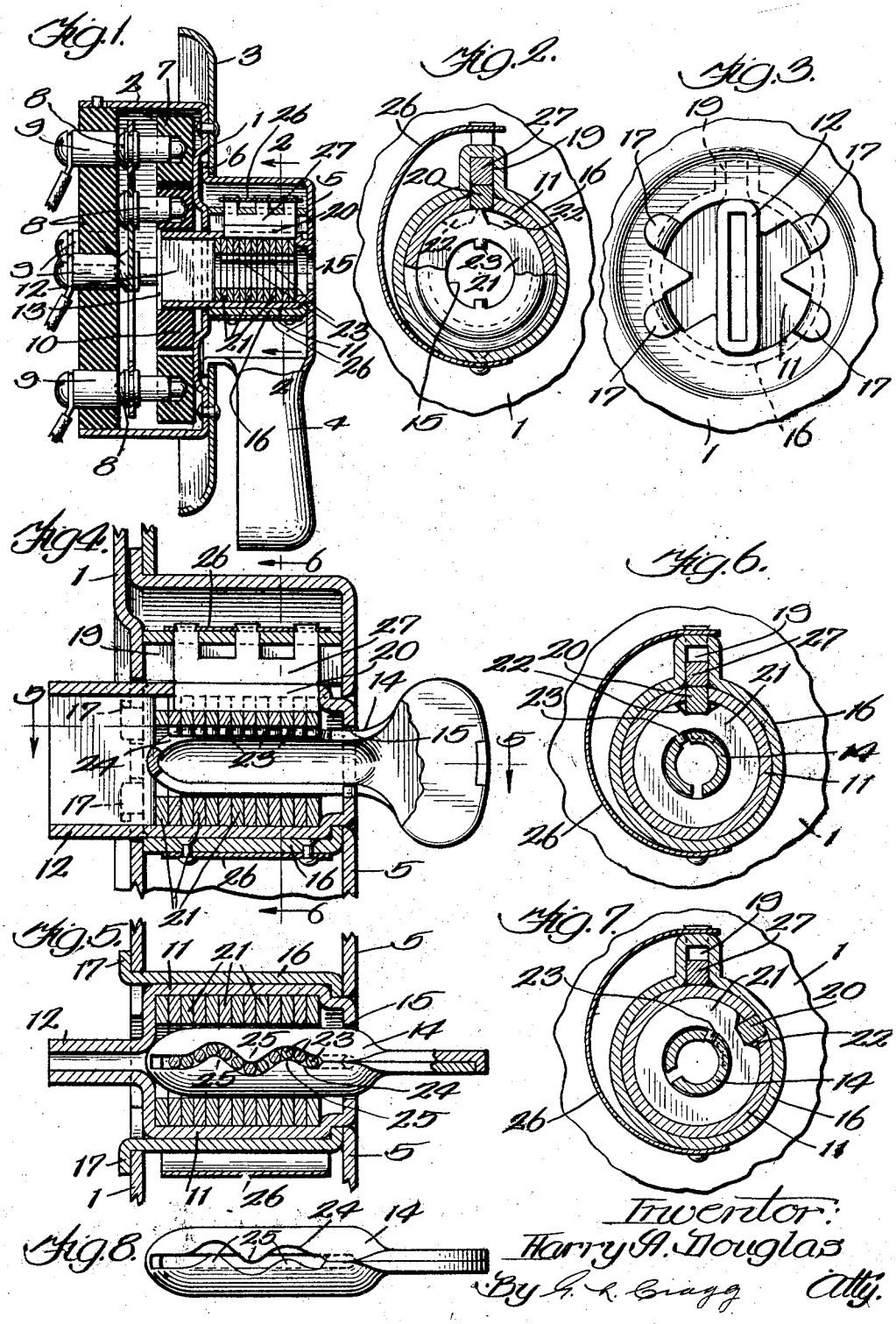
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H. A. DOUGLAS

LOCK

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Inventor:
Harry A. Douglas
By G. L. Bragg Atty.

