Nov. 4, 1941. A. A. BLUEMLE 2,261,218

LOCK

Filed Nov. 9, 1938

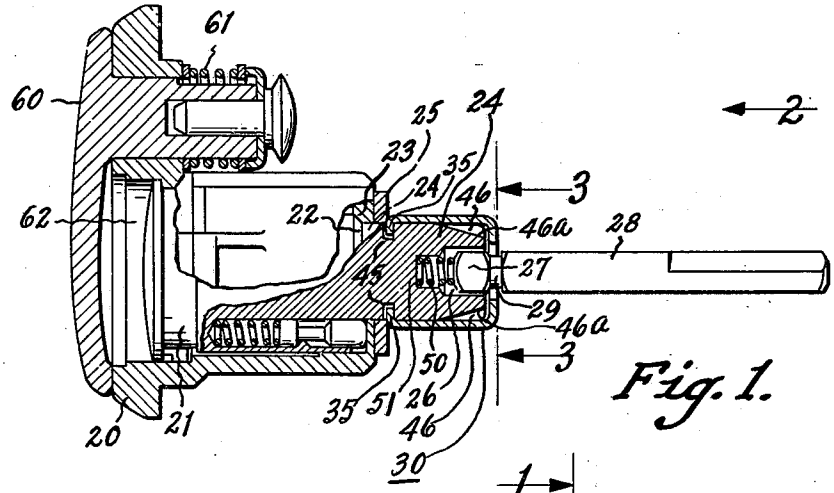


Fig. 1.

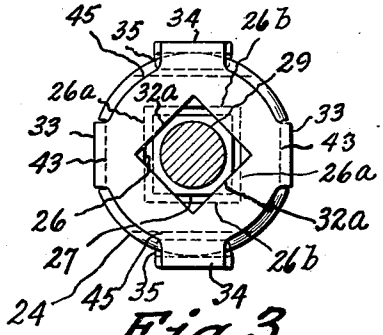


Fig. 3.

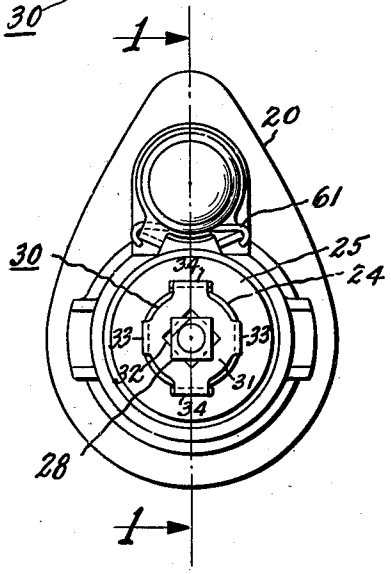


Fig. 2.

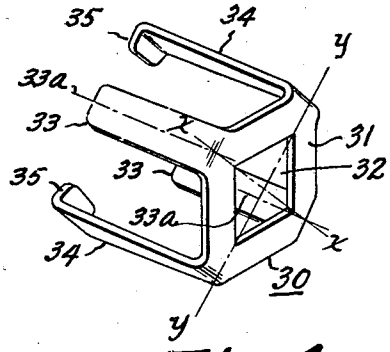


Fig. 4.

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LOCK

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16 Claims. (Cl. 70—379)

This invention relates to door locks and more particularly to the type of door lock which includes a lock cylinder rotatable in a frame and operatively connected with a shaft extending into a latch operating mechanism housed within the door.

It is an aim and object of the present invention to provide simple and durable means for coupling the shaft to the lock cylinder and for retaining the cylinder in the frame.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of the invention is clearly shown.

In the drawing:

Fig. 1 is a view of a lock cylinder and shaft assembly partly in section, the section being taken on the line 1—1 of Fig. 2.

Fig. 2 is a view of the assembly looking in the direction of the arrow 2 of Fig. 1.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a perspective view of the member for retaining the lock shaft and the lock cylinder in coupled relation and for retaining the cylinder within the frame.

Referring to the drawing, the lock comprises a frame 20 provided with a stepped bore which receives a lock cylinder 21 which can be turned with respect to the frame by the use of the proper key. The cylinder 21 has a shoulder 22 bearing against a shoulder 23 provided by the frame. The shoulder 23 surrounds an opening in the frame 20 through which an extension 24 of the cylinder projects. A washer 25 surrounds the extension 24 and bears against the right end of the frame 20. The extension 24 has a centrally located recess 26 of square cross section contour which loosely receives the end 27 of a shaft 28 which is made of square stock. Shaft 28 is provided with an annular groove 29. The shaft is maintained in coupled relation to the lock cylinder extension 24 by a coupler 30 shown in perspective in Fig. 4.

