Dec. 25, 1928. 1,696,829

S. WISE

LOCK

Filed July 12, 1927 2 Sheets-Sheet 1

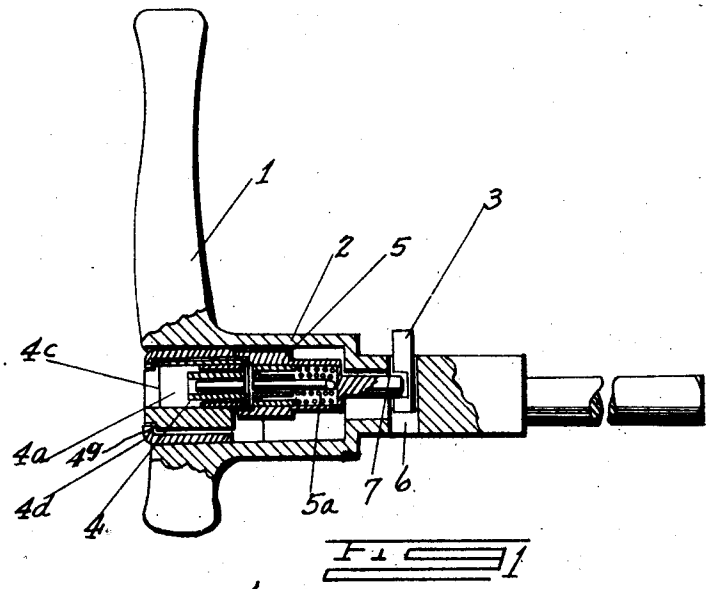


FIG 1

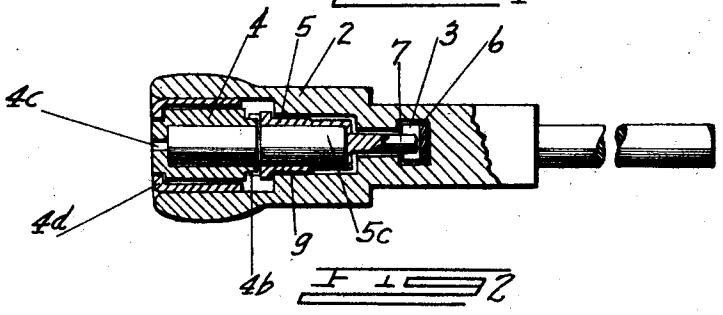


FIG 2

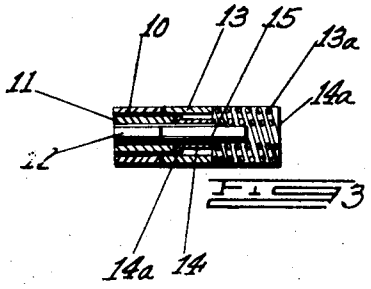


FIG 3

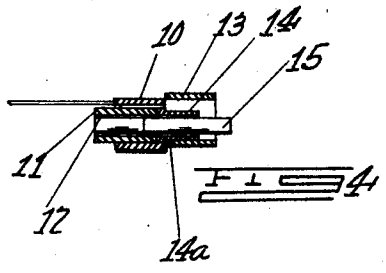


FIG 4

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Dec. 25, 1928. 1,696,829

S. WISE

LOCK

Filed July 12, 1927 2 Sheets-Sheet 2

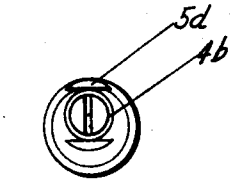


FIG 5

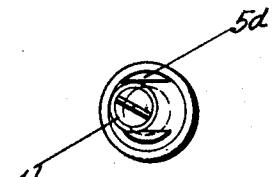


FIG 6

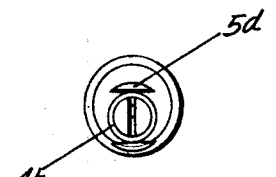


FIG 7

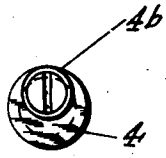


FIG 8

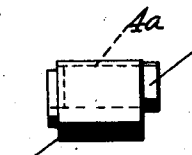


FIG 9

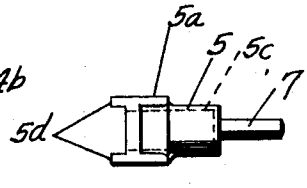


FIG 10

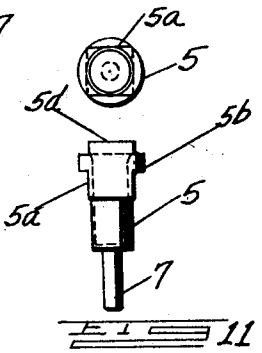


FIG 11

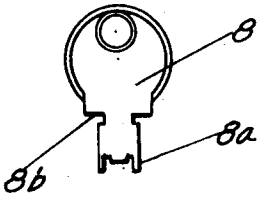


FIG 12

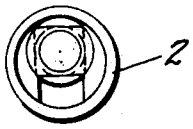


FIG 13

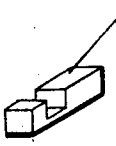


FIG 14

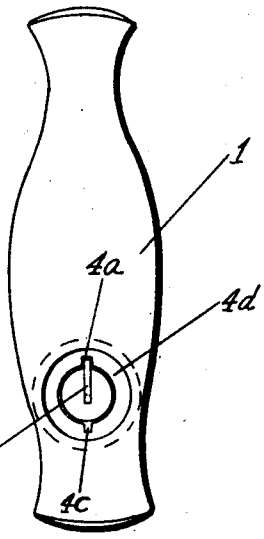


FIG 15

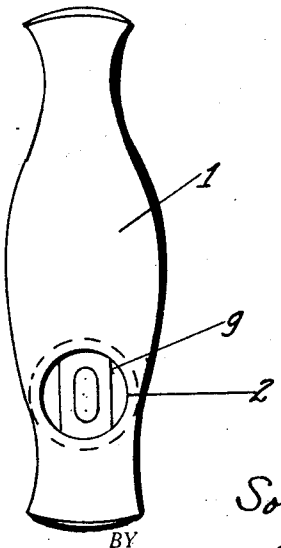


FIG 16

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Patented Dec. 25, 1928. 1,696,829

UNITED STATES PATENT OFFICE.

SOLOMON WISE, OF CINCINNATI, OHIO.

LOCK.

Application filed July 12, 1927. Serial No. 205,186.

My invention relates to locks employing tumblers which are in the form of concentric tubes, my particular objective being to provide a door handle lock, in which the handle is held in fixed position, or is permitted to revolve, the key passing into the shank of the handle. My invention will, of course, have other uses, and in one respect has general application to any tumbler lock of the type described.

One of the objects of my invention is to so arrange tubular tumblers in a lock structure that it is not practical to establish a line of cleavage on the outer ones of the set by means of a pin, and then move the one system of plungers with relation to the other by placing a strain on the mechanism to hold the two sets out of line, followed by displacing each of the inner tumblers to the line of cleavage and thus picking the lock without the use of a key.

