Jan. 20, 1925. 1,523,534

C. COTTONN

COMBINATION LOCK

Filed Aug. 1, 1921 2 Sheets-Sheet 1

Fig. 1.

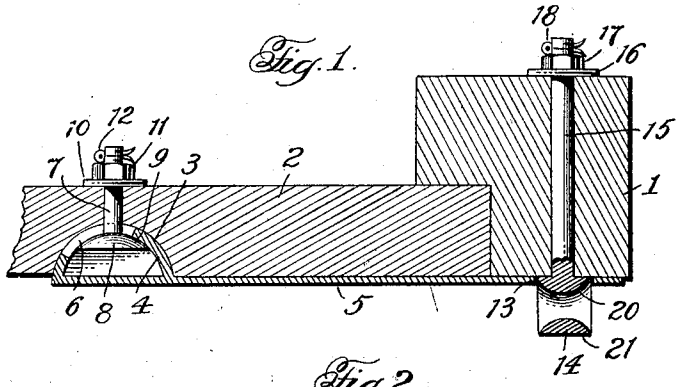


Fig. 2.

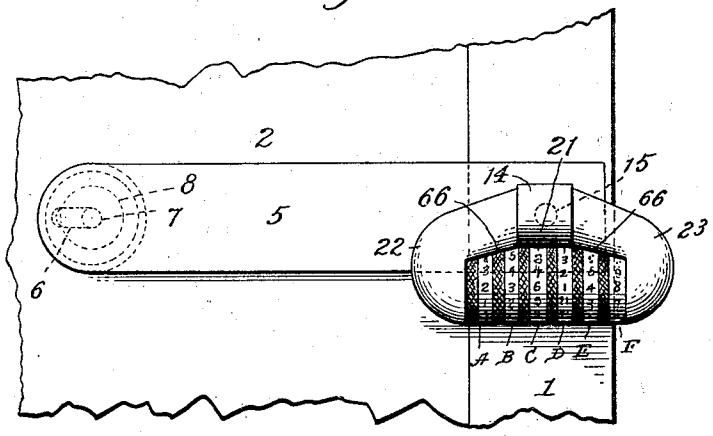


Fig. 11.

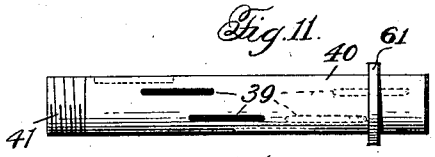
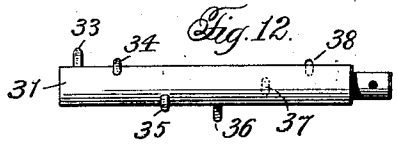


Fig. 12.



Inventor:

Witness:

Jas. E. Hutchinson.

Charles Cottonn,

By Milans & Milans Attorneys

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C. COTTONN

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Fig. 3.

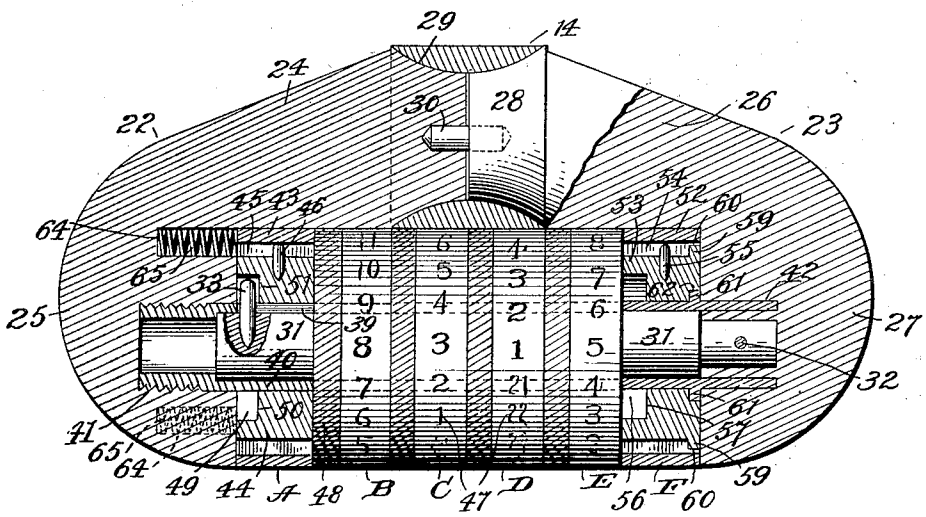


Fig. 4.

