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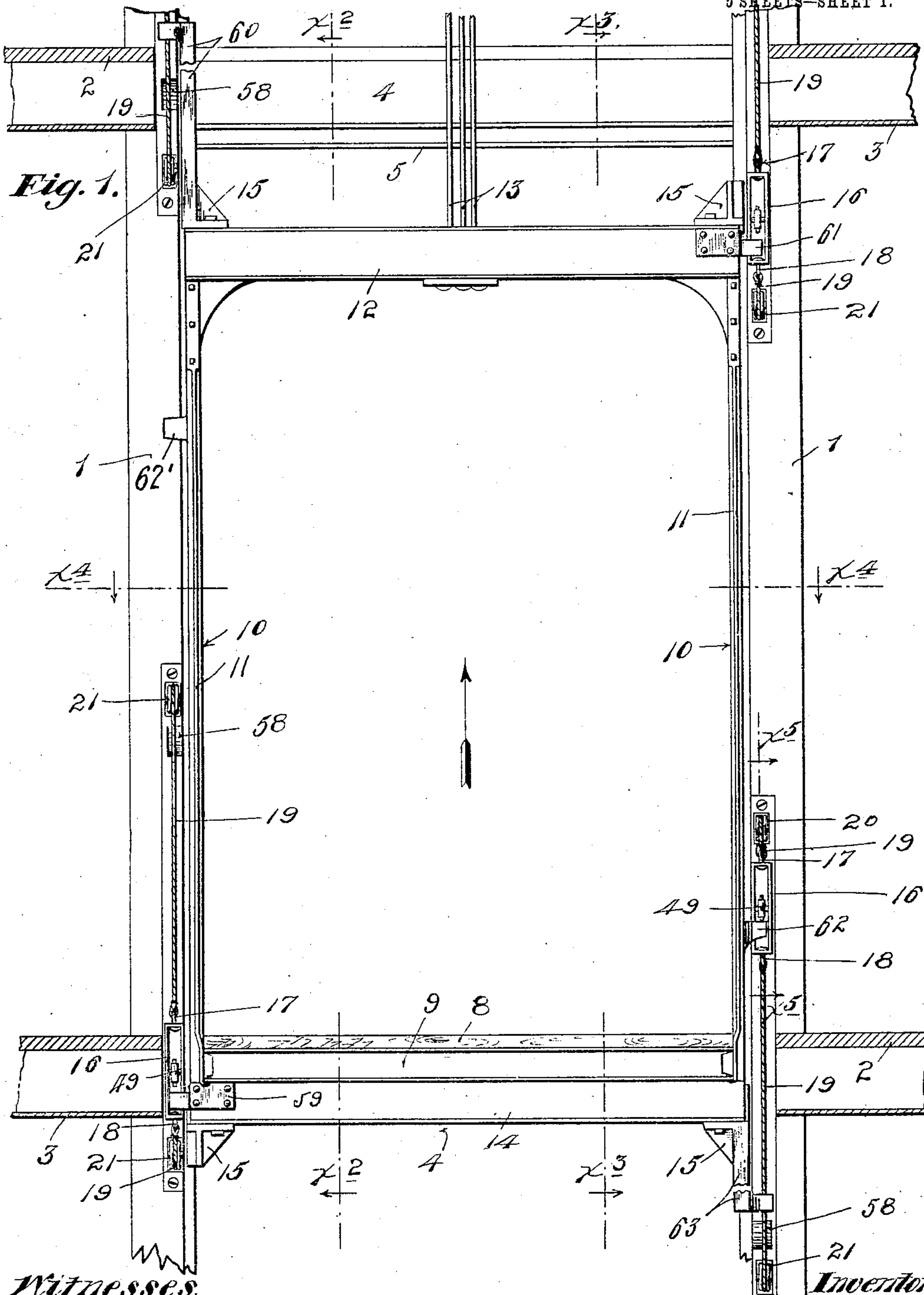
PATENTED NOV. 26, 1907.

W. C. SMITH.

FLOOR GATE ACTUATING DEVICE FOR ELEVATORS.

APPLICATION FILED APR. 8, 1907.

5 SHEETS—SHEET 1.



Witnesses:
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Leon B. Losey.

