

No. 715,464.

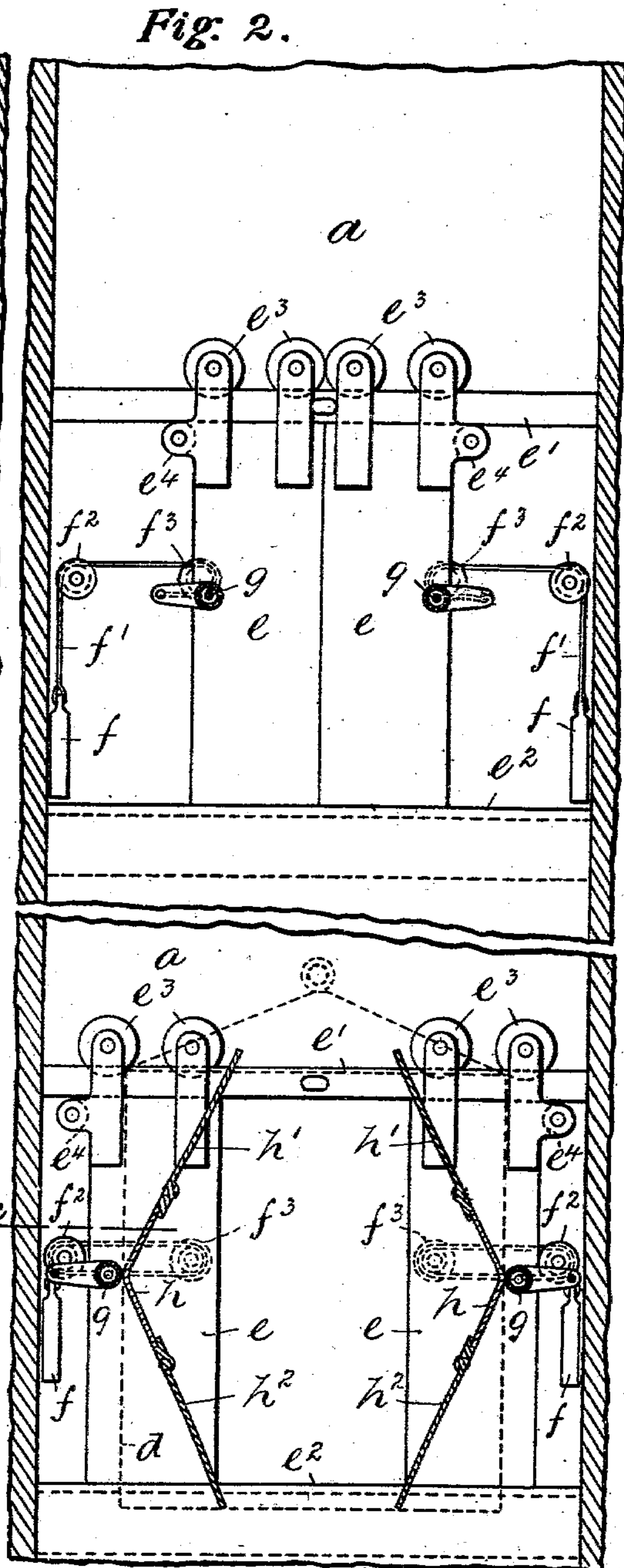
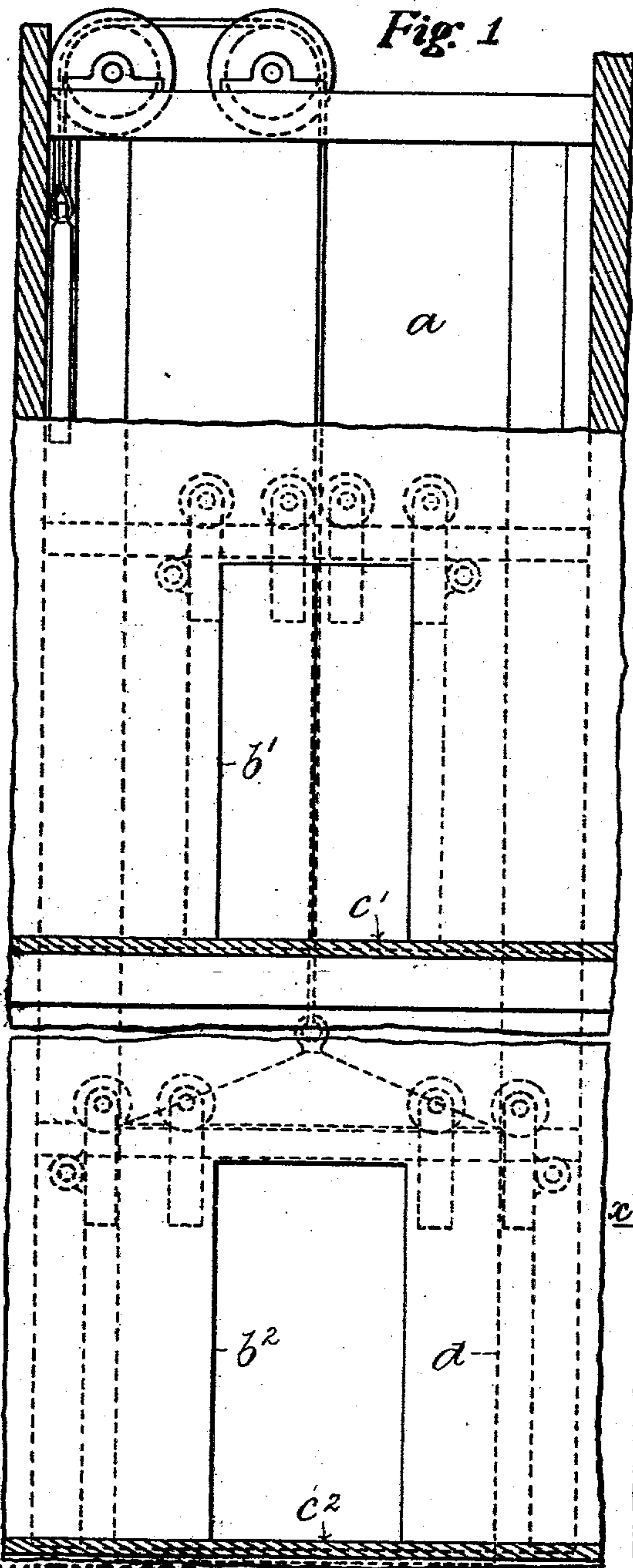
Patented Dec. 9, 1902.

