Feb. 22, 1949. H. J. FELDMANN 2,462,827

LOCK MECHANISM

Filed Oct. 1, 1946

Fig. 1.

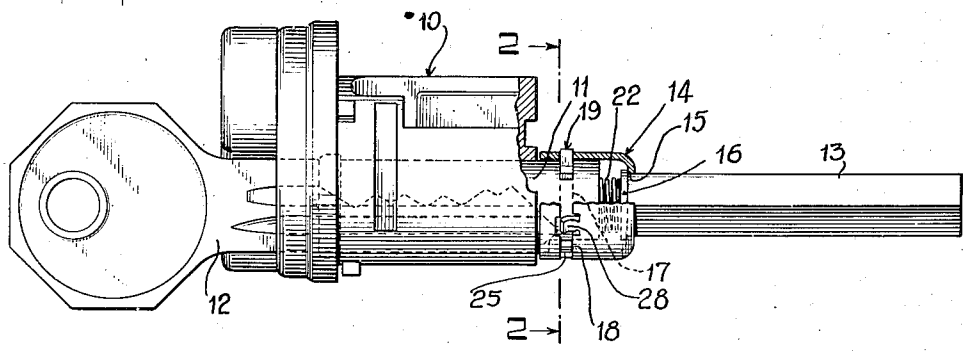



Fig. 2.

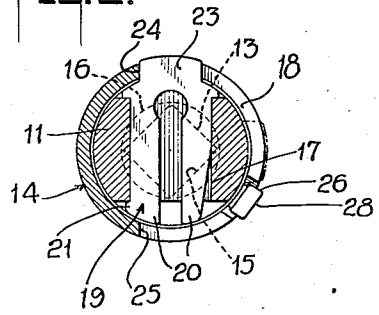



Fig. 3.

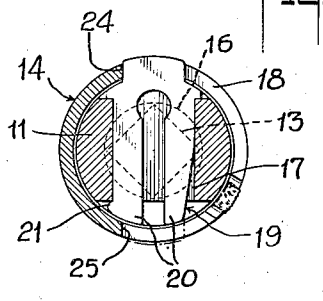



Fig. 4.

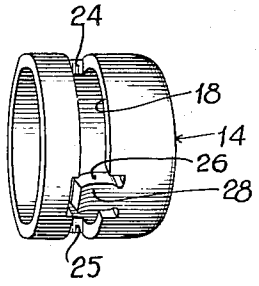
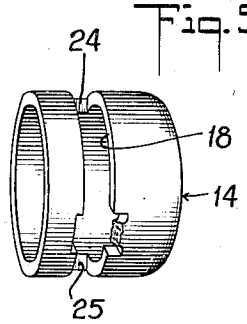



Fig. 5.




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Patented Feb. 22, 1949 2,462,827

# UNITED STATES PATENT OFFICE

2,462,827

## LOCK MECHANISM

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Application October 1, 1946, Serial No. 700,522

13 Claims. (Cl. 70—379)

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This invention relates to a lock, and more particularly to a lock of the type in which a rotatable key controlled element is adapted to move a driven lock element.

Those skilled in the lock art fully appreciate that in most types of tumbler locks keys cannot be removed from the elements that they control, such as key plugs, except when the key plugs are in a particular rotated position. Therefore, when a key plug and the lock element driven thereby must rotate in a particular predetermined relationship, the means of connection between the key plug and the driven element must be such that when the driven element is placed in a predetermined position, the key plug may be moved to, or actually be in a position in which the key may be removed.

In some locks, the key plug and the driven element are keyed together so as to be rotated together, or they may be formed of one piece. In such locks, the key plug must always be in a particular position allowing the removal of the key when the driven element is moved to a predetermined position. Otherwise, it must be possible to rotate the key plug back to a predetermined position. In other locks, there is a lazy or lost motion connection between the key plug and the driven element so that the key plug may, for instance, be rotated 360° while rotating the driven element 180°. Therefore, after the driven element is rotated 180°, the key plug which has rotated 360°, is positioned so that the key may be readily removed therefrom. The amount of lost motion in the lost motion connection varies with individual locks, as those skilled in the art will appreciate.

It is the object of my invention to contribute a driving connection between a key plug and a driven element, whereby the amount of lost motion may be changed very readily. Those skilled in the art will appreciate that this makes it possible to use a single combination of lock elements for at least two different installations, and therefore, simplifies the problem of the manufacturer.

As a feature of my invention, I utilize means of connection having a readily removable part adapted when removed, to change the relationship between the key plug and the driven element, and the amount of free rotation of the key plug relatively to the driven element. As a more particular feature of this part of the invention, the readily removable element is a frangible piece that may be broken off quite readily to change

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the relationship between the key plug and the driven element.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention, and that my invention should not be considered as limited to the particular structure herein shown and described.

