June 5, 1934. F. K. HEYER 1,961,586

LOCK

Filed Aug. 16, 1930

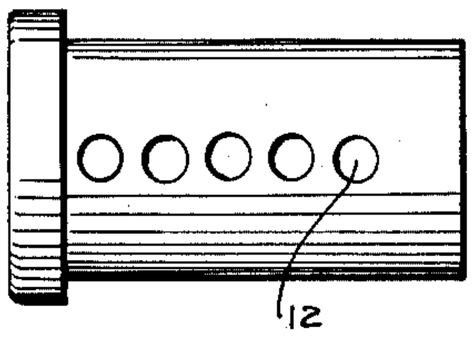


Fig 1

Fig. 4

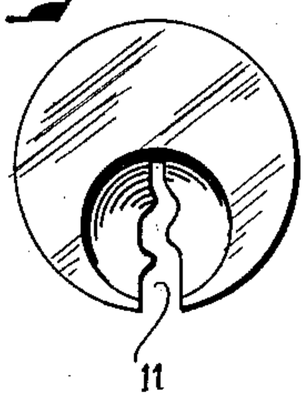


Fig. 2

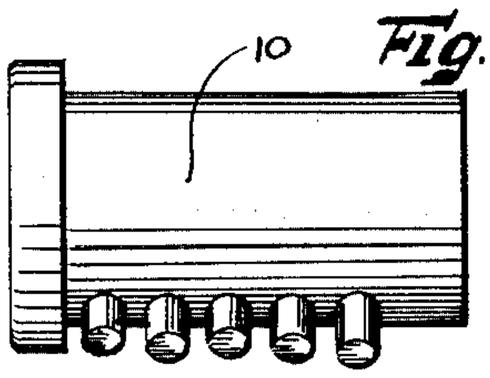


Fig. 5

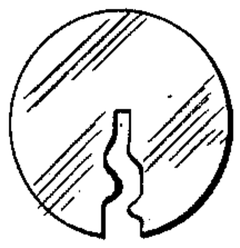


Fig 3

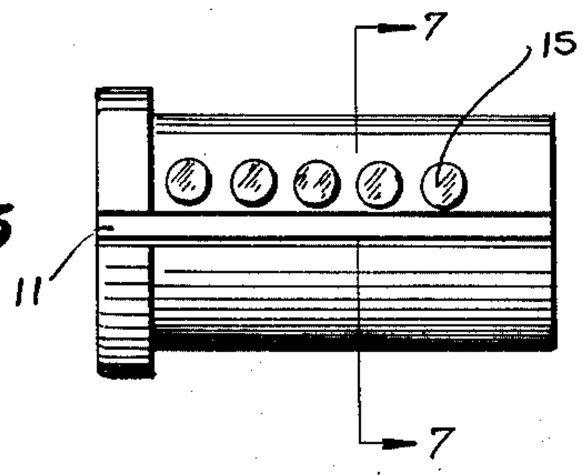
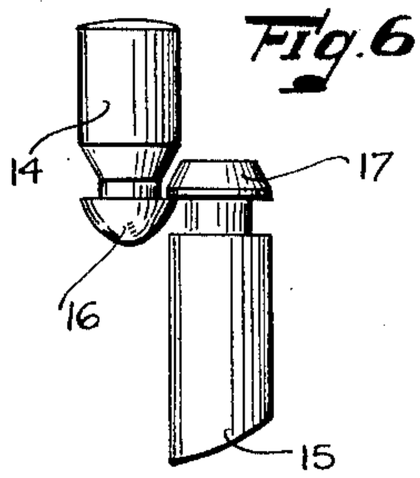


