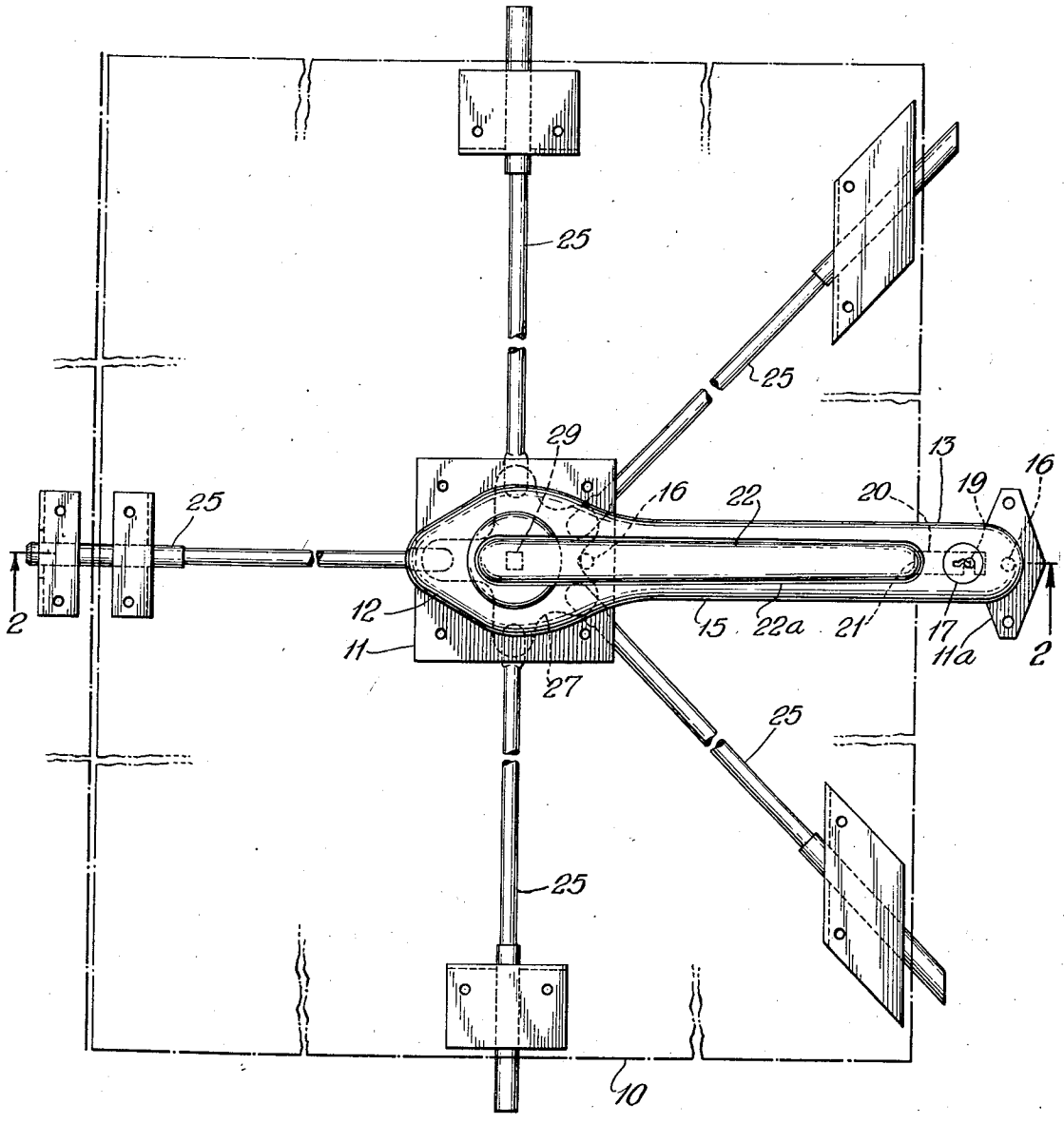
May 29, 1945. S. F. ROLPH 2,377,301

DOOR LOCK

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Fig. 1.