Referring now to the drawings, Fig. 1 is a vertical elevation of a lock assembly in which my invention is embodied. Fig. 2 is a section taken along lines 2—2 of Fig. 1, while Fig. 3 is a similar section showing the frangible element broken off. Fig. 4 is a perspective view of that part of the combination on which is preferably found the readily frangible element. Fig. 5 shows the same part with the element broken therefrom.

Referring now more particularly to the drawings, my lock combination preferably utilizes a cylinder 10 in which is rotatable a key plug 11 adapted to be controlled in its rotation by tumblers adapted to be set by a key 12. Those skilled in the art will appreciate that when the key 12 is inserted into the key plug, the tumblers will be set and the key plug will be rotatable relatively to the cylinder 10. It will also be understood that the key 12 may be removed only in one or more positions relatively to the cylinder depending on the type of lock and its mode of construction. Thus, in the usual pin tumbler lock well known by those skilled in the art, the key may be removed only in one position. In the usual plate tumbler lock in which the tumblers slide in the key plug, the key may be taken out generally in two positions 180° apart. All this is so well known as to need no further explanation and no showing in the drawings.

The driven element of my lock combination is designated by reference numeral 13, and is shown here to be a connecting bar that generally extends into cooperation with a locking member or lock operating member of some sort, all as those skilled in the art will understand. For coupling the connecting bar 13 to the key plug 11, I use a cap or sleeve 14 having a square opening

15 adapted to fit about the square connecting bar 13 so that the two are locked against rotation relatively to one another. A flange 16 of the connecting bar 13 fits against the inside surface of the end of the cap or sleeve 14 and prevents endwise removal of the connecting bar 13 from the said cap 14, as probably best seen in Fig. 1.

The key plug 11 is formed as best shown in Figs. 2 and 3 with a transverse slot 17 adapted for alignment with a circumferential slot 18 formed in the cap or sleeve 14. A spring-like detent 19, of the type well known in the art, is utilized to assemble the cap or sleeve 14 to the key plug 11, and therefore to assemble the connecting bar 13 to the key plug 11. Thus, the connecting bar 13 is first placed in its assembled relation to the cap or sleeve 14 as best seen in Fig. 1. The cap 14 is then inserted over the end of the key plug 11 until its slot 18 is in alignment with the slot 17 of the key plug. The legs 20 of the detent 19 are then compressed slightly and the said detent is inserted downwardly through the slot 18 and into the slot 17. When the detent reaches its position of Figs. 2 and 3, the two legs 20 will spring apart and the lug 21 on the left leg 20 will prevent outward movement of the detent 19 from its assembled relation to the key plug 11. It is obvious now that the connecting bar 13 and the cap or sleeve 14 are locked against endwise removal from the end of the key plug 11. Preferably a spring 22 may be placed in position between the flange 16 and the end of the key plug 11 so as to prevent rattling of the parts, this being especially desirable in automotive work.

An upper shoulder portion 23 of the detent 19 is now in position to contact the end surfaces 24 and 25 of the slot 18 of the cap 14, and also to contact the surface 26 of a lug 28 formed integrally with the cap and lying in bridging relation to a part of the slot 18. The lug 28 is formed when the slot 18 is cut, by simply allowing some of the material of the cap or sleeve 14 to remain. The lug 28 is quite readily frangible and may be broken off as shown in Fig. 5, leaving the slot 18 completely open so that the part 23 of detent 19 may ride between the surfaces 24 and 25.

With the lug 28 still forming part of the cap or sleeve 14, it is obvious that the shoulder 23 of the detent 19 will ride between the surface 24 at one end of the slot 18, and the surface 26 of the lug 28. Therefore, the key plug 11 will be capable of sufficient free motion relatively to the connecting bar 13 to bring the shoulder 23 against the surface 26 when the key plug rotates clockwise in Fig. 2. With the lug 28 broken off as in Figs. 3 and 5, the key plug and its detent 19 will rotate to bring the shoulder 23 of the detent 19 against the end surface 25 of slot 18 when the key plug 11 rotates clockwise in Fig. 3. The free motion of the key plug relatively to the connecting bar 13 is then rather considerably greater. Then, the entire combination of elements shown by me may be used for operating lock assemblies that require different co-action between the parts to allow removal of the key 12 in a particular position of the connecting bar 13. While I have shown but a single frangible lug 28, it is obvious that several such lugs may be utilized so that my operating combination will have great versatility and will be capable of adaptation quite readily to different lock combinations. Also, the frangible lug may be formed as part of the driving element and my invention



contemplates such variation. I believe that the great simplicity of my invention and its considerable value to the lock manufacturer will now be readily appreciated by those skilled in the art.

