Dec. 24, 1935. P. J. NAWN 2,025,293

LOCK AND METHOD OF MAKING SAME

Filed Nov. 15, 1930

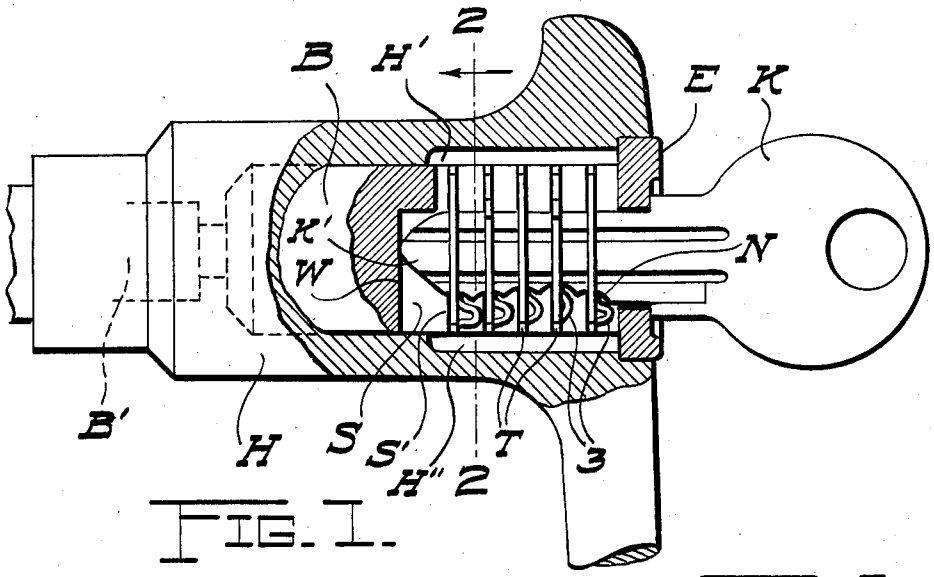


FIG. 1.

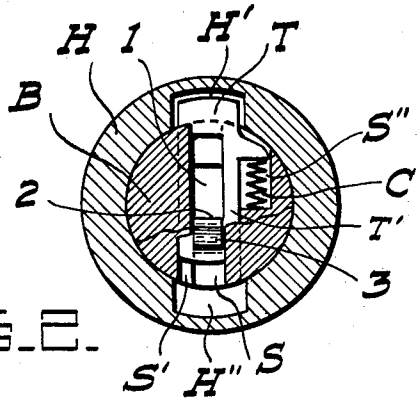


FIG. 2.

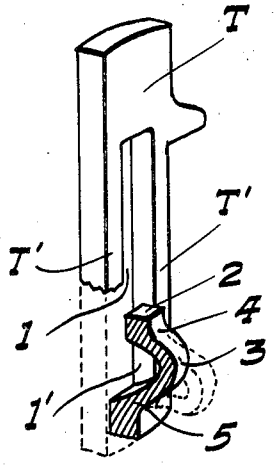


FIG. 3.

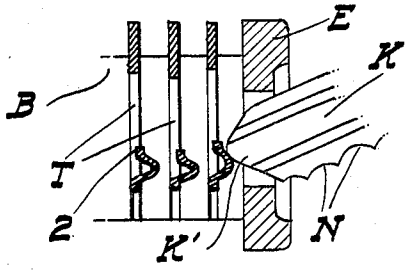


FIG. 4.

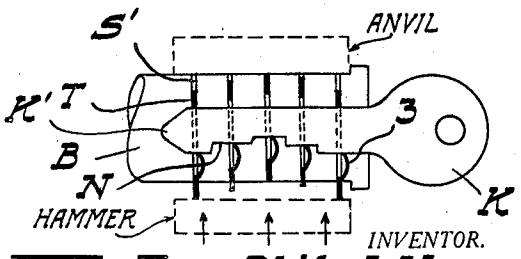


FIG. 5.

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LOCK AND METHOD OF MAKING SAME

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12 Claims. (Cl. 29—148)

This invention relates to locks wherein are employed spring actuated tumbler elements of non-flexible ductility and of other sheet-metal or like material whose thinness and physical properties offer an appreciable amount of flexibility.

