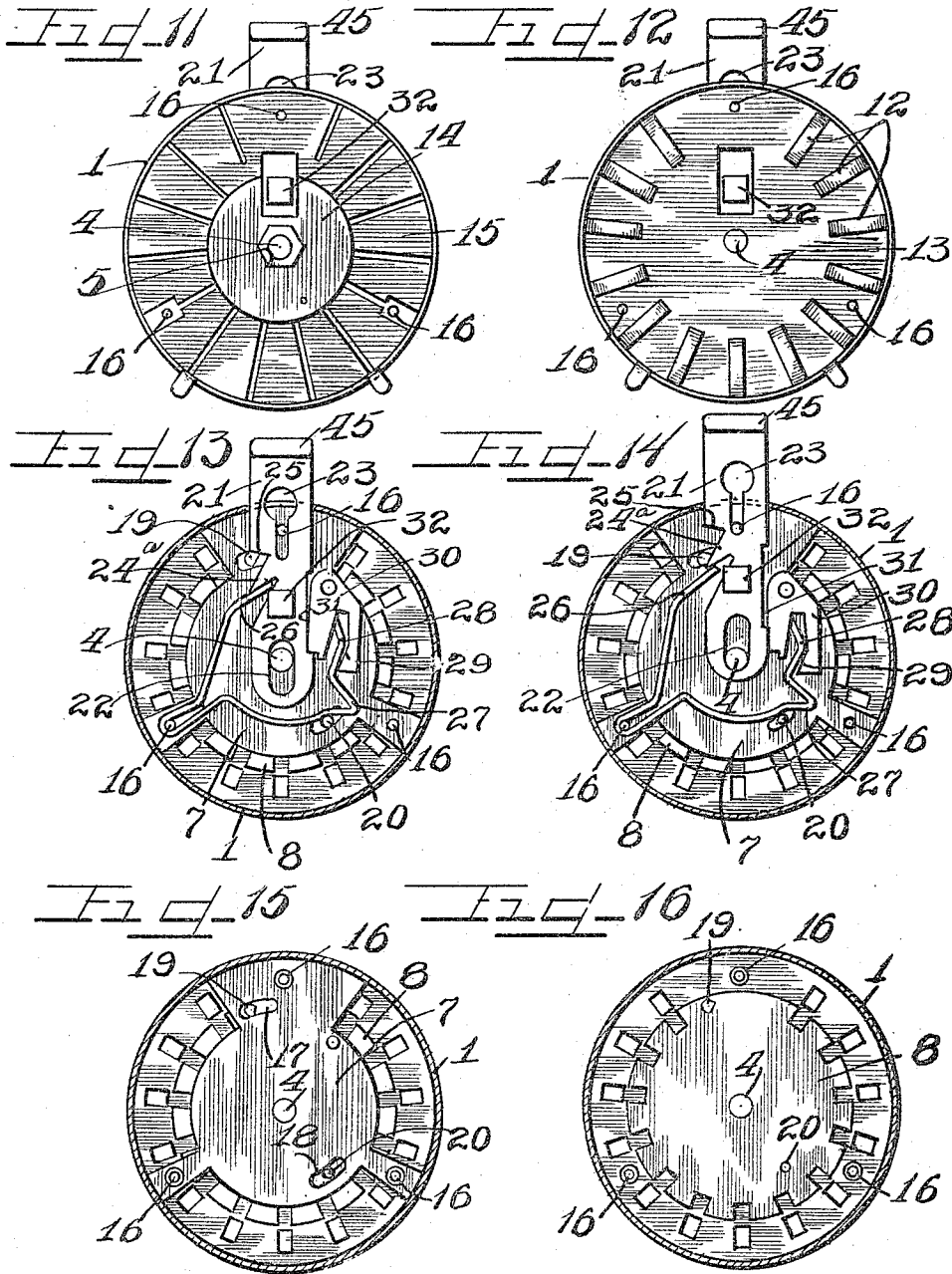
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1,229,269.

Patented June 12, 1917.

