(No Model.) 3 Sheets—Sheet 1.

A. J. BLAIKIE.

MACHINERY FOR OPENING AND CLOSING AUTOMATICALLY SAFETY COVERS FOR ELEVATORS.

No. 312,699. Patented Feb. 24, 1885.

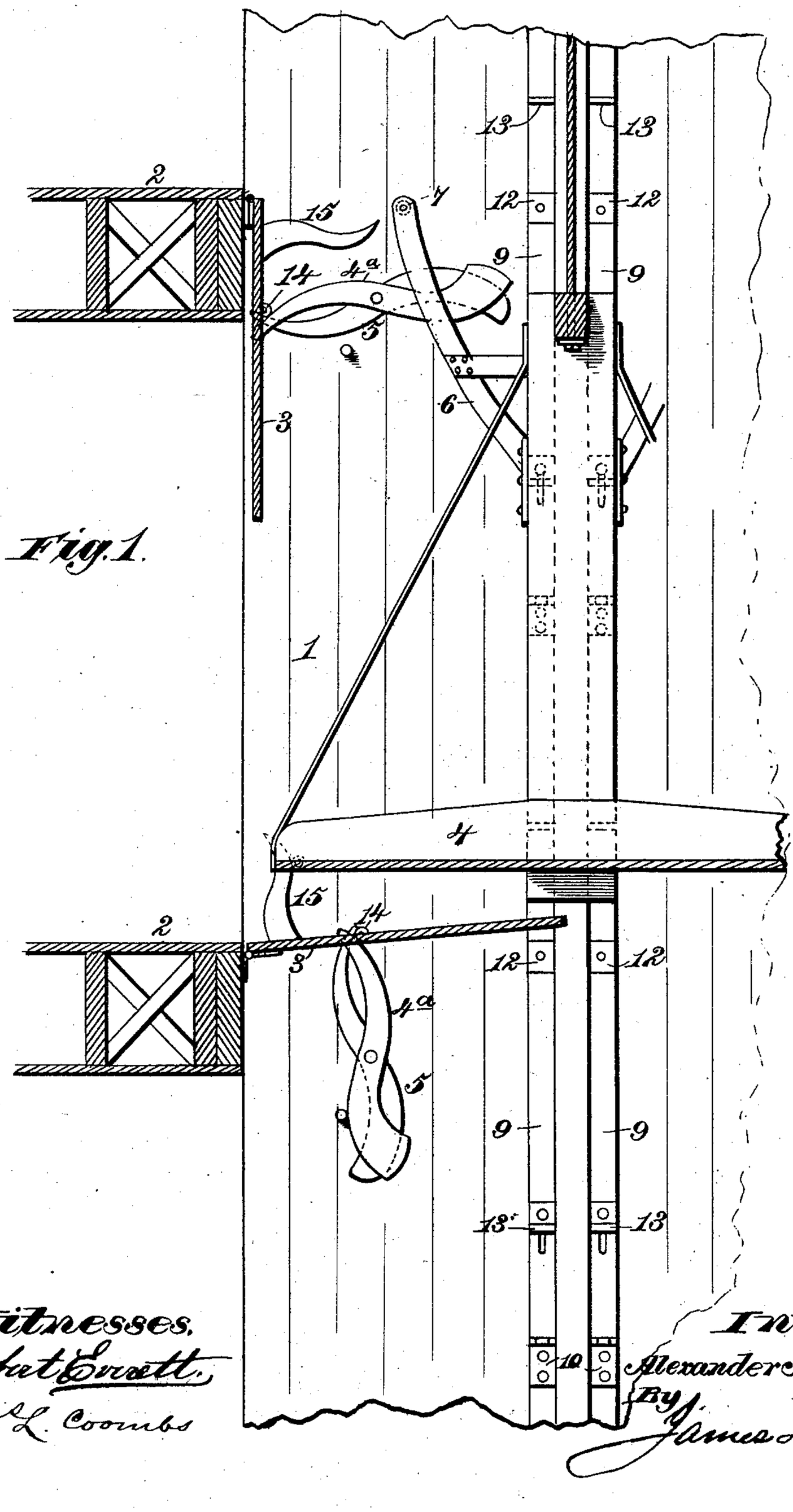

Fig. 1.

