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Lipschutz

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[54] **TUMBLER PLATE LOCK**

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[52] **U.S. Cl.** ..... **70/364 R,** 70/377

[51] **Int. Cl.** **E05b 15/14,** E05b 29/00

[58] **Field of Search** ..... 70/364 R, 377, 37 C, 70/DIG. 52, DIG. 53, DIG. 54, DIG. 55

[56] **References Cited**

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Attorney—Albert C. Nolte, Jr. et al.

[57] **ABSTRACT**

A lock wherein a flat key acts on tumbler plates, slidable in a core, to slide these several plates in one direction while an elastic biasing element or return spring, surrounding the structure, urges them in the opposite direction. The elastic element can directly contact a small boss on each tumbler plate. It urges each tumbler plate to return in the direction of the plate's axis, thereby minimizing looseness of the core and tumbler structure.

4 Claims, 6 Drawing Figures

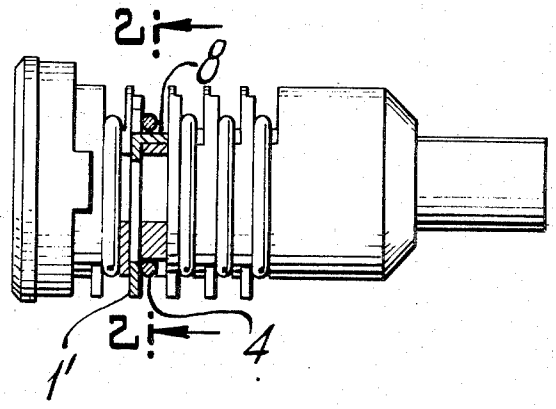


Fig.1.

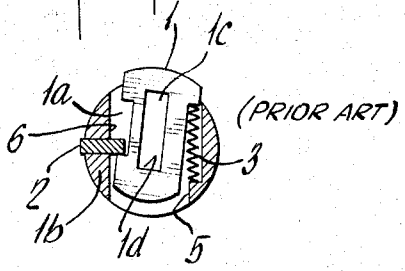


Fig.2.

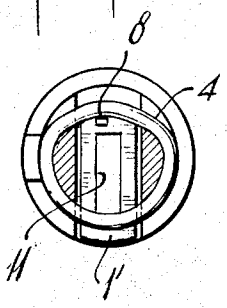


Fig.3.

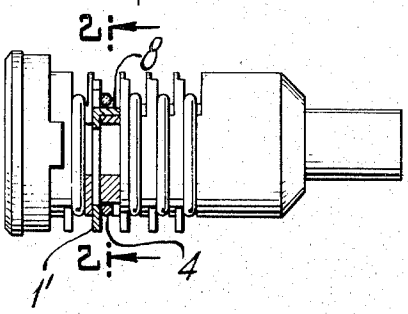


Fig.4.

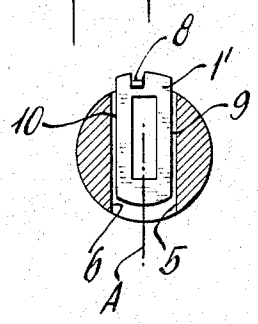
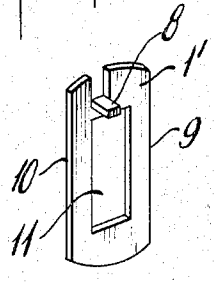


Fig.5.



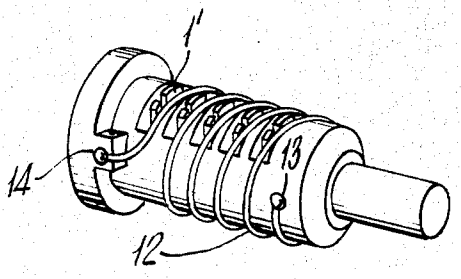


Fig.6.