Inventor:
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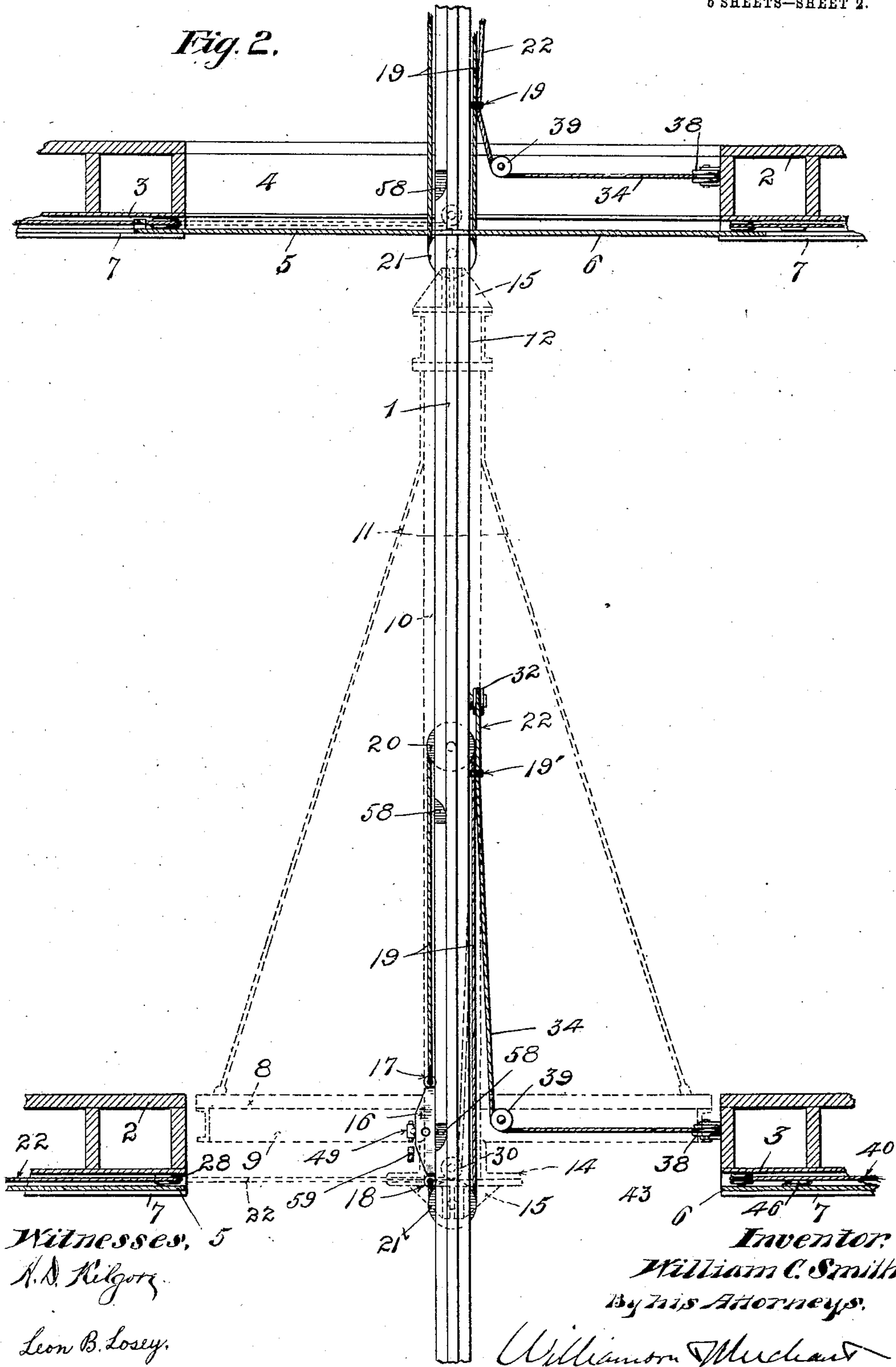
