

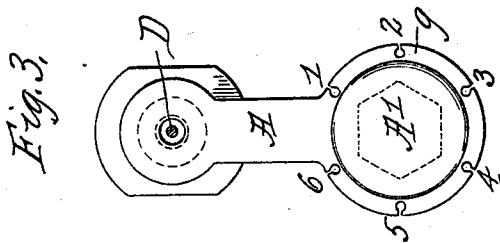
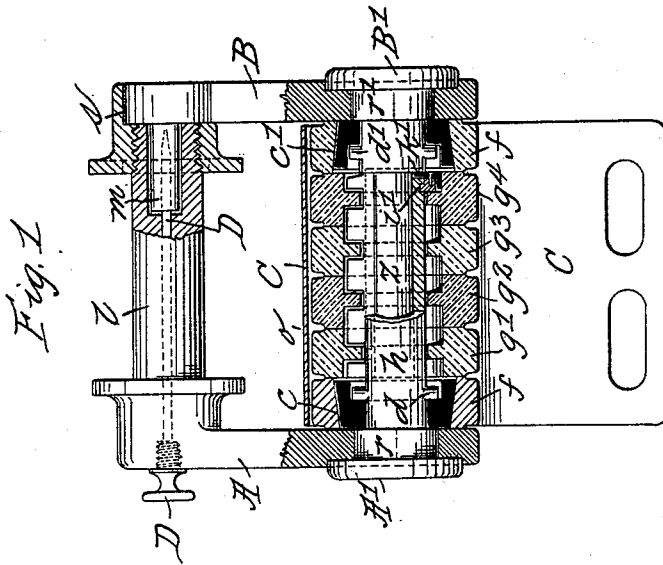
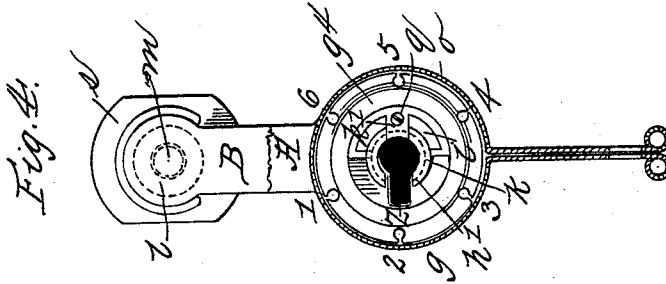
(No Model.)

2 Sheets—Sheet 1.

R. NÁDAS.
PERMUTATION PADLOCK.

No. 583,603.

Patented June 1, 1897.



Witnesses:

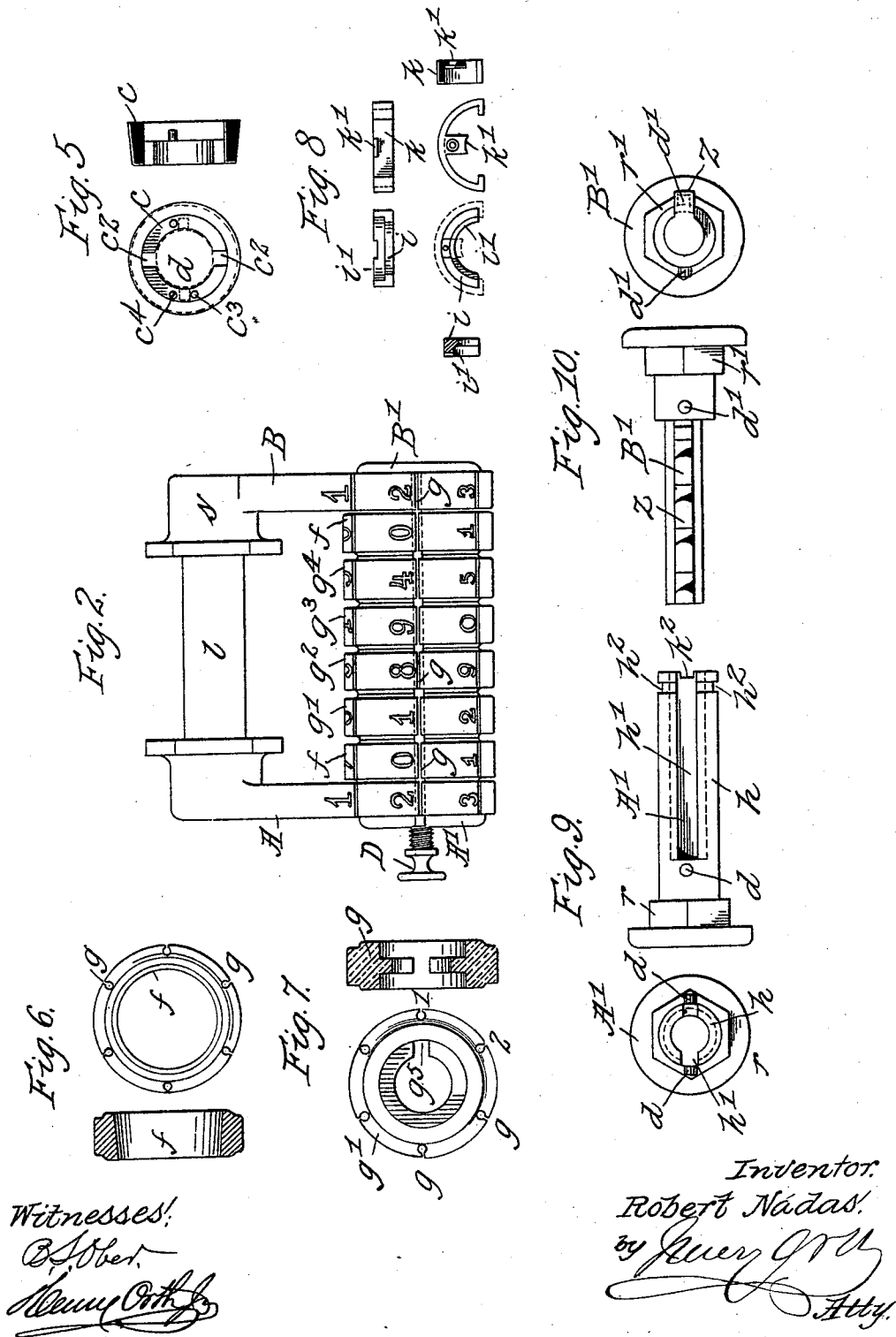
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Inventor.
Robert Nádas.
by Henry M. [Signature] Atty.

