Nov. 2, 1926. 1,604,983

J. M. FERGUSON

COMBINATION LOCK

Filed Dec. 20, 1924

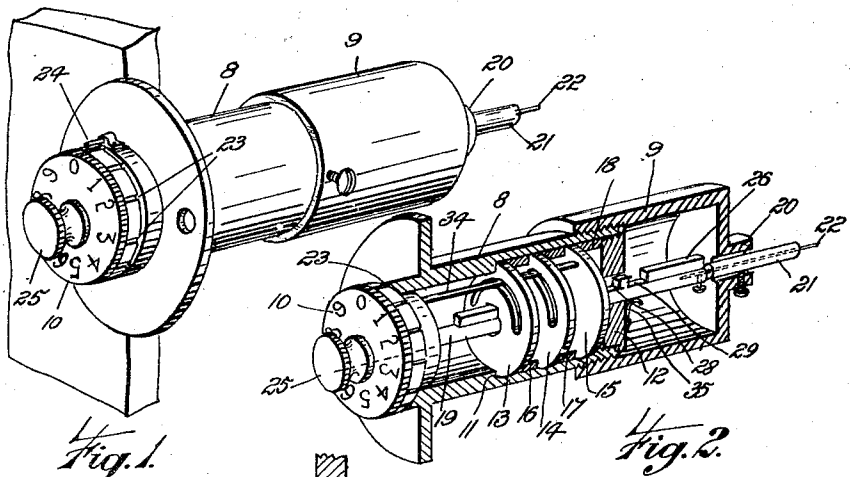


Fig. 1.

Fig. 2.

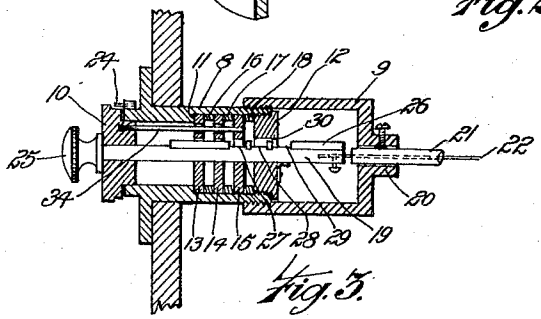


Fig. 3.

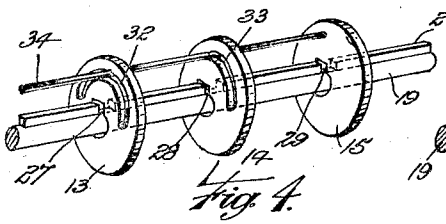


Fig. 4.

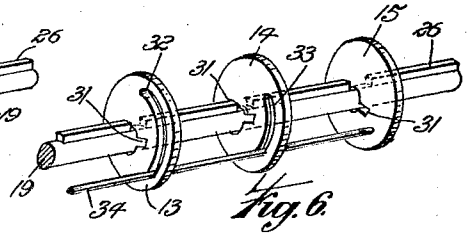


Fig. 6.

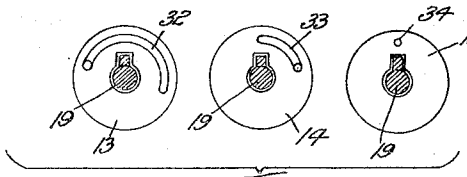


Fig. 5.

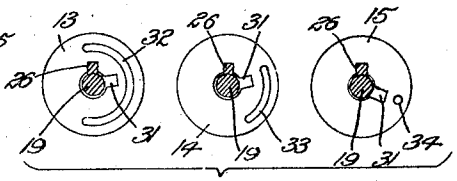


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOHN MALCOLM FERGUSON, OF SYDNEY, NEW SOUTH WALES, AUSTRALIA.

COMBINATION LOCK.

Application filed December 20, 1924, Serial No. 757,210, and in Australia October 20, 1924.

This invention relates to locks but more especially refers to the style of lock which does not require a key for its operation, a type which is generally referred to as a combination lock.

The object of the invention is to provide a lock of this description which can be easily and cheaply manufactured and which will be efficient and positive in its operation. The lock has been primarily devised for use on motor cars for securing various parts of the mechanism in order to prevent unauthorized use thereof but may be applied with equal facility for any other analogous purposes.

The device consists briefly of a shaft having an interrupted key thereon working in a casing through a series of rotatable discs which are adapted to be brought into predetermined positions by means exterior to the casing to permit of free movement of the shaft.

The lock will now be described with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of the complete lock,

Figure 2 is a sectional perspective view showing the internal arrangement thereof,

Figure 3 is a sectional elevation,

Figure 4 is an extended view showing the relationship between the various internal moving parts when the device is unlocked.

Figure 5 is a series of end elevations of these various parts.

Figure 6 is a similar view to Figure 4 with the device locked, and

Figure 7 is a view similar to Figure 5 of the parts shown in Figure 6.

