Aug. 20, 1935. M. C. DE WOLFE 2,011,893

ELEVATOR

Filed July 2, 1934 2 Sheets-Sheet 1

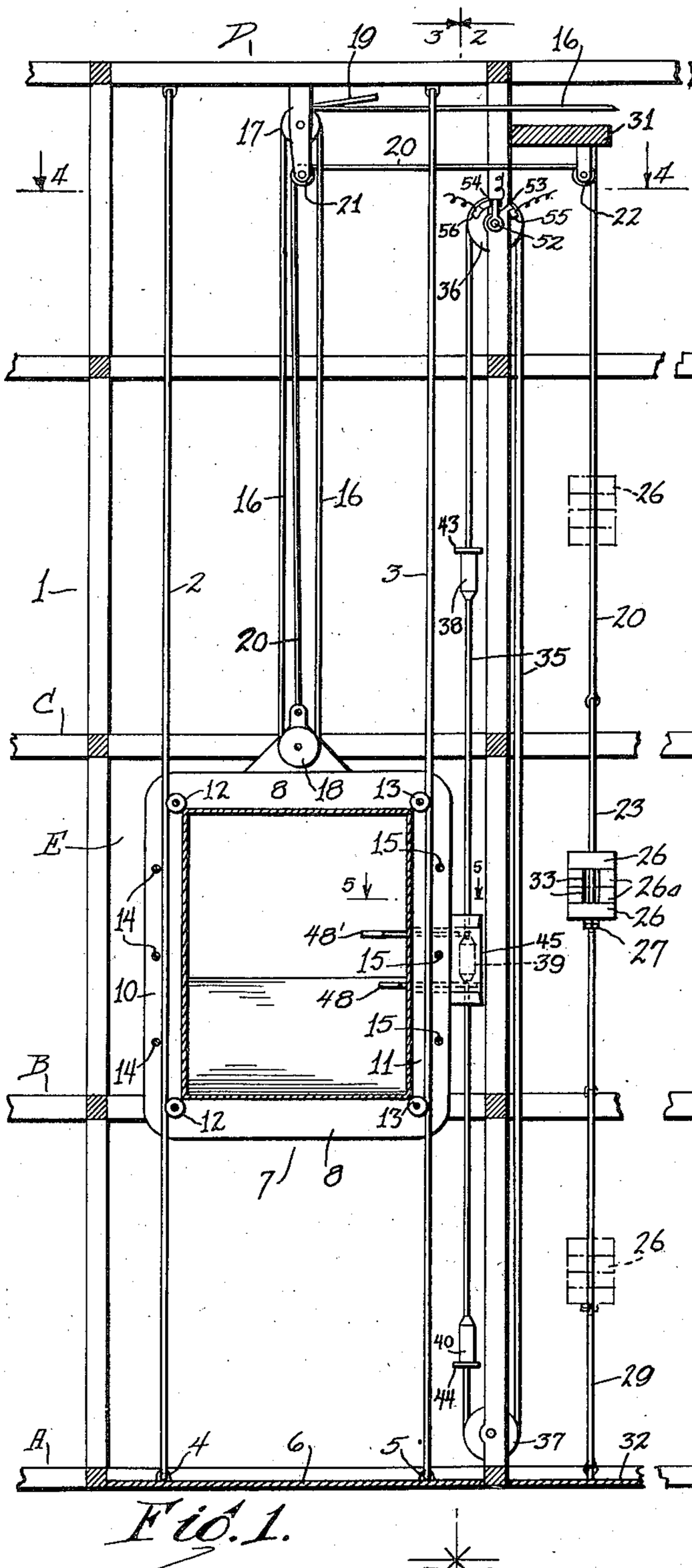

Fig. 1.