Fig. 6



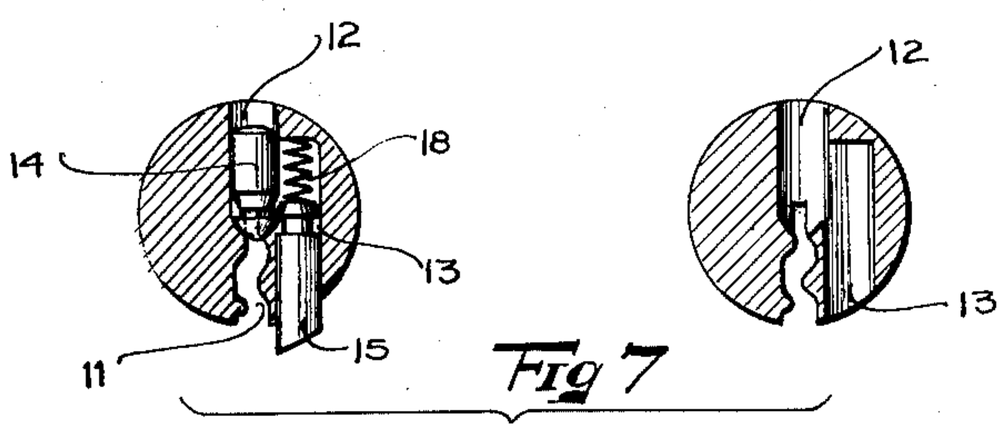


Fig 7

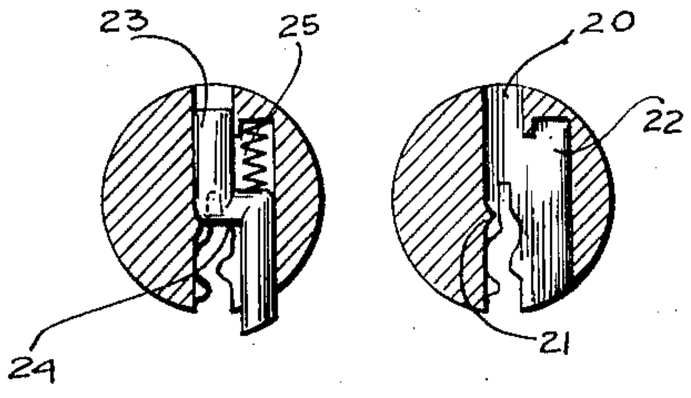


Fig. 9

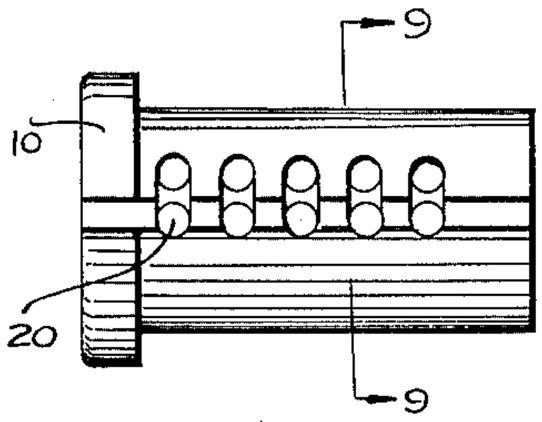


Fig. 8

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LOCK

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Application August 16, 1930, Serial No. 475,675

23 Claims. (Cl. 70—47)

This invention relates to pin-tumbler locks of the type having a plug controlled by a series of pin tumblers in tumbler bores, said pin-tumblers resting entirely within the plug when properly key actuated. In the prior art, there have been locks in which the pin tumblers have been entirely retained within the plug, so that the plug could be assembled and then inserted as a unit, with its tumblers and springs, into its cylinder. However, in the prior art devices, various retaining means have been necessary to keep the tumblers and springs assembled within the plug.

It is the object of my invention to devise a one piece pin-tumbler plug wherein the pin tumblers and the springs are maintained within the plug by the inherent construction of the plug itself and the tumblers used therein. Hence, in my invention I do not require any sort of mechanism, or devices, or means to maintain the tumblers and springs assembled within the plug, even when the plug is withdrawn from the cylinder. This invention relates more especially to an improvement on the Croning Re-issue Patent 17,451 and to a co-pending application Serial No. 475,714 filed this day by Karl A. Brauning.

For a description of my invention, I refer to the drawing wherein Fig. 1 is a top view of my particular plug. Fig. 2 is a side elevation thereof, whereas Fig. 3 is a bottom view of the same. Fig. 4 is a front view of the plug showing the keyway therein, while Fig. 5 is a rear view of the same. Fig. 6 shows in detail a pair of tumblers used in the plug. Fig. 7 illustrates a section of the plug along the line 7—7 of Fig. 3 showing the tumblers and springs assembled within the plug, and a pin tumbler chamber prior to the insertion of a tumbler and spring. Fig. 8 is a top view of a modification of my invention, while Fig. 9 is a sectional view along the line 9—9 of Fig. 8 showing a tumbler within the particular chamber before the tumbler is inserted therein.

Referring now more particularly to the drawing and especially Figs. 1 to 7 inclusive, I utilize a plug 10 of the general die-cast type, equipped with a keyway 11 as is well known in the art. While I prefer to use a die-cast plug, it should be readily understood that the same may be machined from brass or other material.

Referring now more particularly to the right-hand figure of Fig. 7, my plug is equipped with a pair of partial transverse bores 12 and 13. The bore 12 leads into the keyway and is of rather short length in comparison with the bore 13, which is made deeper in order to accommodate the tumbler spring 18.

Referring now to Fig. 6, I employ a pair of tumbers 14 and 15, equipped with cooperating heads 16 and 17. It will be readily understood from the left-hand figure of Fig. 7, that the tumbler portion 14 is inserted in the bore 12, whereas the spring 18 and then the portion 15 are inserted in the bore 13. When the headed portions 16 and 17 come opposite one another, an extra pressure on the tumblers will force the heads to move into the cooperative position illustrated in Fig. 6 so that the two tumblers will thereafter be joined for movement together. This movement will, of course, be controlled by the spring 18 in a downward direction and by a key operating in the keyway 11 in an upward direction. The regular key will set the tumblers in their proper position and the plug will then be operated in its usual manner.