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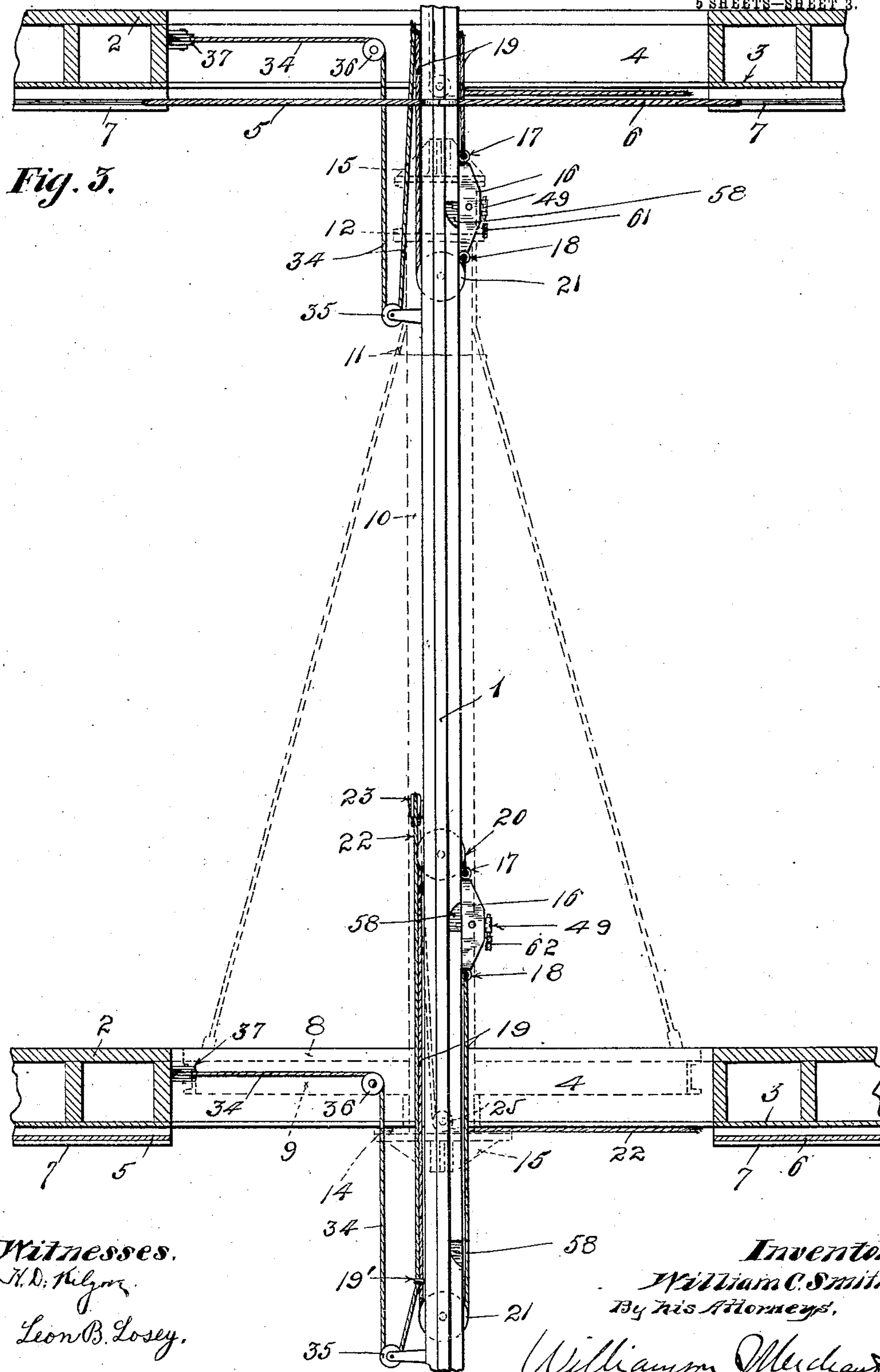


