Dec. 3, 1935. P. W. OLSON 2,023,208

CYLINDER LOCK

Filed Feb. 26, 1934

Fig. 1

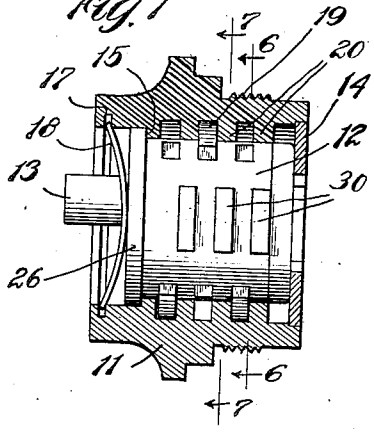


Fig. 2

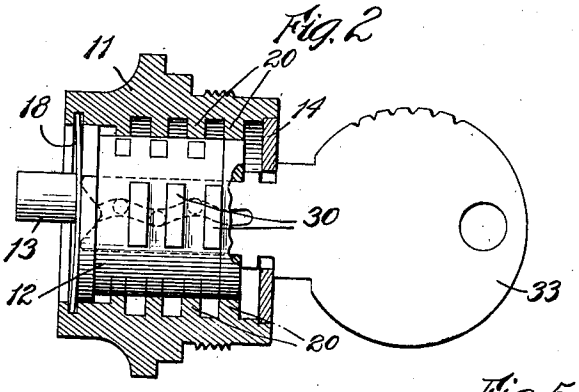


Fig. 3

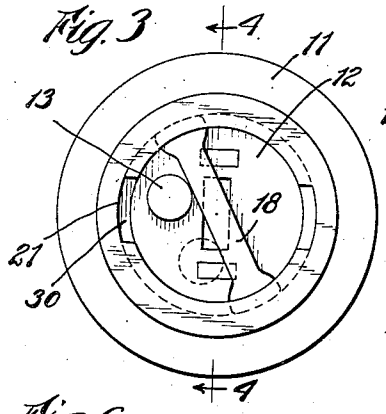


Fig. 4

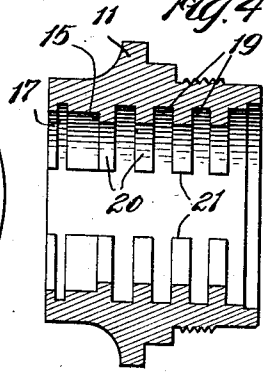


Fig. 5

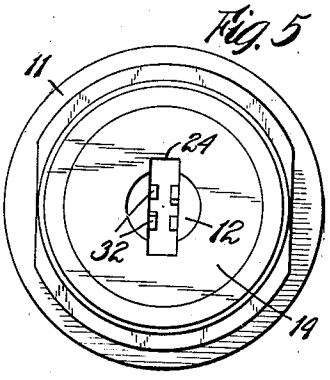


Fig. 6

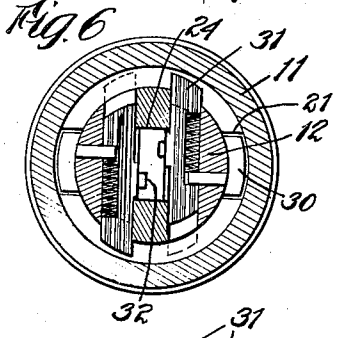


Fig. 7

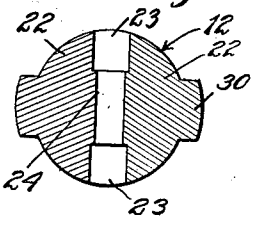


Fig. 8

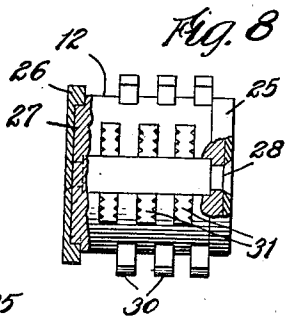


Fig. 9

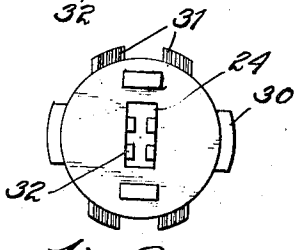
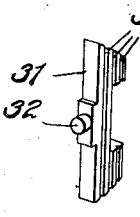


Fig. 10



Inventor
Phillip W. Olson
John E. Titus
Atty.