Witnesses.
Robert Evatt.
Jo. L. Coombs

Inventor.
Alexander J. Blaikie.
By James L. Norris.
Atty

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

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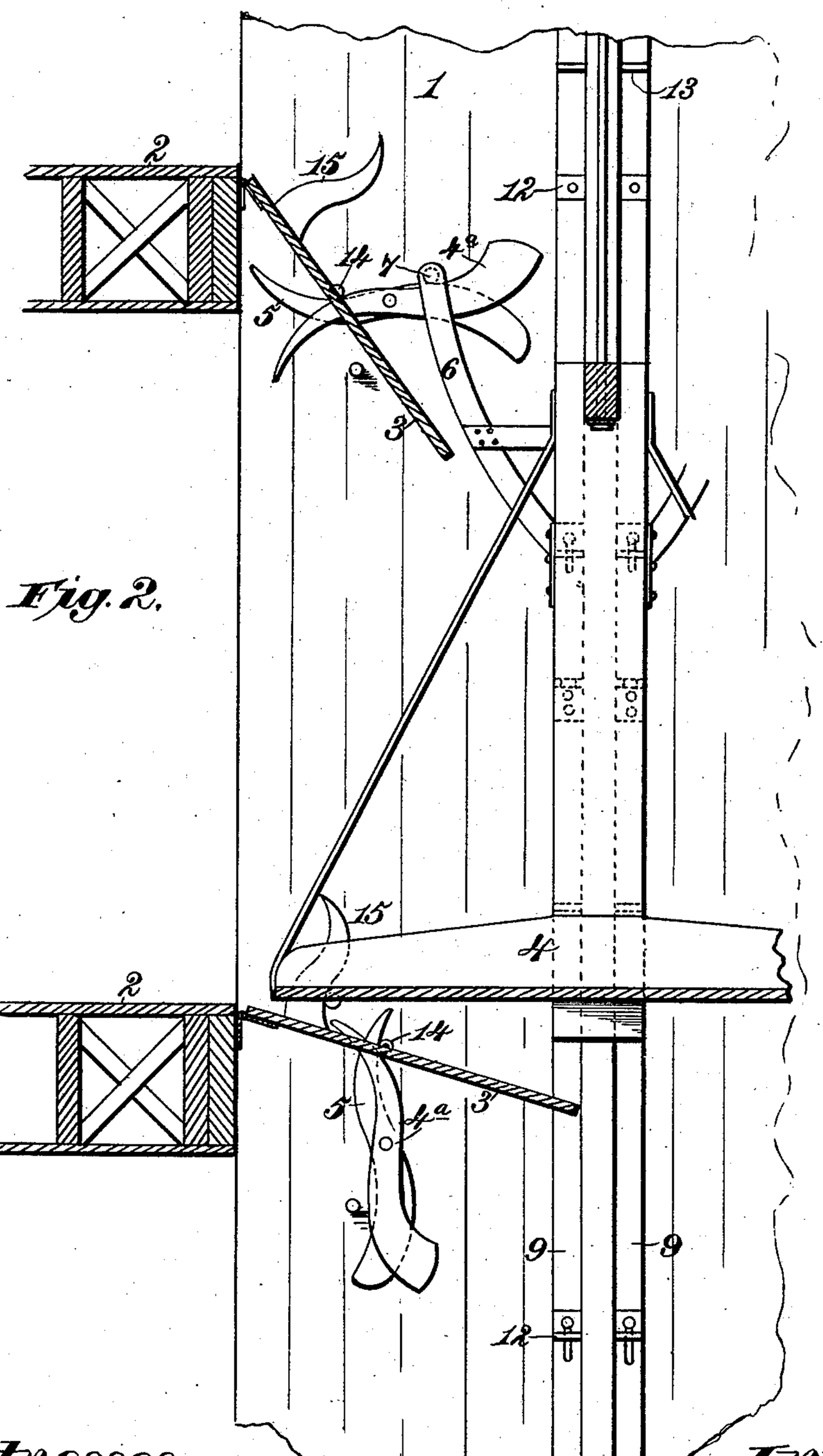

Fig. 2.

