

May 13, 1930.

V. T. JULIN

1,758,608

PERMUTATION LOCK

Filed May 3, 1929

Fig.1

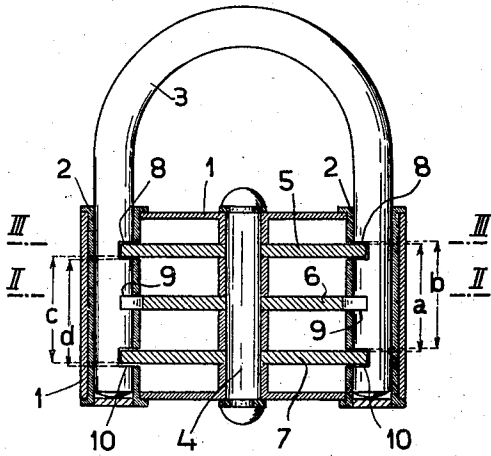


Fig.4

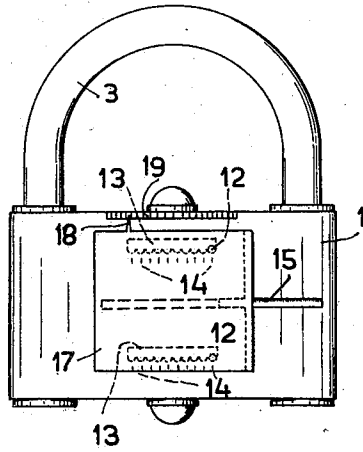


Fig.2

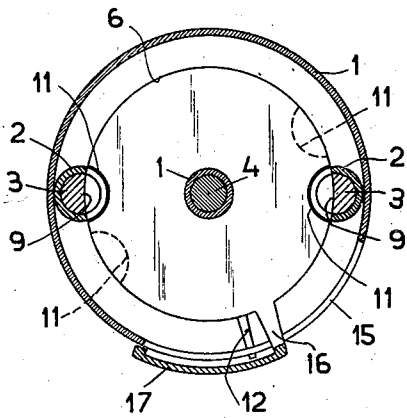
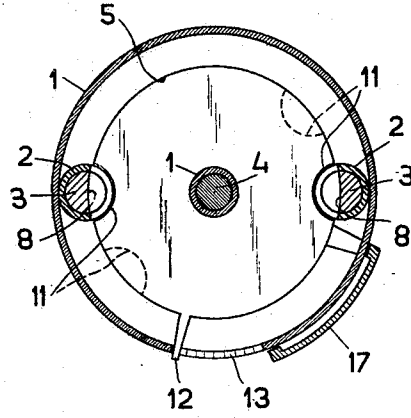


Fig.3



V. T. Julin
INVENTOR

By: *Mantel & Co.*
ATTYS.

UNITED STATES PATENT OFFICE

VICTOR TEODOR JULIN, OF DJURSHOLM-DANDERYD, SWEDEN

PERMUTATION LOCK

Application filed May 3, 1929, Serial No. 360,235, and in Austria November 9, 1927.

The invention relates to permutation locks and particularly to that type thereof, in which the bolt co-acts with rotary discs allowing the retraction of the bolt only, when these discs occupy a certain predetermined position.

The main object of the invention is to increase the safety of such locks and another one is to reduce the costs of manufacture. This is according to the invention realized by connecting to one of the setting discs, which fits accurately into the corresponding recess of the bolt, a cover, which, when this disc engages with the respective bolt recess, obstructs the access to the other discs engaging with their corresponding bolt recesses so that there is a clearance.

In the drawing by way of example as one embodiment of the invention a padlock is illustrated.

Fig. 1 shows a sectional elevation,

Fig. 2 a horizontal sectional view according to the line II—II of Fig. 1,

Fig. 3 a horizontal sectional view according to the line III—III of Fig. 1 and

Fig. 4 is a side-view (elevation).

The cylindrical casing 1 is formed with tube-like guides 2 for receiving the legs of a shackle 3, said casing supporting an axle 4, on which the discs 5, 6 and 7 are rotatably mounted. These discs engage with recesses 8, 9, 10 provided on each leg of the shackle and have arc-shaped notches (sweeps) 11 cut in their peripheries at diametrically opposed circumferential points thereof. Each of the two discs 5 and 7 bears a small handle 12 extending through a slot or window 13 of the casing so, that its end can be moved along a scale 14. The disc 6 is connected to a cover 17 by means of an extension 16 projecting through a slot 15 of the casing.

For ensuring the effect aimed at by the present invention it is essential that the disc 6 fits exactly into the recesses 9, whilst the other discs 5 and 7 ought to be allowed to move within their recesses 8 and 10 with a clearance.