J. DAVIES.
SAFETY DOOR FOR LIFTS.

(Application filed Apr. 28, 1902.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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(No Model.)

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Fig. 7

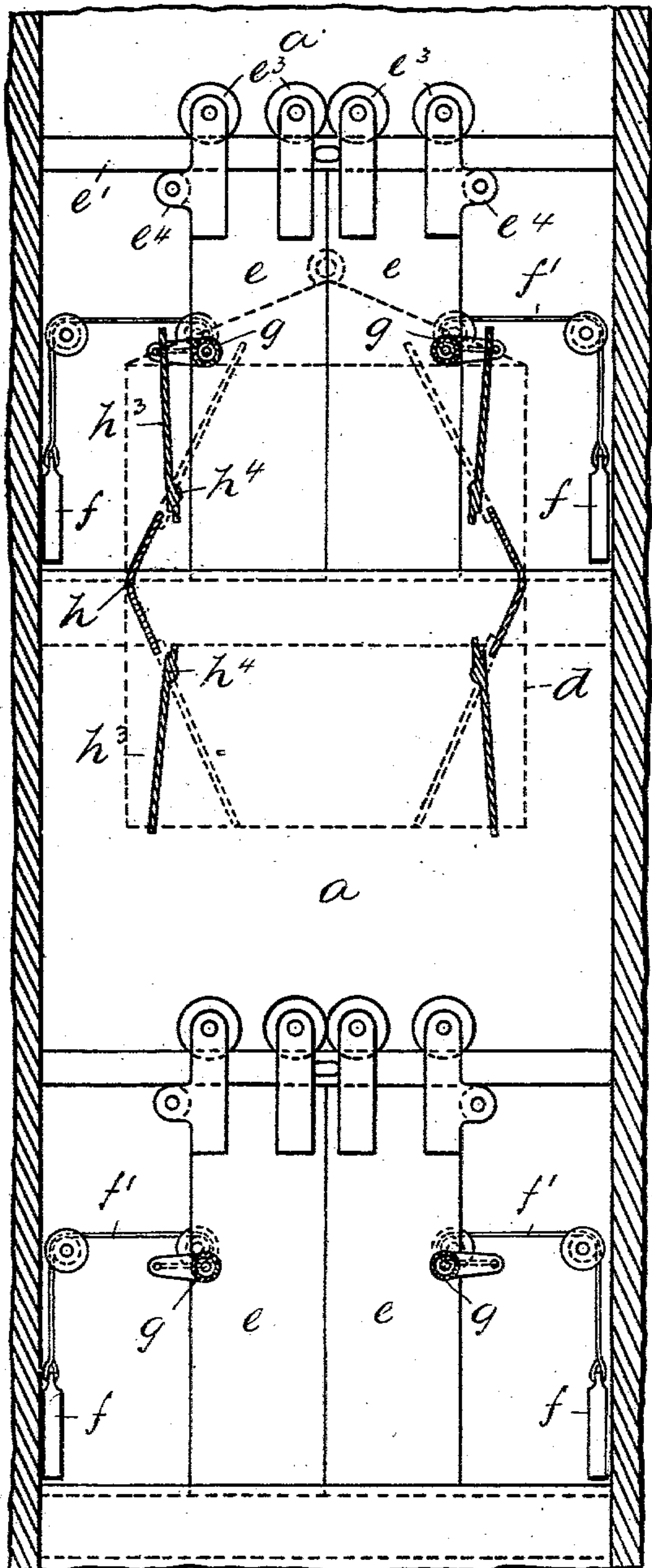


Fig. 3

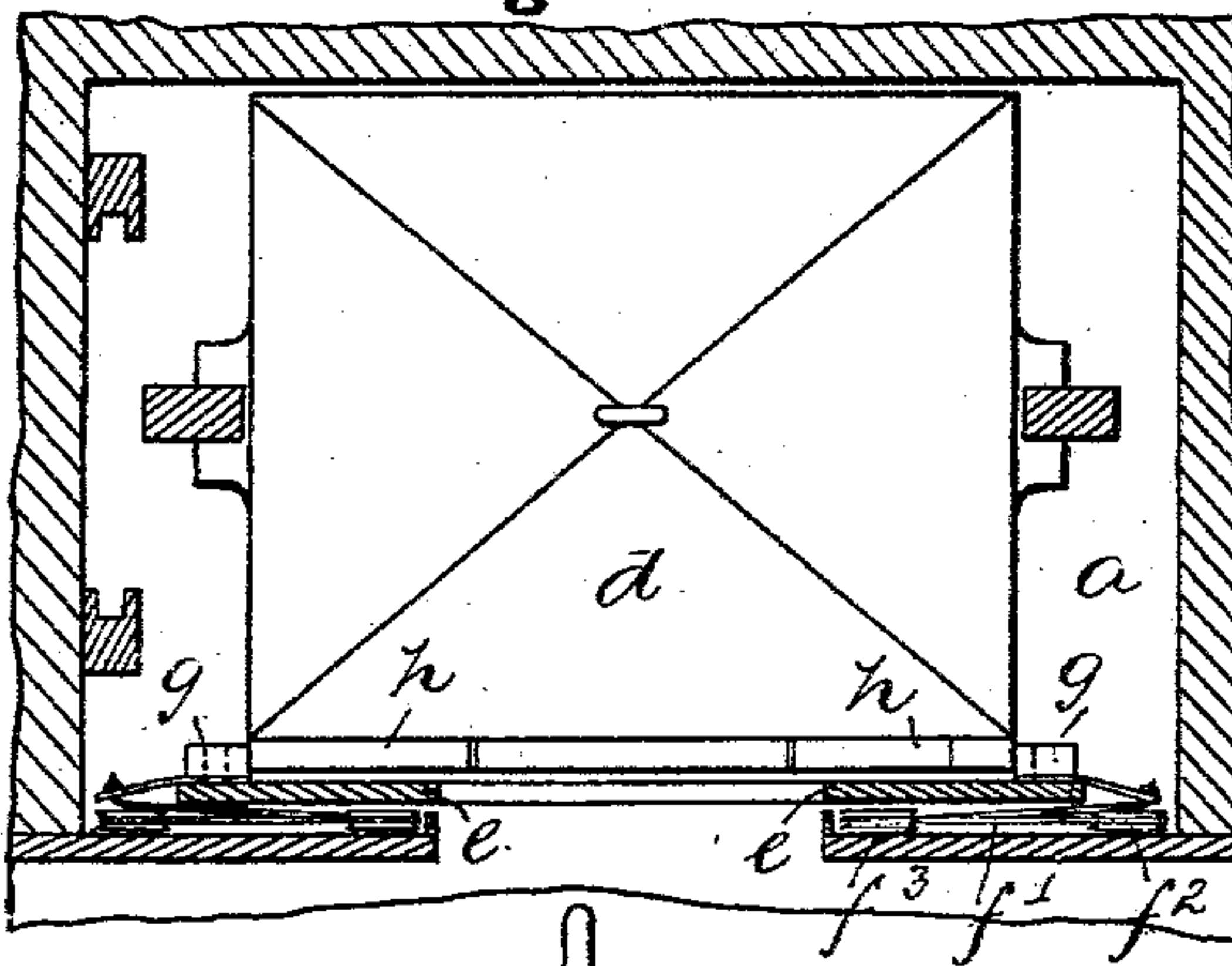
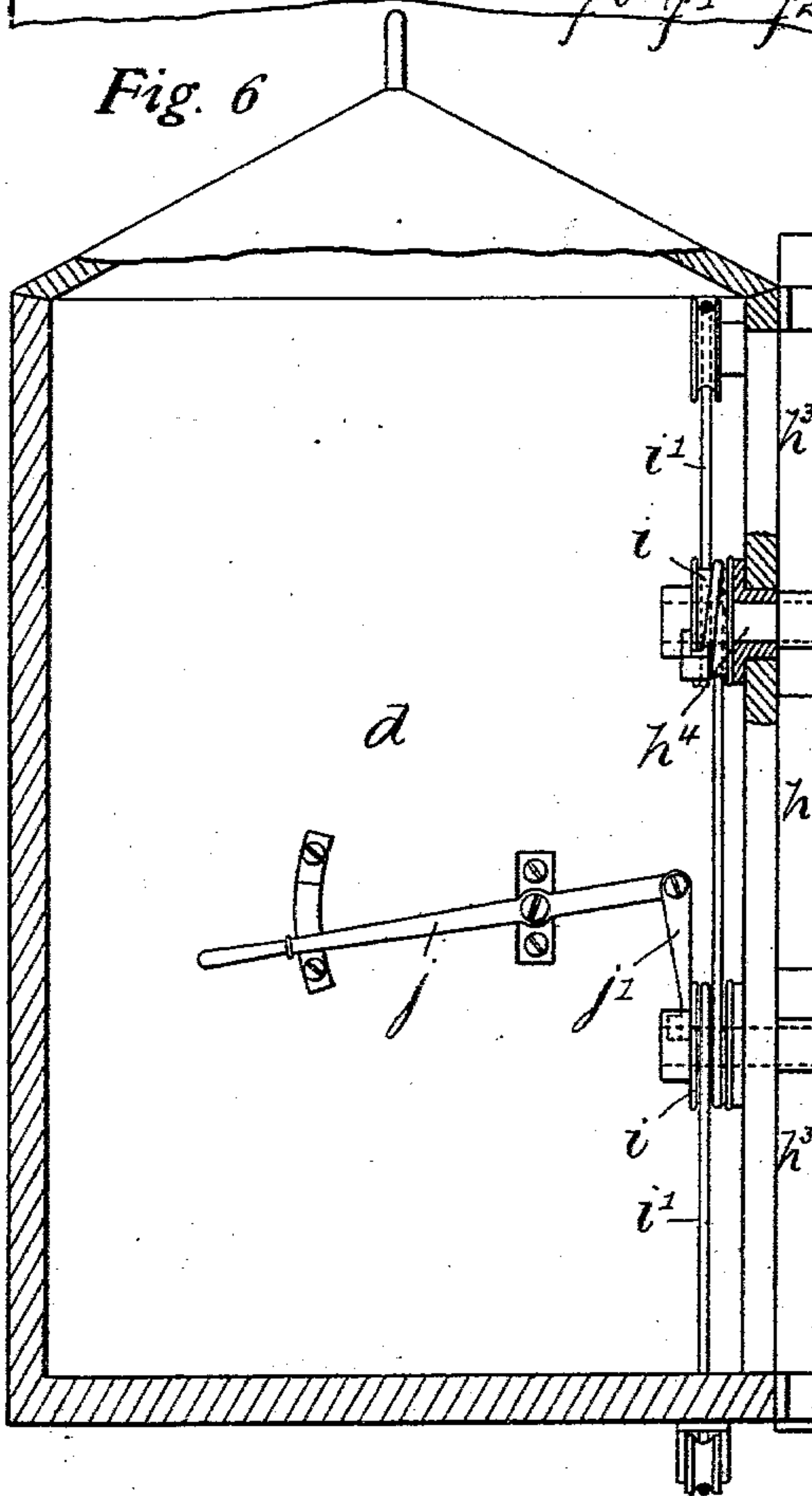


