(No Model.) 2 Sheets—Sheet 1.

I. B. RAPAPORT.

PERMUTATION PADLOCK.

No. 526,740. Patented Oct. 2, 1894.

Fig. 1.

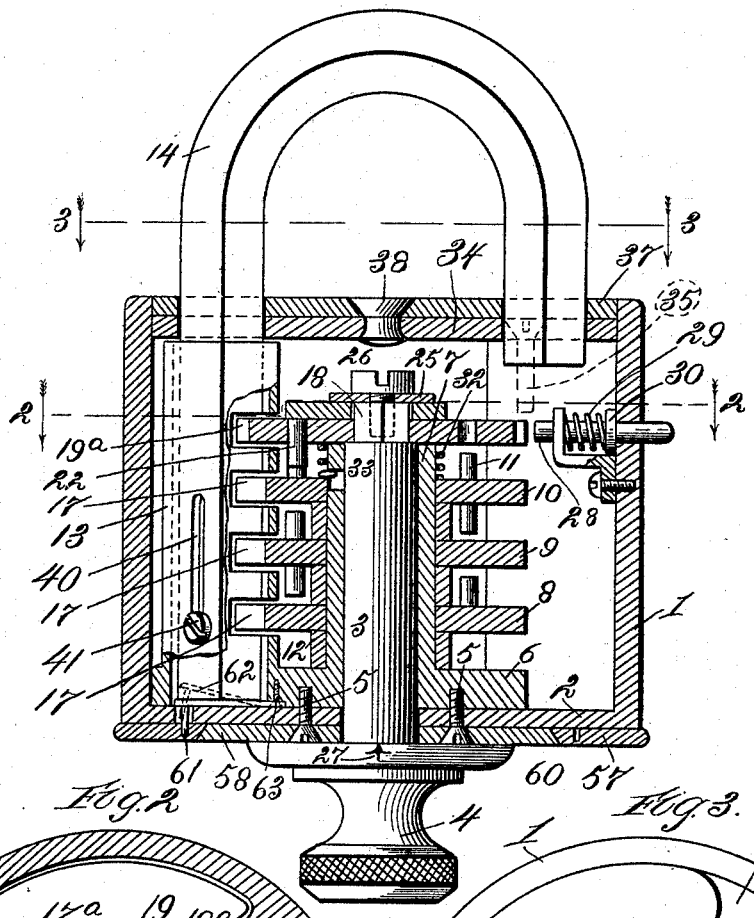


Fig. 2.

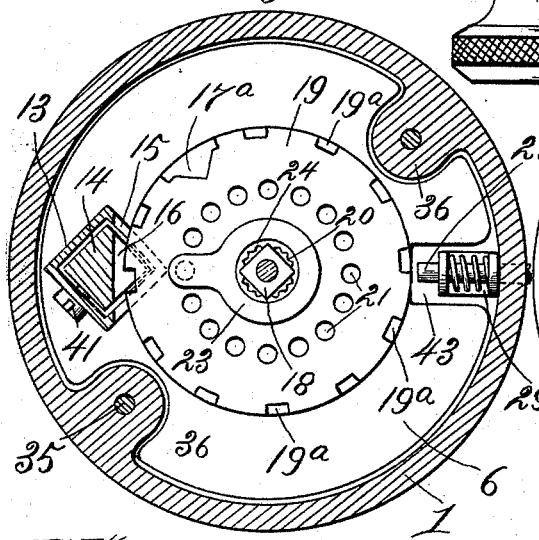
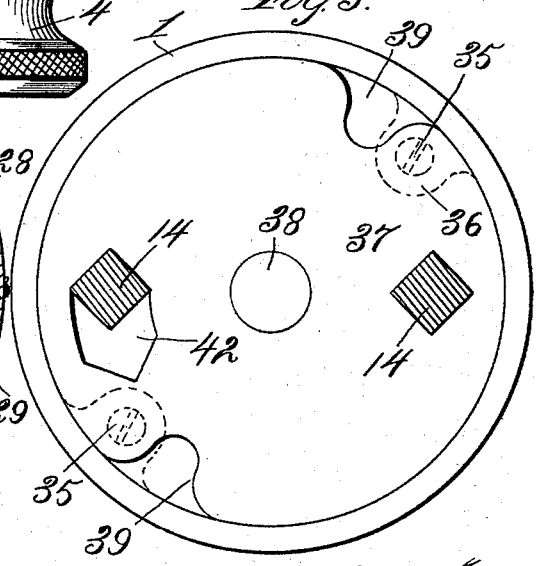


Fig. 3.