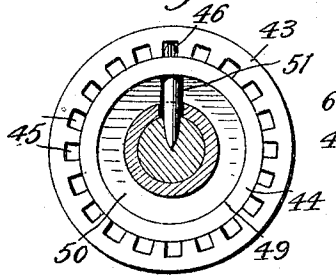


Fig. 5.

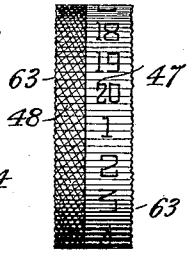


Fig. 6.

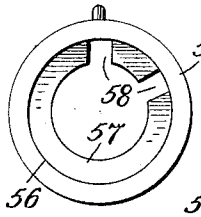


Fig. 9.

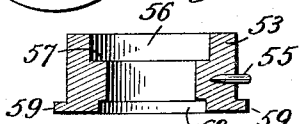


Fig. 7.

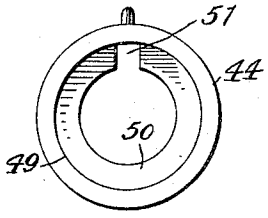


Fig. 8.

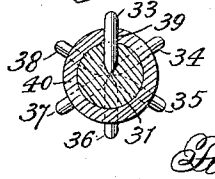
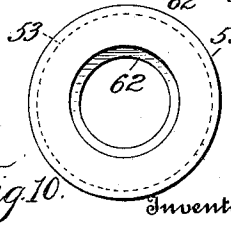


Fig. 10.



Inventor:

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Witness:

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Patented Jan. 20, 1925. 1,523,534

UNITED STATES PATENT OFFICE.

CHARLES COTTONN, OF SALEM, VIRGINIA.

COMBINATION LOCK.

Application filed August 1, 1921. Serial No. 488,892.

To all whom it may concern:

Be it known that I, CHARLES COTTONN, a citizen of the United States, residing at Salem, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Combination Locks, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to new and useful improvements in locks and more particularly to a combination lock adapted for use in various connections and so constructed as to prevent opening by unauthorized persons, there being no screws or other connections which might be removed by unauthorized persons and the lock being so shaped as to prevent opening by hammering against the parts.

The principal object of the invention resides in the provision of a lock having a plurality of discs, each bearing reference characters, the characters upon the discs adapted to be brought into proper alignment for releasing the parts and unlocking.

Another object resides in the construction of the locking discs in such a manner that the combination may be changed at will and the faces of the discs being roughened, or provided with projections so that adjacent discs will be held by friction until turned by the manipulator of the lock.

A further object consists in providing, in combination with the lock, a novel form of hasp and eye, each being so constructed, for attachment, that no removable parts are accessible to an unauthorized person.

The invention has for a still further object the construction of the lock in such a manner that rain or other elements will be discharged therefrom in such a way as to prevent access to the working parts and will thereby prevent rust which might impair the effective operation.

With the above and other objects in view, which will appear as the description proceeds, my invention consists in the novel details of construction and arrangement of parts, described in the following specification and illustrated in the accompanying drawings, and while I have illustrated and described the preferred embodiments of the invention it will be understood that such changes may be made as will fall within the scope of the appended claims.

In the drawings:—

Fig. 1 is a horizontal section through my improved form of hasp and a section of the door frame and door, with parts shown in elevation.

Fig. 2 is a front view of my improved form of hasp and lock in position.

Fig. 3 is a longitudinal vertical section through the lock with parts shown in elevation.

Fig. 4 is a transverse section showing a face view of one of the operating discs.

Fig. 5 is an edge view of one of the operating discs.

Fig. 6 is a face view of one the inner rings of the operating discs.

Fig. 7 is a face view of an inner ring of one of the discs.

Fig. 8 is a transverse vertical section through the telescoping rod and sleeve with the projecting pins of the rod shown in elevation.

Fig. 9 is a horizontal section through the inner ring of one of the discs.

Fig. 10 is a face view of the ring shown in Fig. 9.