Witnesses.
Robert Everett,
Jos. L. Coombs

Inventor:
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(No Model.) 3 Sheets—Sheet 3.

A. J. BLAIKIE.

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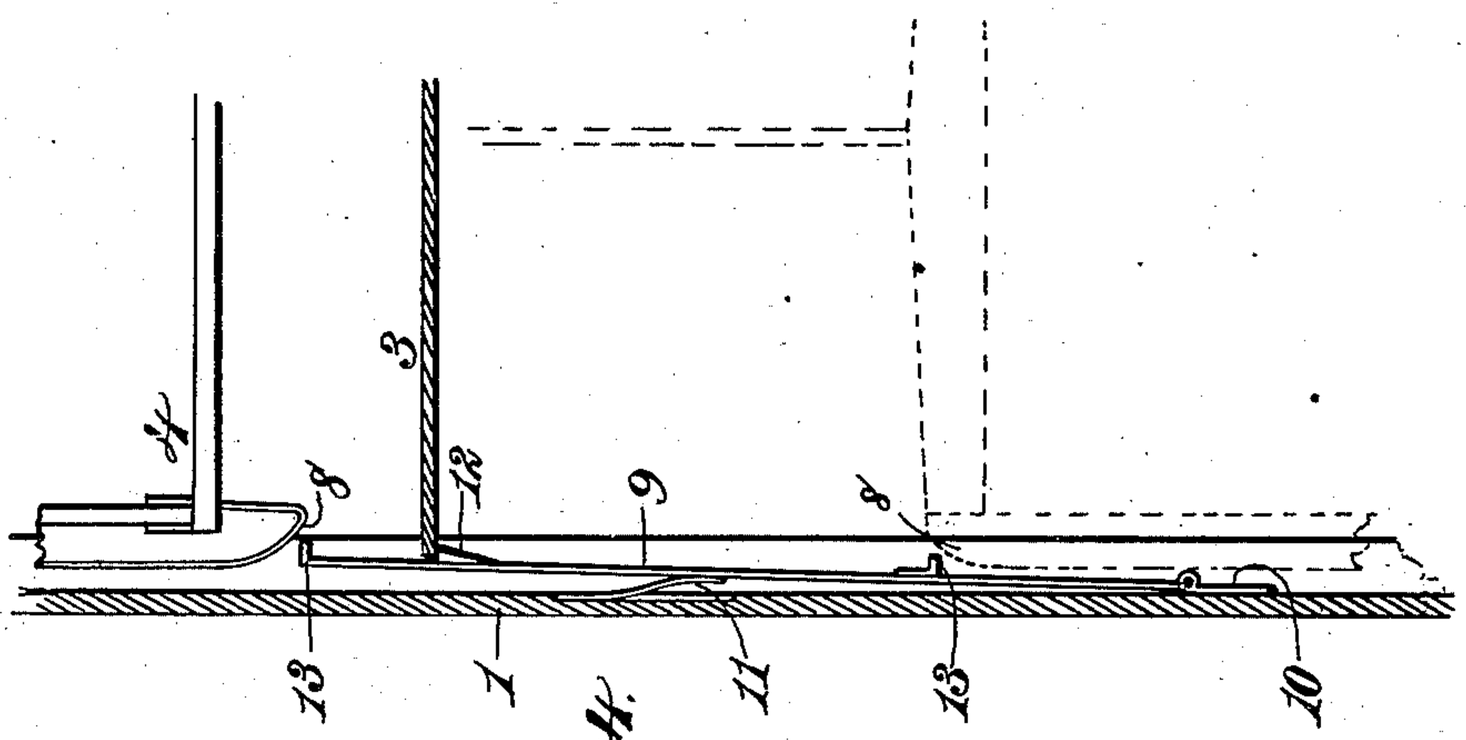

Fig. 4.