Witnesses:
Wm. F. Fleming
Arthur F. Durand.

Inventor:
I. B. Rapaport.
by Elliott & Hopkins Attys.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

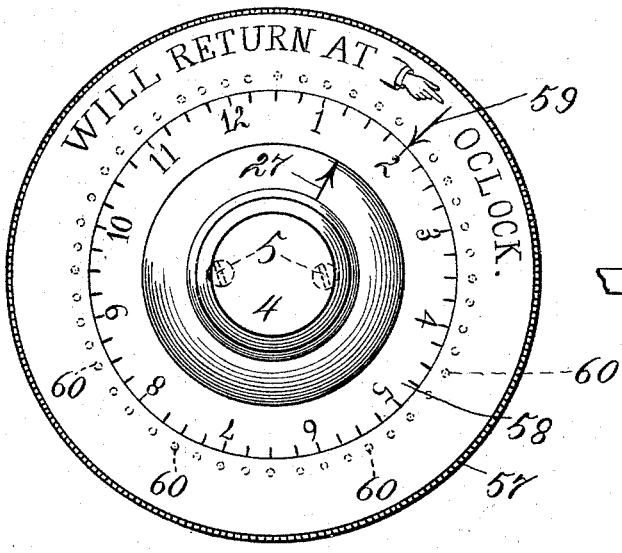


Fig. 7.

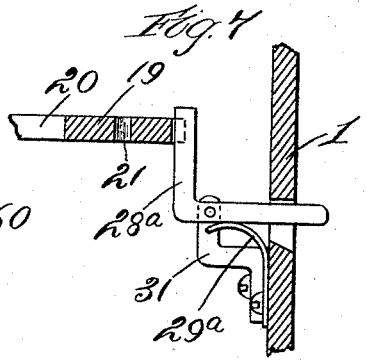


Fig. 6.

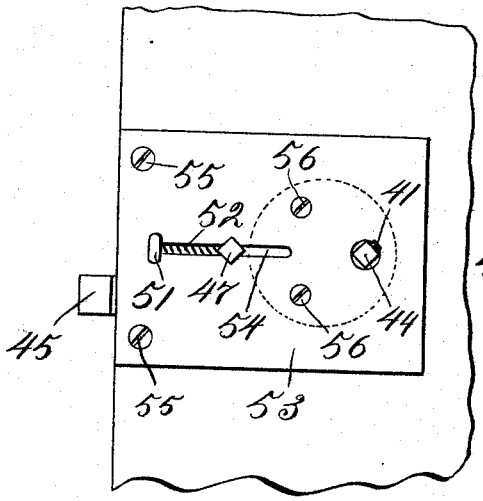
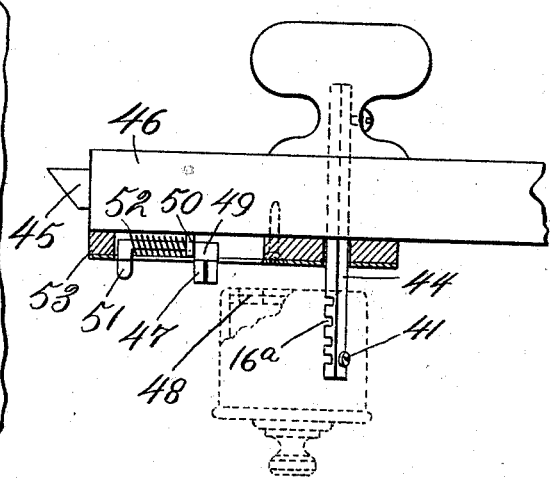


Fig. 5.



Witnesses:
Wm. F. Fleming
Robert E. Durand.

