Aug. 11, 1936. A. SCHOOREL 2,050,696

LOCK CONSTRUCTION

Filed Feb. 15, 1934 2 Sheets-Sheet 1

Fig. 1.

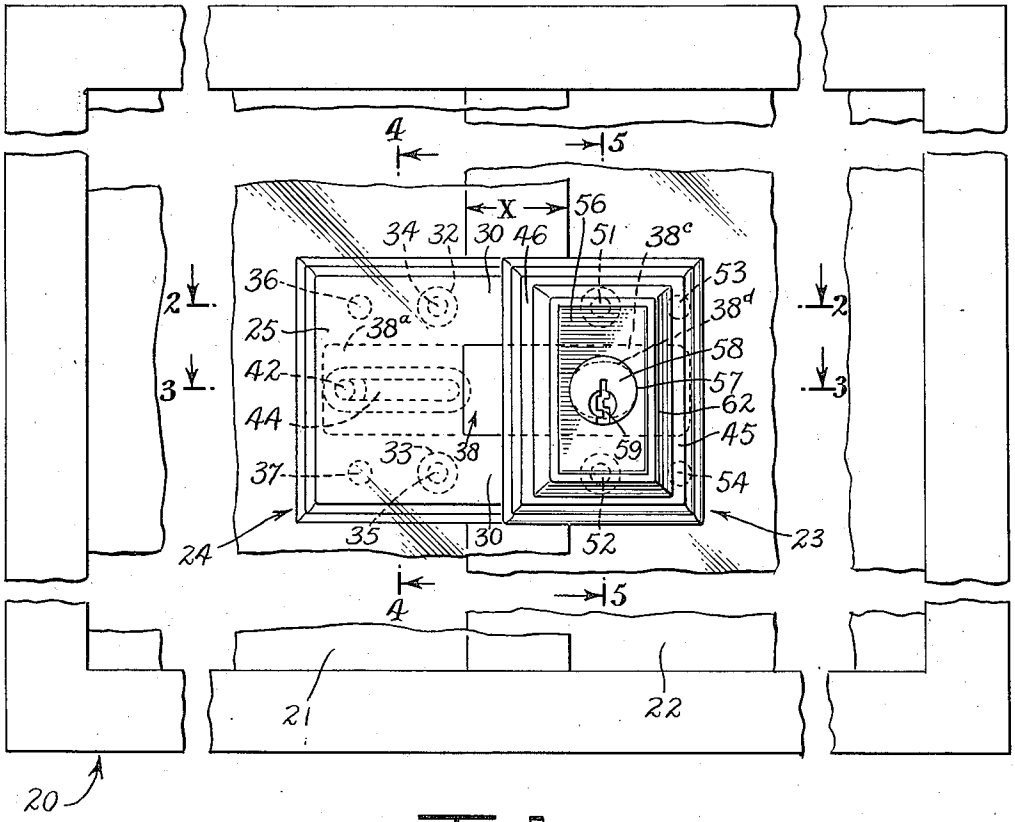
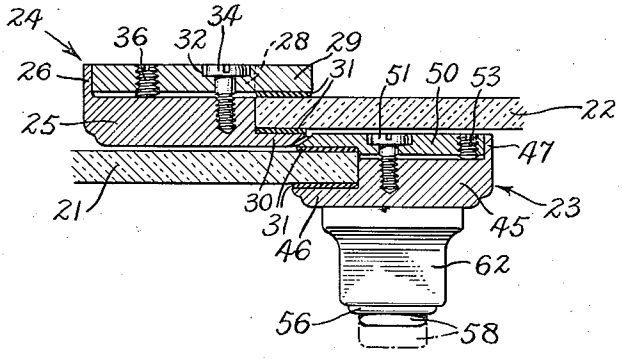


Fig. 2.



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Fig. 3.

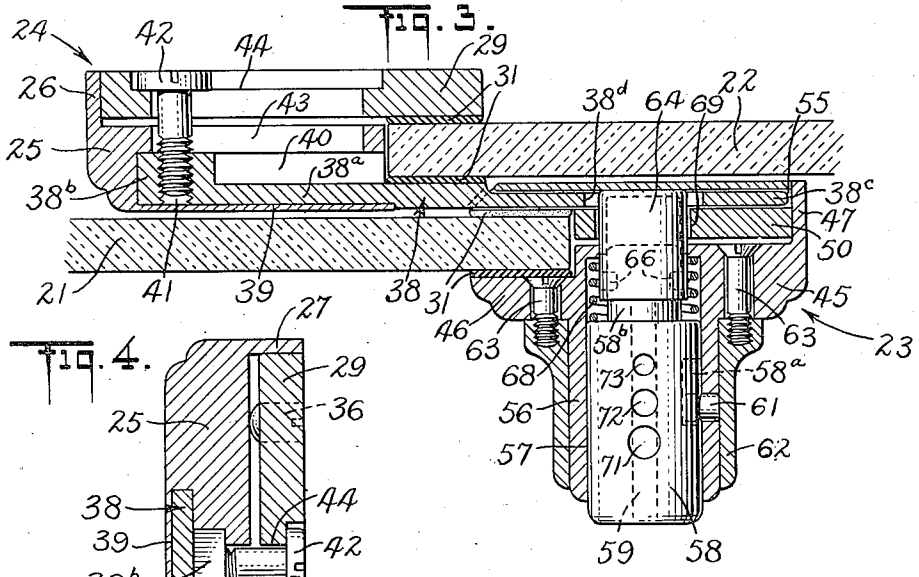


Fig. 4.

Fig. 7.

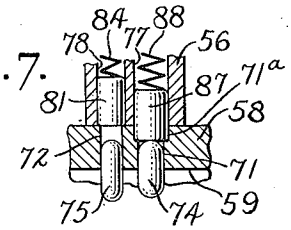


Fig. 5.

