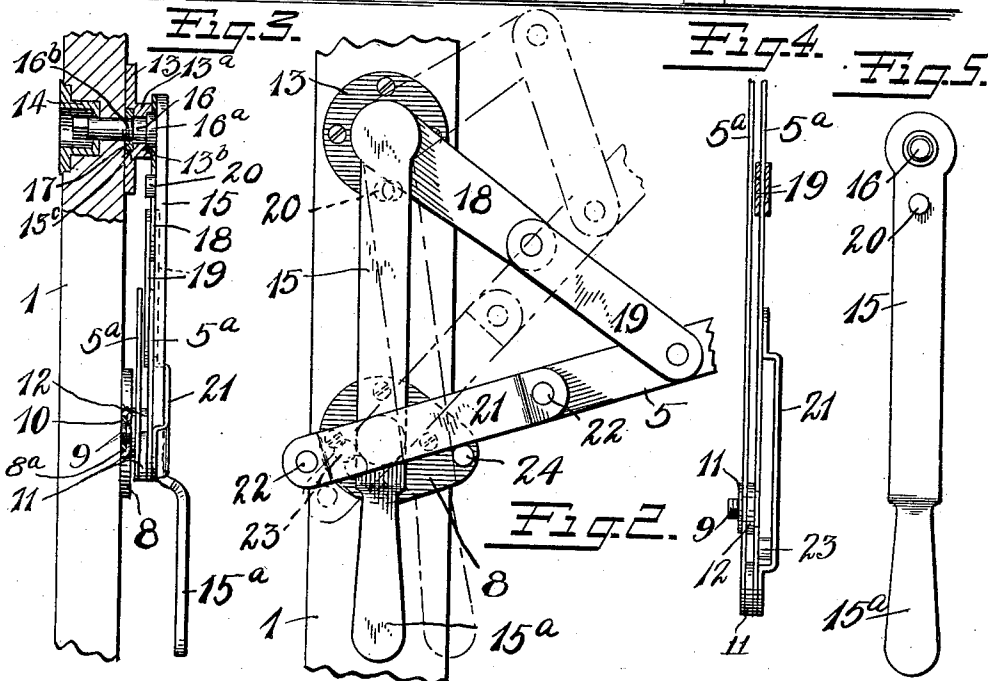
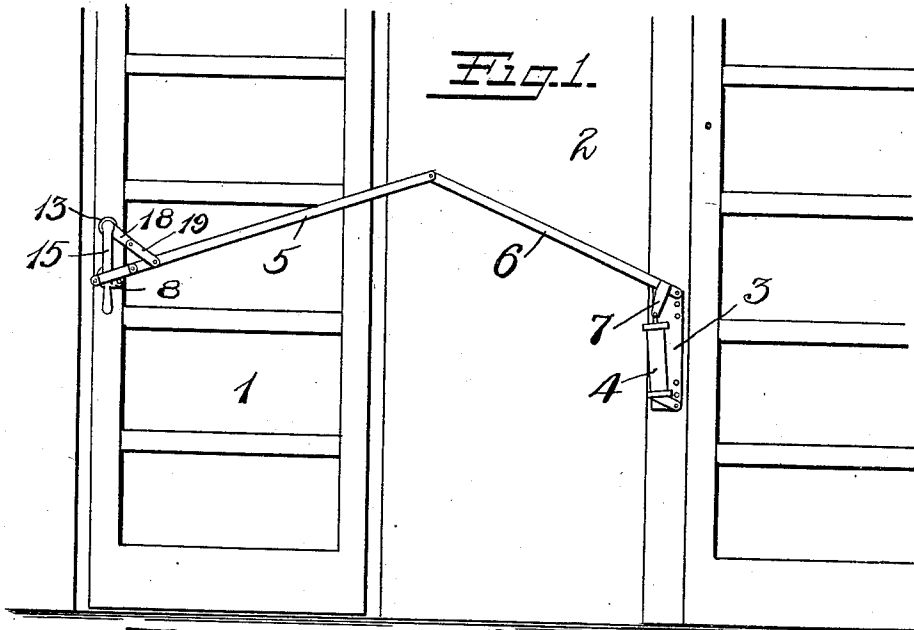


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DOOR CONTROLLING MEANS.
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DOOR-CONTROLLING MEANS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY G. VOIGHT, a citizen of the United States, residing at New Britain, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Door-Controlling Means, of which the following is a full, clear, and exact description.

