

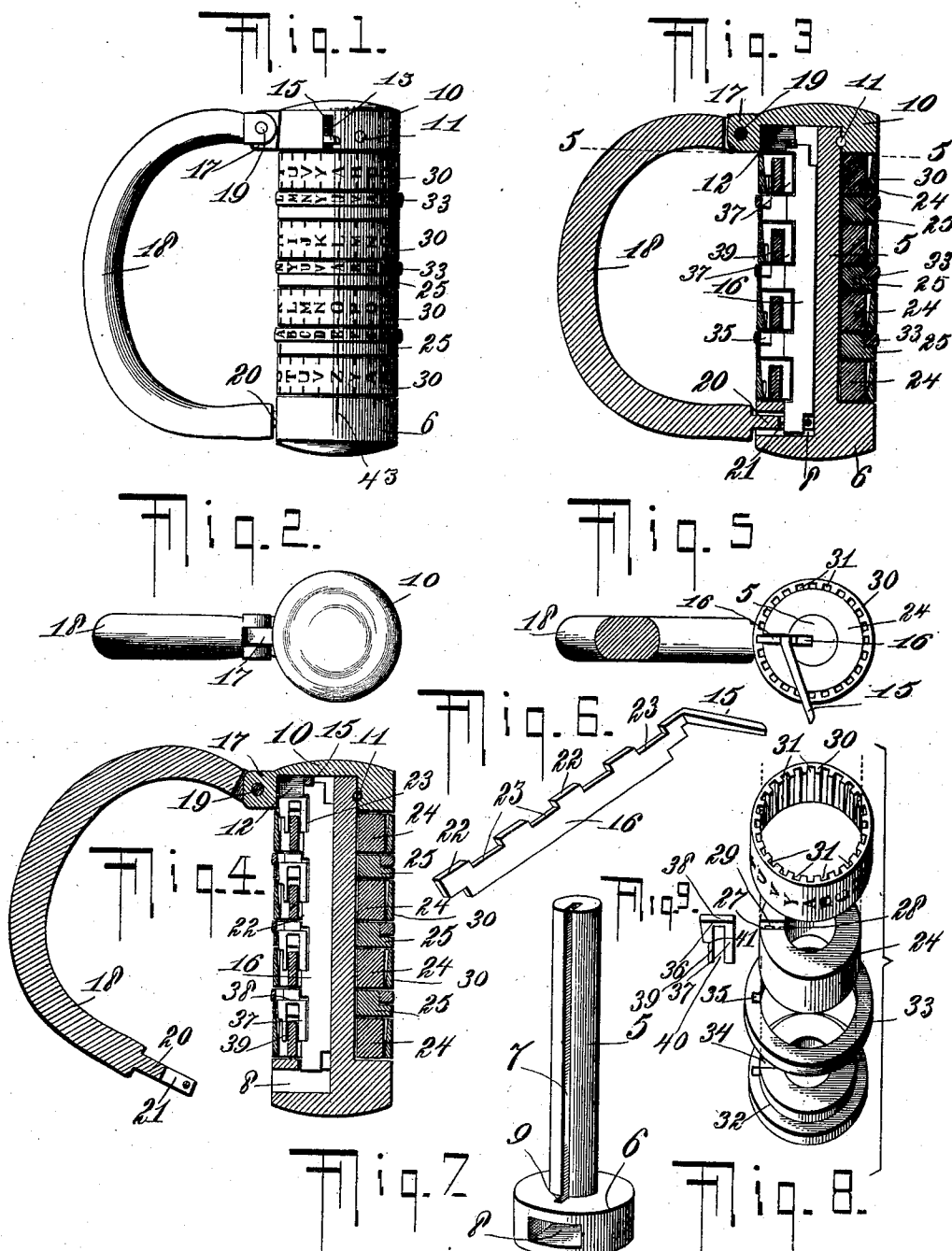
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Patented Oct. 28, 1902.

A. NADEAU.
PERMUTATION PADLOCK.

(Application filed July 21, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PERMUTATION-PADLOCK.

SPECIFICATION forming part of Letters Patent No. 712,084, dated October 28, 1902.

Application filed July 21, 1902. Serial No. 116,315. (No model.)

To all whom it may concern:

Be it known that I, ALPHONSE NADEAU, a subject of His Majesty the King of Great Britain, residing at South Point, Anticosti Island, Province of Quebec, Canada, have invented certain new and useful Improvements in Permutation-Padlocks; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in permutation-padlocks of that class intended to be used on freight-car doors and in all other places where it is usual to employ a staple and hasp or other means for the reception of the shackle which forms an integral part of the padlock.

