A. J. DRAPALIK.

KEYLESS LOCK.

APPLICATION FILED MAY 2, 1916.

1,196,218. Patented Aug. 29, 1916.

Fig. 2.

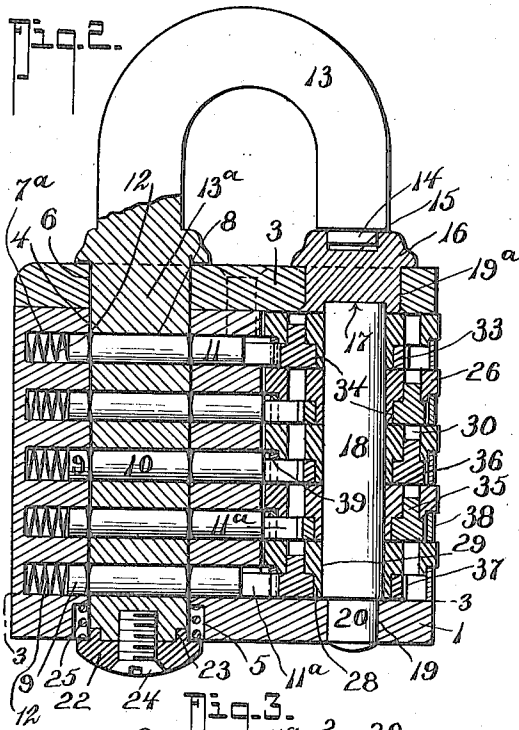


Fig. 1.

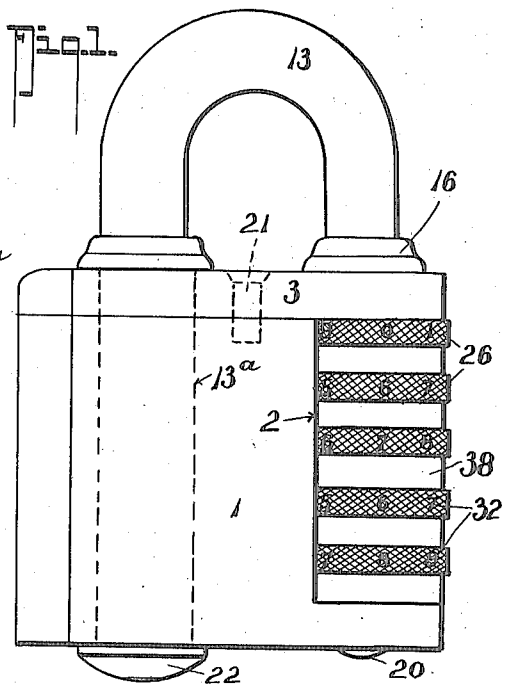


Fig. 3.

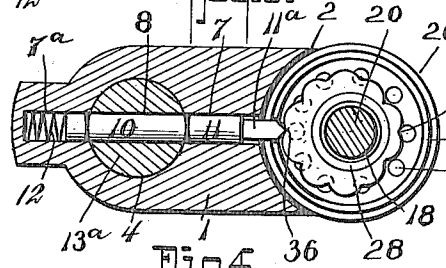


Fig. 5.

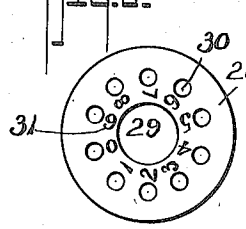


Fig. 8.

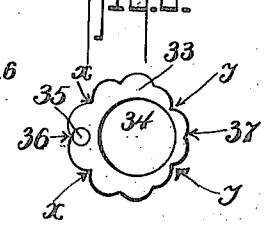


Fig. 4.

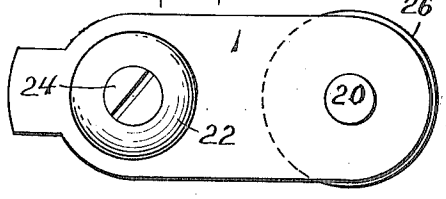


Fig. 6.

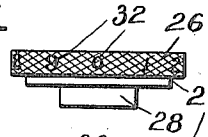


Fig. 9.

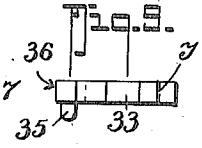


Fig. 7.

