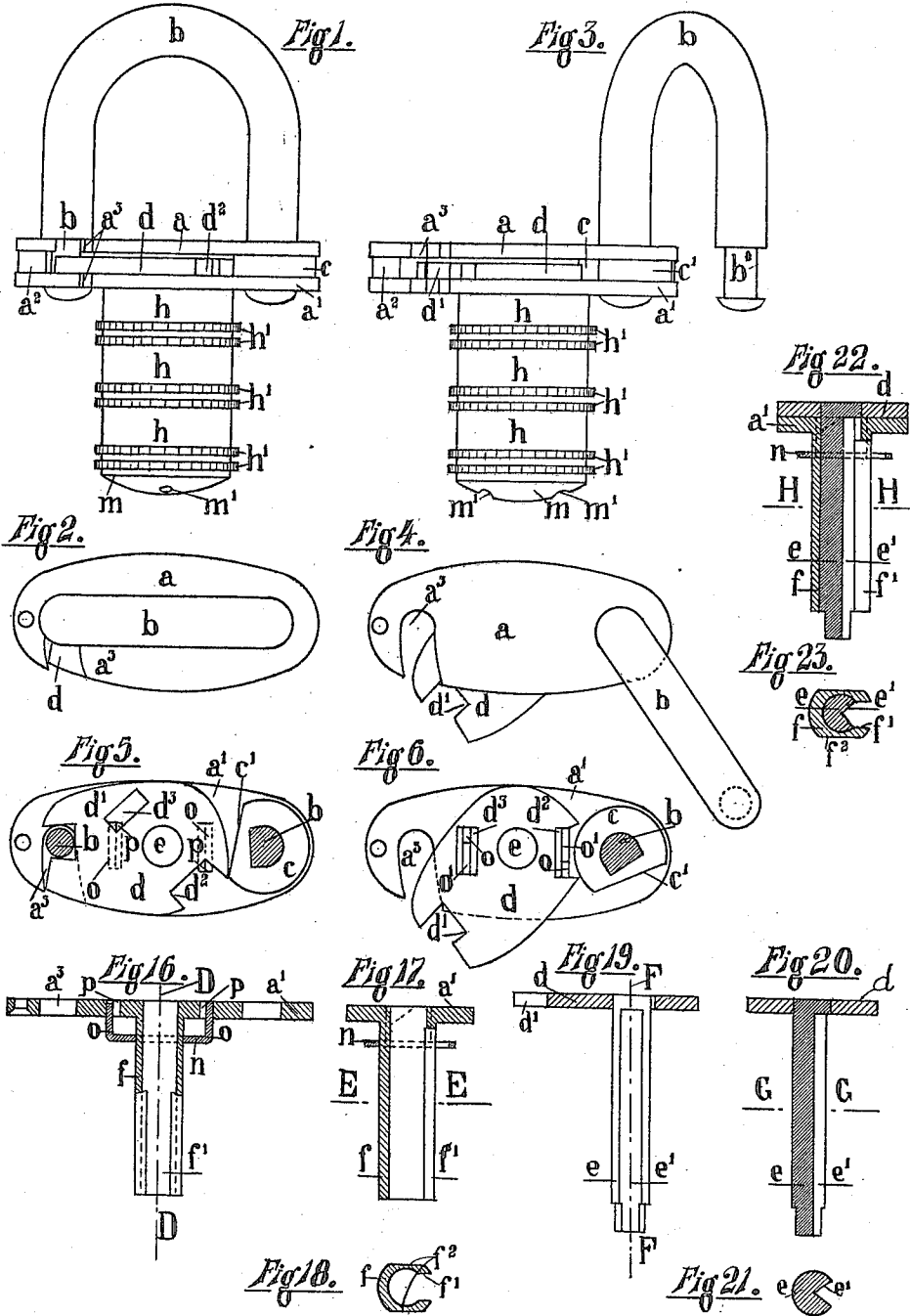


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 PERMUTATION PADLOCK.
 APPLICATION FILED APR. 27, 1914.

1,222,082.

Patented Apr. 10, 1917.

