April 28, 1925.

1,535,210

H. W. DYER

EXIT DOOR LOCK

Filed Sept. 3, 1921

2 Sheets-Sheet 1

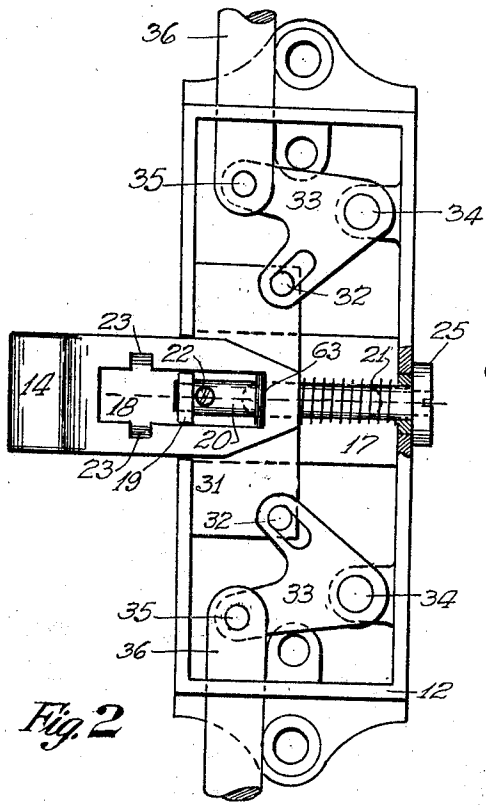


Fig. 2

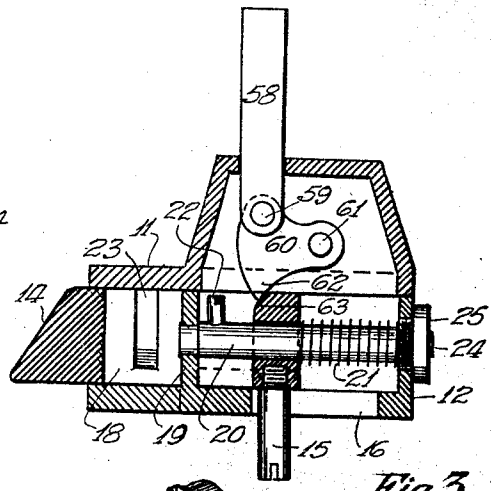


Fig. 3

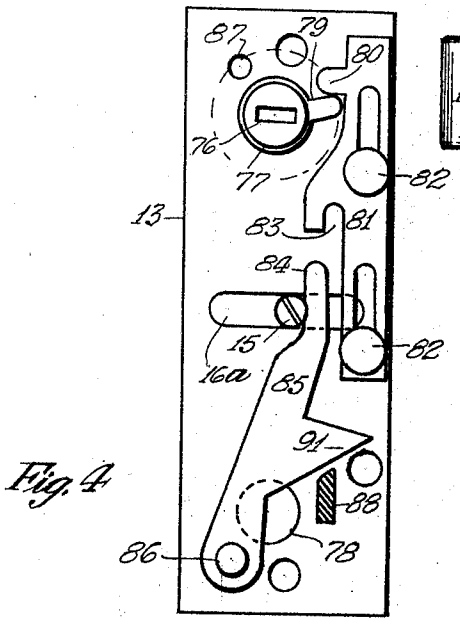


Fig. 4

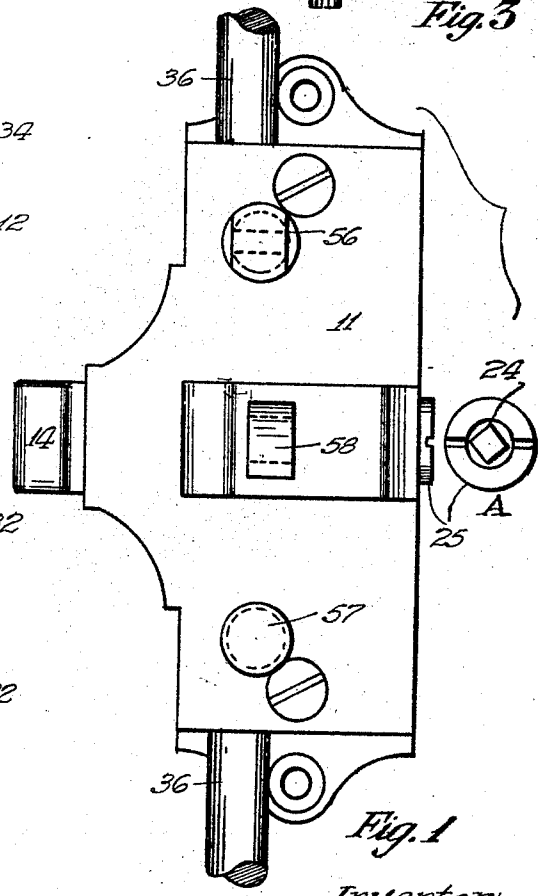


Fig. 1

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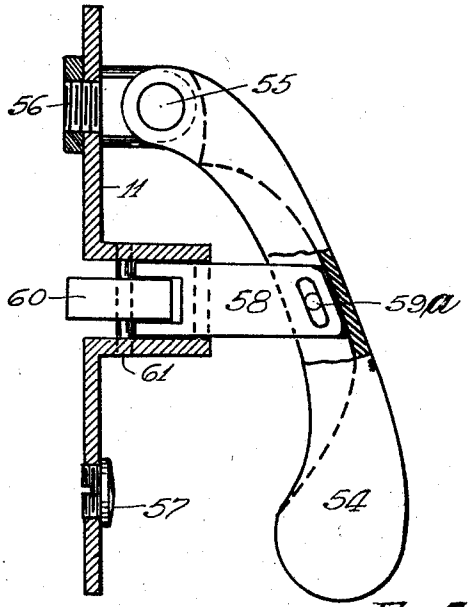


