

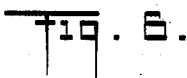
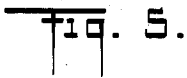
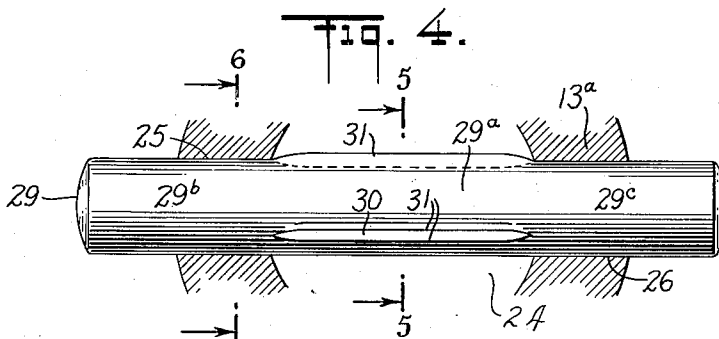
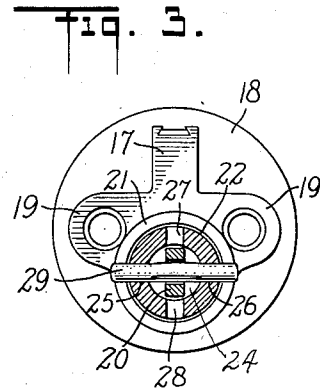
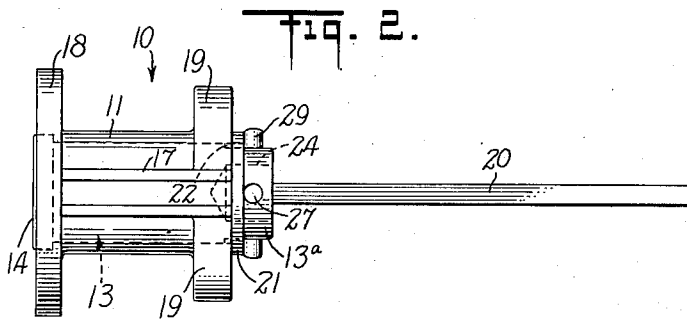
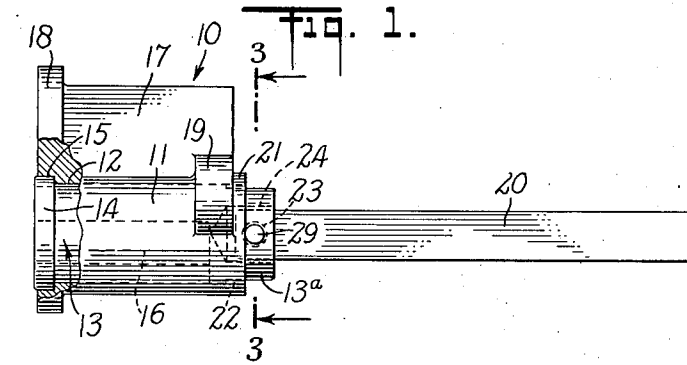
Nov. 1, 1938.

S. BRANTINGSON

2,135,322

LOCK CONSTRUCTION

Filed June 3, 1937



INVENTOR
Sigurd Brantingson
BY
William T. Kriesner
ATTORNEY

UNITED STATES PATENT OFFICE

2,135,322

LOCK CONSTRUCTION

Sigurd Brantingson, Palisades Park, N. J., assign-
or to Francis Keil & Son, Inc., a corporation of
New York

Application June 3, 1937, Serial No. 146,144

11 Claims. (Cl. 70—357)

This invention relates to lock construction.

One of the objects of this invention is to provide a simple, practical and inexpensive but dependable lock construction. Another object is to provide a lock construction in which the individual parts can be inexpensively manufactured and easily and inexpensively assembled. Another object is to provide a lock construction which is capable of simple and easy disassembly and subsequent assembly, as is sometimes necessary on the part of a locksmith for effecting change in the tumblers or tumbler pins, or the like.