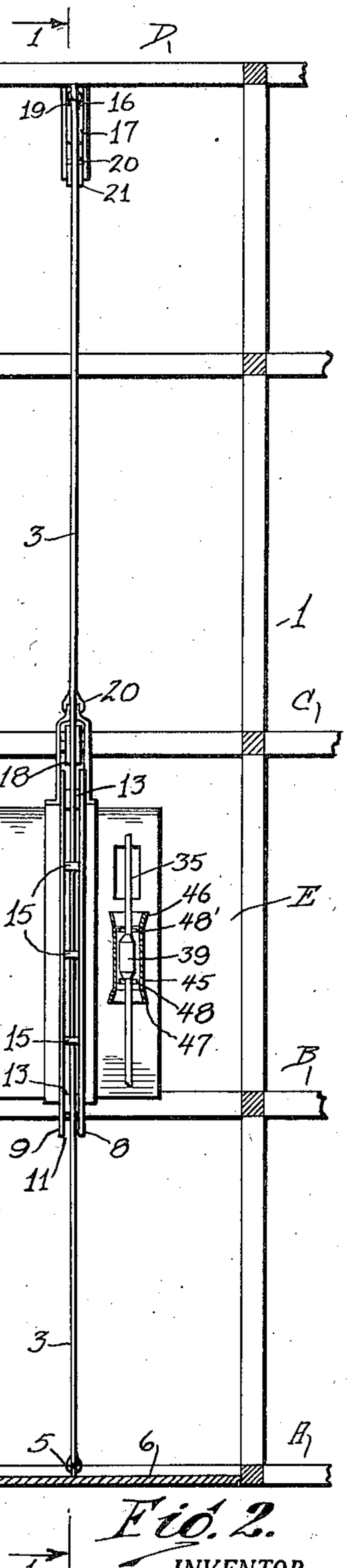

Fig. 2.

INVENTOR.
MARK C. DE WOLFE
BY Wynn, Anderson & Liddy
ATTORNEYS.

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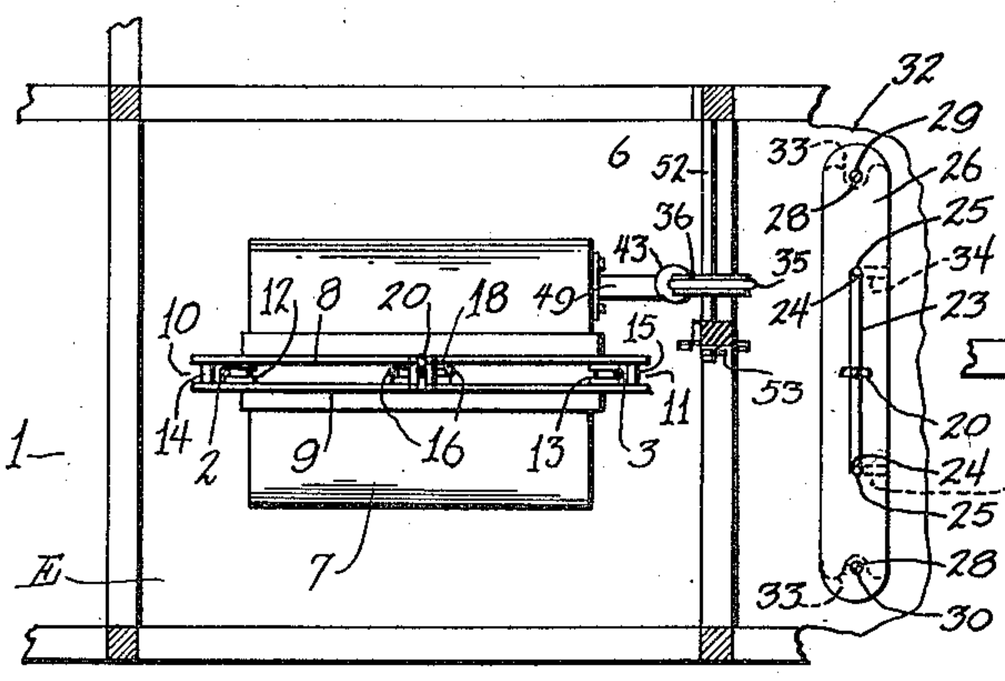

Fig. 4.