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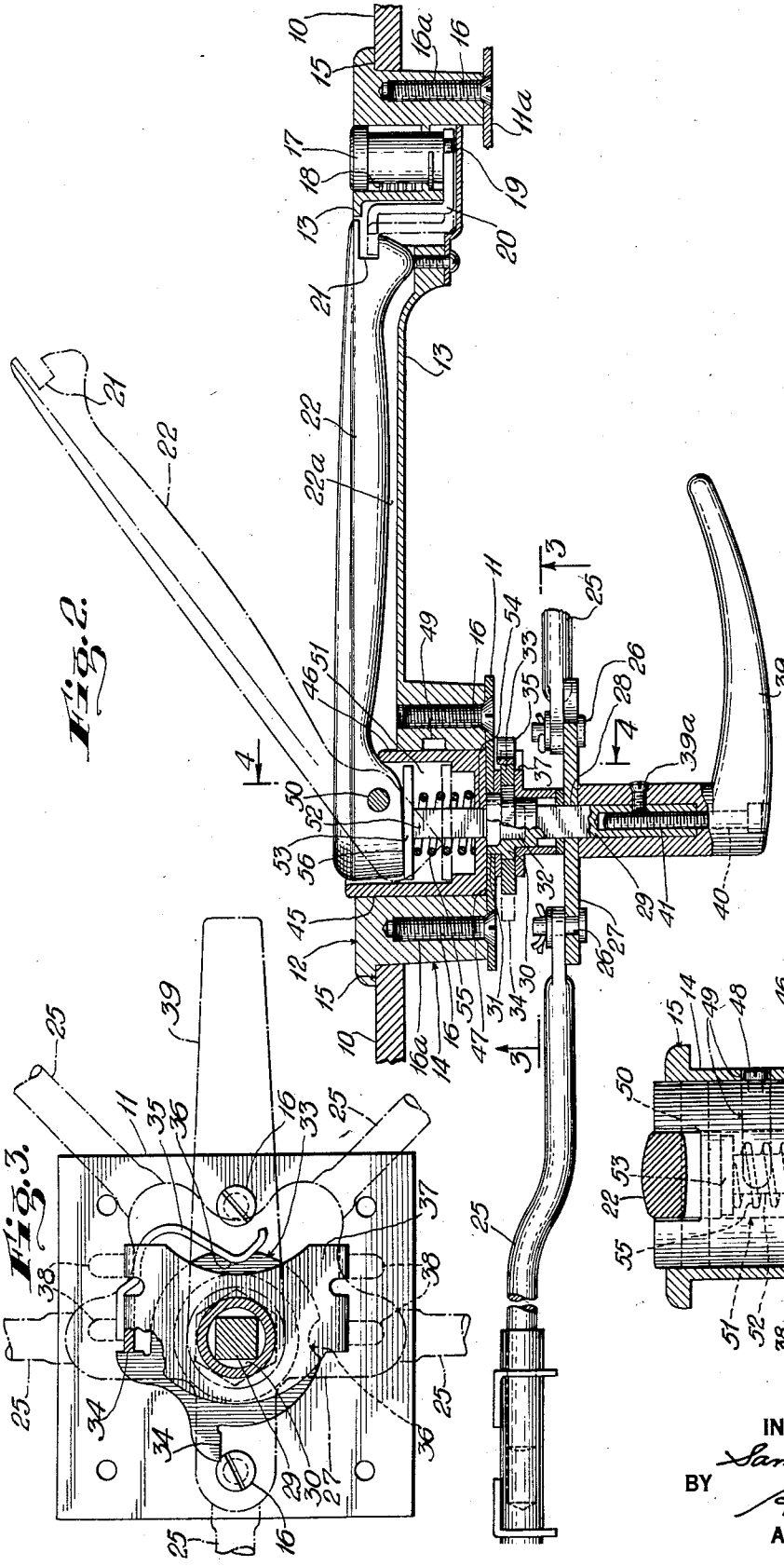


Fig. 2.

Fig. 3.

