

No. 776,294.

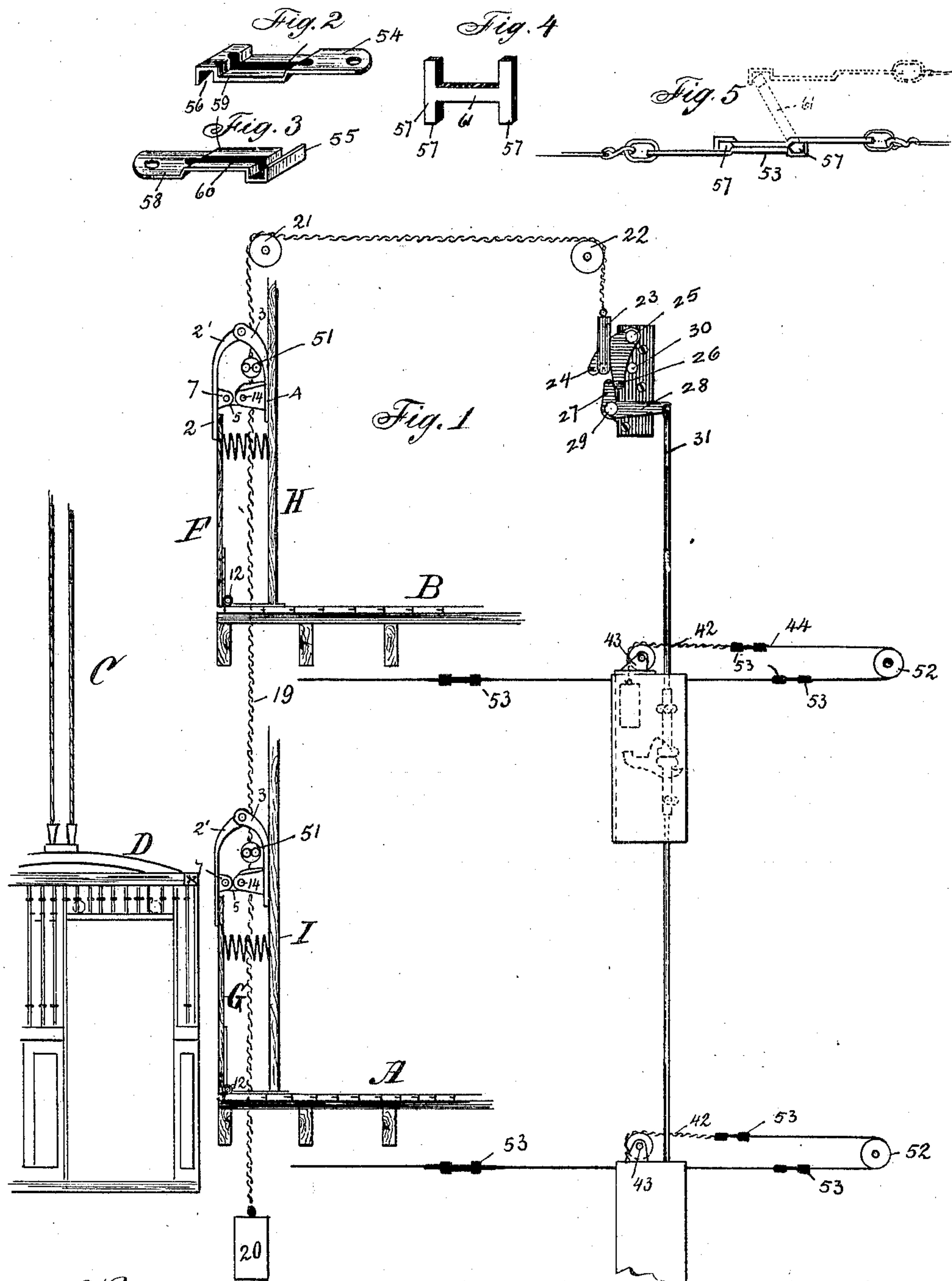
PATENTED NOV. 29, 1904.

A. D. CAYWOOD.
DOOR CONTROLLING DEVICE.

APPLICATION FILED JUNE 27, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
Paul Gerhardt.
Leon Abraham.