Coupler 30 is punched and shaped from sheet metal so as to provide a flat base portion 31 provided with a square opening 32 of such dimensions that the shaft 28 may pass through it when the faces of the squared end 27 of the shaft are located parallel to the squared edges 32*a* of the opening 32; but, when the shaft 28 is located so that its corner edges are staggered with respect to the corners of the hole 32 the shaft cannot be passed into the hole. The coupler 30 is provided with diametrically opposite prongs 33 extending from the base 31 and located substantially parallel to each other. The center line of symmetry 33*a* of the prongs 33 will intersect a diagonal line *x*—*x* which intersects opposite corners of the opening 32. The coupler 30 is provided with diametrically opposite prongs 34 having hooked ends 35. The symmetrical axes of prongs 34 intersect a line *y*—*y* which intersects opposite corners of the hole 32 and which is substantially at right angles to the line *x*—*x*.

The shaft groove 29 is of such width as to freely receive portions of the base 31 of the coupler 30. The extension 24 is provided on its exterior with diametrically opposite flat grooves 43 extending longitudinally of the cylinder and located in planes parallel to opposite surfaces 26*a* defining the squared recess 26. The grooves 43 are of such dimensions as to receive the prongs 33 of coupler 30. The extension 24 is provided with diametrically opposite transverse flat grooves 45 located in planes paralleling the flat surfaces 26*b* which define the squared recess 26. Each groove 45 is adapted to receive a hooked end 35 of a prong 34. Extension 24 is provided with diametrically opposite tapering grooves 46 having flat bottoms 46*a* which meet the right-hand end surfaces of the extension 24 at edges which are parallel to the surfaces 26*b* defining the squared recess 26.

To couple the shaft 28 to the cylinder 21, the squared end 27 of shaft 28 is placed in substantially axial alignment with the coupler 30 and is turned so that its flat surfaces are parallel to the flat side edges 32*a* of the hole 32 in the coupler 30. This permits passing the shaft 28 through the base 31 of the coupler 30. The shaft 28 is passed through the base 31 until the groove 29 is in alignment with the base 31. Then the shaft 28 is turned relative to the coupler 30 until the squared hole 32 of the base 31 of coupler 30 is located with respect to the head 27 of shaft 28 as shown in Fig. 3. In other words the shaft 28 is turned 45° from a position which permits passing the shaft through the coupler base 31 to a position such as shown in Fig. 3 which prevents detaching the shaft 28 from the coupler 30. Then the shaft 28 together with the coupler 30 are moved axially relative to the cylinder 21 to permit the shaft head 27 to enter the squared recess 26 in the lock cylinder extension 24 and the prongs of the coupler are caused to engage the extension 24 in the following manner:

The prongs 33 are received by the grooves 43 of the cylinder extension 24, and the hooked ends 35 of prongs 34 of the coupler are received by the grooves 45. During this relative axial movement between the coupler 30 and the cylinder extension 24 the prongs 35 first engage the tapered surfaces 46*a* of the grooves 46 which cause the prongs 34 to be spread apart. Due to the resiliency of the metal of which the coupler is constructed the prongs will unflex as soon as the hooked ends 35 are in alignment with the grooves 45 of the lock cylinder. Then the prongs 35 snap into the grooves 45 thereby locking the

coupler to the lock cylinder extension **24**. Then the shaft **28** cannot be withdrawn from coupling engagement with the lock cylinder **21** because corner portions of the head **27** of shaft **28** will be obstructed by the flat portions **32***a* defining the opening **32** in the coupler base **31**.

To prevent a rattling sound due to the motion of the shaft **28** relative to the coupler and cylinder, a compression spring **50** is located between the head **27** of the shaft **28** and end wall **51** of an axial recess in the extension **24**. Spring **50** urges the head **27** of shaft **28** against the coupler, thereby eliminating noise.

The prongs **34** function not only to attach the coupler to the cylinder extension **24**, but they also retain the washer **25** to the position shown in Fig. 1, thereby preventing displacement of the cylinder **21** toward the left with respect to the frame **20**.

The part **60** is a rotatable cover which is normally urged by spring **61** into position for covering the opening **62** through which the key is passed when being applied to the cylinder **21**.