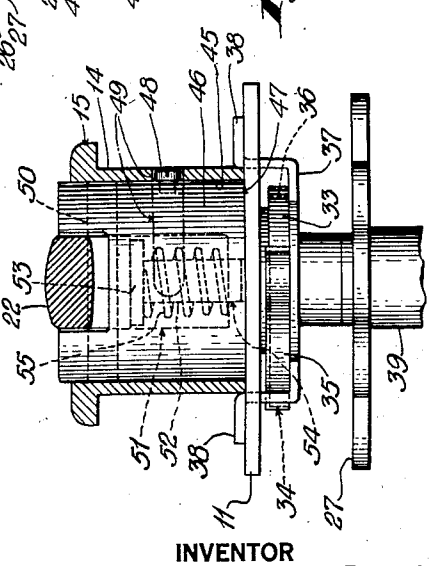


Fig. 4.

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DOOR LOCK

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20 Claims. (Cl. 70—208)

This invention relates to a door lock especially adapted for use on airplanes although, as those skilled in the art will recognize, it is well adapted for other uses.

More particularly, this invention relates to that class of locks in which an inside handle and an outside handle are adapted to retract a bolt, and preferably also project the bolt, the inside handle being movable independently of the outside handle so that the outside handle may remain locked and yet not interfere with the operation of the inside handle.

It is a feature of my invention that the outside handle is adapted for swift assembly and disassembly relatively to the door on which it is carried. A further feature of my invention resides in the mounting of the handle and its operating means as a simple and single unit on a door lock whereby to eliminate the need for the usual mounting of a series of individual parts.

Thus, through the use of my invention it is possible for the manufacturer of an airplane to apply his locking mechanism to the door in an exceedingly simple and effective manner and without the necessity of mounting on the door a series of small parts individually applied to the door.

I have thus described generally the more important features of my invention in order that the relation of my invention to the prior art may be better understood. Those skilled in the art will readily appreciate from the detailed description that follows, that the basic concept of my invention may be utilized with mechanical means different from those that I shall herein describe, and that my invention should not be limited to the structures set forth in this application.

Referring now to the drawings,

Fig. 1 is a view of a portion of a door taken from the outside thereof showing the locking handle of my invention applied to the door, and illustrating the locking means that are applied on the inside of the door and are actuated by the locking handle.

Fig. 2 is a section taken along lines 2—2 of Fig. 1.

Fig. 3 is a section taken along lines 3—3 of Fig. 2.

Fig. 4 is a section taken along lines 4—4 of Fig. 2.

Referring now more particularly to the drawings, the surface of the door to which my lock is shown applied is in the form of a steel plate designated in Fig. 2 by reference numeral 10. Inside mounting plates for supporting the lock relatively to the plate 10 are designated by reference numerals 11 and 11a. Secured to the surface plate 10 of the door is what may be termed an escutcheon or mounting member for the outside handle. This escutcheon or mounting member is designated by reference numeral 12 and is formed with a grooved horizontally extending portion 13, and a relatively large end bearing portion 14. A continuous flange 15 of the escutcheon or mounting member 12 is secured against the outside surface of the door surface plate 10, and a series of holding screws 16 carried by the plates 11 and 11a are driven into threaded bores 16a of the mounting member 12, so that the escutcheon or mounting member 12 is thus readily secured to the door, all as will be apparent.

At the end of the horizontally extending portion 13 of the mounting member 12 there is mounted a locking key plug 17 adapted for rotation relatively to the mounting member upon the proper positioning of the series of usual key set tumblers 18. The key plug 17 is equipped with a pin 19 that is adapted in the standard manner known in the art to retract and project a sliding locking bolt 20. It is the function of the locking bolt 20 when in its dotted line position, to enter a notch 21 in a handle 22 so as to lock the handle 22 in its full line position of Fig. 2. When the bolt 20 is moved into its full line position the handle 22 is of course released and may move to its dash and dotted line position of Fig. 2, all as will be made more apparent hereinafter.