The objects of the invention are as follows:—

The providing of lock tumbler elements having rectangular apertures for receiving a key whose flat and irregularly serrated edge will, upon entering into or withdrawal from the lock, glide readily over horizontal ledges parallel to the key's transverse edge; the parallel relationship minimizing wear at contacting surfaces: and eliminating the otherwise unavoidable roughing of the aforesaid surfaces during the key-fitting process.

The providing of a lock whose tumblers respond to each one of a plurality of keys after one of the complement has functioned as an anvil element in the key-fitting process here concerned; also, that duplicate replicas of the original keys may be depended upon to operate the lock, which latter cannot be subjected to a second key-fitting process. The present invention provides for the employment of any of the conventional key forms belonging to the notched edge variety. There is no requirement in the present invention that a key be especially milled or thinned at its notched edge; the key-blade may be as thin as the tumbler's thickness, or, as thick as the width of the tumbler's aperture. All standard key-blanks, when properly notched, are efficient here.

The providing of a lock having tumblers whose exposed surfaces are devoid of flat areas tending to oppose the entering of a key inserted at a careless angle, eliminating all abutment-like formations for the lodgement of tampering instruments which may exert pressure sufficient to distort a tumbler beyond registry with its key-notch. Also, the elimination of opportunities for passing pins, a wire, etc., through minor tumbler apertures, thereby rendering a lock useless until taken apart and corrected.

Other advantages will be noted throughout the particular description and pointed out in the appended claims.

Referring to the drawing, the several views are indexed as follows:—

Fig. 1 is a sectional elevation of a lock assembly.

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a sectional perspective of a lock tumbler, collapsed aspect dotted.

Fig. 4 is a diagrammatic sectional view showing certain key and tumbler relationships.

Fig. 5 is a key fitting diagram, showing clamp or vise-jaws dotted.

The views are purposely enlarged beyond actual scale of a small sized lock; however correct proportion has been preserved throughout.

Similar reference characters apply to similar parts in all the views.

In the drawing, H is a conventional design of lock body or housing wherein the smaller sized locks may be inserted, the present invention being largely concerned with the barrel or plug B, the tumblers T, and a key K; the latter element, in this invention, need not be of special design as any form of the commonly known notched key will apply in the key-fitting step employed in the arranging of particular tumbler forms here preferred. The collapsing attribute residing in th tumblers of this invention, wherewith a key functions as an anvil element, does not require specific shaping of the key's blade in order to attain the desired results.

The plug B, common in the present art of lock manufacture, is provided with a key-slot S, and tumbler slots S'. The slot S divides the plug cylinder into equal halves between the escutcheon plate E and a point beyond the occurrence of the slots S' where its termination forms a wall W that limits the tapered end, K', of the key K. The inner end of the plug B extends to function as a latch effecting means outside the present invention.

The tumblers T, of a completed lock, are disposed in the plug's transverse slots S' where they freely reciprocate under the influence of an inserted key to lie within the diameter of said plug, thus permitting rotation of the plug in its housing bore. When the key is withdrawn the tumblers are free to extend themselves beyond said diameter under the influence of actuating springs C located in small bores S'' staggered along the plug B at the slots S'. When projected beyond the plug the tumblers enter grooves H' fashioned in the housing H to offer abutment shoulders which prevent rotation of the aforesaid plug which must be turned before the latching means will be effected.

The tumblers being similar, a detailed description of one will suffice for the plurality shown. The tumbler is cut or "blanked" from relatively thick ductile metal, or, they may be of relatively thin, of harder product having flexible characteristics by way of differentiation from what is understood to be ductile qualities. The thickness gage of the tumblers must be such that will assure positive reciprocative freedom in their slots S' under the actuating means provided. An aperture 1 in the tumbler coincides with the key-slot S through which the blade portion of the key is passed when the device is unlocked. This aperture is rectangular in outline and relatively elongated. The metal cut out to form said aperture is partially separated from the tumbler proper to offer a portion indicated as 2, 3, 4, and 5 forming a tongue that obstructs the lower part of the aforesaid aperture. The free end of the tongue element is cut to provide a horizontal ledge 2 that is slightly off-set from the