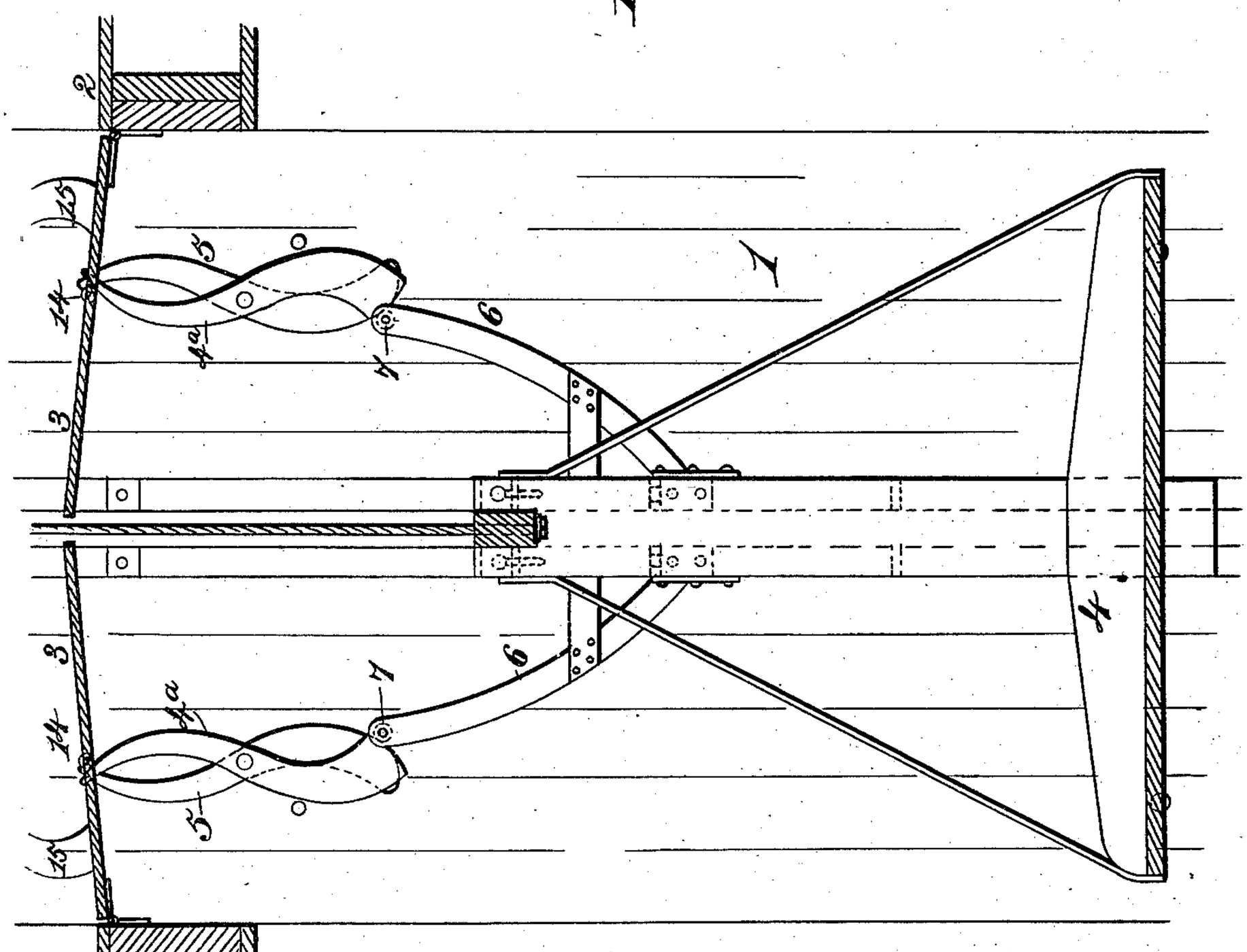

Fig. 3.