Referring now to Figs. 8 and 9, I illustrate a second embodiment of my invention, wherein I employ a plug having a transverse bore 20, in which a lug 21 is allowed to remain when the plug is machined or cast. If the plug is cast, it will be understood that the core forming the bore 20 will be made in two parts, meeting at the point where the lug 21 is located. The plug also has a second bore 22 running partially therethrough, the two bores being so arranged that they form substantially a figure 8 contour, although they may be spread apart into any particular shape, or may even be square if desired.

A unitary tumbler 23, having parallel leg portions and a horizontal key actuated portion 24, is adapted to be forced into the two bores 20 and 22, subsequent to the insertion of a spring 25 in the partial bore 22. It will be readily understood that the tumbler will be able to pass the obstruction 21, due to the pressure exerted there against, but that outward movement of the tumbler in a reverse direction will be prevented by the lug 21, as is readily apparent from the left-hand figure of Fig. 9.

It will thus be apparent, that I have devised a cylinder plug, in which pin tumblers and springs are mounted within the plug, but wherein the plug and tumblers are so designed that the springs and tumblers are inherently retained within the plug without the use of any auxiliary retaining mechanism. While I have shown two modifications of my invention, it should be understood that further modifications of the same within the scope of the appended claims will readily occur to one skilled in the art.

I claim:

1. A lock comprising a stationary cylinder and a one-piece rotatable plug therein carrying tumblers and itself independently retaining said tumblers therein, said plug having transverse bores to receive pin tumblers, pin tumblers in said apertures having a portion for engagement by a key and a portion projectable beyond the surface of said plug, integral means carried by said plug and cooperating with a normal part of a pin tumbler to prevent the complete projection of said tumbler in the direction of the projection of said tumbler portion, a spring acting to urge said tumbler in said projecting direction, and means integral with said cylinder and cooperating with said spring to prevent the spring from leaving the plug, when the plug is removed from the cylinder.

2. A lock comprising a stationary cylinder and a one piece rotatable plug therein carrying tumblers and itself independently retaining said tumblers therein, said plug having transverse bores to receive pin tumblers, pin tumblers in said apertures having a portion for engagement by a key and a portion projectable beyond the surface of said plug, integral means carried by said plug and cooperating with a normal part of a pin tumbler to prevent the complete projection of said tumbler in the direction of the projection of said tumbler portion, a spring acting to urge said tumbler in said projecting direction, said tumbler acting to maintain said spring from movement out of the plug in one direction, and means integral with said cylinder and cooperating with said spring to prevent the spring from leaving the plug in the opposite direction, when the plug is removed from the cylinder.

3. A locking device comprising a plug carrying tumbler pins and itself independently retaining said pins assembled therein, said plug comprising a pair of connected bores with a tumbler pin having a portion in one bore and an integral portion in the connecting bore, a portion of one bore being provided with an obstruction preventing separation of the tumbler pin from said plug, a spring bearing upon a portion of the tumbler pin to urge the projection thereof beyond the surface of said plug in the direction of said obstruction, and a keyway connected with a portion of said tumbler pin to permit contact by the proper key, in combination with means integral with said plug and forming a retaining chamber for said spring, whereby said spring and its tumbler are each retained within the plug.

4. In a lock, a plug having a pair of parallel bores, a spring mounted in one of said bores, a tumbler having a pair of offset parallel leg portions adapted to slide in said parallel bores and to be pressed in a locking direction by said spring, an integral obstruction protruding into one of said bores cooperable with said tumbler for limiting its movement in said bore, said obstruction being located along the line of insertion of said tumbler into the plug bores.

5. In a cylinder lock, a plug having a transverse bore, said plug also having a partial bore communicating with said first bore, a spring contained in said partial bore, and a tumbler having parallel portions adapted to slide in said first bore and in said partial bore and spring pressed by said spring in a locking direction, an obstruction in one of said bores, said tumbler being insertible forcibly into said bores against said spring pressure and past said obstruction whereby said tumbler may be retained in said bore by said obstruction, regardless of said spring pressure.

6. In a lock, a one piece plug having a pair of parallel bores, one of said bores being arranged to traverse said plug while the other partially traverses the plug, a spring mounted in said partial bore, a tumbler having a pair of offset parallel leg portions connected by a horizontal key actuated portion mounted in said pair of bores, an integral obstruction in one of said bores, cooperable with a shoulder of said tumbler formed by one of said leg portions and said horizontal portion, said tumbler being adapted to be forced beyond said obstruction when the tumbler is inserted, said obstruction thereafter being adapted to prevent removal of the tumbler.