Another object is to provide a lock construction of the cylinder type having a casing, key plug, and connecting or operating bar but constructed so that a simple, inexpensive, speedy and dependable fabrication and assembly may be achieved. Another object is to provide a lock construction of this type with assembly-retaining means that is inexpensive, accurate in action, well adapted to meet the conditions of practical use, strong, free from complexities of construction or handling and thoroughly practical. Another object is to provide a construction of the above-mentioned character in which the individual parts can be fabricated or conditioned for assembly by way of simple and inexpensive operations. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing in which is shown one of the various possible embodiments of my invention—

Figure 1 is a side elevation of a lock construction in assembled relation, certain parts being broken away or shown in section;

Figure 2 is a plan view, as seen from the top of Figure 1;

Figure 3 is an end elevation partly in section, as seen along the line 3—3 of Figure 1;

Figure 4 is a fragmentary sectional view on a much enlarged scale showing certain of the parts that appear in Figure 3;

Figure 5 is a sectional view, as seen along the line 5—5 of Figure 4, and

Figure 6 is a similar enlarged sectional view, as seen along the line 6—6 of Figure 4, certain parts being omitted.

Similar reference characters refer to similar

parts throughout the several views in the drawing.

Referring first to Figures 1, 2 and 3, there is generally indicated at 10 a casing having a lower cylindrical portion 11 bored out as at 12 to receive a key plug 13; the latter preferably has a peripheral flange 14 at its front or left-hand end that is received in the undercut 15 at the front end of the bore 12 as the key plug 13 is inserted from the left, as viewed in Figure 1. The flange 14 thus acts to limit movement of the key plug 13 toward the right, while permitting freedom of rotation relative to the casing 10.

Key plug 13 is provided with a key slot 16 which may be of usual form to receive any suitable form of key and it has appropriate tumblers or tumbler pins (not shown), such as pin tumblers, which may coact with tumblers, such as pin tumblers (not shown) arranged in the tumbler-receiving extension 17 of the casing 10. The latter may have a front flange or escutcheon plate 18, preferably circular, and it may have near its right-hand or rear end screw threaded ears 19 to receive the securing or clamping screws (not shown) for holding the lock construction in installed position. The key plug 13 has connected to it at its rear end, in a manner about to be described, a connecting or operating bar 20 which makes connection with the part or parts, such as a bolt (not shown) which are to be actuated by the movement of the key plug 13.

The right-hand or rear end of the cylindrical casing portion 11 is preferably faced off in any suitable manner, as at 21 (Figure 1), to provide an end face whose plane is at right angles to the axis of the key plug 13, particularly where the latter is to partake only of rotation relative to the casing 10. Key plug 13 is preferably of a length greater than the length of the bore 12 and hence has a rearwardly extending portion 13^a. The diameter of the key plug 13 is such that it neatly and snugly fits into the bore 12 to permit appropriate movement of the former relative to the latter under the control of the proper key, but throughout an appropriate extent adjacent the rear or right-hand end of the key plug 13, there preferably exists a difference between the diameters of the key plug 13 and the bore 12 so as to provide an annular gap, as at 22 (Figures 1 and 3) between the wall of the bore 12 and the surface of the key plug 13; in practice the axial extent of this annular gap may be on the order of one-sixteenth of an inch and preferably it is provided by making the rearwardly projecting portion 13^a of the key plug of lesser diameter than

that of the bore 12 and carrying that reduced diameter toward the left, as viewed in Figure 1, to an appropriate extent, such as the above-mentioned one-sixteenth of an inch. The purpose of this gap 22, when employed, will presently appear.

The connecting bar 20 may be of any appropriate or suitable shape or form and illustratively it may be a straight or regularly shaped piece of suitably heavy sheet metal, illustratively rectangular, and at its one end it is provided with a hole 23; the latter apertured end is receivable into a recess or bore 24 provided in the right-hand or rear end portion of the key plug 13, and as better appears in Figures 1 and 3, the recess 24 may be and preferably is cylindrical and hence may be and preferably is made as by drilling in the direction of the axis of the key plug 13. Preferably, also, and where the key plug 13 is to partake only of rotation, the recess 24 is of a depth (see Figure 1) to extend inwardly of the plug 13 beyond the plane of the end face 21 of the casing 10.

