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J. A. SCHWEIG

2,624,081

ELEVATOR SHAFT DOOR

Filed March 27, 1947

2 SHEETS—SHEET 1

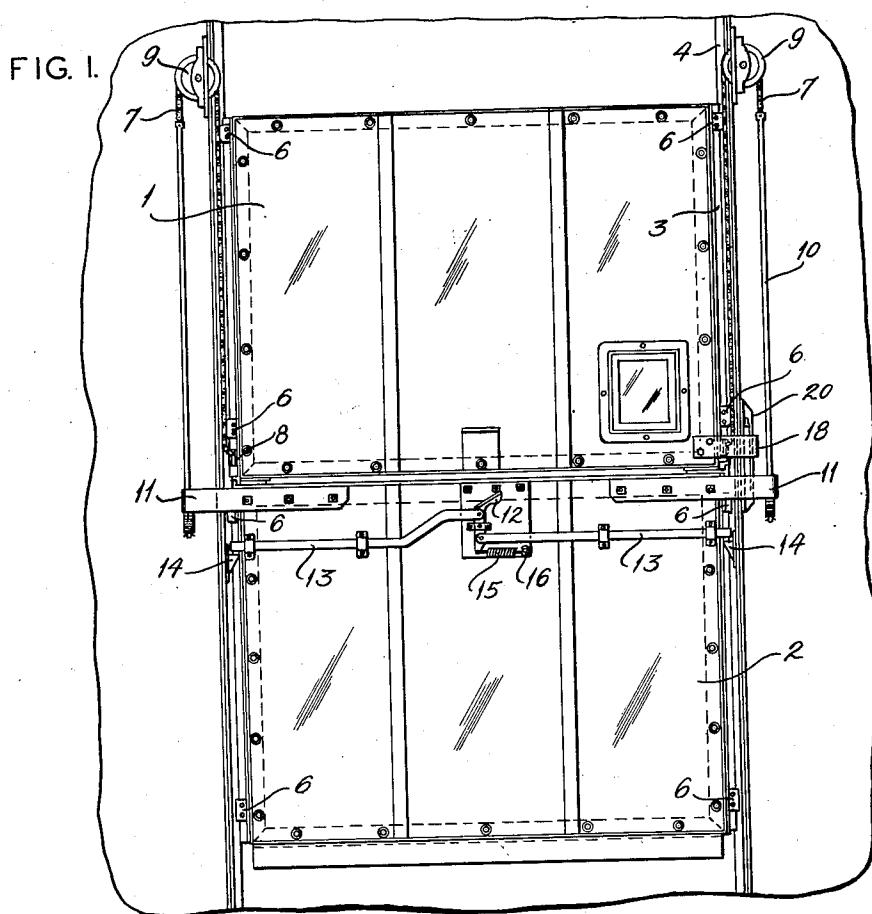
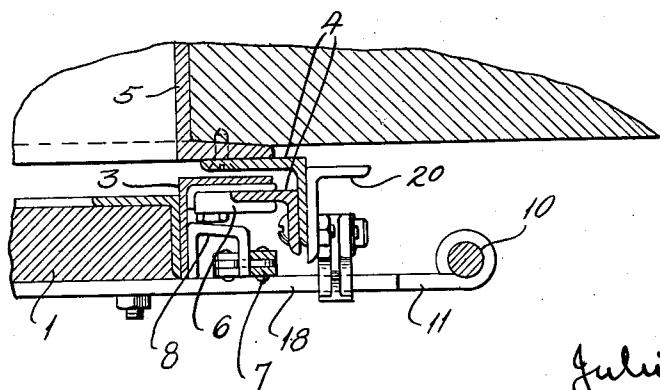


FIG. 4.



INVENTOR.

Julius A. Schweig,
by Lam Man Gravely,

HIS ATTORNEYS.