The device consists of a casing formed in two parts 8 and 9 the front part 8 of which is provided with a graduated cap 10, an internal shoulder 11 and an end cap 12. Between the shoulder 11 and the cap 12 are a series of rotatable discs 13, 14, and 15 and distance pieces 16, 17, and 18. The bar 19 passes through the cap 10, the discs 13, 14, and 15 and end cap 12. The rear part of the casing 9 screws onto the front part 8 and is provided with a central boss 20 which receives a tube 21 through which in this example a wire 22 attached to the mechanism to be operated and to the shaft 19, passes.

The graduated cap is marked with a series of numbers and is provided with indentations 23 and adapted to engage with the pointer 24 attached to the casing 8. The bar has a knob 25 and a raised key 26 thereon, said key being cut away at 27, 28, and 29, the spaces equal to the thickness of the discs 13, 14, and 15. The end cap 12 has a keyway so placed therein as to allow the shaft 19 to pass therethrough. The discs 13, 14, and 15 also have keyways 31 therein while the disc 13 has a comparatively long circular slot 32, the disc 14 has a relatively shorter slot 33. The cap 10 and disc 15 are united rigidly by the rod 34 which passes through the slots 32 and 33.

The operation will now be described. Normally when locked the bar 19 is withdrawn so that the breaks 27, 28, and 29 in the key 26 correspond with the discs 13, 14, and 15 which are arranged in any position to lock the shaft as shown in Figures 6 and 7. When it is desired to unlock the device the cap 10 is rotated to a predetermined position thereby rotating the discs 13, 14, and 15 until the keyway in disc 13 comes opposite the key 26. The cap 10 is then rotated in the opposite direction taking with it the discs 14 and 15 and leaving the disc 13 stationary because the rod 34 passes freely through the slot 32, until the keyway in disc 14 is brought opposite the key 26. The cap 10 is then rotated in the opposite direction again, until the keyway in disc 15 is brought into alignment with key 26, the disc 14 remaining stationary as the rod 34 passes freely along 33. The bar 19 may then be operated, the discs being in the position shown in Figures 4 and 5 all the keyways being in alignment. The amount of turning of the cap 10 as well as the initial direction is governed by the position of the keyways 31 relative to the slots 32 and the rod 34. This is arranged in the assembling of each device so that a certain combination is required to release the shaft 19.

For example, suppose the required positions of the various discs correspond to the numbers "2," "7," and "0" on the cap 10 and that the cap has to be turned initially to the right, the first movement is to turn the cap 10 to the right until the indentation 23 corresponding to the numeral "2" is brought into engagement with pointer 24. This brings the disc 13 to its proper position. The next movement is to rotate the cap 10 to the left until the indentation corresponding to "7" engages 24. This brings disc 14 to its correct position. The last movement

is the turning of the cap 10 to the right again so that "0" is brought opposite pointer 24 thus bringing disc 15 to its proper position for releasing the bar 19. The knob 25 may then be depressed. When it is desired to lock the device the knob 25 and bar 19 are withdrawn and the cap 10 given a few random turns thus upsetting the combination.

The slots 32 and 33 are not confined to the exact length shown but may extend practically round the whole disc and by altering the positions of keyways 31 in the discs 13, 14, and 15 relative to the positions of the slots 32, 33, and 34 a new set of stopping places for the cap 10 are required which may be, for example, "7", "0", "2" with the initial movement to the left.

The keyway 30 in the cap 12 maintains the bar 19 in a constant position and the spring 35 acts as a brake to steady it.

The device has been described with three discs but it is obvious that it may if desired include two or four or more. Other minor variations may be made in the arrangement and construction of the parts without departing from the principle of the invention.

I claim:—

1. A locking device comprising a casing, a rotatable cap at one end of said casing, a series of spaced coaxially aligned rotatable discs within said casing, each of said discs being provided with a keyway, a bar adapted to pass through the centers of said rotatable cap and said discs, and a rigid rod connecting said cap and the rearmost disc, each of the other discs being provided with a segmental slot through which said connecting rod passes, whereby upon rotation of said cap the keyways in said discs may be aligned to permit longitudinal movement of said bar.

2. A locking device comprising a casing, a fixed rear end cap, a series of discs rotatable between distance pieces within said casing, keyways and slots in said discs, and a centrally situated bar passing through said discs and said end cap and having an interrupted key thereon, a rotatable front cap surrounding said bar, a rigid connection bar between said rotatable front cap and the rearmost of said rotatable discs, said bar passing through said slots in said intervening discs and means for indicating the position of said rotatable front cap.

3. A locking device comprising a front casing a rear casing, a front rotatable cap, a fixed cap at rear end of said front casing, a series of discs rotatable between distance pieces in said front casing, keyways in said discs and said fixed cap, slots in said discs, a centrally situated bar passing through said rotatable front cap said discs and said rear cap, a key formed on said bar, interruptions in said key, a rigid bar connecting said rotatable cap and the rearmost of said rotatable discs, said bar passing through said slots in said intervening rotatable discs, graduations on said rotatable cap and means for indicating the position of said graduations and means for attaching said bar to the mechanism to be operated and for passing said mechanism through said rear casing.

In testimony whereof I have affixed my signature.

JOHN MALCOLM FERGUSON.