I now claim:

1. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a driven element adapted for rotation by said driving element and having two surfaces adapted to be contacted sequentially by said driving element when moved in its driving path by rotation of said key plug, and one of said surfaces being formed on a part of said driven element readily removable from the path of said driving element.

2. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a driven element adapted for rotation by said driving element and having two surfaces adapted to be contacted sequentially by said driving element when moved in its driving path by rotation of said key plug, and one of said surfaces being formed as a part of a readily frangible portion of said driven element adapted to be broken off and removed from the path of said driving element.

3. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a driven element adapted for rotation by said driving element, one of said elements having two surfaces adapted for sequential contact with the other of said elements, and one of said surfaces being formed for ready removal.

4. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a driven element adapted for rotation by said driving element, one of said elements having two surfaces adapted for sequential contact with the other of said elements, and one of said surfaces being frangible so as to be adapted to be readily broken off said element.

5. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a driven element rotatable about the end of said key plug and having two surfaces adapted to be contacted sequentially by said driving element when moved in its driving path by rotation of said key plug, and one of said surfaces being formed on a part of said driven element readily removable from the path of said driving element.

6. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a driven element rotatable about the end of said key plug and having two surfaces adapted to be contacted sequentially by said driving element when moved in its driving path by rotation of said key plug, and one of said surfaces being formed as a part of a readily frangible portion of said driven element adapted to be broken off and removed from the path of said driving element.

7. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a sleeve-like driven element having a pair of longitudinally extending surfaces adapted to be contacted sequentially by said driving element when moved in its driving path by rotation of said key plug, and one of said surfaces being formed on a part of said driven element readily removable from the path of said driving element.

8. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a sleeve-like driven element having a pair of longitudinally extending surfaces adapted

to be contacted sequentially by said driving element when moved in its driving path by rotation of said key plug, and one of said surfaces being formed as a part of a readily frangible portion of said sleeve-like driven element adapted to be broken off and removed from the path of said driving element.

9. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a sleeve-like driven element rotatable about the end of the key plug and having a slot in which the driving element rides, a lug on said sleeve-like driven element extending into said slot and adapted to be contacted by said driving element when moved in its driving path by rotation of said key plug, and said lug being removable so that said driving element will contact the end surface of said slot instead of said lug.

10. In a lock of the class described, a rotatable key plug, a driving element rotatable with said key plug, a sleeve-like driven element rotatable about the end of the key plug and having a slot in which the driving element rides, a lug on said sleeve-like driven element extending into said slot and adapted to be contacted by said driving element when moved in its driving path by rotation of said key plug, and said lug being readily frangible and adapted to be broken off and removed from the path of said driving element.

11. In a lock of the class described, a key plug, a sleeve rotatable about the end of the key plug and having a circumferential slot therein, a retaining and driving element adapted to be inserted into said circumferential slot and also into a retainer opening in said key plug in alignment with said circumferential slot whereby to hold said sleeve against endwise removal from about said key plug, said retaining and driving element through impinging against the end surfaces of said circumferential slot rotating said sleeve, and a readily removable part on said sleeve extending into the path of said retaining and driving element and adapted to be contacted by said retaining and driving element in advance of its contact with one end of said slot.

12. In a lock of the class described, a key plug, a sleeve rotatable about the end of the key plug



and having a circumferential slot therein, a retaining and driving element adapted to be inserted into said circumferential slot and to be retained in a retainer opening in said key plug in alignment with said circumferential slot whereby to hold said sleeve against endwise removal from about said key plug, said retaining and driving element through impinging against the end surfaces of said circumferential slot rotating said sleeve, and a part of said sleeve extending longitudinally relatively to said circumferential slot for contact with said retaining and driving element in advance of its contact with one end of the slot, said part of said sleeve being integral therewith and readily frangible for removal from the path of said retaining and driving element.

13. In a lock of the class described, a key plug, a sleeve rotatable about the end of the key plug and having a circumferential slot therein, a retaining and driving element adapted to be inserted into said circumferential slot and to be retained in a retainer opening in said key plug in alignment with said circumferential slot whereby to hold said sleeve against endwise removal from about said key plug, said retaining and driving element through impinging against the end surfaces of said circumferential slot rotating said sleeve, a connecting bar in driven retained relation to said sleeve, and a part of said sleeve extending longitudinally relatively to said circumferential slot for contact with said retaining and driving element in advance of its contact with one end of the slot, said part of said sleeve being integral therewith and readily frangible for removal from the path of said retaining and driving element.

HENRY J. FELDMANN.


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