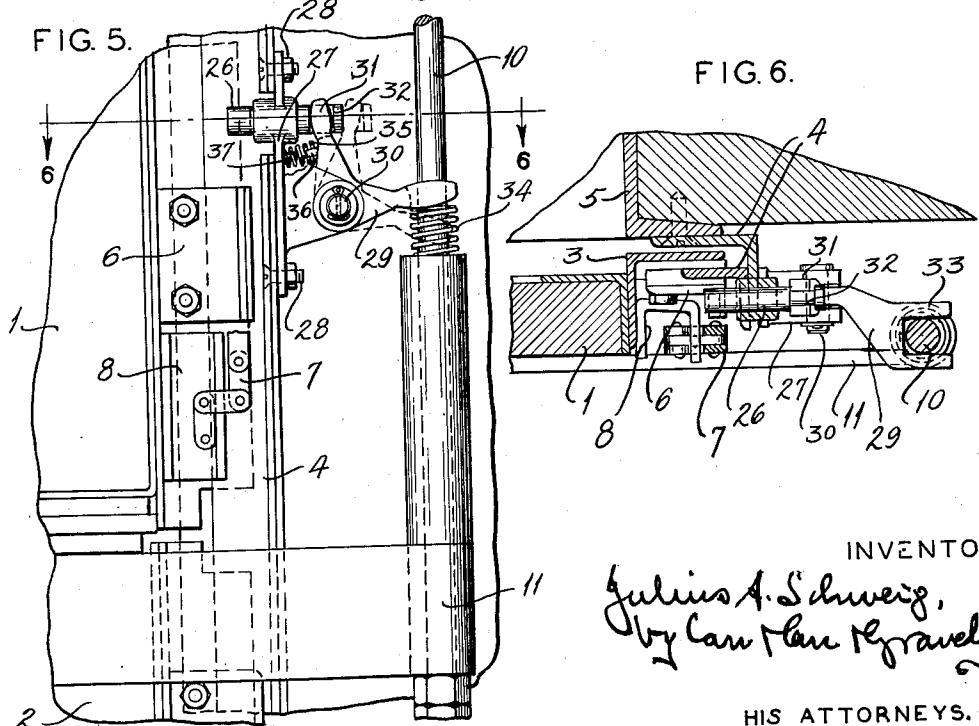
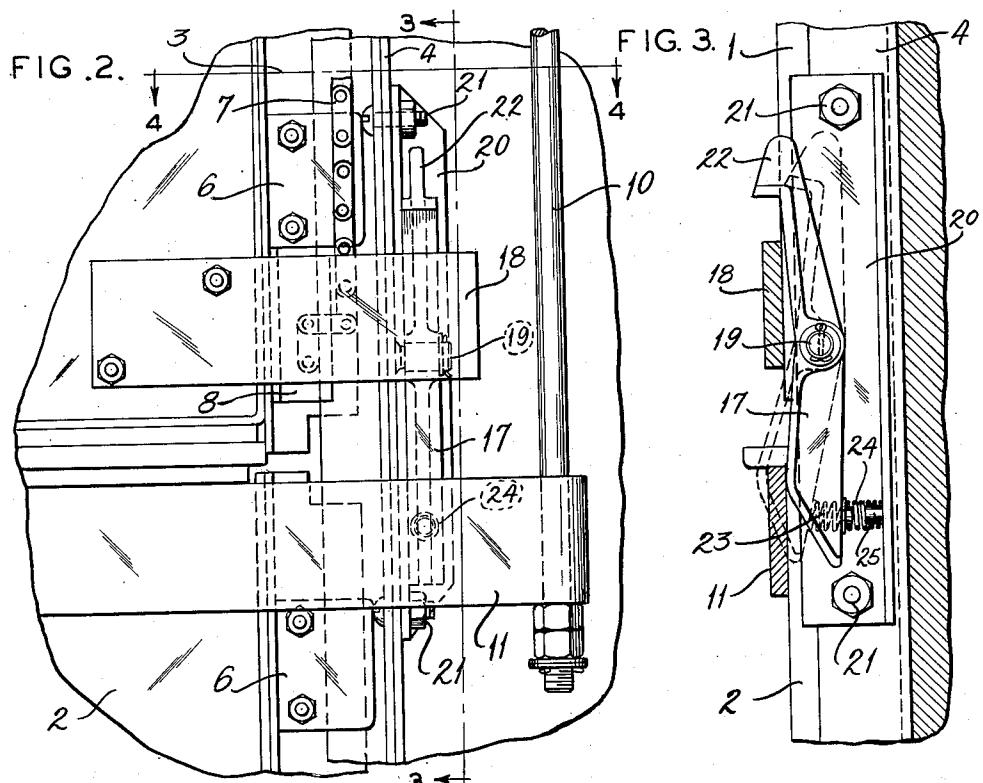
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2 SHEETS—SHEET 2



