

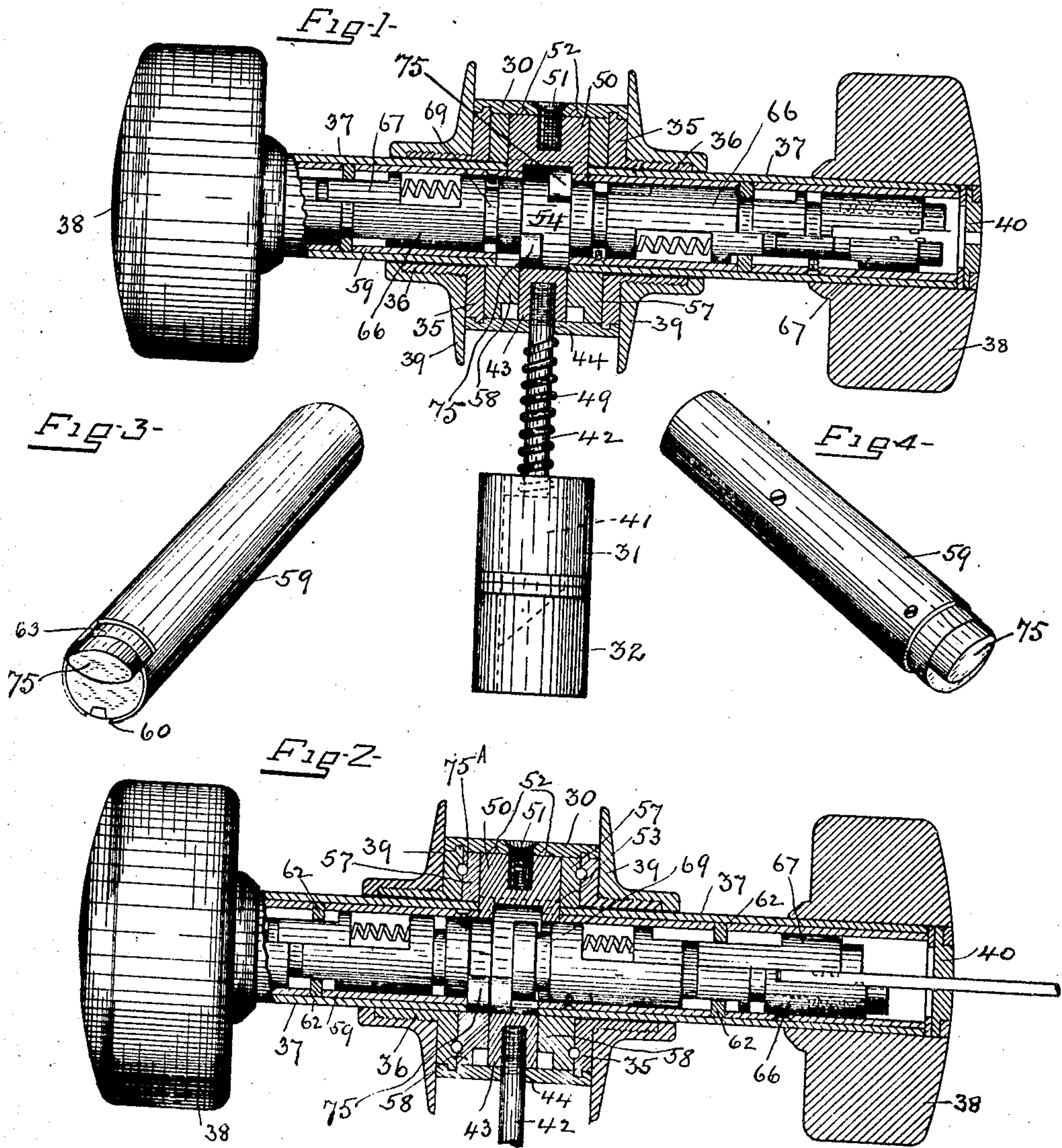
H. W. SIMPSON.  
LOCK.

APPLICATION FILED SEPT. 24, 1907.

920,091.

Patented Apr. 27, 1909.

4 SHEETS—SHEET 1.



WITNESSES:

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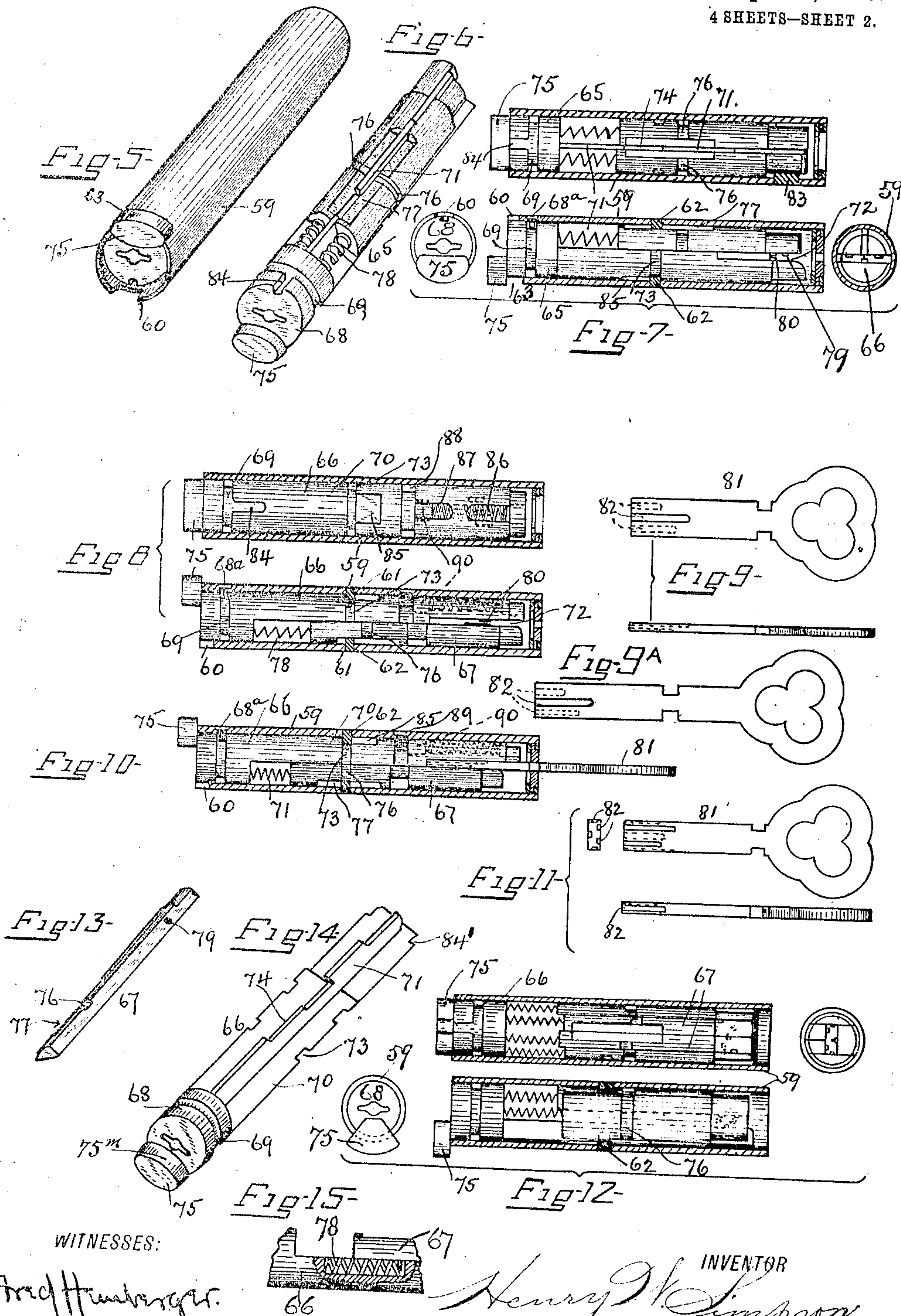
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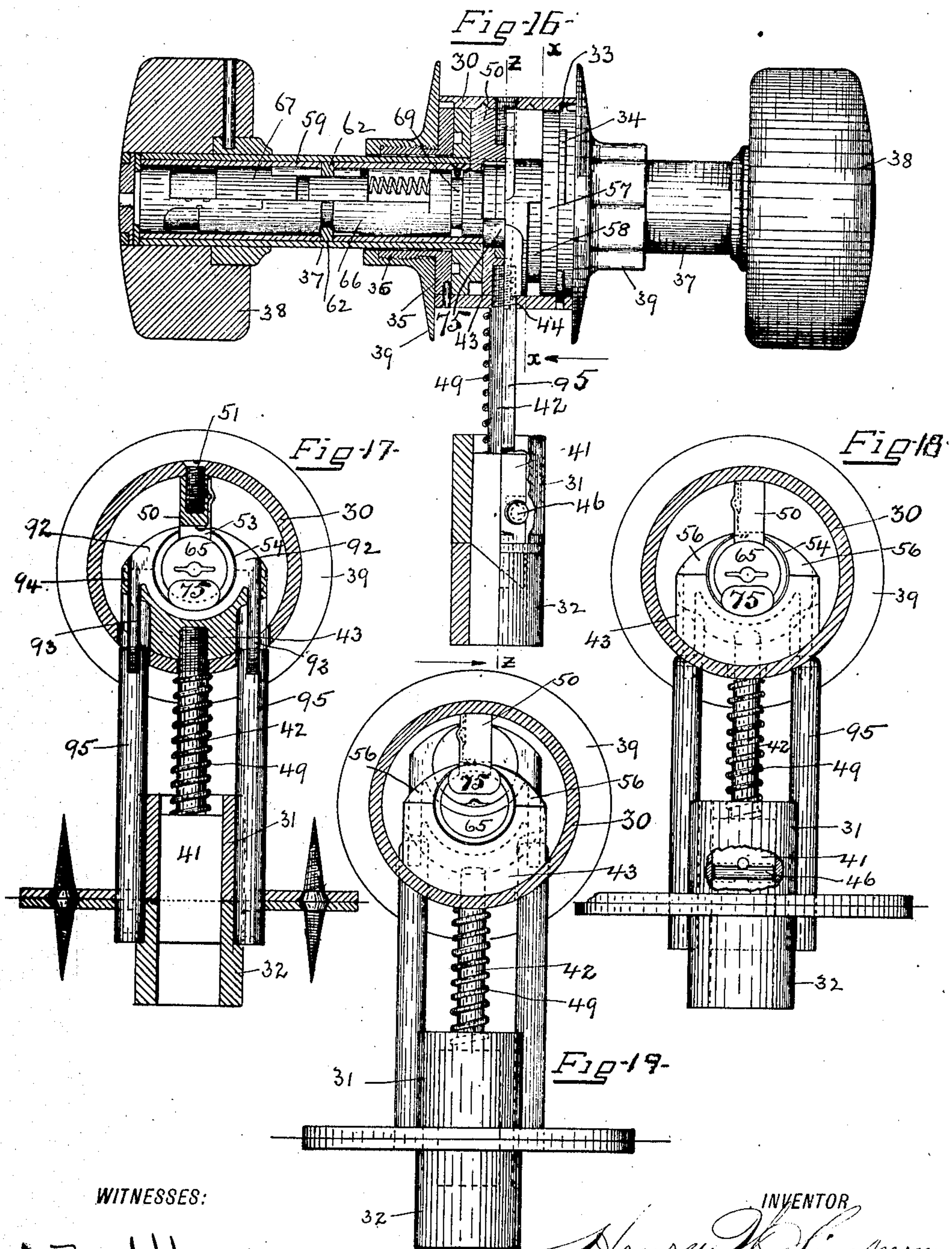
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4 SHEETS—SHEET 3.



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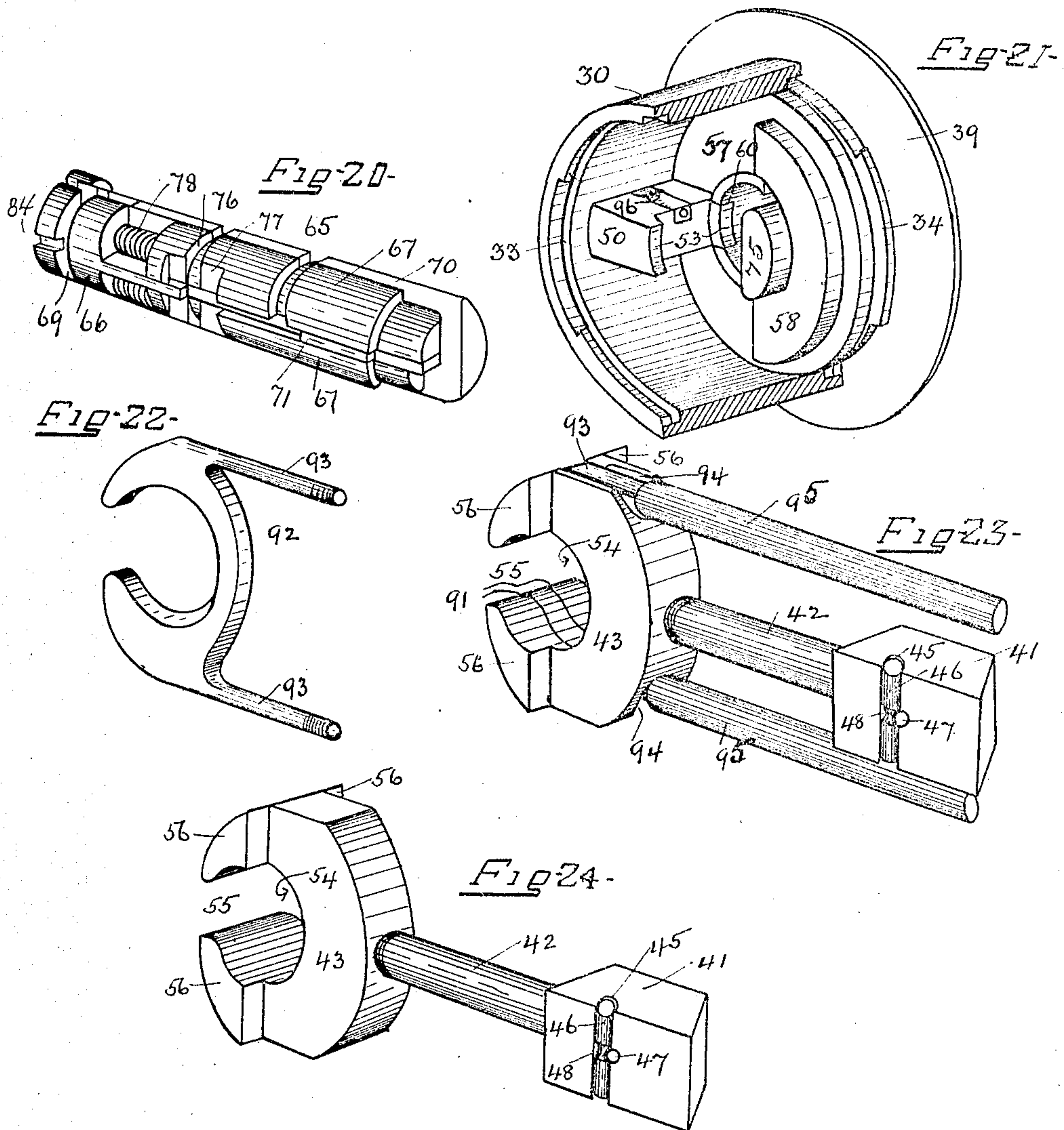
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# UNITED STATES PATENT OFFICE.