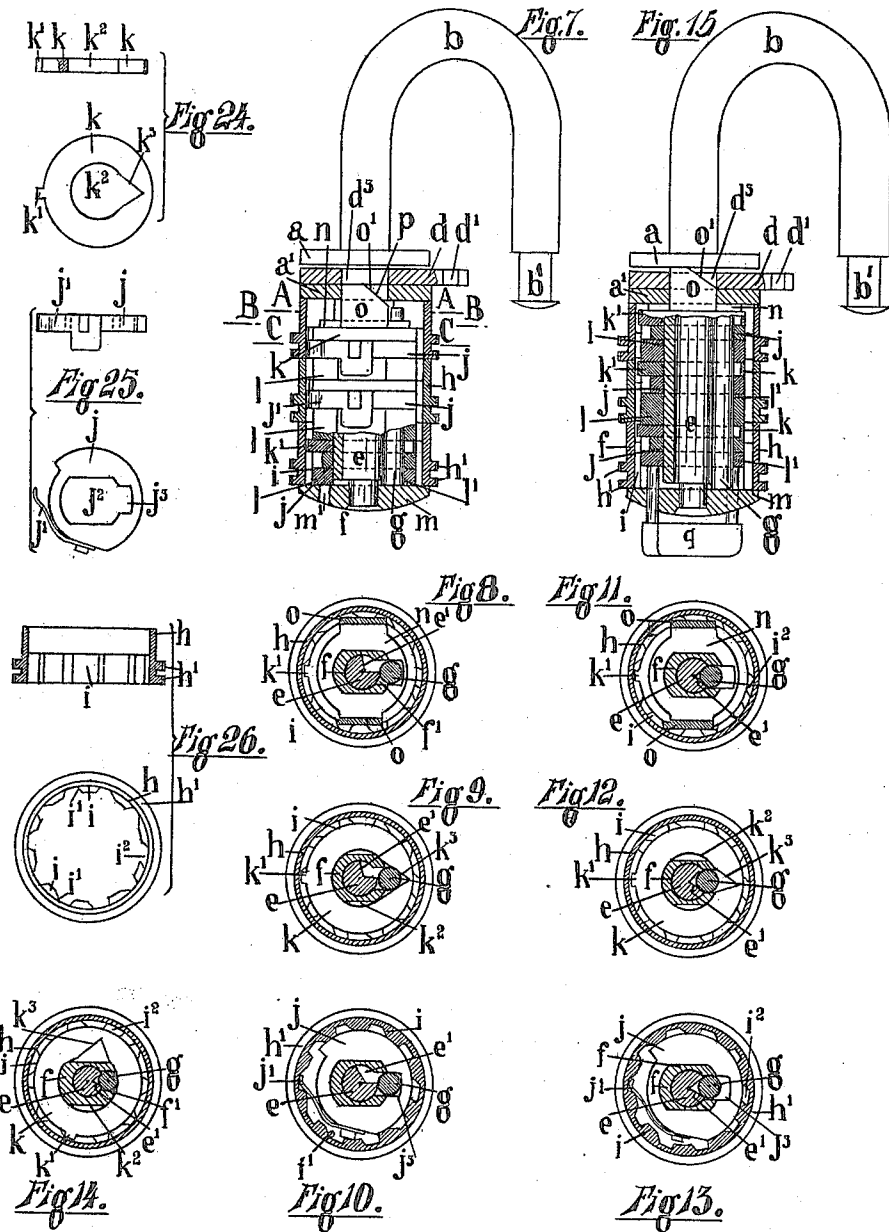
2 SHEETS—SHEET 1.



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PERMUTATION-PADLOCK.

1,222,082.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EUGÈNE MAURICE OCTAVE DESCALLES, manufacturer, a subject of France and resident of Paris, in the Republic of France, have invented certain new and useful Improvements in and relating to Permutation-Padlocks; and I do hereby declare the following to be 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, reference being had to the accompanying drawings, and to letters or figures of reference marked therein, which form a part of this specification.

This invention relates to securing means of the type known as permutation padlocks, in which the opening of the bow or shackle of the padlock can only be effected when the movable members are brought into a position corresponding to a predetermined number or word, the combination of the numbers and words being adapted to be varied as desired.

In padlocks of the type described a certain number of superposed rings are adapted to turn independently of one another and are intended to operate members the position of which permits of the opening or closing of the padlock.

My invention consists in providing securing means of the type described with means for locking or releasing the bolt plate, arresting or retaining the bow or shackle, comprising a single metal rod which opposes the rotary movement of a spindle integral with the said bolt plate, and which can actuate and release the said spindle when the number or word has been formed by the suitable rotation of the combination rings.

In the accompanying drawing a preferred embodiment of my invention is illustrated, in which:

Figure 1 shows the padlock closed, in elevation.

Fig. 2 is a plan thereof.

Fig. 3 shows the same padlock in open position.