INVENTOR:

Julius A. Schwerig,
by Sam Flax Photography.

HIS ATTORNEYS.

UNITED STATES PATENT OFFICE

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ELEVATOR SHAFT DOOR

Julius A. Schweig, Clayton, Mo., assignor to Security Fire Door Company, St. Louis, Mo., a corporation of Missouri

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2 Claims. (Cl. 20—19)

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This invention relates to elevator shaft doors of the kind wherein two vertically sliding door sections are connected by counterbalancing chains for simultaneous movement towards and away from each other to close and open the door space, and the lower door section is provided with a latching device which prevents joint opening movement of both door sections, but does not prevent the upper door section from being opened independently of the positively locked lower door section. The present invention has for its principal objects to provide a separate latching device for the upper door section; to provide means controlled by the lower door section for engaging said latching device when the lower door section closes and for releasing said latching means when the lower door section starts to open; and to provide for simplicity and cheapness of construction and compactness of design.

The invention consists in the elevator shaft door construction and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, which form part of this specification, and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a shaft side elevational view of an elevator shaft door construction embodying my invention,

Fig. 2 is an enlarged fragmentary shaft side elevational view in the region of the locking device,

Fig. 3 is a vertical sectional view on the line 3—3 in Fig. 2,

Fig. 4 is a horizontal sectional view on the line 4—4 in Fig. 2,

Fig. 5 is a view similar to Fig. 2, showing a modified form of the invention; and

Fig. 6 is a horizontal sectional view on the line 6—6 in Fig. 5.

In the accompanying drawings, my invention is shown embodied in a vertical sliding, center-parting, counterbalanced door construction of the kind used for closing the door space or opening in an elevator shaft. Said door construction comprises vertically sliding upper and lower door sections 1 and 2, respectively, each provided along each vertical edge with an angle bar side rail 3 having an outstanding flange slidably arranged between an upright double angle bar door guide 4 rigidly secured to the adjacent jamb member 5 of the door frame. A guide shoe 6 is fixed to the outstanding flange of the angle bar side rail 3 and straddles one flange of the double angle bar door guide 4.

The upper and lower door sections 1 and 2 are counterbalanced by means of chains 7 that are connected, as at 8, to the lower corners of the upper door section. The chains 7 extend upwardly around sheaves 9 mounted on the angle bar door guides 4 and thence downwardly in the direction of the lower door section 2 where they are connected to the upper ends of upright chain rods 10 whose lower ends are secured to the outer ends of door arms 11 that project horizontally beyond the side edges of said lower door sections. By this arrangement, each door section acts as a counterbalance for the other door section, whereby the door may be easily opened by pushing down on the lower door section 2 or by pushing up on the upper door section 1.

