(No Model.)

W. F. COLE.

CONTROLLING DEVICE FOR ELEVATORS.

No. 515,930. Patented Mar. 6, 1894.

Fig. 1.

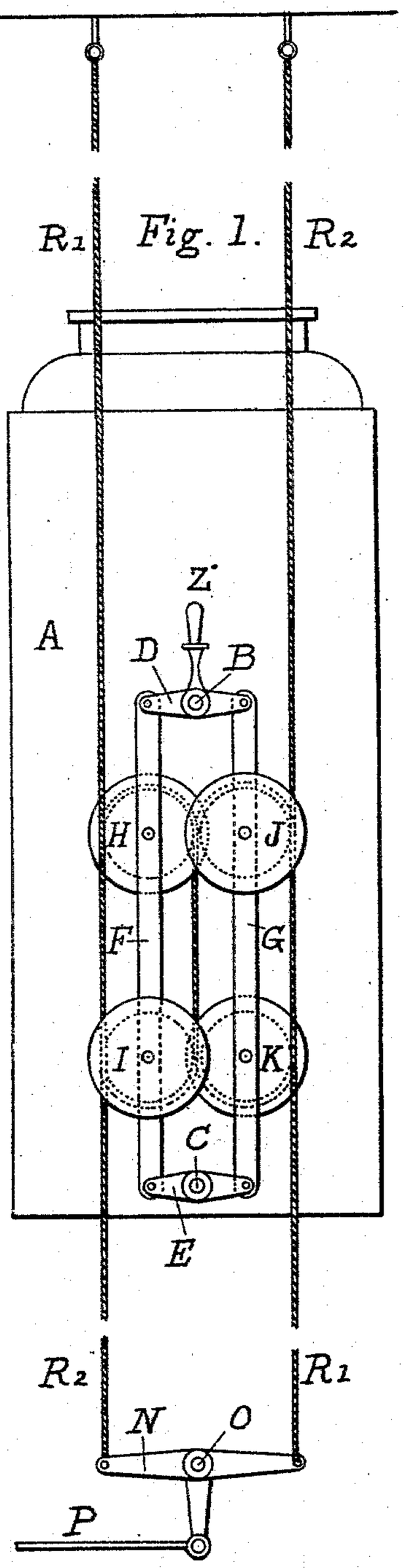


Fig. 2.

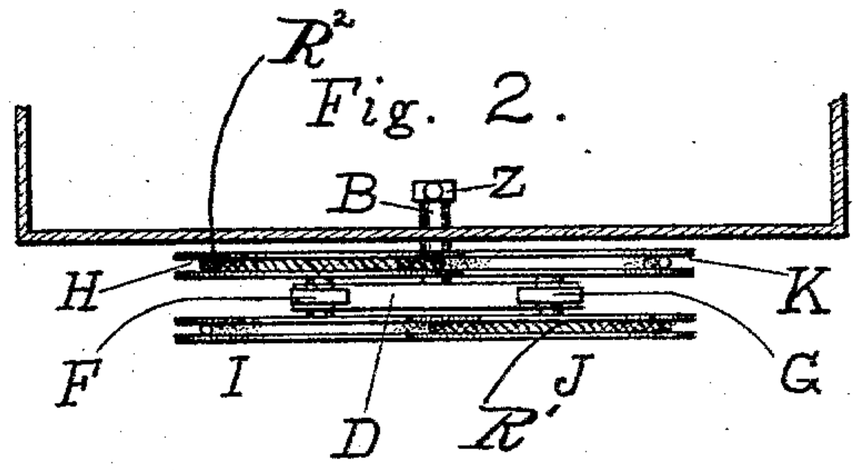


Fig. 3.