The common permutation-padlock found on the market is open to the objection that the purchaser or owner thereof cannot conveniently change the combination in case it becomes known to unauthorized persons. Although various expedients have been resorted to in order to overcome this defect, I have sought to solve the problem by the provision of a simple construction which may be manipulated to change the combination at any time by the owner or user having knowledge of the secret or private workings of the structure, such change of combination being easily performed without taking the lock apart, but not being capable of attainment by any one not having knowledge of the secret or private word, phrase, numbers, or other characters.

Further objects and advantages of the invention will appear in the course of the subjoined description, and the novel features will be defined in the claims.

In the drawings hereto annexed, forming a part of this specification, Figure 1 is a side elevation of a permutation-padlock embodying my invention and showing the shackle in its closed or locked position. Fig. 2 is a top plan view of the padlock shown by Fig. 1. Figs. 3 and 4 are central longitudinal sectional views through the padlock and showing the parts in their locked and open positions, respectively. Fig. 5 is a sectional plan view in the plane of the dotted line 5 5 of Fig. 3. Fig. 6 is a detail perspective view of the locking-

bolt removed from the padlock. Fig. 7 is a detail perspective view of the core or spindle detached from the padlock. Fig. 8 is a detail perspective view of one of the collars, a supplementary tumbler, a rotatable tumbler, and a shiftable sleeve, respectively. Fig. 9 is a detail perspective view of one of the keys.

The same numerals of reference denote like parts in all the figures of the drawings.

In carrying my invention into practice I employ a cylindrical core or spindle 5, which is provided at one end with a permanent head 6, the latter being in the form of a disk integral with the spindle or core. A longitudinal slot or recess 7 is formed in the spindle to open through one side thereof, and in the permanent head is formed a chamber 8, the same having communication with the slot 7 of the core by means of the opening 9. (See Fig. 7.) The removable head 10 of the padlock is fitted to the otherwise free end of the core or spindle 5, and this removable head is secured firmly in place by a transverse fastening-pin 11, the latter passing through an opening in the head and an opening which is formed in the core or spindle 5 at one side of the slot or recess 7 therein, although other means may be resorted to for the purpose of separately attaching the head 10 to the core. This head is formed with a radial recess 12, which is adapted to aline or coincide with the slot or recess 7 of the core. It is furthermore provided with a recess 13, which communicates with the central cavity of the head and which recess 13 is adapted to accommodate the angular operating-arm 15 of the slidable locking-bolt 16, whereby said angular operating-arm may project outside of the lock, and access may easily be obtained thereto. Furthermore, the removable head 10 is provided with an offstanding lug 17, to which is pivoted the shackle 18 by means of the pivot-pin 19. The free end of the shackle is reduced to form the lug 20, which is provided with a slot 21, and this slotted lug is adapted to fit into the chamber 8 of the permanent head 6, so that the slot 21 of said lug will lie in alinement with the opening 9 of the head and the longitudinal slot or recess 7 in the core or spindle 5, thus making provision for the end of the locking-bolt 16 to pass through the opening 9 and enter the slot 21 of the shackle, as

clearly shown by Fig. 3, whereby the slidable bolt may have interlocking connection with the shackle to prevent the latter from turning on its pivot 19 and opening the lock.

5 The locking-bolt 16 is arranged longitudinally of the core or spindle 5 and is received in the slot or recess 7 thereof, the parts being snugly fitted together, so that the locking-bolt will be free to have the desired slidable
10 play or movement. The depth of the locking-bolt is practically the same as the depth of the slot 7 in the core, so that the bolt proper will be flush with said core; but said bolt is provided with a series of lugs 22, which are
15 spaced equidistant and forming a series of intermediate notches 23. The lugs increase the width of the locking-bolt in the intervals between the notches, and hence said lugs are adapted to extend beyond the cylindrical sur-
20 face of the core. The operating-arm 15 extends from the lug at one end of the bolt; but the lug at the other end of the bolt is adapted to pass through the opening 9 and the chamber 8, so as to have engagement
25 with the slotted lug 20 of the shackle. (See Figs. 4 and 6.)