The door is provided with a latching device comprising an operating lever 12, which is pivotally mounted on the shaft side of the lower door section 2, and oppositely extending horizontal latch bars 13 pivotally connected at their inner ends to the respective upper and lower arms of said operating lever. The latch bars 13 are slidably supported on the lower door section 2 for sliding movement into and out of engagement with suitable catches 14 fixed to the double angle bar door guides 4. A coil spring 15 is attached at one end to one of the arms of the lever 12 and at its other end to a lug 16 on the shaft side of the lower door section 2, the parts being arranged so that the spring tends to project the latch bars into latching position.

From the construction thus far described, it will be seen that the latching device on the lower door section prevents both door sections from opening in unison; but said device does not prevent the upper door section from being opened independently of the locked lower door section by lifting the dead weight of the upper door section. In order to prevent the upper door section from being separately opened when both sections are locked against joint opening movement, the upper door section is provided with a separate latching mechanism that will positively lock the upper door section when the lower door section closes and will unlock the upper door section when the lower door section opens.

The separate automatic latching device for the upper door section 2 comprises an upright latch lever 17 pivotally supported on one or each angle bar door guide 4 for vertical swinging movement towards and away from the projecting portion of the door arm 11 on the adjacent upper corner of the lower door section 1 and the projecting portion of a door plate 18 that is secured flatwise

to the shaft side of said upper door section and extends horizontally beyond the side edge thereof near the lower corner thereof. The upright latch lever 17 is rotatably supported intermediate between its upper and lower ends on a horizontal pivot stud 19 that is fixed to one flange of an upright angle bar 20, which flange is secured by bolts 21 to the outstanding flanges of the double angle bar door guide 4. The upper arm of the latch lever 17 terminates in a detent which is part of the lever. The detent, in this form, is a hook-shaped upper end portion 22 adapted to overhang the door plate 18 on the upper door section, and the lower arm of said lever terminates in a cam surface 23 that inclines downwardly and outwardly away from the opposing face of the door arm 11 of the lower door section. A coil compression spring 24 is sleeved on a horizontal pin 25 fixed to the angle bar 20 with one end seating thereagainst and with the other end seating against the lower arm of the latch lever 17. The spring 24 serves to swing the cam-shaped lower arm of the latch lever towards the door arm 11 of the lower door section and the detent or hooked upper end 22 of said lever clear of the door plate 18 on the upper door section.

When the door is closed, the door arm 11 of the lower door section engages the cam surface 23 on the lower arm of the latch lever 17 and thus swings the fixed detent or hooked upper end 22 of said lever over the door plate 18 on the upper door section, thereby preventing the upper door section from being opened when the lower door section is closed. As shown in the drawings, the hook portion 22 of the latch lever 17 is spaced above the plate 18 on the upper door section in the fully closed position of the lower door section so as to permit opening movement of the upper door section with the lower door section until the lower door section has moved downwardly far enough to release the lower arm of the latch lever and permit the hooked upper end thereof to swing clear of the plate on the upper door section.

By the arrangement described, the upper door section is automatically locked when the lower door section is locked by means 12, 13 and 14. The conventional latching device on the lower door section prevents simultaneous opening movement of the upper and lower door sections. At the same time, the separate latching means for the upper door section prevents said section from being opened independently of the closed lower door section. The latching device for the upper door section is moved to locking position by the closing movement of the lower door section; and the upper door latching device is moved by the spring 24 to unlocking position when the lower door section starts its opening movement.

In the modified form of my invention illustrated in Figs. 5 and 6, the latching mechanism for the upper door section 1 comprises a detent in the form of a separate bolt 26 that is mounted for axial sliding movement in a plate 27 that is secured by means of bolts 28 to the outstanding flange of the double angle bar door guide 4. The detent or bolt 26 is slideable crosswise of the double angle bar door guide 4 and is adapted to move into and out of a detent abutment, which is, in this case, the path of movement of the guide shoe 6 fixed to the angle bar side rail 3 of the upper door section.