This invention relates to means for controlling sliding doors, and particularly to means whereby the door is locked against opening movement by the closing movement of the door; and further, to means for unlocking and opening the door, said means being operable from either side of the door. I am illustrating the invention in connection with a specific form of lever connections and closer cylinder for actuating the same, but the invention is not limited by any means to use in connection with such specific form of connections.

I have illustrated a preferable embodiment of my invention in the accompanying drawings, in which—

Figure 1 is a view in elevation of a sliding door provided with a toggle lever and closer cylinder and having connected thereto the door locking and unlocking means forming the present invention. Fig. 2 is a fragmentary view in elevation of the forward or inner edge of the door showing my locking and unlocking device connected thereto. Fig. 3 is an end view of the door, parts being shown in section for detail illustration. Fig. 4 is a top plan view, with parts in section, of the door connecting lever and attached parts, detached from the door. Fig. 5 is a rear elevation of the unlocking and opening handle lever.

Referring to the drawings by numerals, 1 designates a door of the sliding type and 2 the casing of said door forming for instance the side of an elevator well and acting as a stationary abutment independent of the door. Upon this casing and distant from the door is mounted a bracket 3, to the lower end of which is pivoted a closer cylinder 4. Levers 5 and 6 are pivoted at their non-adjacent ends to the door 1 and casing 2 respectively. The lever member 5 is preferably composed of spaced bars 5^a, which overlap and are pivotally connected to the free end of lever member 6, the two lever members together forming a toggle. The lever member 6 adjacent its outer or rear end is provided with a transverse arm

7 suitably connected to the piston of the closer cylinder 4.

Upon the forward edge of the door is mounted a lower pivot plate 8, centrally apertured and having a recess 8^a formed in its rear face about said aperture. The bars 5^a adjacent the forward ends are provided with suitable apertures through which a headed pivot stud 9 is adapted to fit, its shank extending through the aperture in the pivot plate 8 and being threaded at its end to engage with a threaded nut 10 seated in the recess 8^a and bearing against the inner side of the door. The bars 5^a forming the lever member 5 at their forward pivoted ends, are spaced from each other and from the door by washers 11 and 12 seated over the shank of the pivot stud 9. Above and in vertical alinement with the lower pivot plate 8 is a second and upper pivot plate 13, likewise centrally apertured and provided with a central boss 13^a projecting from its outer face and with a recess 13^b in its inner face about the central aperture therein. This upper plate 13 is also provided with an annular recess 13^c formed in the outer end of the boss 13^a and extending about the central aperture of the pivot plate. Upon the outer side of the door and in horizontal alinement with the upper pivot plate 13 is a socket plate 14 having a central aperture alined with the aperture of plate 13. Upon the inner side of the door is an operating lever 15 having a lower offset handle portion 15^a and provided at its upper end with a pivot stud 16 having an annular hub portion 16^a at its inner end and having its shank portion reduced and provided with an intermediate threaded portion 16^b and with a squared outer end. This pivot stud 16 of the operating lever is adapted to be inserted through the central aperture of the upper pivot plate 13 with its annular hub portion 16^a partly seated within the annular recess 13^c of the pivot plate and its intermediate threaded portion 16^b engaging with a threaded washer 17 seated within the recess 13^c of the pivot plate and bearing against the inner face of the door. The shank of the pivot stud 16 extends through the door, which is suitably apertured for that purpose, and extends through and within the socket plate 14.

Pivotally mounted upon the hub portion 16^a of the pivot stud between the boss 13^a and the inner face of the lever end and in-

dependent of said end, is a lever member or link 18, which extends outwardly from the operating lever 15 and has its end overlapped and inclosed between the ends of a second and double link member 19, which is pivoted at its other and rear end to the outermost bar 5^a of the lever member 5, these two links or levers forming together a locking toggle. Projecting from the inner face of the operating lever 15 at a point below its pivoted upper end, is a lock releasing pin 20, adapted to engage with the link member 18 for the purpose hereinafter described.

The operating lever 15 extends downwardly from its upper and pivoted end, and is inclosed between the outermost bar 5^a of the lever member 5 and a guide bracket 21 secured to said bar at its outer or forward end, this bracket being spaced from the bar and guiding the lower end of the lever 15 there-between. This bracket is secured to the outermost bar 5^a by rivet 22; or other equivalent means, such as bolts and nuts, may be used. A buffer stop 23 for the lower guided end of the operating lever, is inserted between the bracket and its bar 5^a at the outer or forward end of the door. The lower pivot plate 8 at its inner or rear end is provided with an abutment stud 24 lying in the path of movement of the operating lever 15.