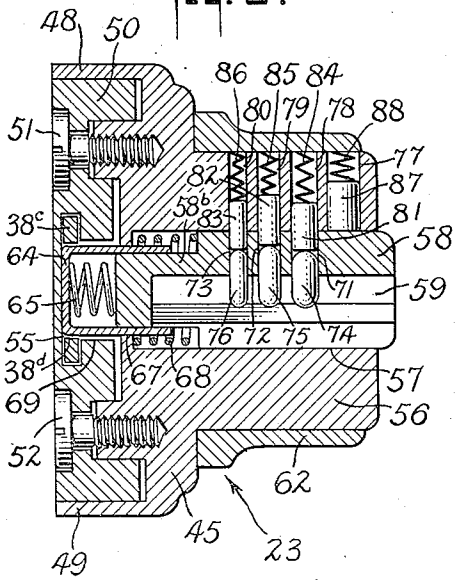
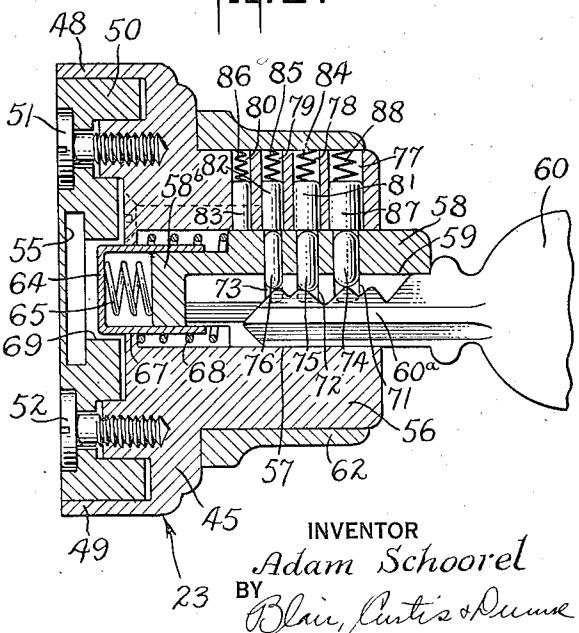


Fig. 6.



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Patented Aug. 11, 1936 2,050,696

UNITED STATES PATENT OFFICE

2,050,696

LOCK CONSTRUCTION

Adam Schoorel, New York, N. Y., assignor to Francis Keil & Son, Inc., a corporation of New York

Application February 15, 1934, Serial No. 711,367

36 Claims. (Cl. 70—47)

This invention relates to lock construction and with regard to certain features thereof to a construction particularly adapted for locking two relatively slidable members together, such as the glass panels of a show-case.

One of the objects of this invention is to provide a tumbler-controlled lock construction in which the key plug or cylinder and/or the bolt operated thereby may, under the control of an appropriate key, be given a thoroughly dependable locking or unlocking movement in the direction of the length of the key itself. Another object is to provide a simple, practical and inexpensive tumbler-control for controlling movement of the key cylinder or plug in the direction of its axis. Another object is to provide a compact and inexpensive lock construction of the above-mentioned character. Another object is to provide a lock construction that will be practical and thoroughly reliable for locking together or unlocking two relatively slidable parts such as the panels of a show-case, for example. Another object is to provide a lock construction for operation upon two relatively slidable members that will be self-contained, compact, free from detachable parts, and capable of thoroughly dependable and reliable action. Another object is to provide a construction of the above-mentioned character that may be easily fabricated and easily installed. Another object is to provide a construction of the above-mentioned character that may be easily and rapidly suited to meet the varying conditions met with in practical use. 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 drawings in which is shown a preferred embodiment of my invention,

Figure 1 is a front elevation showing an illustrative installation of my lock construction with respect to a closure employing two relatively slidable panels, such as in a show-case;

Figure 2 is a horizontal sectional view on the same scale as Figure 1, as seen along the line 2—2 of Figure 1, showing the attachment of the parts to the panels;

Figure 3 is an enlarged sectional view, as seen along the line 3—3 of Figure 1, showing certain parts in elevation, and indicating the relation of the parts when the panels are locked together;

Figure 4 is a vertical sectional view on an enlarged scale, as seen along the line 4—4 of Figure 1 and, like Figure 3, it shows certain telescopic arrangements of the parts for accommodation to different degrees of overlap of the panels;

Figure 5 is a vertical sectional view on an enlarged scale, as seen along the line 5—5 of Figure 1, showing in detail also certain parts of the key-controlled mechanism;

Figure 6 is a view like that of Figure 5 but showing the parts in unlocked relation, and

Figure 7 is a detached fragmentary view of a structure embodying all of the features of Figures 1–6 but including, as shown in Figure 7, a coacting feature of construction.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to Figure 1, I have indicated at 20 a casing or frame or other structure which, for illustrative purposes, may be considered to be a show-case, the structure 20 being suitably formed or constructed, as by the provision of appropriate guideways, to slidably receive closure members 21 and 22, usually and illustratively in the form of glass panels and dimensioned, with respect to the structure 20, to overlap, as at X, when in closing position. To obtain access to the interior of the structure 20, closure member 21 may be slid to the right or closure member 22 may be slid to the left, in either case increasing the overlap. When in closing relation, however, the overlap is as indicated at X and the panels or closures 21—22 are to be locked in this closing position and against the above-described sliding movement of either of them.

In practice, moreover, the thicknesses of the closure members or panels 21—22 may vary widely and the extent of overlap X may also vary widely, depending not merely upon manufacturing tolerances but also upon such matter as design, construction, or particular installation. To provide a thoroughly practical lock construction that will meet such varying conditions in practical use, is one of the dominant aims of this invention.

Referring now to Figures 2 and 3, and for convenience of subsequent description, it might at this point be noted that my lock construction includes parts which may generally be designated as the key-controlled bolt structure generally indicated at 23 and a keeper structure generally indicated at 24, respectively secured, in a preferred manner described below, to the panels 21

and 22, and for convenience the details of the keeper structure 24 may first be considered.

The keeper structure 24 includes a plate-like base portion 25 generally rectangular in shape (Figure 1) which is provided with a guiding flange extending about three sides thereof, being made up of the left-hand flange 26 (Figures 2 and 3) extending rearwardly, and the upper and lower side flanges 27–28 (see Figure 4). Extending parallel to the base portion 25 and received within the flanges 27—26—28 (see Figures 2, 3 and 4) is a clamping plate 29, generally rectangular in shape, as is also the base portion 25, but whose length (in a direction toward the right) is greater than that of the base portion 25, the latter being provided with an extension 30, directed toward the right (see Figures 1 and 2) by an amount equivalent to the extent through which the clamping plate 29 overlaps the base portion 25.

As is better shown in Figure 2, the parts 29—30 thus form clamping portions between which the rearmost panel or closure member 22 may be received, suitable strips of cushioning material, indicated at 31, being interposed, if desired, between these clamping portions and the member 22, particularly where the latter is made of fiber, rubber, or the like, but I have found it particularly advantageous to employ so-called friction tape which also has adhesive qualities.