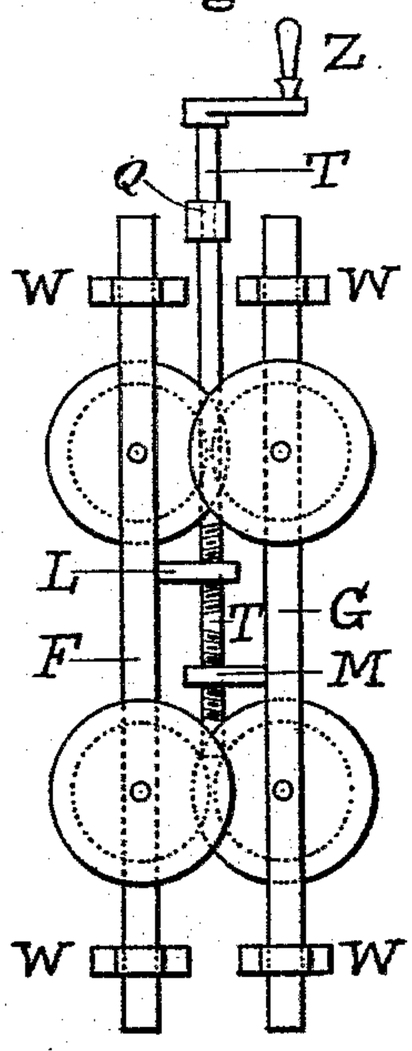


Fig. 5.

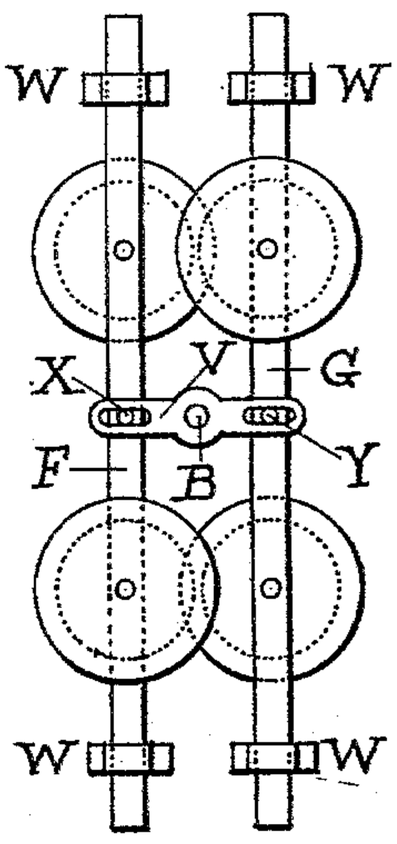
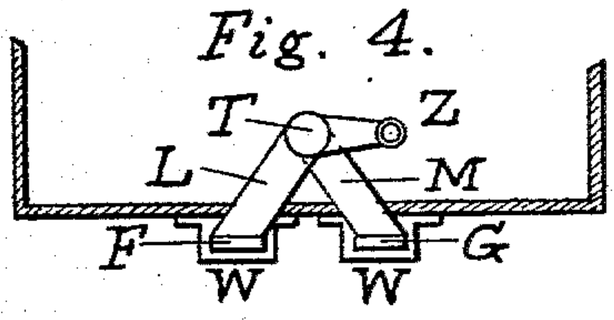


Fig. 4.



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CONTROLLING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 515,930, dated March 6, 1894.

Application filed July 17, 1893. Serial No. 480,766. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. COLE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Controlling Device for Elevators, of which the following is a specification.

My invention relates to that class of controlling devices in which motion is conveyed from the elevator car to the controlling mechanism by means of two standing ropes extending the length of the well room and looped around sheaves carried by the car in such a manner that adjustment of these sheaves by the attendant in the car causes one rope to be paid out or lengthened and the other rope to be taken up or shortened. The controlling mechanism with which the ropes are connected may be a valve, if the elevator is of the hydraulic type, a rheostat or switch if it is of the electric type, or it may be such other device as is suitable to control the power that is employed to operate the elevator.

My invention relates to the arrangement and adjustment of the sheaves on the car and the manner of looping the ropes about these sheaves, and is not concerned with the particular control gear to which the ropes are connected and which they actuate.

To aid in the description of my invention reference is made to the accompanying drawings, in which—

Figure 1 is a side view of sufficient of an elevator to show my device. Fig. 2 is a plan view of part of same. Fig. 3 shows another form of my device in elevation. Fig. 4 shows the same in plan with the sheaves and thrust bearing removed, and Fig. 5 shows a third form.

In Fig. 1, A represents the side of an elevator car with all guides, hoisting ropes, &c., removed as these have nothing to do with my invention.

R′ and R² are two ropes or sections of the same rope, suitably suspended from the top of the elevator well.

N is a lever at the bottom of the well room fulcrumed at O and from which extends the rod P to the controlling mechanism, which as already stated may be any device suitable to control the power employed.

