

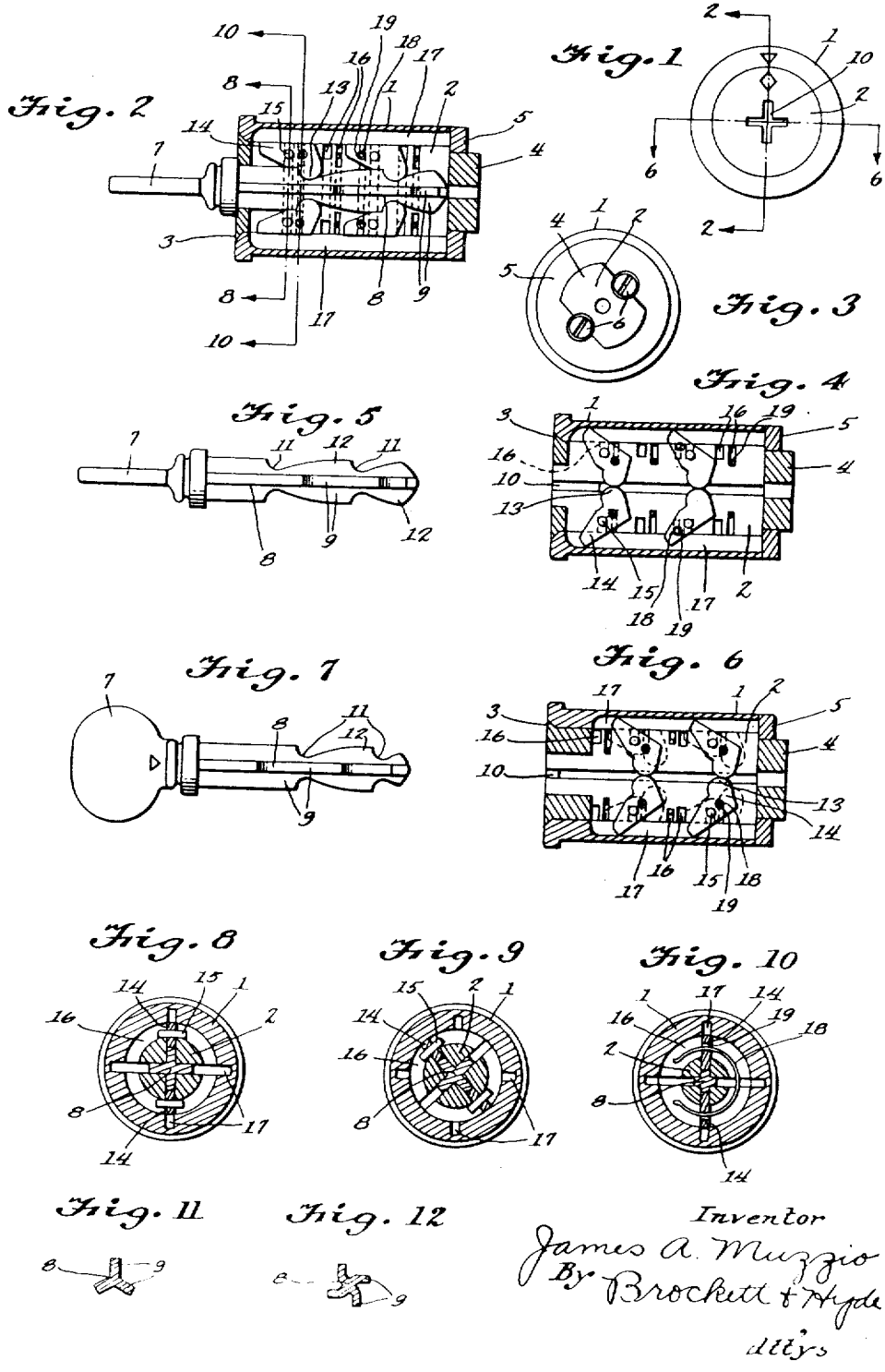
July 27, 1926.

1,594,297

J. A. MUZZIO

CYLINDER LOCK

Original Filed Jan. 13, 1922



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UNITED STATES PATENT OFFICE.

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CYLINDER LOCK.

Application filed January 13, 1922, Serial No. 528,952. Renewed December 21, 1925.

This invention relates to cylinder locks.

The object of the invention is to provide an improved cylinder lock which is so constructed and arranged as to enable it to be readily manufactured in quantities at low cost, and which lock is more secure against unauthorized manipulation than prior devices of this character.

A further object of the invention is to provide a cylinder lock in which all of the movable or working parts are carried by the rotatable plug, and in which said parts include levers or locking members which enter longitudinal grooves or channels in the cylinder and spaced circumferentially around the same, so as to increase the difficulty of "picking" the lock and also securing edgewise engagement between the locking members and channels so as to avoid breaking the parts by forceable relative rotation between the cylinder and the plug.