Inventor
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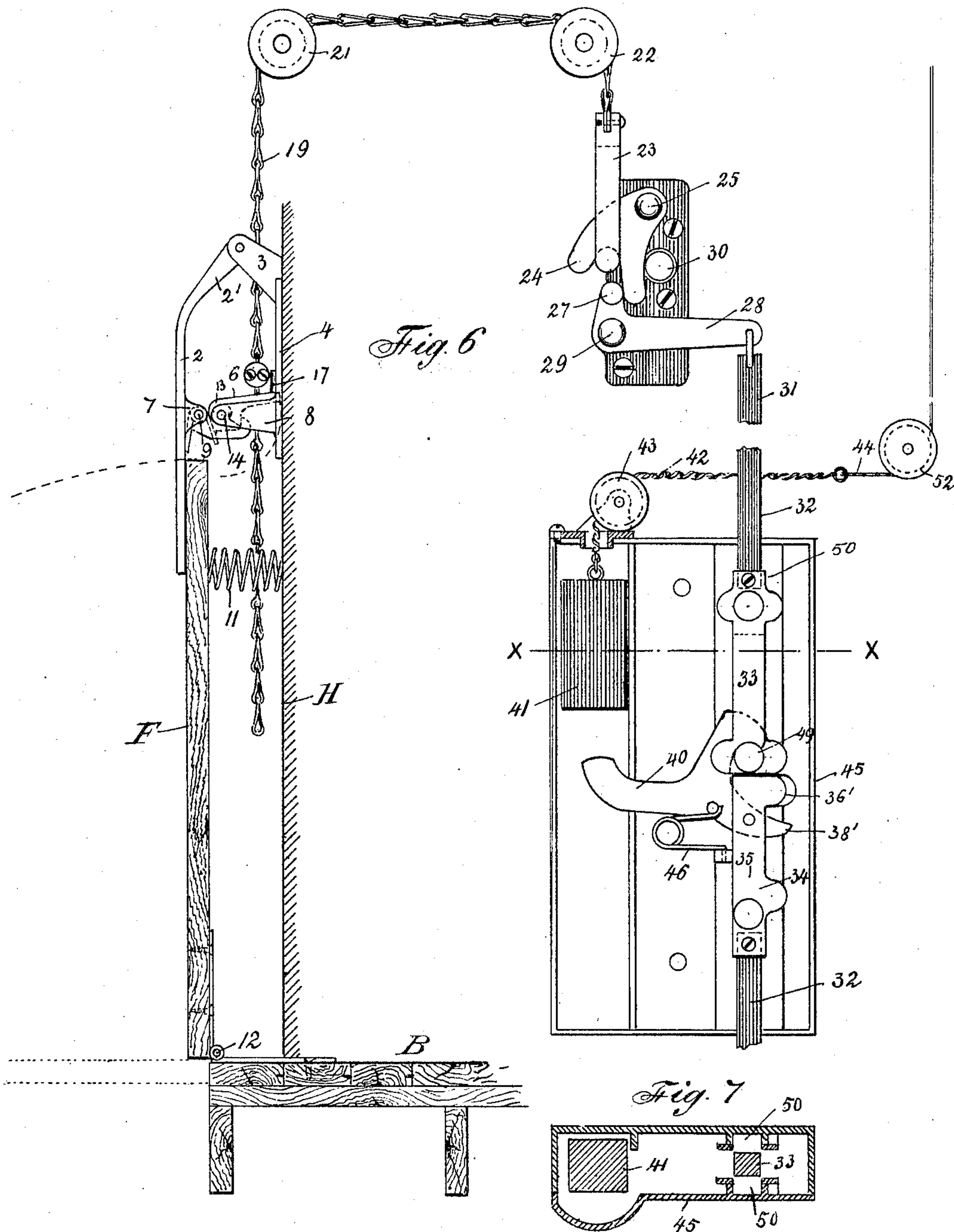