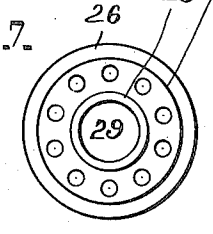


Fig. 10.

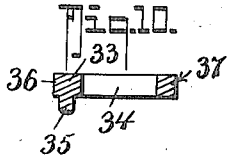


Fig. 11.

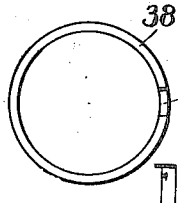


Fig. 12.

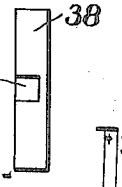
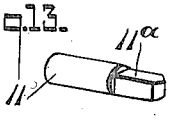


Fig. 13.



INVENTOR

A. J. Drapalik.

BY

Fred G. Dieterich & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALFRED J. DRAPALIK, OF ROCKY MOUNT, NORTH CAROLINA, ASSIGNOR OF ONE-HALF TO JOSEPH B. HALL, OF ROCKY MOUNT, NORTH CAROLINA.

KEYLESS LOCK.

1,196,218. Specification of Letters Patent. Patented Aug. 29, 1916.

Application filed May 2, 1916. Serial No. 94,967.

To all whom it may concern:

Be it known that I, ALFRED J. DRAPALIK, residing at Rocky Mount, in the county of Edgecombe and State of North Carolina, have invented certain new and useful Improvements in Keyless Locks, of which the following is a specification.

My invention relates to certain new and useful improvements in permutation locks and the invention primarily has for its object to provide a lock of this character of a simple and effective construction which cannot be operated by anyone not knowing the required combination.

A further object of the invention is to provide a lock of the type stated in which a very large number of "combinations" can be obtained so that no two locks need have the same combination, the invention further having for its object to so construct the parts as to make the changing of "combinations" an easy matter.

Another object of the invention is to provide a permutation lock of the pad lock type, in which a shackle is locked by a plurality of pins which are carried by one of the shackle legs and when the lock is to be opened these pins are designed to be located within the confines of the shackle leg so that the shackle leg may be endwise moved to unseat the free end of the shackle and whereby the shackle may be then rotated to the open position, the structure being such that when the shackle is opened, the locking pins and disks will be held in the unlocked position.

The invention also includes those novel details of construction, combination and arrangement of parts, all of which will be first fully described, then be specifically pointed out in the appended claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of a lock constructed in accordance with my invention, the pin operating disks being positioned with the "combination" set to permit the lock to be opened. Fig. 2 is a central vertical longitudinal section and part elevation, the parts being in the position shown in Fig. 1. Fig. 3 is a horizontal section on the line 3—3 of Fig. 2. Fig. 4 is a bottom plan view of the lock. Fig. 5 is a top plan view of one of the numbered rotatable operating disks. Fig. 6 is a side elevation of the same. Fig. 7 is a bottom plan view of the disk shown in Fig. 5. Fig. 8 is a top plan view of one of the eccentric pin engaging members. Fig. 9 is a side elevation of the same. Fig. 10 is a central vertical section of the eccentric disk. Fig. 11 is a plan view of one of the notched spacer rings. Fig. 12 is a side elevation of the same. Fig. 13 is a detail perspective view of one of the eccentric disk engaging pins.

In the drawings in which like numerals and letters of reference designate like parts in all of the figures, 1 represents the housing of the lock, the same having a portion cut away, as at 2, to expose the pin operating numbered disks, by which the lock may be unlocked or relocked, the housing being provided with a removable cover 3 that is secured in place by set screws 21; the cover 3 and the body 1 having apertures 19—19ª in alinement with each other, the aperture 19 receiving the reduced end 20 of the spindle 18 on which the operating disks are journaled, the spindle 18 fitting into a recess 17 in a plug 16 that is secured in the aperture 19ª of the cover 3.

