

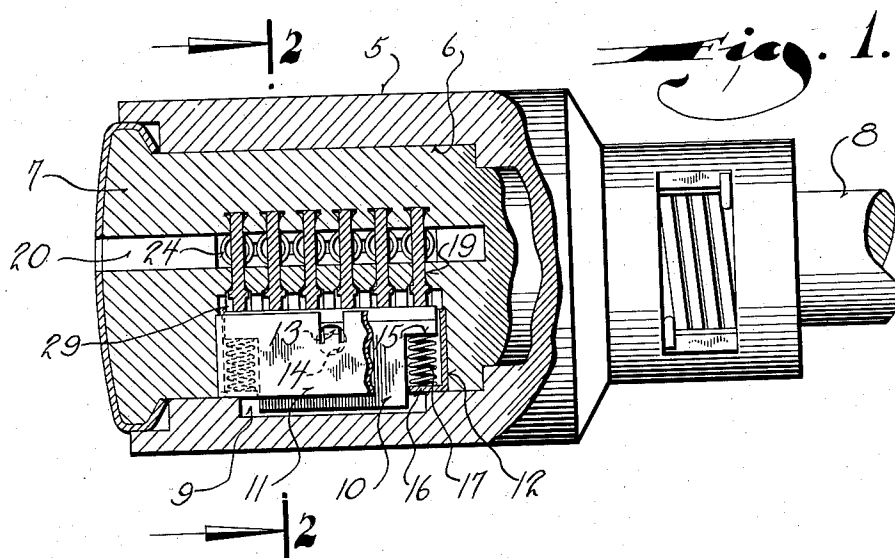
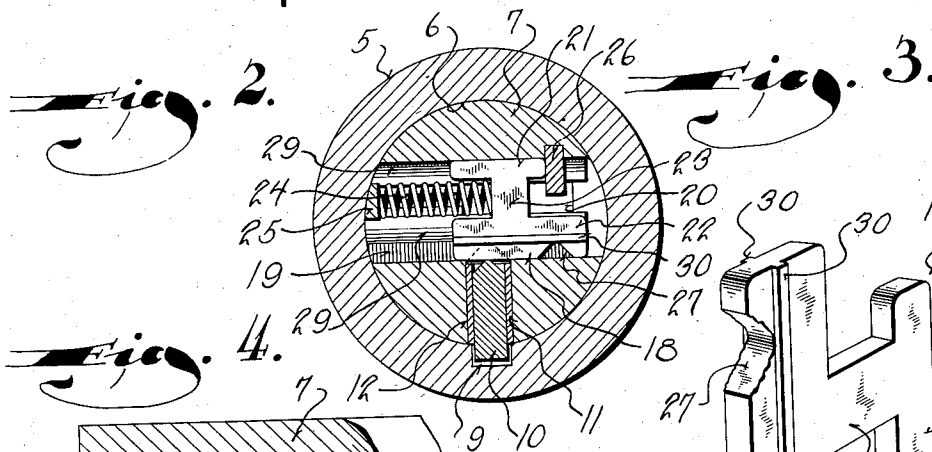
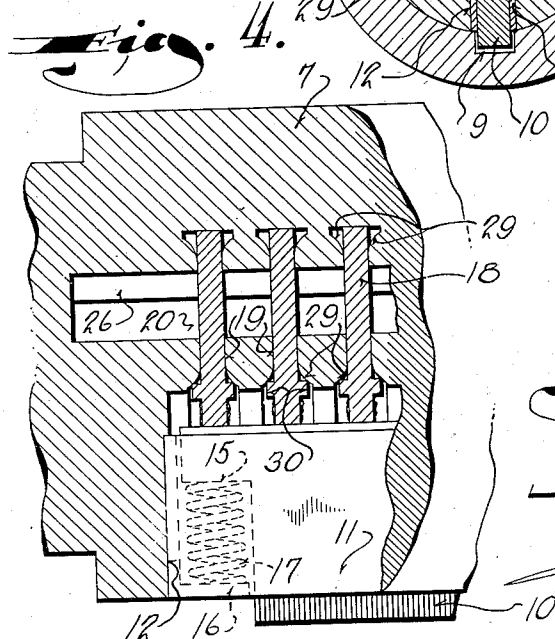
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LOCK

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## LOCK

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This invention relates to improvements in locks, and refers more particularly to cylinder locks of the type shown in Patent No. 1,965,336, issued to John W. Fitz Gerald, July 3, 1934.