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## LOCK.

No. 920,091.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed September 24, 1907. Serial No. 394,267.

*To all whom it may concern:*

Be it known that I, HENRY W. SIMPSON, a citizen of the United States, residing at Ithaca, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Locks, of which the following is a specification.

This invention relates to improvements in locks, and has particular reference to locks for use at points where it is desirable to permit the unlocking of the lock in the manner heretofore employed by the use of a "master key". In hotels, as an example, the general practice has been to provide a lock which can be manipulated by a key from either side of the door, the key presumably being carried by the occupant of the room, a duplicate of the key being carried by the proper person in the hotel in order that access to the room may be had during the absence of the occupant or in case of the loss of the key. In other forms of locks the structure is somewhat similar, but the lock is so arranged as to permit of the use of a master key by means of which the lock may be manipulated irrespective of the particular key for the door being operated upon. With either form of lock, if the door be locked from the inner side and the key retained in the lock, it is an exceedingly difficult matter to unlock the door from the outer side, since there must necessarily be a manipulation of the key on the inner side of the door, it generally requiring the service of an expert locksmith to manipulate the lock to permit its being unlocked from the outer side and the door opened. And if the key on the inner side should have been intentionally secured in such position as would prevent its being manipulated from the outer side of the door, it will be necessary that the lock itself be broken in order that access to the room may be had.

In the present invention, the same general results accomplished by the type of lock above indicated are provided, but in addition the locking bolt may be thrown from either side of the door, but in general practice, the unlocking must take place on the same side of the door that was used in locking the door, so that the occupant of the room may feel reasonably sure against the entrance of undesirable persons. In addition, however, provision is made by means of which the lock may be unlocked from the outer side in cases where the locking has been

from the inner side and the key remains in the door, so that under extraordinary circumstances, such, for instance as where the occupant of the room is in a condition where he is unable to manipulate the locking mechanism from the inner side of the door, the door may be unlocked and access be had to the room. This result is obtained by providing means for retracting the latch bolt from its outer or projected position, independent locking means being introduced from each side of the door, the means on one side being so arranged relatively to the means on the other side that, under certain circumstances, the locked position of one set of means can be changed to an unlocked position by manipulation of the other set of means.

The principal object of my invention is, therefore, to provide locking means for the latch bolt of a lock capable of being operated from either side of the door and which, when in particular positions, can be manipulated to interengage for the purpose of a movement which will permit unlocking of the door.

A further object is to provide an independent barrel and tumbler mechanism on each side of the door, each having a latch bolt engaging element, the several elements having no operative connection excepting when in a particular relative position, the movement of one element will effect a displacement of the opposing element to permit of the movement of the latch bolt.

A further object of the invention is to provide a barrel and tumbler mechanism movable, under the action of a key, axially to change the position of a locking element relatively to the barrel casing.

A further object is to provide a locking bolt or bolts with a construction of such form as will permit of their being thrown by the movement of the latch bolt locking means, so that a single key would not only lock the latch bolt against movement but which will, at the same time, project the bolts into a locked position.

Other and further objects will appear as the invention is hereinafter described.

To these and other ends, therefore, my invention consists in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims.



In the drawings, in which similar reference characters indicate similar parts in each of the views, Figure 1 is a horizontal sectional view of a lock embodying one form of my invention, parts thereof being shown in elevation, the operating parts being shown in a position where the latch bolt is locked against movement by the locking element carried by the mechanism shown at the left of the figure.

Fig. 2 is a similar view, showing the locking element of the mechanism at the left as having been moved out of its locked position by the locking element carried by the mechanism on the right in said view. Fig. 3 is a perspective view of the barrel and casing located on the left in Fig. 1. Fig. 4 is a similar view of the barrel and casing shown at the right in Fig. 1. Fig. 5 is a view similar to Fig. 3 with the locking element seated within its recess in the casing. Fig. 6 is a detail view of the barrel and tumbler structure shown in Figs. 3 and 5, the casing having been removed. Fig. 7 shows in plan, side elevation and end elevations, the barrel and tumbler structure shown in Fig. 6, the casing being shown in section. Fig. 8 shows in plan and side elevation the barrel and tumbler structure shown in Fig. 4, the casing being shown in section. Fig. 9 shows side and edge views of a key for operating the barrel and tumbler structures shown in the preceding views and Fig. 9<sup>a</sup> shows such a key with an extended shank, specially adapted for imparting longitudinal movement to the mechanism. Fig. 10, is a view showing the barrel and tumbler structure shown in Fig. 8, the tumblers having been moved to a different position by the insertion of the key. Fig. 11 shows in side elevation, end elevation, and edge view, a key adapted to operate the barrel and tumbler structure shown in Fig. 12. Fig. 12 shows in plan view, side elevation and end elevations, a barrel and tumbler structure having a multiple number of tumblers, the casing being shown in section. Fig. 13 is a detail view showing one of the tumblers. Fig. 14 is a detail view showing the tumbler-carrying member. Fig. 15 is a detail view showing a modified form for applying tension to the tumblers. Fig. 16 is a view partly in plan and partly in section of the lock mechanism substantially as shown in Figs. 1 and 2, but having a lock bolt structure applied thereto. Fig. 17 is a sectional view taken on line z—z of Fig. 16. Fig. 18 is a sectional view taken on line x—x of Fig. 16. Fig. 19 is a view similar to Fig. 18 with the locking bolt carrier in its inoperative position. Fig. 20 is a perspective view of a barrel and tumbler structure which may be employed in connection with the mechanism shown in Fig. 16. Fig. 21 is a perspective view of a lock casing of one side of the door. Fig. 22 is a detail view of the locking bolt yoke. Fig. 23 is a

perspective view showing the locking bolts in position on the latch bolt carrier. Fig. 24 is a perspective view of the latch bolt and its carrier.