Fig. 11 is a side elevation of the sleeve carried by one of the yoke sections of the lock and

Fig. 12 is a side elevation of the rod carried by the other yoke section of the lock adapted to telescope in the sleeve shown in Fig. 11.

In illustrating my invention I have shown the lock and its associated hasp and eye in connection with a swinging door, but I desire it clearly understood, at the outset, that the use of the lock, and its associated parts, is not limited to use upon a door but may be used in various other connections, where such a lock may be of advantage, such as upon chests, windows, or for connecting the ends of chains, belts or the like.

In the drawings 1 indicates a portion of a door frame and 2 the door hingedly, or slidably, connected thereto. A semispherical recess 3 is formed in the outer face of the door and is adapted to receive the semispherical portion 4 of a hasp 5, the said semispherical portion 4 being formed adjacent the inner end of the hasp and provided with an elongated opening 6 through which extends the shank 7 of a bolt, the outer end thereof being screw threaded and the inner end provided with a head 8 which is adapted

to be received within the semispherical portion 4, as quite clearly shown in the drawings. The inner face of this head 8 will preferably be rounded as shown at 9 so as to conform to the interior curvature of the portion 4. In practice the semispherical portion 4 will preferably be welded to the hasp 5 and it will be seen that the bolt may be placed in position, prior to the welding. The shank 7 of the bolt, for connecting the hasp to the door, will pass through an opening formed in the door and receive a washer 10 and nut 11 for securing the same to the door. It will be noted that the washer 10 is interposed between the nut 11 and inner face of the door and, if desired, as an extra precaution a cotter pin 12 may be passed transversely through an opening in the bolt shank. The hasp adjacent the outer end, is provided with an opening 13, preferably square, to receive the eye 14 which is secured to the door frame 1 by the threaded shank 15 formed integral with the eye, said shank passing through the frame and receiving the washer 16 and nut 17, the washer 16 being interposed between the nut 17 and inner face of the frame. If desired, as an added precaution, a cotter pin 18 may be passed transversely through the shank 15 to prevent accidental displacement of the nut 17. The opening of the eye 14 will preferably be positioned transversely thereof and the ends of the openings are curved as shown at 20 for a purpose which will be later described. While I have described the eye 14 as preferably being square it will be understood that it might equally as well be of other shapes and accomplish the same purpose. The outer face of the eye will also preferably be rounded as shown at 21 so as to adapt the eye for easy positioning in the opening 13 of the hasp 5.

My improved form of lock comprises a sectional yoke and a plurality of locking discs, the sections of the yoke adapted to be separated, when the discs are in proper position, and each section being so shaped as to properly engage the opening in the eye of the hasp connection. The sections of the yoke are shown at 22 and 23, the section 22 being hereinafter referred to as the left hand section and the section 23 as the right hand section. Each of the sections 22 and 23 are of substantially right angle construction, the horizontal arm of the section 22 being indicated at 24 and the vertical arm at 25, whereas the horizontal arm of the section 23 is shown at 26 and the vertical arm at 27. The inner end of the horizontal arm 26, of the right hand section 23, is beveled as shown at 28 and the inner end of the horizontal arm 24, of the left hand section 22, is beveled as shown at 29, the said beveled portions 28 and 29 adapted to be received, when the lock is in locked position, within the opening in the eye 14 and so shaped as to conform to the curved ends 20 of the said opening. A pin 30 is secured to the end of the arm 26 of the right hand section of the yoke and is adapted, when the sections are together, to be received in a recess formed in the end of the arm 24 of the left hand section of the yoke.

Extending inwardly from the vertical arm 27 of the right hand section of the yoke is the horizontal rod 31, the end of the rod being received in the recess formed in the arm 27 and secured therein by means of a transversely extending key 32. Secured to, or formed integral with, the rod 31 are the helically arranged pins 33, 34, 35, 36, 37 and 38 each of said pins extending through elongated openings 39 formed in a sleeve 40 secured to and extending inwardly from the vertical arm 25 of the left hand section of the yoke. The inner end of the sleeve 40 is preferably exteriorally threaded at 41 and is received in an interiorally threaded opening formed in the inner face of the arm 25. As quite clearly shown in the drawings the rod 31 is received within and extends longitudinally of the sleeve 40, with the pins 33, 34, 35, 36, 37 and 38, as previously described, extending through the elongated openings 39. The pins referred to are of such a length as to normally extend beyond the outer face of the sleeve for a purpose which will be later described. The vertical arm 27, of the right hand section of the yoke, is provided with the circular recess 42, surrounding the end of the rod 31, and this recess will receive the outer end of the sleeve 40 when the parts are in locked position.

