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2,262,140

LOCK

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FIG. 1

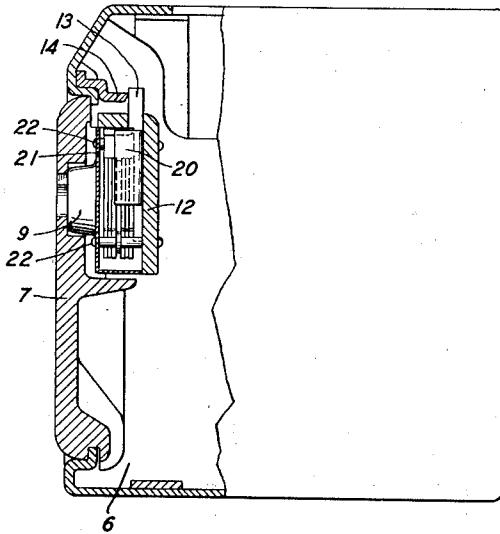


FIG. 2

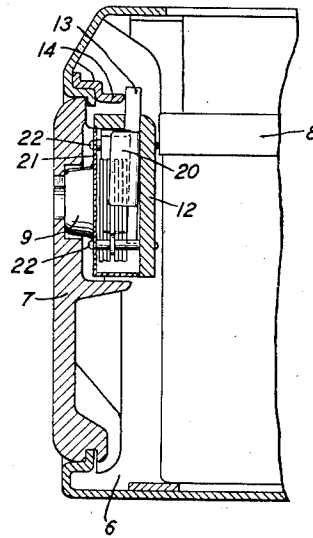


FIG.3

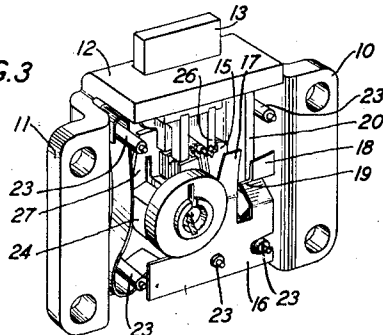


FIG. 4

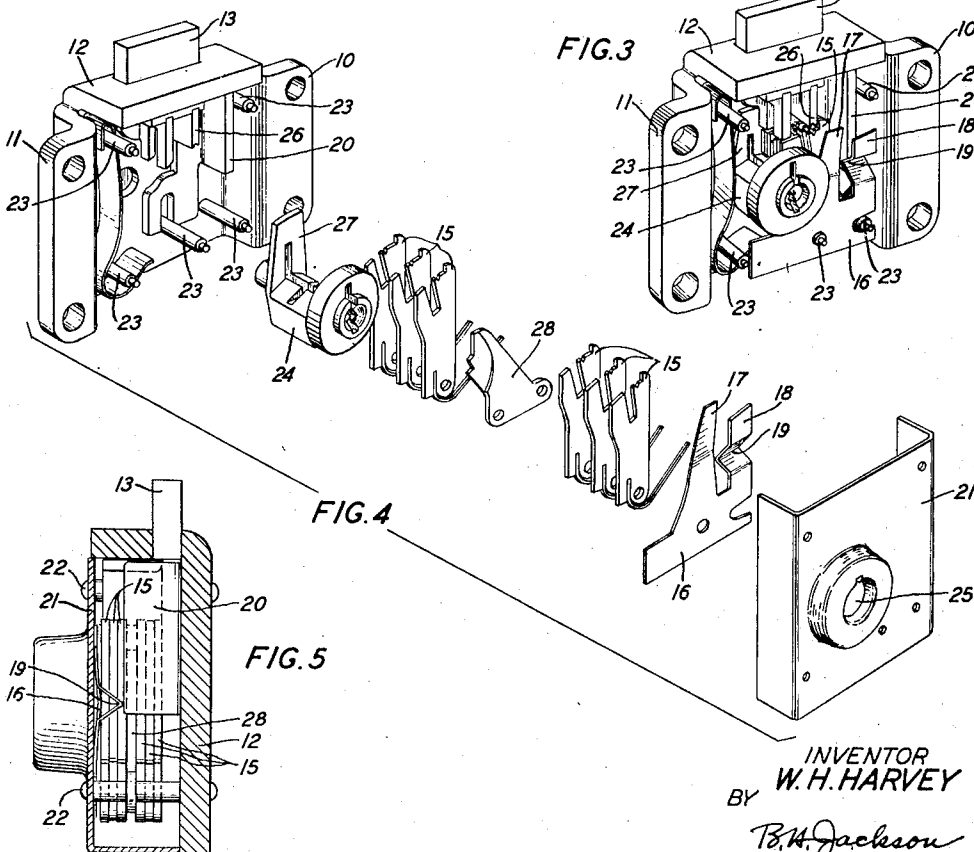
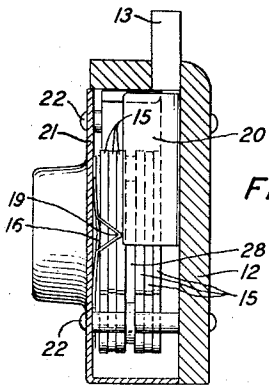


FIG.5



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LOCK

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8 Claims. (Cl. 70—81)

This invention relates to improvements in locks and, more particularly, to locks of the key-operated tumbler type.