Another object of my invention is to provide a structure using the tubular plungers in which the revolution of the container for the outer set of tumblers moves the container for the inner set through its full path from one locked position to another locked position, in a one-half revolution of the key, which locks a door open and also locks it closed. It is also the object to provide a structure in which the revolution of the container for the outer set of tubes moves the container for the inner set in a straight line or substantially so, said latter movement energizing the locking bar of whatever lock is being operated.

As advantages for my particular type of plungers in a vehicle or other door handle, I refer to the fact that the key can be inserted in two opposite ways instead of in but one way as in the pin tumbler type of lock, and to the fact that the particular arrangement permits the door handle to be freely movable unless the key is operated, because the tumblers are interengaged to hold out the handle fastening bolt, as well as being engaged to hold the bolt in locking position.

I accomplish the stated objects and advantages and others to be noted by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings:—

Figure 1 is a section taken through the door handle lock showing the use of my invention.

Figure 2 is a section taken through the lock with the tumbler removed at right angles to the section of Figure 1.

Figure 3 is a view showing the relation of the plungers when in normal position of interengagement.

Figure 4 is a view showing the result of an attempt to pick the lock.

Figures 5, 6 and 7 are diagrams showing the three positions of the lock, i. e. locked in one direction intermediate between positions, and locked in the other direction.

Figure 8 is an end view of the barrel or tumbler container for the outer set of tumblers.

Figure 9 is a side elevation thereof.

Figure 10 is a side elevation of the container for the inner set of tumblers.

Figure 11 is a view of the part shown in Figure 9 at right angles to said figure, with a projection of the said part.