From the foregoing it is apparent that I have provided for the connection of the lock shaft of the key cylinder by a relative simple and inexpensive coupling member which serves also to prevent displacement of the key cylinder with respect to the cylinder frame in one direction. These parts may be readily disassembled by the use of a simple tool such as a screw driver to pry the prongs **34** away from the cylinder extension **24** so as to withdraw the hooked ends **35** from the grooves **45** of the cylinder extension **24**. Then the coupler **30** can be removed together with the shaft **28** from the cylinder extension **24**. Then, after turning shaft **28** forty-five degrees with respect to the coupler **30** so as to locate the flats of the shaft **27** parallel to the flats **32***a* of the opening **32** in the coupler **30**, the shaft **28** may be disassembled from the coupler **30**.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A cylinder lock comprising a frame, a key receiving cylinder rotatable within the frame and having a part extending through an end wall of the frame, a square shaft or bar for transmitting rotary motion from the cylinder, said bar having a square head portion received by a square recess in the cylinder extension and having an annular groove located outside the cylinder extension when the cylinder and bar are assembled, and a coupler having a base provided with a square hole of such dimensions that the square head of the bar will pass through said square hole when the flats of the bar are substantially parallel to the flats of the coupler base defining the square hole therein, the dimensions of said squar hole of the coupler base being such that, when the bar is turned approximately 45° relative to the coupler base, the square head of the bar will not pass through the square hole in the coupler base, such turning being permitted by aligning the coupler base with the groove in the bar, and means provided by the coupler and cylinder extension for attaching the coupler to said extension in such position that the corners of the hole in the coupler base are staggered with respect to the corners of the square recess in the cylinder extension.

2. A cylinder lock according to claim 1, said coupler being provided with flat prongs which extend substantially at right angles from the coupler base and from portions of the base adjacent corners of the square hole therein, and said cylinder extension being provided with flats located parallel to flats of the square recess of the cylinder extension, said flats receiving said prongs.

3. A cylinder lock according to claim 1, said coupler being provided with resilient prongs extending from the coupler base and having hooked ends which snap into recesses provided by the cylinder extension.

4. A cylinder lock according to claim 1, said coupler being provided with prongs which extend from the coupler base and along the outside of the cylinder extension to positions adjacent the end wall of the frame and which thus prevent removal of the cylinder from the frame.

5. A cylinder lock according to claim 1, said coupler being provided with resilient prongs extending from the coupler base and along the outside of the cylinder extension to positions adjacent the end wall of the frame, said prongs having hooked ends which snap into recesses provided by the cylinder extension whereby accidental removal of the coupler from the cylinder extension is prevented, and also removal of the cylinder from the frame.

6. A cylinder lock according to claim 1, said coupler being provided with four prongs extending, respectively, from those portions of the coupler base which are adjacent to corners of the square hole therein, a diametrically opposite pair of said prongs being flat and received by flat-bottom, longitudinally extending grooves provided by the cylinder extension whereby to prevent rotation of the coupler relative to the cylinder extension, another diametrically opposite pair of said prongs being resilient and having hooked ends adapted to snap into recesses provided by the cylinder extension whereby to prevent accidental separation of the coupler from the cylinder extension.

7. In a cylinder lock, the combination with a frame providing a bearing, a key operated cylinder rotatable in said bearing having a part extending through an end wall of the frame and provided with an axially located non-round recess, a shaft or bar for transmitting rotary movement from the cylinder, said bar having an end portion of non-round cross-sectional contour adapted to be received by the non-round recess of the cylinder when the bar is properly located rotatively with respect to the recess, and a coupler including a flat base portion adapted to be located adjacent and substantially parallel to the end of the cylinder extension, said coupler base having a non-round hole through which the end of the bar may be passed when the bar and coupler are properly located rotatively with respect to each other, said bar having a portion which can be located in the plane of the coupler base and which is of such shape and dimensions as to permit turning of the bar relative to the coupler base so that the bar end cannot pass through the base, and means provided by the coupler and cylinder extension for attaching the coupler thereto in such location that the end of the bar, thus received by the recess of the cylinder extension, cannot be withdrawn but will be obstructed by the coupler base, the connection between the cylinder and bar preventing rotatively aligning the non-round bar end with the non-round hole in the coupler base.

8. In a cylinder lock, the combination with a frame providing a bearing; a key operated cylinder rotatable in the bearing having a part extending through an end wall of the frame and having an axially located non-round recess; a connecting bar for actuation by the cylinder, said bar having an end portion of non-round cross section adapted to be received by the non-round recess, coupling means for holding the cylinder, the frame and the bar in assembled relation, said coupling means including a base having an opening through which one end of the bar may be passed, said opening adapted to be arranged with respect to the non-round portion of the bar so that the non-round portion cannot pass through the opening when the cylinder, the frame and the bar are in their proper assembled relation; and a coiled spring housed within the recess for urging the bar longitudinally of the cylinder, said spring operating to hold resiliently the non-round portion of the bar against portions of the base of the coupling means to prevent rattling.