5 As in the aforesaid patent, the cylinder is secured against rotation in its mounting member or casing by a locking member projected radially from the cylinder into locking engagement with the mounting member or casing by the key operable tumblers.

10 The tumblers have notches in their side edges in which the locking member is received when the tumblers are all moved to predetermined positions by a proper key, to free the locking member from locking engagement with the mounting member. These notches are cut into the tumblers after they are assembled with the cylinder and in their formation, burrs are generally left on the sides of the tumblers, which heretofore obstructed the free movement of the tumblers and in general prevented the desired smooth operation.

15 It is, therefore, an object of this invention to provide a cylinder so constructed that the presence of burrs on the sides of the tumblers does not in any way affect the smooth and free operation of the tumblers.

20 Another disadvantage found in locks of this type has been the possibility of releasing the cylinder for rotation by cutting through the tumblers by means of a tool forced down into the keyway, and it is, therefore, another object of this invention to provide a lock of the character described so constructed that even though all of its tumblers are sheared through by a tool inserted into the keyway, the locking member will still be held in its operative locking position preventing rotation of the cylinder.

25 With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

30 The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

35 Figure 1 is a view partly in side elevation and partly in longitudinal section through a lock embodying this invention;

Figure 2 is a cross section view through Figure 1 on the plane of the line 2-2;

Figure 3 is a perspective view of one of the tumblers; and

Figure 4 is an enlarged detail view showing a fragment of the cylinder in elevation to more clearly illustrate the relationship of the tumblers to their guideways in the cylinder.

Referring now more particularly to the accompanying drawing, in which like numerals indicate like parts throughout the several views, the numeral 5 designates a mounting member or casing bored as at 6 to receive a cylinder 7. As is customary, the cylinder has a stem 8 projecting from its rear end to drivingly connect the same with lock mechanism (not shown).

Communicating with the bore 6 is a longitudinal groove 9 into which a locking member 10 carried by the cylinder projects to secure the cylinder against rotation. The locking member 10 is in the form of a flat bar substantially rectangular in cross section and slidably mounted in a cage or box 11, preferably formed of sheet metal and secured in a radial pocket or recess 12 formed in the side of the cylinder. The locking member 10 is retained assembled with its cage by a tang 13 struck inwardly from one wall of the cage and entering an aperture 14 in the locking member.

The opposite ends of the locking member are stepped as at 15 and the adjacent end walls of the cage have inwardly directed tongues 16 between which and the stepped portions 15, springs 17 are confined. The springs 17 yieldably urge the locking member inwardly of the cylinder and into engagement with the adjacent side edges of key operable tumblers 18. The tumblers 18 are mounted in guideways 19 extending diametrically through the cylinder substantially perpendicularly to the radial recess 12, and communicating with the inner portion thereof to permit the engagement of the locking member inner edge with the adjacent side edges of the tumblers. The regular keyway 20 extends longitudinally down the cylinder in open communication with all of the guideways 19, so that upon the insertion of a proper key into the keyway, all of the tumblers will be actuated to predetermined positions as determined by the contour of the key.

The individual tumblers are substantially H-shaped having side portions 21 and 22 connected by a transverse portion 23, and as best shown in Figure 2, are all yieldably maintained in predetermined positions by individual springs 24 bearing on the transverse portion 23 and a spring seat

25 in the form of a bar extending longitudinally across the several tumbler guideways and secured to the cylinder in any suitable manner.

The movement of the tumblers by their springs 24 is limited by a stop 26 extending into the guideways and preferably in the form of a longitudinal bar extending the length of the keyway to provide a guide on which the key slides.