Inventor:
I. B. Rapaport.
by Elliott & Hopkins Attys.

UNITED STATES PATENT OFFICE.

ISADOR B. RAPAPORT, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO NATHAN COHN, OF SAME PLACE.

PERMUTATION-PADLOCK.

SPECIFICATION forming part of Letters Patent No. 526,740, dated October 2, 1894.

Application filed January 4, 1894. Serial No. 495,668. (No model.)

To all whom it may concern:

Be it known that I, ISADOR B. RAPAPORT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Locks, of which the following is a full, clear, and exact specification.

My invention relates to improvements in locks and more particularly to combination locks, and of this class the improvements have more especial reference to portable locks, such as padlocks, that may be carried from place to place, and applied to ordinary doors, &c.

The improvements have reference to the means by which the lock is secured to the door or to the thing to be locked, or to some part connected with the door; to the means by which the tumblers may be set without the aid of sight; to the means of changing the combination; to an attachment for indicating the time of day that the tenant or occupant of the room to which the lock is applied, will return, or giving other such information, and to certain other novel features of construction and arrangement hereinafter described.

The primary object of my invention is to provide a lock that may be applied interchangeably to an ordinary knob-latch such as that in a flat or mortise lock, for preventing the withdrawal of such latch; and to a suitable hook-like or curved hasp to adapt it for the uses of any ordinary padlock.

Another object of my invention is to enable the combination to be set by the sense of touch without the aid of sight.

A further object is to improve and simplify the means for altering the combination; and a still further object is to provide the lock with a dial or other indicator for giving certain information, and to prevent the movement of such dial while the lock is unlocked.

With these ends in view my invention consists in certain features of novelty by which the said objects and certain other objects hereinafter described, are attained, all as fully explained with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a vertical sectional view of my improved lock showing it equipped with a curved or hook-like hasp. Fig. 2 is a plan section taken on the line 2—2, Fig. 1. Fig. 3 is a similar section taken on the line 3—3 Fig. 1. Fig. 4 is a bottom view of the lock viewed from the under side in Fig. 1. Fig. 5 is an edge view of a door looking downward, illustrating the manner of applying my improved lock to the knob's spindle, the lock proper being indicated in dotted lines and certain attachments to the door being shown in section. Fig. 6 is a face view thereof, and Fig. 7 is a detail view of a modification hereinafter explained.

Like signs of reference indicate like parts throughout the several views.

Referring now more particularly to Figs. 1 to 3 of the drawings, 1 represents the shell or casing which is preferably formed integrally with one of its heads 2, through which passes the stem 3 of the tumbler actuating knob 4. Secured within this casing 1 by suitable means such as the screws 5 passing through the head 2, is a plate 6 upon which is formed a hollow journal 7 through which passes the stem 3, and upon this journal are mounted the rotary tumblers 8, 9, 10, which are provided with projecting pins or lugs 11 for communicating their movement to each other in setting the combination in the ordinary manner, the tumblers being held at a suitable distance apart by spacing rings or washers 12. Also formed upon or secured to the plate 6 to one side of the journal 7 is a sleeve 13 which constitutes a socket for one branch of the U shape hasp 14 when the hasp is used, or for the spindle of the knob when the lock is applied to a knob-latch as hereinafter described. This sleeve 13 is provided at a point opposite each of the tumblers with a recess 15 for admitting the edges of the tumblers as clearly shown in Figs. 1 and 2, and the end of the hasp which is inserted in this sleeve is likewise provided opposite the tumblers and coincident with the recesses 15, with notches 16 in which the edges of the tumblers engage and prevent the withdrawal of the hasp when the tumblers are scattered, the portions of the sleeve which project between the tumblers serving to relieve the tumblers of any damage that might otherwise result from endwise strain on the

hasp. The tumblers are of course provided in their edges with notches or gaps 17 which, when coincident with the sleeve 13 permit the hasp to be withdrawn.