For explaining the manner, how this arrangement operates, it may first of all be assumed, that only the two discs 5 and 7

moving with a clearance in their shackle leg recesses are existing. The movability is due to the fact, that in the manufacturing operations accuracy cannot be pushed so far that two or several discs fit simultaneously with full exactness into the shackle leg recesses. Consequently, if the shackle 3 is pushed toward the casing or pulled away from it, only one disc will come to touch the lateral wall or side of one of the shackle leg recesses 8 or 10 so as to cause strong friction thereon, as the accuracy of manufacturing cannot go so far, that the distance a between the upper surfaces of the discs is perfectly equal to the distance b between the sides of the recesses and that the distance c between the lower surfaces of these two discs be exactly equal to the distance d . In practice, particularly when wholesale manufacture by series is concerned, these distances will always differ for some fraction of a millimeter, owing to which inexactness, when the shackle and casing are pushed towards each other or pulled in opposite directions, only the one of the discs will abut by strong friction against one of the sides of the respective recess, whilst the other discs may be turned more or less without offering any substantial resistance. If now the disc subjected to strong friction is turned while continuing to push or pull the casing and the shackle, the friction resistance will remain effective. But as soon as the cuts (sweeps) 11 of the disc will coincide with the recesses of the shackle legs, the friction resistance will suddenly cease. Consequently by the resistance to be felt during the rotation to be effected in the said manner the right position of this disc, that is to say the one allowing the shackle to pass, can be found out. If now the disc is allowed to remain in this position and casing and shackle are again pushed or pulled in the described manner, the other disc will touch one side wall of its corresponding shackle leg recesses so as to cause strong friction thereon and by turning now this second disc it may also be brought into such position as to allow the shackle to be pulled out. Consequently the lock can be opened without

knowing the secret of the necessary combination of the numbers or characters.

But if according to the present invention only the one disc 6 is made so as to fit exactly into the recess 9 of the shackle legs, whilst the other discs 5 and 7 show a certain clearance, the latter can only be brought to friction engagement with the sides of their respective leg recesses, when the exactly fitting disc is in its open position, that is to say the position allowing the shackle legs to pass. For the purpose of preventing such possibility a cover 17 is connected to the disc 6, which cover obstructs the access to the handles 12 and covers the scales belonging to them, as long as the disc 6 is in the said open position.

If the lock is to be opened, first of all the cover 17 has to be shifted aside, whereby the cuts 11 of the disc 6 come out of engagement with the recesses 9 of the shackle legs. Now the discs 5 and 7 are by means of the handles 12 and by the aid of the scales 14 turned into the opening position and finally the cover 17 is turned back into its open position. Now the sweeps of all the discs are coinciding with the recesses of the shackle legs and the latter can be withdrawn from the padlock.

The disc 6 may also be included in the permutation system, for which purpose the cover 17 connected to it may be provided with an indicator (pointer) 18 bearing upon a scale 19, which is to be of such dimensions and arranged so, that at all positions of the disc 6, which are possible, the access to the other discs is shut off by the cover 17.

As with a lock according to the invention the movability of the discs 5 and 7 does not cause any irregularity of their working, the clearance between these discs and their respective shackle recesses may be made relatively large. If at the same time the lower edge of the slots or windows 13 is made sinuous (wave like) so, that the depressions between two waves coincide with the divisions of the scale, the wave crests will, when the discs are turned by means of the handles 12, offer a resistance, the overcoming of which may be felt as well as heard, whereby the possibility is given of handling the lock also in the night time without light.

What I claim is:

1. A permutation lock comprising rotary discs with cuts, and a shackle having recesses in its legs for engaging said discs, of which only one fits exactly into its respective leg recess, whilst the others are movable within their recesses with a clearance, the accurately fitting disc being provided with a cover, which obstructs the access to the discs movable with clearance, when the fitting disc is placed in its open position.

2. A permutation lock comprising a shackle having recesses therein, a setting disc exactly fitting into its shackle recesses and provided with a cover, several discs movable with a

clearance within their shackle recesses and provided with projections, which pass through openings of the casing, and a scale for setting the discs by means of their projections, the lower edges of said openings having wave like form and the depressions of the waves thereof coinciding with the divisions of the scale.

3. A permutation lock comprising discs with cuts, and a shackle with recesses in its legs for engagement with said discs, of which only one fits exactly into its respective leg recess, whilst the others are movable within their recesses with a clearance, the accurately fitting tumbler being provided with a cover, which obstructs the access to the discs movable with clearance, when the fitting disc is placed in its open position and is provided with an indicator bearing upon a scale.

In testimony whereof I have signed my name to this specification.

VICTOR TEODOR JULIN.