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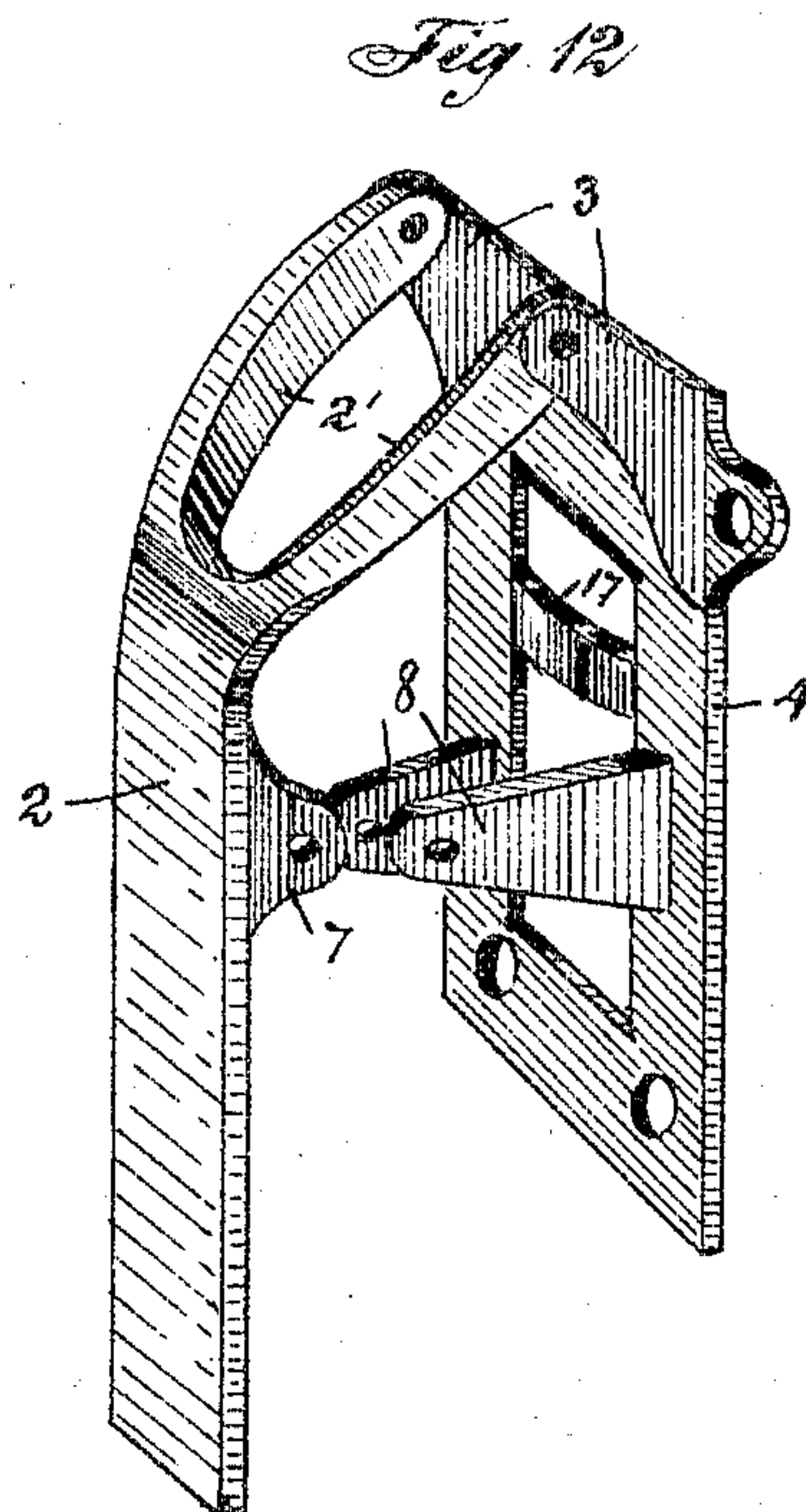