Fig. 5

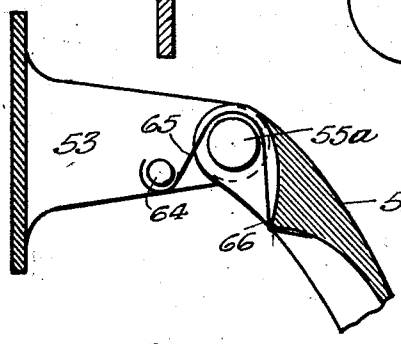


Fig. 6

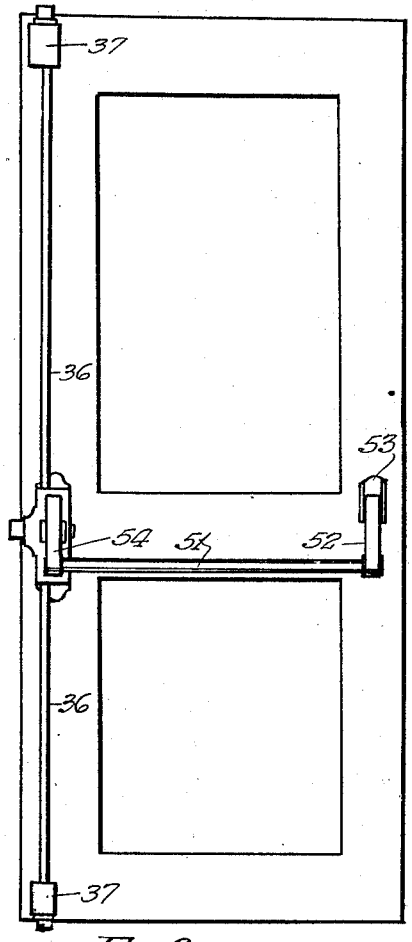


Fig. 8

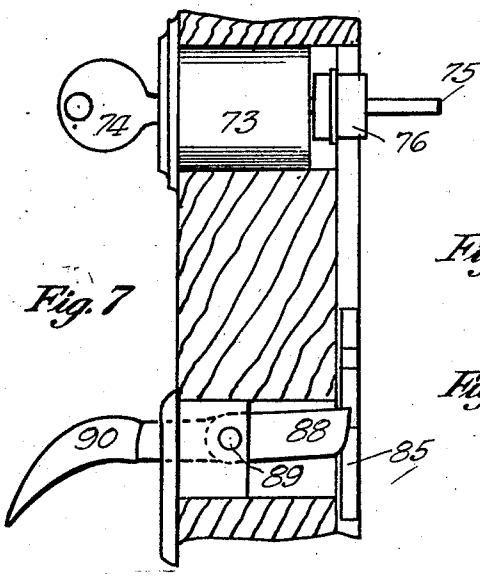


Fig. 7

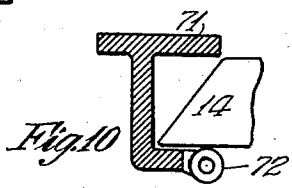


Fig. 10

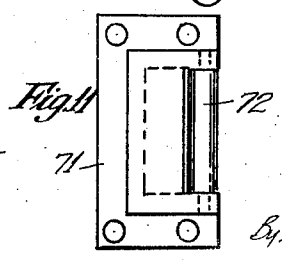


Fig. 11

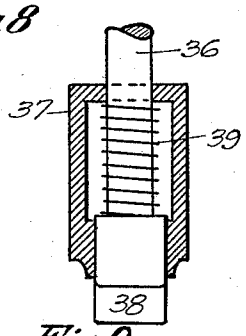


Fig. 9

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Patented Apr. 28, 1925.

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UNITED STATES PATENT OFFICE.

HARRY W. DYER, OF EAST ORANGE, NEW JERSEY.

EXIT DOOR LOCK.

Application filed September 3, 1921. Serial No. 498,315.

To all whom it may concern:

Be it known that I, HARRY W. DYER, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Exit Door Locks, of which the following is a specification.

This invention relates to exit door locks for the exit doors of public buildings and has for an object to provide a lock of this kind which will automatically release from the interior when pressure is applied to a horizontal bar or rail passing along the middle of the door, so that in case of emergency the door will be automatically unlocked by the pressure of a crowd of people against the inside of the door. This is sometimes referred to as a panic door lock, for the reason that it is intended mainly to insure that exit doors will open in case of a panic arising from a fire or similar causes in public buildings. Further objects of this invention are included in the detail arrangement of the parts and mechanisms as described in the following specification and shown in the accompanying drawings in which Fig. 1 shows the lock mechanism with the cover in place, detail A showing the bolt-releasing shaft, Fig. 2 shows the lock mechanism with the cover removed, Fig. 3 is an elevation partly in section on the centre line of the lock bolt, Fig. 4 shows the back plate of the lock and certain elements of the lock mechanism, Figs. 5 and 6 show the application of the operating arm to the lock mechanism, Fig. 7 is a cross-section of a door showing a cylinder lock and latch handle as may be arranged for operating this invention, Fig. 8 is a door showing one method of applying the present invention, Fig. 9 is a detail of a bolt for the top and bottom of the door and Figs. 10 and 11 are details of the catch which the bolt of the lock engages.