Fig. 4 is a plan thereof.

Figs. 5 and 6 are two horizontal sections of the padlock showing the position of the bolt plate when the padlock is closed and open, respectively.

Fig. 7 is a vertical section through the

padlock showing the position of its various members when the bow is open.

Figs. 8, 9 and 10 are three horizontal sections, taken on lines A—A, B—B, and C—C of Fig. 7 respectively.

Figs. 11, 12 and 13 are similar sections showing the position of the members at the moment where the desired number or word is formed.

Fig. 14 shows the position of these members when the combination has failed.

Fig. 15 is a vertical section through the padlock showing the parts in the position assumed when the combination has been changed.

Fig. 16 is a longitudinal vertical section through a sleeve integral with the stationary part of the padlock, permitting of the displacement of the arresting rod.

Figs. 17 and 18 are a vertical section and a horizontal section, respectively, through the same member, taken on lines D—D, of Fig. 16, and E—E of Fig. 17.

Fig. 19 is a separate view of the arresting bolt plate and its spindle.

Figs. 20 and 21 are two sections of the same member taken on lines F—F of Fig. 19, and G—G of Fig. 20, respectively.

Fig. 22 is a vertical section through the spindle of the bolt plate engaged in the sleeve shown in Fig. 17.

Fig. 23 is a horizontal section taken on line H—H of Fig. 22.

Figs. 24 and 25 show in elevation and plan, respectively, the members permitting of establishing the combinations.

Fig. 26 shows in vertical section and plan, one of the combination rings.

Referring to the drawing, a padlock constructed according to my invention comprises two metal plates *a* and *a'* spaced one above the other. These two small plates are connected by a rivet or screw engaged in a washer *a²* and by one of the ends of the bow *b* of the padlock.

The other end of the bow *b* has a reduced extension *b'* adapted to engage the notches *a³* of the plates *a* and *a'* and the notch *d'* of the bolt plate *d* which is arranged between the plates *a* and *a'*. This bolt plate is integral with a vertical spindle *e* formed with a groove *e'*. This spindle turns in a sleeve *f* fixed on the lower surface of the plate *a'*; and which is formed with a slot *f'*

the width of which is equal to the groove e' in the spindle e and which groove is opposite the slot f' when the padlock is closed. The arresting or locking of the bow in the closed position is effected by means of a rod g which is located in the slot f' and in the groove e' .

On the sleeve f are threaded the parts of the mechanism forming three groups each comprising three members, to wit: first a metal ring h adapted to be rotated by means of a milled flange h' and formed with internal teeth i each having an inclined portion i' , except one which forms a notch i^2 at an acute angle (see Figs. 11 and 26); second a member j mounted within the ring h and formed with an opening j^2 permitting it to slide, without rotating on the sleeve f which at this end is formed with two plane sides f^2 . The curved end of a spring j' secured to the member j engages between the teeth i of the ring h . Third, an arresting plate k provided with an opening k^2 having a notch k^3 and adapted to rotate on the sleeve f and formed with a tooth k' adapted to engage between two teeth i , of ring h .

These three groups are separated by the washers l threaded on the sleeve f and which are held against rotation and are each formed with a notch l' . All these members are maintained by plate m secured to the lower end of the spindle e .

The operation of the lock is as follows:—

In order that the bow may be opened it is necessary that the selected number should be formed. Assuming that this number is 123, the rings h are first of all brought to the position O. To this end, the rings are successively turned from the left to the right. The spring j' of the member j provided within each ring opposite the teeth i formed on the latter, slides on the inclined portion i' of the teeth and drops into the free spaces provided between these teeth, producing successive shocks or clicks which are heard quite clearly and which permit of counting very easily the number of teeth over which the spring j' has passed.

Each ring h turns until the end of the corresponding spring engages the notch i^2 . The spring cannot pass over the straight edge of this notch so that the ring h is arrested. This position corresponds to the position O.

When the three rings are thus brought to O, and in order to form the aforesaid number 123, the upper ring is turned from the right to the left so as to obtain the digit 1. This digit is formed by the spring j' which passes over the first tooth of the said ring and drops into the notch between this tooth and the next, producing a readily perceptible shock, as has been stated before. The two other digits of the said member are obtained in the same manner by turning suc-

cessively the other two rings so that their respective springs pass one over two teeth and the other over three teeth i .