Fig. 6



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Fig. 5.

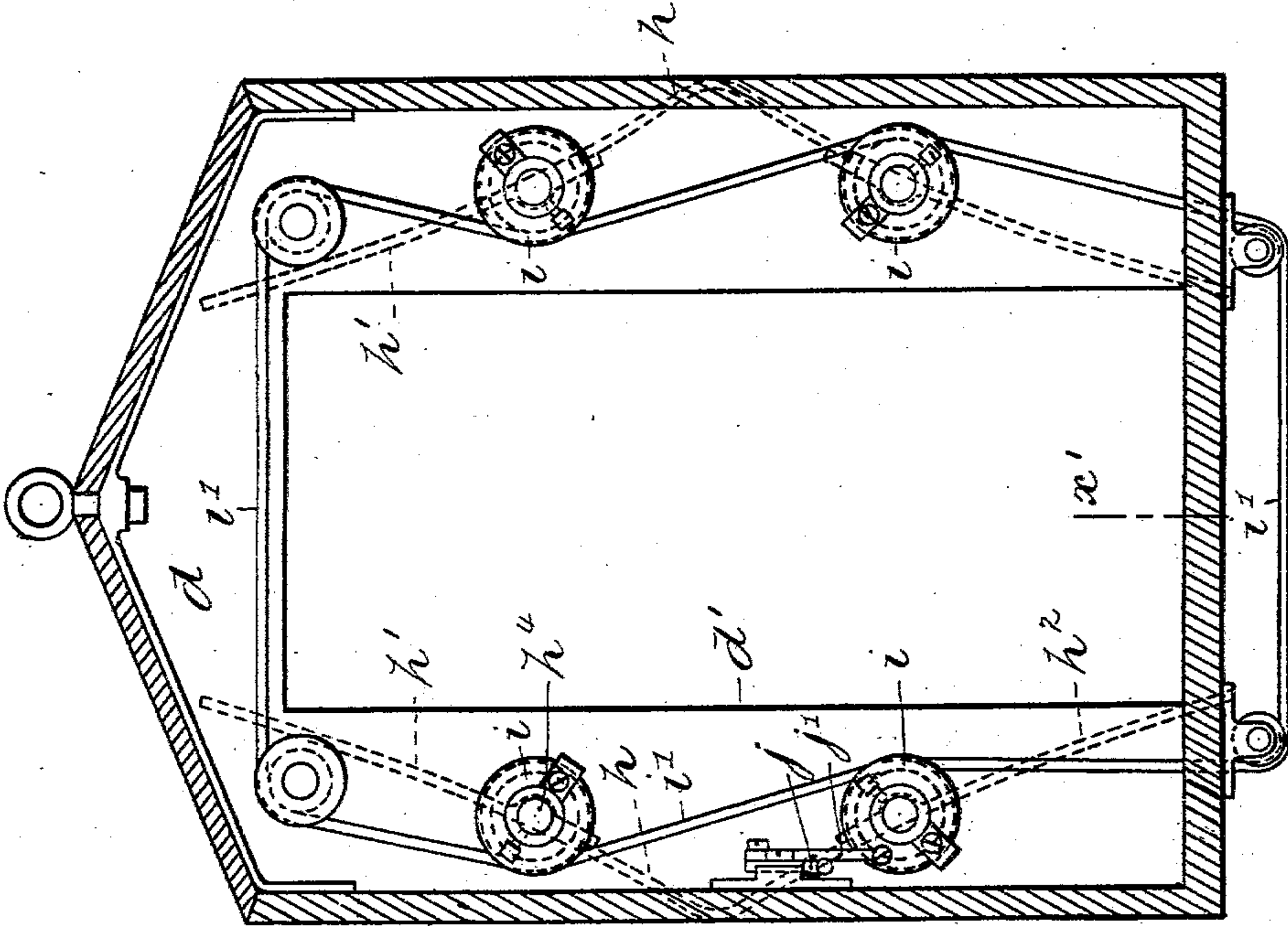