Carried on the mounting plate 11 of the door are devices adapted for operation to project and retract the five bolts 25 best illustrated in Fig. 1. Each of these bolts, as best illustrated in Fig. 2, is pivoted through a pin 26 to a plate-like device 27 that I term a crank for convenience in describing the apparatus, it being obvious that many types of bolt operating devices may be used as equivalents thereof. This crank 27 has a square opening 28 whereby it may fit on a square spindle 29. The spindle 29 is made integrally with a thimble 30 that is mounted at 31 for rotation on the mounting plate 11. A square opening 32 is formed in the thimble 30 for a purpose to be presently indicated. Secured for rotation with the thimble 30 on the spindle 29 is a control and limiting plate 33 which through its shoulders 34 limits the rotation of the spindle 29. A spring 35 cooperates with dwells 36 on the control and limiting plate 33 for yieldingly maintaining the said plate 33 and the spindle 29 in either one of

two positions corresponding to the dwells 36 and determined by shoulders 34.

A retaining member 37 that is best shown in Figs. 3 and 4 is adapted to hold the control and limiting plate 33 and the several parts described, in their operating position. For the particular purpose the retaining member 37 is formed with tabs 38 that enter openings in the bearing plate 11 so that it may be secured to the plate 11, all as is quite apparent from the drawings. Spacers and washers such as those shown in the drawings may be used to hold the several parts in their relative positions. It may be well to indicate that the assembly of the parts used to rotate the crank plate 27 is merely illustrative of a particular group of parts preferably utilized by me.

An inside handle 39 is secured as through a screw 39a for rotation with the spindle 29. A further screw 40 that is in threaded engagement with a threaded bore 41 of the spindle 29 serves to hold the handle 39 against endwise removal from the spindle. It is obvious of course that rotation of the handle 39 will rotate the spindle 29 to project or retract the several bolts 25 through crank plate 27 and that this will lock the door or release the door for opening.

I shall now describe the manner in which the outside handle 22 retracts and projects the several bolts 25, it being now clear that the inside handle operates independently of the outside handle when moving the bolts 25.

The bearing portion 14 of the handle mounting member 12 is formed preferably with a circular opening 45. A handle bearing member that I prefer shall take the form of a cylinder 46, is adapted for insertion into the opening 45 and with its end surface 47 preferably against the mounting plate 11. Once the cylinder 46, which functionally is really a bearing for the rotation of the handle 22, is inserted in the opening 45, a retaining screw 48 is threaded into the mounting member 46 through a slot 49 of the bearing portion 14 of the handle mounting member 12. It is obvious of course that the screw 48 will thereafter hold the cylinder 46 against movement outwardly of the opening 45, and that the said screw 48 may also limit the rotation of the cylinder 46 and the handle 22 mounted thereon.

The handle 22 is mounted on a pivot shaft 50 relatively to the cylinder bearing 46 as is probably best illustrated in Figs. 2 and 4. The ends of the pivot shaft 50 are of course maintained covered when the cylinder 46 is within the bearing opening 45 of the handle mounting member 12 as best seen from Fig. 4. The handle 22 is thus adapted for pivotal movement from its full line position of Fig. 2 to its dash and dotted line position of Fig. 2 whenever it is released by the bolt 20.

The cylinder 46 is preferably formed with an opening 51 within which is adapted to slide a square spindle 52. This square spindle 52 is guided at its upper end relatively to the opening 51 by a plate 53, and is guided at its lower end by an opening 54 in the bottom of the cylinder 46. A spring 55 maintains the plate 53 in the extreme upper position illustrated in Figs. 2 and 4, in which position it bears against the surface 56 of the handle 22. Because of this relationship of the parts the spring 55 not only serves to maintain the square spindle 52 in its upper full line position of Fig. 2 and preferably entirely within the cylinder 46, but also yieldingly maintains the handle 22 entirely within the groove 22a of the handle mounting member 12. In this position of the parts the handle 22 is of course substantially flush with the surface of plate 10 of the door and the flange 15 of the escutcheon or handle mounting member 12. In an assembly of this type it is desirable that the handle 22 lie in the groove 22a so that no tool may be inserted to pry the handle out of the groove 22a.