A further object of the invention is to generally improve the manner of mounting the movable locking levers or members and insure their cooperation with the key. A further object of the invention is to provide an improved lock actuated by a special improved form of key.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawings, Fig. 1 represents a front elevation of a lock embodying the invention; Fig. 2 is a sectional elevation thereof on the line 2—2, Fig. 1, with the key in place; Fig. 3 is a rear elevation; Fig. 4 is a sectional view, corresponding to Fig. 2, the key being withdrawn; Fig. 5 is a detail view of the key; Fig. 6 is a sectional view on the line 6—6, Fig. 1; Fig. 7 is another view of the key shown in Fig. 5, the key being turned 90°; Fig. 8 is a sectional view on the line 8—8, Fig. 2; Fig. 9 is a similar view with the plug turned 45°; Fig. 10 is a sectional view on the line 10—10, Fig. 2; and Figs. 11 and 12 are detail cross sectional views showing modified forms of keys.

The lock shown in the drawings comprises an outer casing member 1, usually termed a "cylinder", which is suitably formed for attachment to the part to which the lock is to be secured. In said cylinder is a cylindrical opening to receive a cylinder plug 2 provided with an annular ex-

ternal rib 3 at one end and at its opposite end with a projection 4 adapted to actuate the bolt or other locking device. The plug is rotatably held in the cylinder so as to be capable of removal therefrom, such as by a collar 5 sleeved over the projection 4 and held to the plug by screws 6. All of these parts may be of ordinary construction.

Plug 2 is provided with a central longitudinal opening to receive the key, one form of key being shown in Figs. 5 and 7. This key is provided with a turning head 7 and a shank 8 having a plurality of longitudinally extending circumferentially spaced ribs 9. These ribs may lie in radial planes and may be of any suitable number, such as three in the form shown in Fig. 11, or four, as shown in Figs. 5, 7 and 12, or more if desired, or said ribs may be of curved form as shown in Fig. 12. In any case the ribs will be straight from end to end of the key so that the latter can be pushed endwise into a similarly shaped opening in the plug. In the lock shown in the drawings, the plug is provided with an opening 10, Fig. 1, of cruciform cross section to correspond with the key shown in Figs. 5 and 7.

Each of the ribs 9 is cut away or otherwise suitably formed to provide depressions 11 and intervening raised portions 12, the depressions being adapted to cooperate with rounded ends 13 on the arms of locking levers 14. In the particular form shown, there are two such levers for each key rib, the two levers for each rib being spaced longitudinally and these alternate levers being in staggered relation, as will appear by comparison of Figs. 4 and 6. Each lever turns about a pivot pin 15 which is suitably formed or may, for example, be a short pin driven into the lever and fast thereto, with its projecting ends lying in an annular groove or recess 16 turned in the outer surface of the plug 2. Each of the levers can turn about its pivot pin from the release position shown in Fig. 2 to the locking position shown in Figs. 4 and 6, and whenever the key is withdrawn from the plug said levers always tend to turn to the locking position (Figs. 4 and 6) so that they extend outwardly into longitudinally extending channels or recesses 17 in the cylinder 1. Two of said channels, the ones shown in Fig. 6, are shorter than the other two and

prevent the parts reaching locking position in any other position than the correct one. This operation is also assisted by slight unequal circumferential spacing of the channels 17 and also of the levers 14. For example, the channels will not be spaced exactly 90° apart, but will vary three or four degrees in spacing, the several sets of levers being correspondingly spaced, so that locking engagement can be secured in only one definite position of relative rotation.

To normally tend to move said levers to locking position, as shown in Figs. 4 and 6, the several levers are provided with yielding means for tending to move them to such position, said means comprising a series of fine wire springs 18 coupling oppositely disposed levers in pairs, and which springs pass through openings 19 in said levers. Some of the springs are on one side of the pivots 15 and others are on the other side, as clearly shown in Fig. 4, so that some of the springs will be formed with a tendency to push their lever arms outwardly and others with a tendency to pull their lever arms inwardly. In either case, the tendency of each spring will be to move its lever to the locking position.

In the manufacture of this lock the several annular channels 16 which receive the lever pivots and springs are turned up by a simple turning operation. After insertion of the levers and springs the key is pushed to place, its recesses and projections 11, 12 having been previously formed. A light finishing cut is then taken on the outside of the plug to reduce not only the outer surface of the plug to cylindrical form, but to also turn down the outer edges of the levers so that they are flush with the plug surface. The lock is then inserted into the barrel and when in proper rotated position the key may be withdrawn.