thickness plane of the tumbler T. The said tongue, between said ledge and its root **5**, is arcuately expanded beyond its original length and plane to form an arched protuberance which latter, due to the lengthening thereof, leaves this stretched portion of lesser thickness, and, therefore, readily susceptible to being bent more acutely without incurring any indentation of, either, the ledge's key-contacting surface or the key's notch when the pressure of key-fitting is applied. The bend of the tongue portion being already provided permits of further collapsing this part without affecting the remainder of said tumbler whose slot S' is a snug fit that will not allow for any distortion likely to act as a brake overcoming the minute lifting springs C. The ledge **2** and its protuberance **3** project into the key-slot **1** where there is ample room. The maximum of collapse in the arched portion will never be such as to interfere with an adjoining tumbler. The features **2**, **3**, and T, are joined by purposely devised curves, or, "fillets" **4** and **5**, to avoid any corner formation likely to offer lodgement to any tampering instrument, or, to a key carelessly inserted as illustrated in Fig. 4. The tumbler just described induces what is entered keywise to seek the opening **1** only. The arcuate surfaces coacting with the key end K' is a cam effect that compels the tumblers to sink without any appreciable friction. The tongue, **2**, **4**, **3**, **5**, forms a closure against the entering of anything calculated to render the tumblers inefficient. Where a knife-blade will find lodgement, tumblers can be bent to where their ends fall within the plug diameter and the plug turned. A secondary aperture offers convenient opportunity for inserting simple objects, such as toothpicks, pins, etc., which require an expert to remove. The present improvement removes these exigencies. Only one of a complement of keys allotted each lock is used in the fitting process, and as nothing is changed in the method here described, the remaining keys of the complement accurately fit also, as well as future replicas replacing lost or stolen keys. The differences that make this sort of keys unlike may be termed minute differences. Keys are made of comparatively soft alloys that wear rapidly, even in the pocket; their relative hardness is but little more than that of the tumblers, so that the latter, in key-fitting, if the necessary pressure is inordinate because of resistance, the key will receive indentures whose markings offer rough surfaces that act as do saw-teeth to quicken wear. The differences between the depth of key-notches will, at times, be less than 1/128th of an inch, never more than a full 1/64th''. Where an indentation is equal to these amounts, as it is in some cases where the tumblers have received the maximum depression in existing key-fitted locks, the unfitted keys will not be exactly similar to the one that was fitted; therefore, a lock operated with the former will have to be "forced" because of the differences obtaining. This forcing means excessive wear that is soon apparent in metals of the kind here considered.

Locks of the class here considered are used in great quantities in the automobile industry, as one example. The position of a lock's keyhole, or escutcheon plate E, in an automobile door, varies with respect to an adjacent curb, so that keys will be inserted into their respective locks at different angles. The first, and often the second, tumbler will be subject to an abutting relationship with an entering key unless provision be made that will induce the mentioned tumblers to lower under a key's touch, and in this way compensate for the irregular manner of introducing keys, as here remarked.

Having described the invention what is claimed and desired to protect by United States Letters Patent, is:—

1. A key plug tumbler having a free ended tongue reduced in thickness and arched to span its origin in the tumbler plane.

2. A key plug tumbler having a bent tongue portion adjustable under pressure exerted thereagainst without transmitting the force generated by said pressure to affect other than said tongue portion.

3. A lock having, a tumbler provided with a key contacting portion and an outer controlling portion, said key contacting portion being adjustable relatively to said outer portion without departure from the original horizontal aspect at the point of key contact.

4. The method of assembling a tumbler plug which consists in inserting the key and a group of tumblers, and then directing a force against said tumblers to conform them to the plug periphery without compressing any portion of the aforesaid tumblers.

5. A key plug tumbler having an opening therethrough and an integral bent tongue portion curved to form a deflecting surface leading into said opening, from a point beyond the face plane of said tumbler.

6. A lock having adjustable tumblers that operatively respond to all similar keys after one of said keys has been employed for opposing a force affecting the final flexing of a portion of said tumbler previously bent below a constant key contacting ledge.

7. A key plug tumbler having an aperture provided with an elongated tongue portion bent to permit subsequent folding of said tongue upon itself.

8. A singular plug tumbler apertured to guide a key actuated ledge entirely free of the tumbler proper.

9. A key tumbler having an integrally connected tongue offering a free and movable horizontal ledge dividing a rectangular opening therethrough, said ledge remaining horizontal in all its positions across said opening.

10. A key plug tumbler having an aperture therethrough and an integral tongue arched above the tumbler's face plane to terminate in a free ledge dividing said aperture.

11. A lock tumbler struck from incompressible material that will automatically return, except an adjustable portion thereof, to an original plane after being flexed therefrom.

12. A singular lock tumbler having an adjustable portion equal in width to the thickness of an actuating key element.

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