With the parts constructed as above illustratively described, the key plug 13 is inserted into the casing 10 to an extent permitted by the front or peripheral flange 14 thereof, thus projecting rearwardly of the casing the reduced end portion 13^a and thus presenting also the annular gap 22. Then, and preferably by employing an appropriate jig or drill guide, a pair of alined holes 25—26 (Figure 3) is drilled through the opposed portions of the annular wall of the plug extension 13^a, and preferably in such manner that the drill, and hence also the cylindrical theoretical outward extensions of the holes 25—26, are all tangent to the rear end face 21 of the casing. The axis of holes 25—26 is preferably at right angles to the plane of the key slot 16 and in like manner and preferably two alined and opposed holes 27—28 (Figure 3) are provided but on an axis at right angles to the axis of the holes 25—26. A plurality of pairs of holes are provided where selectability of the relationship of the cross-section of the operating bar 20 to the plane of the key slot is desired, as will later appear.

As above noted, these holes are preferably drilled and by providing the annular gap 22 (Figure 1) between the key plug and bore wall, I provide adequate accommodation for any "burs" or like distortions or raising up of the metal, usually brass, of the plug 13 at the point or points of entry and particularly of exit of the drill. Thereby, additional machining or finishing operations, such as might be necessary to remove these burs or protrusions are avoided and also I eliminate interference with freedom of movement of the key plug 13 relative to the casing 10. Thus, for example, a wedging or binding action as the key plug 13 is rotated or as it may be moved longitudinally of the casing 10, illustratively during removal of the plug, is dependably precluded from taking place.

Depending upon the desired relationship of the cross-section of the operating bar 20 to the plane of the key slot 16, a suitable one of the several pairs of opposed holes is selected, illustratively the holes 25—26, and the apertured end of the bar 20 is then inserted into the recess 24 which, by the way, is sufficiently larger than the cross-sectional dimensions of the bar 20, to permit an appropriate range of angularity of the bar relative to the axis of the key plug, and the hole 23 in the bar 20, preferably somewhat larger than the holes 25—26, is more or less alined with the

latter, as indicated in Figures 1 and 3. Thereupon, a pin 29 of a length preferably materially greater than the diameter of the plug 13 is inserted through these alined holes. The pin is preferably cylindrical and aside from thus interconnecting the operating bar 20 and the key plug 13, it is preferably made also to hold the key plug 13 against removal from the casing bore 12. This latter action is achieved by causing one and preferably both of the ends of the pin 29 to project beyond the plug extension 13^a and thus to assume a relationship of tangency to the rear casing face 21. Where the key plug 13 is rotatable, its rotation is thus accompanied by a sweeping of the ends of the pin 29 relative to and in preferably light contact with the end face 21 and the pin 29 thus coacts with the parts 14—15 (Figure 1) to hold the key plug 13 against play in an axial direction and thus to maintain the tumblers or tumbler pins of the key plug in appropriate relationship to their coacting parts of or in the casing 10.

Any suitable means may be employed to hold the pin 29 against unintentional removal; for example, the pin 29 may be of a diameter with respect to that of the holes 25, 26 such that the pin fits into the holes with a sort of press fit and hence with sufficient tightness to hold it in place. Preferably, however, I construct the pin 29, as is better shown in Figures 4 and 5 on an enlarged scale.

Accordingly, I provide an intermediate portion of the pin 29, such as a portion 29^a, that is intermediate of the opposed walls of the key plug extension 13^a, with a suitable number, illustratively three, of protrusions which preferably are of a height and character such that they force or cut their way, as the pin 29 is forced through one of the holes, such as hole 25, into and through the wall of the hole 25; they may, for example, be constructed to have an action analogous to that of a broach and the cutting or forcing action is improved or enhanced if the pin 29 is made harder than the material of the key plug extension. For example, the pin may be made of steel and the key plug of brass.

The protrusions may be brought about in the surface of the pin 29 in any suitable manner, and illustratively and preferably, may be effected by pressing or forcing a suitable tool with a V-shaped cutting edge into the surface of the pin at a suitable number of peripherally distributed places, illustratively three, as shown in Figure 5. The V-shaped tool, which may have a length equivalent to the axial length which it is desired to give the protrusions in question and that length is preferably slightly less than the interior spacing between the opposed wall portions of the annular plug extension 13^a, thus forms V-shaped depressions 30 (Figure 5) and in so doing compresses the metal laterally of itself and causes the metal at the sides of the depressions to flow upwardly into relatively sharply pointed V-shaped pairs of protrusions 31, giving that portion of the pin an appearance as though it were fluted and hence producing a suitable number of strong V-shaped fin-like members.