The upper end of the stem 3 is provided with a square or prismatic portion 18 upon which is secured a disk or circular plate 19 which, if desired, may be equal in diameter to the tumbler so as to also serve as one of the tumblers. As a means of securing this disk 19 to the stem 3, I provide the disk with a central opening 20 as shown in Fig. 2, whose edges are notched or serrated so as to engage with the square corners of the portion 18 and thus prevent independent rotation of the disk. This disk is also provided with an annular series of perforations 21 through one of which depends a pin or lug 22. This pin or lug may be conveniently held in place by means of an arm or plate 23 having an enlarged opening 24 and fitting loosely around the upper extremity of the squared portion 18, and on the top of this may be arranged a washer 25 held in place by screw 26 threaded in the end of the stem 3; thus serving to hold the pin or lug 22 from displacement and at the same time holding the disk 19 in place on the squared end 18. The object in providing the series of perforations 21 is of course to permit the location of the pin 22 to be altered with reference to the index 27 on the knob 4 and thus alter the combination necessary to bring the notches 17 into coincidence with the hasp.

The purpose of the serrations in the central opening 20 in the disk 19, apart from holding the disk against independent rotation, is to provide for a wide range of alteration in the location of the notch 17^a in the disk 19 for the passage of the hasp, with reference to the index 27, so that the last number or turn of the combination required for bringing such notch 17^a into coincidence with the bolt may also be varied.

In order that the tumblers may be set in the proper arrangement for permitting the withdrawal of the bolt, without regard to the index 27 and the usual numbers on the lock shell or casing shown in Fig. 4, I provide the edge of the disk 19 with a number of notches 19^a and I arrange opposite the edge of such disk a depressible dog or stop 28 whose outer end protrudes through the shell or casing 1 and is held in its retracted position by means of a suitable spring 29 abutting against a flange 30, so that the operator by pressing upon this protruding end may force the inner end of the dog against the periphery of the disk, and as the notches coincide with it, it will enter them and check the rotation of the disk and the knob 4, the notches 19^a being preferably precipitous at their edges as shown in Fig. 2 so that the rotation of the disk cannot be continued until the thumb releases the dog. The notch 17^a however is much greater in extent than the notches 19^a, and consequently when it reaches the dog the operator will be enabled to distinguish it from the others and determine the exact position of the disk 19 with relation to the index 27. Hence when the combination is to be set through the aid of the sense of touch in this manner, the notch 17^a is taken as the starting point and from which point the disk 19 is turned the requisite distance to bring the notch 17 in the first tumbler 8 into coincidence with the hasp, this extent of revolution being determined by counting the notches 19^a as they pass and engage with the dog 28. When the first tumbler has been set the rotation of the disk 19 is reversed after the usual fashion until the notch 17 in the next tumbler 9 coincides with the hasp, the notches 19^a being counted as they pass the dog 28 to determine the extent of this second movement of the disk 19; and so on until the last tumbler 10 has been set and the notch 17^a in the disk 19 finally turned into coincidence with all of the notches 17.

If desired the spring for forcing the dog 28 in one direction may be caused to force the dog into engagement with the disk so as to enter the notches automatically and require to be withdrawn by the thumb instead of being forced into engagement by the thumb. In order to do this the dog may be made in the form of a bell-crank lever 28^a pivoted on a suitable bracket 31 and having one of its arms protruding through the side of the casing or shell, a blade spring 29^a being arranged to hold one arm of the lever normally in engagement with the periphery of the disk. The form first described however, is preferable for the reason that it is not desirable to have the dog engage with the disk at all times because it is not only inconvenient to hold it out of contact while the combination is being manipulated in the ordinary way by reference to the numbers on the casing, but the resulting noise is liable to lead to the discovery of the combination by unauthorized persons, and moreover the continual wear of the dog on the disk when the notches are made V-shape so as to permit the disk to be rotated without withdrawing the dog, soon obliterates the notches.

Interposed between the under side of the disk 19 and the upper one of the tumblers is a coil spring 32 having one end turned inward and engaging in a slot 33 in the hollow journal 7 so as to hold the tumblers 8, 9, 10, together with capability of yielding endwise on the journal.