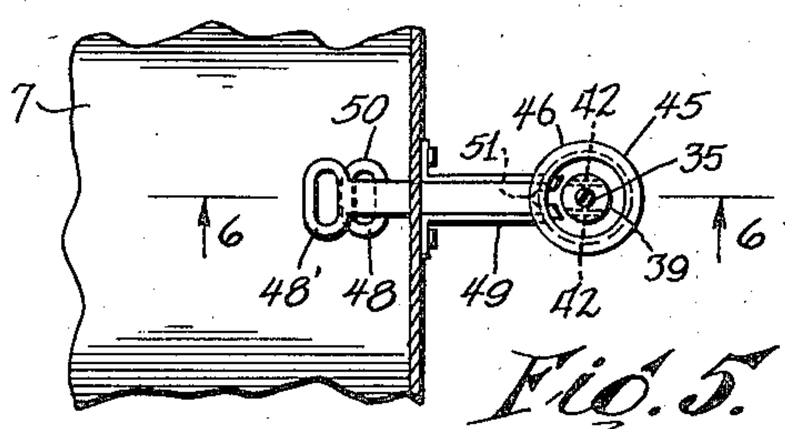

Fig. 5.

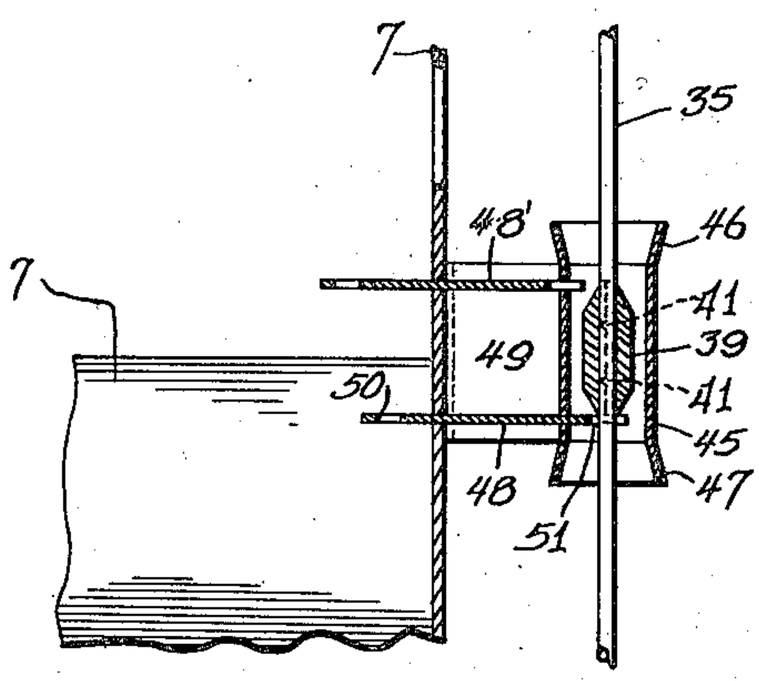

Fig. 6.