With this preferred construction of the pin 29, therefore, the protrusions 31, 31, 31, etc., if the pin is first entered through the hole 25 as above assumed, force or cut into the walls of the hole 25 (see now Figure 6) corresponding lengthwise-extending grooves 32, and finally and preferably emerge from the hole 25 when the pin 29 reaches a position as shown in Figure 3 where, under

circumstances earlier above pointed out, it is desired to have the extreme end portions of the pin coact with the rear end face 21 of the casing. With these protrusions of appropriate and preferred lengths, as indicated in Figure 4, and even assuming a looseness of fit of the end portions 29^b and 29^c of the pin in their respective holes 25 and 26, pin 29 is held against unintentional removal by the coaction of the protrusions or fin-like members 31, 31 with the annular wall of the plug extension 13^a, for they prevent sufficient axial movement of the pin 29 for such removal since the intermediate portion 29^a of the pin cannot be forced out throughout either of the holes 25 and 26 without the application of sufficient force to cause these parts 31, 31 to force or cut new grooves, like the grooves 32 of Figure 6, into the walls of the hole. Also, even if the pin 29 remains in a position such that the protrusions 31, 31 remain alined with the grooves 32, 32 which they respectively cut, accidental or unintentional removal cannot take place because these parts would interfit too tightly. Also, even if the pin 29 were sufficiently loose to partake of rotary movement, the protrusions 31, 31 act as above described and also the chances of an appropriate alinement thereof with the grooves 32 which they respectively cut are mathematically extremely small; also, and if desired, the peripheral spacings (see Figure 5) of these protrusions may be made non-uniform and thus still further lessen the chances of achieving alinement.

However, if it is desired to disconnect the operating bar 20 from the key plug 13, or to disassemble the latter from the casing 10, pin 29 is relatively easily forced out, in either direction, as viewed in Figure 4, of the holes 25 and 26, the cutting fins 31, 31 simply forcing or cutting new grooves in the walls of whichever hole they are forced through, whence disassembly of the parts may take place; upon subsequent assembly the pin 29 is again forced into position, as shown in Figures 3 and 4, and whether or not additional grooves 32 are cut in one or the other of the hole walls, the above-described retaining actions again take place and thus assembly of the parts is maintained.

If it is desired to give the operating bar 20 a different angular relationship to the plane of the key slot 16, the parts are assembled with the pin 29 related to holes 27, 28 (see Figure 3). In either case the parts are so proportioned that there is sufficient looseness or play between the hole 23 and pin 29 and the operating bar 20 and the recess 24 that substantial misalignment of the operating bar 20 with respect to the axis of the key plug 13 can exist to take care of allowable misalignment between the mounting of the lock construction, as seen in Figure 1, and the bolt or other mechanism operated by the operating bar 20.

Thus, it will be seen that there has been provided in this invention a construction in which the various objects above noted together with many thoroughly practical advantages are successfully achieved. It will be seen that the construction is simple, strong, durable and well adapted to meet the varying conditions of hard practical use, that it is inexpensive and easy to assemble and disassemble.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth, or shown in the accompanying

drawing, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, said key plug member having a recess in its rear end for receiving said bar member and having a wall portion that has therein aperture means communicating with said recesses, and a device having protruding cutting means on a portion thereof forced through said wall portion by way of said aperture means to bring said portion into said recess for engagement with said bar member whereby said cutting means cuts itself a path in said wall portion of said aperture means and after emergence from said cut path acts to prevent unintentional removal of said device from said aperture means, said device having a part for coaction with said casing member to limit movement of said plug member relative thereto.

2. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, said key plug member having a recess in its rear end for receiving said bar member and having opposed parts provided with alined apertures communicating with said recess, and a pin of a cross-section to be received in said apertures and having protruding cutting means in at least an intermediate portion thereof which, when said pin is forced into said alined apertures to bring said intermediate portion crosswise of said recess, cuts a path in the wall of one of said apertures and thereafter coacts with uncut portions about said apertures to hold said pin against movement out of said apertures, the end of said bar member that is in said recess having means engaged by said pin for holding it assembled to said plug member and said pin having a portion coacting with said casing member to limit movement of said plug member relative thereto.

3. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, said key plug member having a recess in its rear end for receiving said bar member and having opposed cylindrically-walled apertures the axis of which intersects said recess and said casing member having a rear end face the plane of which is at right angles to the axis of said plug member and to which plane the cylindrical walls of said alined apertures are substantially tangent, and a cylindrical pin fitted and held in said alined recesses and having an intermediate portion in engagement with that end of said bar member that is in said recess and having a portion projecting externally of said key plug for substantially tangential contact with said rear end face of said casing member.

4. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, and a single device holding said three members in assembled relation, one of said members and said device having means for holding said device against unintentional removal therefrom, said means comprising an aperture in said one member through which a portion of said device is

passed, and protruding cutting means on said portion of said device that cuts itself a path in the wall of said aperture as said portion passes therethrough and thereafter coacts with uncut portions about said aperture to prevent retrograde movement of said device.

5. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, said plug member having an end portion that projects beyond the rear end face of said casing, there being an annular gap between the plug member and the casing member that extends inwardly of said rear end face, said end portion having a hole drilled therein adjacent said end face and said annular gap accommodating such surface distortion of the metal adjacent the drilled hole as results from the drilling, whereby binding of said plug member relative to said casing member is prevented, and means in said drilled hole and coacting with said three members to hold said bar member and plug member assembled and to limit movement of said plug member relative to said casing member.

6. In lock construction, in combination, a casing member having a cylindrical bore therein, a key plug member movably mounted in said bore, there being an annular gap between said two members adjacent the rear end face of said casing member, a drilled hole in one of said members merging therefrom at a point such that any surface distortion of the metal caused by the drilling is accommodated in said annular gap and movement of said plug member relative to said casing member may take place without binding action of said surface metal distortion, and means engaging in said drilled hole for holding said two members against disassembly.

7. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, there being an annular gap between the rear ends of said casing member and plug member adjacent the rear end face of said casing member, said plug member having a drilled hole therein in relation to said annular gap whereby the latter accommodates surface distortions of the metal resulting from the drilling of said hole, and means engaging said hole for holding said bar member and said plug member in coacting operating relationship.

8. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, and means for holding at least two of said members against disassembly and comprising a pair of spaced parts having opposed alined apertures,

said parts being in one of said two members, and a pin supported in said opposed alined apertures and bridging across between said spaced parts, said pin having protruding means at its intermediate portion of sufficient height to engage the contiguous faces of said spaced parts and thereby to hold said pin against unintentional removal through either of said apertures, the other of said two members having means in engagement with said pin.

9. In lock construction, in combination, a key plug and an operating bar, said key plug having opposed wall portions between which said bar is received and said opposed wall portions having each an aperture, a pin having its end portions resting in said two opposed apertures and having an intermediate portion in engagement with said operating bar, and means on said pin intermediate of said opposed wall portions and coacting with the latter for preventing movement of said pin outwardly of either of said apertures.

10. In lock construction, in combination, a key plug and an operating bar, said key plug having opposed wall portions between which said bar is received and said opposed wall portions having each an aperture, a pin having its end portions resting in said two opposed apertures and having an intermediate portion in engagement with said operating bar, the wall of at least one of said apertures having a groove therein and said pin having protruding means on its intermediate portion that is accommodated in said groove as said pin is assembled in said opposed apertures, which protruding means is engageable with ungrooved portions about said one aperture when the pin is assembled and thereby block movement of said pin outwardly of the said aperture.

11. In lock construction, in combination, a casing member, a key plug member movably mounted therein, an operating bar member for transmitting movement from said key plug member, and means for holding at least two of said members in operative assembly and comprising an aperture in a wall of one of said members, said aperture having a groove in its wall, and a device engageable with the other of said two members and having a portion in said aperture and a portion external thereof, said latter portion having projecting means thereon which as said device is entered through said aperture passes through the groove in the wall of the latter and upon emergence from said groove and upon rotary displacement of said pin to bring said projecting means out of alinement with said groove forms an obstacle to prevent retrograde movement of said pin unless said projecting means is alined with said groove.

SIGURD BRANTINGSON.