This invention consists of a mechanism applied usually on the interior of a door with a spring controlled sliding bolt which automatically latches the door when it is closed. This bolt may be arranged to include a motion plate and crank arrangement which operates vertical rods for controlling the bolts at the top and bottom of the door. These bolts are operated by a horizontal bar or plate passing across the interior of the door and supported by two arms. One of these arms is pivoted to the lock mechanism and operates a plunger which in turn rotates a dog engaging the bolt of the mechanism and thereby withdrawing the bolt from its catch and releasing the bolts at the top and bottom of the door by the same operation. The plunger referred to is operated by pressure applied to the horizontal bar so that a movement of this bar toward the door will release the lock in the manner just described.

This locking mechanism is operated from the exterior of the door by the ordinary latch handle which engages devices on the lock that withdraw the bolt from its catch, without moving the horizontal bar in the interior. The mechanism is also locked by an ordinary cylinder lock so that when in the locked position the bolt cannot be released by the latch on the outside of the door but this does not effect the emergency releasing of the door by the horizontal bar as previously mentioned.

The bolts of the emergency lock may be withdrawn and keyed in the unlocked position when it is desired to have the door swing free of the mechanism, both inside and outside.

In the construction of this lock one type of mechanism is suitable for right and left hand doors and a change may be made from the right to the left hand, simply by changing a few of the pivots which changes are provided for in the mechanism.

Referring to the drawings, 11 represents the cover plate, 12 is the mechanism case, and 13 is the base-plate of the lock mechanism. 14 is the bolt of the mechanism having a stem 15 sliding in the slot 16 in the bar 17 which is an integral part of the mechanism case 12. The bolt 14 is provided with a horizontal rectangular slot 18, Fig. 2 into which a projection 19 of the mechanism case fits. The shaft 20 is supported by the part 19 and by the flange 25. The back of the bolt 14 is provided with a hole through which the shaft 20 passes, the bolt 14 being free to slide back and forth in the mechanism case and is normally biased to the latching position by means of the coil spring 21. The shaft 20 is provided with a stud 22 which engages the recesses 23 on either side of slot 18 as shown in Figs. 2 and 3. When the bolt 14 is pushed back and shaft 20 rotated from the square shank shown at 24, detail A, Fig. 1, in either direction, the

stud 22 engages the recess 23 and holds the bolt in the unlatched position.

