July 2, 1940. G. E. SWANSON 2,206,539

CYLINDER LOCK

Filed April 25, 1939 2 Sheets-Sheet 1

Fig. 1

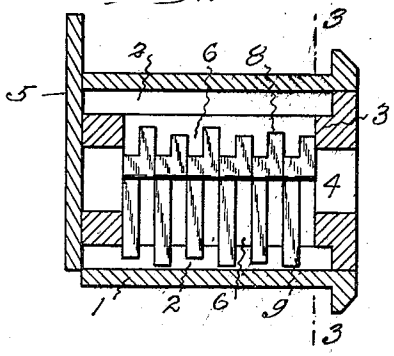


Fig. 2

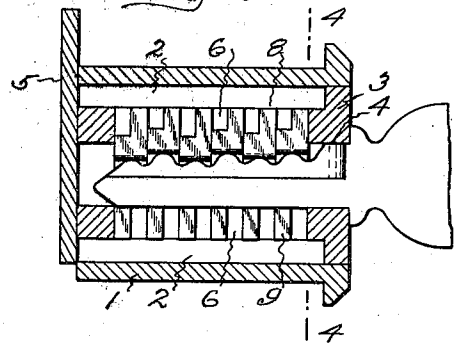


Fig. 3

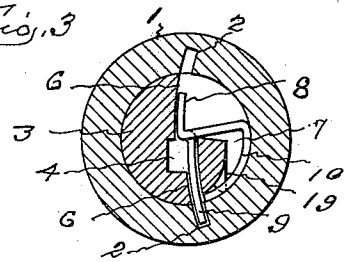


Fig. 4

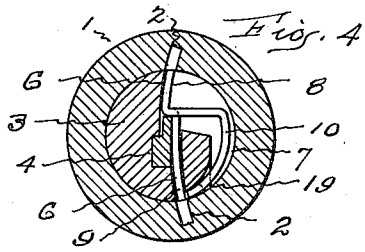


Fig. 5

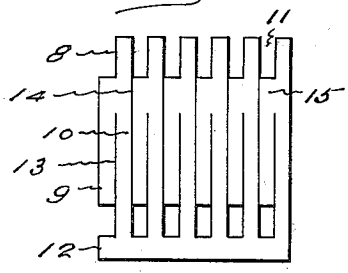


Fig. 6

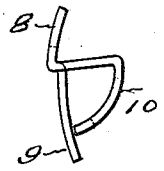


Fig. 7

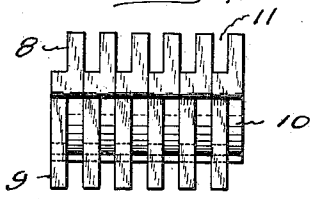


Fig. 14



Fig. 12

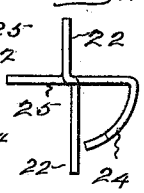


Fig. 13

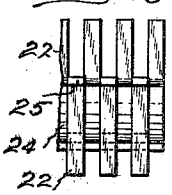


Fig. 10

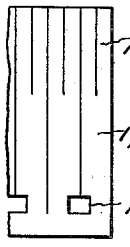


Fig. 8



Fig. 9

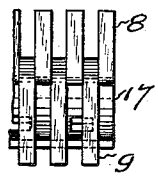
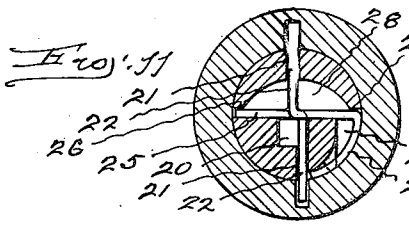