5 SHEETS—SHEET 3.

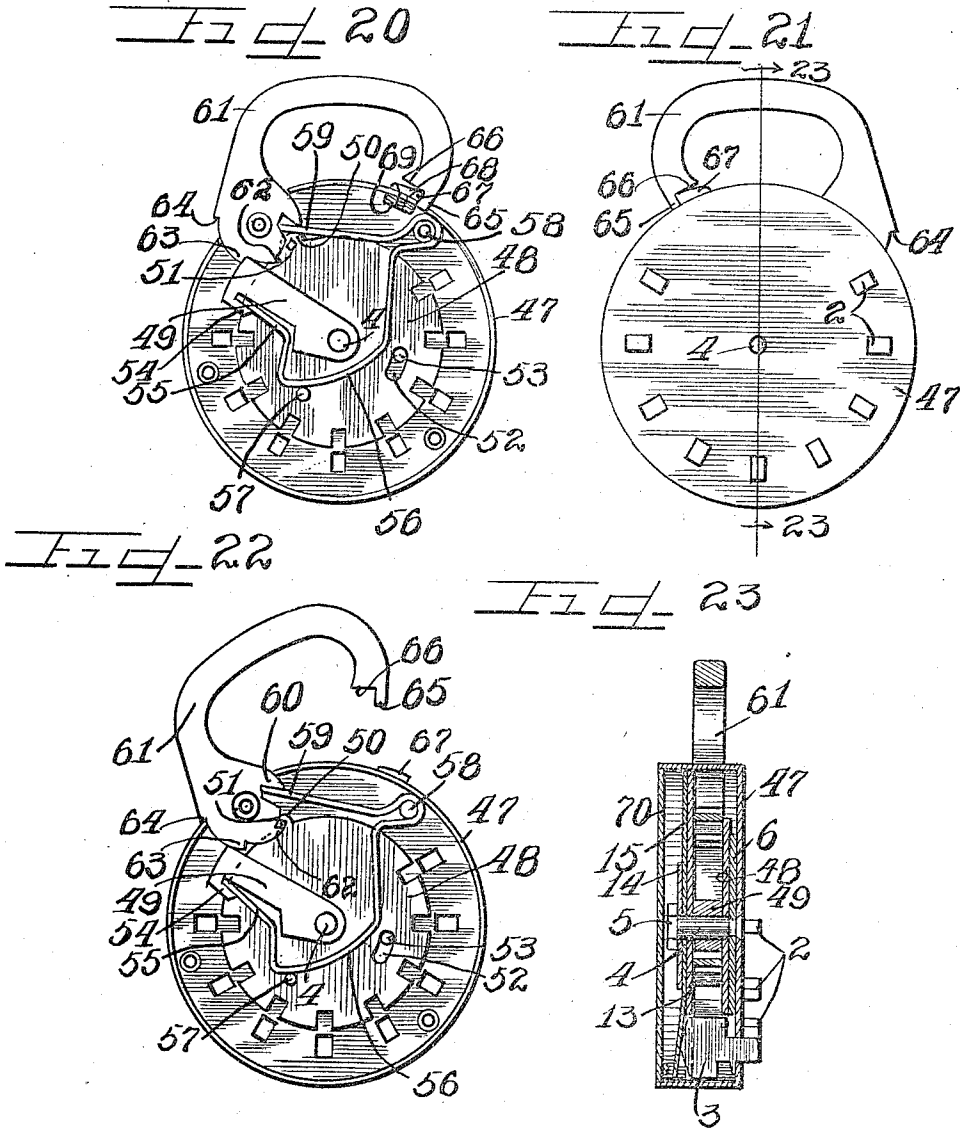


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1,229,269.

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5 SHEETS—SHEET 4.



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APPLICATION FILED OCT. 31, 1913.

Patented June 12, 1917.

5 SHEETS—SHEET 5.

1,229,269.

Fig. 24

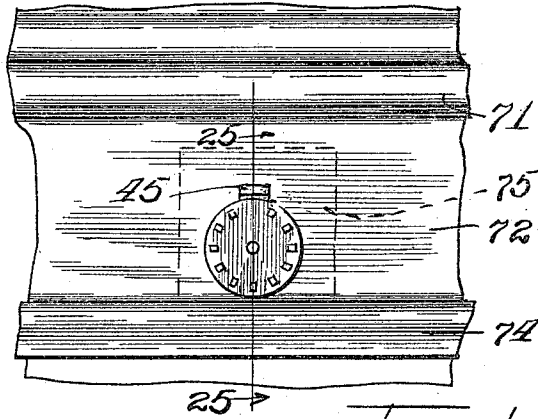


Fig. 25

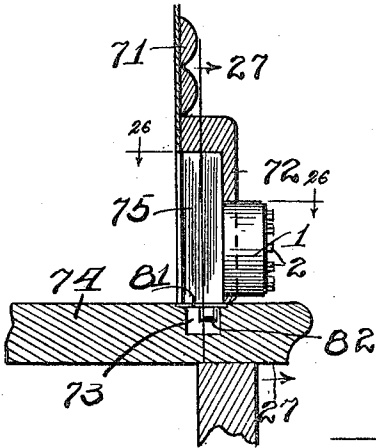


Fig. 27

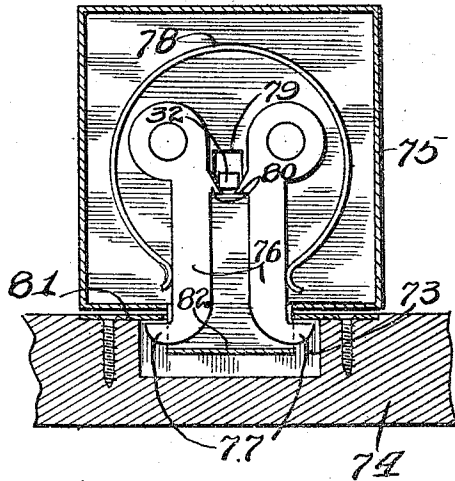
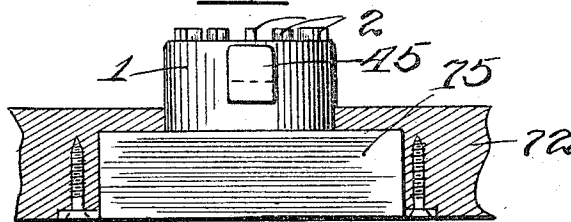


Fig. 26



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UNITED STATES PATENT OFFICE.

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KEYLESS LOCK.

1,229,269.

Specification of Letters Patent. Patented June 12, 1917.

Application filed October 31, 1913. Serial No. 798,397.

To all whom it may concern:

Be it known that I, CHARLES W. HORN, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Keyless Locks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

Many types of keyless locks have been constructed wherein the manipulation of certain elements into a particular position has permitted opening of the lock. However, generally in such types of locks of simple construction, opening of the lock may be effected by properly setting the various locking elements, each one of which of course must be actuated.

This invention relates to a keyless lock wherein a number of locking elements are employed and the lock may be so adjusted as to be opened by any one of the same, or any number thereof as desired, and in any particular arrangement or combination with one another. In this invention if other of the locking members than those set for opening the lock are manipulated, actuation thereof will serve to further prevent release of the lock even by the correct elements.

It is an object of this invention to provide a keyless lock having a number of locking elements associated therewith, the actuation of the proper ones of which serves to release the lock.

It is also an object of this invention to provide a keyless lock having a plurality of locking elements associated therewith whereby actuation of the proper ones of which will serve to release the lock, but actuation of any of said locking elements other than the proper ones will serve to further lock and prevent release of the device.

It is also an object of this invention to construct a keyless lock wherein a rotatable locking element is mounted within a casing and a plurality of locking members are mounted therearound, certain ones of which normally engage said rotatable locking element to prevent movement thereof, and by the actuation of which, said rotatable element may be moved into release position,

It is also an object of this invention to provide a keyless lock wherein a rotatable element is associated with a number of locking members, certain ones of which are adapted to prevent rotation of said element unless actuated, and the others of which are adapted to permit rotation of said element unless actuated, so that a double combination of locking members is effected, certain ones acting to release the rotatable element by movement thereof, and others acting to lock the same when actuated.

It is furthermore an object of this invention to provide a keyless lock wherein a notched rotatable locking element is mounted concealed within a casing and a number of locking members adapted to register with the notches in said element are slidably mounted in said casing, with a portion thereof projecting therethrough for manual actuation, whereby actuation of the proper locking members will release said notched locking element to permit opening of the lock, and actuation of any one of the other of said locking members will serve to lock said notched element, even though the proper locking members be also simultaneously actuated.

It is also an object of this invention to construct a keyless lock adapted to be released by the manipulation of any one or combination of proper locking members as the case may be, and with an electric switch associated therewith whereby the proper contacts may be closed or opened when the lock elements are actuated.

It is also an object of this invention to construct a device wherein a locking bolt is controlled by a rotatable locking element having a spring connected thereto and to said bolt, and with locking members, the proper ones of which when actuated, serve to release the locking element and the locking lever therewith and said spring acting to cause movement of the locking element and locking bolt.