In their normal spring projected positions, the edges of the side portions 22 of the tumblers engage the adjacent edge of the locking member, which is bevelled or V-shaped as shown, and hold the same outwardly in its projected position operatively engaging in the groove 9. Any one individual tumbler spring 24 is stronger than the springs 17, so that any one tumbler can hold the locking member in its operative position.

All of the tumblers have V-shaped notches 27 on their side edge portions 22 which, upon actuation of the tumblers to their proper key actuated positions, are all in line opposite the radial recess 12 to receive the locking member and permit the same to be moved out of locking engagement with the groove 9 by its springs 17.

Through the cam action afforded by the inclined sides of the locking member inner edge and the sides of the V-shaped notches 27, the freeing of the tumblers by the withdrawal of the key returns the locking member to its operative position, as will be readily apparent.

The V-shaped notches 27 are preferably cut into the tumblers after the tumblers are assembled with the cylinder, this being done by inserting a tool into the radial recess 12 and running the tool longitudinally of the cylinder to successively cut the notches in the tumblers, it being understood that the key is in position during this cutting operation.

Invariably the formation of the notches in this manner results in burrs which project from the sides of the tumblers and which ordinarily would restrict the free movement of the tumblers in their guideways. To preclude such interference with the free motion of the tumblers, the guideways 19 at their opposite sides and particularly that side which communicates with the radial recess 12 and in which the operative side portions 22 of the tumblers are received, are widened as at 29. Consequently, even though burrs or other projections extend beyond the side faces of the tumblers, their free action in the guideways is not interfered with.

The widened portions of the guideways which receive the side portions 22 of the tumblers extend inwardly beyond the bottoms of the V-shaped notches 27 to accommodate ribs 30 projecting from opposite faces of the tumblers directly inwardly of the V-shaped notches. These ribs 30 prevent the inward lateral displacement of the side portions 22 of the tumblers from their operative positions in the event the transverse connecting portions 23 are cut away by a shearing tool inserted down into the keyway 20, and thus positively prevent releasing the locking member and consequently freeing the cylinder for rotation by so destroying the tumblers.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art to which this invention appertains, that this invention materially improves the construction of cylinder locks of the type in which the cylinder is secured against rotation by a locking member projected from the side thereof into locking engagement with the mounting member by not only

affording a smoother operating lock, but also adding to the security thereof by precluding release of the locking member upon forcible destruction of the tumblers.

What I claim as my invention is:

1. In a lock having a cylinder provided with tumbler guideways, key operable tumblers slidable in said guideways, said tumblers having a formation apt to have burrs on the sides thereof adjacent one edge, and said guideways having widened portions to accommodate such burrs, so that their presence does not interfere with the free action of the tumblers in the guideways.

2. In a lock of the character described, including a cylinder having transverse tumbler guideways communicating with a radial recess, a locking member radially movable in said recess and having its inner edge portion projectible into said tumbler guideways, key operable tumblers slidable in said guideways with their side edges adjacent the radial recess engageable with the adjacent edge of the locking member, said side edge portions of the tumblers having notches to receive the locking member, the formation of said notches leaving burrs on the opposite faces of the tumblers, and the guideways being enlarged at their portions receiving said side edge portions of the tumblers to accommodate any burrs projecting from their faces so that the presence of such burrs does not interfere with the free action of the tumblers in the guideways.

3. In a lock, a cylinder having a transverse tumbler guideway, a tumbler slidable in said guideway and said guideway having its extreme side portions throughout its length wider than the thickness of the tumbler to afford a clearance at the opposite faces of the side edge portions of the tumblers.

4. In a lock, a lock cylinder having a transverse tumbler guideway, a tumbler slidable in said guideway and having projections of indeterminate size on its opposite faces adjacent a side edge portion, and said guideway being enlarged at its portion which receives said side edge portion of the tumbler to accommodate such projections from the side faces of the tumbler so that their presence does not interfere with the free sliding of the tumbler in the guideway.

5. In a lock, a cylinder having a transverse tumbler guideway, a tumbler slidable in said guideway and having a key engageable portion accessible from a keyway in the cylinder and an operative portion at the side of the key engageable portion, and means to hold the operative portion of the tumbler in its proper position in the guideway independently of any other portion of the tumbler, so that in the event the key engaging portion of the tumbler is sheared off from its operative portion, said operative portion remains in its proper position.