Moving integral with the bolt 14 is the motion plate 31 having on both top and bottom sides the stud 32. This stud engages crank 33 pivoted at 34 and pivoted in the opposite leg at 35 to a jaw in the vertical rod 36, this mechanism being duplicated and having similar reference characters for the operation of the locking bolt at the top and at the bottom of the door. The holes in crank 33 are slotted as indicated to secure the free operation of the lineal and rotary connection. The vertical rods 36 operate the bolt 38, Fig. 9, secured in the casing 37 and biased to the locking position by the coil spring 39. In the application of this invention as shown in Fig. 8, the horizontal bar 51 is connected at one end to the arm 52 supported by the bracket 53 and at the other end to the arm 54 pivoted at 55 to the stud 56 secured to the cover 11. Below the arm 54 is located the plunger 58 secured to this arm by the pivot 59^a working in the slot as shown in Fig. 5. The lower end of plunger 58 terminates in a jaw pivoted at 59 to the dog 60 which is pivoted to the cover 11 at 61, Figs. 3 and 5. The up and down movement of the plunger 58 rotates dog 60 on pivot 61. This dog, it will be noted, has a curved extension at 62 falling into the inner end of slot 18 in bolt 14 and engaging the curved end thereof at 63 with the result that a downward pressure on the plunger 58 moves the bolt 14 inward and when this pressure is released spring 21 moves the bolt outward and raises the plunger 58. The force which depresses the plunger 58 may be applied to any point of the horizontal bar 51 and a flat curved plate may be substituted for this bar where desired, connecting to the arms 52 and 54 as shown. In the bracket 53 I provide a flat spring which tends to hold the plunger 58 in the raised position This will be understood by referring to Fig. 6 in which the flat spring 65 at one end engages a pin 64 and turns around the pivot 55^a engaging the underside of the arm 52 at 66 as shown.

The catch for this lock may be of the ordinary type, although in the present invention I prefer to use the type shown in Figs. 10 and 11 in which 71 is the fixed catch member provided with a roller 72 as shown which engages the bolt 14. This enables a hardened steel roller to be used for this part and distributes the wear over a greater surface.

This mechanism is arranged to be operated by the ordinary door latch from the outside and is also provided with a cylinder lock whereby it may be locked on the outside but cannot be locked on the inside. The locking mechanism is provided on the underside of the mechanism case 12 as shown in Fig. 4 which shows the working parts turned around with relation to Fig. 2. A rotary lock operating member 77 is rotatably secured to the base-plate and provided with a slot 76 into which the flat operating finger 75 of the cylinder lock 73 is placed as shown in Fig. 7. This lock is operated by the key 74. The lock releasing member has an arm 79 which, when turned into the position shown in Fig. 4, engages the nose 80 of the locking piece 81 which slides vertically on the studs 82 by means of the slots shown. As indicated in Fig. 4, the mechanism is in the unlocked position. When, however, the locking member 77 is turned around by means of key 74 so that the arm 79 engages the upper side of extension 80, locking member 81 is forced downward, the lower end of which engages extension 91 of rocking lever 85 and brings the extension 84 of this lever under the hook 83 so that the rocking lever 85 becomes securely locked. When the mechanism is unlocked as shown, rocking lever 85 is free to move on pivot 86 and depressing the thumb latch 90 pivoted at 89, raises the extension 88, Fig. 7, to engage the extended incline 91 of rocking lever 85, thereby forcing this lever to the left and with the pin 15 working in slot 16^a moves the bolt 14 back from the locking position. When in the locked position, it will be noted that rocking lever 85 is locked against movement to the left so that the latch handle 90 cannot be operated to release the lock. However, pin 15 is free to move in slot 16^a so that plunger 58 releases the bolts whether the mechanism is locked from the outside of the door or not. An important feature of the present invention is the fact that the same mechanism may be used for right or left hand doors. In order to change the mechanism shown to the opposite side of the door it is only necessary to turn the door lock end for end, remove stud 56 which is secured by a screw and nut and place in the hole occupied by the plug 57, while this plug is transferred to the hole occupied by stud 56; also turn the plunger 58 on its pivot so that the slot for the stud 59 will correspond with the position of the lever arm 54. The cylinder lock may also be changed to the opposite end of the mechanism by transferring the locking member 77 to the hole 78 and pivoting 85 in the hole 87, and the locking plate 81 should be reversed for this condition.