Locks of this general type are disclosed in O. A. Shann Patent 1,793,254 and reference may be had to that patent for a complete description of the structure and operation of such locks. The present invention is an improvement on locks of the type disclosed in that patent.

One specific application of locks of the type of the Shann patent is in telephone pay stations for locking the door of the coin compartment. This compartment contains a coin receptacle and, due to manufacturing variations, coin receptacles are occasionally found which are slightly longer than the space adapted to receive them. In such a case the receptacle presses against the lock, thereby causing the bolt of the lock to bear against the coating surface of the coin compartment with more than ordinary force. Since there must be a certain amount of clearance between the movable parts of the lock, including the bolt, tumblers, etc., this extra force on that part of the bolt which extends beyond the lock casing tends to move the tumblers out of their normal alignment with respect to the cutting of the key. When this occurs considerable trouble is experienced in unlocking the coin compartment door.

This invention, therefore, has as an object an improvement in the operation of key-operated tumbler locks.

Another object of the invention is to reduce excessive play between certain movable parts of a key-operated tumbler lock.

A further object of the invention is to assure the proper alignment of the tumblers of a key-operated tumbler lock.

These objects are accomplished in one embodiment of the invention by inserting a two-branched spring member in the lock so that one branch is between the cover and tumbler pile-up and the other branch is between the cover and a projection on the bolt.

The invention will be better understood from the following description and accompanying drawing forming a part thereof, in which:

Fig. 1 is a view of a telephone pay station coin compartment with one side partly broken away to show the door and lock in normal condition without the spring of the invention;

Fig. 2 is a view similar to Fig. 1, including the coin receptacle, in which the coin receptacle presses against the lock with sufficient force to throw the bolt and associated tumblers out of

normal alignment when the spring is not present;

Fig. 3 is a projection of the lock assembly without the cover but with the spring member of the invention in place;

Fig. 4 is an exploded view of the lock; and

Fig. 5 is an enlarged side view of the lock showing the spring in the assembled position.

Referring now to the drawing, Fig. 1 shows a coin compartment 6 having a door 7 which is removed when coin receptacle 8 (Fig. 2) is to be inserted or withdrawn.

Lock 9 is attached to the door by means of bolts or other suitable means which pass through holes in flanges 10 and 11 of case 12. When the door is in place in the compartment opening and the lock operated to the locking condition the bolt 13 rests against extension 14 of the compartment in an obvious manner. Normally, bolt 13 will remain in a vertical position substantially parallel to the face of the door and lock cover 21.

When a slightly oversize receptacle 8 is placed in compartment 6, as shown in Fig. 2, it is necessary to exert more than normal force on the door to permit bolt 13 to move past extension 14 to lock the door in place. After the door is locked in place receptacle 8 will press against the lock casing and will cause the bolt 13 to take a slanting position, as shown in Fig. 2. The lower part of bolt 13, that is the part inside the lock case, therefore presses against the tumblers 15 (Fig. 4) and, due to the clearance between the individual tumblers, those nearest the bolt will be moved far enough from their normal position to render difficult operation by the key to withdraw the bolt and unlock the door.

In accordance with the present invention the condition outlined in the previous paragraph is prevented by inserting a spring 16 as shown in Figs. 3, 4 and 5. This spring is preferably of phosphor-bronze, but may be of other suitable spring material, and is provided with two upwardly extending branches 17 and 18.

Branch 17 is slightly bowed to enhance its spring action and is adapted, as shown, to press against the outer member of the tumbler pile-up. Branch 18 is provided with a V-shaped bend 19. This bend rests upon projection 20 of bolt 13.

As indicated in Fig. 3 and as described in detail in the Shann patent noted the lock is operated by inserting a proper key in barrel 24 through opening 25 in cover 21. When the key is turned the slots therein match with the tumblers to move the tumblers away from projec-

tion 26 on the bolt. Upon further turning the key lever member 27 contacts with the bolt to withdraw it from the locked position. Reversing the motion of the key will move the bolt to the locked position. As explained in the Shann patent a fixed partition 28 is inserted in the tumbler pile-up to prevent operation of the lock by means of an improper key.