Fig. 11



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CYLINDER LOCK

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Fig. 15

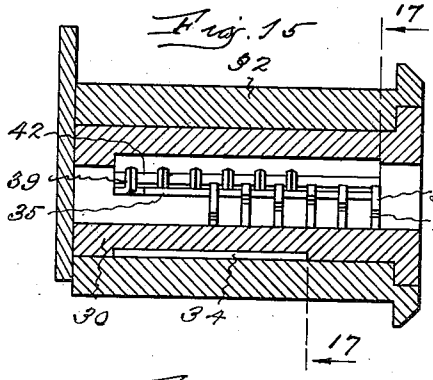


Fig. 16

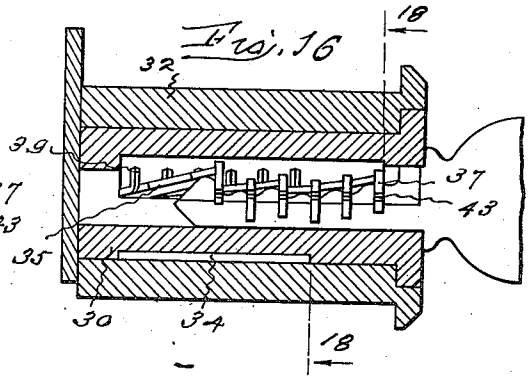


Fig. 17

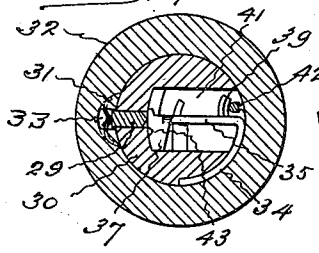


Fig. 23

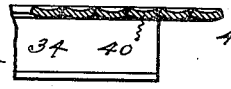


Fig. 18

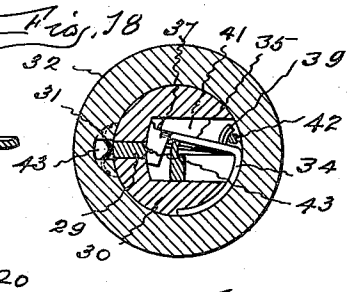


Fig. 19

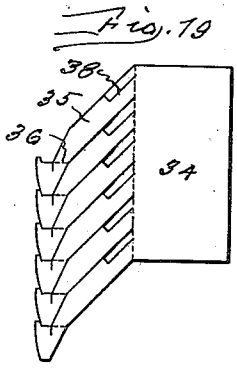


Fig. 20

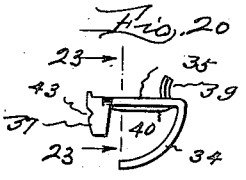


Fig. 21

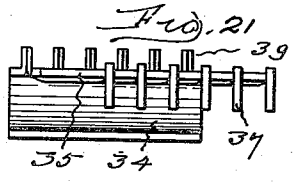


Fig. 22

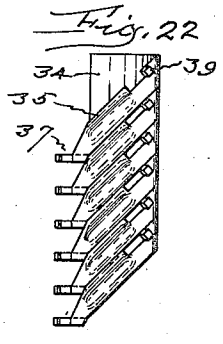


Fig. 24

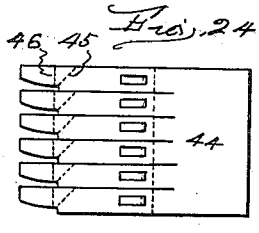


Fig. 25

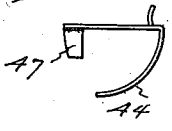
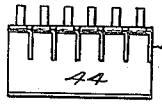


Fig. 26



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Patented July 2, 1940

2,206,539

UNITED STATES PATENT OFFICE

2,206,539

CYLINDER LOCK

Gunnard E. Swanson, New Britain, Conn.

Application April 25, 1939, Serial No. 269,918

12 Claims. (Cl. 70—362)

This invention relates to multiple tumbler cylinder locks, the object being a construction which permits cylinders of the same pattern and locking units which are identical to be produced in large quantities and assembled with minimum labor, the locking units comprising a plurality of integral springs and tumblers that can be cheaply made and quickly applied at random to the cylinders and the tumblers easily adjusted according to the contours of the bits of the individual keys intended for the different locks after the locking units have been applied to the cylinders.

Having the tumblers and springs formed as integral units not only reduces to a minimum the number of separate elements and the cost of their manufacture, but also results in the saving of much time and labor over that required to select and assemble the correct individual springs and tumblers which will register with the different keys, as is the case with the common cylinder locks, and furthermore the unitary construction eliminates all liability of the tumblers and springs dropping from the cylinders while handled or during transportation, and the possibility of their misadjustment when replaced.