Figure 12 is a view of a key.

Figure 13 is a section on the line 13—13 of Figure 2.

Figure 14 is a perspective of the locking bar.

Figure 15 is an external elevation showing the door handle lock.

Figure 16 is a view like Figure 15, with the tumbler parts and containers removed.

I will describe my lock with reference to the particular embodiment shown, which is of a door handle for vehicles. The handle is illustrated at 1, having a hollow shank 2. The shank extends inward in the door to a point where it operates the usual door latch, and is so mounted that when a locking bar illustrated at 3 is projected from the inner end of the shank, the shank, and hence the handle, cannot be revolved. This locks the door by means of the handle operated latch, which is then out of control of the operator.

There are two tumbler containers in the lock, marked in general 4 and 5. The locking bar 3 lies in a slot 6, which passes through the shank of the handle, and the inner end of the container 5, as indicated at 7, engages the lock bar. The inner container 5 is arranged so that it slides to and fro, when the outer container is revolved, thus operating the locking bar.

The remainder of the lock is adapted for use in connection with any desired hollow shank or mounting element to operate any kind of a movable lock bar.

To describe first the outer container, it will be noted that this container has a barrel

shaped portion which has been marked 4. Within this portion is a chamber 4^a for the tumbler assembly, which chamber is off center of the barrel shaped portion, and there is a projection 4^b of the container in line with the chamber.

The outer face of the container 4 is closed except for a slot 4, which lets into the tumbler chamber. Through this slot the key is inserted, so that the revolution of the key revolves the container.

The container is held in place in the shank of the door handle by means of a thimble 4^d, which is driven into place and is flanged inwardly to engage over a shoulder 4^g, about the outer end of the container. The thimble is notched at 4^e, to permit insertion of the key in both positions of the barrel. The key 8 has the tumbler operating tongues 8^a, and the notches 8^b, for insertion past the notches in the thimble.

The container 5 has a flattened portion 5^a, which rests in a rectangular portion 9 of the bore of the handle shank. It has a flange 5^b which rests on the shoulder about the outer end of the portion 9 of said shank bore. The chamber 5^c in the container 5 is eccentric to the central axis thereof, and two lips 5^d extend from the outer end of the container, in line with the bore, and are flattened on the inner faces thereof. The projection 4^b of the container 4 lies between the said lips, with the result that when the container 4 is revolved, the container 5 is moved crosswise across the bore portion 9. The inner end of the container 5, as has been noted, has a projection 5, which engages the locking bar, and the arrangement is such that when the container 5 is at one end of its stroke, the lock bar will latch the door handle against movement, and when at the other end of its stroke the lock bar will be in inoperative position.

The structure is also such that the tumbler containing chambers will be in line with each other so that the tumblers can intermesh at both ends of the stroke, thus avoiding chance dislodgments of the lock bar and absolutely requiring a key operation to open and to close the said lock bar. This relation will be evident from Figures 5, 6 and 7.

The tumblers themselves may be of any desired number, and in this case I have shown three tumblers in each container chamber, the central ones being pins, and the two outer ones concentric tubes.

Referring first to the outer set, there is the outer tube 10, the inner tube 11, and the central pin 12. In the inner set there is the outer tube 13, the inner tube 14, and the central pin 15. There are springs 13^a and 14^a, set into the tumbler chamber 5^c, so that when the container chambers are both in line, the tumblers will be forced by the springs to intermeshing relation which will prevent the two containers from moving out of line with each other.

To line up the tumblers of the outer set with those of the inner set to a line of cleavage requires the insertion of the key which is inserted until the pin 15 is forced to the bottom of the chamber 5^a, thus gauging the amount of insertion of the key that fits the particular assembly. The tubular elements will be then so lined up that the containers can move with relation to each other, and the inception of any degree of movement will make the cleavage permanent until the half turn of the key (in this instance) when the chambers will line up again, then the key will be forced out of the lock by the springs on the inner set of tumblers.

It is evident that changes in length of tumblers will give a very large number of variations of the required keys to open any given arrangement.

