June 2, 1936. R. SIMON 2,042,867

LOCK

Filed Dec. 4, 1934

Fig. 1

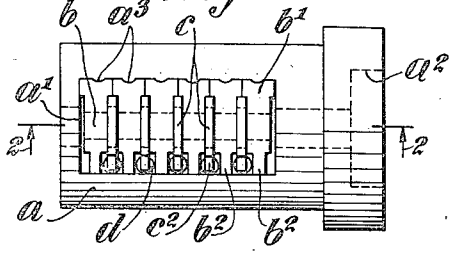


Fig. 2

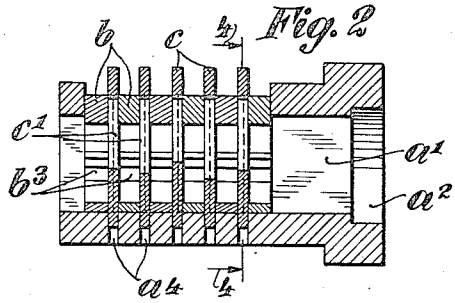


Fig. 4

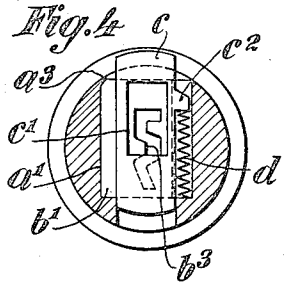


Fig. 3

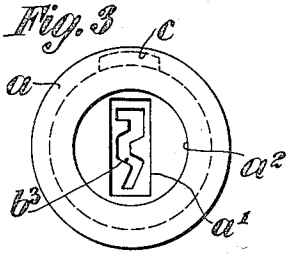


Fig. 5

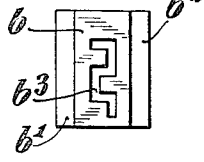


Fig. 6

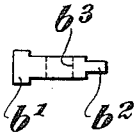


Fig. 7

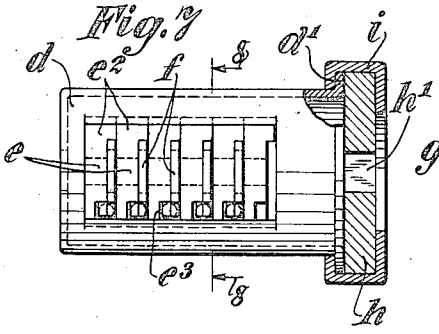


Fig. 8

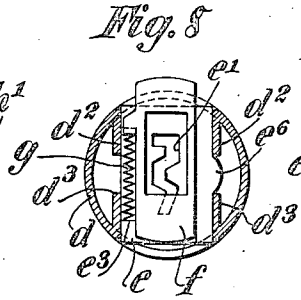


Fig. 9

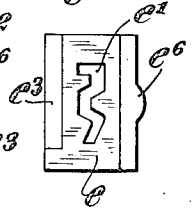


Fig. 10

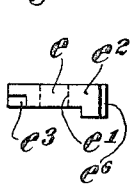


Fig. 11

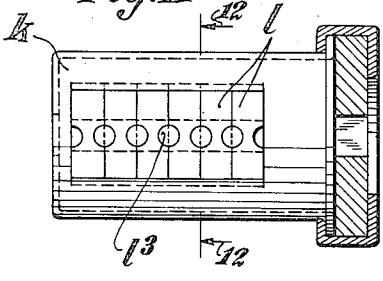


Fig. 12

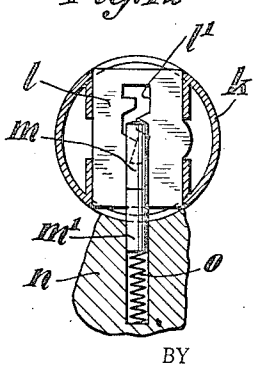
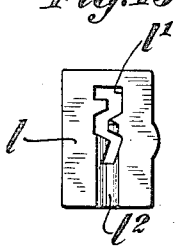


Fig. 13



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LOCK

Reuben Simon, Detroit, Mich.

Application December 4, 1934, Serial No. 755,883

2 Claims. (Cl. 70—46)

This invention relates to locks and the improvements are of particular value in connection with so-called cylinder locks as now known. While manufacturing processes have made it possible to provide satisfactory locks of this type on a mass production basis at increasingly lower costs nevertheless operations are involved which necessarily keep the costs relatively high. Further, known practices have been such that locks of a particular model (having reference to the desired tumbler combinations) have admitted of no changes other than changes in the tumbler apertures, where wafers are used or in pin lengths where pins are used. In other words, no variation in tumbler spacing has been possible in a lock of predetermined design. In accordance with existing practices the barrel or cylinder has been cast. In the casting operation it has been necessary to core for the key opening and the tumbler openings. The difficulties and objections are well known to one skilled in the art.