The edge flanges 27—26—28, which are preferably integrally formed with the base portion 25 which, by the way, may be made in any suitable manner, even as by die casting, thus encompass the clamping member 29 and not only guide the latter for movement toward or away from the base portion, as viewed in Figure 2, but also hide or screen from view any possible gap or crevice between the parts 25—29, thus avoiding an unsightly appearance. Clamping plate member 29 is, on its rear face, provided with suitable countersunk apertures 32 and 33, spaced vertically, as shown in Figure 1, to receive screws 34 and 35 which are threaded into suitable threaded openings in the base portion 25, as is better shown in Figure 2 with respect to the screw 34. The screws 34—35, by reference to Figures 1 and 2, will be seen to be positioned relatively closely to the right-hand terminus of the base portion 25 of the keeper structure 24 and, coacting with these screws 34—35 are two stud screws 36—37 (Figure 1) threaded into threaded openings in the clamping member 29, as shown in Figure 2 with respect to screw 36, and adapted to abut against the rear face of the base portion 25. Screws 36—37, referring to Figure 1, are spaced to the left of the screws 34—35 and adjacent the left-hand edge of the member 29.

By means of screws 34—35 and screws 36—37, the clamping member 29 may be drawn toward and held with respect to the base portion 25 and particularly the clamping portion 30 thereof (see Figure 2), thereby to cause the juxtaposed clamping portions 29—30 to securely clamp the panel member 22, but the screws permit of always maintaining parallelism between the faces of the clamping portions 29—30, thereby to cause the latter to exert a secure frictional gripping of the parallel faces of the panel member 22 itself.

For example, screws 34—35 may be turned to draw the clamping plate 29 toward the base portion 25 (Figure 2) while screws 36—37 are backed off or threaded in reversed direction, and by appropriately manipulating these four screws, the above-mentioned parallelism of clamping portions 29—30 may be readily and quickly achieved.

Thus, the keeper structure 24 may be secured in position upon the left-hand vertical edge portion of the inner panel or sliding closure member 22. Now the keeper structure 24 is provided with a bolt-receiving keeper generally indicated at 38 (Figures 1, 3 and 4); keeper 38 has a left-end portion 38^a generally rectangular in cross-section (see Figure 4) slidably guided in a correspondingly shaped slot 39 underneath the front face (see Figure 3) of the base portion 25 and at its left-hand end (see Figure 3) the keeper 38 is provided with a boss 38^b which is of less width than the width of the portion 38^a (see Figure 4). The boss portion 38^b is received in a slot 40 (Figures 3 and 4) in the base portion 25 of the structure 24 and joins with the slot 39 (the two together forming what is in effect a T-slot). Thus, the keeper 38 is dependably guided for lengthwise sliding movement relative to the base portion 25 by its snug interfitting with the T-slot 39—40 and its component parts.

As is better shown in Figure 3, the boss portion 38^b of the keeper 38 is provided with threaded hole 41 into which is received a screw 42, screw 42 passing through a longitudinally extending slot 43 in the base portion 25 and which slot joins the slot 40 (see Figure 4) and passing also through a countersunk slot 44 extending lengthwise of the clamping plate member 29 (see Figure 3) and extending alongside of the above-mentioned slot 43 (see Figure 4).

By means of this screw 42, the keeper 38 may be locked in any position in which it is placed lengthwise of the T-slot 39—40, the screw 42, when driven home, acting also to clamp the clamping member 29 to the base portion 25 and thus to supplement the already achieved clamping action of the clamping and adjusting screws 34—35—36—37 (Figures 1 and 2). In Figure 3 the keeper member 38 is shown in its most extreme position to the left, it being assumed that the overlap X (Figure 1) of the closure members 21—22 illustratively illustrates the minimum overlap to be contended with. If, however, this overlap is greater than X, screw 42 is loosened (and this does not disturb the clamping action of the parts 29—30—Figure 2—in holding the keeper structure 24 to the closure member 22) and the keeper structure 38 is moved along its T-slot in a direction toward the right to the desired extent, whereupon the screw 42 (Figure 3) is again driven home.

The keeper portion of the keeper 38 (see Figure 3) is the portion 38^c provided with a bolt-receiving aperture 38^d and it will be seen to be an extension toward the right of the intermediate portion 38^a above described; it also is preferably of rectangular shape and may be made relatively thin in order that it may be easily accommodated in the relatively narrow space between the panels 21—22 and thus made to project toward the right beyond the right-hand edge of the front panel 21. By the adjusting action and construction above described, it will thus be seen that the physical location of the bolt-receiving aperture 38^d (Figure 3) of the keeper 38 with respect to the right-hand edge of the front panel 21 may be determined throughout a relatively wide latitude and thus correspondingly wide variations in the degree of overlap X quickly accommodated or compensated for in order thereby to properly locate the bolt-receiving aperture with respect to the key-controlled bolt structure 23 carried by the front panel 21.

The key-controlled bolt structure 23 includes

a base portion 45 (Figure 2) generally rectangular in shape adapted to abut against the left-hand vertical edge of the front panel 21 and extended toward the left as at 46 (Figure 2) to overlap the front face of the panel 21; it is provided with a right-hand end flange 47 (Figure 2) and with upper and lower horizontally extending flanges 48—49 (Figure 5), preferably integrally formed therewith, within which is received and guided a clamping plate member 50 of sufficient dimension in a direction toward the left, as viewed in Figure 2, to overlap the inner face of the panel 21. Between these panel-clamping portions 46 and 50, cushioning material 31, like that above described, may be interposed, if desired. Clamping plate member 50 and base portion 45 are provided with pairs of countersunk clamping screws 51—52 (Figures 1 and 2) and coacting stud screws 53—54 (Figures 1 and 2) related and spaced much in the manner as described above in connection with the screws 34—35—36—37 of the keeper structure 24. By means of these screws, the front panel 21 may be securely clamped by the clamping portions 46—50, the latter maintained in desired parallelism to each other or to the faces of the panel 21 which they engage, and thus the key-controlled bolt structure 23 securely attached to the panel 21.

The left-hand end of the clamping member 50 (Figure 2) of the key-controlled bolt structure 23, is provided with a horizontally extending recess or slot 55 (Figures 5 and 6) extending in line with the keeper portion 38c (see also Figure 3) and in cross-section rectangular in shape to be similar to the rectangular cross-section of the keeper portion 38c; preferably, however, the recess 55 (see Figure 5) is dimensioned somewhat larger than the cross-section of the keeper portion 38c of the keeper 38 so as to provide some tolerance to compensate for structural tolerances or misalinements or variations in spacings with respect to the closure members 21—22. Thus, the bolt-receiving aperture 38d (Figures 3 and 5) is brought inside of the clamping member 50 and thus within the key-controlled bolt structure 23 (see Figure 3), for coaction with the bolt.