24 designates a series of rotatable tumblers which are separated one from the other by a series of collars 25, said tumblers and collars
30 being slipped on the core or spindle one after the other, so as to occupy a compact relation between the permanent and removable heads 6 10, respectively, as clearly shown by Figs. 1, 3, and 4. The collars 25 are interposed
35 between the tumblers so as to separate the latter one from the other, and these tumblers and the collars are of peculiar construction, so as to have coöperative relation to a series of keys and to the notches and lugs of the
40 slidable locking-bolt. Each rotatable tumbler is provided on its outer periphery with a groove 27, on its inner periphery with a groove 28, and in one face with a groove 29, that serves to connect the two grooves 27 28.
45 With each rotatable tumbler 24 of the series is associated a shiftable sleeve 30, the same being provided on its inner periphery with a continuous series of grooves 31. This shiftable sleeve has a smooth external surface,
50 which is inscribed or otherwise indelibly impressed with the letters of the alphabet, so that the series of sleeves may be set or adjusted to produce a word, phrase, &c., which will constitute the combination of the pad-
55 lock.

Each collar 25, which is interposed between the two adjacent tumblers and the shiftable sleeves therein, is reduced for a part of its length by the formation of an annular groove
60 32, the same provided with a bearing-shoulder on one side of the collar, which shoulder is adapted to receive the supplementary tumbler 33. The collar 25 and its bearing-shoulder are provided with a transverse notch or
65 slot 34, adapted to coincide or register with the grooves 27, 28, and 29 in the rotatable tumbler and with one of the grooves 31 in the

shiftable sleeve 30. The supplementary tumbler 33, one of which is associated with each collar 25 of the series, is also provided with a
70 transverse notch 35, the latter adapted to register with the notch 34 in the bearing-shoulder and the collar 25.

36 designates the series of keys which are adapted to be temporarily seated in the
75 notches 23 of the locking-bolt and are adapted to lie between the lugs 22 thereof, said lugs serving to impart endwise adjustment to the keys when the locking-bolt is given its slidable adjustment by the operator applying
80 pressure against the exposed arm 15 of said bolt. Each key is made in a single piece of metal in the form shown more clearly by Figs. 3, 4, and 9, and each key consists of the shank 37, the head 38, and the arm 39, said arm and
85 the shank being separated by an intervening slot 40, and the arm being cut away to produce the shoulder 41, the free end of the arm being considerably thinner than that part of the arm which is joined to the head 38. The
90 shanks 37 of the series of keys are adapted to rest snugly in the notches and between the lugs of the bolt 16, so that the shanks will be received in the inner grooves 28, which are provided in the series of tumblers, while the
95 heads 38 of the series of keys are adapted to occupy the vertical grooves 29 of the tumblers or the vertical grooves 34 of the collars, and, finally, the arms 39 of the series of keys are adapted to enter the outer peripheral
100 grooves 27 of the tumblers, the inner grooves 31 of the shiftable sleeves, or the grooves 34 35 of the collars, and the supplementary tumblers.

Assuming that the several parts of the pad-
105 lock shall have been properly assembled together, the parts occupy the position shown by Fig. 4 when the lock is opened. By reference to this figure it will be seen that the shackle is raised, that the bolt 16 is drawn
110 backwardly into the cavity of the removable head 10, so as to free the other end of the bolt from the slotted lug of the shackle, and that the lugs 22 of the bolt shall have forced the series of keys partly into the notches 34
115 of the series of collars 25, thereby partly withdrawing the thin ends of the arms 39 of the keys from engagement with the grooves 31 of the shiftable sleeves 30. These sleeves are not entirely free from restraint by the series of
120 keys, and said sleeves cannot be turned freely on the series of tumblers, the latter and the series of collars being kept in stationary positions because they are engaged by the keys. The keys serve to connect the tumblers and
125 the sleeves together, and each tumbler and its sleeve may be turned on the core until the sleeves of the series bring the letters "z o l a" into proper alinement, as shown by Fig. 1, and thereby form the combination-word. The
130 lock may be applied to a door or other place by adjusting the shackle through a staple or other part, after which the slotted lug of the shackle should be thrust into the chamber 8