If desired, the cylinder, plug and key may be suitably marked, as indicated in Figs. 1 and 7. For example, the marks on the cylinder and plug may be so positioned that when they are in registering relation, as in Fig. 1, the locking levers are in release position and the key can then be withdrawn. A mark may be placed on each side of the turning head 7 of the key, to indicate the proper manner of inserting the key, it being merely necessary to bring the marks on the key in vertical alignment with the marks on the cylinder and plug.

The lock is so constructed as to be capable of manufacture in quantity at exceedingly low cost. It can not be manipulated by the ordinary lock "picking" operations, one reason being that the number of locking levers is largely increased and they are so disposed that gravity or the effect of blows cast definitely upon the various sets of levers has no effect.

Other advantages flowing from this invention will be apparent to those skilled in the art to which it relates.

What I claim is:

1. A cylinder lock, comprising relatively rotatable cylinder and plug members, said plug member being provided with a series of circumferentially spaced locking levers each lever having a pivot pin, said plug member being also provided with circumferentially extending recesses to receive said pins.

2. A cylinder lock, comprising relatively rotatable cylinder and plug members, circumferentially spaced locking levers carried by said plug member, and circumferentially extending springs effective upon said levers, said plug member being provided with annular channels to receive said springs.

3. A cylinder lock, comprising relatively rotatable cylinder and plug members, said cylinder member being provided with circumferentially spaced longitudinally extending locking grooves, a series of sets of longitudinally spaced locking levers circumferentially distributed around said plug member, the levers of successive circumferentially spaced sets of levers being staggered relative to each other.

4. A cylinder lock, comprising relatively rotatable cylinder and plug members, circumferentially spaced locking levers carried by the plug member, and circumferentially extending springs effective upon said levers, said plug member being provided with annular channels to receive said springs, each locking lever being provided with a pivot pin, said plug member being also provided with annularly extending grooves to receive said pivot pins.

5. A cylinder lock, comprising relatively rotatable cylinder and plug members, said cylinder member being provided with circumferentially spaced longitudinally extending locking grooves, and a series of sets of longitudinally spaced locking levers circumferentially distributed around said plug member, the levers of successive circumferentially spaced sets of levers being staggered relative to each other, each locking lever being provided with a pivot pin, said plug member being also provided with annularly extending grooves to receive said pivot pins.

6. A cylinder lock, comprising relatively rotatable cylinder and plug members, circumferentially spaced locking levers carried by the plug member, and circumferentially extending springs effective upon said levers, said plug member being provided with annular channels to receive said springs and with longitudinally extending channels to receive said levers.

7. A cylinder lock, comprising relatively rotatable cylinder and plug members, said cylinder member being provided with cir-

cumferentially spaced longitudinally extending locking grooves, and a series of sets of longitudinally spaced locking levers circumferentially distributed around said plug member, the levers of successive circumferentially spaced sets of levers being staggered relative to each other, circumferentially extending springs coupling diametrically opposed levers, said plug member being also provided with annularly extending channels to receive said springs.

8. A cylinder lock, comprising relatively rotatable cylinder and plug members, circumferentially spaced locking levers carried by the plug member, and circumferentially extending springs effective upon said levers, said plug member being provided with annular channels to receive said springs, each lever being provided with a pivot pin and opposite levers being coupled by circumferentially extending springs, said plug

member being also provided with annularly extending channels to receive said pivot pins and springs.

9. A cylinder lock, comprising relatively rotatable cylinder and plug members, said cylinder member being provided with circumferentially spaced longitudinally extending locking grooves, and a series of sets of longitudinally spaced locking levers circumferentially distributed around said plug member, the levers of successive circumferentially spaced sets of levers being staggered relative to each other, each lever being provided with a pivot pin and opposite levers being coupled by circumferentially extending springs, said plug member being also provided with annularly extending channels to receive said pivot pins and springs.

In testimony whereof I hereby affix my signature.

JAMES A. MUZZIO.

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8. A cylinder lock, comprising relatively rotatable cylinder and plug members, circumferentially spaced locking levers carried by the plug member, and circumferentially extending springs effective upon said levers, said plug member being provided with annular channels to receive said springs, each lever being provided with a pivot pin and opposite levers being coupled by circumferentially extending springs, said plug

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Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,594,297, granted July 27, 1926, upon the application of James A. Muzzio, of Cleveland, Ohio, for an improvement in "Cylinder Locks," an error appears in the printed specification requiring correction as follows: Page 2, lines 82 and 83, claim 2, strike out the words "annular channels" and insert instead *circumferentially extending recesses*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of August, A. D. 1926.

[SEAL.]

M. J. MOORE,
Acting Commissioner of Patents.

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[SEAL.]

M. J. MOORE,
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