No. 741,827. PATENTED OCT. 20, 1903.

F. D. POTTER.

ELEVATOR.

APPLICATION FILED MAR. 13, 1903.

NO MODEL.

Fig. 1.

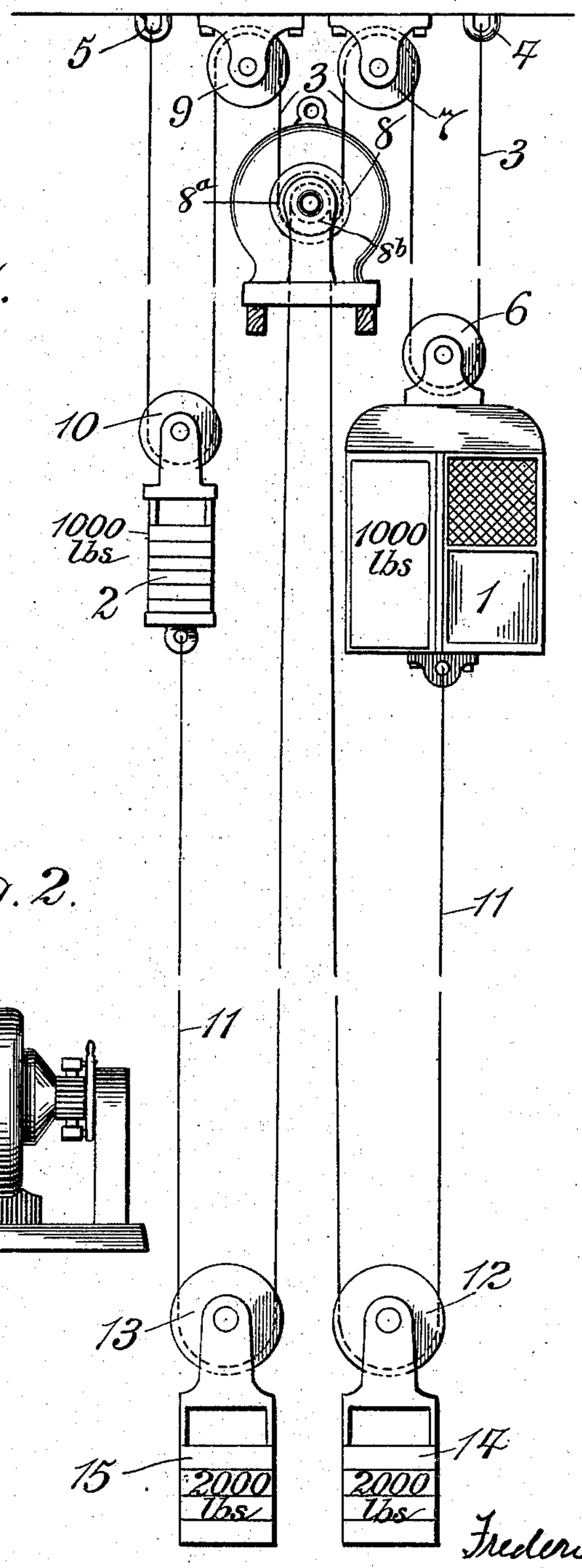
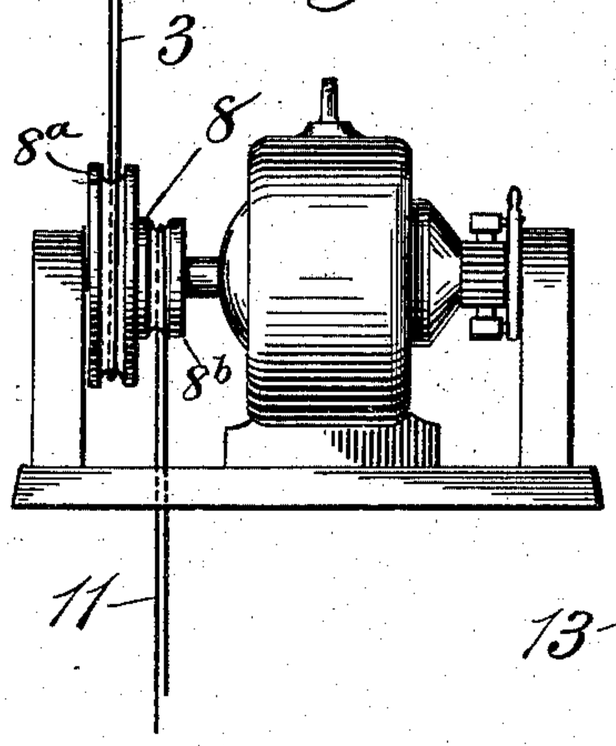


Fig. 2.



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No. 741,827. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

FREDERIC D. POTTER, OF LINDEN, NEW JERSEY.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 741,827, dated October 20, 1903.

Application filed March 13, 1903. Serial No. 147,573. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC D. POTTER, a citizen of the United States, residing in Linden, county of Union, and State of New Jersey, have invented a certain new and useful Improvement in Elevators, of which the following is a specification.

This invention relates to that type of elevators in which cables and pulleys are used for moving the car and wherein a driving-pulley receives the driving-cable on one side and pays it off on the other, whether said cable makes one or more turns around said pulley or not.