Fig. 1 of the accompanying drawings shows a longitudinal section of a lock that embodies the invention before its key has been inserted and with the tumblers in such positions that the cylinder cannot be turned.

Fig. 2 is a similar section showing the positions of the tumblers with a key inserted and the cylinder free to be turned for throwing the locking bolt or latch operating member.

Fig. 3 is a transverse section of the lock on the plane indicated by the dotted line 3—3 on Fig. 1.

Fig. 4 is a transverse section of the lock on the plane indicated by the dotted line 4—4 on Fig. 2.

Fig. 5 shows a blank from which the tumblers and springs may be shaped.

Fig. 6 is an edge view and Fig. 7 a front view of the blank after it has been bent into operative shape.

Fig. 8 is an edge view and Fig. 9 a front view of a modified shape of tumbler unit.

Fig. 10 shows a blank from which a modified tumbler unit may be shaped.

Fig. 11 is a section of a lock showing a different way of applying the tumbler unit to the cylinder.

Fig. 12 is an edge view and Fig. 13 is a front view of the tumbler unit shown in Fig. 11, and Fig. 14 shows a blank from which this unit may be shaped.

Fig. 15 is a longitudinal section of a lock with the tumbler unit arranged to engage a dogging bar.

Fig. 16 is a similar view with a key inserted.

Fig. 17 is a transverse section on the dotted line 17—17 on Fig. 15.

Fig. 18 is a similar view with the key inserted.

Fig. 19 is a plan of the blank from which the unitary member may be formed.

Fig. 20 is an edge view, Fig. 21 is a front view and Fig. 22 is a plan view of this blank folded to operative shape.,

Fig. 23 is a section on the dotted line 23—23 of Fig. 20 illustrating the manner in which the tumblers may be cupped to facilitate insertion of the key.

Fig. 24 shows a further modified form of blank.

Fig. 25 is an edge view, and Fig. 26 is a front view of the last mentioned blank folded to operative shape.

The barrel 1 of the lock is formed of the usual material and of normal size. The interior wall of the barrel is provided with recesses, preferably slots 2 which may extend from end to end of the barrel. The cylinder 3 is shaped and sized to have a rotatable fit within the bore of the barrel. The cylinder has the usual longitudinal key slot 4 which may extend from end to end and at its rear the cylinder may be provided with a locking bolt or latch operating member 5. The cylinder first shown has two longitudinal slots 6 that extend in slightly curved planes substantially diametrical with relation to the key slot, and also in one side a recess 7, these slots and the recess communicating with the key slot.

The tumbler unit has a plurality of upper locking tongues 8, lower locking tongues 9, and springs 10. This unit may be bent from a strip of sheet metal which has notches 11 at its upper edge that will separate the upper locking tongues 8, and has an integral section 12 at its lower edge which will unite the lower ends of the springs 10. The blank may have slits 13 to separate the lower ends of the lower locking tongues from the springs, also slits 14 to separate one tumbler from the adjacent tumbler except at the lower edge of the unit, as illustrated in Fig. 5. This blank is bent on the sections 15 so that the lower locking tongues will be slightly back of the upper locking tongues and the springs will extend backward from approximately the junction of the upper and lower locking tongues and curve downward toward the back of the lower locking tongues. Fig. 6.

The modified tumbler unit shown in Fig. 8

is practically the same as the unit shown in Fig. 6, the difference being mainly in the way of slitting and bending the blank. The blank for the unit previously described has slits 13 which extend upward from near the lower edge of the blank for separating the lower tumbler 9 from the springs 10, Fig. 5, whereas the blank for the modified unit has slits 15 cut down from the upper edge of the blank so as to separate the lower tumblers from the upper tumblers, Fig. 10. In the latter case the lower tumblers are folded down and the springs remain full width. To increase the resilience of these springs notches 16 may be cut from their edges. In both cases each tumbler and its spring is disconnected from the other except at the lower ends of the springs.

The springs of the tumbler units of the forms described are sprung out and the units are slipped down upon the cylinders so that the upper tongues will extend upward from the key slots and the lower tongues will extend downward adjacent to the key slots, and the springs will extend into the recesses 7 and clasp about the curved inner walls thereof. Lugs 19 may be formed on the inner walls of the recesses so as to enter the spaces between the springs for assisting in holding the units in place. Figs. 3 and 4.