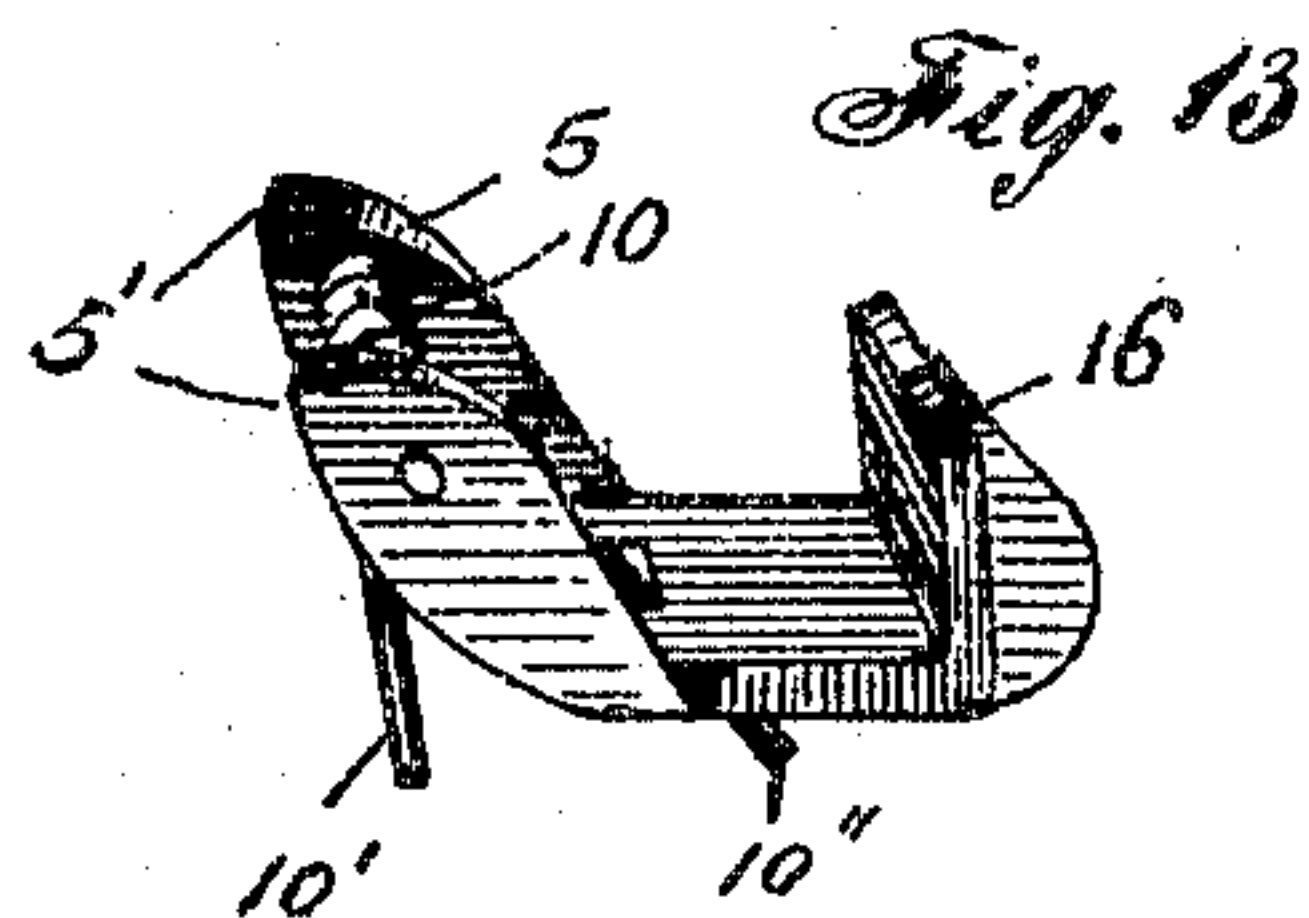
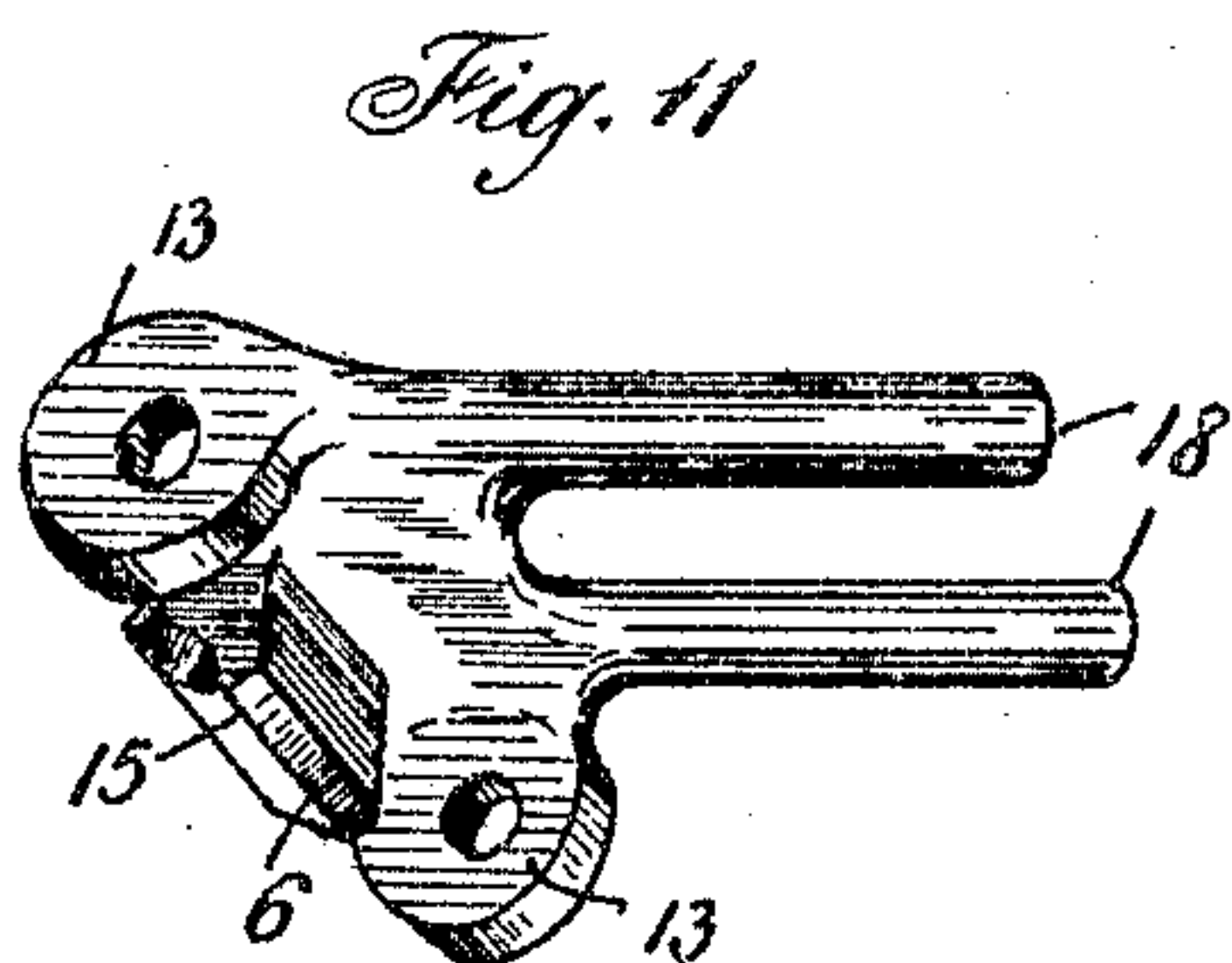
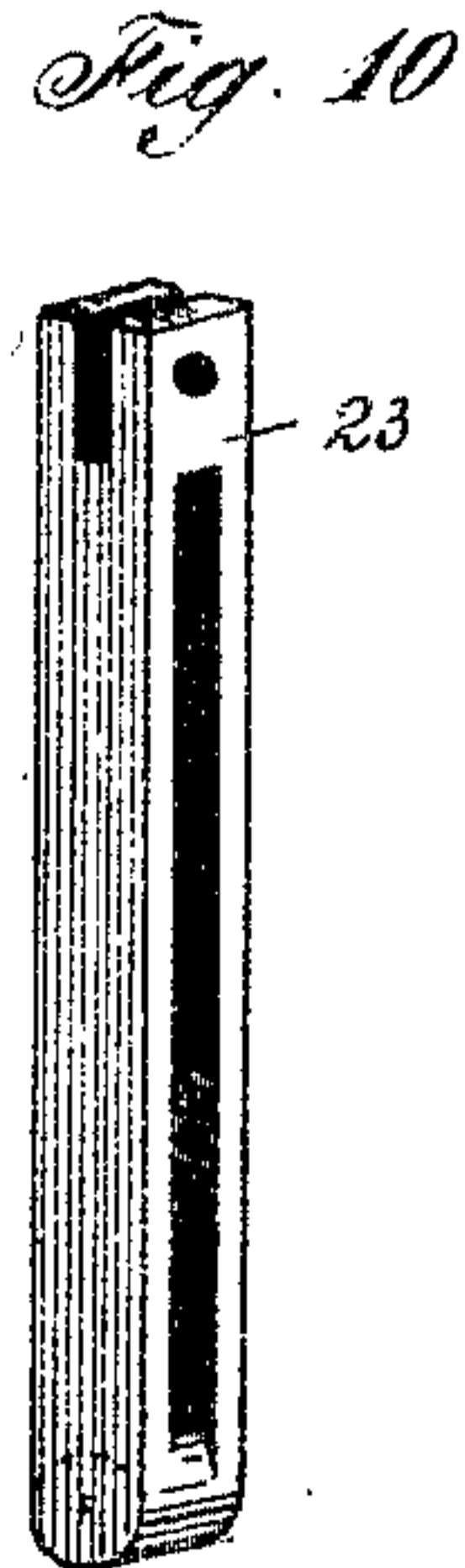