It is also an object of this invention to provide a device wherein a rotatable locking element is employed associated with a spring mounted on a casing containing said element, and with a plurality of locking members, the proper ones of which when actuated serve to release said element whereby a locking bolt also connected to said spring may be impelled into release position.

tion with the release movement of said element, and as said locking bolt moves into said release position, also serving to return said locking element to initial position.

5 It is also an object of this invention to provide a padlock, the locking shackle of which is maintained in locked position by a spring actuated pawl, and with a rotatable locking element capable of being
10 moved under the impulse of said spring when the proper ones of a number of locking members normally retaining said element from movement are actuated, and as
15 said locking shackle moves into release position also under the impulse of the aforesaid spring with the release of said pawl, said shackle acts to positively move said rotatable element back to initial position.

It is also an object of this invention to
20 provide a device wherein a rotatable locking element controlling the release movement of a locking bolt is retained from movement by certain of a number of spring thrust locking
25 members, the actuation of the proper ones of which serve to release said locking element, but whereby actuation of any but the proper of said members serves to further lock said element from movement.

It is also an object of this invention to
30 provide a combination lock, the locking bolt of which may only be moved to release position when certain ones of a number of locking members are alone actuated.

It is furthermore an object of this invention to construct a lock which may only
35 be released by actuation of proper ones of a number of locking members, and whereby the mechanisms of the device are returned to initial position immediately upon the
40 release operation of the lock so as to be in position for relocking without actuation of any of said locking members.

It is finally an object of this invention to construct a device simple in operation and
45 so assembled as to defy tampering therewith, and which may only be taken apart when in release or unlocked position.

The invention (in a preferred form) is
50 hereinafter more fully described and defined in the accompanying drawings and specification.

In the drawings:

Figure 1 is a front face view of a lock mounted upon any suitable support.

55 Fig. 2 is a section on line 2—2 of Fig. 1, illustrating the details of construction and association of the lock with an electric switch.

Fig. 3 is a section on line 3—3 of Fig. 2.

60 Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 4^a is a section on line 4^a—4^a of Fig. 4.

Fig. 5 is an interior view of the casing for the locking mechanism illustrating the attaching means thereon.

65 Fig. 6 is a fragmentary enlarged detail

section on line 6—6 of Fig. 1, with the switch mechanism omitted.

Fig. 7 is a similar view but with a locking member shown mounted in the device in a different position.

70 Fig. 8 is a top view of the switch mechanism with the casing broken away and shown in section.

Fig. 9 is a fragmentary detail of the notched rotatable locking element of the device.

Fig. 10 is a sectional detail illustrating the locking member forming a part of the lock mechanism and adapted to interlock with the switch mechanism to prevent movement
80 thereof.

Fig. 11 is a rear face view of the locking mechanism with the switch element removed.

Fig. 12 is a similar view with the spring plate of the locking device removed and
85 showing the guide member.

Fig. 13 is a similar view with a guide member removed and showing the mechanisms in locked position.

Fig. 14 is a view similar to Fig. 13, showing the mechanisms in release position.

Fig. 15 is a view similar to Fig. 14, with a part of the locking mechanisms removed and showing a supporting plate therefor.

Fig. 16 is a view similar to Fig. 15, with
95 the supporting plate removed.

Fig. 17 is a front face view of one of the plurality of locking members of the device.

Fig. 18 is a view of one end thereof.

Fig. 19 is a view of the other end
100 thereof.

Fig. 20 is a rear face view of a modification of my invention with parts removed showing the adaptation of the mechanism to a padlock.

Fig. 21 is a front face view of the padlock.

Fig. 22 is a view similar to Fig. 21 and illustrating the padlock in release position.

Fig. 23 is a section taken on line 23—23
110 of Fig. 21.

Fig. 24 is a front face view of a modification of a device adapted to a desk.

Fig. 25 is a section on line 25—25 of Fig. 24.

Fig. 26 is a section taken on line 26—26
115 of Fig. 25.

Fig. 27 is a section taken on line 27—27 of Fig. 25.

As shown in the drawings:

120 The locking mechanism of the device is contained within a circular casing 1, which is apertured at a plurality of points symmetrically about the center of the casing

to permit the projection therethrough of the narrowed or reduced ends 2, of a plurality of slidable locking members indicated as a whole by the reference numeral

3. A stud or pintle 4, is secured centrally in said casing and projects inwardly and
125

130

is threaded at its inner free end to receive a nut 5, thereon. Said pintle 4, is slightly reduced in diameter at one end adjacent the casing 1, and mounted thereon and in close contact with the inner face of said casing, is a spacer element 6.

A bracket plate 7, is secured at three points to the inner periphery of said casing 1, and is centrally apertured to permit passage of said pintle 4, therethrough. Rotatably mounted on said pintle 4, between said spacer element 6, and said bracket plate 7, is a locking element 8, which has a plurality of notches in the periphery thereof corresponding in number and position with the apertures in said casing 1, for the locking members 3. The side edges 9, of the notches in said element 8, are slightly inclined away from a radial line drawn through one corner of the notch as clearly shown in Fig. 9, and for a purpose hereinafter described.

The locking members 3, serve to permit or prevent, as the case may be, rotation of the locking element 8, depending upon the particular manner in which said members are inserted in the device and whether or not the same are actuated.

As already stated, the locking members may be so associated with the device that the same may be operated to release condition by pressing only certain proper ones of said members, and whereby an actuation of any one or number of the other of said locking members will serve to lock the rotatable locking element from movement even if released by actuation of the proper locking members. The two methods of inserting the locking members in the device are clearly shown in Figs. 6 and 7, in which the locking member 3, as shown in Fig. 6, is inserted so as to necessitate an actuation thereof when it is desired to release the lock, whereas the locking element 3, as associated with the device in Fig. 7, is turned about with respect to its position in Fig. 6, and by means hereinafter described it will be shown that an actuation of the key in the latter figure will serve to lock the locking element 8, from rotation.

As clearly shown in Figs. 6, 7, and 17, 18, and 19, each of the locking members is recessed on one side thereof for more than half its length, but is provided with an outstanding tapered lug 10, on said recessed portion, while on the other side said member is also recessed for a portion of its length but an amount less than the first side. Furthermore in the latter case an angled abutting edge 11, is provided adapted to cooperate with the angled edges 9, of the notched element 8, to insure easy engagement and disengagement of the locking member with said locking element 8, when positioned in the device as in the case shown in Fig. 6. The lower inner edge of the lock-

ing member 3, opposite from the actuating end 2, is shaped to afford a blunt point 12. A guiding element or plate 13, is also mounted on said pintle 4, and consists of a circular plate having a plurality of radially directed slots in the periphery thereof, said slots of course arranged to receive the pointed ends 12, of the locking members 3 therethrough. Clamped against said guiding plate 13, by means of a smaller plate 14, beneath the nut 5, is a spring steel plate 15, which is radially notched intermediate the position of the notches in said guide plate 13, and receives the blunt point 12, of the locking member 3, abutting against the spring leaves thus afforded, one for each of said locking members.