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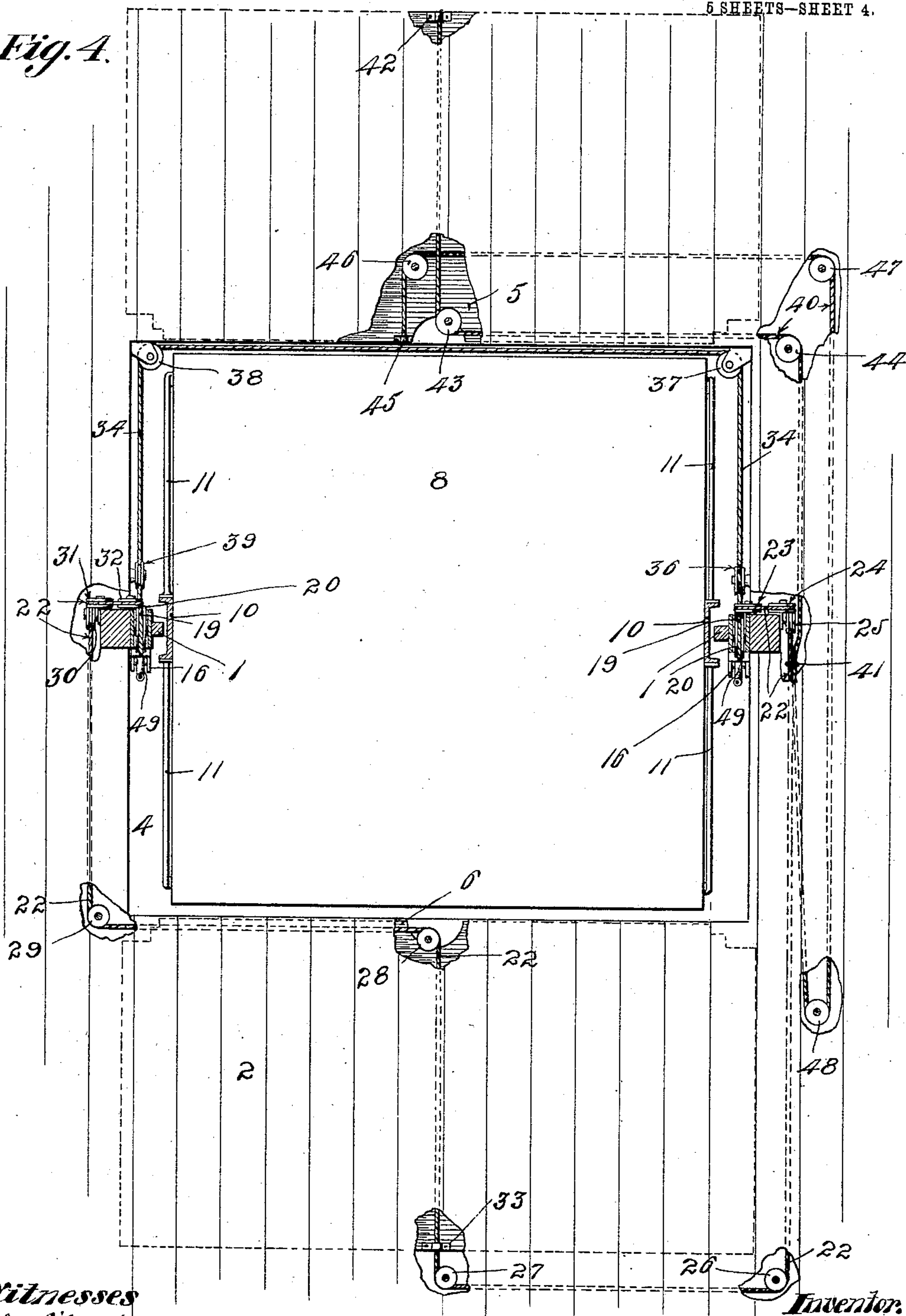
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Fig. 4.