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UNITED STATES PATENT OFFICE.

ROBERT NÁDAS, OF STEIN-AM-ANGER, AUSTRIA-HUNGARY.

PERMUTATION-PADLOCK.

SPECIFICATION forming part of Letters Patent No. 588,603, dated June 1, 1897.

Application filed December 27, 1895. Serial No. 573,547. (No model.) Patented in Germany March 30, 1895, No. 84,258, and in Austria May 25, 1895, No. 45/1,831.

To all whom it may concern:

Be it known that I, ROBERT NÁDAS, a subject of the King of Hungary, residing at Stein-am-Anger, in the Province of Hungary, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Permutation-Locks, (for which patents have been obtained in Austria, No. 45/1,831, dated May 25, 1895, and in Germany, No. 84,258, dated March 30, 1895;) 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 thereon, which form a part of this specification.

A safety-lock embodying these improvements belongs to that class of permutation-locks in which a number of locking-disks must be set or arranged in accordance with a previously-determined key or solution (hereinafter called "solution number") in order to unfasten the lock.

One of the characteristic features of my invention lies in the provision of additional safety devices, irrespective of the permutation mechanism itself, in that the latter when set to a given number can also be set to a given relative position, so that in order to open the lock it is not only necessary to know the solution number, but also the position number, as will hereinafter more fully appear.

Figures 1 and 2 of the accompanying drawings are respectively a longitudinal section and a front elevation of a lock according to this invention. Figs. 3 and 4 are respectively an end elevation and a cross-section of the same; and Figs. 5 to 10, inclusive, are separate views of single parts of the lock.

As shown, the lock portion A and the key portion B constitute, when put together, a rectangle of which one side is open when the portion B is separated from the portion A—that is to say, when the lock is open. The lock portion A carries the lock mechanism proper, while the key portion B is provided with the parts that are requisite for effecting the connection with the main portion A.

The lock mechanism comprises a bolt A',

Fig. 9, having its head partly sunk in the lock portion A, the said head having a triangular, rectangular, or polygonal shoulder r , which terminates in a tube or sleeve h , provided with a longitudinal slot h' . The bolt A' is fixed in the portion A by means of an externally-conical ring c and is provided with studs d , which, for the purpose of fastening the bolt, are inserted through corresponding slots or ways c^2 in the ring c , whereupon the said ring is rotated through ninety degrees and is then secured against rotation in a backward direction by means of a pin or pins c^4 , which are screwed in next to the studs d and in front of a stop-pin or stop-pins c^3 , provided in the ring c . Similarly the key portion B has also let into it a bolt B', Fig. 10, having a partly-sunk head and a triangular, rectangular, or polygonal shoulder r' , which is held fast by means of a ring c' , Fig. 1, and a stud or studs d' and carries a rack or toothed bar z , whose teeth fit in the slot in the sleeve h . The conically-turned rings $c c'$, Fig. 5, are surrounded by brass rings f , Fig. 6, which are marked on their peripheries with numerals and are intended, in the first place, to cover the fastening of the bolts A' B' to the rings $c c'$ and, in the second place, to deceive unauthorized persons.