A number of pins 16, are provided upon the bracket plate 7, which engage in apertures correspondingly arranged upon the guide plate 13, and serve to properly space said guide plate 13, from said bracket plate 7. Slots 17, and 18, respectively, are also provided in said bracket plate 7, and projecting therethrough and secured upon the rotatable locking element 8, are pins 19, and 20, respectively, which not only serve to limit the amplitude of movement of said rotatable locking element 8, with respect to said fixed bracket plate 7, but also serve another purpose hereinafter described. Slidable through an aperture in the upper peripheral wall of the casing 1, is a locking bolt 21, which extends into the casing between the bracket plate 7, and said guide plate 13. Said locking bolt 21, is provided with a longitudinal slot 22, in the lower end thereof adapted to engage around the pintle 4, to limit said bolt in its upward and downward movement. Another longitudinal slot for a similar purpose is provided in the upper end of said bolt 21, to permit projection therethrough of the spacing pin 16, and as shown the upper end of said latter longitudinal slot is enlarged as indicated by the reference numeral 23, to permit an insertion of an attaching screw therethrough when the casing 1, is secured upon a suitable support, the lug on the casing to receive said screw being denoted by the reference numeral 24, clearly shown in Fig. 5. It is to be understood that the enlargement of aperture 23, is merely to permit insertion of said screw and access thereto, and the bolt 21, does not engage said screw in any manner whatsoever.

One edge of said locking bolt 21, is recessed at two points affording a sharp downwardly directed tooth or cam 24^a, and an inclined abutting edge 25, above the same. A stiff spring engages at one of its ends 26, beneath said tooth 24^a, thence around one of the pins 16, which affords a fixed fulcrum point therefor and is then provided with a bent V-shaped portion 27, 130

engaging the pin 20, and finally terminates in the angled end 28, within a recess having an inwardly directed side wall 29, in a pivoted pawl member 30, mounted on said bracket plate 7.

The other edge of said locking bolt 21, adjacent the pawl 30, is recessed for a portion of its length as indicated by the reference numeral 31, in order to permit projection therinto of the locking tail of the pawl, which acts as shown in Fig. 13, when in such position, to retain the locking bolt in locking or lowered position, and when released from said recess permits upward ejection of said locking bolt to the position shown in Fig. 14, under the impulse of the end 26, of said spring which, as stated, bears upwardly beneath said tooth 24^a, for the purpose.

A tail piece or lug 32, is provided on said locking bolt 21, and projects outwardly therefrom at right angles thereto to engage an element of a switch hereinafter described. The locking bolt 21, the pawl 30, and the spring mentioned, are all contained in the device between the bracket plate 7, and the guide plate 13, which is spaced therefrom, as pointed out, by the pins 16. The end 26, of the spring acts to normally thrust the locking bolt 21, upwardly at all times, and it will be seen that the pin 19, upon the rotatable locking element 8, engages in the recess in said bolt above the tooth 24^a.

As the elements are shown in Fig. 13, stress in the spring tends to rotate the locking element 8, rotation of which is of course prevented by one or more of the locking members 3, which are arranged, as shown in Fig. 6, with the inclined abutting edges 11, engaged in the notches of said element 8. Likewise said pawl 30, is normally impelled into latching or locking position with the locking bolt 21, by said spring, and with the elements in this position said pin 19, is in contact with the abutment edge 25, on said locking bolt.

When the locking members 3, which normally prevent rotation of the locking element 8, are depressed from the position shown in Fig. 6, said locking element 8, under the impulse of said spring which bears against the pin 20, secured to said element 8, rotates a slight amount with the consequent downward movement of the end 28, of the spring which contacts the inclined edge 29, of the pawl 30, said pawl is retracted out of engagement with the locking bolt 21, thus permitting the locking bolt 21, under the impulse of the end 26, of said spring, to be thrust upwardly and as this upward release movement of the locking bolt 21, takes place the upper surface of the tooth 24^a, of said bolt bears against the pin 19, to thrust the same away, and therefore

cause a reverse rotation of the locking plate back to initial position or that wherein the notches are in register with the locking members 3. Said locking members 3, then under the impulse of the spring leaves of the plate 15, are impelled into normal position, the abutments 11, on said members engaging in the notches and preventing further rotation of said rotatable locking element 8.

It will be seen that owing to the actuation of the proper keys of the device the locking element 8, is permitted a certain amount of rotation wherein the notches in said plates are out of register with the locking members, and the locking bolt is permitted to move into release position, but such movement of the locking bolt serves to reverse the rotation of said plate now released from the stress of the spring, until the notches of the plate are again in register with the locking members, which, under the impulse of their respective spring levers, slide back into engagement with the notches in the plate. All that is needed now to return the locking bolt to locking position, is to thrust the same downwardly, the other elements being already in proper position, and by such movement stressing the spring. As the locking element moves to its extreme locked position the pawl 30, of course engages the same to retain the locking bolt in locked position.

The electric switch portion of the device connected for operation by and with said locking means comprises a casing 33, containing insulating bases 34, and mounted on said bases are curved contacts 35, 36, 37, and 38, respectively, each of which is connected to a terminal post on the rear surface of said bases to which suitable wires may be attached. An actuating arm 39, is pivotally mounted between said bases upon a pivot pin 40, and said arm carries a contact element 41, secured transversely thereon, whereby when said arm is rotated about its pivot point into one extreme position, it affords a connection between the elements 35, and 36, and when rotated to the other extreme position serves to afford an electrical connection between the contacts 37, and 38, respectively.

When the arm is in a central position, as shown in Fig. 4, the contacts 35, and 37, are joined and each thereof being on single lines of different circuits it is immaterial whether they are connected, so that thus the central position of the arm is a neutral one. Said arm 39, is grooved to receive a complementally shaped actuating lever 42, removably therein. The tail piece or lug 32, on the locking bolt 21, of the locking mechanism, projects through a slot in the front face of the casing 33, of the switch mechanism, and is adapted when in a lower position to engage in a recess 43, in the upper end of said

arm 39, thus preventing rotation thereof when the same is in neutral position.