When the desired number has thus been formed, the plates k which have been operated owing to the engagement of the tooth k' with which they are formed, by the teeth of the said rings, are arranged in such a manner that their notches k^3 are opposite the slot f' , that is to say opposite the arresting rod g as shown in Fig. 12. Furthermore, the notches j^3 of the spring controlled members j and those l' of the washers l are in the same position, that is to say opposite the slot f' of the sleeve f (Figs. 11 and 13).

When the parts are in this position it is possible to open the padlock which is effected by exerting a lateral tractive effort on the branch of the bow b engaged in the notches a^3 of the small plates a and a' so as to move the bow out of the notches. The effect of this movement is to operate or move the arresting bolt plate d into the notch d' in which the end of the bow b is also engaged. The spindle e of this bolt plate turns in the stationary sleeve f . As soon as this rotary movement begins, the angle of the groove e' formed in the spindle e exerts a pressure on the rod g . Owing to the shape and depth of this groove, the said rod is pushed back and engages the notches j^3 , k^3 , and l' of the members j , k , and l , these notches being placed opposite one another, as shown in Figs. 8 to 10.

The spindle e of the bolt plate d can therefore turn in the sleeve f thus permitting the said bolt plate to be brought into the position shown in Fig. 6. The bow b has then left the notches a^3 and can also leave the notch d' of the bolt plate d so as to be brought into the position shown in Figs. 3 and 4.

When the bow b is in that position, the rounded-off portion of the washer c mounted upon the bow b and actuated by the latter, is engaged in the notch d^2 of the bolt plate d and is retained by the external edges of this notch so that the said bolt plate is arrested in its opening position shown in Fig. 6.

This bolt plate can only be released when the bow b is turned to close the padlock, and when the flattened portion c' of the washer c is opposite the notch d^2 .

The bow b which then engages the notch d' of the bolt plate, actuates the latter and brings it into the closed position shown in Figs. 1, 2 and 5. The rod g remains engaged in the notches j^3 , k^3 and l' and in the slot f' of the sleeve f , but the groove e' of the spindle e is located opposite the said slot.

In order to prevent the opening of the padlock all there is to do now is to destroy the combination by turning any of the rings

5 *h*. As soon as one of these rings is turned, the plate *k* engaged therein is moved there-
 with by its tooth *k'*. The edge of the notch
 10 *k*³ of this plate pushes the rod *g* back which
 penetrates the groove *e'* of the spindle *e* and
 places itself in the position enabling the said
 15 plate to turn around the sleeve *f*. As soon
 as the notch *k*³ of the plates *k* does not cor-
 respond with the slot of this bolt it is im-
 possible to turn the spindle *e* which is ar-
 20 rested by the said plates, as shown in Fig.
 14. The bolt plate *d* integral with this
 spindle therefore cannot move and retains
 the bow *b* in the closed position until the
 25 moment the number corresponding to the
 combination selected has been formed again
 in the above-described manner.

The combination is changed in the follow-
 ing manner:—

20 As has been stated above, the spring con-
 trolled members *j*, the plates *k* and the
 washers *l* are superposed within the cavity
 formed by the rings *h* so as to constitute a
 block. In normal condition, this block bears
 25 with its upper part on the washer *n* which is
 threaded onto the sleeve *f* and formed with
 lugs *o* bent at right angles and therefore dis-
 posed vertically, as shown in Figs. 7, 8, 11
 and 15.

30 The upper edge of each of these lugs is
 formed with an inclined portion *o'* and is
 engaged in an aperture *p* formed in the
 lower small plate *a'* (Figs. 5 and 6).

35 In normal condition, the uppermost por-
 tion of the lugs *o* touches lightly the upper
 edge of the small plate *a'* and when the pad-
 lock is open and the arresting plate *d* has
 been displaced, the notch *d*² and the aper-
 40 ture *d*³ of the said bolt plate locate them-
 selves opposite the apertures *p* of the plate
a' (Fig. 6).

In order to change the combination, it is
 necessary that the bow of the padlock should
 45 be in the open position and therefore that
 the arresting rod should have been pushed
 back into the notches of the members *j*, *k*
 and *l* as has been stated above.

The padlock being in this position, the
 50 members or prongs of a fork *g* are intro-
 duced, as shown in Fig. 15, into the two
 apertures *m'* of the lower plate *m*, so that
 the ends of these members should come into
 contact with the lower washer *l*. If a cer-
 55 tain amount of pressure is exerted on this
 fork *g*, all the members *j*, *k* and *l* will be
 pushed back and slide along the bolt *f*. In
 this movement the lugs *o* of the washer *n*
 being placed opposite the notch *d*² and the
 60 aperture *d*³ of the arresting bolt plate, will
 engage these apertures and will come into
 contact with the inner face of the upper sta-
 tionary plate *a* (Fig. 15).