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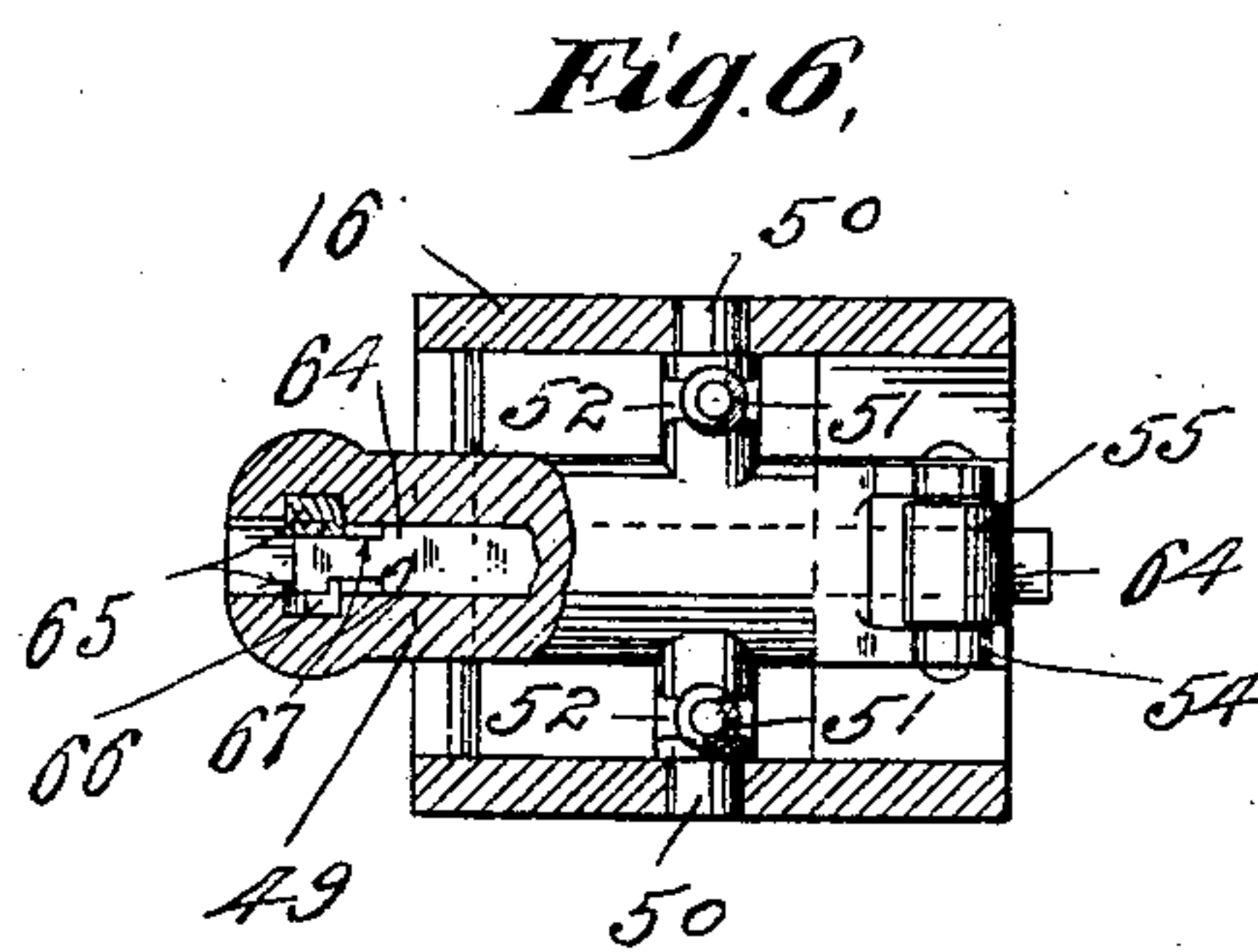
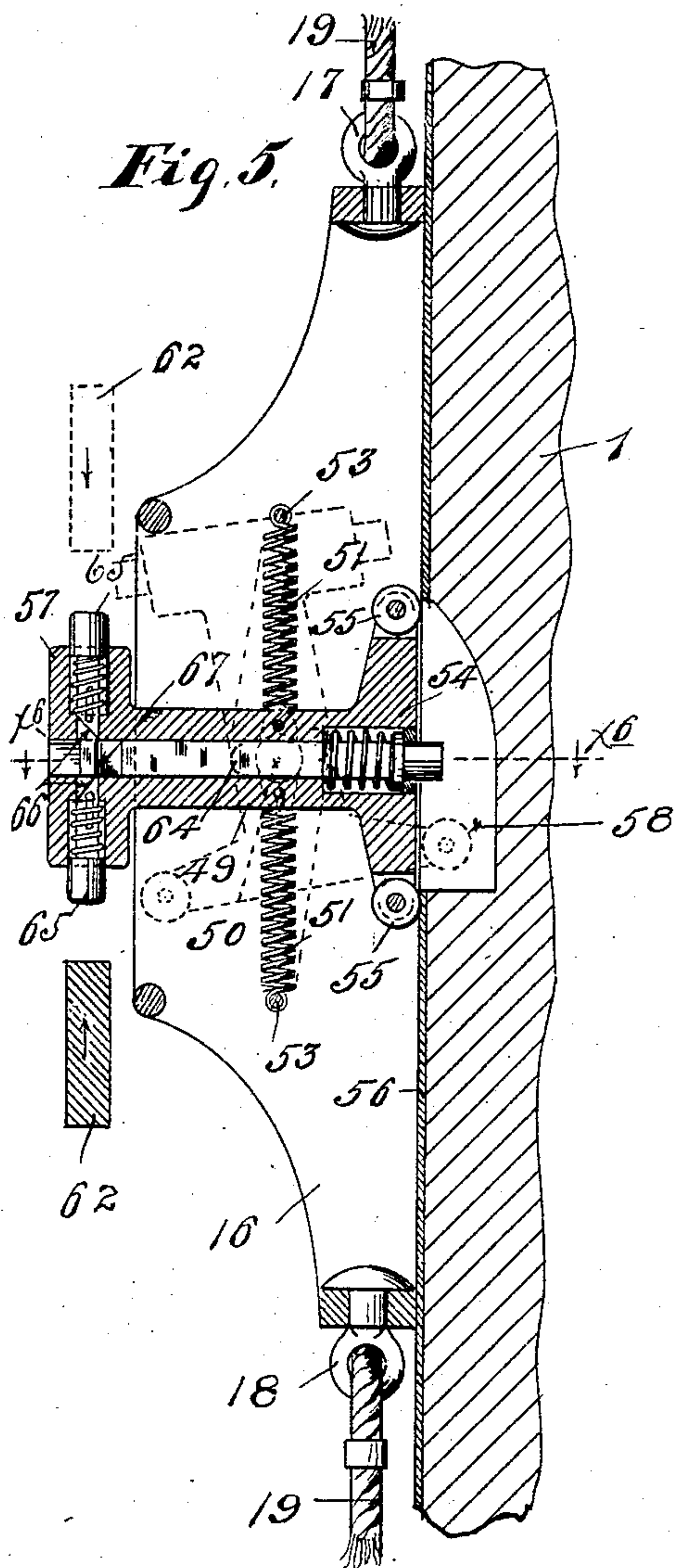
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