Of course the switch mechanism may be secured to any suitable support 44, by screws or bolts engaged therethrough and covered over by the attachment of the locking mechanism superposed thereon, although I have not shown the same, such attaching means may form an obviously simple expedient. However, for the purpose of attaching the locking mechanism to the switch mechanism or to a support whereby access may be had thereto only when said locking mechanism is in release position the upper end of the locking bolt 21, is provided with a head 45, which when the bolt is in locking position projects over the lug 24, through which an attaching bolt or screw 46, for the device extends.

Figs. 20 to 23 inclusive illustrate a modification of my invention wherein the locking principles are applied to, and associated with a padlock. In this construction a casing 47, is provided somewhat similar in shape and construction to the casing 1, already described. As in the prior construction, a spacer element 6, is provided with a rotatable notched locking element 48, adjacent thereto, and also a slotted guide plate 13, and a spring plate member 15, the latter of which is held clamped in place as before by a clamping plate 14, beneath a nut 5, on the pintle 4. In this modification the bracket plate 7, is dispensed with and the guide plate 13, and notched locking element 48, are maintained in spaced relation from one another on the pintle 4, by the hub of a pawl 49, rotatably mounted on said pintle.

The notched locking element 48, is of slightly different construction than the notched locking element 8, in the prior construction described and has formed on its peripheral edge thereof a lug or cam projection 50, and a squared pin 51, is secured thereon and projects outwardly from the surface thereof. A slot 52, is also provided through the rotatable element 48, and a pin 53 secured upon the casing 47, and projecting through the spacer element 6, engages in said slot, and thereby limits the amplitude of movement of said locking element about its pivot point 4.

A hook-like projection 54, is formed on the end of said pawl 49, and engaging therebeneath is one end 55, of a spring 56, which bears upon a fixed pin 57, on said locking element 48, and then passes upwardly and is looped around a pin or stop 58, secured within the casing 47, near the periphery thereof, and with the other end 59, of said spring, engaging beneath a projection 60, formed on a pivoted shackle 61, of the padlock.

Said shackle 61, is provided with projections or teeth 62, 63, and 64, respectively.

The projection or tooth 62, is adapted to engage the pin 51, whereas the projection 63, is provided for the purpose of affording a stop for the shackle to maintain the same in locked position as shown in Fig. 20, by means of the spring thrust pawl member 49. The purpose of the projection or tooth 64 is to limit the opening movement of the shackle 61, by contact with the periphery of the casing, as clearly shown in Fig. 22.

The spring 56, in this construction, as well as in the prior construction already described, serves a three fold purpose, that is to say referring to Fig. 20, in which the spring is shown in its stressed position, the end 55, serves to impel the pawl 49, in locking engagement beneath the projection 63, on the shackle to prevent opening of the lock, and also bears upon the pin 57, on the locking element 48, exerting a pressure thereon tending to rotate said element, and the other end 59, of said spring acts to thrust the shackle 61, into open position when the same is released. Of course, the locking and releasing means for the notched element 48, consist of the locking members 3, which are identical in construction and operation with the locking members described with reference to the switch lock. When the proper locking members are pressed to release the notched locking element, said element due to the stress in the spring 56, rotates a slight amount counter-clockwise, referring to Figs. 20, and 22, respectively, and with the consequent downward movement of the spring end 55, the pawl 49, moves out from beneath the projection 63, on the shackle of the padlock, and said lever, under the impulse of the spring end 59, is then thrust outwardly into open position, as shown in Fig. 22.

As the opening movement of the shackle 61, takes place, the projection 62, thereon, engages the pin 51, upon the locking element 48, thus causing the latter to rotate clockwise, and when the same has rotated a sufficient amount to bring the notches therein in register with the locking members 3, the proper ones thereof under the impulse of the spring plate 15, are thrust into engagement with said notches, again locking said element in initial position, although of course the shackle 61, is in open position. All that is now necessary to lock the padlock is to depress the shackle 61.

As said shackle 61, is moved downwardly into locking position the projection 62, is of course drawn away from the pin 51, on said element 48, but owing to the engagement of the locking members 3, therewith, said element is not permitted to rotate, and due to the downward movement of the spring end 59, by the projection 60, on the shackle, the spring is again stressed. As the projection 63, on said shackle, moves beyond the end of the pawl 49, said pawl is

thrust therebeneath due to the impulse of said spring end 55, thus locking the shackle 61, in closed position.

An aperture or slot is provided in the peripheral side walls of the casing 47, to receive the reduced end 65, of the shackle 61, therein when the lock is in locked position. As shown, a relatively broad surface 66, is provided on the end of said shackle 61, adjacent the reduced end 65, and this is for the purpose of covering a lug 67, on the casing 47, which is apertured to receive a small screw 68, countersunk therein, as shown clearly in Fig. 20. Said screw threads into a lug 69, forming a part of a back plate 70, adapted to close the casing 47, and conceal the mechanism therein. Thus it is apparent that the lock can not possibly be taken apart while in locked position, it being necessary to remove the back plate 70, in order to permit access to the inclosed mechanism of the device.

In the modification illustrated in Figs. 24 to 27 inclusive, a locking mechanism adapted for a desk or the like is shown associated with the locking means embraced in the description of the combination of the lock and switch, the particular locking mechanism in the latter case being identical in construction with that already described with reference to the switch lock. In the modification herein referred to, the portion of a cover 71, for a roll top desk is shown provided with the usual hollow block 72, which closes over a recess 73, in the desk table top 74. Within said block 72, is a metallic casing 75, in which are pivotally mounted a pair of locking levers 76, the lower outwardly projecting ends 77, of which are normally impelled toward one another by a spring 78, secured within said casing. A longitudinal slot 79, is provided in the face of said casing 75, and projecting therethrough is the tail piece or lug 32, secured on the locking lever of the locking mechanism already described.

A cam 80, is provided on each of said locking levers 76, whereby when said tail piece 32, moves downwardly the same contacts said cams 80, thus impelling the ends 77, outwardly and away from one another into locking position beneath the edges of a slotted plate 81, which is secured over said recess 73, in the top of the desk. Of course, any suitable spring thrust plate 82, is associated with the plate 81, covering the recess in the desk top, to close the slot in said plate 81, when the locking levers 76, are removed therefrom, as when the desk and cover is raised, but of course this is a well known construction, and inasmuch as it forms no part of this invention the details of construction will not be entered into here.

When the proper locking members of the locking mechanism are depressed to release the locking bolt, so that the head 45, there-

on moves upwardly, the tail piece 32, which is also connected on said locking bolt, also moves upwardly and out of contact with the cams 80, thus permitting the ends 77, of the locking levers 76, to be impelled toward one another by the spring 78, so that the lock is thereby unlocked and the desk cover may be raised. When it is desired to lock the desk the cover is closed upon the same and the head 45, of the locking means is thrust downwardly, thus impelling the tail piece 32, downwardly and causing an outward projection of the ends 77, beneath the plate 81, on the desk top.