The base portion 45 of the structure 23 has secured thereto or preferably integrally formed therewith a forwardly projecting casing portion 56 (Figures 3, 5 and 6) which, for symmetry of design or appearance, may be rectangular in shape, as viewed from the front or as seen in Figure 1, and extending centrally thereof and into the base portion 45 is a bore 57, preferably and most conveniently circular in cross-section, to receive a key-receiving plug 58 provided with an appropriately shaped and shouldered key slot 59 (Figures 1, 5 and 6) for receiving a suitably coded key 60 (Figure 6). Where the bore 57 is circular in cross-section, the key plug 58 may be of similar cross-section and hence be a cylinder and in the latter case, rotation of the key plug 58 relative to the casing portion 56 is prevented by means which conveniently comprise (see now Figure 3) a slot 58a of suitably dimensioned extent and extending lengthwise in the side of the key plug 58, and a pin or stud 61 carried by the side wall of the housing portion 56 and projecting into the slot 58a. Though such relative rotation is thus prevented, the plug 58 may nevertheless move in the direction of its length by an amount permitted by the length of the slot 58a with respect to the pin 61. The pin 61 also takes part in holding the plug 58 in assembled relation to the housing portion 56 and against removal.

To preclude access to the pin or stud 61 from the exterior of the key-controlled bolt structure 23, I provide a sleeve-like outer housing 62 (Figure 3) that is telescoped over the housing portion 56, being suitably shaped to mate therewith. This outer housing 62 abuts against the front face of the base portion 45 and it is secured to the latter by a suitable number of screws, such as the screws 63 (Figure 3) that are passed through the base portion 45 and threaded into the outer casing 62. These screws 63 are suitably countersunk in the inner or rear faces of the base portion 45 and, as is better shown in Figure 3, they are thus made inaccessible for removal, and thus the outer housing 62 likewise cannot be removed.

The rear or left-hand end of the plug 58 is stepped or turned down as at 58b (Figure 5) to a lesser diameter to form part of a bolt construction for coaction with the bolt-receiving aperture 38d in the keeper 38; slidably received over the top portion 58b is a cup-shaped member 64 whose outer diameter is somewhat less than the diameter of the bolt-receiving aperture 38d in the keeper 38, so that the member 64 may easily enter the aperture 38d. Member 64 and portion 58a are telescopically related to each other and interposed therebetween but housed within the member 64 is a spring 65 (Figure 5) which, always tending to expand, urges the member 64 toward the left and away from the other bolt portion 58b, suitable pin and slot connections 66 (Figure 3) therebetween limiting the extent of movement of the member 64 in a direction away from the bolt portion 58b under the urge of the spring 65. The effective bolt may thus be considered to be the parts 58b—64 which, by the above-described construction, will be seen to be yieldable, for a purpose hereinafter described.

The bolt portion 64 projects through and is slidably guided by an aperture 67 (Figures 5 and 6) in the base portion 45, aperture 67 being of lesser dimensions than the bore or recess 57 in which the key plug 58 slides, thereby forming a shoulder between which and the main portion of the key plug 58 a coil spring 68 is interposed, spring 68 acting in a direction always to tend to force the key plug 58 to the right and toward the position shown in Figure 6, movement of the key plug 58 in that direction being limited by the pin and slot 61—58a above described (see Figure 3).

The clamping plate 50 (Figures 3, 5 and 6) which coacts with the base portion 45 of the key-controlled bolt structure 23 is provided with a round aperture 69 in line with the aperture 67 through which the bolt portion 64 projects, this aperture 69 (see Figure 6) communicating with the slot 57 in the back member or clamping part 50 into which the keeper portion 38c (Figure 3) is received, as above described.

Hence, when the slidable panels 21—22 slide away from each other and into the overlapping relation shown in Figures 1, 2 and 3 of the drawings, and with the parts appropriately adjusted and secured as above described, the keeper portion 38c, which moves with the rear closure member 22, slides into the slot or recess 55, bringing the bolt-receiving aperture 38d (Figure 3) of the keeper 38 into a position juxtaposed to the bolt 64—58b whereupon the latter may be projected into the bolt-receiving aperture 38d, in a manner hereinafter described, thereby to lock the closure members 21—22 against relative movement and

also against movement relative to the frame or case **20** (Figure 1) in which they are slidably mounted.

Normally or in unlocked condition, the key plug **58** is in the position shown in Figure 6, being in its extreme position to the right and hence projecting from the casing portion **56**, as shown in full lines in Figure 6 and in dotted lines in Figure 2; the cup-like bolt portion **64** is, under these conditions, in its most extreme position to the left relative to the plug **58**, being urged and held in that position by the spring **65** and prevented from exceeding that position by the pin and slot connections **66** above-mentioned (see Figure 3). However, the pin and slot connections **66** permit of a movement of the bolt portions **64** in a direction toward the right (as viewed in Figure 6) against all action of the spring **65**, for a purpose hereinafter mentioned. These, then, are the positions of the various parts in unlocked relation, as shown in Figure 6, the bolt being withdrawn and held in withdrawn position by the spring **68**.

Alined in the direction of the length of the key plug **58** and communicating with the ribbed key slot **59** therein is a suitable number, illustratively three, of tumbler-receiving or guiding slots or recesses, and preferably and illustratively these recesses are cylindrical and where cylindrical they are of progressively different diameters. The three recesses are better shown in Figures 3, 5 and 6 and are indicated at **71**, **72** and **73**, and they receive suitable tumblers, illustratively in the form of cylindrical tumbler pins **74**, **75** and **76**, likewise of progressively different dimensions or diameters.

These tumbler pins **74**, **75**, **76** are also of a length sufficient to cause them to project into the key slot **59** in order to be appropriately raised or lifted by the coded shank **60a** of the key **60** (Figure 6).

In the casing portion **56** (see now Figure 5) is provided a series of coacting spring-pressed tumblers but these are in number in excess by one of the number of tumbler pins provided in the key plug **58** and just described. Where, therefore, the key plug **58** is provided with three tumblers, the casing portion **56**, with respect to which the key plug **58** is axially movable, is provided with four tumblers and correspondingly four tumbler recesses. These tumbler recesses are shown in Figures 5 and 6 at **77**, **78**, **79** and **80** and where the tumblers are in the form of cylindrical pins, these recesses are likewise cylindrical and extend from the upper face of the casing portion **56** through and into communication with the bore **57** in which the key plug **58** is slidable. These recesses are progressively of different dimensions and three of them are dimensioned to correspond respectively with the recesses or tumbler-receiving bores **71**, **72**, **73** in the key plug **58**.