of the permanent head. The operator now applies pressure to the arm 15, so as to shove the locking-bolt 16 along in the slot 7 of the core and make the free end of said bolt engage with the lug of the shackle. This operation changes the positions of the series of keys 36, so that the arms 39 thereof will be moved more thoroughly into locking relation with the shiftable sleeves and said keys will be withdrawn from engagement with the series of collars, thus making the sleeves and the tumblers fast one with the other and disconnecting the keys and the tumblers from the spacing-collars. At this time the lugs 22 of the bolt lie in the heads and in the collars of the padlock, while the keys will serve to connect the tumblers and the sleeves together, as before described, thus permitting the tumblers and the sleeves to rotate freely around the core, whereby the keys will be shifted with the connected tumblers and sleeves and bring the keys out of coincidence with the notches 34 in the collars. The tumblers thus lie in the path of the lugs on the locking-bolt and prevent the latter from being moved so as to disengage the bolt from the shackle, and the lock will remain in the closed position shown by Fig. 3. The collars normally occupy a stationary position in the lock, but the supplementary tumblers 33, as well as the tumblers 24 and their sleeves, may be turned freely. To open the lock, the connected sleeves 30 and the tumblers 24 should be rotated on the core until the proper letters to form the combination-word "zola" are brought into registration, thus adjusting the series of sleeves in alinement with the notches 34 in the collars, whereby the bolt can be withdrawn and the series of keys will be moved partly from engagement with the tumblers and into the notches 34 of the collars. The bolt 16 is thus free from the shackle; but the keys do not move far enough to disengage them from the shiftable sleeves nor from the tumblers, the movement of the keys being limited by the supplementary tumblers 33, which have their notches 35 out of alinement with the notches 34 in the collars. The lock may thus be opened and closed by manipulating the tumblers which are connected by the keys with the sleeves and by giving end-wise adjustment to the bolt, which imparts like adjustment simultaneously to the series of keys, and this opening and closing of the lock can be performed without manipulating the supplementary tumblers.

In order to change the combination word or phrase, the owner or proprietor of the lock is furnished with a secret or private word, which is formed by the letters, characters, or numerals which are provided on the external surface of the series of supplementary tumblers 33, and in the example shown by Fig. 1 this secret or private word is formed by the letters "e a u," the same indicating the notches 35 in the supplementary tumblers. By adjusting the supplementary tumblers so

that the letters "e a u" thereon will be in alinement with the registering combination word "zola" and the index-mark 43 on the lock the supplementary tumblers are moved into positions for the notches 35 thereof to coincide with the notches 34 in the collars. The slidable bolt may now be drawn backward to its full limit, and the series of keys may be adjusted to pass into the notches 34 in the collars and the notches 35 in the supplementary tumblers, thereby disengaging the arms 39 of the keys from the grooves 31 of the sleeves. The sleeves may now be turned on the tumblers 24, so as to change the combination, after which the bolt should be shoved back in order to restore the operative connection of the keys to the tumblers and their sleeves and to free the keys from engagement with the supplementary tumblers 33.

Although I have shown and described the sleeves and the supplementary tumblers as provided with alphabetical letters, it will be understood that numerals or other indicating characters may be employed in lieu thereof.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described my invention, what I claim as new is—

1. A permutation-padlock provided with a series of tumblers, a bolt, a series of keys controlled by the bolt, and means substantially as described whereby the combination may be changed without taking apart the lock, substantially as set forth.

2. A permutation-padlock comprising a series of tumblers each having a shiftable sleeve, a series of keys normally connecting the tumblers and their sleeves together, a bolt, a series of collars, and supplementary tumblers adapted to prevent the keys from disengagement with the tumblers and the sleeves, substantially as described.

3. A permutation-padlock comprising a series of tumblers each having a shiftable sleeve, a bolt, a series of keys having operative relation to the bolt to be shifted thereby and each key normally connecting one tumbler and its sleeve in fast relation one to the other so as to be rotatable therewith, and a series of supplementary tumblers interposed between the sleeves and their tumblers and arranged to lie in the path of the keys, substantially as described.

4. A permutation-padlock comprising a series of notched tumblers each having a shiftable grooved sleeve, a notched locking-bolt, a series of notched collars interposed between the tumblers, a series of keys fitted to the tumblers and their sleeves and having operative relation to the bolt to be shifted there-

with at certain periods and also adapted to rotate with the tumblers and sleeves at other periods, and notched supplementary tumblers fitted to the collars to lie in the path of the keys, substantially as described.

5 5. A permutation - padlock comprising a grooved core, the heads, a shackle, a notched bolt fitted in the groove of the core, a series of notched tumblers, a series of grooved
10 sleeves each fitted in one of the tumblers, a series of notched collars between the tumblers and each having a reduced portion, keys normally fitted into interlocking rela-

tion to the tumblers and their sleeves and adapted to be seated in the notched portions 15 of the bolt to be movable endwise therewith, and notched supplementary tumblers fitted on the reduced portions of the collars, substantially as described.

In witness whereof I have hereunto set my 20 hand in the presence of two witnesses.

ALPHONSE NADEAU.

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