9. In a cylinder lock, the combination with a rotatable key operated cylinder, a frame providing a bearing for the cylinder, a shaft or bar to transmit rotary movement from the cylinder, a washer about the cylinder exterior of the frame, and a one-piece coupler about the cylinder exterior of the frame and the bar for connecting the cylinder and the bar and for holding the washer against the frame to prevent removal of the cylinder from the frame and prevent separation of the bar from the cylinder.

10. A cylinder lock comprising a frame, a key receiving cylinder rotatable within the frame and having a part extending beyond an end of the frame, a ring surrounding the extending part of the cylinder, a shaft adapted to receive rotary movement from the cylinder, a one-piece coupler about the extending part of the cylinder and the shaft for connecting the shaft with the cylinder and for holding the ring against the end of the frame whereby appreciable longitudinal movement between the cylinder and frame is prevented and the cylinder is incapable of being removed from the frame when the coupler is in its assembled relation with the elements.

11. A cylinder lock comprising a frame, a key receiving cylinder rotatable within the frame and having a part extending beyond an end of the frame, a ring surrounding the extending part of the cylinder, a shaft adapted to receive rotary movement from the cylinder, a one-piece detachable coupler about the extending parts of the shaft for connecting the shaft with the cylinder, and means including integral parts of the coupler for anchoring the coupler to the extending part and for holding the ring firmly against the end of the frame to prevent longitudinal movement of the cylinder in either direction.

12. A cylinder lock comprising a frame, a key receiving cylinder rotatable within the frame and having a part extending beyond the rear end of the frame, a member slidably mounted upon the extending part of the cylinder exterior of the frame, a bar to transmit rotary movement from the cylinder, a one-piece coupler about the extending part of the cylinder and the bar for connecting the cylinder and the bar, and means associated with the coupler in its assembled position with the parts for maintaining the member against the end of the frame whereby the cylinder is incapable of being removed from the frame.

13. A cylinder lock comprising a frame, a key receiving cylinder rotatable within the frame and having a portion extending beyond the frame, an apertured member about the extending portion of the cylinder, a shaft having a portion adapted to enter a recess in the extending portion of the cylinder so as to receive rotary movement from the cylinder, removable means about the extending portion of the cylinder and the shaft, said means operating to hold that portion of the shaft within the recess of the cylinder and for holding the apertured member firmly against the end of the frame whereby the cylinder and the bar are incapable of being removed from the frame and the recess respectively when the removable member is in its assembled relation with the parts.

14. A lock comprising a frame; a plug rotatably supported within the frame and extending beyond the rear end of the frame and having a depression; a washer about the extending portion; and a removable cap member non-rotatably supported about the extending portion of the plug for holding the frame, plug and washer in assembled relation preventing removal of the plug from the frame, said cap member including a plurality of resilient prongs at least one of the prongs having an angular projection anchored in the depression to prevent any substantial axial movement of the cap member relative to the plug and having the free ends of the other prongs abutting the washer holding the washer against the rear end of the frame.

15. A lock comprising a frame; a plug rotatably supported within the frame and extending beyond the rear end of the frame; a bar for transmitting rotary movement from the plug, said bar having an interfitting connection with the plug; and a coupler having a base provided with an opening through which the bar interfitting connection will pass when in predetermined position with respect to the opening and when the bar is turned a certain distance relative to the base the interfitting connection will not pass through the opening, such turning being permitted when the coupler base is beyond the interfitting connection of the bar; and resilient arms extending from the base of the coupler and having portions which fit into depressions provided by the plug extension to anchor the coupler to the base, said arms operating to prevent accidental removal of the plug from the frame.

16. A cylinder lock comprising, a frame, a plug rotatable within the frame and having a portion extending beyond the frame; a bar for transmitting rotary movement from the plug, said bar having a driving connection with the extending portion and having an annular groove located beyond the driving connection; and a coupler having a base provided with an opening of such dimensions that the drive connection of the bar will pass through the opening when in predetermined position with respect to the opening, and when the bar is turned a certain distance relative to the coupler base, the bar drive connection will not pass through the opening, such turning being permitted by aligning the coupler base with the annular groove of the bar; and means provided by the coupler and the extending portion of the plug for anchoring the coupler to the extending portion with the means of the coupler operating, automatically, to prevent accidental removal of the plug from the frame.

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