Instead of springing the tumbler units transversely onto the cylinders they may be slipped longitudinally into the cylinders. In this case the slot 20 for the key, the slots 21 for the upper and lower tumblers 22, and the recess 23 for the clasping spring 24 may be extended through the rear end of the cylinder and the unit inserted from that end so as to occupy the position shown in Fig. 11. The tumbler unit may have the shape of either of the previously described units, it is preferred however that the unit have an additional tongue 25 extending substantially at right angles to the upper and lower tumbler tongues. Fig. 12. This tongue may be obtained by bending forward the sections 26 at the upper edge of the slitted blank. Fig. 14. The cylinder may have a longitudinal slot 26 for the reception of the end of this transverse tongue, and also a shoulder 27 at the bend of the spring. With this arrangement the tongue and spring will co-act in their effect on the tumblers. A space 28 is provided in the cylinder above the tongue and spring to permit them to yield when a key is inserted in the key slot.

Many tumbler blanks of the style chosen may be made all of the same size, that is, with the upper tumbler tongues the same length and with the lower tumbler tongues the same length, but somewhat in excess of their ultimate lengths. When these are first snapped onto or inserted into the cylinders the ends of the tumblers will project beyond the periphery of the cylinders. The key that is to be used with a lock is inserted and its bits engaging with the shoulders adjacent to the bends at the junction of the upper and lower tongues and springs will position the several tumblers with relation to that particular key, the springs yielding to allow this. The ends of the tumblers that project beyond the periphery of the cylinder are then cut off flush with the surface of the cylinder so that the cylinder is free to be turned by the key. When there is no key in the cylinder and the tumblers are trimmed, the springs cause the ends of the lower tumblers to project into the lower locking slot in the barrel and prevent the cylinder from turning. If an improper key is inserted the bits of that key may fail to lift some of the lower tumblers from the lower slot, or may raise some of the upper tumblers into the upper slot in the barrel and thus prevent the cylinder from being turned.

The cylinders and these unitary tumblers may be assembled in quantities and the tumblers of each lock registered with the key designed for that lock by merely inserting the key and clipping off the ends of the tumblers. All of the required tumblers are quickly attached to a lock at one operation in a very simple manner.

The integral tumbler and spring member may with slight alteration be employed to engage a dogging bar for locking the cylinder instead of depending upon the direct engagement of the tumbler tongues with the barrel for locking the cylinder as previously described. In this modification there is a dogging bar 29 movable in a slot in the cylinder 30, and springs 31 are arranged in the barrel 32 so as to tend to press the dogging bar out of the slot 33 in the barrel and into the cylinder. Figs. 17, 18.

The blank from which the tumbler unit illustrated in Figs. 15 and 16 is shaped, is slitted angularly to the spring section 34 so that the tumblers 35 will extend obliquely from that section (Fig. 19) and consequently have considerable flexibility. The spring section 34, to which the tumblers are integrally united, is curved allowing it to be sprung onto a curved wall of the cylinder for holding the tumbler unit in place. The free ends of the tumblers are bent downwardly, as on the lines 36, Fig. 19, to form leaves 37 the forward edges of which may be notched for receiving the edge of the dogging bar. The tongues are also slitted on the lines 38 and these portions when the blank is bent to shape are designed to form fingers 39 that project upwardly from the tongues. The tumbler tongues may be slightly indented to provide convex surfaces 40 on their under sides along which a key when inserted will easily slide. The unit thus formed is inserted sidewise into the opening 41 in the cylinder so that the forward edges of the leaves 37 will bear against the inner edge of the dogging bar. When in this position the member 34 clasps against the wall of the cylinder and a bar or pin 42 is placed back of the fingers 39 to retain the unit in place.