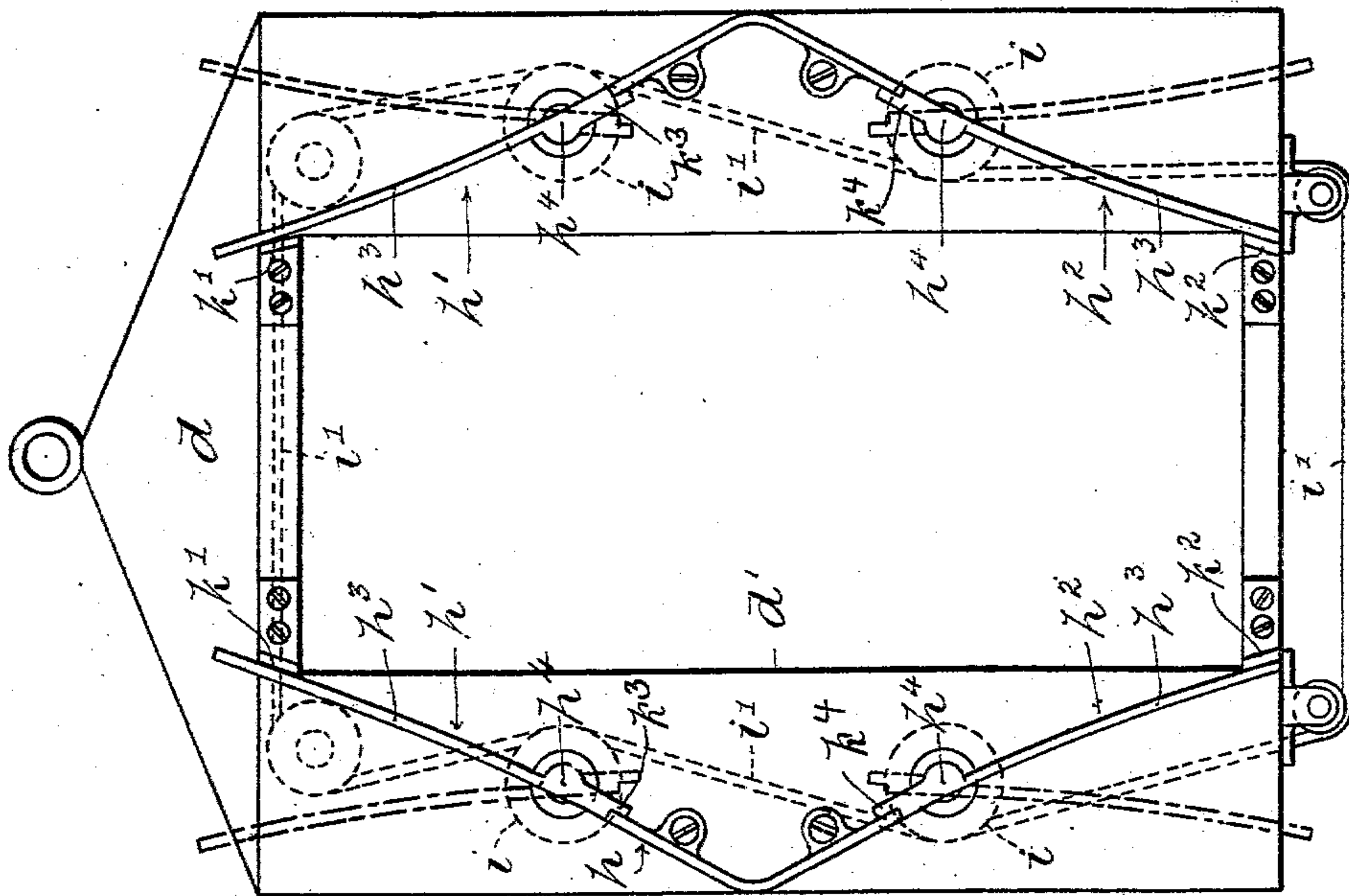


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN DAVIES, OF BIRMINGHAM, ENGLAND.