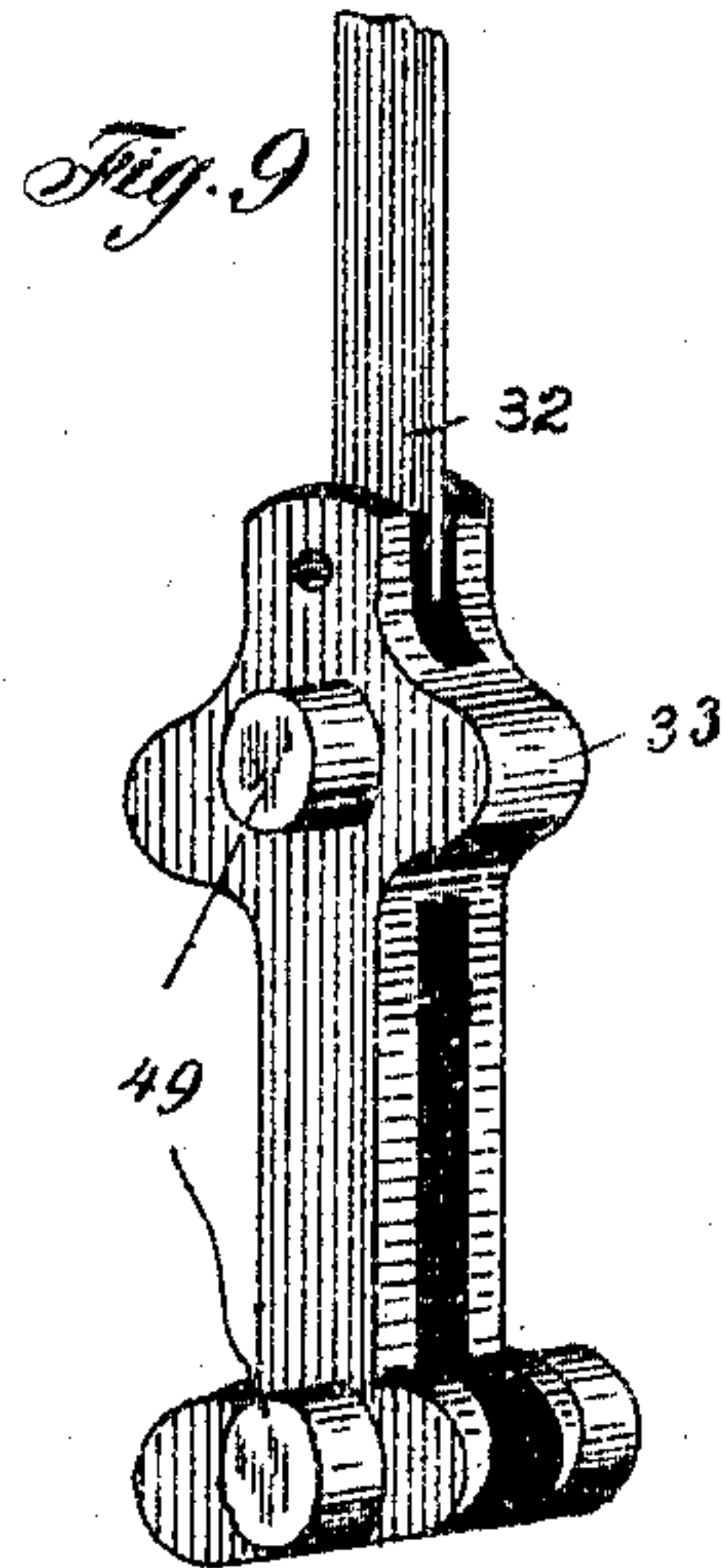
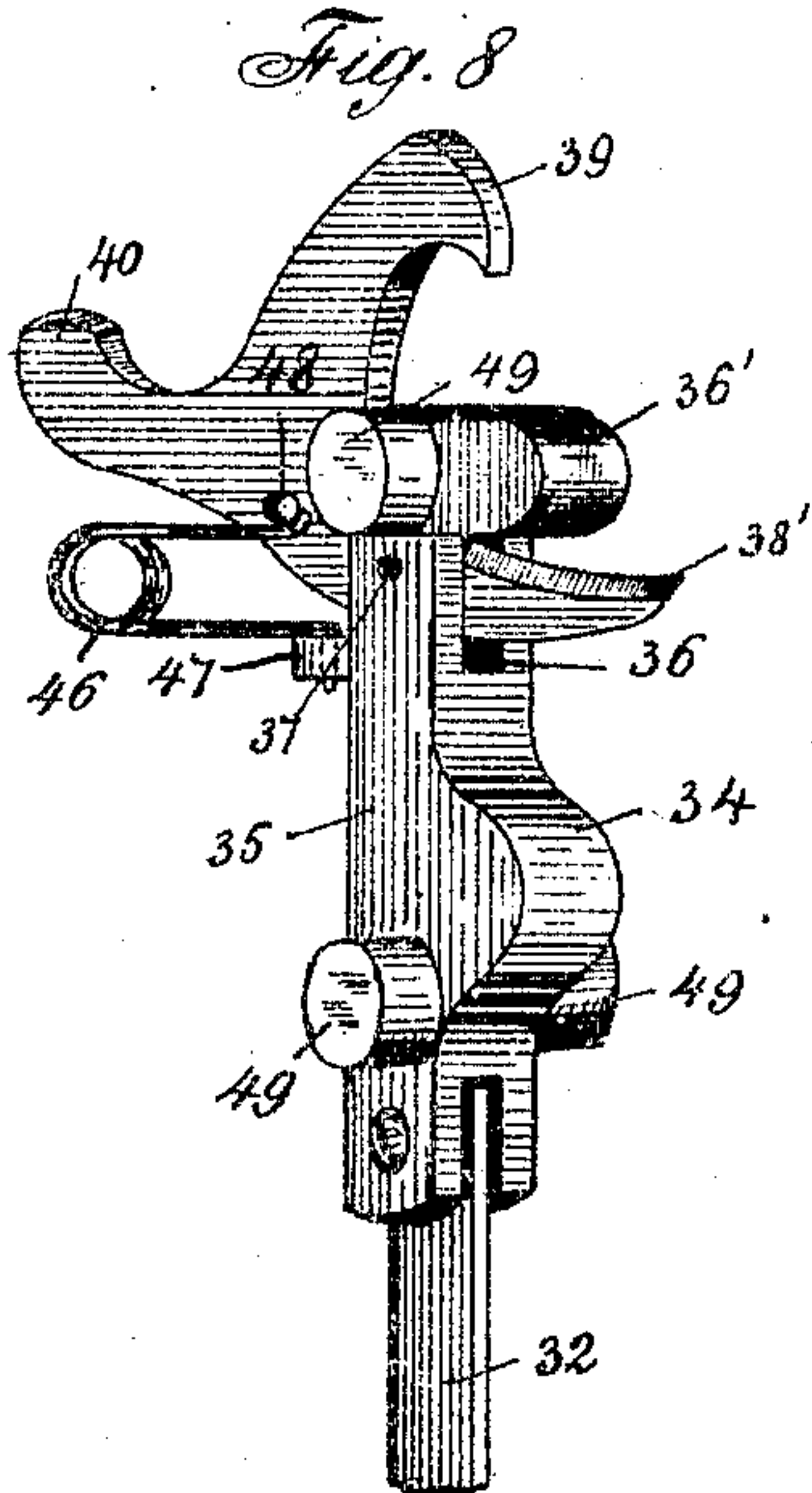
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3 SHEETS—SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