The principal object of the present invention is to provide a fabricated lock cylinder or barrel which shall be composed generally of a drawn or cast carrier of simple pattern in which are supported stamped or cast adapters or plates. These adapters when assembled may be retained in place by any desired expedient. Their broad function is to complete the cylinder lock construction by providing a key-way of the desired outline and retaining the tumblers in the desired predetermined spaced relationship for movement under the influence of the key. A fabricated lock structure constructed in accordance with the principle indicated eliminates all of the principal difficulties and objections heretofore encountered in manufacture and insures a substantial reduction in cost. It has the additional important advantage that the unitary adapters may be stamped in the first instance with key-ways of any desired form so the fabrication of a lock of a desired model involves merely the selection of adapters of desired form, the cylinder or barrel being otherwise standardized. Such adapters may not only vary in respect of the key-way but also in thickness or cross section so as to vary the spacing and thus influence the tumbler spacing.

The improvements will be better understood in connection with the embodiments thereof shown in the accompanying drawings which are intended merely by way of illustration of possible adaptations of the principle and in which:

Figure 1 is a view in plan showing a cylinder fabricated in accordance with the invention and carrying a series of unit adapters and tumblers in assembled relationship.

Figure 2 is a view in longitudinal section through the assembly illustrated in Figure 1 and taken on the plane indicated by the line 2—2 of Figure 1 and looking in the direction of the arrows.

Figure 3 is a view in front elevation of the barrel shown in Figure 1.

Figure 4 is a view in transverse section through the assembly shown in Figure 2 and taken on the plane indicated by the line 4—4 of Figure 2 and looking in the direction of the arrows.

Figure 5 is a view in front elevation of a suitable unitary adapter formed in accordance with the invention.

Figure 6 is a view in plan of the adapter shown in Figure 5.

Figure 7 is a view similar to Figure 1 with the parts broken away showing an assembly in which the carrier is formed as a tube.

Figure 8 is a view in transverse section through the assembly shown in Figure 7 and taken on the plane indicated by the line 8—8 and looking in the direction of the arrows.

Figures 9 and 10 are views in front elevation and plan, respectively, of the modified unit adapter shown in Figures 7 and 8.

Figure 11 is a view similar to Figure 7 showing an improved assembly with pin tumblers.

Figure 12 is a view in transverse section through the assembly shown in Figure 11 and taken on the plane indicated by the line 12—12 and looking in the direction of the arrows, and with the casing of the lock indicated in section to show the relation of the pins thereto.

Figure 13 is a view showing the front face of a suitable adapter for a pin tumbler assembly embodying the improvements.

The cylinder or barrel a of the improved lock is illustrated in Figures 1—4 as cast in simple form. The bore is generally rectangular in outline as indicated at a' while the front face of the cylinder may have a circular recess a^2 as usual. The wall of the cylinder is open at one side for a substantial distance exposing the central recess a' so that the units now to be described can readily be inserted. These units comprise a series of plates which may be stamped or cast and are referred to herein as unit adapters for a reason which will appear. One such adapter is illustrated in Figures 5 and 6 at b. Its cross sectional form as shown in Figure 6 is such as to enable a particular relationship between wafer tumblers and their operating springs to be ac-

complished; thus, the adapter has a thickened portion b' along one edge giving it generally a T-form and a reduced portion b^2 along the other edge. Through the adapter unit thus provided may extend a key-way b^3 of any desired outline to receive a key of the particular cross section for which the lock is intended. In fabricating the lock a series of adapter units b having key-ways of desired form will be dropped into the central recess a' formed within the cylinder a, the outline of the adapter units, of course, conforming to the outline of such recess. The ends b' of the adapter units will abut while the reduced sections of the units will provide spaces. In these spaces will be inserted, respectively, wafer tumblers c having apertures c' therein of predetermined size, respectively, for the intended combination. The reduced ends b^2 of the adapters afford spaces within which may be disposed the springs d for cooperation, respectively, with lugs c^2 on the edges of the tumblers in accordance with known practice. The unit adapters when assembled may be secured with relative permanence in the cylinder a by upsetting the metal at the contacting edge as indicated at a^3 or spot welding or otherwise, the assembly becoming to all intents and purposes a unitary structure. It will be understood that the key openings b^3 in the several adapters will be aligned and the several tumblers c will rest in the path of the key when it is inserted in the key-way, the tumblers being finally brought to rest in the relationship determined by the notches of the key and in which position the cylinder may be free to revolve or reciprocate in accordance with known practice. In this connection, it should be noted from Figure 2 that when the cylinder a is drawn or cast or otherwise formed spaced openings a^4 for the respective tumblers are provided in the wall below the recess a'.