With the structure of the foregoing parts in mind, the operation of the device is as follows: Assuming that the closer cylinder 4 on the door casing is actuating the toggle levers 5 and 6 to close the door, this movement will swing the forward lever member 5 downwardly on its pivot and will straighten the link members 18 and 19 into longitudinal alinement as the door reaches closed position. As these link members together form a toggle which is straightened out by the closing movement of the door, it is obvious that they form a lock against further closing movement and against door opening movement of the lever member 5, and that the door cannot be opened until the link members are flexed and the toggle lock formed thereby broken. To open the door, the operating lever 15 is moved to the right from the position shown in Fig. 2, this movement being independent of and relative to the links 18—19 and causing the pin 20 to engage the lower edge of the link 18 and to break the toggle. This action takes place while the operating lever is moving from its forward position toward the abutment stud 24 and the toggle is broken by the time the edge of the lever contacts with said stud. A further and continued movement of the operating lever will therefore serve to slide the door open against the power in the closer cylinder, this being rendered possible and practicable by the powerful leverage secured through the transverse arm 7 of lever

member 6. When it is desired to close the door, the operator releases the operating lever 15, which thereupon by gravity drops down against the buffer stop 23. The power in the closer cylinder 4 will now move the lever members 5 and 6 downwardly and close the door, the closing of the door serving to straighten out the links 18 and 19 to form the locking toggle, as hereinbefore described.

In addition to utilizing the handle portion 15^a of the operating lever for opening the door from the inside, or, in the case of elevators, car side of the door, I have provided means whereby this operation can be accomplished from the outside of the door. This means is through the squared ends 16^c of the operating lever pivot stud 16, the squared end projecting through the door and lying within the socket plate 14 secured to the outer side of the door. By engaging the squared outer end of the pivot stud 16 with a suitable tool, the lever 15 may be moved on its pivot to bring its pin 20 against the link member 18 and open the door in the manner hereinbefore described. While I have illustrated the outer end of the pivot stud as squared, the shape may be varied and the outer end may be so shaped that only a special tool will engage with and operate the same. This will prevent the door from being opened from the outside by unauthorized persons. Other variations and preventive measures may be taken against such actuation of the door by persons without authority.

From the foregoing it will be seen that the locking device embodies a lever member carried by the door and movable relative thereto by the opening and closing of the door, and locking means having a limited free movement relative to said lever and positioned thereby upon the closing of the door to lock said lever against door opening movement. This structure and the means for operating the same to release and open the door, form a comparatively simple structure, which has proven very effective and is susceptible of practical commercial use.

While I have described a specific embodiment of my door controlling means, it is obvious that the same is susceptible of variations and adaptations within the spirit of the invention and of the appended claims.

What I claim, therefore, and desire to secure by Letters Patent, is:

1. In a device of the character described, the combination of a door casing, a sliding door, a lever pivoted to said door and connected to said casing and swinging with the opening and closing movement of said door, locking means permanently connecting said door and lever so constructed and arranged that upon the closing of the door said means is positioned to lock said lever against door

opening movement, and means whereby said locking means may be moved from locking position and whereby said door may be opened.

5 2. In a device of the character described, a sliding door, a movable arm carried thereby, a connection for said arm independent of the door, an operating handle carried by the door, locking means permanently
10 connecting said door and arm and controllable by said handle so constructed and arranged that upon closing of the door, said means is positioned to lock said lever against movement and to thereby lock said door.

15 3. In a device of the character described, a sliding door, a movable lever carried thereby, a connection for said lever independent of the door, an operating handle carried by the door, locking means permanently
20 connecting said door and lever so constructed and arranged that upon the closing of the door, said means is positioned to lock said lever against movement and to thereby lock said door, said locking means being
25 controllable by said handle, and closing mechanism for said door operatively connected with said lever to move the latter in a direction to move said door to closed position.

30 4. In a device of the character described, a sliding door, an arm pivotally mounted near one end on said door, a support or connection independent of the door for the other end of said arm, said arm being movable relatively to said door and to said
35 pendent support, an operating handle carried by the door for moving the latter, said handle having a limited independent movement relatively to said door, and locking means permanently connecting said door
40 and arm and controllable by said handle so constructed and arranged that upon closing of the door, said means is positioned to lock said lever against movement and to thereby lock said door.