Witnesses.
Robt Everett.
Jo. L. Coombs

Inventor.
Alexander J. Blaikie.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

ALEXANDER J. BLAIKIE, OF ROCHESTER, NEW YORK.

MACHINERY FOR OPENING AND CLOSING AUTOMATICALLY SAFETY-COVERS FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 312,699, dated February 24, 1885.

Application filed June 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER J. BLAIKIE, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Mechanism for Operating Hatchway-Doors of Elevator-Shafts, of which the following is a specification.

This invention relates to improved mechanism for opening and closing the safety doors or covers of elevator wells or hatchways; and it consists, essentially, in the provision of a system of levers that are arranged on the walls of the elevator-well and are acted upon by the ascending or descending cage for the purpose of opening or closing said doors or covers. Vertical spring-pressure bars on the side walls of the elevator-well serve as a medium for supporting the safety covers or doors and firmly holding the latter in a closed position. These supporting-bars are engaged by suitable stops on the elevator-cage, that release the bars at the proper time and allow the doors to be opened by the ascending or descending cage, and as soon as the doors have been properly closed, or brought into a horizontal position, the supporting-bars are thrown outward by springs bearing thereon and made to engage with the closed doors.

The invention also consists in certain details of construction and arrangement, which will be hereinafter more fully described, and then set forth in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of an elevator-car, its passage-way, and two floors of a building, the car being in position between the lower closed safety covers or doors and upper doors that have been opened by the ascending car. Fig. 2 is a similar view showing the position of the elevator-car and the devices for automatically closing or opening the safety-covers when said devices are engaged in the act of opening or closing said covers. Fig. 3 is an elevation showing the position of the levers and safety-covers as the car is about to open a cover from below. Fig. 4 is a detail view of the spring-pressed bars that support the safety-covers in a closed position, part of the elevator-car and inclosing-well being also shown in this figure.

The reference-numeral 1 designates the frame and panel work of an elevator well, passage, or hatchway which has the customary openings or approaches to the floors 2 of a building. At these approaches or openings are arranged covers or horizontal doors 3, which are pivoted or hinged to the side walls of the elevator-well, and are designed for closing said well when the elevator car or platform is not taking the place of said covers by being opposite one of the floors of the building.

The elevator-car (designated by the numeral 4) is of any preferred construction, and is combined with any desired mechanism for raising and lowering the same.

On one of the side walls of the elevator-well, at or near the points where the safety-covers are located, are arranged levers 4^a and 5, that are of a double-curve or **S** shape, and are pivoted together in pairs, in the manner of shear-blades. These levers are designed to be acted upon by the ascending or descending elevator-car for opening or closing the hinged safety-covers and allowing the car to travel through the entire elevator-well or passage-way.

The elevator-car has diverging or outwardly and upwardly extending arms 6 at the sides thereof, adjoining the side of the elevator-well, where the system of shear-levers are located. Their arms are rigidly secured to the elevator-car, and their upper ends are provided with horizontal cams or rollers 7, that engage with the levers in the manner hereinafter explained. In addition to said arms 6, the elevator-cage has beveled top and bottom surfaces or projections, 8, that are designed for engagement with upright bars 9, arranged in seats on the side walls of the elevator-well. These bars are hinged at their lower ends to suitable plates, 10, and in rear of each bar is located a spring, 11, the function of which is to throw the bar outward when no pressure is exerted upon the bar to force it against the wall of the elevator-well. Each bar has a projection or lug, 12, that engages or fits under the face or inner edge of the corresponding safety-cover, and thus said bars serve for holding the safety-covers in a closed or horizontal position. Other stops or projections, 13, are applied to the bars 9 near their lower or hinge joints. These stops are in line with the beveled tops 8 of the elevator-car, the function

of the latter being to engage with the stops 13 and force the bars 9 in an inward direction for releasing them from the safety covers or doors. It should be observed that said bars 9 are fitted into their seats in such a way that their upper ends will have room to clear the sides of the elevator-car and not interfere with the travel of the same.