Rotatably mounted upon the sleeve 40, between the vertical extending arms 25 and 27 of the yoke sections, are a plurality of locking discs, and while any number of said discs may be used I have illustrated, in the present instance, six of said discs, the same being designated A, B, C, D, E, and F. The discs A, B, C, D, and E are similarly constructed whereas the disc F is slightly differently constructed, these differences being apparent from the description to follow. Each of the discs A, B, C, D, and E are formed of an outer ring 43 and an inner ring 44, the outer ring 43 being provided interiorally with a plurality of circumferentially spaced transversely extending recesses 45 and the inner ring provided with an outwardly extending pin 46 adapted to be received in one of the recesses 45 for coupling the rings in such a manner that when the outer ring is rotated the inner ring will be simultaneously rotated. Designating characters 47 are arranged on the outer face of the outer rings 43 and a recess 45 will be provided beneath each of these designating characters so that by placing the pins 46, of the different discs, in the dif-

ferent recesses the combination may be changed at will. The designating characters may, of course, be of numerals or letters and preferably only take up a portion of the face of the disc, the other portion being milled as shown at 48 so that a secure grasp may be secured for turning the rings. One face of the inner rings 44 are recessed as shown at 49 to form the flange or shoulder 50, said flange or shouulder having notches 51 formed therein. The inner ring of the disc A is only made with one of these notches 51, whereas the inner rings of the remaining discs will preferably have two of said notches, the purpose of this arrangement being more clearly brought out as the description will proceed. As previously stated the disc F, is slightly different from the remaining discs, this particular disc being formed of the outer ring 52 and the inner ring 53, the outer ring having, on its inner face, a plurality of circumferentially spaced transversely extending recesses 54, and the inner ring 53 having the outwardly extending pin 55 adapted to be received in one of the recesses 54. The face of the inner ring 53 is recessed as shown at 56, to form the shoulder or flange 57 having the notches 58 extending therethrough. An outwardly extending flange 59 is formed on the inner ring 53 and will be received in a recess 60 formed in the face of the outer ring 52. An outwardly extending flange 61 is formed on the sleeve 40, adjacent its outer end, and will be received in a recess 62 formed in the face of the inner ring 52. The edges of the outer rings of each disc will be provided with the teeth 63 so that the adjacent discs will be frictionally held against accidental displacement. Of course, it will be understood that the outer faces of the end discs might not be provided with such teeth although their inner faces will have the same.

Recesses 64 are formed in the inner faces of the arm 25 of the left hand yoke section and receive the coiled springs 65 which bear against the outer face of the disc A, one of said springs engaging the outer ring and the other spring engaging the inner ring. It will be noted that these springs tend to hold the discs in frictional engagement and the flange 61 on the sleeve 40 limits the movements of the inner ring 53 of the disc F upon the sleeve and the flange 59 on the said inner ring limits the movement of the outer ring. In other words the discs are held upon the sleeve by the vertical arm 25 of the left hand yoke section and the flange 61 formed on the sleeve.

The under faces of the horizontal arms 24 and 26 of the yoke sections are dished out or concaved as shown at 66 and the edges extend downwardly from the center, as shown, this construction draining water or other elements from the lock in such a manner that rust will not form to impair the operation of the lock. The yoke is curved, as quite clearly shown in the drawings, to eliminate corners or recesses, this construction deflecting hammer blows should an unauthorized person endeavor to break the lock in this manner.