Upon the sleeve h there are loosely slipped locking-disks $g' g^2 g^3 g^4$, Figs. 1 and 7. There may be any desired number of these disks, and their order on the sleeve h can be changed. In order to prevent these locking-disks from falling off the sleeve h , the free end of the latter has cut in it an annular groove h^2 , Fig. 9, in which there engages the projecting rim i' of a segment-shaped part i , Fig. 8, which is completely protected against lateral displacement or falling off by means of a packing-piece k , Fig. 8, and a screw q , the arrangement being such that the screw q engages in the part i and a shoulder k' of the piece k engages in a notch k^2 in the sleeve h , Figs. 1 and 4. This mode of attachment allows the locking-disks to be readily changed.

Each of the locking-disks $g' g^2 g^3 g^4$ is marked on its periphery with equidistantly-arranged numerals, the number of which on each disk is equal to the number of angles of each of the polygonal shoulders $r r'$. Above

or radially opposite to each of these numerals a cut or a groove or slot g , Figs. 2 and 7, is made in the locking-disks. Furthermore, each disk is bored out to correspond with the teeth of the rack z , so that the disks can rotate freely when the rack is inserted therein. To enable the rack to be inserted, each locking-disk has also a radial slot or way g^5 , Fig. 7, the width of which is slightly greater than the thickness of the teeth and the center line of which is situated exactly under or radially opposite to one of the slits or lines made in the periphery of the locking-disk.

The position of the ways g^5 with relation to the lines or slits g is determined by the solution number in accordance with which the lock is to be opened. In the case represented it is assumed, by way of example, that the ways g^5 are situated inside the locking-disks g^1, g^2, g^3 , and g^4 at places indicated externally by the grooves or lines g , appertaining to the numerals "1," "8," "9," and "4" of the respective locking-disks, counting from left to right, so that, therefore, the solution number for opening the lock is "1894."

The teeth of the rack z extend radially, when the rack is in position in the lock, beyond the outer periphery of the sleeve h , so that they can be inserted only when all the ways g^5 of the locking-disks are situated over, or opposite to, the longitudinal slot h' of the sleeve h . If, after the insertion of the rack, the locking-disks be rotated, then the ways g^5 will be displaced relatively to the teeth of the rack, so that the rack will be prevented from being drawn out of the sleeve h , and the lock will be thereby fastened. If the sleeve h be readjusted by means of the polygonal shoulder r , (which is effected by removing the locking-disks and the rings f and c , then drawing out the bolt A' , and, after rotating the same through a suitable angle, reinserting and fixing it in position,) the rack z of the bolt B' , together with its polygonal shoulder r' , must be shifted through the same angle, in order to bring the teeth of the rack into line with the slot in the sleeve h . The positions into which the bolt A' can be set (six, in this case, the shoulder r being hexagonal) are indicated by the respective numerals (1 to 6) on the lock portion A. Now the rack can be inserted into the sleeve only when the teeth and the slot in the sleeve are in line with each other, and the ways g^5 of the locking-disks g^1, g^2, g^3, g^4 are exactly over, or opposite to, the slot in the sleeve, which occurs only in the case of the position to which the bolts A' and B' have both been set. It is therefore obvious that in addition to the solution number itself—*e.g.*, the number "1894"—it is necessary to know the position (in the example given, the position 2) for the same, in order to be able to unfasten the lock. The number of positions for the solution number may be selected as desired, but is in each case equal to the number of angles of the polygonal shoulders r, r' on the bolt A' and the rack

z . In the example shown these polygonal shoulders are hexagonal, and therefore there are six possible positions. If the shoulders r and r' were octagonal or duodecagonal, the solution number could be set to eight or twelve different positions, respectively, in the case of only one of which would the lock be unfastened. In the example given the complete solution can be represented by the fraction $\frac{2}{1894}$, which indicates that the lock will be unfastened when the number "1894" is in the position 2. Now this constitutes a very great advantage as compared with permutation-locks as hitherto known, which have been constructed only for one position of one invariable solution number, because the number of possible permutations is increased to an inconceivable extent.

Into the key portion B there is firmly fixed a pin m , which fits into a recess in a pin l , situated on the lock portion A. Upon the pin l is screwed a nut s , which has a segment-shaped shoulder that surrounds and projects beyond the head of the key-portion B.