TUMBLER PLATE LOCK

BACKGROUND AND NATURE OF THE INVENTION:

Tumbler plate locks have encountered difficulty in connection with correct guidance of the tumbler plates. Conventionally these plates have return springs. Because of the geometry of the lock these have been placed on the sides of the tumblers and have therefore produced an eccentric push which tended to rock the tumbler plate in the slide space provided for it, where some clearance always exists particularly after a large number of lock operations.

The conventional construction also had the effect that a lateral abutment was necessary for the return spring, on the tumbler plate, thereby reducing the length of its stroke, across the core of the lock.

These shortcomings are overcome by the present invention, which for this purpose replaces the lateral return spring by an elastic ring element, disposed about other parts of the core and which advantageously bears on a small boss or other projection or heel on each tumbler plate. This arrangement automatically centers the action of the new return spring and thereby urges the tumbler plate to return along its axis. At the same time the stroke of this plate can be made much longer than before.

DRAWINGS

FIG. 1 (prior art) is a cross section through the core of a convention lock;

FIG. 2 is a generally similar section taken along lines 2—2 in FIG. 3, through a lock constructed according to the invention;

FIG. 3 is a side view of the lock of FIG. 2;

FIG. 4 is a detail from FIG. 2, showing a tumbler plate in shifted potions;

FIG. 5 is a perspective view of a tumbler for the lock of FIG. 2; and

FIG. 6 is a perspective view of a modified lock according to the invention.

As is shown in FIG. 1 with some exaggeration tumbler plate 1 is disposed in a diametric recess 1a of core 1b. A key hole 1c is provided in a central region of the plate. The key (not shown) acts on a lower surface 1d in the keyhole, whereby it urges plate 1 downwards, subject to restraint by a side pin 2 on one side and a return compression spring 3 on the other side of the plate between side walls 5 and 6 of the slideway for this plate. The position of the tumbler plate in its recess is somewhat unpredictable, and can be inclined in various directions as the key is inserted and then turned. After some number of lock operations the plate may tend to be inclinded to almost the large extent shown in this figure. This can make it difficult to insert the key.

The lock of the invention shown in FIGS. 2 to 5 greatly reduces this difficulty even if the materials for the tumbler plate and core are the same as in the earlier constructions. Each new tumbler plate 1' has a lateral boss or heel 8, shown as a small tongue stuck out at 90° from the stock of the plate, and elastic rings 4, surrounding suitable portions of the core, push inwardly against the outsides of bosses 8, on the tumbler plates, whereby these plates are urged into their normal positions, not displaced by key or spring action.

Desirably each boss is located substantially at, or at least close to, the central axis A of key hole 1c. As best shown in FIGS. 4 and 5, the boss is slightly displaced from this axis, whereby a slight lateral push, caused for example by rotary motion, can be compensated.

Elastic rings 4 can be replaced by a single, elastic spiral 12, as shown in FIG. 6.

In both cases, FIGS. 3 and 6, tumbler plate 1' can have straight, uninterrupted sidewalls 9, 10, sliding along side walls 5', 6' of the tumbler recess in the core. Wear and tear between walls 9, 5' and 10, 6' is less likely and less concentrated than in FIG. 1, and when some of it occurs nevertheless it is less likely to cause tilting of plate 1 — all this by virture of the new, centrally acting return spring 4 or 6.

What is claimed is:

1. Lock for a flat key, comprising a core, tumbler plates therein, and spring means for returning the tumbler plates after displacement by the key, the spring means being of annular form, surrounding the tumbler plates and bearing on substantially central parts of ends of said plates, each plate having a boss, laterally extending from one of the substantially central parts, to be engaged by the spring means.

2. Lock according to claim 1 wherein each boss comprises a small heel struck out of the plate.

3. Lock according to claim 1 wherein the spring means comprises a plurality of elastic rings.

4. Lock according to claim 1 wherein the spring means comprises an elastic helix.

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