The operation is as follows:

The locking elements of this type of lock consist of the rotatable notched wheel denoted as 8, in one construction and as 48, in the padlock modification thereof, and this element is released or locked in position by the locking members 3, which, owing to their peculiar shape and method of insertion or mounting in the device, determines their manner of operation. As already pointed out, a member mounted in the lock in the position shown in Fig. 6, is an actuating member, and owing to the engagement of the portion 11, of said member within one of the notches of the rotatable locking element, said element is not permitted to rotate, and the aforesaid member 3, must be actuated by pressing upon the exposed portion 2, such pressure of course being resisted by the spring plate element 15, bearing upon the inner end 12, of said member.

However, when said member or members, depending on whether or not one or more of the same are positioned in the lock in the manner shown in Fig. 6, are actuated by depressing the same to release the locking element, rotation of the latter takes place under the impulse of the stressed spring engaging the same. Said spring by its movement with the rotatable element not only releases the locking bolt of the device, but actually ejects the same into release position, and, as such movement of the locking bolt takes place, certain means on said bolt contact a pin upon the rotatable locking element to reverse the rotation thereof to initial position, whereupon the locking members 3, already referred to, under the impulse of the spring plate 15, are thrust into engagement with the notches of said locking element, thereby locking the same in initial release position.

When it is desired to lock the lock again, the locking members 3, need not be actuated but the locking bolt in one construction denoted by the reference numeral 21, and the shackle in another by the reference numeral 61, is manually pushed into locking position against the pressure of the spring, and the mechanisms within the lock, having already

been returned to normal, take no part in the return movement of the locking bolt or shackle, as the case may be, merely the pawl or detent moving to latch with said locking member first to retain the same in locking position until again released.

It is noticeable in the operation in the various constructions set forth, that the movement of the rotatable locking element within the device is very quick, and only momentary, the spring connected thereto acting first to rotate the same to release the locking lever and the locking bolt or shackle member in each case, then acting under the impulse of the spring to rotate the locking element reversely again into initial position.

When the locking members 3, are mounted in the device in the position shown in Fig. 7, they take no part in the operation of unlocking the device, but should for any reason any one of the so disposed locking members be depressed, as for instance by a person unacquainted with the proper combination for opening the lock, the outwardly projecting lugs 10, on said members will be moved into engagement with one of the notches of the rotatable locking element, so that even should the correct locking members then be depressed, the rotation of said locking element will be prevented.

The projection 10, also serves another purpose and this is to prevent, or rather limit the outward projection of the locking member under the impulse of the spring plate 15, through the apertures in the casing for the device, and as shown in Figs. 6 and 7, said projection 10, rests against the inner surface of the casing, thus acting to limit the movement of said locking member in that direction. Another important feature of my invention is the ease with which access may be gained to the interior for adjustment of the parts when so desired, by merely removing the screw, in one case denoted by 46, and in another by 68, which, when the lock is in locked position, is concealed respectively by the head 45, of the locking bolt and by the broad surface 66.

I have shown my device associated with an automobile switch and also with a desk lock, and as a padlock, but of course it is readily apparent that the same may be constructed for use upon practically any device or article wherein a lock is required.

I am aware that various details of construction may be varied through a wide range without departing from the principles of this invention. I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. In a device of the class described a lock, a plurality of flat locking members associated therewith, a spring plate contact-

ing the inner ends of said locking members to hold the same in initial position, and mechanism for causing said lock to open automatically when certain of said locking members are actuated.

2. In a device of the class described a plurality of flat non-rotatable movable locking members, mechanism controlled thereby to permit an automatic opening of the lock when the proper ones of said locking members are actuated and to prevent opening of the lock when any of the other of said locking members are actuated, and a radially slotted guide plate adjusted to guide and hold said locking members in position.

3. In a device of the class described a radially notched rotatable locking element, a plurality of flat locking members having notches with inclined edges adapted to retain the same in position, said locking element adapted to be released by the actuation of proper ones of said locking members, a tapered lug on each of said locking members for limiting the outward movement thereof and also serving when other than the proper ones of said locking members are actuated to lock said locking element irrespective of the actuation of the proper locking members, and mechanism acting to automatically move the locking element into release position when released by said locking members.

4. In a device of the class described, a slidable locking bolt, a radially notched rotatable locking element controlling the movement thereof, certain predetermined flat notched members for permitting release of the same, means automatically moving said element into unlocked position when released, other similar notched members which when actuated prevent release of said locking element, and means acting to rotate said locking element when released to permit the locking bolt to move into released position.

5. In a device of the class described a rotatable locking element, flat non-rotatable means retaining the same in locked position, certain of said means capable of actuation to release said locking element, and the other of said means acting to prevent release of said locking element if actuated, and a flat radially slotted plate adapted to guide said means and hold the same in spaced relation to one another.

6. In a device of the class described a locking bolt, a spring engaged therein adapted to actuate the same, rotatable means controlling the release of said bolt to unlocked position, a plurality of flat non-rotatable locking members, certain ones thereof in engagement with said means to release the same when actuated and other of said locking members acting to further lock said means if actuated.

7. In a device of the class described a

casing, a rotatable locking element mounted therein, flat non-rotatable locking members having notches therein with inclined edges adapted to control the movement of said element, and means on said members to prevent movement of said locking element when other than the proper ones of said members are actuated.

8. In a device of the class described a casing having apertures therein, a flat radially notched rotatable locking element therein, a plurality of spring thrust non-rotatable locking members adapted to engage said casing and said element to hold the element in locked position, mechanism for automatically impelling said locking element into release position and means associated with said locking members to prevent movement of said locking element when other than the proper ones of said locking members are actuated.

9. In a device of the class described, a flat radially notched locking element, pins rigidly secured thereon to limit the movement thereof, resilient means adapted to cause movement of said locking element, a plurality of non-rotatable members, certain ones so disposed as to engage said locking element to prevent movement thereof except when said certain members are actuated, and other of said locking members disposed normally to permit movement of said locking members and to prevent movement thereof when actuated.

10. In a device of the class described, a slidable locking bolt, a rotatable notched locking element adapted to control the movement thereof from locked to unlocked position, a pawl adjacent said bolt to lockingly engage the same, resilient means connecting said locking element to said pawl, and to said bolt and acting to move each thereof, and a plurality of locking members arranged around said locking element, certain ones of which engage said element to prevent movement thereof except when said certain members are actuated, and other of said members normally permitting movement of said element except when any one of the same is actuated.