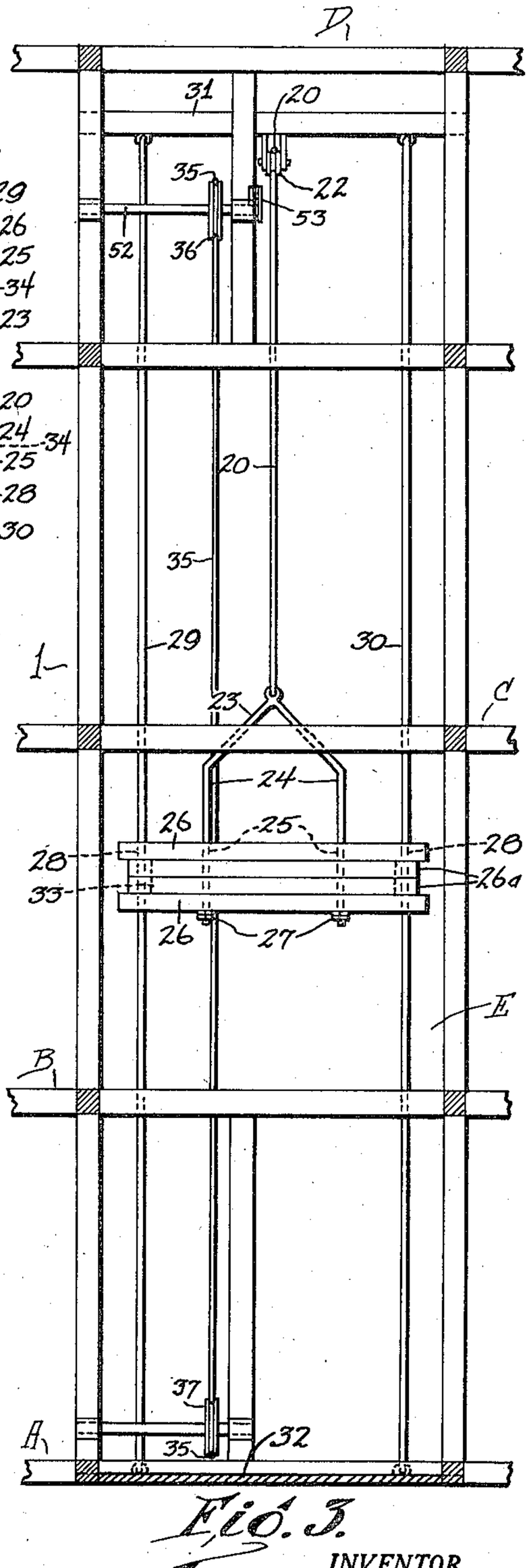

Fig. 3.

INVENTOR.
MARK C. DE WOLFE
BY Quinn, Anderson & Liddy
ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,011,893

ELEVATOR

Mark C. De Wolfe, Oakland, Calif.

Application July 2, 1934, Serial No. 733,498

4 Claims. (Cl. 187—43)

My invention relates to improvements in elevators, and it consists of the combinations, constructions and arrangements hereinafter described and claimed.

An object of my invention is to provide an elevator in which the cage or skip is guided in its vertical movement by cables, and in which the counter-weight for the elevator is also guided in its movement by cables. The cables may be supported by any structure desired, such as a boom or the frame of a building, etc. The weights may be adjusted for counter-balancing the load of the cage, and thus to take care of different cage weights.

I also provide novel means for automatically stopping the cage at desired levels, this means being controlled by the operator in the cage. The means are so constructed as to prevent the elevator from being started from a point exteriorly of the cage, and in this way the safety of the occupants in the cage is materially helped. The device for controlling the stopping of the elevator at different levels can be actuated when the elevator is moving up or down.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings form a part of this application, in which

Figure 1 is a section along the line 1—1 of Figure 2;

Figure 2 is a section along the line 2—2 of Figure 1;

Figure 3 is a section along the line 3—3 of Figure 1;

Figure 4 is a section along the line 4—4 of Figure 1;

Figure 5 is a section along the line 5—5 of Figure 1; and

Figure 6 is a section along the line 6—6 of Figure 5.

In carrying out my invention I provide a supporting structure indicated generally at 1, and which in the drawings is shown as a building frame. It is obvious, however, that this supporting structure may be a boom or the leg of a tower, etc. In the supporting structure I show three platforms A, B and C. I further show a gallus frame D from which are suspended guide cables 2 and 3. These cables have their lower ends anchored at 4 and 5 to a base plate 6 which, in turn, forms a part of the building frame.