The bolt 26 is reciprocated by means of a bell crank lever that is pivotally secured, as at 30, to the plate 27 for vertical swinging movement towards and away from the outstanding flange of

the double angle bar door guide 4. One arm of the bell crank lever 29 extends upwardly and terminates in a bifurcated or forked upper end portion 31 that straddles a transversely grooved portion 32 of the bolt 26. The other arm of the lever 29 terminates in a bifurcated or forked end portion 33 that straddles the vertical chain rod 10. In the closed position of the upper and lower door section, the underside of the chain rod engaging arm of the bolt operating lever 29 is engaged by a coil compression spring 34 which swings said lever in a direction that will slide the bolt 26 across the top of the guide shoe 6 on the upper door section and thus prevent the latter from being opened. The spring 34 is sleeved on the chain rod 10 and seats on the upper end of a sleeve that is also sleeved on said rod and seats on the door arm 11 of the lower door section. A coil compression spring 35 is also interposed between the bolt engaging arm of the lever 29 and the supporting plate 27 therefor and has one end supported on a lug 36 on said arm and the other end supported on a lug 37 on said plate.

When the door of the modified construction is closed, the coil spring 34 on the chain rod 10 of the lower door section 2 urges the bell crank lever 29 in a direction that will slide the bolt 26 over the guide shoe 6 of the upper door section 1, thereby preventing the upper door section from being opened independently of the lower door section. When the lower latch mechanism is released and both door sections opened simultaneously, the spring 34 moves downwardly with the lower door section, thus permitting the spring 35 to rock the lever 29 in a direction which will withdraw the bolt 26 from the path of movement of the guide shoe 6 of the upper door section 1 and thus permit the latter to open. The bolt 26 moves to locking position after the guide shoe 6 of the upper door section moves downwardly below the level of said bolt. In the fully closed position of the door, the guide shoe 6 of the upper door section is spaced below the bolt 26 so as to permit opening movement of said upper door section with the lower door section until the latter has opened far enough to permit the lever 29 to withdraw the bolt 26.

Obviously, the hereinbefore described elevator shaft door construction admits of considerable modification without departing from the invention. Therefore, I do not wish to be limited to the precise arrangements shown and described.

What I claim is:

1. In a door construction comprising counterbalanced upper and lower door sections slideable vertically in opposite directions to open and close in unison and means for manually locking the lower door section in closed position, the combination therewith of a latch plate on said upper door section, an arm on said lower door section, a latch lever, a cam on said lever engaged by said arm upon the vertical sliding movement of said lower door section to closed position, a hooked detent formed at one end of said latch lever and movable therewith from a normal retracted position into a position engaging said latch plate for locking the upper door section in closed position, and spring means acting on said lever in response to the vertical sliding opening movement of the lower door section and arm away from said cam for moving the lever and return said hooked detent to normal retracted position out of the path of movement of said latch plate while the door sections are out of closed position, said hooked detent being actuated by said cam and arm into

locking position substantially simultaneously with the sliding movement of both upper and lower door sections into closed position in unison.

2. In a door construction comprising counterbalanced upper and lower door sections movable vertically in opposite directions to open and close in unison and means for locking said lower door section in closed position, the combination of separate means for locking the upper door section in closed position, said separate locking means comprising an abutment rigid with the upper door section, a horizontally pivoted latch lever, a hooked detent at one end of said lever, a cam surface on said latch lever at the other side of the pivot from said hooked detent, arm means 10 on the lower door section moved, when the lower door section approaches its closed position, to engage said cam surface of said lever and pivot said lever to move said hooked detent into the path of travel of said abutment on the upper door 15 section, and spring means for pivoting said latch 20

lever to a normal position with said hooked detent out of position to engage said abutment and the cam surface on said lever in position to be engaged by said arm means, said hooked detent being actuated by said arm engaging said cam surface into position to project into the path of movement of said abutment substantially simultaneously with movement of the upper and lower door sections into closed position in unison.

JULIUS A. SCHWEIG.

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