11. In a device of the class described a locking bolt, rotatable locking means controlling the movement thereof from locked to release position, pins secured upon said locking means, a bracket plate having slots therein adapted to engage said pins to limit the movement of said means, and a plurality of non-rotatable members for controlling the movement of said rotatable means whereby actuation of certain of said members will prevent unlocking of the device.

12. In a device of the class described a locking bolt, a pawl adapted to retain the same in locked position, a rotatable locking

element adapted to control the movement of said bolt, and a spring engaging said bolt, said pawl, and said element.

13. In a device of the class described a locking bolt, means for controlling the movement thereof, locking members for controlling the movement of said means, mechanism for retaining said locking bolt in locked position, and a single spring engaging said locking bolt, said means, and said mechanism, for actuating the same.

14. In a device of the class described a casing, a slidable locking bolt therein, a radially notched flat rotatable locking disk therefor, a plurality of non-rotatable locking members, certain ones of which are adapted to prevent movement of said locking element, means adapted to rotate said locking element when released by said members, and mechanism associated with said locking bolt to return said locking element to initial position during a release movement of said bolt.

15. In a device of the class described a slidable locking bolt, a radially notched rotatable locking element, a plurality of non-rotatable slidably mounted locking members, certain ones of which normally engage said locking element to prevent rotation thereof, means on other of said locking members to prevent rotation of said locking element if any one of the latter of said members are actuated, and means acting to rotate said element when released to permit said locking bolt to move into release position.

16. In a device of the class described a casing, a rotatable radially notched locking element mounted therein with the edges of said notches inclined, a plurality of flat locking members having notches therein the edges of which are inclined to permit easy engagement and disengagement of the members with said locking element, said locking members slidably mounted in said casing at right angles to said locking element, certain ones of which are disposed to normally prevent rotation of said locking element, others of said locking members being disposed to normally permit rotation of said locking element, means automatically rotating said element when the former of said members are actuated, and means associated with each of said locking members to prevent rotation of said element when any one of said latter disposed members are actuated.

17. In a device of the class described a casing, a plurality of locking members slidably mounted therein at right angles to the plane thereof, a plate radially notched to form spring leaves for normally impelling said members outwardly through the casing, a lug on each of said members to limit the outward projection of said members through said casing, locking mechanism within said casing capable of being released only when

the proper ones of said locking members are actuated, and a slidable locking bolt automatically impelled into release position when said mechanism is released.

5 18. In a device of the class described a plurality of flat radially disposed locking members having notches therein the edges of which are inclined to permit actuation thereof, said locking members capable of
10 being inserted in the device at right angles to the plane thereof in more than one position, said locking members acting in one position to lock the device and to release the same when actuated, and acting in the
15 other position to permit unlocking of the device when not actuated and to prevent unlocking of the device when actuated, and a slidable locking bolt automatically impelled into release position when the proper mem-
20 bers are actuated.

19. In a device of the class described a casing, a plurality of locking members slidable therein at right angles to the plane thereof, a locking element adapted to be
25 controlled in its movement by said slidable locking members, a locking bolt, a pawl adapted to engage the same to retain the same in locked position, a spring engaging said locking bolt, said locking element, and
30 said pawl, and acting successively to rotate said element and disengage said pawl, and move said locking bolt into release position, when said locking members are properly actuated, and means engaged on said lock-
35 ing element adapted to be contacted by said locking bolt, whereby said locking element is reversely rotated to initial position during the releasing movement of said locking lever.

40 20. In a device of the class described a casing, a pin extending therethrough, a radially slotted locking element journaled on said pin, a plurality of flat members radially disposed slidably engaged in said
45 casing at right angles thereto parallel to the axis of said pin, and certain ones of which being disposed to engage said slotted locking element to prevent movement thereof, and other of said locking members
50 so disposed as to prevent movement of said locking element, when actuated, and a slotted spring plate mounted on said pin adapted to abut the inner ends of said locking members to hold the same in normal position.
55

21. In a device of the class described a casing, a pin extending therethrough, a radially notched locking disk rotatably mounted thereon, a plurality of flat locking
60 members, certain ones of which engage in the notches in said disk to normally prevent movement thereof, other of said locking members so disposed as to normally permit movement of said locking disk, a bracket
65 plate having slots therein secured in said

casing, pins secured on said locking disk to engage in said slots for limiting the amplitude of movement of said locking disk, when released, resilient means for moving said
70 disk, and slidable mechanism actuated by the same resilient means to reversely move said locking disk after the same has been moved by said resilient means.

22. In a device of the class described a slidable locking bolt having slots therein,
75 means engaged in said slots to guide and limit the movement of said bolt, a rotatable slotted locking disk for controlling the movement of said bolt, means rotating said disk and releasing said locking bolt, and a
80 pin secured on said locking disk and adapted to be engaged by said locking bolt to reversely rotate said disk during the release movement of said bolt.

23. In a device of the class described a
85 stud, a slidable locking bolt having a slot therein adapted to engage said stud to limit the movement of said bolt, a rotatable radially slotted locking element mounted on said stud adapted to control the movement
90 of said bolt, and a plurality of flat non-rotatable locking members adapted to be associated with the device in more than one manner whereby actuation of only certain ones thereof will permit movement of said
95 locking element.

24. In a device of the class described a casing, a locking bolt slidable therein, a rotatable radially slotted locking element adapted to control the movement of said
100 bolt, a plurality of radially disposed flat locking members, certain ones of which when actuated permit movement of said locking element, and a spring engaged on said locking bolt, said locking element, and
105 on said casing, to cause movement of the respective elements relative said casing when the proper locking members are actuated.

25. In a device of the class described a
110 casing, a locking bolt slidable therein, a radially notched locking element movable within said casing, a pawl adapted to engage said locking bolt to retain the same in locked position, a plurality of flat lock-
115 ing members engaging in the radial notches in said locking element and acting when the proper ones of which are actuated to release the same, unitary resilient means engaging said bolt, said locking element, and
120 said pawl, and attached to the casing to cause a release movement of the respective elements when said locking element is released, and a pin secured on said locking element and adapted to be engaged by said
125 locking bolt to move said locking element back to initial position to be engaged by said locking member, when said locking bolt moves to release position.

26. In a device of the class described a 130

casing, a rotatable locking element therein, a plurality of radially disposed flat locking members slidably mounted in said casing having notches in each side thereof, and with certain ones thereof in position to engage in radial notches in said rotatable element to normally lock the same from movement, a guide plate mounted in said casing, and radially slotted to receive said locking members therein, and a radially slotted spring steel plate adapted to bear against the inner ends of said locking members to resist actuation thereof.