Within the well E formed by the building frame I slidably mount a cage 7, and this cage or skip has angle irons 8 and 9 which entirely surround it, see Figures 1 and 4. The angle irons form channels 10 and 11 for the guide cables 2 and 3. Pulleys or sheaves 12 and 13 are mounted in the guide channels 10 and 11 and ride on the guide cables 2 and 3. If desired rollers 14 and 15 may also be mounted in the guide channels 10 and 11 and prevent the guide cables 2 and 3 from pulling free from the guide channels 10 and 11.

The means for lifting the cage is shown in Figure 1, and comprises a load cable 16, which is passed over a sheave 17, then around a sheave 18 which is connected to the cage. The cable 16 is wrapped around a drum not shown, and the drum is actuated in the ordinary manner for raising and lowering the cage. If desired a safety cable 19 may be wrapped around the same drum and passed over the sheaves 17 and 18, and this cable will support the cage in case the load cable 16 breaks.

In Figures 1 and 3 I show the novel means for balancing the cage. A cable 20 is passed from the cage 7 over a pulley 21, then over a pulley 22. The end of the cable 20 is secured to a fork-shaped member 23, see Figure 3 and the legs 24 of this member extend through openings 25 in counter-weights 26. The lower ends of the legs 24 are threaded and receive nuts 27.

The lowermost and the uppermost weights 26 are of the shape shown in Figure 4. These weights have openings 28 for slidably receiving guide cables 29 and 30 which, in turn, are secured at their upper ends to a cross piece 31, and are anchored at their lower ends to a base plate 32. The intermediate counter-weights 26—*a* are provided with recesses 33, see Figure 4, for receiving the guide cables 29 and 30. The intermediate counter-weights are arranged for quick assembly and removal, and have slots 34 for receiving the legs 24 of the fork-shaped member 23. If the load carried by the cage is heavy, additional intermediate counter-weights 26—*a* can be disposed between the top and bottom weights 26. If the weight of the load is changed so as to lighten the load in the cage, certain of the intermediate weights 26—*a* can be removed. In this novel manner the cage can be balanced for different weights.

I also show means for controlling the cage or elevator so that the operator in the cage can bring it to a stop at any of the floor levels A, B and C. An endless control cable 35, see Figure 1, is passed around pulleys 36 and 37, and is provided with buttons 38, 39 and 40. Figures 5 and 6 show the button 39 as comprising two separable halves, one-half having projections 41, and the

other half having recesses for receiving the projections.

Screws **42** may be used for clamping the two halves about the control cable **35**. The buttons **38**, **39** and **40** are adjusted on the control cable so that they will be disposed opposite the cage when the cage is at a floor level. It will be seen that the top button **38** has a disc **43** disposed at its upper end, while the button **40** has a disc **44** disposed at its lower end.

The cage or elevator **7** carries a sleeve **45**, see Figure 6, and this sleeve has flared ends **46** and **47** for receiving the buttons **38**, **39** and **40** as the cage moves upwardly or downwardly. A sliding fork-shaped member **48** is mounted in the bracket **49** carrying the sleeve, and this fork-shaped member has a handle **50** which permits the operator to move the slide and cause the recess **51** of the fork to slidably receive the control cable **35**. If the operator wishes to stop the cage at the floor level B, he moves the slide **48** into operative position and when the slide contacts with the button **39**, it will move the button and the control cable **35**, and will cause the cable to rock the pulley **36**. This rocking movement rocks a shaft **52** which supports the pulley and the shaft swings a contact arm **53**, see Figure 1, from the contact **54**, which closes a circuit to a motor, not shown, onto a contact **55** which closes a circuit to a braking mechanism not shown. The motor controlled by the closing of the contact **54** actuates the drum around which the load cable **16** is wound. The contact **55** when closed actuates the braking mechanism which stops further rotation of the load cable drum.