Referring to Figs. 1 to 4, and Fig. 21, 30 designates a cylindrical casing of a width slightly less than the thickness of the door, said casing being adapted to be mounted in an opening extending through the door, communicating with which is an opening leading to the edge of the door, the latter being suitably mortised to receive the mortised edge plate 31, through which the latch bolt is adapted to operate, said plate being of any preferred form and not forming any particular part of the present invention. The door and its opening are not shown in the drawings, as it is believed unnecessary to particularly show these parts, the arrangement being obvious.

32 designates the edge plate located in the door jamb and having an opening to receive the end of the latch bolt when projected, said edge plate also being of any preferred form.

The casing 30 is provided on its inner periphery adjacent its side edges with suitable bayonet slots 33, shown in Figs. 16 and 21, adapted to receive the lugs 34 formed on the flange 35 of a sleeve 36 loosely mounted on a tubular casing 37, the outer end of which is suitably secured in the door knob 38. If desired the sleeve 36 may be secured against a rotative movement to free the bayonet slot connection, by the passage of a screw or pin through the casing 30 and into the periphery of the flanges 35, this connection being provided on one side of the door, prior to the insertion of the casing within the opening in the door, the casing being passed through the opening in the door to secure the opposing flange, it being understood, however, that the bayonet slot connection will be provided on each side of the casing, a sleeve 36 being provided on each tubular casing 37. To properly position the casing 30, within the door, I provide the rose 39 said rose having a screw-threaded connection with the sleeve 36, the construction being such, that when the casing 30 and the casings 37 are mounted within the door, and the roses 39 are screwed up tightly against the faces of the door relative movement of the casing 30, the sleeve 36, and the roses 39 will be prevented.

Each of the door knobs (one located on the outer and one on the inner side of the door) is provided with a suitable rotatable key-entering plate 40, through which the key is adapted to be inserted into the barrel and tumbler mechanism, presently described.

41 designates the latch bolt, having its outer face inclined, and having its inner end connected by a rod 42 with a latch bolt carrier 43, as best shown in Figs. 16 and 24. The carrier 43 is located within the casing 30,



the rod 42 extending outwardly through an opening 44 in the casing 30, the bolt 41 extending into and being adapted to be projected out of the edge plate 31, the latch bolt 5 having one of its side faces provided with a recess 45 extending laterally, within which is mounted a roller 46, retained in position by a pin 47 engaging in a groove 48 formed in the roller 46, the construction being such that 10 the outer surface of the roller projects beyond the plane of the side face of the latch bolt to provide an anti-friction bearing for said bolt. A spring 49 is interposed between the inner end of the latch bolt and the outer 15 face of the casing 30, said spring tending to retain the latch bolt in a projected position. Owing to the relatively fixed position of the latch bolt within the edge plate 31, the passage of the rod 42 through the casing will prevent any rotative movement of the casing 20 after the parts have been assembled and placed in the door.

Secured within the casing 30 at a point diametrically opposite the opening 44 is an 25 inwardly-projecting lug 50, extending in a direction axially of said casing and held against movement relative to said casing by suitable means such as a screw 51 and interlocking pins 52. The lug 50 extends inwardly a suitable distance and has its inner 30 face provided at its end edges, with inwardly-extending flanges 53, adapted to be received within the barrel casings hereinafter described for the purpose of retaining them 35 against rotative movement within the knob spindles or tubular casings 37.

As will be seen, the opening 44 for the latch bolt and the opening for the screw 51 are diametrically opposite and of equal size. 40 This construction is to permit the lock-bolt to be passed through either opening to permit the lock to be used as a right or left hand structure, as may be found necessary.

The carrier 43 is preferably formed as 45 shown in Fig. 24, being oval in general configuration in side elevation with the ends of the oval flattened. Said carrier adjacent its rear edge is provided with a circular opening 54 extending laterally through the carrier, 50 the latter having its rear wall cut away as at 55 to form a passage way leading to the opening 54. Said carrier, when in position within the casing 30, has its rear spaced edges straddling the lug 50, the movement of said carrier causing the inner face of said lug to pass 55 into the opening 54 to a greater or less extent depending upon the direction of movement of the carrier. The rear portion of the carrier is provided with laterally-extending 60 flanges 56, presenting abutments which serve as cam surfaces to retract the latch bolt when the knobs are manipulated as hereinafter described.

The knob spindles 37 each have their inner 65 end provided with an annular flange 57, said

flange 57 having its inner face provided with a semi-circular plate 58 forming abutments which, when the parts are assembled, are adapted to co-act with the abutments on the carrier 43 to retract the latch bolt. 70

It will be understood that the parts above described, when assembled, will permit of the ordinary functions of a knob-operated latch bolt, the movement of either knob retracting the latch bolt by reason of the opposing 75 surfaces of the abutments or cam surfaces of the knob spindle and the latch bolt carrier, and then when the knob is released, the spring 49 will automatically return the latch bolt and its carrier to its outer or projected position. The locking of the door is 80 accomplished by preventing the retraction of the latch bolt. For this purpose, I provide a locking element which, for the purpose of locking the latch bolt, is rotatable into and 85 out of a position directly in rear of the wall of the opening 54 located directly in rear of and in alignment with the rod 42. For the purpose of imparting the rotative movement to the locking element, I provide suitable 90 mechanism located within the knob spindle, and I preferably provide each knob spindle with a complete mechanism including the locking element, said mechanism being independent of the mechanism of the opposing 95 knob spindle, so that the latch bolt may be locked from either side of the door by the movement of the locking element of a particular knob into the locking position. As each mechanism has its own locking element, 100 the unlocking must generally take place from the same side of the door as that on which the locking action was applied. However, I have provided an additional function to be brought into operation under certain circumstances, which operation will be hereinafter 105 described, for the purpose of displacing the locking element of one of the barrels from its locking position. To provide this operation, it is necessary that said elements have an additional movement relatively to the spindle, 110 which movement is axially of the spindle. As these axial movements are in opposite directions in the opposing locking elements, it is necessary to provide different operating 115 mechanism in each of the knob spindles. And while the general construction of such operating mechanism is the same in both structures, the differences are such as to require a description of each of the mechanisms separately. But inasmuch as there are 120 general features of construction alike in both forms of the mechanism, I will proceed to describe the general construction by means of which the rotative movements of the locking element is obtained, and then the particular structures which permit of the different longitudinal movements of the locking elements. 125 This structure is particularly shown in Figs. 3 to 15 inclusive.