SAFETY-DOOR FOR LIFTS.

SPECIFICATION forming part of Letters Patent No. 715,464, dated December 9, 1902.

Application filed April 28, 1902. Serial No. 105,057. (No model.)

To all whom it may concern:

Be it known that I, JOHN DAVIES, engineer, a subject of the King of Great Britain, residing at 31 Cavendish road, in the city of Birmingham, England, have invented certain new and useful Improvements in Safety-Doors for Lifts, of which the following is a specification.

This invention has relation to safety-doors to be used in connection with the wells or shafts of passenger and analogous lifts for gaining access to the ascending and descending cage, and has for its object to prevent accidents due to the lift-entrances being inadvertently left open after the cage has moved away from a particular floor. This object I propose to attain by the employment of special means, as hereinafter described, whereby the doors of the entrances to the lift-well on the different floors of a building are automatically and immediately closed as the cage moves away and also whereby any particular door is automatically reopened when the cage in ascending or descending is brought to a standstill behind it.

According to one form of my invention the entrance to the lift-well from each room or floor through which the cage passes is fitted with a pair of sliding doors provided with balance weights or springs, the tendency of which is to take and keep the said doors in their closed positions, and in order to gradually move back these doors, so that they shall be wide open by the time the cage arrives at a floor-level, and then allow them to return, so that they shall be quite shut by the time that the cage has traveled on to the extent of a half of its length, the backs or inner sides of the said doors are provided with rollers or other contacts, while the front of the cage is fitted on its opposite sides with double-acting inclined planes or cam-like projections, which as they move past the doors in ascending or descending with the cage act against the rollers, and so slide the doors in opposite directions in opposition to the force of the closing weights or springs and keep the doors fully opened so long as the cage remains stationary at the floor-level; but when the cage moves away the doors are automatically and immediately closed again by the reaction of the springs or weights. Provision

is also made whereby the opening mechanism may be temporarily thrown out of action, so as not to act upon the doors when the cage is passing a particular floor without stopping.

Figure 1 of the accompanying drawings represents diagrammatically part of a passenger or like lift in which the entrances or doorways are closed by sliding doors which are automatically opened and closed by self-acting devices in accordance with my invention. Fig. 2 is another diagrammatic view looking from the inside of the lift-well and showing one set of sliding doors closed and another set held fully open by the inclines on the cage-front, the position of the cage being indicated by dotted lines, but the inclines are represented in full lines. Fig. 3 is a horizontal section of the lift upon the dotted line x , but showing the cage in full. Fig. 4 is a front elevation of the cage separately and upon an enlarged scale. This view shows part of the arrangements provided for throwing the inclines out of action when the lift is required to pass any particular door without opening the same. Fig. 5 is a vertical section of the cage, taken from one side to the other; and Fig. 6 is another section taken from front to back upon the dotted line x' , Fig. 5. Fig. 7 is a diagrammatic view of the lift similar to that represented in Fig. 2, but it shows the automatic opening mechanism thrown out of action by placing parts of the inclines on the cage in such positions that they cannot act upon the rollers in passing behind any particular pair of doors.

The same letters of reference indicate corresponding parts in the several figures of the drawings.

a is the lift well or shaft, and b' b^2 are the doorways or entrances on the floors c' c^2 for gaining access to the ascending and descending cage d of the lift, which may be of any well-known type, whether worked by high or low pressure hydraulic power or electrically or otherwise, and may be provided with guide-rails, balance-weights, and other usual accessories.

In the particular arrangement shown in the drawings each of the doorways is provided with a pair of horizontally-sliding doors e e , adapted to move in opposite directions between top and bottom guide-rails e' e^2 , the

doors being preferably suspended from the upper rail by means of an arrangement of rollers or runners, such as $e^3 e^4$, although I do not confine myself to this method of mounting the doors, as any other arrangement may be used so long as the said doors will move freely or with but little resistance away from or toward one another when acted upon by the opening mechanism.