When the operator wishes to cause the cage to move from the floor B to the floor C, he releases the slide **48** and pulls downwardly on the control cable **35** and closes the switch arm **53** with the contact **54**. This causes the motor to actuate the drum for moving the cage. When the cage reaches the floor level C the sleeve **45** abuts the disc **43** and again moves the control cable **35** for applying the braking mechanism to the load cable drum.

In the downward movement of the cage a second control slide **48'** is used and operates in the same manner as the slide **48** except that the slide **48'** strikes the top of the button **39** instead of the bottom.

When the cage reaches the lower platform A a sleeve **45** strikes the disc **44** and moves the control cable for rotating the holder **36** in an opposite direction for swinging the arm **53** onto a contact **56**, this contact closing the circuit to the same braking mechanism. It will be seen from this that a novel control for the movement of the cage is provided and this control can only be actuated by the operator in the cage.

The guide lines **2** and **3** may be "clamped off" at their tops and bottoms or be carried by a drum so that they can be extended. This permits the lengths of the lines to be extended at will. It is obvious that the elevator can be operated with or without the counter-weights.

The cables **16** and **19** may operate from the same drum as stated in an earlier part of the specification or they may be wrapped around independent drums. The cage or skip **7** is preferably provided with a window adjacent to the control cable **35** for permitting access to the cable by the operator.

The cable **35** can control the motor circuit for the moving of the cage **7**. The operator in the cage has access to an electric control, within the cage, for causing the elevator to move up or down at the will of the operator. The circuit for causing the elevator to pass up or down has the switch arm **53** and the contact **54** in series therewith. The moving of the switch arm off the contact **54** stops the elevator from moving up or down. The switch arm **53** engaging with contacts **55** and **56** closes the circuit to the braking mechanism not shown, which brings the elevator to a quick stop. It is obvious that the cable **35** and switch arm **53** instead of actually controlling the movement of the elevator could flash signal lights to an operating engineer who had control of the movements of the cage.

I claim:

1. In combination, an elevator cage, angle irons encircling the cage and providing vertical guide channels on its sides, guide cables passed through the channels for guiding the elevator cage in its movement, and rollers mounted in the guide channels and being disposed on opposite sides of the cables for holding the cables in the channels.

2. In combination, an elevator cage, means for moving the cage up and down, a counter-weight for the cage and comprising a cable having one end connected to the cage, weights secured to the other end of the cable, pulleys for supporting the cable between the cage and weights, certain of said weights being removable when it is desired to lessen the weights of the counter-weight and additional weights being added when it is desired to increase the weight of the counter-weight, and guide cables for the weights, the upper and lower weights having openings for slidably receiving the guide cables, the intermediate weights having recessed ends for slidably receiving the guide cables.

3. A counter-weight for an elevator comprising guide cables, a fork-shaped member, weights having openings for receiving the legs of the member, means for securing the weights to the member, and weights designed to be placed between the top and bottom weights, these intermediate weights having recessed ends for slidably receiving the guide cables, said first named weights having openings for slidably receiving the guide cables, and a cable for lifting the fork-shaped member and weights and having its other end connected to an elevator cage.

4. In combination, an elevator cage, means for raising and lowering the cage, a control cable for said means, said cable when moved into one extreme position, causing said means to lift the cage and when moved into the other extreme position, causing said means to lower the cage, said cable when moved midway between these positions causing said means to bring the cage to a stop, buttons mounted on the cable and spaced therealong at desired points, a sleeve carried by the cage and slidably receiving the cable and the buttons as the cage is moved, an upper and a lower stop independently movable into the sleeve and engageable with a button passing through the sleeve for causing the button and cable to be moved by the cage for stopping the cage, the upper stop being movable into operative position when the cage is moving downwardly, and the lower stop being movable into operative position when the cage is moving upwardly.

MARK C. DE WOLFE.