59 designates the barrel casing in the form of a tube open at both ends, said casing having at one end a recess 60 to receive the flange 53, as best shown in Fig. 21, by which construction the casing is held from rotative movement. Longitudinal movement of the casing within the knob spindle in a direction toward the outer end of the knob is prevented by the contact of the end of the casing with the key-entering plate 40, and in the opposite direction by the inner wall of the recess 60 engaging the outer face of the flange 53. The casing is also provided with slits 61 extending crosswise of the casing on opposite sides thereof, said slits receiving bars 62, the slits being of sufficient depth to permit the inner face of the bars to project within the inner periphery of the casing, the slits being located at any desired point in the length of the casing; the outer surfaces of the bars 62 are rounded to conform to the outer periphery of the casing.

65 designates the barrel which consists of the tumbler-carrying member 66 and the tumblers 67. The member 66 is formed substantially as shown in Fig. 14, being of a length approximating the length of the casing 59. One of its ends 68, that opposite the key-inserting end, is circular in cross-section and adapted to fit the interior of the casing, the relative sizes being such as to permit a relative movement of the member 66 in the casing. The end 68 is provided with a circumferential groove 69 spaced from and parallel with the surface of said end. A screw or pin 68<sup>a</sup> extends through the casing 59, the inner end of said pin extending into said groove 68. The member 66 is also provided with a longitudinally-extending bar 70 semi-circular in cross-section and having an area approximate half the area of a cross-section of the end 68, said bar being of a suitable length. Extending radially from the center of the flattened surface of the bar 70 is a plate 71 which extends longitudinally of the barrel and is of such length as to terminate approximately at the free end of the bar 70, a kerf 72 being formed between the flattened surface of the bar and the inner edge of the plate, said kerf extending inwardly a suitable distance. The bar 70 is provided with a circumferentially-extending groove 73, substantially midway of its length, and the plate 71 is also provided with a recess 74, one end of which corresponds in position with the groove 73. The end 68 of the member 66 is provided with a locking element 75, in the form of a lug or projection having its outer face curved concentrically with the curvature of the end 68, the distance between the periphery of the end 68 and the periphery of the lug 75 corresponding to or slightly more than the thickness of the wall of the casing 59. The inner face of the lug is substantially flat, as shown at 75<sup>m</sup>, Fig. 14, the meeting points of the

inner and outer faces of the lug 75 being preferably rounded. The tumblers 67, two of which are shown in the drawings, are formed substantially as shown in Fig. 13, having a general-cross-sectional shape of a right-angle triangle, the outer side of which is rounded. These tumblers are adapted to be seated in the ways formed on each side of the plate 71, and the curvature of their outer faces corresponds to the curvature of the inner periphery of the casing, the tumblers practically completing the circular form of the barrel. Each tumbler is provided with a circumferentially-extending groove 76 and an extended recess 77. Each tumbler is normally retained in an outer position by means of a spring 78 interposed between the end of the tumbler and a wall of the end 68. One end of each tumbler has a surface exposed to the plane of the kerf 72, and said surface is provided with a projecting pin or lug 79 which, together with a pin or lug 80 located on the opposing face of the bar 66, provide the guides for the keywords and the tumbler-moving devices by means of which the parts are placed in position where rotative movement may be had. The key 81 is provided with longitudinally-extending grooves 82, of such length as to provide a construction such that when the groove which receives the pin or lug 80 has reached its limit of movement, the several tumblers will have been moved to a position where the grooves 76 will be in alignment with the groove 73, and thereby form a substantially complete groove around the periphery of the barrel. In view of the fact that the bars 62 are so located that, when the key has reached its movement to position the tumblers, they will lie within the plane of the groove 73 and grooves 76, it will be understood that in this position, movement of the barrel relatively to the casing 59 may be had.

The rotative movement of the barrel within the casing is limited by the presence within the casing at a point adjacent the key end thereof, of an inwardly-extending lug 83 (see Fig. 7) projecting slightly beyond the inner periphery of the casing. The bar 70 has its rear end peripherally-recessed as at 84', said recess extending inwardly a distance sufficient to clear said lug 83 when the barrel is moved longitudinally; but when the barrel is in its normal position, its peripheral edges will contact with said lug 83 and thereby limit the movement of the barrel in a rotating direction to substantially a one-half revolution. The plate 71 and each of the tumblers is also provided with a recess, the length of said recess in each case being sufficient to prevent any contact being made with said lug during a rotative movement.

The particular construction and arrangement of the barrel and tumbler so far described, and which pertains solely to the



rotative movement of the barrel within the casing, is not herein specifically claimed, as such structure forms the subject-matter of an application for Letters Patent filed by me September 14, 1907, Serial No. 394,266. Therefore I do not herein describe in minute detail the particular construction of the parts, it being understood that the tumblers when unacted upon by the key are so located relatively to one of the bars 62, as to prevent the rotative movement of the barrel, but when acted upon, as above described, to carry the tumblers into position where the bars 62 may ride within the groove 76, such rotative movement may be had, the inwardly-projecting end of the pin 68<sup>a</sup> riding within the groove 68.

It is here noted that my co-pending application filed September 24th, 1907, Serial Number 394,268, discloses and claims the form of cylinder lock shown herein having a longitudinal movement of the operating lug in addition to the rotary movement thereof.

The normal position of the lug 75 is that wherein it lies within the recess formed between the flanges 53 of the lug 50, in which position the knob can be rotated to operate the latch bolt in the manner heretofore described, the lug 75 presenting no obstruction to the passage of the carrier 43 in the direction to retract the latch bolt. If, however, the key be inserted and the tumblers carried to their proper position, and the barrel rotated until it has reached its opposite extreme of movement, the lug 75 will have been carried to the position shown in Fig. 21, where it lies directly in rear of the front wall of the opening 54. In this position, the latch bolt is locked against a retracting movement, and since the carrier 43 is held from movement, the knobs are also held against movement, as the movement of the latter can take place only when the carrier 43 is permitted to be retracted.