6. In a lock, a lock cylinder having a transverse tumbler guideway, a flat plate-like tumbler slidable in the guideway with its opposite side edge portions engaging the opposite sides of the guideway, one of said side edge portions of the tumbler being the operative portion of the tumbler, said tumbler cylinder having a keyway so located that a key inserted therein engages a portion of the tumbler other than said operative side edge portion, and means to hold said operative side edge portion in the guideway independently of the other side edge portion of the tumbler so that upon destruction of the tumbler by a tool inserted into the keyway, said operative

side edge portion of the tumbler is retained in its operative position.

7. In a lock, a lock cylinder having a tumbler guideway and a recess intersecting the guideway, a locking member movable in the recess and projectible into the tumbler guideway, a key operable arranged to cross said recess to be engaged by the locking member, said locking member being held in its operative position by the tumbler, and means to hold the side edge portion of the tumbler in its position engageable with the locking member and against movement away from the locking member in the event of destruction of the tumbler by shearing its key engaging portion from said side edge portion.

8. In a lock having a lock cylinder provided with a transverse tumbler guideway, a tumbler slidable in said guideway and having an operative edge portion of increased thickness, and the guideway being increased in width to accommodate the increased width of the operative edge portion and provide means to hold the edge portion of the tumbler in its operative position in the event of destruction of the tumbler resulting in loss of support from the opposite edge of the guideway.

9. In a lock having a cylinder provided with a transverse tumbler guideway, a tumbler in said guideway having an operative edge portion at one side of the guideway, a locking member carried by the cylinder and operable by said edge portion of the tumbler, and means on said tumbler having a sliding interengagement with the walls of the guideway to hold the operative side edge portion of the tumbler in its proper operative position regardless of destruction of the tumbler resulting in loss of support from the side of the guideway opposite that in which the operative side edge portion of the tumbler is disposed.

10. In a lock having a cylinder provided with a transverse tumbler guideway, a tumbler slidable in said guideway and having an operative side edge portion at one side of the guideway and a guiding portion engaged with the other side of the guideway, and ribs on the side of the operative side edge portion of the tumbler slidable in an enlargement of the guideway to hold the operative side edge portion of the tumbler in its operative

position in the guideway regardless of destruction of the tumbler resulting in removal of the guiding portion of the tumbler out of supporting engagement with its side of the guideway.

11. In a lock having a cylinder provided with a tumbler guideway, a tumbler slidable in said guideway, said tumbler having an operative side edge portion slidably engaging one side of the guideway, an opposite supporting side edge portion slidably engaging the other side of the guideway, and a key engaging portion connecting said side edge portions and accessible from a keyway in the cylinder, whereupon the tumbler is subject to being sheared through to separate its side edge portions by a tool inserted into the keyway and operating on the key engaging portion of the tumbler, and means to hold the operative side edge portion of the tumbler operatively in the guideway regardless of such destruction of the tumbler.

12. In a lock having a cylinder provided with a tumbler guideway, a tumbler slidable in said guideway, said tumbler having an operative side edge portion slidably engaging one side of the guideway, an opposite supporting side edge portion slidably engaging the other side of the guideway, and a key engaging portion connecting said side edge portions and accessible from a keyway in the cylinder, whereupon the tumbler is subject to being sheared through to separate its side edge portions by a tool inserted into the keyway and operating on the key engaging portion of the tumbler, and inter-engaging abutments on the operative side edge portion of the tumbler and the adjacent walls of the guideway to retain the operative side edge portion of the tumbler in its operative position within the guideway regardless of such destruction of the tumbler.

13. In a lock, a cylinder having a longitudinal keyway, and a transverse tumbler guideway intersecting the keyway, a tumbler slidable endwise of the guideway, said guideway being of a width adjacent the keyway to have guiding engagement with opposite faces of the tumbler adjacent the keyway and being of increased width from a point spaced from the keyway and extending along and to the adjacent side edge of the guideway.

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