65 Owing to this displacement of these mem-
 bers *j*, *k* and *l*, the tooth *k'* provided on the
 edge of each plate *k*, abandons the teeth of

the corresponding ring *h* so that it is pos-
 sible to turn this ring without thereby actu-
 ating the plate *k*.

The spring *j'* of each member *j* remains
 engaged in the teeth of the rings so that by
 70 turning the latter, the said springs will be
 caused to pass over the teeth *i*. The rings
 are then brought back to the O position, and
 if, for instance, the springs of three rings *h*
 are caused to pass over four teeth by a suit-
 75 able rotation of these rings, the new com-
 bination number will be 444.

When this new number is thus obtained,
 the bow *b* will be closed, the effect of this
 movement being to actuate the arresting
 80 plate *d*. In this movement, the lower edge
 of the notch *d*² and of the aperture *d*³ of
 the said arresting bolt plate, will engage the in-
 clined portions *o'* of the lugs *o* integral with
 the washer *n*, and push the said lugs back.
 85 The washer *n*, in turn pushes back the mem-
 bers *j*, *k* and *l* so that the tooth *k'* of the
 plates *k* again engages the teeth of the rings
h and the said plates can now be actuated by
 the said rings.

90 The only thing to do now is to mix up the
 combination by turning the said rings any-
 how so as to arrest the plate *d* and the pad-
 lock will not be opened unless the number
 444 is formed by turning the rings in the
 95 afore-described manner.

From the foregoing it will be perceived
 that the combination can only be changed
 when the bow *b* is open because at this mo-
 100 ment only the washer *n* can be displaced
 owing to the engagement of the lugs in the
 apertures *d*² and *d*³ of the arresting bolt
 plate.

105 The members *j*, *k* and *l* are brought back
 into position automatically by simply clos-
 ing the bow of the padlock.

In the example illustrated, the rings *h*
 have no external signs, but it is obvious that
 it will be possible to trace on the outside of
 these rings, numerals corresponding to the
 110 various teeth *i*. These numerals may be re-
 placed by letters and words will be thus
 formed instead of numbers.

115 The number of the rings *h* is not limited
 to three and may vary as desired.

The above devices have only been given
 by way of example; the forms, dimensions
 and details may vary according to the case
 without thereby modifying the principle of
 120 the present invention.

Claims:

1. The combination with a lock having a
 bow arresting bolt plate, a spindle integral
 with said bolt plate, a rod normally pre-
 125 venting the rotation of said spindle, arrest-
 ing members comprising superposed plates
 provided with notches, means for turning
 said plates around said spindle to position
 the notches therein to receive said rod to
 permit the rotation of the spindle.

2. In a lock of the class described, the combination of a spindle, a rod normally preventing the rotation of said spindle, arresting or locking members for said spindle comprising superposed plates provided with notches, rings inclosing each of the locking or arresting plates and formed with internal teeth between any two of which a tooth of the plate may be engaged to connect the plate and the ring.

3. In a permutation lock, arresting or locking members comprising superposed plates provided with notches and teeth, rings inclosing the locking or arresting plates and each formed with internal teeth between any two of which a tooth of the plate it encircles may be engaged to connect said plate and ring, and a spring controlled pawl adapted to engage between the teeth of each ring, one of the teeth being shaped to lock said pawl in one point in one direction of rotation to furnish simultaneously an indication of the degree of rotation through which the ring has been turned, and a starting point for the rotation in one direction.

4. In a permutation lock, the combination with a spindle, a rod normally preventing

the rotation of said spindle, arresting or locking members comprising superposed plates provided with notches and teeth, rings inclosing each of the locking plates and formed with internal teeth between any two of which a tooth of the plate which it encircles may engage to render said plate integral with its ring, a spring controlled pawl to engage between the teeth of each ring one of said teeth being shaped to lock said pawl in one point in one direction of rotation to furnish simultaneously an indication of the degree of rotation through which the ring has been turned, and a starting point for the rotation in one direction, and means for displacing the different arresting plates parallel to the spindle so that their teeth cease to be in contact with the teeth of the rings, thus permitting the rotation of the rings with respect to the plates in order to change the combination of the lock.

In testimony whereof I affix my signature in presence of two witnesses.

EUGÈNE MAURICE OCTAVE DESCALLES.

Witnesses:

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