ALBERT D. CAYWOOD, OF CHICAGO, ILLINOIS.

DOOR-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 776,294, dated November 29, 1904.

Application filed June 27, 1904. Serial No. 214,237. (No model.)

To all whom it may concern:

Be it known that I, ALBERT DOUGLAS CAYWOOD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Controlling Devices, of which the following is a specification.

My invention relates to fire-doors, and has particular reference to means for normally retaining said doors in an open position and for closing them automatically in case of fire.

The object of the invention is to provide door-controlling means for hatchways, elevator-shafts, and the like which cannot be easily disarranged or made inoperative or prematurely operated by persons tampering with the apparatus. Other and collateral objects of the invention will appear in the subjoined description.

The invention consists in the combination, with a chain, cord, or the like having door-retaining and door-releasing devices associated therewith, of means for preventing operation of said devices by a pull upon said chain in either direction.

The invention further consists in novel retaining and releasing devices and in several of the various details of construction and combinations of parts described hereinafter, illustrated in the drawings, and incorporated in the claims.

In the drawings, Figure 1 represents fragments of two floors of a building adjacent to an elevator-shaft, my invention applied thereto, and a portion of an elevator. Figs. 2, 3, 4, and 5 are detail views illustrating the fuse-link and the several parts thereof. Fig. 6 is an enlarged view of the equipment as it appears on one floor of a building. Fig. 7 is a section taken on line *x x* of Fig. 6. Figs. 8 to 11, inclusive, and Fig. 13 are detail views of the catches; and Fig. 12 is a perspective view of the door-keeper and its bracket.

Referring to the drawings, A represents a lower and B an upper floor of a building; C, an elevator-shaft; D, an elevator; F and G, shaft closers or doors, and H and I the rear wall of the elevator-shaft.

Referring to the arrangement on the floor B, which is similar to the arrangement on the

other floors, the drop-door F is held in its upright or open position by means of a keeper 2, having a forked portion consisting of a pair of arms 2', pivoted to a pair of lugs 3 on a wall plate or bracket 4. Said keeper 2 is normally held against movement by a pair of cooperating catches 5 and 6, the former pivoted to a lug 7 on the keeper 2 and the catch 6 pivoted between a pair of projections or lugs 8 on the wall-bracket 4. The catch 5 has a bifurcated base portion 5' pivoted to the lug 7 and is held in place by a pivot-pin 9 passing through said catch and lug. Around the pivot 9 is coiled a spring 10, having projecting spurs 10' and 10'' supporting said catch in a raised position. A spiral spring 11, secured to the wall H and tensioned against the door F, tends to force the latter away from its vertical position on its pivot or hinge 12. The catch 6 is provided with apertured ears 13 13, pivoted to opposite inner sides of the projections 8, on a pin or pivot 14, and has a hook 15, adapted to engage the hook 16 on catch 5. The wall plate or bracket 4 has a portion of its body stamped out, leaving a bar or stop 17 slightly curved away from the face of the plate, so as to engage the ends of arms 18 of the catch 6 and prevent upward movement of said arms or rotation of the catch in the same direction. A chain 19 or its equivalent passes between the arms 2', lugs 8, and arms 18 from floor to floor, as shown in Fig. 1. The lower end of this chain carries a weight 20, and the upper end passes over pulleys 21 and 22 over the topmost floor and terminates in a slotted bar or link 23. The latter is linked to a hook 24, pivoted at 25 to any suitable stationary part on or of the building. The hook 24 has a finger 26 engaging a detent 27 of elbow-lever 28, pivoted at 29. A stop or pin 30 prevents rotation of the hook 24 and finger 27 toward the left when in normal position. (Shown in Fig. 1.) The upper end of a divided rod, chain, or its equivalent 31 is pivoted to the free end of lever 28, and the lower end is anchored in any suitable manner in the lower part of the building. The rod 31 is made in sections, one section for each floor, and each of said sections consists of a strap or connection 32, pivoted or linked to the lever 28 at

the top floor or to the section above it, as the case may be. The adjacent ends of connections 32 are provided with, respectively, an upper coupling member 33 and a lower coupling member 34. The member 33 is substantially of link form, as shown in Fig. 9, and the lower member 34 consists of a block 35, having a slot 36 and a lug 36'. In the slot is fulcrumed at 37 a lever 38, provided with a spur 38', limiting its rotation against lug 36'. Lever 38 has also a hook 39 and an arm 40, through which said hook is disengaged from said link 33 by a weight 41. The latter is suspended from a chain 42, passing over a pulley 43 to a wire 44. The connections or coupling members 33 and 34, as well as weight 41, are suspended within a cabinet-like casing 45, fastened to or between walls or any suitable portion of the building. As plainly shown in the cross-section view, Fig. 7, the casing or box 45 has an interior arrangement providing guideways for the weight and coupling members, though this is not essential for carrying out my invention. The hook 39 is held in its normal position by a spring 46, mounted at one end upon a lug 47 upon block 35 and bearing at its opposite end against a pin 48 upon the member 38. Oppositely-projecting studs 49 upon coupling members 33 and 34 guide said members vertically in channels 50 within casing 45. To the chain 19 are clamped a series of lumps or balls of metal 51, serving as trips for the catches 5 and 6 when the chain 19 drops from normal position under action of weight 20.