For the purpose of protecting the lock mechanism against the action of the weather and of depriving all unauthorized persons of every possibility of being able to open the lock, even as the result of continued attempts, there is placed over the locking-disks a casing o , (of sheet-steel or of paper,) which may, if desired, be fastened together by means of a cord or string drawn through the same and secured by a leaden seal. As this casing must be removed in order to obtain access to the lock mechanism, the removal of the said casing is a visible sign that an attempt has been made by an unauthorized person to open the lock. In the hollow pin l there is preferably inserted and fastened—for example, by screwing—so as to be readily removable, a steel-wire pin D, having its free end filed sharp. This pin serves as a screw-driver for effecting all operations necessary for altering the lock and can also be used by inserting it into the grooves or holes g below the numerals of the locking-disks for holding the latter, so as to enable the lock to be readily opened by less-practiced hands and also, when the lock is open, to prevent the locking-disks from rotating.

I claim—

1. A permutation-lock, consisting of two complementary elements, both provided with a polygonal bearing, a tubular cylindrical and longitudinally-slotted support provided with a polygonal portion fitting the bearing of one of said complementary parts, a plurality of lock elements revoluble on the cylindrical portion of said support, and a toothed rack provided with a polygonal portion fitting the corresponding bearing in the other complementary part of the lock and into the aforesaid tubular support when the lock elements thereon are set to a given relative position, and to engage the teeth of said rack when said lock elements are revolved, both

support and rack detachably connected with and shiftable about their longitudinal axes in their respective bearings, for the purpose set forth.

2. A permutation-lock consisting of two complementary parts whereof the first comprises a tubular longitudinally-slotted support provided with a polygonal head whereby the support is adjusted, and a plurality of lock elements revoluble thereon, and the second comprises a toothed rack provided with a similar polygonal head to be adjusted to a like position, the said toothed rack adapted to be introduced into said support when the locking elements are at a given position and locked against removal when said lock elements are revolved, substantially as described.

3. A permutation-lock consisting of two complementary parts whereof the first comprises a tubular longitudinally-slotted support provided with a polygonal head adjustable within the lock portion A, a plurality of lock elements revoluble thereon provided on their interior with central flanges and held between the flanges of each lock element, a ring for spacing said lock elements, and segments attached to the end of said support to keep the locking elements thereon, and the second complementary part comprising a toothed rack provided with a similar polygonal head adjustable within the portion B and adapted to be introduced into said support and locked against removal when said lock elements are revolved.

4. In a permutation-padlock, the combination with the part A provided with a polygonal bearing, the longitudinally-slotted cylindrical bolt A', provided with a polygonal portion fitting the aforesaid bearing, a plurality of locking-disks revoluble on said bolt, and locking devices locking the latter and the disks against endwise movement; of the part B provided with a stud fitting a socket in an arm of part A and with a polygonal bearing corresponding with that in said part A, the bolt B' provided with a polygonal portion fitting the like bearing in part B, said bolt B' provided with a toothed cylindrical portion adapted to be introduced into the bolt A' so that the teeth will project from the slot in said bolt A' when the disks are set to a given relative position, said disks adapted to engage said teeth and lock the bolt B' against endwise motion when the disks are moved out of their said given relative position, substantially as and for the purpose set forth.

5. The combination with the bolt A' provided at its outer end with an annular groove h^2 and a recess k^2 , and the segment i provided with a flange i' fitting the groove h^2 ; of the locking-segment k fitting into segment i and provided with a tongue k' fitting into recess k^2 in the aforesaid bolt A', and a screw passing through said bolt into segment i , substantially as and for the purpose set forth.

6. The combination with the parts A B and the bolts A' B' each provided with radial lugs d , of a cone-sleeve for each bolt provided with radial recesses c^2 adapted to register with the radial studs d on their respective bolts and with pins c^3 limiting the rotation of the sleeves on said bolts, and a locking-screw cooperating with one of the aforesaid pins to lock the sleeves against rotation, substantially as and for the purpose set forth.

7. The combination with the parts A B and the bolts A' B' each provided with radial lugs d , of a cone-sleeve for each bolt provided with radial recesses c^2 adapted to register with the radial studs d on their respective bolts and with pins c^3 limiting the rotation of the sleeves on said bolts, a locking-screw cooperating with one of the aforesaid pins to lock the sleeves against rotation and a blind-number disk for and revoluble on each of said sleeves, substantially as and for the purpose set forth.

8. The combination with the parts A and B, the former provided with an arm l , having a longitudinal passage therein, screw-threaded interiorly at one end and enlarged at its opposite end, said part B having a socketed stud fitting into the enlarged portion of the aforesaid passage, of the headed screw-driver D having a threaded portion screwing into the like end of the aforesaid passage in part A and projecting into the socket of the stud on part B, substantially as and for the purpose set forth.

9. The combination with the part B provided with a stud near its outer end, of the part A provided with an arm socketed to receive said stud, and the sleeve s screwing onto the said arm and having a flange overlapping the outer end of said part A, substantially as and for the purpose set forth.

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

ROBERT NÁDAS.

Witnesses:

DEAN B. MASON,
FRIEDRICH KARNING.