Each lug 75, forming the locking element, projects inwardly approximately one-half of the width of the carrier 43, and as each locking element may be operated independently by a proper key, it will be understood that the locking movement of either lug 75, will provide an effectual lock against the movement of the latch bolt regardless of the position of the lug 75 supported by the other knob. Obviously, therefore, in order to unlock the latch bolt, it is necessary that the operating mechanism of the lug 75 which is holding the latch bolt in its locked position, must be manipulated to rotate the barrel to carry the lug to its inoperative position. Hence, it will be understood, that the lock must be as a general proposition, unlocked from the same side of the door as that on which the locking movement took place. As heretofore set forth, under certain circumstances, such limitation in requiring that the

locking and unlocking movements must be from the same side of the door, is undesirable and I provide an alternative construction by means of which the locking element 75 of one mechanism can be displaced by the mechanism of the opposing element in such manner as to permit the latch bolt to be retracted. This alternative operation is provided by permitting the barrel of each of the mechanisms to move axially. Such axial movement must be accomplished by the key on one side of the door, and therefore the movement must be in a direction to displace the lug 75 of the opposing mechanism. And since there are provided no over-lapping portions of the opposing lugs 75, the displacing of the lug cannot be by a rotative movement, so that it must be in a direction to carry the lug entirely out of the path of movement of the carrier 43. While one of the lugs 75 is therefore movable to a point entirely within its casing, the opposing lug which has a movement serving to make such displacement, must also have a longitudinal movement. Under these circumstances, it will be understood that the displacing movement is limited entirely to the lug on one side of the door, since it is not practicable to provide a structure which may be moved longitudinally in either direction from an intermediate position. I therefore place the lug, which is capable of being displaced on the inner side of the door, so that it would be impossible for an occupant of a room to so manipulate the locking mechanism as to prevent an unlocking from the outer side of the door. This displacing operation is obtained in the following manner, it being understood that the locking member on the inner side of the door is movable to a position within its casing, and that on the outer side of the door is movable to project substantially across the path of movement of the carrier 43 and be returned to its normal position, the particular arrangement of the parts for performing these operations being hereinafter described. When the lug 75, operative from the inner side of the door is in its locked position, said lug, as heretofore pointed out, is located directly in the rear of and in contact with the front wall of carrier 43. If it is desired to unlock the door from the outer side, the proper key constructed as shown in Fig. 9<sup>a</sup> is inserted from that side and the lug 75 of that particular mechanism is also moved to a locking position, so that both lugs 75 lie in the same plane. If, with the lugs in this position, pressure is applied to the end of the key on the outer side of the door, the barrel of that side will be forced inwardly carrying with it its lug 75, which in turn moves the lug 75 of the opposing member into its casing and entirely out of the path of movement of the carrier 43. The pressure is then relieved, whereupon the barrel which has been pro-



jected will return to its normal position, carrying with it its lug 75, still leaving the latch bolt locked against the retracting movement. It will then be necessary only to rotate the barrel so as to move the lug 75 to its inoperative position, whereupon the latch bolt can be retracted by a simple rotative movement of the door knob.

The barrel structure located on the inside of the door differs only from the above described in providing the end 68 with a groove 84 leading from the groove 69 toward the outer surface of said end; and in providing a flat side 85 on the periphery of the bar 70 adjacent the groove 73, such changes permitting the pin 68<sup>a</sup> to ride within the groove 84, and the bar 62, which will be in alinement with the flat side 85, to leave the groove 73 and ride over the surface of said flat side. The casing 59 is provided with a recess 63 within which the lug 75 may pass, leaving the end of the casing free from projecting surfaces. When said lug has been placed in this position, as above described, it will be retained therein until a key has been again inserted into the barrel, when the inserting movement will cause the lug to resume its normal position relative to the casing of the barrel, and the barrel is then rotated to bring the lug to its normal inoperative position, it being understood, of course, that the barrel cannot be rotated while the lug 75 is located within the recess 63.

The barrel and casing structure shown on the right in Figs. 1 and 2 differs from that shown on the left, the differences in construction of said barrel being now pointed out. In this construction, the groove 84, flat side 85, and recess 74 extend in the opposite direction from the grooves 69 and 73, and its position in the plate 71, respectively. This permits the barrel to be projected from its casing instead of being withdrawn into the casing as is the case with the opposing barrel. Since there is no provision in the key for providing a reverse axial movement to said barrel, independent provision is made for returning the barrel to its normal position when the pressure on the key is relieved. This mechanism consists of a spring 86 mounted within a longitudinal recess 87 formed in the bar 70 adjacent the outer end thereof, said recess leading from a circumferential groove 88 formed in said bar and the plate 71 and continued in the tumblers in a proper position thereon relatively to the groove 76, so that when the tumblers are properly positioned to permit the rotative movement, a complete circumferential groove will be formed around the barrel. A screw 89 extends through the casing 59 and has its inner end projected into said groove 88. Within the recess 87, and located intermediate the spring 86 and the groove 88, is a follower block 90, which when the barrel has

been rotated to a point which will bring said block in alinement with the screw 89 (the position in which longitudinal movement of the barrel is permitted) such longitudinal movement will tend to compress the spring 86, and thereby place the barrel under spring tension. When, therefore, the pressure on the key is relieved, this tension will return the barrel to its normal position as shown in Fig. 1.

It will be understood that in each of the forms of barrel shown in the drawings, the longitudinal movement of the barrel can take place only when the barrel is in one particular position; in the form shown at the left in Figs. 1 and 2, this movement can take place only when the lug 75 is in alinement with the recess 63, and this alinement is provided only when said lug has reached its locking position. In the form shown at the right in Figs. 1 and 2, the longitudinal movement can take place only when the follower block 90 is in alinement with the screw 89, and the parts are so arranged that this alining position is assumed only when the lug 75 of the particular barrel structure is in its locking position. From this it will be obvious that while each barrel may be rotated on its axis between certain extremes of movement by the key, whenever the proper key has been placed in position to move the tumblers to points within which rotative movement is permitted, longitudinal movement can take place only when the barrels are in a predetermined position, so that there is no liability of displacing the parts when the lugs are in other than the desired position.

The construction heretofore described provides simply for the use of a latch bolt alone as the door securing element, the latch bolt serving its usual purposes when permitted to do so, and being locked against such movement when the locking mechanism is operated. It may be desirable, and sometimes is preferable, to place additional locking means in position to strengthen the holding effect between the door and its jamb. Such construction is shown in Figs. 16 to 23, consisting in providing one or more longitudinally movable bars or bolts which are adapted to be projected or retracted into and from suitable openings in the door jamb. In order that there be no need of a different key or of a double locking or unlocking of the parts, these bars are arranged in position relatively to the remaining parts of the latch bolt mechanism so as to permit of their being positively projected during the locking movement of the lug 75, and retracted by the movement of a knob spindle after the lug 75 has been moved to its inoperative position, the carrier or yoke for the locking bars being arranged to engage and catch when in its retracted position to retain the bars in their retracted position without in



any way limiting the succeeding projecting movement of the latch bolt. The particular mechanism for producing these results will now be described.