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UNITED STATES PATENT OFFICE.

HARRY A. DOUGLAS, OF BRONSON, MICHIGAN.

LOCK.

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My invention relates to keys for locks. The key of my invention is formed of two adjacent portions of strip metal placed side by side and having adjacent longitudinal edge portions shaped to form a slot having operating wards.

The invention will be more fully explained in connection with the accompanying drawing in which Fig. 1 is a diametrical sectional view of a combined lighting and ignition automobile switch, so equipped with a lock operable by a key of my invention that the ignition portion of this switch may be locked or unlocked, the lighting portion of the switch being capable of operation independently of the ignition portion of the switch; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a view illustrating the inner end of the lock and contiguous parts; Fig. 4 is a view on a larger scale illustrating the lock with the key therein, the lock being then in unlocking adjustment; Fig. 5 is a sectional view on line 5—5 of Fig. 4; Fig. 6 is a sectional view on line 6—6 of Fig. 4; Fig. 7 is a view similar to Fig. 6 but showing the tubular member of the lock in one of the positions to which it may be turned by the fully inserted key; and Fig. 8 is a side view of the key alone.

The switch illustrated, will be first described, in order that the illustrated use of the improved lock may be understood.

The switch casing has an end wall 1 and a side wall 2, the wall 1 being essentially flat and the wall 2 being cylindrical. A mounting plate 3 is disposed over the end wall and upon the exterior of the casing beyond which the end plate laterally projects. A handle 4 has a hub portion 5 formed with flanges 6 that are confined in a space afforded between the plate 3 and casing wall 1, a construction that defines for the handle an axis of turning movement which is coincident with the axis of the switch casing. In switches of this type, which are well known in the art, the handle has continuations, not shown, extending through arcuate slots in the casing wall 1 that are coaxial with the casing and the handle, these continuations being coupled with a ring 7 of insulation. This ring is in actuating relation with contacts 8 that are arranged to be moved into and out of engagement with contacts 9 which pertain to the various lighting circuits of an automobile.

Another insulating ring 10 is surrounded by the ring 7 and may also be turned to open and close the ignition circuit of the automobile equipped with the switching mechanism.

The ring 10 is provided with a lock whereby the ignition circuit may be locked open, the portion of the switching mechanism governing the lighting circuit being operable at all times independently of the portion of the switching mechanism that governs the ignition switch. The drawing illustrates the use of a lock of my invention in controlling the ignition portion of the switching mechanism. The lock illustrated is inclusive of a tubular member 11 formed with a flattened inner extension 12 receivable in a slot 13, constituting the bore of the ring 10. Through the intermediation of mechanism hereinafter described, the tubular member 11 may be turned by a key 14 inserted through the circular opening 15 formed in the inturned outer end of the tubular member. A shell 16, constituting the preferred form of lock guard, surrounds the tubular member 11 and is fixedly mounted upon the end wall 1 of the switch casing by means of tongues 17 carried by and projecting inwardly from the shell and clinched over the inner surface of the casing wall 1, as illustrated in Figs. 3 and 5. The tubular member 11 is formed with a slot 18 in its side and the shell is formed with a slot 19 in its side, said slots being positioned to be brought into and out of register upon turning of the tubular member. A radially movable locking bar 20 is carried by the tubular member in its slot and is partially receivable in the slot formed in the shell, when the two slots are in register and the locking bar is moved outwardly upon the withdrawal of the key 14, as will more fully appear. Annular rotatable tumblers 21, are arranged in the tubular member 11 coaxial therewith, the bores of these tumblers being aligned to constitute a cylindrical receiving passageway for the key. Each of these tumblers is formed with a peripheral recess 22 and a ward 23. The wards and recesses in the different tumblers are preferably located at different distances apart so the recesses will be in staggered relation when the key is withdrawn. The key is desirably formed from a metal strip folded back upon itself and with two adjacent longitudinal edge portions shaped to form a sinuous slot 24 providing wards 25 that are engageable with the wards 23. As the key is inserted, the inter-engaging wards