When the handle 22 is moved to its dash and dotted line position of Fig. 2, the square spindle 52 will move downwardly from its full line position to bring the square spindle 52 into the square opening 32 in the thimble 30. Thereafter, rotary movement of the handle 22 will effect the rotation of the cylinder 46 in the bearing opening 45 to rotate the square spindle 52, the thimble 30, and the spindle 29. This rotation of the parts will of course rotate the crank plate 27 to retract or project the several bolts 25. Shoulders 34 of the limiting and control plate 33 will of course limit the rotation of the handle 22, and the spring 35 will yieldingly maintain the handle and the several parts in one of two positions corresponding to the dwells 36.

It will now be apparent that anyone on the inside of the door may retract or project the bolts independently of the condition of the outside handle. It will also be apparent that the outside handle 22 may be used to project or retract the bolts 25 when it is desired. It will also be obvious that the assembly of my locking mechanism is extremely simple, since once the escutcheon or handle mounting member 12 is applied to the door, the mere insertion of the cylinder bearing 46 of the handle 22 into the opening 45 will immediately effect an operating assembly of the parts of my invention.

I now claim:

1. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a cylindrical bearing opening and a longitudinally extending depression, an outside handle assembly comprising a cylindrical member mounted for rotation in said bearing opening, a handle pivoted on said cylindrical member and normally spring pressed relatively thereto into said longitudinally extending depression, means for actuating said device mounted in said cylindrical member and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said cylindrical member moves said device actuating means into operative engagement with said device.

2. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member rotatably mounted in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted on said bearing member and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating means into operative engagement with said device.

3. In a lock of the class described, a bolt actuating device, an inside handle for actuating

said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member insertible into said bearing opening from the outside and for rotation in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted on said bearing member and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating means into operative engagement with said device.

4. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member insertible into said bearing opening from the outside for rotation therein, means on said bearing member abutting a surface of said bearing opening for retaining said bearing member in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted on said bearing member and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating means into operative engagement with said device.

5. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member rotatably mounted in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted for sliding movement on said bearing member in its axis of rotation and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating means in said axis and into operative engagement with said device.

6. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member rotatably mounted in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, a square pin for engaging said device mounted for rotation with said bearing member and for sliding movement on said bearing member in its axis of rotation and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said pin into operative engagement with said device.

7. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member rotatably mounted in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted for rotation therewith but for movement relatively thereto, means whereby said device actuating means are normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating maens into operative engagement with said device.

8. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle secured in fixed relation to said supporting means, said mounting member having a bearing opening for an outside handle assembly, an outside handle assembly comprising a bearing member rotatably mounted in said bearing opening, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted for sliding movement on said bearing member in its axis of rotation but maintained for rotation therewith, means whereby said means for actuating said device are normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating means into operative engagement with said device.

9. In a lock of the class described, a bolt, a bearing member adapted for rotation on an axis passing centrally therethrough, a handle pivoted on said bearing member, spring means pressing said handle normally into a position at right angles to the axis of rotation of said bearing member, a bolt actuating member slidably mounted on said bearing member in the axis of its rotation, and means whereby when said handle moves on its pivot out of its normal position it moves said bolt actuating member.

10. In a lock of the class described, a bolt, a bearing member adapted for rotation on an axis passing centrally therethrough, a handle pivoted on said bearing member, spring means pressing said handle normally into a position at right angles to the axis of rotation of said bearing member, a bolt actuating member slidably mounted on said bearing member in a direction parallel to the axis of its rotation, and means whereby when said handle moves on its pivot out of its normal position it moves said bolt actuating member.

11. In a lock of the class described, a bearing member adapted for rotation on an axis passing centrally therethrough, a handle pivoted on said bearing member, spring means pressing said handle normally into a position at right angles to the axis of rotation of said bearing member, a lock actuating member movably mounted on said bearing member and movable therewith when said bearing member is rotated whereby to actuate the lock, said actuating member lying out of an operating position when said handle is in said normal position, and means whereby when said handle moves on its pivot out of its normal position

it moves said actuating member into its operating position.