After a unit has been located in the cylinder the key to be used with that lock is inserted and the tumblers lifted according to the outline of the bits of the key. Then a tool is run in through the slot which is to be occupied by the dogging bar and the notches 43 cut in the edges of the tumblers. Thus the notches of the leaves of the tumblers will be in alignment when the proper key is inserted and the dogging bar will be free to be pressed inward by the springs in the barrel so as to unlock the cylinder and allow it to be turned by the key. When an improper key is inserted the tumblers will be so positioned that the notches in the forward edges of the leaves will be out of alignment and then the dogging bar can not be pressed in so as to release the cylinder.

Instead of cutting the tumbler tongues obliquely from the spring section as shown in Fig. 19 they may be cut perpendicular with relation to the spring section 44 as shown in Fig. 24. These tongues may then be folded on the lines 45 and again on the lines 46 so as to provide the leaves 47 at the ends of the spring sections as shown in Figs. 24 and 25. In this case, as that above described, the unit is snapped sidewise into the opening in the cylinder and the leaves notched for the proper key as mentioned.

In all of the forms described the springs and tumblers are integrally connected and form for each lock a single unit which is first sprung into place and then adjusted to the key selected for the particular lock.

The invention which involves the conception of a unitary spring and tumbler member adapted to be sprung into place in a lock is not limited to the specific details illustrated, but includes other forms that come within the terms of the following claims.

The invention claimed is:

1. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, and a unitary locking member applied to the cylinder, said member consisting of a plurality of locking tongues of varying lengths movable radially in the cylinder into and out of openings in the barrel, and springs for normally controlling the positions of the tongues, all of said springs being integrally connected with each other and with the tongues.

2. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, and a unitary locking member applied to the cylinder, said member consisting of a plurality of upper locking tongues and plurality of lower locking tongues of varying lengths movable radially in the cylinder into and out of openings in the barrel, and springs for normally controlling the positions of said tongues, all of said springs being integrally connected with each other and with the tongues.

3. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, and a unitary locking member applied to the cylinder, said member consisting of a plurality of locking tongues and springs for normally controlling the positions of the tongues, said springs being integrally connected with each other and with the tongues and curved about a portion of the cylinder and clasping the locking member in place.

4. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, and a unitary locking member inserted within the cylinder and extending longitudinally therein, said member consisting of a plurality of locking tongues of varying lengths and springs for normally controlling the positions of the tongues, all of said springs being integrally connected with each other and with the tongues.

5. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, and a unitary locking member applied to and rotatable with the cylinder, said member consisting of a plurality of radially movable locking tongues of varying lengths and springs for normally controlling the positions of the tongues, one end of each spring being integrally connected with a tongue and the other ends of all of the springs being integrally joined to each other.

6. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, a plurality of tumblers radially movable in and rotatable with the cylinder, a spring integrally connected with each tumbler and normally retaining it in engagement with the barrel, and means integrally connecting all of the springs with each other.

7. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, a unitary member applied to the cylinder, said member consisting of a plurality of tumblers and integrally connected springs for controlling the positions of said tumblers, and a dogging bar carried by the cylinder and normally retained by said tumblers in engagement with the barrel.

8. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel, a unitary member applied to the cylinder, said member consisting of a plurality of tumblers with cam-shaped free ends and integrally connected springs for controlling the positions of said tumblers, and a dogging bar carried by the cylinder and normally retained by the cam-shaped ends of said tumblers in engagement with the barrel.

9. A cylinder lock comprising a barrel, a cylinder rotatably fitted in the barrel and a unitary member clasped upon the cylinder, said member comprising radially movable tumblers and curved spring means integrally connecting all of the tumblers for controlling the positions of the tumblers and also for clasping the member on to the cylinder.

10. Locking means in combination with the barrel and cylinder of a cylinder lock, which means comprises a plurality of tumblers, a spring integrally joined to each tumbler, and means integrally connecting all of the springs to each other whereby the tumblers and springs are an integral unit.

11. The combination with the barrel and cylinder of a cylinder lock of locking means, which comprises a curved spring section shaped to clasp and turn with the cylinder, and a plurality of spaced apart tumblers integrally joined to and extending angularly from said spring section, said tumblers having their free ends angularly folded and provided with notches in varying positions.

12. Locking means adapted for a lock, which comprises a plurality of spaced apart tumblers, a spring extending from and integrally joined to each tumbler, and means integrally connecting all of the springs to each other.

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