The wire 44 is arranged in any suitable manner, as along the ceiling of a room or extending from room to room. A portion thereof should of course be near or around the elevator-shaft, so as to be primarily exposed to flames in that vicinity. One end of the wire is attached to the chain 42 and the other end securely fastened or anchored. Wherever a turn is made in the course of the wire I prefer to employ pulley-supports 52, three of which are shown in Fig. 1. At suitable points along the wire 44 its continuity is broken and fuse-links 53 inserted. The fuse-link is shown in Figs. 2, 3, 4, and 5 as consisting of three parts. These parts are lightly soldered together at the ends of overlapping plates 54 and 55 with the interlocking member, Fig. 4, interposed between the overlaps. As shown, this member is substantially of the form of the letter I. The plates 54 and 55 are substantially alike, being stamped to form a trough or channel 56 for the reception of one of the cross-bars 57 of the interlocking member, apertured ears 58, and an intermediate raised portion 59, having a slot 60 there-through, which receive the intermediate bar 61 of the interlocking member, Fig. 4. The thickness of the latter is substantially the same as the combined thickness of plates 54 and 55, so that half of said thickness occupies each of

the slots 60 when plates 54 and 55 are placed together, as shown in Fig. 5. The interlocking member thus locks the plates 54 and 55 against lateral or longitudinal sliding movement against each other, while they are entirely free to drop apart in all other directions. As there is no appreciable lateral strain upon the plates of the link when the wire 44 is under tension so long as said plates lie close together, but very little adhesive force is required to prevent separation of said plates, and it is desirable to use a minimum of such adhesive force, so that the link will operate promptly under the action of heat from a fire in close proximity to it. A single drop of solder at each end of the overlapping portion of the plates is sufficient, and such a quantity being small and entirely on the surface of the plate would soften and permit the plates to drop apart very quickly in the manner indicated by dotted lines, Fig. 5. Where the fusible element or solder is a link, pin, or rivet, the whole body of said element must melt before there can be a separation of the wire 44, whereas a comparatively small degree of heat in the link itself, a harder substance and a better conductor than the solder, will cause it to release itself from said solder.

In case of fire in close proximity to the elevator-shaft or to the fusible link 53, wherever one happens to be, the heat will soften or melt the solder holding the plates 54 and 55 in contact and permit said link to drop apart, releasing weight 41 to drop on arm 40, thus releasing hook 39 from link 33. The spur 38' on lever 38 engaging lug 36' will prevent the arm 40 from rotating far enough to permit the weight 41 to pass it. Hence said weight 41 will be arrested by the arm and prevented from dropping farther than necessary to release the hook 39. The hook having released the link 33, the lever 28 and its detent 27 will be released from engagement of the finger 26 under action of the weight 20 on chain 19, which will rotate the hook 24 to release the slotted bar or link 23 in engagement with said hook. As the chain 19 drops the releasing-balls 51 will force arms 18 of catch 6 downward, releasing said catch from its complementary member. Catch 5 and the doors H and I under pressure of springs 11 will force out the keepers 2 and drop into their closed positions across the shaft, thus preventing a conflagration from spreading from floor to floor through the elevator-shaft.

The releasing mechanism directly operated by weight 41 being boxed up cannot be tampered with and cannot be operated except by breaking the chain 42 or wire 44. An upward pull on the connections comprising straps 32, link 33, block 34, and its hook 39, so far as said connections are exposed between boxes 45, will not accidentally operate to close the doors, because said connections are firmly anchored at their lower end. A downward pull

on said connections will be resisted by the stop or pin 30. The chain 19 is also protected against pull upon it in either direction, because the only way in which the catches 5 and 6 can be released through such a pull is by lowering said chain, so that the releasers 51 will rotate the arms 18, and said chain 19 is anchored at a high point on hook 24, which, moreover, cannot be rotated without releasing the connections passing through boxes 45. The safeguards my invention provides against accidental operation of the doors are very important, owing to the great liability of curious pulling upon the connections in places where they are necessarily exposed.

It is obvious that numerous modifications may be made in the embodiment of my invention without departing from the spirit thereof, and I therefore do not wish to confine my invention to the exact details of construction herein shown and described.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a door, of a keeper, a catch holding said keeper in engagement with said door, a weighted chain and a trip thereon both normally free of said catch, supporting means for said chain and means for releasing said supporting means.

2. The combination, with a door, of a keeper, a catch holding said keeper in engagement with said door, a weighted chain suspended near said catch, a trip arranged upon said chain to occupy a position normally above said catch, a chain of anchored connections supporting said chain, and means for breaking the continuity of said connections.

3. The combination, with a door, of a pivoted keeper therefor, a catch holding said keeper in engagement with said door, a

weighted chain passing over a suitable support and carrying a trip for releasing said catch, a tripping mechanism restraining said chain, an anchored connection controlling said mechanism, and means for parting said connection.

4. The combination, of a series of door-keepers normally held in retaining position, a chain having a series of trips thereon for releasing said keepers and passing over a suitable support, a main weight, a series of separable connections, and tripping mechanisms for separating said connections.

5. The combination, of a pivoted door-retaining lever, a catch engaging said lever and serving to hold its free end in engagement with the door, a chain having a trip thereon for releasing said catch, a weight for actuating said chain, tripping mechanism normally supporting said chain, and an auxiliary weight suspended by fusible connections and serving to move said tripping mechanism.

6. The combination of a series of door-retainers normally held in retaining position, a chain having trips thereon serving to release said retainers and passing over a suitable support, a main weight tending to move said chain, a series of connected tripping mechanisms normally supporting said chain and a series of auxiliary weights suspended by independent fusible connections and serving to move said tripping mechanisms.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALBERT D. CAYWOOD.

Witnesses:

PAUL GERHARDT,

HANS R. KELLERSBERGER.