7. In a lock, a one piece plug having a pair of parallel bores, one of said bores being arranged to traverse said plug while the other partially traverses the plug, a spring mounted in said partial bore, a tumbler having a pair of offset parallel leg portions mounted in each of said pair of bores and connected by a horizontal key actuated portion, an integral obstruction in one of said bores cooperable with an integral portion of said tumbler, said tumbler being adapted to be forced beyond said obstruction when the tumbler is inserted, said obstruction thereafter being adapted to prevent removal of the tumbler.

8. In a lock, a one piece plug, a keyway in said plug, a pair of connected bores in said plug, forming a substantially figure 8 chamber, one of said bores extending completely through the plug, the other of said bores extending partially through the plug to form a pocket, a spring in said pocket, an integral obstruction in said figure 8 chamber, and a tumbler having leg portions fitting into each of said bores and adapted to be forced into said chamber past said obstruction.

9. In a cylinder lock, a plug having a pair of partially traversing parallel bores, a separable tumbler portion in each of said bores, and means connecting said tumbler portions for simultaneous operation.

10. In a cylinder lock, a plug having a pair of parallel bores, a tumbler portion independently insertible into each of said bores, and means connecting said tumbler portions for simultaneous operation.

11. In a cylinder lock, a plug having a pair of parallel bores, a tumbler portion independently inserted into each of said bores, and means on each of said tumbler portions whereby they may be connected for simultaneous operation.

12. In a cylinder lock, a plug having a pair of tumbler chambers, a tumbler portion independently inserted into each of said chambers, and means connecting said tumbler portions for simultaneous operation.

13. In a cylinder lock, a plug having a pair of partially traversing parallel bores, a separable tumbler portion in each of said bores, a spring in one of said bores, and means for connecting said tumbler portions for simultaneous operation.

14. In a cylinder lock, a plug having a pair of parallel bores, a pair of tumbler portions independently insertable into each of said bores, a spring in one of said bores, and means connecting said tumbler portions for simultaneous operation.

15. In a cylinder lock, a plug having a pair of parallel bores, a tumbler portion independently inserted into each of said bores, a spring inserted into one of said bores, and means on each of said

tumbler portions whereby they may be connected for simultaneous operation.

16. In a cylinder lock, a plug having a pair of tumbler chambers, a tumbler portion independently inserted into each of said chambers, a spring inserted into one of said chambers, and means for connecting said tumbler portions for simultaneous operation.

17. In a cylinder lock, a plug having a pair of partially traversing parallel bores, said bores having a communicating portion, a separable tumbler portion in each of said bores, a spring in one of said bores, and means operating in said communicating portion for connecting said tumbler portions for simultaneous operation.

18. In a cylinder lock, a plug having a pair of parallel connected bores, a tumbler portion independently insertible into each of said bores, a spring inserted into one of said bores, and means operating in the connecting portion of said bores for connecting said tumbler portions for simultaneous operation.

19. In a cylinder lock, a plug having a pair of parallel bores in communication, a tumbler portion independently inserted into each of said bores, a spring in one of said bores and means on each of said tumbler portions whereby they may be connected for simultaneous operation, said means being operable through the connecting portion of said bores.

20. In a cylinder lock, a plug having a pair of parallel connected bores each partially traversing said plug, a spring adapted to be inserted into one of said bores, the entrance into each of said bores being on the periphery of said plug opposite the entrance to the other of said bores a tumbler portion independently inserted into each of said bores from the entrance end of said bores, integral means on said tumbler portions whereby the same may be joined at the communicating portion of said bores, whereby said tumbler portions may be operated simultaneously.

21. In a key plug, a keyway, a pair of connected transverse bores in said plug, a tumbler portion insertible into one of said bores, a second tumbler portion insertible into the other of said bores, said tumbler portions having connecting portions adapted to be joined when said tumbler parts are inserted, said parts forming a single tumbler fully retained in said plug by the inherent shape of said plug and the nature of said assembled tumbler.

22. In a cylinder lock, a one piece plug, a pair of bores in said plug, a pair of separate tumbler parts, each of said parts being insertible into one of said bores, each of said bores being arranged to prevent removal of said portions except in the direction of their insertion, and means on each of said parts forming a joint when said tumblers are in said plug whereby said parts form a single tumbler constantly retained in said plug.

23. In a cylinder lock, a one piece plug, a pair of parallel bores in said plug, a tumbler part inserted into one bore at one end of the same, a second tumbler part inserted into the other of said bores at an end opposite the end of insertion of the first tumbler part, each of said bores being arranged to prevent removal of said portions except in the direction of their insertion, and means on each of said parts forming a joint when said tumblers are in said plug whereby said parts form a single tumbler constantly retained in said plug.

FREDERIC K. HEYER.