WILLIAM C. SMITH, OF MINNEAPOLIS, MINNESOTA.

FLOOR-GATE-ACTUATING DEVICE FOR ELEVATORS.

No. 871,898.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed April 8, 1907, Serial No. 366,955.

To all whom it may concern:

Be it known that I, WILLIAM C. SMITH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Floor-Gate-Actuating Devices for Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its especial object to provide an improved device for automatically opening and closing elevator shafts, and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view principally in side elevation showing my invention as applied to an elevator shaft, some parts being broken away and some parts sectioned. Fig. 2 is a vertical section taken on the line $x^2 x^2$ of Fig. 1, with some parts illustrated by dotted lines. Fig. 3 is a vertical section taken on the line $x^3 x^3$ of Fig. 1, with some parts illustrated by dotted lines. Fig. 4 is a horizontal section taken on the line $x^4 x^4$ of Fig. 1, some parts being broken away and some parts sectioned. Fig. 5 is a detail on an enlarged scale, taken on the line $x^5 x^5$ of Fig. 1. Fig. 6 is a detail taken approximately on the line $x^6 x^6$ of Fig. 5.

The numeral 1 indicates the vertical guides for the elevator car. The numeral 2 indicates two of the floors, and 3 two of the ceilings of a building, the same having the usual openings 4 through which the elevator cars may pass.

The shaft openings 4 in the floors 2 and the ceilings 3, are adapted to be opened and closed by a gate preferably made up of two sections 5 and 6. These sections are adapted to slide horizontally in suitable guide grooves 7 secured to the ceilings 3, as shown in Figs. 2 and 3. In practice, of course, the openings 4 in each of the several floors of the building, through which the elevator shaft is passed, should be provided with a gate of the kind described.

Only the main parts of the elevator car are

shown in the drawings. Of the parts shown, the numeral 8 indicates the car floor or platform resting upon a rectangular channel-shaped frame 9, which is rigidly secured to a pair of laterally spaced uprights 10, which, as shown, are provided with suitable braces or stay rods 11. The uprights 10 are tied together at their upper portions by a heavy transverse beam 12, to which the car supporting cables 13 are attached in the usual or any suitable way. A heavy transverse beam 14 is also secured to the under side of the rectangular frame 9, to the outer ends of which, and to the outer ends of the beam 12, are secured suitable guides 15 adapted to slide upon the vertical guides 1.

To operate the gate sections 5 and 6 there is provided, for each floor of the building equipped with said gate sections 5 and 6, a pair of gate operating devices, one for opening and the other for closing said gate sections. These gate operating devices are located, one on each of the vertical guides 1, as shown, but if preferred may be located both on the same vertical guide 1. The gate operating devices will be described in the singular for the sake of brevity.

The numeral 16 indicates a rectangular carrier frame, having secured at its upper end an eye 17, and to its lower end an eye 18. A cable 19, having one end secured to the eye 17 and the other end to the eye 18, runs over a pair of sheaves 20 and 21 mounted in one of the vertical guides 1. These sheaves 20—21 are of such size as to project through each side of the vertical guide 1, sufficiently, so as to allow the cable 19 to run quite close to both sides of said guide 1. To the intermediate portion of the cable 19 which runs over the guide sheaves 20 and 21 located in the vertical guide 1 to the right with reference to Fig. 4, a long cable 22 is secured by a clip 19' (see Fig. 3). Said cable 22 first runs upward and over guide sheaves 23—24 and under a guide sheave 25 secured to the vertical guide 1; thence said cable 22 runs over the guide sheaves 26, 27, 28 and 29 secured to the under side of the floor 2 (see Fig. 4); thence under the guide sheave 30 and over the guide sheaves 31 and 32 secured to the vertical guide 1 to the left, with reference to Fig. 4. Said cable then runs upward and is secured by clip 19' to the intermediate portion of the cable 19 which runs over the guide sheaves 20 and 21 located in the vertical guide 1 just referred to.