Each of the doors is connected with a balance-weight f through the medium of a cord or chain f' , running over a pulley f^2 and a second pulley f^3 , both situated on the fixed framework, the arrangement being such that the tendency of the weight is constantly to keep the door in its closed position and to automatically take the door back to the closed position after it has been opened. Instead of balance-weights any suitable arrangement of springs may be employed in connection with the doors for the same purpose.

The weights or springs should be sufficiently heavy or strong to insure the doors closing, but not capable of causing inconvenience or harm to any person inadvertently caught between the closing doors.

At the back of each door is a roller or other projection g , preferably covered with india-rubber to insure silent action and which is acted upon by means of inclined rails, races, or cam-surfaces fixed on the front of the ascending and descending cage for opening the doors or sliding them apart in opposition to the closing tendency of the springs or weights. In the arrangement shown in the drawings the front of the cage is fitted with a pair of angular or double-inclined rails, outstanding ribs, or the like h , disposed one on either side of the opening d' in the cage-front and set with the points of the angles facing in opposite directions. These rails are double-acting—that is to say, they act upon and open the doors whether the cage is ascending or descending, the top incline h' of each rail coming into action and opening the door when the cage is going up the well, while the bottom incline h^2 acts when the cage is going down.

As the cage in ascending or descending approaches the doorway at any floor one or other of the inclines of each of the angular or cam-like rails strikes against the rollers of the doors, and by the wiping of the inclines past the rollers the latter are constrained to move laterally and carry with them the doors, which are automatically opened in opposition to the closing weights or springs, and by the time that the floor of the cage is level with the floor of the room the rollers are at the angle of the double-acting inclines, and the doors are fully opened and kept in this position so long as the cage remains stationary; but as soon as it commences to move away the springs or weights come into play and close the doors.

The arrangement provided whereby the lift attendant retains control of the mechanism and may throw the apparatus out of action when the lift is passing a door which is not

required to be opened consists in making the inclined rails in sections—that is, with the ends or other parts movable, so that they may be turned out of the way to provide clearances which pass over the rollers without opening the doors. In Figs. 4, 6, and 7 the movable parts of each rail are marked h^3 , and they are pivoted at h^4 , so as to turn from their inclined operative positions shown on full lines to the inoperative or clearance positions indicated by the dotted lines. The pivots or the movable parts are directed through to the inside of the cage and are there provided with pulleys i , connected together, so as to admit of being moved in unison, by means of an endless rope, cable, or chain i' , which is directed, round suitable rollers or other guides and is actuated by suitable means, such as a hand-lever j , placed within convenient reach of the attendant and connected to one of the pulleys by the link j' . Any other mechanism, such as a worm and worm-wheel or other gearing may, however, be employed for actuating the pulleys and transmitting motion simultaneously to the whole of the shifting parts of the rails, so as to make the necessary clearance or break for the rollers.

The movable portion of the rails may be supported in their operative positions by means of rests or seatings, such as $k' k^2$, carried by the cage, these seats arresting the inward movement of the outer ends of the shiftable sections. The inner ends of the shiftable sections are provided with the integral lugs $k^3 k^4$, which are adapted to engage the stationary sections of the rails, so as to limit the outward movement of the inner ends of the shiftable sections.

The mechanism may be applied to open and close single doors, whether sliding, pivoted, or collapsible, and may be adapted to only close the doors (the opening being performed by hand) or even to open them only.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. The combination with an elevator-cage and the doors of an elevator-shaft, of rollers carried by the doors, means connected with the doors and with the elevator-shaft for normally retaining the doors in a closed position, a pair of rails which incline in opposite directions and each comprising a fixed central section and two shiftable end sections, said rails adapted to be secured to the elevator-cage, and means carried by the cage for simultaneously shifting the four movable end sections of the rails from operative to inoperative position.

2. In combination with an elevator-cage, a pair of rails each inclined in opposite directions secured to said cage, each of said rails consisting of a fixed central section and two shiftable end sections, means carried by the cage for simultaneously shifting the four movable end sections of the rails from oper-

5 ative to inoperative position, means carried
by the cage for limiting the inward movement
of the outer ends of the shiftable sections and
means integral with the inner ends of the
shiftable ends of the rails, and adapted to en-
gage the stationary sections of the rails for
limiting the outward movement of the said
shiftable sections.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit- 10
nesses.

JOHN DAVIES.

Witnesses:

HENRY SKERRETT,
HARRY PRATT.