5 When the locking mechanism is to be provided with the locking bolts, the carrier 43 is bifurcated at its rear as shown at 91 in Fig. 23, to receive a yoke 92, shown in Fig. 22 in detail, said yoke having the general configuration of the carrier 43, but being relatively narrow to fit within the recess formed by the bifurcated ends of the carrier. Said yoke is also provided with rods 93, screw threaded at their outer ends, said rods being parallel 10 with each other and adapted to extend through grooves 94 formed on the flattened ends of the carrier, or, if desired, said rods may pass through openings formed in the carrier, this being an equivalent construction to that shown in Fig. 23. Bars or rods 95 15 are screw-threaded on the rods 93, said bars being of a proper length, and adapted when retracted, to be free from contact with the keeper in the door jamb, but which will, when projected, pass into suitable openings in the keeper to form additional locking means. For the purpose of retaining the yoke 92 in its retracted position I provide the lug 50 with a yoke-engaging device 96 located 20 in the path of movement of one of the ends of the yoke. The yoke 92 normally remains in its retracted position, as indicated in Fig. 19. When the lug 75 of either of the locking mechanisms is rotated to place said lug in its operative position, the movement of the lug 25 in passing to this position causes the yoke 92 to be carried forward and thereby project the bars or rods 95, forming locking bolts, into the door jamb. When it is desired to unlock the door, the lug 75 which is in the locking position, is rotated to its inoperative position, thereby releasing the carrier 43 and placing the parts in position where the operation of one of the knobs will retract the carrier 43. As the yoke 92 is located within the 35 carrier 43, such retracting movement of the latch bolt will carry with it the yoke 92, the movement being continued until the engagement of the yoke with the engaging device 96 takes place, after which, a release of the door knob will permit the spring 49 to carry the latch bolt and carrier 43 to its projecting position, the engaging device 96 retaining the yoke in its retracted position. The presence 40 of the yoke 92 does not affect the operation of the parts to displace the lug 75 as heretofore described, it being understood that the lugs 75 are of sufficient width to extend substantially half way across the width of the yoke, so that the lug 75 on either side will operate to lock the carrier and move the yoke to its projected position. And, inasmuch as the displacing movement of the lug takes place when the carrier and yoke are in a projected position, no obstruction will be pro-

vided which would prevent the longitudinal movements of the barrels as heretofore set forth.

In view of the fact that the opening 54 is circular, the locking and unlocking of the lugs 75, whether the lock be formed with or without the locking bolt structure will not affect the position of the carrier 43 to change its position relatively to the casing; in other words, the latch bolt structure is not operative in any respect by either of the lugs 75, the movement of said structure being entirely by the knob spindles. As heretofore pointed out, however, the projecting movement of the yoke is provided by the lugs 75. 80 It is also to be noted, moreover, that if the spring 49 becomes broken or defective, the latch-bolt structure and carrier 43 would be carried forward by the lug 75, upon a proper action of a key in the operation of locking 85 and the door thus secured.

While I have herein shown and described one form of a lock mechanism which will produce the results desired by me, as indicated hereinafter, it is to be understood that the specific structure shown and described does not comprise all of the structures which might be employed for producing the results aimed at: I do not therefore, limit myself to such specific structural details, but claim 95 the right to use any and all modifications thereof which may fall within the spirit and scope of the invention as disclosed in the claims hereto appended.

I preferably provide a ball or anti-friction bearing between the wearing surfaces of the annular flange 57 and the flange 35 of the sleeve 36, as designated at 75<sup>A</sup> in Fig. 2.

Having thus described my invention and pointed out one form in which it may be carried into effect, what I claim as new, is:—

1. In a lock, independent latch-bolt operating knob-spindles each having an element for preventing movement of the spindles when the element is in position to cooperate with the latch-bolt, each spindle being movable independently of its element. 110

2. In a lock, a latch-bolt, independently-operable knob-spindles for operating said bolt, a bolt-locking element carried by each spindle and normally lying within an inoperative position, each of said spindles being operable independently of its element when both elements are in inoperative position, and means for moving either element into a position to retain the bolt locked. 120

3. In a lock, a latch-bolt, independently-operable knob-spindles for actuating said latch-bolt, and a bolt-locking element carried by each spindle for retaining the bolt in locked position, each knob-spindle and its bolt-locking element being movable independently of each other. 125

4. In a lock, a latch-bolt, independently-operable knob-spindles for actuating said 130



bolt, a rotative locking element supported by each spindle for locking the bolt, said elements being normally in an inoperative position, the path of rotative movement of either element being in a single plane at right angles to the axis of the element, and means independent of the knob-spindle for rotating its element to lock the bolt.

5. In a lock, a latch-bolt, knob-spindles for actuating said bolt, a locking element carried by each spindle to retain said bolt in locked position, each of said elements normally extending into the path of movement of the bolt and being normally in a position to permit free movement of the bolt, and means for moving either element into locking position relative to the bolt.

6. In a lock, a latch bolt, knob spindles for actuating said bolt, said spindles being spaced from each other to provide a passageway for the bolt therebetween, a locking element carried by each spindle, each element being movable from positions at either extreme of the path of movement of the latch bolt, the element in one of said positions retaining said bolt against movement.

7. In a lock, a latch bolt, knob spindles for actuating said bolt, said spindles being spaced from each other to provide a passageway for the bolt therebetween, a locking element carried by each spindle, each element being rotative from positions at either extreme of the path of movement of the latch bolt, the element in one of said positions retaining said bolt against movement.

8. In a lock, a latch bolt, knob spindles actuating said bolt, said spindles being spaced from each other to provide a passageway for the bolt therebetween, a locking element carried by each spindle to retain, when in one position, said bolt in a locked position, said elements being operable independently of each other and of either knob spindle, the movement of the knob spindles and their elements being independent of each other.

9. In a lock, a latch-bolt and its carrier normally in a position with the bolt projected, knob-spindles operatively connected with the carrier to retract said bolt, said spindles being spaced from each other to provide a passageway for said carrier, and a locking element extending into the path of the carrier and movable into a position to contact with the carrier to prevent retraction of the bolt.

10. In a lock, a latch bolt and its carrier normally in a position with the bolt projected, knob spindles operatively connected with the carrier to retract said bolt, said spindles being spaced from each other to provide a passageway for said carrier therebetween, and an independently-operable locking element carried by each spindle, each element being normally in the path of and movable

into a position to contact with the carrier to prevent retraction of the bolt.

11. In a lock, a spring-projected latch bolt and its carrier, independently-operable knob spindles operatively-connected with said carrier to retract the bolt, and a locking element extending within said carrier and movable to a position to retain the carrier against movement.

12. In a lock, a spring-projected latch bolt and its carrier, knob spindles for independently retracting said latch bolt, a locking element carried by each spindle and normally extending within the carrier, the opposing elements having independent paths of movement, either element being movable to a position to retain the carrier against movement.

13. In a lock, a spring-projected latch bolt and its carrier, the carrier having a laterally-extending opening, knob spindles for independently retracting said carrier and bolt, and an independently-operable element carried by each spindle and extending within the opening of said carrier, each element being movable therein to a position to retain the carrier against movement.

14. In a lock, a spring-projected latch bolt and its carrier, said carrier having a circular laterally-extending opening, and a locking element extending within said opening and having a path of movement corresponding with the periphery of said opening when the carrier is in its projected position, said element, in one position, retaining the bolt against movement.

15. In a lock, a spring-projected latch bolt and its carrier, said carrier having a circular laterally-extending opening, and an independently-operable locking element carried by each knob spindle and extending within said opening and having a path of movement corresponding with the periphery of said opening when the carrier is in its projected position, either element, when in a predetermined position, retaining the bolt against movement.