Thus, the recesses **78**, **79** and **80** (Figure 5), though of different diameters, are respectively of the same diameters as the recesses **71**, **72** and **73** so that, when the plug **58** is in its inwardly projected position, as shown in Figure 5, recesses or bores **78**, **79** and **80**, respectively, mate with or form continuations of the recesses **71**, **72** and **73** in the key plug **58** whereupon cylindrical or pin tumblers **81**, **82** and **83**, slidably received and fitted into the recesses **78**, **79** and **80**, respectively, and likewise of different diameters, and spring-pressed in downward direction by springs **84**, **85** and **86**, move out of the recess in the casing portion **56** and respectively into the correspondingly dimensioned or diametered recesses **71**, **72** and **73** in the key plug **58**, assuming the positions shown in Figure 5. In such positions, key plug **58** is independently held against movement relative to the casing portion **56**.

With the key plug **58** in the position shown in Figure 5 and thus locked against movement relative to the casing portion **56**, the bolt portion **64** has been moved out of the aperture **69** in the back plate **50** and into the bolt-receiving aperture **38d** in the keeper **38c**, thus dependably locking the keeper structure **24** and its panel **22** to the key-controlled bolt structure **23** and its panel **21**.

In this latter connection the bolt portion **64** is yieldable relative to the bolt portion **58**, due to the construction above described, including the spring **65**, and thus assurance is achieved that the bolt portion **64** dependably bottoms against the left-hand wall (as seen in Figure 5) of the keeper-receiving slot **55** for effectively engaging the keeper portion **38c**, the construction thus automatically accommodating itself to different spacings between the clamping parts **50** and **45—46** (Figures 2 and 3) and hence to the different thicknesses of panels **21** to which the structure might be clamped.

To the right of the alined tumbler-receiving bores or recesses **78**, **79** and **80** (see Figures 5 and 6) in the casing portion **56** and alined with these recesses in the above-mentioned tumbler-receiving recess **77** which, as is clearly shown in Figures 5 and 6, is of a diameter or crosswise dimension greater than that of the tumbler-receiving recess **78**; in this recess **77** is received a cylindrical tumbler or pin **87** urged in a downward direction (Figure 5) by a spring **88**. With the positions of the parts as shown in Figure 5, tumbler **87** bears against the upper face or edge of the key plug **58**, being held in readiness for coaction as hereinafter described.

In order now to effect disengagement of the bolt portion **64** from the keeper **38** (Figures 3 and 5), there is inserted into the ribbed key slot **59** a key coded or edged to correspond to the differing lengths of the tumbler pins **74**, **75** and **76**; let the key **60** of Figure 6 by such an appropirately coded or edged key (note its shank **60a**). When inserted into the key slot **59**, the key **60** raises the tumblers **74**, **75**, **76** each to an amount such that the upper ends (preferably rounded) of these tumblers are brought into line with the periphery of the key plug **58**, whereby the tumblers **81**, **82**, **83** (Figure 5) in the casing portion **56** are correspondingly raised to bring their lower ends into alinement with the periphery of the bore **57** and hence to lift them out of the recesses **71**, **72**, **73**, respectively. Thereby the key plug **58** is released for movement relative to the casing portion **56** and, under the action of spring **68**, it immediately moves toward the right, assuming a final position, as shown in Figure 6, thus withdrawing the bolt portion **64** from engagement with the keeper **38**, pin and slot **61—58a** of Figure 3 limiting this movement of the key plug **58** toward the right. During this movement the same pin and slot preclude rotation of the key plug **58** and cause the upper ends of the tumblers **74**, **75**, **76** (Figure 6) now alined with the periphery of the key plug **58**, to be traversed along the line of the lower alined ends of the tumblers **83**, **82**, **81**, **87** in the casing portion **56**, and in a direction toward the right. Tumbler recesses **73**, **72** and **71** finally become alined with tumbler recesses **79**, **78**, and **77** (see Figure 6) but, upon a sub-

sequent withdrawal of the key 60, interengagement of tumblers in these alined recesses with the latter is precluded.

Thus, tumbler pin 82 (Figure 6) though juxtaposed to the tumbler recess 73 in the key plug 58, cannot enter the latter because the latter is too small; similarly tumbler 81, though juxtaposed to the tumbler recess 72 in the key plug 58, does not enter the latter because the latter is of lesser diameter than the tumbler 81; similarly, tumbler pin 87, though juxtaposed to the tumbler-receiving recess 71 in the key plug 58, is too large to enter the latter. The smallest tumbler 83 (see Figure 6) in the casing portion 56 is juxtaposed to an unrecessed portion of the key plug 58 and hence it does not interlock with the plug 58.

Thus, also, still referring to Figure 6 and assuming that the key 60 is still in the key slot 59, the key-contacted tumblers 74, 75 and 76 are juxtaposed respectively to the respectively larger spring-pressed tumblers 87, 81 and 82 whereby free upward movement of any of the tumbler pins in the key plug 58 is permitted and as might be necessary due to the lifting thereof by portions of the coded key shank 60a that have to be passed by these tumblers as and when the key 60 is withdrawn in a direction toward the right.

If, now, it is desired to interengage the bolt portion 64 with the keeper 38, the key plug 58 now being in outwardly projected position, as shown in the dotted-line position of Figure 2 or in the full-line position of Figure 6, the key plug 58 is manually engaged at its outermost end as by the thumb or finger, and positioned inwardly relative to the casing portion 56, projecting the bolt portion 64 into engagement with the keeper 38 as already above described but at the same time tumblers 76, 75 and 74 (Figure 6) are bodily traversed toward the left relative to the tumblers 82, 81, 87 but without any interlocking action taking place until tumblers 76, 75 and 74 become respectively juxtaposed to the tumblers 83, 82, 81, and the correspondingly juxtaposed tumbler recesses now mating, permit the springs 86, 85 and 84 (Figure 5) to push their respective tumblers 83, 82 and 81 into the tumbler recesses 73, 72 and 71, respectively, giving the relation of parts shown in Figure 5, thus effectively locking the parts together.

It has above been pointed out how the outer casing 62 (Figure 3) blocks access to the pin and slot connection 61—58a between the inner casing portion 56 and the key plug 58, acting also to hold the finger 61 in place and against removal. Outer casing part 62, as above described, slides over the inner casing portion 56 and, after the casing-tumblers and their springs are inserted into the recesses 80, 79, 78 and 77, the outer casing portion 62 is slipped over the inner casing portion 56 and secured in place as above described, whereby these tumbler-receiving recesses in the inner casing 56 are closed by the outer casing 62 and access thereto by the latter dependently precluded.