The lock disclosed in this invention obtains results in the simplest possible manner by the fewest number of moving parts and provides a rugged, substantial and direct acting construction. It provides a three bolt lock which can be operated from the outside as well as the inside of the door and may be applied with a bolt in the centre and one at either the top or the bottom or

the centre bolt may be entirely cut off, retaining the rest of the mechanism and operating the locking bolts at the top and bottom of the door only and these effects may be obtained for right or left hand operation with the minor changes aforementioned.

Having thus described my invention, I claim:

1. In a door lock of the class described, the combination of a locking mechanism having a sliding bolt with a hollow section, a shaft upon which said bolt slides longitudinally, passing through said hollow section and means on said shaft arranged to be positioned by turning said shaft to engage the sides of said hollow section whereby the movement of said sliding bolt is controlled.

2. In a door lock of the class described, the combination of a locking mechanism having a bolt operating horizontally and bolts at the top and bottom of said door, a pair of vertical rods operated by said mechanism, said rods operating the bolts at the top and bottom of said door, a plunger for operating said mechanism projecting horizontally from said mechanism and a horizontal bar on said door engaging said plunger to release said bolts by pressure against said bar.

3. In a door lock of the class described, the combination of a locking mechanism having a bolt operating horizontally and bolts at top and bottom of said door, a pair of vertical rods operated by said mechanism, said rods operating the bolts at the top and bottom of said door, a horizontal bar pivoted to said mechanism and extending across the middle of said door for releasing said bolts from one side, a plurality of positions for said pivots whereby said mechanism may be changed for right or left hand doors and a latch for releasing said bolts from the other side.

4. In a door lock of the class described, the combination of a locking mechanism having a bolt operating horizontally and bolts at top and bottom of said door, a pair of vertical rods operated by said machanism, said rods operating the bolts at the top and bottom of said door, a horizontal bar pivoted to said mechanism and extending across the middle of said door for releasing said bolts from one side, a plurality of positions for said pivots whereby said mechanism may be changed for right or left hand doors and a latch for releasing said bolts from the other side.

5. In a door lock of the class described, the combination of a locking mechanism having a member operating horizontally, a plate moving integrally with said member, a pair of studs on said plate, a pair of bell cranks pivoted to said mechanism and each connected with one of said studs, a vertical rod connected with each crank, a locking bolt operated by each rod, a plunger for moving said member and a horizontal bar on said door for operating said plunger.

6. In a door lock of the class described, the combination of a locking mechanism having a bolt operating horizontally, a shaft upon which said bolt slides, a stud on said shaft and means including said stud whereby said shaft may be rotated to hold said bolt in the unlocked position.

7. In a door lock of the class described, the combination of a locking mechanism, having a bolt operating horizontally, a shaft upon which said bolt slides, a stud on said shaft, a groove on said bolt and means whereby said shaft may be turned to engage said stud with said groove.

8. In a door lock of the class described, the combination of a locking mechanism having a sliding bolt, a longitudinal groove in said bolt, a shaft upon which said bolt slides, a spring on said shaft holding said bolt in the engaging position, a dog pivoted to said mechanism and engaging said groove, a plunger extending through said mechanism and connected with said dog and a horizontal bar for operating said plunger by pressure against said bar.

9. In a door lock of the class described, the combination of a locking mechanism having a sliding bolt, a shaft upon which said bolt slides, a spring on said shaft holding said bolt in the engaging position, a dog pivoted to said mechanism and engaging said bolt, a vertical plunger pivoted to said dog and means for releasing said bolt by pressure on said plunger.

10. In a door lock of the class described, the combination of a locking mechanism having a sliding bolt, a dog pivoted to said mechanism and engaging said bolt, a vertical plunger on the centre line of said mechanism connected with said dog and a horizontal arm capable of being pivoted to said mechanism on either side of the centre line for operating said plunger.

11. In a door lock of the class described, the combination of a locking mechanism having a hollow sliding bolt, a shaft upon which said bolt slides, a fixed guide for the end of said shaft projecting through said hollow bolt and means for controlling the movement of said sliding bolt by a partial rotation of said shaft.

Signed at New York, in the county of New York and State of New York, this 20th day of July A. D., 1921.

HARRY W. DYER.