45 5. In a device of the character described, a sliding door, a toggle lever connected at one end to said door, a cooperating toggle lever for the other end of the first mentioned toggle lever, a support for said second toggle lever, means for moving said toggle
50 levers normally in a direction to transmit a closing movement to the door, locking means permanently connecting said door and first mentioned toggle lever, so constructed and
55 arranged that upon the closing of the door said means is positioned to lock said first mentioned toggle lever against movement and to thereby lock said door, a door operating handle carried by the door and capable
60 of limited independent movement relatively thereto, and means of connection between said handle and said locking means whereby the latter may be inoperatively positioned preparatory to opening the door.

65 6. In a device of the character described,

a sliding door, a lever connected at one end thereto and having a swinging movement relatively thereto, an independent support for the other end of said lever, a door operating handle also carried by the door movable therewith and relatively thereto and to
70 said lever; locking means permanently connecting said door and lever so constructed and arranged that upon closing of the door said means is positioned to lock said lever against movement and to thereby lock said
75 door, said locking means being movable to inoperative position by the relative movement of the handle to the door and lever.

7. In a device of the character described, a sliding door, a stationary abutment, a lever mounted on said door and connected to said abutment and movable relatively to said door by the opening and closing thereof, a
80 locking member permanently connected to the door and to said lever, and constructed and arranged so as to be positioned by the closing of the door to lock said lever against door opening movement, and means operable from either side of the door for moving
85 said member from lever locking position and for opening said door.

8. In a device of the character described, a sliding door, a stationary abutment, a lever mounted on said door and connected to said abutment and movable relatively to said door by the opening and closing thereof, a
90 locking member permanently connected to the door and to said lever having a limited free movement relative to said door and lever and so constructed and arranged as to be positioned by the closing of the door to lock said lever against door opening movement, an operating handle cooperating with
95 said locking member, and means actuable from either side of the door whereby a limited movement of said handle will move said locking member from lever locking position, and whereby a further movement thereof
100 will open said door.

9. In a device of the character described, a sliding door, a stationary abutment, a lever pivotally mounted on said door and connected to said abutment and movable relatively to said door by the opening and closing
105 thereof, a plurality of lever members pivotally connected to said door and said lever and having a limited free movement relative to said lever, means whereby, upon the closing of the door, the said lever members
110 are positioned to lock said lever against door opening movement, and means for moving said lever members from locking position and for opening said door.

10. In a device of the character described, a sliding door, a stationary abutment, a lever mounted on said door and connected to said abutment and movable relative to the door by the opening and closing thereof, a toggle
115 connection between said door and lever,

means whereby, upon the closing of the door, said toggle is straightened to lock said lever against door opening movement, and means for flexing said toggle connection to release
5 said lever and for opening said door.

11. In a device of the character described, a sliding door, a stationary abutment, a lever mounted on said door and connected to said abutment and movable relative to said door
10 by the opening and closing thereof, a toggle connection between said door and lever, means whereby, upon the closing of the door, said toggle is straightened to lock said lever against door opening movement, and
15 means, operable from either side of the door, for flexing said toggle connection to release said lever and for opening said door.

12. In a device of the character described, a sliding door, a stationary abutment, a lever
20 pivotally mounted on said door and connected to said abutment and movable relatively to said door by the opening and closing thereof, a plurality of lever members pivotally connected to said door and to said lever
25 and forming a toggle, means whereby, upon the closing of the door, said toggle is straightened to lock said lever against door opening movement, and an operating han-

dle mounted on the door provided with means for flexing said toggle and for opening said door. 30

13. In a device of the character described, a sliding door, a stationary abutment, a lever pivotally mounted on said door and connected to said abutment and movable relatively
35 to said door by the opening and closing thereof, a plurality of lever members pivotally connected to said door and to said lever and forming a toggle, means whereby, upon the closing of the door, said toggle is
40 straightened to lock said lever against door opening movement, an operating lever having a pivot stud journaled in the door and extending therethrough, a pin carried by said lever positioned to engage a toggle lever member and flex the locking toggle upon
45 a preliminary actuation of said operating lever, and an abutment mounted on the door and positioned to be engaged by a further actuation of said operating lever whereby
50 said door may be opened.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."