The body 1 of the lock has a bore 4 in parallelism with the pin 18 and the cover 3 has a bore 6 alining with the bore 4 for the purpose of receiving the body leg 13ª of the shackle 13. The shackle 13 has its free end stepped as at 14 to enter the recess 15 in the plug 16 when the parts are in the locked and closed position (see Figs. 1 and 2). The shackle leg 13ª may be pulled upwardly against the resistance of a spring 25 that is located in a pocket 5 in the body 1 and engages a collar 22 which is recessed at 23 to fit over the reduced end of the leg 13ª to which it is secured by a set screw 24 (see Fig. 2). The body 1 is provided with a series of parallel bores 7—7ª which aline with corresponding bores 8 in the leg 13ª of the shackle, when the parts are in the closed position.

9 designates a series of short pin members held in the bore portion 7ª and pressed toward the shackle leg 13ª by springs 12, the pins 9 engaging pins 10 in the bores 8 of the shackle leg 13ª, the pins 10 being in turn engaged by locking pins 11 which have squared projecting ends 11ª to pass through the rectangular openings 39 in the spacing rings 38 and coöperate with the eccentric disks 33 as will be later explained.

26 designates the "combination" disks, each of which is of the same construction and consists of the head whose periphery is milled at 26 for convenience in turning. The head is also provided with numbers 32 corresponding to a series of pin holes 30 which are also numbered as at 31 for a purpose presently explained. The "combination" disk 26 has a shoulder 27 against which the spacing ring 38 rests and a sleeve 28 is provided with a bore at 29 to fit onto the pin 18. The eccentrics have bores 34 to fit onto the sleeves 28 and lie within an inclosure formed by the spacing ring 38, the said eccentrics 33 having fluted peripheries, the flutes corresponding in number to the number of pin holes 30 in the disk 26 and the number of digits 32—31 on the "combination" disk 26. The eccentrics 33 have operating pin recesses 36—37, the one being diametrically opposite the other, and the one being "low" while the other is "high" for a purpose presently explained. The notches x—x at each side of the notch 36, and the notches y—y at each side of the notch 37, are deeper than the respective notches 36—37 so that those notches at x—x and y—y will permit the lock pins to drop deeper and not reach the "open" position except at the notches 36 or 37, as the case may be.

35 is a pin on the eccentric 33 to fit into the pin holes 30 whereby the eccentric can be pinned to the disk 26 in any desired position for purpose of changing the "combination" as may be found desirable.

In the practical construction of the lock I prefer to provide pins 11 of two lengths, one set of pins being long and the other set short (see intermediate pins 11 in Fig. 2 for the long ones and top and bottom pins 11 in Fig. 2 for the short ones). The object of this is to prevent unauthorized opening of the lock, for were the pins of the same length and all designed to open the lock with the eccentrics 33 all in the same position, a person could, in time, find the "combination" by "feeling" for it against the resistance of the springs 12, but where the pins 11 are of two lengths, the longer set being designed to reach the opening position when engaging the notch 37 of the respective eccentric 33 and the shorter pins designed to open when they engage the notches 36 of their corresponding eccentrics 33, one desiring to discover the "combination" and not knowing which of the pins are the short ones and which are the long ones will be unable to "feel" for the "combination".

If it is desired to change the "combination" so that, for instance, the upper disk 26 in Figs. 1 and 2, will open when the numeral 1 is adjacent the edge 2 of the body 1 instead of the number 9, it is only necessary to remove the eccentric 32 from that disk and change the pin 35 from the pin hole numbered 9 to the pin hole numbered 1 and the "combination" of the lock so changed will be 1—5—6—5—7 instead of 9—5—6—5—7, as shown in Fig. 1.

From the foregoing it will be seen that a very large number of "combinations" can be made with this lock before exhausting all of the possible arrangements and groupings of the numbers.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction, operation and advantages of this invention will be readily understood.

What I claim is:

1. In a combination lock, a body and a shackle having a leg rotatably mounted and endwise movable in the body, a plurality of sets of locking pins within the body and leg, permutation devices engaging certain of said pins and adapted to bring the pins into shackle leg releasing position when said devices are in a predetermined position each of said sets of locking pins including a pin of a length substantially equal to the diameter of the shackle leg and another pin for engaging said shackle leg pin and said permutation devices and a third spring actuated pin for engaging the shackle leg pin.