Patented Dec. 3, 1935 2,023,208

UNITED STATES PATENT OFFICE

2,023,208

CYLINDER LOCK

Phillip W. Olson, Grand Rapids, Mich., assignor to Automatic Musical Instrument Company, Grand Rapids, Mich., a corporation of Michigan

Application February 26, 1934, Serial No. 713,007

9 Claims. (Cl. 70—46)

This invention relates to improvements in cylinder locks, and more especially to the provision of a lock which is less susceptible to being damaged by "jimmying" or attempted forcible operation than the prior types of locks.

In the more common constructions of cylinder locks, the series of key-operated tumblers project from the plug into recesses in the barrel of the lock, and the tumblers directly prevent the rotation of the plug. Accordingly when a flat instrument such as a screw driver is inserted in the keyway in an attempt to forcibly rotate the plug by shearing the tumblers, the tumblers are likely to be damaged even if the "jimmying" is unsuccessful, so much so that the lock can no longer be operated by the proper key.

In this invention the rotation of the plug in locking position is opposed by surfaces integrally formed on the plug and in the barrel so that when forcible rotation is attempted the tumblers are not affected and the lock is less apt to be materially damaged.

Other objects and advantages of this invention will become more apparent in the following description, taken with reference to the accompanying drawing, in which an illustrative embodiment of the invention is shown.

Fig. 1 is a longitudinal section of a cylinder lock unit with plug shown in full, and the parts in normal and locking position.

Fig. 2 is a similar view with a key inserted and the plug unlocked and freed for rotation.

Fig. 3 is a rear elevation looking from the left at Fig. 1.

Fig. 4 is a section of the lock barrel, with the plug removed, taken on the line 4—4 of Fig. 3.

Fig. 5 is a front elevation of the lock unit.

Fig. 6 is a section taken on the line 6—6 of Fig. 1.

Fig. 7 is a cross-section of the plug, taken on the line 7—7 of Fig. 1.

Fig. 8 is a plan view of the plug removed from the barrel, looking down on Fig. 1, with parts shown in section and parts shown in elevation.

Fig. 9 is a front elevation of the plug removed from the barrel.

Fig. 10 is a perspective view of one of the tumblers.

A barrel 11 is provided, which is substantially tubular in formation, and is adapted to be threaded into a lock assemblage, the barrel being fixedly secured in position; and a plug 12, contained in the barrel may be provided with any common arrangement, such as an eccentric lug 13 on the rear and inner end thereof, for operative engagement with the movable lock elements.

A key hole plate 14 is fixedly secured in the front end of the bore of the barrel; and at the rear end the bore is enlarged to provide a shoulder 15 for limiting the forward movement of the plug, and is grooved at 17 for retaining a curved plate spring 18, which urges the plug forwardly.

The medial portion of the bore of the barrel is provided with a plurality of spaced annular grooves 19, leaving ridges 20, which are notched by oppositely disposed longitudinal grooves 21, which intercept the annular grooves.

A simple form of built-up constructions for the plug is shown, which makes the machining operations quite simple and provides an accurate construction suitable for high grade locks of material, such as brass, which lasts indefinitely without appreciable wear, and is not subject to corrosion which would in time interfere with the operation of the lock.

A pair of cylindrical segments 22 are provided, which are spaced by a pair of bars 23 to provide the keyway 24, as best shown in Fig. 7. At the ends the segments and bars are fastened together by means of discs 25 and 26, the discs being recessed to receive reduced circular end portions 27 of the segments, and apertured for receiving reduced end staking portions 28 of the bars, which project through and are riveted over the plates.

The plate 25 on the front end of the plug is of even diameter with the plug; and the disc 26 at the rear end is enlarged to abut against the shoulder 15 to limit the forward movement of the plug. The plug is pressed forwardly into locking position by said spring 18, so that the oppositely disposed row of lugs 30, integrally formed on the surfaces of the segments 22, then are in registration with the ridges 20 and engages in the notches to directly oppose the rotational movement of the lock.

The plug is locked in the forward position by a series of plungers 31, which are slidably mounted in the plug, at either side of the keyway. The tumblers are in staggered relation with the lugs, and, therefore, in the locking condition, project into the grooves 19 and abut against the sides of the ridges 20. Projecting into the keyway are lugs 32 formed on the respective tumblers, so that, by the insertion of an irregularly grooved key 33, the ends of the tumblers may be withdrawn into the plug to release the plug for endwise movement. Then, by pressing on the key, the plug may be shoved into the barrel, so that the locking lugs 30 register with the grooves 19,

thus permitting rotation of the plug, by turning the key, to operate the lock for unlocking.