From the above detail description it is thought that the construction of the lock and its associated parts will be clearly understood and while, as previously stated, I have illustrated the lock as applied to a door it will be understood that it might equally as well be used in a number of other places. When in locking position the sections of the yoke will be so positioned that the beveled ends 28 and 29 thereof will be positioned within the eye 14 which is secured to the door frame. The pin 30, carried by the right hand section, will be received in the recess formed in the end of the left hand section and this pin will prevent side movements of the sections and properly position the ends with respect to one another. With the sections in the position described the rod 31 will be telescoped within the sleeve 40 and the discs will be so rotated that the openings 51, in the inner rings, will be out of alignment with the pins projecting from the rod 31. The pins will be received in the cut out portions 49 of the inner rings of the discs A, B, C, D, and E and the last pin 38 will be received in the recess 56 formed in the inner ring of the disc F. When in the positions described the discs may be freely rotated and it will be seen that the sections of the yoke cannot be separated to withdraw the ends thereof from the eye 14. When it is desired to open the lock the party knowing the combination can rotate the discs A, B, C, D, E, and F so as to bring the notches 51 and 58 of the inner rings into alignment with the pins 33, 34, 35, 36, 37 and 38 and when this has been done the sections may be separated, the rod 31 being slid with respect to the sleeve 40 and the sliding movement thereof being limited by the pins engaging the ends of the elongated opening 39 formed in the sleeve. In setting the proper combination the teeth 63 formed on the side faces of the outer rings of the disc will frictionally hold the adjacent discs so that they will not slip to disarrange the combination. At the same time the coiled spring 65 tend to press the discs together. The discs being formed of inner and outer rings, the combination may be changed at will by merely engaging the pin carried by the inner rings into different notches or recesses formed in the inner face of the outer ring. As previously stated I put a separate notch in the inner face of the outer ring for each designating character on the outer face thereof. In separating the sections of the

yoke the pins carried by the rod 31 will be withdrawn through two of the discs, and for this reason in all of the discs, with the exception of the first one A, it is necessary to have two of the notches or recesses 51.

With the improved form of lock I also employ the novel form of hasp and eye, these members being connected to the door and foor frame, respectively, in such a manner that they cannot be disconnected by an unauthorized person. The hasp is swiveled to the door by means of a bolt and socket connection whereby the hasp may be swung in all directions and may be easily engaged over or disengaged from the eye secured to the door frame. The slot 6 formed in the semispherical portion 4, of the hasp, allows a swinging movement of the hasp with respect to the connecting bolt. The eye itself is formed with a peculiarly shaped bore adapted to receive and snuggly fit the ends of the yoke sections.

In providing a lock, hasp, and eye, of the particular construction described I believe that I have guarded against opening of the door, or other member, by an unauthorized person and it will be impossible for them to unlock or disengage the parts by means of hammers, chisels, or similar tools. The exterior surface of the yoke is of such curvature that no corners or recesses are provided and if a hammer should be used in an attempt to open the lock the blows would be deflected. By having the ends of the yoke sections snuggly fitting the eye and also by having the discs fitting the inner cylindrical surface of the yoke it is impossible for a chisel or other implement to be inserted to pry the sections apart and the pin 30 will prevent lateral movement of the ends of the sections.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A lock of the character described comprising a yoke formed in two sections, a sleeve carried by one section, a rod carried by the other section and adapated to normally telescope within the sleeve, pins carried by the rod and extending through openings in the sleeve, and discs rotatably mounted upon the sleeve and adapted to engage the pins, the side faces of the discs provided with circumferentially spaced teeth, the teeth of adjacent discs interlocking to frictionally hold the adjacent discs.

2. A lock of the character described comprising a sectional yoke, rotatable discs and means carried by the yoke and engaged by the discs for locking the sections together, the under surface of the yoke being concaved to receive the upper surface of the discs and the edges of the concaved portion overlying the discs.

3. A lock of the character described comprising a yoke formed in two sections, a sleeve carried by one section, a rod carried by the other section and adapted to normally telescope within the sleeve, that section of the yoke carrying the rod having a groove surrounding the end of the rod to receive the free end of the sleeve, pins carried by the rod, and rotatable discs carried by the sleeve and adapted to engage the pins.

4. A lock of the character described comprising a yoke formed of two sections, a sleeve carried by one of the sections, a rod carried by the other section and normally telescoping within the sleeve, pins carried by the rod and extending through openings in the sleeve, discs rotatably mounted upon the sleeve and adapted to engage the pins. said discs being formed of superimposed rings and means for connecting the same, the inner rings having a passage therethrough for the passage of the pins when the rod is slid with respect to the sleeve, a spring for normally engaging the outer ring of one end disc, and a spring normally engaging the inner ring of one end disc, said springs normally holding the rings of the discs in frictional engagement.

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

CHARLES COTTONN.

Witnesses:
CHARLES W. COOK,
W. C. MUSE.