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F. HYMANS

COMPENSATING ROPE FOR HOISTING APPARATUS

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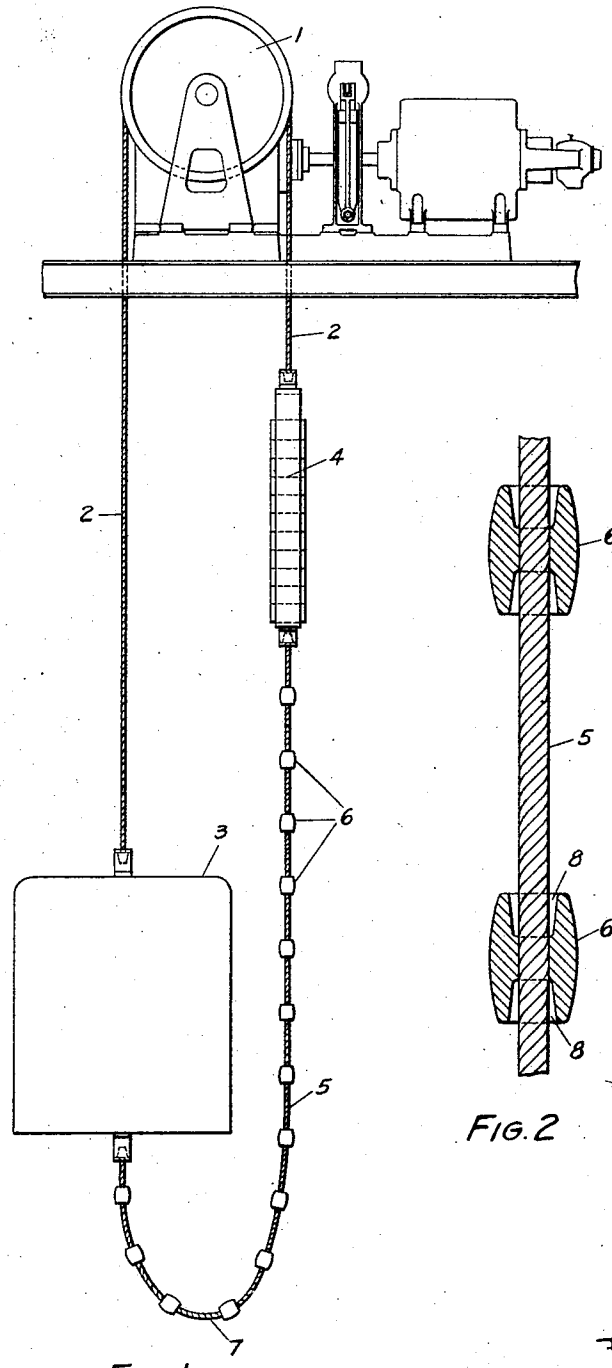


FIG. 1

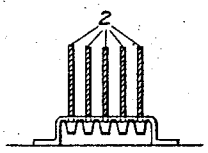


FIG. 4

FIG. 2

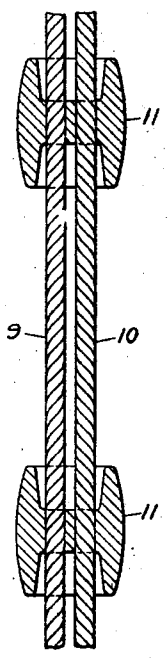


FIG. 3

Inventor
Frederick Hymans
By his Attorney
Walter C. Bradley

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UNITED STATES PATENT OFFICE.

FREDERICK HYMANS, OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

COMPENSATING ROPE FOR HOISTING APPARATUS.

Application filed August 30, 1924. Serial No. 735,180.

This invention relates to hoisting apparatus and more particularly to means for compensating for the change in weight, due to the change in length, of the ropes between a body and the drum from which it is suspended. As the body is raised and lowered the weight of the ropes between the hoisting mechanism and the body decreases and increases and to compensate for this change in weight, means are provided for subtracting and adding weight to the suspended body as it moves up and down.

The object of the invention is to provide simple and economical compensation which will be noiseless in operation and durable.

A preferred embodiment of the invention as applied to an elevator system will be described in connection with the accompanying drawings, in which,—

Figure 1 is a schematic view of an elevator system embodying the invention.

Figure 2 is a detail sectional view of a portion of the compensating means.

Figure 3 is a detail sectional view of a portion of another embodiment of the compensating means.

Figure 4 is a fragmentary view taken at right angles to Figure 1 and showing the hoisting ropes at their point of connection to the elevator car.

Referring to Figure 1, the hoisting mechanism is shown as comprising a grooved sheave 1 over which passes a set of ropes 2. On one side of sheave 1 is suspended an elevator car 3, while from the other side is suspended a counterweight 4. A compensating rope 5 having one end attached to the counterweight and its other end to the elevator car, hangs freely suspended in the hatchway. Masses 6 of suitable material are secured to rope 5 at spaced intervals. As the hoisting mechanism is operated to raise the elevator car 3, the portion of hoisting ropes 2 between car 3 and sheave 1 decreases in length while the portion of ropes 2 between counterweight 4 and sheave 1 increases in length. At the same time the portion of compensating rope 5 between its lowest point 7 and car 3 increases in length while the portion between point 7 and counterweight 4 decreases in length, these changes in length being equal to the changes in length of the portions of the hoisting ropes. Therefore, to effect full compensation for changes in weight of the two portions of the hoisting ropes, the weight per unit length of the compensating rope is made equal to the weight per unit length of the hoisting ropes.

Referring to Figure 4, the number of hoisting ropes is shown as five. Hence, the combined weight of masses 6 and rope 5 is made equal per unit length to the weight of the five hoisting ropes 2. By such construction, the total weight of the hoisting ropes and the compensating rope is equally divided at all times between the two sides of the sheave, regardless of the position of the car.

The masses 6 (see Figure 2) are preferably of material having a high specific gravity, as for example, lead or babbitt, and may be cast in position in spaced relation to one another to firmly grip the rope 5, or the masses 6 may be pressed in place by pressure applied externally. For a given spacing, the length of contact with which the mass 6 engages the rope 5 will have a definite effect in reducing flexibility and increasing local bending of the rope. In order that each mass may have its major axis disposed longitudinally of the rope, as is preferable, while avoiding undue length of contact with the rope, each mass may have a clearance recess 8 at one or both ends. A determining factor in the length of contact is the amount of surface which must be in engagement to maintain the masses in their proper positions on the rope.

In Figure 3, the compensating rope is shown as comprising two ropes 9 and 10, one a right lay and the other a left lay, and the masses 11 may in such cases embrace the pair of ropes and be secured thereon in a manner similar to that described in connection with Figure 2. This combination has no tendency to spin.

It has been found that compensating ropes constructed in accordance with this invention operate noiselessly, are easy to install and have low cost of up-keep. The pressing or molding of the mass elements in place, provides for their firm contact or engagement with the contour of the rope, thus making them secure. It is apparent that other forms of roping, both as to the hoist-

ing ropes and compensating rope, may be employed without departing from the scope of this invention.

What is claimed is:—

Compensating means for hoisting apparatus ropes comprising a pair of ropes of right and left lay respectively, and a plurality of mass elements embracing said pair of ropes and secured in spaced relation thereon.

In testimony whereof, I have signed my name to this specification.

FREDERICK HYMANS.