16. In a lock, a casing, a spring-projected latch bolt extending through said casing and having a carrier within said casing, said carrier having a laterally extending opening and having its rear portion bifurcated, a lug secured to said casing and extending within the bifurcated portion of said carrier, said lug controlling the path of movement of said carrier, and a locking element extending within said opening and normally located adjacent the face of said lug, said element being movable to a position to retain the carrier against movement.

17. In a lock, a spring-projected latch bolt and carrier, said carrier having a laterally-extending opening, and having cam surfaces on opposite sides thereof, a knob spindle



on each side of said carrier, each knob spindle having a complementary cam surface for retracting said carrier independently, and a locking element extending within said opening and movable to a position to retain the carrier against movement.

18. In a lock, a latch bolt, and locking means therefor, the locking and unlocking of the bolt being normally limited to the same side of the lock, the position of said means at a predetermined point permitting an additional movement from one of the sides of the lock to displace the locking engagement from the other side of the lock said movements being in a direction at substantial right angles to the plane of the path of movement of the bolt.

19. In a lock, a latch-bolt, and locking means therefor, said means comprising independent locking mechanisms located on opposite sides of the axial plane of the latch-bolt, each mechanism being normally operative only from that side of said plane on which it is located, said mechanisms when moved to a predetermined locking position permitting an additional movement of one of the mechanisms to displace the other mechanism from its locking position, the displacing movement being in a direction at substantially right angles to the plane of the path of movement of the bolt, said mechanisms being held against a displacing movement in the opposite direction.

20. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, one of said elements being displaceable axially from its locking position by the operation of the opposing element.

21. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, one of said elements being displaceable axially from its locking position by the operation of the opposing element when moved to a position in alignment therewith.

22. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, said elements normally lying within the path of movement of the latch-bolt, one of said elements being displaceable axially from its locking position by the movement of the opposing element to its locking position followed by an axial movement of both elements.

23. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, said elements each being rotative to a position to lock the bolt, and each being movable axially only when in such locking position.

24. In a lock, a latch bolt, actuating means therefor, and independent bolt-lock-

ing elements operative from opposite sides of the door, said elements having a limited rotative movement, one extreme of which is at a point to place the elements in alignment, each of said elements being movable axially when in aligned position, such axial movement rendering one of the elements inoperative relatively to the bolt.

25. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, said elements each being rotative to a locking position, one of said elements being displaceable axially while in such locked position.

26. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, said elements normally lying within the path of movement of the latch-bolt, said elements each being rotative to a locking position, one of said elements being displaceable axially by the opposing element while in such locked position.

27. In a lock, a latch bolt, independent knob spindles for actuating said bolt, and barrel and tumbler mechanism carried by each spindle, each mechanism having a bolt-locking element, each of said mechanisms having a limited rotative movement to place the elements in alignment, and each mechanism being movable longitudinally when the elements are in their aligned locking position, such movement rendering one of the elements inoperative relatively to the bolt, one of said mechanisms being positively moved longitudinally by the other mechanism.

28. In a lock, a latch bolt, independent knob spindles for actuating said bolt, and barrel and tumbler mechanism carried by each spindle, each mechanism having a bolt-locking element, each of said mechanisms having a limited rotative movement to place the elements in alignment, and each mechanism being movable longitudinally when the elements are in their aligned locking position.

29. In a lock, a latch bolt, actuating means therefor, and independent bolt-locking elements operative from opposite sides of the door, said elements each being displaceable axially and only while both are in such locked position.

30. In a lock, a latch bolt, independent knob spindles for actuating said bolt, and barrel and tumbler mechanism carried by each spindle, each mechanism having a bolt-locking element, each of said mechanisms having a limited rotative movement to place the elements in alignment, and each mechanism being movable longitudinally when the elements are in their aligned locking position, such movement rendering one of the elements inoperative relatively to the bolt,



the remaining element being rendered inoperative by a return to its unlocked position.

31. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, and a bolt-locking element supported by each spindle, each of said elements having a limited rotative movement to place them in locking position, each element being movable longitudinally, the longitudinal movement being permitted only when the elements are in locking position.

32. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, and barrel and tumbler mechanism carried by each spindle, each mechanism having a bolt-locking element, each of said mechanisms having a limited rotative movement to place its element in locking position, said mechanisms each having a longitudinal movement, said latter movement being permitted only when both elements are in locking position.

33. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, and a bolt-locking element supported by each spindle, each of said elements having an independent limited rotative movement to place it in locking position, said elements being movable longitudinally, the longitudinal movement in one direction being permitted only when both elements are in locking position.

34. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, and a bolt-locking element supported by each spindle, each of said elements having an independent limited rotative movement to place it in locking position, said elements being movable longitudinally, the longitudinal movement in one direction being permitted only when both elements are in locking position, the combined longitudinal movement being controlled solely by the actuating means for one of the elements.

35. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, and a bolt-locking element supported by each spindle, each of said elements having an independent limited rotative movement to place it in locking position, said elements each being movable longitudinally, the longitudinal movements being permitted only when the elements are in locked position, the longitudinal movement of one of the elements in one direction when both are in locked position moving the other element to an inoperative position without unlocking the bolt, the return movement of the actuating element retaining the bolt locked until rotated to inoperative position.

36. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, a bolt-

locking element supported by each spindle, each of said elements having an independent limited rotative movement to place it in locking position, said elements each being movable longitudinally, the longitudinal movements being permitted only when the elements are in locked position, means for positively moving both elements longitudinally in one direction when both are in locked position, and independent means for moving one of the elements in the opposite direction to return it to rotative position.

37. In a lock, a latch-bolt, independent knob-spindles for actuating said bolt, a bolt-locking element supported by each spindle, each of said elements having an independent limited rotative movement to place it in locking position, said elements each being movable longitudinally, the longitudinal movements being permitted only when the elements are in locked position, a key for positively moving both elements longitudinally in one direction when both are in locked position, and spring-actuated means for moving one of the elements in the opposite direction to return it to rotative position.

38. In a lock, a latch-bolt and its operating mechanism, means for locking said latch-bolt against movement, and a locking bolt movable into a locking position by the latch-bolt locking means, the unlocking movement of the locking-bolt being independent of the movement of said means.

39. In a lock, a latch bolt and its operating mechanism, means for locking said latch bolt against movement, and locking bolts movable into a locking position by the latch bolt locking means, the unlocking movement of the bolts being provided by the retracting movement of the latch bolt.

40. In a lock, a latch bolt and its operating mechanism, means for locking said latch bolt against movement, and locking bolts movable into a locking position by the latch bolt locking means, the unlocking movement of the bolts being provided by the retracting movement of the latch bolt, and means for retaining said bolts normally in an unlocked position.

41. In a lock, a latch bolt and its operating mechanism, means for locking said latch-bolt against movement, and locking-bolts supported by the latch-bolt and movable therewith in one direction, the movement in the opposing direction being simultaneous with the movement of the latch-bolt locking means to its operative position.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY W. SIMPSON.

Witnesses:

HOWARD COBB,  
GERTRUDE C. GRIFFIN.