

(No Model.)

J. J. McBRIDE.
HATCH DOOR.

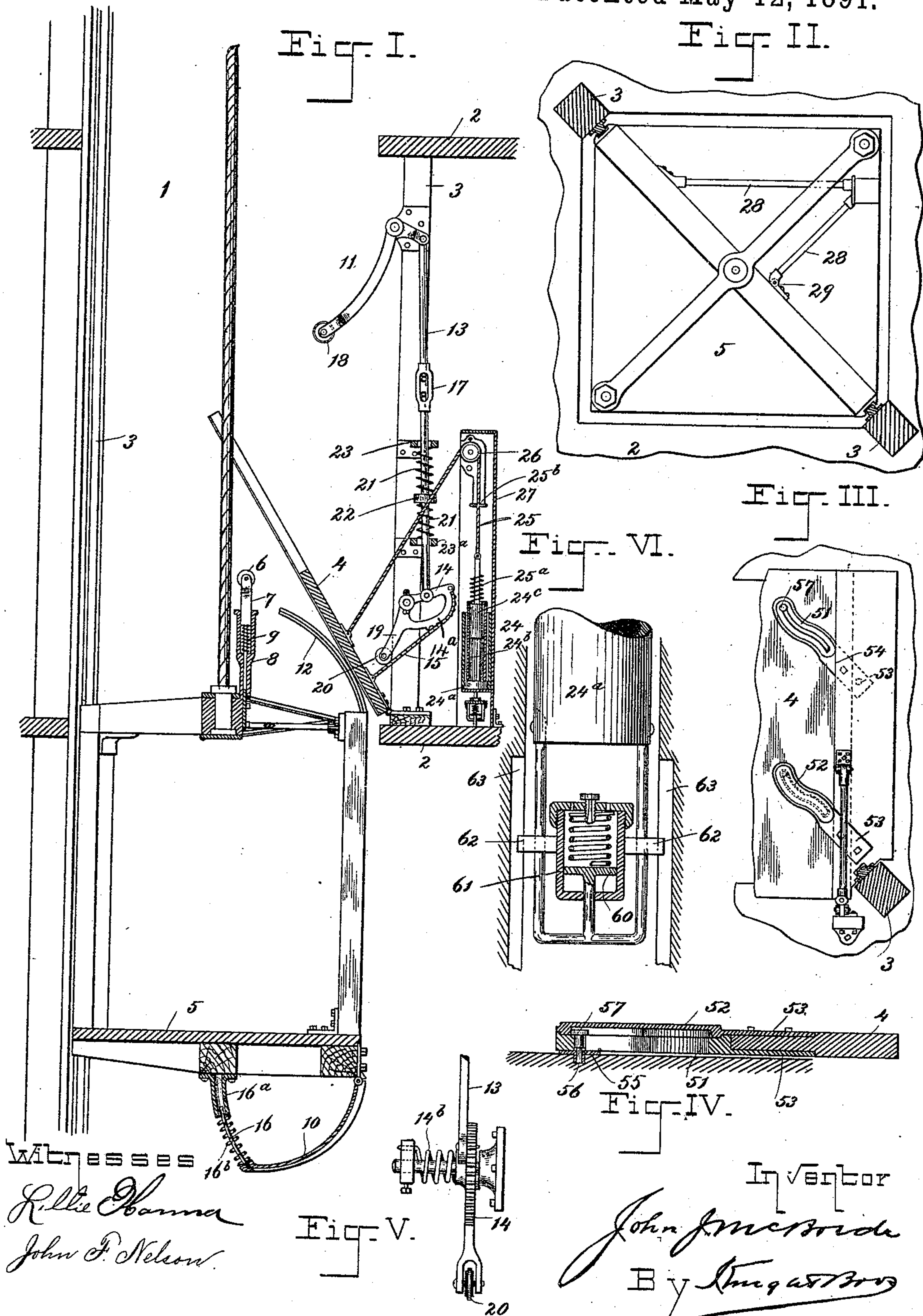
2 Sheets—Sheet 1.

No. 451,947.

Patented May 12, 1891.

Fig. I.

Fig. II.



Witnesses
Rellie Hanna
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Fig. V.

Fig. IV.