The head 34 of the casing or shell 1 is secured in place by means of screws 35 passing therethrough and entering bosses 36 formed on the inner side of the shell. When the hasp is in place its ends pass through complementary openings or perforations in the head 34 in the ordinary manner and at such time the screws 35 are concealed by a shield 37 pivoted at 38 to the head 34, and having peripheral openings 39 for affording access to the screw heads when the shield is rotated a

sufficient distance. This rotation however cannot take place when the hasp is in place as shown in Fig. 1 because the short end of the hasp also passes through an opening in the shield 37 corresponding in size and shape with the opening in the head 34. It is desirable however that the hasp should not be entirely withdrawn from the lock but withdrawn just sufficiently to permit the staple or ring or other part confined by the hasp, to pass between its short end and the shell. To this end I provide the sleeve 13 with a longitudinal slot 40 in which engages a screw or stud 41 secured in the long end of the hasp, the slot 40 being of sufficient length to permit the short end of the hasp to rise clear of the shell. Hence the opening 42 in the shield 37 through which the permanently inserted end of the hasp passes is elongated as shown in Fig. 3 so that such shield may be rotated after the short end of the hasp is withdrawn, without entirely withdrawing the long end.

In order that the inner mechanism carried by the plate 6 may be removed without obstruction from the bosses 36 and the dog 28 and its bracket, the said plate is cut away as shown at 43 directly under the dog and is also cut away around the bosses 36 as clearly shown in Fig. 2.

In order that the lock proper may be employed at once as a knob for turning an ordinary knob-spindle of a knob latch and locking such latch against withdrawal, as before intimated, I make the sleeve or socket 13 angular in cross-section so that when the staple 14 is removed from the lock, the screw 41 being taken out for that purpose, the lock 20 may be inserted over one end of the knob spindle 44 which may be like an ordinary knob spindle but must of course be provided with the notches 16^a for engagement with the tumblers of the lock and also with the screw 41 for preventing the lock from being entirely withdrawn from the spindle.

It is readily seen that when the lock is in place on the spindle the same may be used as an ordinary door knob for withdrawing the latch 45, but in order that it may not be turned as a knob I provide some part of the door 46 or other surface in which the knob spindle is journaled, with a fixed lug 47 which is so arranged as to engage in a recess or socket formed in the shell or casing of the lock when the latter is forced inward toward the door and the tumblers are scattered.

The lug 47 may be so arranged that the perforations 48 in the shield 37 and head 34 of the shell may serve as a socket or recess for the engagement of such lug, the lug being square or angular or complementary in shape to the short end of the hasp 14 which, for the sake of uniformity, is of the same formation as the long end of the hasp and the spindle 44.

The lug 47 is formed on or secured to a bar 49 passing through an ear 50 between which latter and the thumb piece 51 is arranged a spring 52 for holding the lug normally retracted or withdrawn from the lock so that when the tumblers are set and the lock is pulled outward on the stem 44 the lug 47 will immediately recede from under the lock and permit it to be again forced inward if desired, and the tumblers scattered so that mischievous persons may not have an opportunity to lock the door on the outside. The lug 47 and its connected parts are mounted in a special escutcheon 53 having a slot 54 through which the shanks of the lug 47 and thumb piece 51 project. This escutcheon 53 is secured to the door by screws 55, 56, the latter being arranged so as to be covered by the lock and thus prevent the escutcheon being rotated with the lock and spindle 44.

It is often found desirable to leave on an outer office door some indication of the time when the occupant of the office will return. Heretofore clock dials provided with hands and other such devices have been employed, but mischievous persons not unfrequently, alter these devices after they have been set and thus destroy their usefulness. In order therefore that such a device may be employed and automatically held against movement while the lock is locked, I provide the outer end of the shell or casing with a rotatable dial 57 whose outer edge may be milled and protrude slightly beyond the periphery of the lock shell so as to be rotated by the thumb and fingers. This dial may be conveniently held in place on the shell by means of a central plate 58, which is secured to the shell by the screws 5 and is provided with a salient or beveled edge which overlaps a complementary bevel on the inner edge of the dial 57, the numbers corresponding to the positions of the tumblers being indicated on the plate 58 and also standing for the hours of the day, and the dial or indicator 57 being provided with an index 59 adapted to register with any of such numbers and also bearing a part of the information to be communicated as indicated in Fig. 4. In order that this dial or indicator 57 may be held against movement when either the hasp 14 or the spindle 44 is in place, I provide the inner side of such dial with a series of sockets or indentations 60, and I arrange immediately under the sleeve or socket 13 a spring dog which is adapted to be forced into engagement with these sockets 60 by the spindle or hasp when inserted to the full extremity of its inward movement. This spring dog may consist of a pin 61 secured to a spring 62 which is arranged in a suitable recess in the bottom of the plate 6, and secured to such plate by means of a screw 63, the normal tendency of the spring being to withdraw the pin 61 from engagement with the sockets 60.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A combination lock having in combination the tumblers and the part which said