At the side edges of the safety-covers, adjoining the system of levers heretofore described, is mounted a small roller, 14, that engages with the levers at the time and for the object hereinafter explained. Horn-shaped projections or curved arms 15 also rise from the safety-covers near the side edges adjoining the system of levers.

The operation of the mechanism for automatically opening and closing the safety covers or doors by the movement of the elevator-car is as follows, viz: When the elevator-car is ascending in the space between two floors of a building, having safety-covers, as above explained, and shown in Fig. 2, the cams or rollers on the diverging arms will engage with the curved or shear-shaped levers and effect the opening of the covers or doors, the latter being free to drop into a vertical position as soon as the projections or inclines on the top of the elevator-car have released the pivoted supporting-bars from the swinging safety-covers. As soon as the elevator-car has passed the covers opened above the same, or the approach to the well-opening guarded by said covers, the roller on the side of the elevator-car is brought into engagement with the rigid horn on the safety-cover, and the movement of the car being continued it follows that the safety-cover is raised and brought into a horizontal position, and at the same time the roller or cam on the side of the safety-cover glides over the levers and allows the same to return to their normal or vertical positions. Furthermore, as soon as the bottom inclined planes on the elevator-car have passed the upper ends of the hinged supporting-bars the latter are forced outward by the action of the springs bearing thereon and made to engage with the side edges of the doors, for holding the same in a closed position until such time as they are again opened by the descending car. It should be stated that the cam on the elevator-car glides over the levers in such a manner that one of said levers, in closing the covers, draws the latter to a position a little above an angle of forty-five degrees, and after that the other lever pushes it up to a position a little above a horizontal line, so as to allow the projection on the supporting-bar to glide under said cover, after which the latter will settle back to a level position. Furthermore, the action of the cam and levers is such that the cover is opened or let down gently to its place by virtue of the levers following the cam, thereby preventing the slightest possible jar. When the car is descending, as is shown in Fig. 2, the weight of the car sliding upon the cam on its diverging arm will force the cover up, and as the weight of the cover increases as it approaches a horizontal position the power increases as the cam leaves the fulcrum at the center of the lever, and moves along the latter toward the other end thereof, thereby increasing the leverage, as is required by the greater weight to be lifted.

By the herein-described arrangement of levers and engaging cams or rollers I am enabled to work the safety-covers of elevator-wells in a more perfect, positive, and simple manner than has been possible with the contrivance heretofore devised.

What I claim is—

1. In combination with an elevator well or hatchway and safety covers or doors fitted in the same, and an elevator-car traveling in said well, a system of curved or shear levers arranged on the sides of the elevator-well, and adapted for engagement with projections or cams on the elevator-car and the safety-covers, substantially as herein set forth.

2. The combination of the well or hatchway, the covers or doors fitted therein, the elevator-car having the attached diverging arms, provided with end rollers or cams, and a system of curved or shear levers arranged on the sides of the well or hatchway for engagement with the said rollers or cams and with the covers or doors, substantially as described.

3. The combination of the well or hatchway, the covers or doors hinged therein, and provided with attached projecting lever arms or horns, the elevator-car having attached cams or projections and diverging arms, provided with end rollers or cams, and the system of curved or shear levers arranged on the sides of the well or hatchway, substantially as described.

4. The combination of the vertical pivoted spring-pressed bars having projections with an elevator-well, an elevator-cage having inclines at top and bottom, and pivoted doors or covers arranged in the elevator-well, and adapted to be retained and elevated by said pivoted bars and their adjuncts, substantially as herein set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

ALEXANDER J. BLAIKIE.

Witnesses:
WM. A. HAWTHORN,
D. G. HAWTHORN.