The cable 22, between the guide sheaves 27 and 28, is secured to the upper and rear portion of the gate section 6 by a suitable clamp 33 (see Fig. 4). It is evident, that if the carrier frame 16, shown in Fig. 2, is moved upwards, the gate section 6 will slide over one-half of the opening 4, through the cable connections 22; and since said cable is connected to both the left and right hand cables 19, the right hand carrier frame 16 (see Fig. 3) will move downward at the same time that the left hand carrier frame 16 is moving upward. A cable 34 is also secured to the clips 19', at its two ends, (see Figs. 2 and 3). In fact, this cable, if desired, may be a continuation of the cable 22. With reference to Fig. 3, the cable 34 first runs down and under a guide sheave 35 secured to the vertical guide 1; thence upward and over the guide sheaves 36, 37, 38 and 39 secured to the sides of the opening 4 (see Fig. 4); and thence upward to the clip 19' (see Fig. 2). As is evident, when the carrier frame 16, with reference to Fig. 3, is moved upward, the carrier frame 16 on the opposite vertical guide 1, will move downward, through the cable connection 34.

To open and close the gate section 5 simultaneously with the gate section 6, a long cable 40 is secured, approximately at its intermediate portion, by a clip 41 to the cable 22 between the guide sheaves 25 and 26 (see Fig. 4).. One end of the cable 40 is secured to the rear upper portion of the gate section 5 by a suitable clamp 42. That portion of the cable 40, between the clip 41 and the clamp 42, runs over guide sheaves 43 and 44 secured to the under side of the floor 2. The other end of the cable 40 is secured to the forward upper portion of the gate section 5 by a suitable clamp 45, and that portion of the cable 40, between the clip 41 and the clamp 45, runs over guide sheaves 46—47 and 48. As is evident, when the gate section 6 is moved so as to either open or close one-half of the opening 4 adjacent thereto, the gate section 5 will be moved simultaneously to either open or close the other half of said opening, through the cable connection 40.

A push block 49, adapted to rotate between the side walls of each carrier frame 16, is provided with short trunnions 50 mounted in seats formed in said side walls. As shown, four springs 51, are connected to lugs 52 on the trunnions 50, and to pins 53 secured to the side walls of said carrier frame 16. These springs 51 tend to hold the said push block 49 in its normal or horizontal position, as best shown in Fig. 5. Said push block 49 is also provided with oppositely extended feet 54, having journaled therein wheels 55, which are adapted to run over respective wearing strips 56 secured to the vertical guides 1. The said push block 49 is further provided with oppositely extended

bosses 57. For each push block 49, the guide 1 is provided with a pair of pockets 58 to trip said push block and limit the travel thereof, and on account of the shape of said pockets 58, one of the rollers 55 always rests upon the wearing strip 56 after said push block has been tripped.

To trip the push blocks 49 and to cause the carrier frame 16 to travel up and down, to open and close the gate sections 5 and 6, the elevator car is provided on its left hand side (see Fig. 1), with a short arm 59 secured to the beam 14, a short intermediate arm 62' secured to one of the supports 10, and with a long upwardly projecting arm 60 secured to one of the guides 15 on the beam 12. The right hand side of the elevator car is provided with a short arm 61 secured to the beam 12, a short intermediate arm 62 secured to one of the supports 10, and a long downwardly projecting arm 63 secured to the beam 14. All of the arms, 59 to 63 inclusive, are of such length and shape as to have engagement with the several bosses 57 of the push blocks 49, at the proper time.

To lock the gate sections 5 and 6 in either their open or closed positions, a spring pressed lock bolt 64 is mounted for sliding movement through the central portion of the push block 49. Said lock bolt 64 normally projects through the end of the push block 49 and into any one of the several pockets 58 (see Fig. 5). To withdraw the lock bolt 64 from the pockets 58, spring pressed plugs 65 are mounted, one in each boss 57, and normally project above the upper surface thereof. Said plugs are adapted to be compressed by any one of the several levers 59 to 63 inclusive. The end of the plugs 65, which project within the bosses 57, are beveled to form cam surfaces 66, for engagement with shoulders 67, formed one in each side of the lock bolt 64, to withdraw said lock bolt from the pockets 58 before the carrier frame 16 and the push block 49 start to move up or down, as the case may be.