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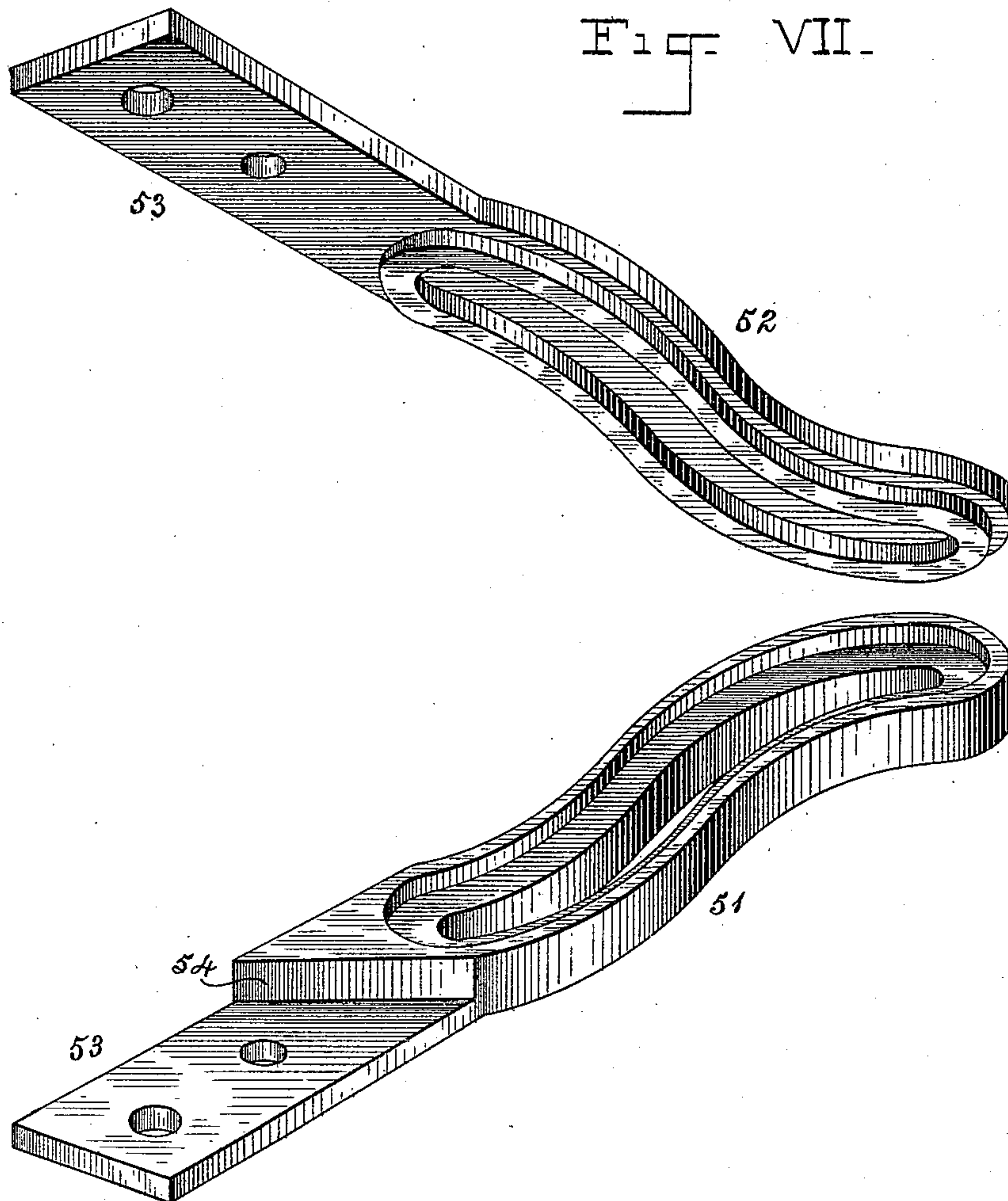
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UNITED STATES PATENT OFFICE.

JOHN J. McBRIDE, OF RIDGEFIELD PARK, NEW JERSEY, ASSIGNOR TO
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HATCH-DOOR.

SPECIFICATION forming part of Letters Patent No. 451,947, dated May 12, 1891.

Application filed May 10, 1890. Serial No. 351,312. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAMES McBRIDE, a citizen of the United States, residing at Ridgefield Park, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Hatch-Doors for Elevators, of which the following is a specification.

My invention relates to hatch-doors for closing elevator-shafts at the several floors of a building.

My invention consists in various features of improvement in such hatch-doors set apart from my application Serial No. 337,621, which features are fully hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figure I is a vertical section through an elevator-cab and hatch-door provided with my improvements. Fig. II is a top view of the form of cab-post brace which I prefer to use. Fig. III is a plan view of an auxiliary slide on the hatch-door. Fig. IV is a vertical section with the operating-cam thereof. Fig. V is an elevation at right angles to Fig. I of what I call the sprocket arm, cam, or lever. Fig. VI is an enlarged partly-sectional view of the counter-weight. Fig. VII shows the obliquely-shouldered ogee-slot piece and its covering-plate detached.