Under certain circumstances of use, it may be desired to preclude the bolt-projecting movement, that is, the movement of the bolt into engagement with the keeper, unless under the control of the key 60; where the structure is used in show-cases and hence where the sliding panels are frequently manipulated, it is possible that the forwardly projecting key plug 58 might be accidentally thrown or pushed inwardly, particularly where the outer casing 62 (see Figure 3) is used as a handle for sliding its associated panel 21; under such circumstances the bolt part 64 becomes projected into the keeper-receiving recess 55 and, should the keeper be in that recess, would result in locking the closures together, requiring the use of a key to obtain access to the interior of the show-case. Or, if the keeper 38 is not at the moment in the keeper-receiving recess 55, a subsequent sliding apart of the panels 21—22 toward the positions shown in Figure 1 would result in the keeper 38 colliding with the bolt part 64, thus either precluding the complete closing of the show-case or resulting, due to the yieldability of the bolt part 64, in the latter yielding against the action of the spring 65 (Figure 5) so as to let the keeper portion 38c by-pass the bolt part 64, whereupon the latter snaps into the bolt-receiving aperture 38d and locks the members 21—22 in closed position, again necessitating the use of the key to obtain access to the interior protected by the closures 21—22.

Under such circumstances, and referring now to Figure 7, wherein I have shown a sectional view like that of Figure 6, but only fragmentarily, it being understood that the structure of Figure 7 may include the other features of construction and action already above described, I counterbore or step the tumbler-receiving recess 71 in the key plug 58 as at 71a, giving the counterbored recess 71a dimensions, such as diameter, such that the spring-pressed tumbler 87 in the casing 56 may enter the recess 71a, when the key 60 is removed so as to permit the tumbler 74 to drop and to permit the tumbler 87 to move into the recess 71a under the action of its spring 88. Tumbler 87 thus locks the plug 58 in its outermost position, the remaining parts of the structure being exactly as shown in Figure 6. Thus accidental or even intentional inward movement of the key plug 58, without the use of the key 60, is prevented

When, under these particular circumstances, it is desired to move the bolt part 64 into keeper-engaging relation, as shown in Figures 3 and 5, the key 60 is inserted, thereby positioning all of the tumblers in the plug 58 and also tumbler 87 (Figure 7) with their edges in the plane of the periphery or upper face of the key plug 58 whereupon the key plug 58 may be moved toward the left and into the position shown in Figure 5; the plug 58 is momentarily held in innermost position as by the thumb or finger of the hand and the key 60 withdrawn, whereupon the plurality of now mating tumbler recesses and tumblers assume the positions and relations shown in Figure 5, the insertion of the key being required, as before, to change the position of the parts from the locked relation of Figure 5 to the relation shown shown in Figure 7. Though the tumbler 87 (Figure 7) enters into or is seated in the recess 71a, the withdrawal of the key nevertheless takes place as already above described in connection with figure 6.

Thus, it will be seen that there has been provided in this invention a construction in which the various objects hereinbefore noted, together with many thoroughly practical advantages are successfully achieved. The construction will be seen to be thoroughly practical, capable of ease and speed of installation throughout widely varying conditions of practical use, and capable also of ease and speed and convenience in manipula-

tion when once installed. Particularly advantageous is one of the features provided in this invention whereby the only removable part is the key itself, certain prior attempts to achieve a locking together of sliding closure members depending upon the removal of a part of the lock construction itself, with attendant inconvenience and danger of loss or misplacement thereof. Furthermore, the construction will be seen to be capable of embodiment in neat and ornamental form, the working parts being effectively hidden. Moreover, even the relation between the extensible keeper member **38** (Figures 1 and 3) and the keeper structure **24** throughout what range of extension that is desired, is such as to maintain absence of unsightly appearance. Furthermore, the construction will be seen to be well adapted to meet the varying conditions of hard practical use.

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

I claim:

1. In lock construction, in combination, a key controlled bolt structure adapted to be secured to a closure member for coaction with an apertured keeper, said structure having a recessed portion into which said keeper is receivable, a key plug slidably mounted in said bolt structure, said bolt structure and said key plug having respectively tumbler-receiving recesses alined in the direction of sliding movement of said plug, tumbler means coacting with said recesses, said tumbler recesses being of progressively different dimensions and said tumbler means coacting therewith being of progressively different dimensions, whereby said tumbler means coact to effect locking of said key plug only when the latter is in one position in its sliding movement, bolt means movably carried by said structure, the latter having an aperture in a wall thereof through which said bolt is movable into said recess, and means forming a yielding connection between said key plug and said bolt means.

2. In lock construction, in combination, a bolt structure adapted to be secured to an end portion of a closure member and comprising a base portion adapted to engage on one side of said closure member and a clamping member adapted to engage on the other side of said closure member, means for securing said clamping member to said base portion, thereby to clamp therebetween varying thicknesses of closure member, said clamping member having a recess into which an apertured keeper may be received, bolt means projectable from said base portion into said recess and operable throughout the range of change of spacing of said clamping member from said base portion corresponding to said varying thicknesses for entry into the apertured keeper, and means carried by said base portion for controlling said bolt means.

3. In lock construction, in combination, a bolt structure adapted to be secured to an end portion of a closure member and comprising a base portion adapted to engage on one side of said closure member and a clamping member adapted to engage on the other side of said closure member, means for securing said clamping member to said base portion, thereby to clamp therebetween varying thicknesses of closure member, said clamping member having a recess into which an apertured keeper may be received, bolt means projectable from said base portion into said recess and into the apertured keeper, means carried by said base portion for controlling said bolt means, and means causing said bolt means to be effectively projected into said recess throughout the range of change in spacing between said base portion and said clamping member, thereby to achieve effective bolt actuation throughout different thicknesses of closure member clamped therebetween.

4. In lock construction, in combination, a bolt structure adapted to be secured to an end portion of a closure member and comprising a base portion adapted to engage on one side of said closure member and a clamping member adapted to engage on the other side of said closure member, means for securing said clamping member to said base portion, thereby to clamp therebetween varying thicknesses of closure member, said clamping member having a recess into which an apertured keeper may be received, bolt means projectable from said base portion into said recess and into the apertured keeper, means carried by said base portion for controlling said bolt means, and means providing a lost motion connection between said bolt means and said control means for compensating for the differing ranges of bolt throw into said recess corresponding to different spacings between said base portion and said clamping member.

5. In lock construction, in combination, a bolt structure adapted to be secured to an end portion of a closure member and comprising a base portion adapted to engage on one side of said closure member and a clamping member adapted to engage on the other side of said closure member, means for securing said clamping member to said base portion, thereby to clamp therebetween varying thicknesses of closure member, said clamping member having a recess into which an apertured keeper may be received, bolt means projectable from said base portion into said recess and into the apertured keeper, means carried by said base portion for controlling said bolt means, said bolt means including two spring-opposed telescopically arranged parts, at least one of which is thereby spring-pressed into said recess upon bolt-projecting movement of said bolt means.