23 and 25 cause the tumblers 21 to turn in succession, the relation of the wards upon the key and lock being such that the recesses 22 are ultimately brought into line when the key is fully inserted. These recesses are so located that, when they are aligned, they are collectively in parallelism with the slots. Prior to the insertion of the key, the recesses 22, are staggered so that the locking bar 20 is then certainly to be held by unrecessed portions of the tumblers in its outermost adjustment in which it not only continues to be received in the slot 18 in the tubular member 11 but is also projected into the slot 19 of the shell 16 whereby the tubular member is held from rotation.

In the use illustrated, the switching member 10 being connected with the tubular member 11, is held from rotation when the ignition circuit is open. When the recesses 22 have been brought into alignment by the fully inserted key, the tumblers 21 may be collectively turned to bring the aligned recesses 22 into register with the slot 18 to permit the locking bar 20 to be received in the aligned recesses. These recesses are of a size to receive the inner longitudinal side of the locking bar and of a depth to prevent the inward movement of the locking bar out of the slot in the tubular member 11 and to permit the inwardly moved locking bar to escape the shell, thereby freeing the tubular member 11 to permit it to be turned, together with the switch member 10, by means of the key operating through the wards 23, the tumblers, and the locking bar 20, partially in the recesses 22 and partially in the slot 18 in the tubular member. The bar 20 not only serves to couple the tumblers with the tubular member 11 when the lock is open and to couple the tubular member 11 with the cylindrical guard 16 when the lock is closed, but also serves to prevent relative rotation of the tumblers when it is received in the aligned recesses 22 when the lock is open so that the key can not be withdrawn when the lock is open, if such an arrangement be desired. In order to withdraw the key, the tumblers have to be collectively turned to place the locking bar in register with the slot 18. When the locking bar has been thus placed, the key may be withdrawn, the sides of the recesses 22 sloping so that as the tumblers are turned, the recessed sides that are forced against the locking bar by the turning action of the key will ride upon the locking bar and force it out of the recesses 22 partially into the slot 19. Thus when the key is withdrawn, the lock is closed and is maintained closed because the recesses 22 are in staggered relation when the key is withdrawn, the unrecessed portions of the tumblers engaging the inner side of the locking bar to hold it in its outwardly projecting position in which it is received in the locking slot 19.

The locking bar 20 is constrained to move inwardly so that when the recesses 22 are aligned and placed in register with the slot 18, the bar will at once enter the recesses. To thus constrain the locking bar, I desirably employ a leaf spring 26 anchored at one end to the shell 16 and connected at its other end with a floating block 27 which is received in the outer portion of the slot 19 and which presses against the outer side of the locking bar 20 through the action of the spring.

It will be seen that the locking bar 20 relieves the tumblers 21 of any direct locking engagement with the shell 16. The tumblers, being comparatively delicate, are relieved of the heavy locking action by the bar, the tumblers serving merely to position the bar in locking adjustment. I do not wish to be limited to the rotatable tumblers, in all embodiments of the invention, nor to the action of each tumbler in thrusting the locking bar into its outward and locking position, it being apparent that this latter function may be performed by a portion only of the tumblers.

Features not herein claimed form the subject matter of a division of this application, Serial No. 123, 955, filed July 21, 1926.

The key is claimed herein. The lock is claimed in my copending application Serial Number 123,955, filed July 21, 1926.

Changes may be made without departing from my invention.

Having thus described my invention, I claim:

1. A key formed of a metal strip folded upon itself and having adjacent longitudinal edge portions of the folded portions of the strip shaped to form a slot having operating wards.

2. A key formed of two adjacent portions of strip metal placed side by side and having adjacent longitudinal edge portions shaped to form a slot having operating wards.

In witness whereof, I hereunto subscribe my name.

HARRY A. DOUGLAS.