Owing to the small size and to the small permissible clearances, and lack of lubrication, the tumblers are apt to stick in the slots in the plug and work very stiff, and it is found that by reducing the area of the surfaces in contact, as by grooves 34 the tumblers operate freely with little friction.

It is now manifest that, in locking condition, the rotation of the plug is opposed entirely by the solid lugs 30 formed on the surface of the plug in contact with the sides of the notches 21 formed in the ridges in the bore of the barrel, and no strain is placed on the tumblers in an attempt to forcibly rotate the plug, since the tumblers are free to rotate in the grooves. The solid lugs will resist a heavy shearing pressure, and will withstand much deformation without interfering with subsequent operation of the lock with a proper key.

In case that some one familiar with the construction of the lock should attempt to drive the plug in, the shearing strength of the tumblers is greater in resisting endwise movement of the plug than in resisting rotational movement.

Having thus described my invention, I claim:

1. A lock comprising a barrel, a plug movably mounted in the barrel, projections integrally formed in the bore of the barrel and on the surface of the plug which interengaged to prevent rotation of the plug when the plug is in a locking position, and tumblers mounted in the plug for holding the same against longitudinal movement in said locking position but not opposing the rotation of the plug, the tumblers being operable by the insertion of a key for releasing the plug for longitudinal movement to disengage said projections so that the plug may then be rotated.

2. In a lock having a barrel having a cylindrical bore, a cylindrical plug inserted in the bore, means for locking the plug in the bore comprising cooperative and interengaging recesses and surfaces integrally formed in the bore of the barrel and on the surface of the plug for locking the plug against rotation arranged so that when the plug is shifted endwise it is free to rotate, the bore having circumferential grooves and the plug having key operated movable tumblers for locking the plug against endwise movement.

3. In a lock, a tubular barrel having annular grooves formed in the bore thereof, the ridges between the grooves being notched, a plug inserted in the bore of the barrel, the plug having lugs integrally formed on the surface thereof for engagement in the notches to prevent rotation, and key operated tumblers contained in the plug releasably engageable in the grooves to prevent longitudinal movement of the plug.

4. In a lock, a tubular barrel having annular grooves and longitudinal notches intersecting the grooves formed in the bore thereof, a plug inserted in the bore, the plug having lugs integrally formed on the surface thereof for engagement in the notches to prevent rotation of the plug, and key operated tumblers mounted in the plug for engagement in the grooves to prevent longitudinal movement of the plug arranged so that by inserting a key and withdrawing the tumblers the plug may be moved endwise to release the lugs from the notches to permit rotation of the plug for unlocking.

5. A composite cylinder lock plug comprising two oppositely disposed cylindrical segments spaced by two longitudinally extending bars to form a central keyway, and end members for fastening said segments and bars together comprising end plates recessed to receive end portions of the same.

6. A built up cylinder lock plug construction comprising a pair of cylindrical segments spaced by a pair of longitudinally extending bars to form a cylinder with a central keyway, the end portions of said segments and bars being reduced in cross section, and discs recessed to receive said reduced end portions for binding said parts together.

7. A built up cylindrical lock plug comprising a pair of cylindrical segments, a pair of longitudinally extending bars for spacing the segments to form a keyway, the inner surfaces of the segments being slotted to provide tumbler slots at either side of the bars, and recessed discs engaging the ends of the segments and bars to bind them together.

8. In a lock, the combination with a tubular barrel having annular grooves in the bore and notches in the ridges between the grooves, of a plug insertable in the bore having integral lugs extending therefrom for engagement in the notches to prevent rotation, key operated tumblers in the plug releasably engageable in the grooves to prevent longitudinal movement of the plug to disengage the lugs thereof, and a spring between the barrel and the plug tending to press the plug longitudinally for engaging the lugs with the ridges to prevent rotation of the plug.

9. A lock comprising the combination of a barrel having annular grooves therein and the ridges between the grooves being notched, a plug insertable in the barrel having integral lugs extending therefrom for engagement in the notches to prevent rotation, key operated tumblers in the plug releasably engageable in the grooves to prevent longitudinal movement of the plug, and a bowed spring having its ends in an end groove of the barrel and its median portion engaging the rear of the plug and tending to press it longitudinally forward for engaging the lugs with the notches.

PHILLIP W. OLSON.