6. A lock construction for securing against movement a pair of closure members, one of which is slidable relative to the other and adapted when in closing position to overlap, comprising, in combination, a base portion having a part resting against the front face of the forwardly overlapping closure member and a part telescopically arranged with said base portion for engaging on the other side of said closure member, and means accessible from the rear end of said lock construction and normally closed over by the rearwardly overlapping closure member for drawing said last-mentioned part and said base portion together, thereby to clamp said structure to its closure member.

7. A lock construction for securing against movement a pair of closure members, one of which is slidable relative to the other and adapted when in closing position to overlap, comprising, in combination, a base portion having a part resting against the front face of the forwardly overlapping closure member and a part telescopically arranged with said base portion for engaging on the other side of said closure member, and means

operable from the back face of said part and thereby inaccessible by said rearwardly overlapping closure member to draw said last-mentioned part toward said base portion and to maintain parallelism between the effective closure-member-clamping parts thereof to the respective faces of the closure member clamped thereby.

8. A lock construction for securing against movement a pair of closure members, one of which is slidable relative to the other and adapted when in closing position to overlap, comprising, in combination, a base portion having a part resting against the front face of the forwardly overlapping closure member and a part having flange portions telescopically arranged with respect to and over the sides of said base portion, said second-mentioned part having a portion for engaging on the other side of said closure member, and means for drawing said last-mentioned part and said base portion together, whereby each structure is clamped to its associated closure member, said telescopic arrangement concealing the space between the base portion and the part telescoped therewith.

9. In lock construction, in combination, a casing having a key plug movable mounted therein for movement in either of two directions, means confining the movement of said key plug relative to said casing against rotation relative to the latter and confining it to a sliding movement, said plug having tumbler means therein for control by a key and said casing having tumbler means exceeding in number the tumbler means in said plug and alined in the direction of movement of said plug relative to said casing and adapted thereby to lock said plug in either extremes of its movement relative to the casing, and means whereby said tumbler means are prevented from achieving interlocking action during transition of said plug from one extreme of its movement to the other.

10. In lock construction, in combination, a three-part casing construction comprising a main body portion having a rear face, a part of which is adapted to engage the structure to which the construction is to be secured and having a forwardly extending portion bored out to receive a key plug, a key plug movably mounted in said forwardly extending portion, the latter and said key plug being provided with means accessible through a side wall of said forwardly extending portion for limiting the extent of movement of said key plug, a second part of said construction comprising an auxiliary casing telescoped over said forwardly extending portion, thereby to make inaccessible said slide-limiting means, means accessible from the rear face of said main body portion for securing said auxiliary casing to said body portion, and a third part of said construction comprising a clamping member juxtaposed to said rear face and having a part juxtaposed to the part of said rear face which engages said structure for engaging the other side of the latter, means for drawing said clamping member to said main body portion, whereby said parts clamp said structure therebetween and said auxiliary casing-securing means is made inaccessible.

11. A lock construction as in claim 10 in which the clamping member has a recess substantially alined with said key plug, and bolt means controlled by said key plug and projectable into said recess.

12. A lock construction as in claim 10 in which the clamping member has a recess extending transversely to the line of movement of the key plug and adapted to receive therein a keeper, bolt means controlled by said key plug and projectable into the recess in said clamping member for coaction with said keeper.

13. A lock construction as in claim 10 in which the clamping member has a recess extending transversely to the line of movement of the key plug for receiving therein a keeper, and automatically extensible bolt means controlled by said key plug projecting through a wall of said recess into the latter for coaction with the keeper and thereby self-accommodating to change in position of said clamping member relative to the main body portion.

14. A lock construction as in claim 10 in which the means limiting the movement of the key plug relative to the forwardly extending portion comprises a pin and slot closed over by said auxiliary casing.

15. A lock construction as in claim 10 in which the means for limiting the movement of the key plug comprises coacting key-controlled tumbler means in the key plug and in said forwardly extending portion, the latter having at least one tumbler-receiving channel laterally exposed but closed over by said auxiliary casing.

16. A lock construction as in claim 10 in which the key plug is slidably mounted in said forwardly extending portion, said clamping member having a recess therein extending transversely to the axis of the key plug for receiving a keeper, there being an aperture in that wall of said recess juxtaposed to said key plug, and bolt means movable, under the control of said key plug, into or out of said recess and by way of said aperture.

17. A lock construction as in claim 10 in which the key plug is slidably mounted in said forwardly extending portion, said clamping member having a recess therein extending transversely to the axis of the key plug for receiving a keeper, there being an aperture in that wall of said recess juxtaposed to said key plug, bolt means in line with said key plug and projectable thereby, through said aperture, into or out of said recess, and spring means interposed between said plug and said bolt means for causing the latter, when projected, to seat itself against the opposed wall of said recess irrespective of the spacing between said clamping member and said main body portion.

18. A lock construction as in claim 10 in which there is provided a space between the rear face of the clamping member and the rear face of the main body portion for the reception therebetween of a keeper, and bolt means controlled by said key plug and projectable across said space for coaction with said keeper.

19. A lock construction as in claim 10 in which there is provided a space between the rear face of the clamping member and the rear face of the main body portion for the reception therebetween of a keeper, and bolt means controlled by said key plug and having yieldable means relating it to the key plug, thereby to insure that said bolt means bridges across said space for varying spacings between said clamping member and said body portion.

20. A lock construction as in claim 10 in which there is provided a space between the rear face of the clamping member and the rear face of the main body portion for the reception therebetween of a keeper, bolt means telescopically related to the inner end of said key plug and adapted by the latter to be projected across said space, and spring means for yieldably varying the telescopic

relation between said bolt means and key plug to compensate for different spacings between said clamping member and said rear face.

21. A lock construction as in claim 10 in which there is provided a space between the rear face of the clamping member and the rear face of the main body portion for the reception therebetween of a keeper, a hollow bolt means telescoped over the inner end of said key plug and spring means within said hollow bolt means for permitting change of the telescopic relation between said bolt means and key plug to compensate for change in spacing between said clamping member and said rear face.

22. A lock construction as in claim 10 in which at least three sides of said main body portion are provided with flanges extending rearwardly beyond said rear face, thereby to laterally overlap and encompass said clamping member.

23. A lock construction as in claim 10 in which the means for drawing the clamping member to the main body portion comprise a plurality of spaced devices independently operable and one acting as a fulcrum for the other for achieving such change in the angle or parallelism between the parts thereof that clamp said structure as to mate respectively with the faces of the latter respectively engaged thereby.

24. A lock construction comprising, in combination, a main body portion having a base portion whereby it may be secured to a structure and a casing portion bored out and having movably supported therein a key plug, said two portions being provided with means accessible by way of a wall of said casing portion for limiting the movement of said key plug, an auxiliary casing portion fitting over said first-mentioned casing portion to cover over said plug-movement-limiting means and thereby make the same inaccessible, and means accessible by way of the rear face of said base portion for securing said auxiliary casing portion against removal.