When cover 21 is attached to the lock by riveting over the ends of posts 23, or other suitable means, spring 16 is compressed against the tumblers 15 and the bolt projection 20. The rivet heads are shown at 22. The V-shaped portion of branch 18 of the spring which presses directly on the bolt is the most important since the force necessary to distort this portion is quite large. Due to the difference in leverage of the force acting on the bolt it will take considerable force to move the bolt against the V-shaped portion of the spring an amount sufficient to displace the tumblers so that they will not be operated by a proper key. At the same time, the force exerted against the tumblers by branch 17 will aid in holding the bolt in position as well as tending to move the tumblers toward the bolt so that all of the clearance between the tumblers will not be taken up in one direction.

It is understood that a particular embodiment of the invention has been described and that modifications of this embodiment may readily be made. The invention, therefore, is not to be limited to this one embodiment but only by the scope of the appended claims.

What is claimed is:

1. A lock comprising a casing, a barrel within said casing operable by means of a key, a bolt movable to a locked or an unlocked position by a projection on said barrel, a portion of said bolt extending beyond said casing when the bolt is in the locked position, said bolt being normally maintained in a plane substantially perpendicular to the axis of said barrel and spring means acting on said bolt to maintain it in its normal position when the bolt is in the locked position and the portion of the bolt external to the casing is acted on by an excessive force.

2. A lock comprising a casing, a barrel within said casing operable by means of a key, a bolt movable to a locked or an unlocked position by a projection on said barrel, a portion of said bolt extending beyond said casing when the bolt is in the locked position, a key-operated tumbler for controlling the movement of said bolt, said bolt and tumbler being normally maintained in substantially parallel planes perpendicular to the axis of said barrel and spring means acting on said bolt and said tumbler to maintain them in their normal positions when the bolt is in the locked position and the portion of the bolt external to the casing is acted on by an excessive force.

3. A lock comprising a casing, a barrel within said casing operable by means of a key, a bolt movable to a locked or an unlocked position by a projection on said barrel, a portion of said bolt extending beyond said casing when the bolt is in the locked position, a plurality of key-operated tumblers for controlling the movement of said bolt, said bolt and tumblers being normally maintained in substantially parallel planes perpendicular to the axis of said barrel and flexible means acting on said bolt and said tumblers to maintain

them in their normal positions when the bolt is in the locked position and the portion of the bolt external to the casing is acted on by an excessive force.

4. A lock comprising a casing, a barrel within said casing operable by means of a key, a bolt movable to a locked or an unlocked position by a projection on said barrel, a projection on said bolt, a portion of said bolt extending beyond said casing when the bolt is in the locked position, a pile-up of key-operated tumblers for controlling the movement of said bolt, one of said tumblers being positioned adjacent said bolt, said bolt and tumblers being normally maintained in substantially parallel planes perpendicular to the axis of said barrel, and flexible means acting on said projection of said bolt and on the tumbler of said pile-up remote from said bolt to maintain said tumblers and said bolt in their normal parallel positions when the part of the bolt external to the casing is subjected to an excessive force in a direction perpendicular to the normal plane of motion of said bolt.

5. A lock in accordance with claim 4 in which said flexible means comprises a bifurcated spring, one branch of which presses against said tumbler pile-up and the other branch of which presses against said bolt projection.

6. A lock in accordance with claim 4 in which said flexible means comprises a bifurcated flat-type spring, one branch of which presses against said tumbler pile-up and the other branch of which presses against said bolt projection, said latter branch having a V-bend therein the lower part of which contacts said bolt projection.

7. A lock comprising a casing, a bolt having a projected and a retracted position, a key-operated tumbler for controlling the retraction of said bolt, one major surface of said tumbler normally being in contact with said bolt, and a flat spring plate within said casing, said spring plate having two projecting arms, one of said arms exerting pressure against said tumbler for holding said tumbler and said bolt in close contact, and the other of said arms engaging said bolt for resisting movement of the portion of the bolt which remains within said casing when the bolt is in the projected position, such movement resulting from pressure exerted against a side of the projected portion of the bolt.

8. A lock comprising a casing, a bolt having a projected and a retracted position, a key-operated tumbler for controlling the retraction of said bolt, one major surface of said tumbler normally being in contact with said bolt, said casing having a front cover, a relatively thin spring plate positioned within said casing, a spring arm projecting from said plate, a V-shaped portion near the free end of said arm, the free end of said arm being in engagement with said front cover, engagement of said front cover and said free end of the arm being effective to cause engagement of the apex of said V-shaped portion and said bolt, engagement of said apex and said bolt being effective to resist movement of the portion of said bolt which remains within said casing when the bolt is in the projected position, such movement resulting from pressure exerted against a side of the projected portion of said bolt.

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