2. In a combination lock, a body and a shackle having a leg rotatably mounted and endwise movable in the body, a plurality of locking pins within the body and leg, permutation devices engaging certain of said pins and adapted to bring the pins into shackle leg releasing position when said devices are in a predetermined position, said permutation devices including "combination" disks, eccentrics connected with said disks and adapted to engage adjacent pins, substantially as shown and for the purposes described.

3. In a combination lock, a body and a shackle having a leg rotatably mounted and endwise movable in the body, a plurality of locking pins within the body and leg, permutation devices engaging certain of said pins and adapted to bring the pins into shackle leg releasing position when said devices are in a predetermined position, said permutation devices including "combination" disks, eccentrics connected with said disks and adapted to engage adjacent pins, spacing collars inclosing said eccentrics and extending between adjacent "combination" disks.

4. In a permutation lock, a body having a shackle leg bore, a shackle rotatably mounted and endwise movable in said bore, said shackle and said body having alining sets of pin apertures, locking pin sets in said apertures, each of said sets comprising shackle leg pins and a pair of operating pins en-

gaging the same, permutation devices mounted in the body and coöperative with said operating pins, means for holding said operating pins in engagement with said permutation devices substantially as shown.

5. In a permutation lock, a body having a shackle leg bore, a shackle rotatably and endwise movable in said bore, said shackle and said body having alining sets of pin apertures, locking pin sets in said apertures, each of said sets comprising shackle leg pins and operating pins engaging the same, permutation devices mounted in the body and coöperative with said operating pins, means for holding said operating pins in engagement with said permutation devices, said permutation devices including a spindle carried by said body, "combination" disks rotatable on said spindle there being one disk for each set of pins, eccentrics connected to said "combination" disks to turn with the same and coöperatively engage the respective operating pins and rings located between adjacent "combination" disks to inclose the respective eccentrics substantially as shown and described.

6. In a permutation lock, a body having a shackle leg bore, a shackle rotatably and endwise movable in said bore, said shackle and said body having alining sets of pin apertures, locking pin sets in said apertures, each of said sets comprising shackle leg pins and operating pins engaging the same, permutation devices mounted in the body and coöperative with said operating pins, means for holding said operating pins in engagement with said permutation devices, said permutation devices including a spindle carried by said body, "combination" disks rotatable on said spindle there being one disk for each set of pins, eccentrics connected to said "combination" disks to turn with the same and coöperatively engage the respective operating pins, rings located between adjacent "combination" disks to inclose the respective eccentrics, means for holding said rings against rotation.

7. In a permutation lock, a body having a shackle leg bore, a shackle rotatably and endwise movable in said bore, said shackle and said body having alining sets of pin apertures, locking pin sets in said apertures, each of said sets comprising shackle leg pins and operating pins engaging the same, permutation devices mounted in the body and coöperative with said operating pins, means for holding said operating pins in engagement with said permutation devices, said permutation devices including a spindle carried by said body, "combination" disks rotatable on said spindle there being one disk for each set of pins, eccentrics connected to said "combination" disks to turn with the same and coöperatively engage the respective operating pins, rings located between adjacent "combination" disks to inclose the respective eccentrics, said "combination" disks having sleeves and said eccentrics having bores to fit on said sleeves, and means for adjustably securing said eccentrics to their respective "combination" disks.

8. In a permutation lock, a body having a shackle leg bore, a shackle rotatably and endwise movable in said bore, said shackle and said body having alining sets of pin apertures, locking pin sets in said apertures, each of said sets comprising shackle leg pins and operating pins engaging the same, permutation devices mounted in the body and coöperative with said operating pins, means for holding said operating pins in engagement with said permutation devices, said permutation devices including a spindle carried by said body, "combination" disks rotatable on said spindle, there being one disk for each set of pins, eccentrics connected to said "combination" disks to turn with the same and coöperatively engage the respective operating pins, rings located between adjacent "combination" disks to inclose the respective eccentrics, said "combination" disks having sleeves, said eccentrics having bores to fit on said sleeves, means for adjustably securing said eccentrics to their respective "combination" disks, said last named means comprising pin and pin hole connections, there being a plurality of pin holes provided for purposes of changing the "combination," said "combination" disks having their peripheries numbered to correspond with the number of pin holes.

ALFRED J. DRAPALIK.