25. A lock construction as in claim 24 in which the key plug slides axially in said first-mentioned casing portion and in which the plug-movement-limiting means comprises a plurality of tumbler recesses with tumbler means both in said first-mentioned casing portion and in said key plug, the said tumbler recesses in said casing portion being exposed for the reception of said tumbler means and thereafter closed over by said auxiliary casing portion to retain said tumbler means, and there being one more tumbler means in said casing portion than in said key plug, and the tumbler means being of progressively greater dimensions in the direction of sliding movement of the key plug, whereby said tumbler means effects interlocking between the plug and said casing portion when the plug has been moved in one direction and interlocking action is prevented when said plug is moved in its other direction.

26. A lock construction comprising, in combination, a main body portion having a rear face, at least a part of which is adapted to rest against the face of a structure to which the lock construction is to be secured and having a clamping member juxtaposed to said rear face and at least a part of which is adapted to rest against the other side of said structure, said body portion having a forwardly extending casing portion that is bored out and has movably mounted therein a key plug, and means for drawing said clamping member toward said rear face of said main body portion and thereby to clamp said structure therebetween.

27. A lock construction as in claim 26 in which the main body portion and said clamping member have portions that are telescopically interfitted.

28. A lock construction as in claim 26 in which the means for drawing the clamping member toward said rear face comprises means coacting with both said clamping member and said main body portion and carried to the rear of the latter and being thereby accessible from the rear face of said clamping member.

29. A lock construction as in claim 26 in which the clamping member has only a part thereof and the main body portion has only a part of its rear face that engage the structure to be clamped and in which the means for drawing the clamping member to the body portion comprises screw means interengaging them at points located outside of the space occupied by the portion of the clamped structure received between the main body portion and the clamping member.

30. A lock construction as in claim 26 provided with movable bolt means controlled by the key plug, the clamping member having an aperture through which the bolt means is movable as controlled by the key plug.

31. A lock construction as in claim 26 in which the clamping member and the main body portion are shaped to provide a space therebetween for receiving a keeper, and bolt means controlled by said key plug and movable thereby transversely of said space for coaction with the keeper.

32. A lock construction as in claim 26 in which the clamping member and the main body portion are shaped to provide a space therebetween for receiving a keeper, bolt means movable transversely of said space for coaction with a keeper therein, and means forming a yieldable lost motion connection between the bolt means and the key plug for accommodating the bolt means to whatever change in the dimension of said space takes place with change in thickness of the structure clamped between the clamping member and the main body portion.

33. A lock construction as in claim 26 in which the clamping member has a recess accessible for the reception therein of a keeper and accessible at a different point for the reception thereinto of a bolt means, and bolt means controlled by said key plug and projectable into or out of said keeper-receiving recess at said different point.

34. In lock construction, in combination, a casing having a key plug slidably mounted therein, said key plug having tumbler-receiving recesses communicating with and spaced lengthwise of the key slot therein, said recesses being of progressively different cross-sectional areas, tumblers slidably fitted in said recesses, said casing having tumbler-receiving recesses similarly and progressively dimensioned and similarly spaced for mating with said first-mentioned recesses when said plug is in one position, said casing having, alined with the tumbler-receiving recesses therein, at least one more tumbler-receiving recess, whereby, when said plug is in its other position, the tumbler-receiving recesses therein are positioned in alinement respectively with all of the tumbler-receiving recesses in the casing but one, spring-pressed tumblers slidably fitted into said tumbler-receiving recesses in the casing, whereby said spring-pressed tumblers may enter said plug recesses when the said plug is is said one position but are precluded from entering recesses in said plug as the latter moves away from said one position by the dissimilarity in

dimensions between said spring-pressed tumblers and said plug recesses as the latter are traversed relative to the former, and means preventing movement of said plug beyond its said other position, whereby the aforesaid alinement of the said plug recesses and casing recesses is maintained for entry into the latter of the plug tumblers in the former as the plug tumblers are moved in response to movement of a key along said key slot.

35. In lock construction, in combination, a casing having a key plug slidably mounted therein, a tumbler-receiving recess in said plug communicating with the key slot therein and having a tumbler slidably mounted therein for actuation by a key, said casing having at least one more tumbler-receiving recess than is contained in said plug and hence having two tumbler-receiving recesses alined along the path of movement of said first-mentioned tumbler-receiving recess as said plug slides relative to said casing and having spring-pressed tumblers slidably received therein, one of said casing tumblers being of a dimension to enter the tumbler-receiving recess in the plug when the plug is moved in one direction and into one position relative to the casing, thereby to lock said plug against movement relative to the casing, and the other of said casing tumblers being dimensioned so that it cannot enter the tumbler-receiving recess in said plug when the plug is moved in opposite direction and into another position relative to the casing, and means preventing movement of said plug in said opposite direction beyond said other position, the recess in which said other casing tumbler slides being dimensioned to permit the plug tumbler to enter it against the action of the spring-opposed tumbler slidably carried therein, thereby to permit said plug tumbler to be raised to by-pass a key portion, when necessary, as the key is withdrawn.

36. In lock construction, in combination, a casing having a key plug slidably mounted therein, said key plug being movable into two extreme positions of slidable movement and having a key slot therein, said casing having tumbler-receiving recesses exposed to said key plug and spaced lengthwise of the latter, said recesses being of progressively differing cross-sectional areas in the direction from one extreme position of the key plug to said other extreme position thereof, spring-pressed tumblers slidably fitted in said recesses, said key plug having tumbler-receiving recesses of progressively different cross-sectional areas and alined in the said direction and being one less in number than said tumbler-receiving recesses in said casing, whereby, when said key plug is in one of said extreme positions, the tumbler recesses in both casing and key plug are in alinement and said spring-pressed tumblers may enter the recesses in the key plug and whereby, when said key plug is in the other of said extreme positions, the tumbler recesses in the latter are placed in alinement with casing tumbler recesses that are respectively larger than the key plug recesses with which they are alined, means for preventing movement of said key plug beyond said other extreme position and for thereby maintaining the aforesaid alinement of said casing tumbler recesses and said key plug recesses, and tumblers in said key plug recesses and operable by a key inserted into said key slot for lifting said spring-pressed tumblers out of the key plug recesses when the key plug is in said one extreme position and for entering said casing recesses when the key plug is in said other extreme position and said casing recesses and key plug recesses are in the aforesaid alinement, and thereby, when said key plug is in said other extreme position, to permit withdrawal of the key from the key slot irrespective of the coding of the key.

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