27. In a device of the class described a notched rotatable locking element, the edges of the notches inclined, a plurality of flat locking members slidably mounted to engage in the notches in said element to lock the same from rotation, a guide plate slotted to receive said locking members to maintain the same in proper position, and a plate slotted to afford a plurality of spring elements one for each of said locking members to retain the same in engagement with said locking element until actuated.

28. In a device of the class described a casing having a plurality of apertures therein, a rotatable notched locking element mounted within said casing, and with the notches therein adapted to be alined with the notches in the casing, a guide plate slotted and positioned with the slots therein in alinement with the notches in said element and apertures in said casing, a plurality of flat notched members slidably mounted in said casing and said guide plate, the edge walls of the notches inclined, some of said members positioned to engage in said notches in said element when actuated, and other of said members positioned to be normally engaged in said notches, and to move out of engagement therewith when actuated, and resilient means for maintaining said locking members in position.

29. In a device of the class described a slidable locking bolt, a pawl adapted to engage the same to retain said bolt in locked position, a spring engaging said bolt and pawl acting by downward movement to retract said pawl from said bolt, a notched member to which said spring is connected, and means permitting movement of said notched member to permit a downward movement of said spring to cause a release of said locking member from said pawl.

30. In a device of the class described a locking bolt having slots therein, means engaged in said slots to limit and guide the movement of said bolts, a pawl adapted to engage the bolt in locked position, a spring adapted by downward movement to retract said pawl from said locking bolt, a notched rotatable locking element adapted to en-

gage said spring under stress when the device is in locked position, a plurality of locking members adapted to engage said element to prevent rotation thereof except when said locking members are actuated to release the same, said locking element adapted to cause a downward movement of said spring when said element rotates, to release said locking bolt from said pawl, and means on said bolt for reversely moving said locking element back to initial position after release of said locking bolt.

31. In a device of the class described a locking bolt, a movable locking element to control the movement thereof, a pawl adapted to latch said locking bolt to retain the same in locked position, and unitary means engaging said bolt, said locking element and said pawl acting to move said locking element and said pawl and said bolt successively to permit movement of said bolt to release position, said means when moving said bolt acting to reverse the movement of said locking element.

32. In a device of the class described a combination lock embracing a plurality of flat notched locking members, the edges of said notches inclined, and a notched locking element with the edges of the notches therein also inclined to permit easy engagement and disengagement of the members with said element.

33. In a device of the class described, a casing, a locking bolt slidably mounted therein, a pintle extending through said casing and engaging in a slot in said locking bolt to limit the movement thereof, a pin at the upper end of said casing engaging in a slot in the upper end of said locking bolt, a spacer element mounted on said pintle and lying against said casing, a bracket plate fixed within said casing and spaced therefrom, a locking element rotatably journaled on said pintle between said bracket plate and said spacing element, means locking said rotatable element from rotation, and retaining means for the locking bolt adapted to be released when said rotatable element is released to permit said locking bolt to move into release position.

34. In a device of the class described, a casing, a pintle secured therein, a spacing element engaged on said pintle and lying against the casing, and a notched locking element journaled on said pintle adjacent said spacing element, a bracket plate apertured to receive said pintle therethrough and acting to confine said rotatable element between the same and said spacer element, a plurality of locking members adapted to engage in the notches in said rotatable element to prevent the rotation thereof, a locking bolt slidably mounted in said casing and slotted to engage said pintle, and a spring connected to said casing, to said rotatable element, and

to said locking bolt, acting to rotate said rotatable element when released by said locking members and to move said locking bolt to release position.

5 35. In a device of the class described, a casing, a locking bolt slidably mounted therein, a notched rotatable locking element journaled in said casing, a plurality of locking members slidably mounted in said casing and adapted to engage said rotatable element to prevent rotation thereof, other locking members adapted to normally permit rotation of said locking element but when actuated acting to prevent rotation thereof, a spring plate adapted to maintain said locking members in position, a slotted guide plate adapted to guide said locking members, and a spring connected to said casing, to said rotatable element, and to said locking bolt, to cause rotation of said locking element and movement of said locking bolt to release position.

36. In a device of the class described, a casing, a bracket plate secured therein, a rotatable locking element having notches in the periphery thereof journaled between said bracket plate and the walls of said casing, a plurality of locking members slidably mounted in said casing, certain ones of which normally engage in the notches in said locking element to prevent rotation thereof, and others of which, when actuated, serve to engage the notches in said locking element, a locking bolt movably mounted on said bracket plate, pins projecting through said bracket plate adapted to engage in slots in said locking bolt to guide the same, and resilient means adapted to rotate said locking element and to subsequently move said locking bolt into release position.

37. In a device of the class described, a casing, a bracket plate secured therein, a notched rotatable locking element between said bracket plate and said casing, a pin secured upon said locking element, a plurality of locking members adapted to engage in the notches of said locking element, a locking bolt, and resilient means adapted to ro-

tate said locking element and to actuate said locking bolt to release position, and a cam 50 on said locking bolt adapted to engage said pin on said rotatable element to rotate said locking element into initial position.

38. In a device of the class described, a casing, a plurality of locking members slid- 55 able in apertures therein, a rotatable notched locking member adapted to be engaged by said members, a movable locking bolt mounted in said casing, a pivoted pawl adapted to engage the same to retain said bolt in locked 60 position, and a spring in said casing, connected to said rotatable member, to said locking bolt, and to said pawl, acting to cause rotation of said rotatable member, retraction of the pawl, and movement of said 65 locking bolt to release position.

39. In a device of the class described, a slidable locking bolt, a notched rotatable locking element, a pin rigidly secured there- 70 on, a plurality of locking members adapted to engage in the notches in said element to prevent rotation thereof, resilient means engaged on the casing to contact said rotatable element, and said locking bolt, to cause ro- 75 tation of said element when released by said locking members and to move said locking members into release position, a pivoted pawl adapted to retain said locking bolt in locked position, a cam surface on said pawl adapted to be contacted by said resilient 80 means to cause retraction of said pawl when said resilient means is moved, due to the movement of said rotatable locking element when the latter is released from said locking members, and a cam surface on said 85 locking bolt adapted to engage said pin on said rotatable element to reversely rotate the same to initial position after movement thereof.

In testimony whereof I have hereunto 90 subscribed my name in the presence of two subscribing witnesses.

CHARLES W. HORN.

Witnesses:

CHARLES W. HILLS, Jr.,
FRANK K. HUDSON.