In Fig. I, the numeral 1 indicates the elevator-shaft; 2, the floors of the building; 3, the upright standards or guide-strips of the shaft; 4, a hatch-door, which in this figure is shown as hinged at one edge.

5 represents the elevator cab or car, which is provided with a device for raising the door as it passes up or down. For operating the door on the upward passage of the cab the latter carries what is known as the "bow." In my present invention this is made in two parts—a standing coil-spring wheel bow or buffer mounted toward the center of the cab on the cross-head and an auxiliary bow or cam 12, mounted on the cab-post. The cross-head bow or buffer has a rubber-bound friction or cushioning wheel 6, supported on the shank 7, sliding in a column or standard 8 and forced up by a spring 9. In operation the standing coiled-spring wheel-bow first strikes the hatch-door, starting it gently, and then the cam 12

engages the door and raises it to its highest position. By making this coiled-spring wheel-bow in two parts, as described, it is made more readily adjustable both as to height and direction, and it is more certain and true in operation than the old long bow with flat springs. The door is also thus made to rise more steadily and with less tremor and tetering, as both the coiled-spring wheel-bow and auxiliary cam-bow engage and open the door, supporting it at two points till it is raised beyond the position of greatest strain.

On the bottom of the cab is a spring-bow 10 for lifting the door as the cab descends. This it does by engaging with and pressing back the lever 11, which is pivoted on one of the uprights 3, and is connected by rod 13 to the sprocket cam or eccentric 14, having a sprocket-toothed portion 14^a, over which passes a chain 15, attached to the door near the hinged edge thereof. When the under cam 10 presses back the arm of lever 11, the tie-rod 13 rises and rotates the sprocket cam or eccentric 14 and by means of chain 15 lifts the door, which is then maintained in an upright position by engagement with the cab-post and bow. This under cam or spring-bow 10 is preferably hinged to the cab-post, as shown, and its free or inner end bears a guide pin or rod 16, which slides in a tubular socket 16^a, fixed to the cab-bottom. A compression-spring 16^b is held between the end of the tubular socket and the bow.

The tie-rod 13 is divided and provided with a turn-buckle 17, with opposite screws, to admit of the longitudinal adjustment. The arm 11 may be provided with a friction or cushion roller 18. The sprocket cam or eccentric 14 has a projection or arm 19, which carries a (preferably rubber-bound) roller 20 for engagement with the upper side of the door, whereby the following useful effects are thereby produced: When the door is nearly raised, it comes against this arm 19 and, pressing it back into and beyond the position shown in Fig. I, it lifts the rod 13, which is therefore a thrust as well as a pull rod, and thereby swings back the arm 11 out of the way of the ascending cam, so that there is no danger of cam 12 striking it end on and carrying it upward, which would be liable to cause break-

age or at least disarrangement and strain. When the door is fully opened, the weight of the parts pressing downward on sprocket cam or lever 14 causes the pressure against the door and gives the initial impulse to the same as soon as it is released by the cab. This dispenses with the usual independent propulsion-spring for this purpose. The sprocket-cam or lever in like manner checks or eases up the motion of the door when approaching a vertical position and diminishes the slam. To enable the sprocket cam or lever to more effectually check and support the door when descending, it may be provided with a coiled spring 14^b, attached at one end to a fixed support. To supplement the above-described action of those parts, the pull and thrust arm 13 may be provided with spring-buffers 21, which may surround the same, above and below a collar 22 thereon, and engage with stops 23 23^a, fixed on the upright 3. The effect of this is that when the door is rising and is nearly vertical it brings the upper spring 21 against the stop 23, and thereby takes off gradually the momentum of the door and also stores power for starting the same when released. When the door in falling has nearly reached a horizontal position, the lower spring 21 is brought against stop 23^a to check the movement of the door and prevent slamming. The pull and thrust rod 13 is rigid and positive in working, and this, in connection with the provision of cam-roll on the sprocket cam or lever 14, insures certain, positive, and complete operation of the parts.