From the description given it will be understood that the manufacture of the component units of the improved lock may be carried on very inexpensively and with the simplest patterns, dies or tools. The assembly is one in which the particular key-way may be selected at the last moment in providing a lock of any desired model. Conceivably, the servicing agency might stock the carrier a and several adapter units b of each form of key-way and thus assemble a lock structure with the desired key-way when and as demanded. Again, the form and dimensions of the unit adapters may vary so that the spacing of the tumbler c may be changed if required. This possibility, of course, permits the association with the standard carrier a of an infinite variety of changes to accommodate different keys. A further practical advantage of the improvement resides in the fact that the force impressed on the key for the purpose of operating the lock is impressed directly on the adapter units and not on the carrier or other associated part. Accordingly, the adapter units may be of commensurate strength while the carrier may be made relatively light.

The principle of the invention may obviously be incorporated in widely different assemblies. By way of illustration, other embodiments are shown. In Figure 7 the cylinder is illustrated as a drawn tube d which is formed with a peripheral flange d' at the front end. The opposite side walls of this tube are slit longitudinally and transversely for a distance and the adjacent wall sections pressed inwardly to form the opposed walls of a channel. In Figure 8, for example, two of these opposed wall sections at one side of the tube are indicated at d^2 and two of the wall sections turned in at the other side of the tube are indicated at d^3. The respective sections are aligned thus constituting a through channel in the tube. Within this channel are mounted a series of adapter units e which may be of the form illustrated in Figures 9 and 10 particularly. The key-ways e' of the several adapters are, of course, similar, and aligned when the parts are assembled. One edge of each adapter e is relatively wide as indicated at e^2 so that when the several adapters are placed side by side with the portions e^2 in abutment, openings are provided to receive the wafer tumblers, respectively. The other edge of each adapter may be recessed for part of its length as indicated at e^3 to receive the actuating spring g of the adjacent tumbler f. In all of the forms illustrated it is contemplated that the adapter units will constitute bearing plates for the tumblers which are guided thereby. The adapter units e in this form may be retained in place by means of a lug e^6 provided on the thickened edge which has frictional engagement with the proximate edges of two of the aligned walls d^2, d^3, constituting the channel-way as shown clearly in Figure 8.

At the front of the lock a circular adapter unit h is secured to the end of the cylinder by means of a circular channel i which is turned over the circular flange d' on the cylinder and over the front face of the plate h. The plate h is formed with a key-way h' similar in outline to the key-ways e' of the adapters within the cylinder and aligned therewith. The operation is, of course, in accordance with the usual practice. The assembly embodies all of the advantages pointed out in connection with the other form, the principal difference being in the character of the carrier d and the assembly of parts.

In Figure 11 there is shown a carrier k formed as a tube similar to that illustrated in Figure 7. The difference in the assembly resides in the provision of pin tumblers in place of the wafers and the adaptation of the cooperating parts thereto. The adapter units l are formed with key-ways l' of any desired outline. However, a semi-circular guide-way l^2 extends centrally of the adapter from the key-way l' to one edge. When the adapters are assembled in the manner heretofore described the guide-ways l^2 of abutting units provide circular guide-ways indicated at l^3 in Figure 11 for the pins m, respectively. Referring to Figure 12 there is shown in section a fragment of the casing n of a lock. It is assumed that the cylinder k is to be moved relative to the casing of the lock. Aligned pin sections m, m', normally hold the cylinder k against such movement relative to the casing. Springs o housed within the casing urge the pin sections towards the key-ways l'. When the proper key is inserted the pin sections are forced outwardly into the casing n against the action of the respective springs o. The proper key will bring the pin sections into such relation to the casing and to the cylinder as to permit the cylinder to be moved freely. The principle of the invention when embodied in a lock having pin tumblers remains the same and all of the advantages are retained. It is unnecessary, accordingly, to restate them.

Changes in details of construction of the constituent parts and form and dimensions, and the process for manufacturing the units may all be

changed without departing from the principle set forth in the appended claims.

I claim as my invention:

1. A lock structure comprising a hollow cylindrical body, diametrical openings in the wall of the body, adapter plates mounted in said openings and having similar aligned key-ways to receive the proper key, tumblers mounted movably between said adapter plates for cooperation with the proper key, guide flanges pressed out of the the material of the body and extending inwardly along the edges of said openings to receive said adapter plates, said guide flanges forming spaced pairs of walls and projections on the adapters adapted to engage between certain of the walls to retain the adapters in the carrier.

2. A lock structure comprising a hollow cylindrical body having an opening formed therein, flanges projecting inwardly from the opposite sides of said opening to form opposed wall sections, an opening in the body spaced from the first opening, adapter plates mounted in said openings and having similar aligned key-ways to receive the proper key, and tumblers mounted movably between said adapter plates for cooperation with the proper key.

REUBEN SIMON.