tumblers are designed to secure, a tumbler-actuating stem having an angular portion, a notched disk or member having a toothed or serrated aperture through which said angular portion passes, a lug projecting from one side of said disk and adapted to impart movement to the tumblers, and a dog arranged to engage the notches of said disk, substantially as set forth.

2. A combination lock having in combination the tumblers and the part which said tumblers are designed to secure having recesses or notches in which said tumblers engage, a sleeve for the reception of said part also having recesses for admitting the tumblers, substantially as set forth.

3. A combination lock having in combination the tumblers and the part which said tumblers are designed to secure having notches or recesses in which said tumblers engage, a slotted sleeve for the reception of said part, also having recesses for admitting the tumblers, and a stud on said part for limiting its movement in the sleeve, substantially as set forth.

4. A lock having in combination a shell or casing, the plate 6 arranged in said shell, devices for securing said shell and plate together, the tumbler-actuating knob covering said devices, the tumblers carried by said plate, a sleeve carried by said plate and having recesses for admitting the edges of the tumblers and for receiving the movable part of the lock, substantially as set forth.

5. A lock having in combination the tumblers and the part to be secured thereby, a shell or casing provided with a removable head having an opening therein for the insertion of the part to be secured by the tumblers, devices for holding said head in place, a shield for covering said devices having an elongated slot coinciding with said opening, and means for holding said shield against movement while the lock is locked, substantially as set forth.

6. The combination of a knob spindle, tumblers for engaging with said spindle, a shell having a socket for said spindle and adapted to move lengthwise thereon and to rotate the same, and means for preventing the rotation of said shell when the latter is forced inward on said spindle, substantially as set forth.

7. The combination of an angular knob spindle having recesses or notches, tumblers for engaging with said spindle, a shell having an angular socket for said spindle and adapted to rotate the same, and means for locking said shell against rotation, substantially as set forth.

8. The combination with a knob-latch spindle and the door or other surface in which it is journaled, of a stud projecting from said door or surface, a lock-shell having sockets for said spindle and stud respectively, and means for removably securing said shell over said spindle and stud, substantially as set forth.

9. The combination with a knob-latch spindle and the door or other surface in which it is journaled, of a stud secured to said door or surface, a lock shell having sockets for said spindle and stud respectively, said stud being movable to and from said shell, and means for removably securing said shell over said stud and spindle, substantially as set forth.

10. The combination with a knob-latch spindle and the door or other surface in which it is journaled, of a stud secured to said door or surface, a lock-shell having sockets for said spindle and stud respectively, said stud being movable to and from said shell, a spring for automatically shifting said stud away from said shell, and means for removably securing said shell over said stud and spindle, substantially as set forth.

11. The combination with a knob latch spindle and the door or other surface in which it is journaled, of a stud secured to said door or surface, a lock shell secured on said spindle with capability of moving endwise thereof but incapable of independent rotation, means for limiting the said endwise movement of said shell, said shell having a socket or recess for the reception of said stud, and means for removably securing said shell over said stud and spindle, substantially as set forth.

12. The combination of a lock-shell, a rotary dial or indicator secured to said shell and having indentations or sockets, a dog arranged in said shell for engaging in said sockets, and a removable part of the lock adapted to press said dog into engagement with said sockets when the lock is locked, substantially as set forth.

ISADOR B. RAPAPORT.

Witnesses:
F. A. HOPKINS,
EDNA B. JOHNSON.