The operation may be briefly stated as follows: As shown in Fig. 2, the opening 4 in the upper floor is closed by gate sections 5 and 6, and the opening in the lower floor is open. When the elevator car moves upward in the direction of the arrow marked in Fig. 1, the arms 60 and 62 will first engage the lower bosses 65 in the push blocks 49 of the two carrier frames 16 standing in their uppermost position, one being located at each floor, the one on the left not being shown. The carrier frames 16, and parts carried thereby, when in their uppermost position, will cover the uppermost pockets 58, as best shown in Fig. 5. As the elevator continues to move upward, the push blocks 49, engaged by the arms 60 and 62, will be swung into the position indicated by dotted lines in Fig. 5, thereby permitting said arms

60 and 62 to pass said push blocks. Before the arms 60 and 62 have released said push blocks, the arms 59 and 61 will engage the lower plugs 65 of the push blocks 49 of the two carrier frames 16 standing in their lowermost position, one being located at each floor, (see Fig. 1), and will force the plugs 65 into their seats, thereby withdrawing the lock bolts 64 from the pockets 58. Under the continued movement of the arms 50 and 61, the two carrier frames 16 engaged thereby, will be moved upward, and at the same time will cause the two carrier frames 16, engaged by the arms 60 and 62, to move downward through the cable connections 19. The two carrier frames 16 will have moved down sufficiently, before being released by said arms, to withdraw the lock bolts 64 from the pockets 58. The arms 59 and 61 will continue to move the carriers 16 engaged thereby, upward until the uppermost pockets 58 are reached, at which time the push blocks 49 carried by said carriers will trip and permit said arms to pass. At the same time that the carriers moving upward reach the uppermost pockets, the carriers moving downward will reach the lowermost pockets, and the lock bolts 64 carried thereby will enter the several pockets 58 and lock the carriers against movement in either direction, and at the same time will lock the gate sections through the cables connecting said carriers and gate sections. As the elevator descends, the gate sections will be opened and closed in the same manner as above described, with the exception that the arms 62' and 63 will release the lowermost carriers 16, and the arms 59 and 61 will move the uppermost carriers 16 downward, and through the cable connections 19 will move the carriers released by the arms 62' and 63, upward, to open and close the several gate sections.

What I claim is:

1. The combination with an elevator car, a pair of guides therefor and a floor gate, of a pair of push blocks adapted to travel on said guides, means for connecting said floor gate and said push blocks, a lock for locking each of said push blocks to said guides, and means carried by said elevator car to release said locks and for engagement with said push blocks, to open and close said floor gate, substantially as described.

2. The combination with an elevator car, a pair of guides therefor and a two part floor gate, of a pair of push blocks adapted to

travel on said guides, means for connecting said gate sections and said push blocks, locks mounted in said push blocks for locking engagement with said guides, and means carried by said elevator car to release said locks and for engagement with said push blocks, to open and close said gate sections, substantially as described.

3. The combination with an elevator car, a pair of guides therefor and a two part floor gate, of a carrier frame adapted to travel on one of said guides a predetermined distance, means for connecting said floor gate sections and said carrier frame, a push block carried by said carrier frame, and arms carried by said elevator car for engagement with said push block, to open and close said floor gate sections, there being a pair of pockets in said guide, to permit said push block to swing out of engagement with said arms and permit said arms to pass by the same, substantially as described.

4. The combination with an elevator car, a pair of guides therefor, and a two part floor gate, of a pair of carrier frames adapted to travel on said guides a predetermined distance, means for connecting said floor gate sections and said carrier frames, push blocks carried by said carrier frames, arms carried by said elevator car for engagement with said push blocks, to open and close said gate sections, there being pockets in said guides to permit said push blocks to trip and swing out of engagement with said arms and permit said arms to pass the same in either direction of travel of said elevator car, and locks for locking said push blocks to said guides, and adapted to be released by said arms, substantially as described.

5. The combination with an elevator car, a pair of guides therefor, and a floor gate, of a push-block adapted to travel on one of said guides, means for connecting said floor gate and said push-block, a lock for locking said push-block to said guide, and means carried by said elevator car to release said lock and for engagement with said push-block to open and close said floor gate, substantially as described.

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

WILLIAM C. SMITH.

Witnesses:

H. D. KILGORE,

F. D. MERCHANT.