12. In a lock of the class described, a bearing member adapted for rotation on an axis passing centrally therethrough, a handle pivoted on said bearing member, spring means pressing said handle normally into a position at right angles to the axis of rotation of said bearing member, a lock actuating member movably mounted on said bearing member and movable therewith when said bearing member is rotated whereby to actuate the lock, means movably maintaining said actuating member in a position on said bearing member in which it rotates freely of the means actuated thereby when said bearing member is rotated, and means whereby when said handle moves on its pivot out of its normal position it moves said actuating member into its operation position.

13. In a lock of the class described, a cylindrical bearing member adapted for rotation in its cylindrical axis, a handle pivoted on said bearing member and adapted to rotate said bearing member, a lock actuating member slidably mounted within said cylindrical bearing member and having a portion adapted to extend outwardly of said cylindrical bearing member, spring means pressing said handle and said lock actuating member into predetermined normal positions relatively to said cylindrical bearing member, and means whereby when said handle moves on its pivot against the pressure of said spring means it moves said lock actuating member out of its normal position.

14. In a lock of the class described, a cylindrical bearing member adapted for rotation in its cylindrical axis, a handle pivoted on said bearing member and adapted to rotate said bearing member, a lock actuating member slidably mounted within said cylindrical bearing member in the axis of its rotation and having a portion adapted to extend outwardly of said cylindrical bearing member, spring means pressing said handle and said lock actuating member into predetermined normal positions relatively to said cylindrical bearing member in which said lock actuating member is substantially within said cylindrical bearing, and means whereby when said handle moves on its pivot against the pressure of said spring means it moves said lock actuating member to extend a portion thereof out of said cylindrical bearing member.

15. In a lock of the class described, a bolt actuating device, an inside handle for rotating said device, supporting means for said inside handle and device, a mounting member for an outside handle, a bearing member rotatably mounted on said mounting member, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for rotating said device mounted for rotation relatively to said mounting member, means whereby said device rotating means are normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said device rotating means into engagement with said device.

16. In a lock of the class described, a bolt actuating device, an inside handle for rotating said device, supporting means for said inside handle and device, a mounting member for an outside handle, a bearing member rotatably mounted on said mounting member, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for rotating said device mounted for rotation relatively to said mounting member, means whereby said bearing member rotates said device rotating means, means whereby said device rotating means are normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said device rotating means into engagement with said device.

17. In a lock of the class described, a bolt actuating device, an inside handle for rotating said device, supporting means for said inside handle and device, a mounting member for an outside handle, a bearing member rotatably mounted on said mounting member, a handle movably mounted on said bearing member and adapted to rotate said bearing member, means for rotating said device mounted for rotation relatively to said mounting member, means whereby said device rotating means are normally maintained out of operative engagement with said device, and means whereby the movement of the handle on said bearing member moves said device rotating means into engagement with said device.

18. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle, an outside handle assembly comprising a bearing member rotatably mounted on said mounting member, a handle pivoted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted for movement on said mounting member and normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the handle on said bearing member moves said actuating means into operative engagement with said device.

19. In a lock of the class described, a bolt actuating device, an inside handle for rotating said device, supporting means for said inside handle and device, a mounting member for an outside handle, an outside handle assembly comprising a bearing member rotatably mounted on said mounting member, a handle pivoted on said bearing member and adapted to rotate said bearing member, a pin for operatively engaging said device mounted for rotation with said bearing member and for movement on said bearing member, means whereby said pin is normally maintained out of operative engagement with said device, and means whereby the pivotal movement of the outside handle on said bearing member moves said pin to operative engagement with said device.

20. In a lock of the class described, a bolt actuating device, an inside handle for actuating said device, means supporting said handle and device for movement, a mounting member for an outside handle, an outside handle assembly comprising a bearing member rotatably mounted on said mounting member, a handle movably mounted on said bearing member and adapted to rotate said bearing member, means for actuating said device mounted for movement on said mounting member and normally maintained out of operative engagement with said device, and means whereby the movement of the handle on said bearing member moves said actuating means into operative engagement with said device.

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