In order to prevent a thief from forcing in the outer largest tumbler until the containers will move slightly with each other, and then forcing in the second largest, and again moving the containers relative to each other, and finally forcing down the central pins, using a hair pin or some like improvised tool, I provide that the tubular tumbler 14 has a shoulder around its outer end as indicated at 14^a, which shoulder fits within the outer tumbler. Should a thief try to force in the outer tumblers to the cleavage line, the result will be that a strain on the container will result in the inner end of the inner tumbler moving to a position where it will project under the shoulder on the tumbler 14, thus preventing this tumbler from being forced in. This relation is shown in Figure 4.

The parts of the whole assembly are easily dropped into place and may be made by die casting or screw machine, so that the lock is not only effective, but strong and cheap to make. To force the lock would require the shearing of a considerable mass of metal equal to the total thickness of the tumbler assembly. To operate the lock, the key has no right side and wrong side for insertion, which simplifies the operation.

It will be evident from the above that the principle of the lock, irrespective of the vehicle door handle assembly, permits of its use in a wide number of ways, and I do not wish my invention limited to any one application or to any specific type of lock bar to be operated, and will express in the claims the invention which I believe to be inherent in my invention.

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

1. In a lock, the combination of two tumbler containers, means on one container for moving the other container with relation to

it, tumbler chambers in said containers, a set of concentric tumblers for each chamber one of which sets at least, is spring impelled, whereby when the chambers are in line the tumblers will intermesh and hold them against relative movement, adapted to receive a key for the one container, establishing a line of cleavage between the sets for concentric tumblers and for rotating said container, and means on the other container to operate a bolt.

2. In a lock, the combination of two tumbler containers, means on one container for moving the other container with relation to it, tumbler chambers in said containers, a set of concentric tumblers for each chamber one of which sets at least, is spring impelled, whereby when the chambers are in line the tumblers will intermesh and hold them against relative movement, adapted to receive a key for the one container, establishing a line of cleavage between the sets of concentric tumblers and for rotating said container, and means on the other container to operate a bolt, said containers having means for mounting the same to permit revolution of one and movement of the other, the chambers in the key operated container being eccentric to it.

3. In a door lock, the combination with a handle and shank, a bolt for locking the shank, tumbler containers within the shank, having each a set of concentric tumblers matching each other in diameter in the sets one set being spring impelled, means on the outer container to move the inner one, and means on the inner one to operate the bolt.

4. In a tumbler lock arrangement, means providing a pair of tumbler chambers which have a coaxial position, a set of concentric tumblers in each chamber, said chambers being relatively movable so as to move the tumblers out of axial relation, one of the tumblers of the inner set having an expanded end fitting within another of the tumblers of said set, for the purpose described.

5. In a tumbler lock arrangement, means providing a pair of tumbler chambers which have a coaxial position, a set of concentric tumblers in each chamber, said chambers being relatively movable so as to move the tumbers out of axial relation, one of the tumblers of the inner set having an expanded end fitting within another of the tumblers of said set, for the purpose described, said tumblers of the inner set having spring means to force them into the chamber of the tumblers of the outer set when the tumbler chambers are coaxial.

6. In a door lock, the combination of a handle having a shank, a tumbler container revoluble in said shank, another tumbler container slidable but not substantially revoluble in said shank, means controlled by the said slidable container for bolting the shank, and concentric tumblers in said containers having spring means to hold them in position of interengagement within the two containers when said containers are in a selected position, a line of cleavage in said tumblers adapted to be established by a key whereby said bolt may be operated.

7. In a lock, the combination with a bolt therefor, of a slidable tumbler container to control the operation of the bolt, a revoluble tumbler container, said tumbler containers having matching concentric tumblers in each which normally interengage to hold the containers against relative movement, the tumblers in the revoluble container being eccentric thereto, and means on said revoluble container, coaxial with the tumbler assembly therein to engage the slidable tumbler container as a cam, whereby revolution of the revoluble container will move the slidable container, when the sets of tumblers are brought to a line of cleavage.

8. In a lock, the combination with a bolt therefor, of a slidable tumbler container to control the operation of the bolt, a revoluble tumbler container, said tumbler containers having matching concentric tumblers in each which normally interengage to hold the containers against relative movement, the tumblers in the revoluble container being eccentric thereto, and means on said revoluble container, coaxial with the tumbler assembly therein to engage the slidable tumbler container as a cam, whereby revolution of the revoluble container will move the slidable container, when the sets of tumblers are brought to a line of cleavage, the path of the slidable container being so controlled as to bring the tumblers in the respective containers into interengaging position, at half revolutions of the revoluble container.

SOLOMON WISE.