B and C are shafts or studs held by the car, one vertically over the other, and upon which rock the levers D and E. One of the levers [in the drawings lever D] is rigidly connected with an operating handle Z inside the car. The levers D and E are connected at their ends by two parallel bars F and G, each of which bars carries two sheaves arranged one above the other in different but in parallel planes. Bar F carries the sheave H on one side, and the sheave I on the other side; while in a like manner the bar G carries the sheaves J and K on its opposite sides, the arrangement being such that the sheaves H and K stand in one vertical plane, and the sheaves I and J in another vertical plane, parallel to the first as shown by Fig. 2.

The ropes are trained around the sheave wheels in this manner: Section B′, starting from its hitch at the top of the well room, in the plane of the sheaves I and J, passes down, around the under side of sheave I, thence up, over the upper side of sheave J, and thence down again to its connection with the lever N at the bottom of the well room. Section B², starting from its hitch at the top of the well room in the plane of the sheaves K and H, passes down, around the under side of sheave K, thence up, over the upper side of sheave H, and thence down again to its connection with the lever N at the bottom of the well room. Now it is manifest that when the lever D is rocked by the handle Z, the bars F and G are given a vertical motion, one up and the other down, increasing the vertical distance between the sheaves around which one rope section is trained, and decreasing the vertical distance between the sheaves around which the other rope section is trained, so that one rope section is taken up or shortened and the other rope section is paid out or lengthened. The rope sections being fast at the top of the well room, this change in their depending length must be compensated for by motion of the lever N at the bottom of the well.

The looping of the rope sections around the sheaves does not interfere with vertical movement of the car in the well room, as during such movement of the car the sheaves simply revolve on their studs in whatever adjustment they may happen to be.

In the modification shown in Figs. 3 and 4, the two bars F and G are held in position by

sliding through guides W. W. W. W. on the car. L and M are two arms or lugs which project out from the bars F and G and through the ends of which is threaded the screw T, right handed through the lug L and left handed through the lug M while Q is a thrust bearing, through which the spindle of the screw passes to prevent end motion in the same. Consequently when the screw is turned by the handle Z, the arms L and M are either forced apart or drawn together, thus simultaneously giving to one bar an upward and to the other a downward motion. In Fig. 5, the bars likewise slide through guides W. W. W. W. and motion is given to them by a single vibrating lever V with slotted ends, through the slots in which reach the pins X and Y, fastened to the bars. In all these modifications it is important that the distance between the bars be about equal to the diameter of the sheaves, so that those portions of the ropes, which pass from one sheave to the other, as the portions between sheaves I and J and between sheaves H and K may hang vertical or nearly so, and it is also important that the motion of the bars deviate but little from vertical. If the take up and let out of the two rope sections are to be precisely equal, it is necessary that all portions of the rope be always maintained precisely vertical. But in practice, owing to the elasticity of the ropes, the inequality of motion introduced by allowing the ropes to move a little out of vertical lines is so slight as to be unobjectionable.

The second and third forms shown give absolutely equal motion to the two rope sections. In the first form the bars receive a slight lateral motion which destroys the mathematical exactness of the result; but so little as not to impair the practical working. These constructions can be brought into a very small compass making them particularly applicable for use in narrow places. I am aware that prior to my invention standing rope sections in combination with vertically adjustable sheaves carried by the car have been employed for controlling elevators and that sundry patents have already been granted for specific methods of adjusting the sheaves and of training the rope sections around them; but in all the constructions hitherto devised, wherein four sheaves are made adjustable, the sheaves have been carried upon oscillative arms or levers and the path of their motion during adjustment has been the arc of a circle, having its center at the pivot or fulcrum of the lever to which the sheaves were attached. But my construction above described, differs from all of these in that I attach the four sheaves not to arms adjustable by oscillation, but to movable bars adjusted by bodily translation, essentially in the direction of their length and permissibly a very little otherwise.

I do not limit myself to the form shown for constructing the bars F and G or to any particular method for connecting and imparting motion to these bars, as numerous other forms and methods of connection will occur to the intelligent mechanic; but those I have shown are simple and hence desirable.

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

In an elevator control device the combination of two vertically arranged bars carried by the car and bodily adjustable thereon in a vertical direction; an operating mechanism that will simultaneously raise one bar and lower the other bar; four revoluble sheaves, attached, two sheaves to each bar, one above the other on the same bar; and two suspended rope sections, trained respectively, each under a lower sheave on one bar and over an upper sheave on the other bar, all substantially as described and for the purpose specified.

WILLIAM F. COLE.

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