24 is a counter-weight for the hatch-door, connected to the same by a rope or flexible connection-chain 25, which passes over a pulley 26, supported in hollow post 27. This counter-weight is preferably divided, as shown, into telescoping parts 24^a 24^b 24^c, of which the outermost one 24^a fits over the middle one 24^b and has a flange fitting over a collar on the inner weight 24^c, which is attached to and keeps taut the rope or chain 25. A spiral spring 25^a is placed above the collar on the inner weight or chain 25, so as to strike fixed stop 25^b when the door is nearly closed and prevent undue jar. It will be seen that as the door rises the weights are dropped in succession on the floor, so as to decrease the counter-weight and compensate for the loss of leverage of the door itself, while when the door is falling these weights are picked up, so as to produce a reverse effect. Instead of telescoping tubes, flat weights with lugs running in grooves may be used when vertical space is scant.

The counter-weight 24 for the hinged hatch-door 4 is preferably provided with an air-cushion, consisting of a piston 60, attached to the outer weight 24^a, and a cylinder 61, in which the piston slides, having lugs 62 running in groove 63 in the hollow post, so that the cylinder and piston will be carried up together until the door has fallen to a nearly-closed position, when the lugs 62 will strike the ends

of groove 63, stopping the cylinder, and the piston will then move the cylinder, compressing the air therein, so as to give a cushioned effect and completely take off the shock.

To enable the cab-post to withstand the strain which is brought on it in holding up the door, braces between it and the cross-head of the cab are necessary. To render these braces stiff so as to be easily accommodated to varying locations and shapes of cab-post and cross-head in the same manner, I make the adjustable and interchangeable braces represented in Fig. 2, in which 28 are the brace-rods, (preferably of gas-pipe,) one of which is screwed in any ordinary socket at one end, fastened to the cab-post, and screwed at the other end into a hinged or jointed socket 29 for attachment to the cross-head. The other brace-rod may be screwed into ordinary rigid sockets at both ends.

Figs. III and IV show a sliding auxiliary leaf on the main hatch-door for closing the opening necessitated at the sides thereof by the presence of the elevator uprights or corner posts. This sliding leaf and substantially the means here shown for operating it form the subject of Patent No. 415,616, dated November 19, 1889.

My present improvement consists in making each of the ogee-slot arms of two metal pieces 51 52, of which the pieces 52 serve as covering-plates to the pieces 51, which latter contain the slot and have extensions 53, which embrace and are fastened to the leaf with an oblique or inclined shoulder 54 on one of said pieces to fit against the edge of the leaf and set the said slot-pieces at the proper angle to the leaf. The slot-piece 51 slides on a plate 55, in which is fastened the pivot 56 of the guiding-roller 57, which runs in the slot of piece 52. This gives a good bearing for the slide and a firm attachment for the roller.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the elevator-car, the door-operating bow fixed to one edge thereof, and the buffer fixed to the car separately from and independently of the said bow and having a spring-pressed head for striking the door before the said bow comes in contact therewith, substantially as set forth.

2. The combination, with the elevator and the hatch-door, of a spring-buffer consisting of a hollow standard 8, sliding shank 7, rubber-bound roller 6, and spring 9.

3. The combination, with an elevator and hatch-door, of levers 11 and 14, pull and thrust rod 13, and a spring or buffer engaging both with said rod and with fixed stop or stops.

4. The combination, with the lever 11, rod 13, and spring 21, of the cam or eccentric 14, having the sprocket portion 14', the arm or projection 19 on said cam, the roller 20 thereon, and the chain 15.

5. The combination, with cam 12 upon the

- elevator-cab and with a hinged hatch-door, of the lever 11, the sprocket-cam 14, the rod 13, connecting said lever and sprocket-cam, the chain connection 15 from said cam to the door, and the arm or projection 19 upon said sprocket-cam, whereby said lever becomes automatically slackened or relieved on impingement of the door against said arm in the manner set forth.
6. The combination, with a hatch-door, of a counter-weight therefor, an air-cushion carried by said counter-weight, and fixed stops for engaging with said air-cushion, substantially as and for the purposes described.
7. The combination of flexible connection 25, the weight 24^c thereon, and weights 24^a 24^b, telescoping over said weight 24^c, substantially as described.

8. The combination, with the hatch-door, of flexible connection 25, stops 25^b, spring 25^a, and counter-weight 24.

9. The combination of a hatch-door, a sliding auxiliary leaf, and means for operating the same, comprising guide slot-pieces 51 52, having extensions 53, and an inclined or oblique shoulder 54, the said extensions and shoulder fitting the edge of the leaf.

10. The combination of the hatch-door, a boss 55 thereon, a sliding leaf, and means for operating the same, comprising a slot-piece sliding on plate 55 and a roller running in the slot and pivoted to such boss.

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Witnesses:

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