The principal advantages derived from this invention are the following: The driving-cables are so arranged that they can be made to produce a minimum pressure upon the bearings of the driving-pulley. The driving-cables are arranged so as to form two bights each embracing the driving-pulley on the side opposite from that embraced by the other, thus giving a double engagement surface between pulley and cable for tractive effort. The cables are so arranged that whether the car is moved up or down and whether the car or the counterweight is the heavier a positive pull will always be transmitted from the driving-point to both car and counterweight.

In the accompanying drawings an illustrative form of this invention is shown.

Figure 1 illustrates in diagram the relation of the various parts, while in Fig. 2 there is given a side view of an electric motor as related to the driving pulley and cables.

In Fig. 1 the car is shown at 1 and the counterweight at 2. These are joined by a cable 3, anchored at its two ends 4 and 5. Between its ends this cable passes under the movable pulley 6 on the car, thence over the fixed pulley 7, under the driving-pulley 8, the pulley 9, and then under the movable pulley 10 on the counterweight. The car and counterweight may have any relation as to mass that is appropriate, this being a matter well understood in the art. The second cable 11 is connected to the car 1, passes thence under the pulley 12, up over the driving-pulley 8, under the pulley 13, and is finally attached at its other end to the counterweight 2. The pulley 8 may be driven by an electric motor, as shown, or in any desired manner.

In the drawings I have shown a cable 11 directly fixed to the car and counterweight; but it is to be understood that my invention is not limited to this form of connection, but covers the use of movable pulleys and exterior anchorage in any well-known manner. It is also to be understood that the specific connection between the car and counterweight and the pulley 8 through the cable 3 is not essential to my invention.

It is clear that, as shown in the drawings, the cable 3 will move around the center of the pulley 8 twice as fast as does the cable 11. Consequently the two parts of the pulley 8 on which these cables run must be properly proportioned, and, as shown in Fig. 2, that portion 8^a of the pulley 8 which is embraced by the cable 3 has twice the diameter of the other part 8^b of said pulley. It is to be understood that these proportions, although made necessary by the specific arrangement shown in Fig. 1, are not essential to my invention.

In studying the construction shown it will be seen that assuming either the car or the counterweight to be the heavier both are positively pulled in the proper direction during operation by one or the other of the cables 3 and 11. This arrangement tends to largely do away with the difficulty otherwise incident to the inertia of the car or counterweight on starting. One advantage following from this arrangement is that since the pulley is embraced on opposite sides through one hundred and eighty degrees by the two cables the entire circumference of the pulley is made available for traction, while at the same time neither cable is bent through more than a half-circle. My invention is not limited to a construction in which each cable is bent through only a half-circle; but I prefer this form as tending to longer life in the cables for a given size of pulleys and a given speed.

The two pulleys 12 and 13 may be fastened down for producing the requisite tension for the cable 11 in any desired manner; but I prefer to employ weights 14 and 15, hung on the axes of said pulleys, for this purpose. By a proper proportion of these weights to the weights of the car and counterweight the theoretical pull on the pulley 8, tending to

produce friction in its bearings, can be made zero, and in practice this pull can be made almost as small as desired.

Supposing, for instance, that the car and counterweight each weigh while running one thousand pounds and that each of the weights 14 and 15 weighs two thousand pounds, as indicated in figures on the drawings, it is obvious that half of the weight 14 will be directly added to the weight of the car, making this two thousand pounds. One-half of this, or one thousand pounds, is transmitted through the cable 3 to one side of the pulley 8. By the same process one thousand pounds is transmitted from the weights 15 and 2 through the cable 3 to the pulley 8. There will thus be a total upward pull of two thousand pounds on the pulley 8, due to the cable 3; but one-half of each weight 14 and 15 is transmitted through the cable 11 to each side of the pulley 8. Consequently the cable 11 exerts a total downward pull of two thousand pounds on the pulley 8. It is thus clear that in the arrangement supposed the downward and upward pulls exactly balance, and there will be no friction in the bearing of the pulley 8.

In practice of course a small amount of friction will be caused by variations in the load on the car from the ideal one thousand pounds and also by stresses required to overcome friction; but the fact remains that by the arrangement shown the permanent frictional effect of dead weight at the bearings of the pulley 8 is largely done away with.

Numerous changes in the construction shown can be made without departing from this invention, and I am not to be understood as limiting myself to the details herein shown and described.

What I claim is—

1. In an elevator, a car and counterweight, a driving-pulley and two cables passing over said pulley and both connected to said car and counterweight so that when one transmits a positive pull to the car the other simultaneously transmits a like pull to the counterweight in the opposite direction, and vice versa, substantially as described.

2. In an elevator, a car, a counterweight and a driving-pulley; in combination with two driving-cables each connected to both car and counterweight, and embracing said pulley in opposite directions, substantially as described.

3. In an elevator, a car, a counterweight, a driving-pulley and a driving-cable passing over said pulley and connected to said car on one side of the pulley and to said counterweight on the other side; in combination with a second driving-cable also passing over said pulley, but in the opposite direction, said latter cable being also connected on opposite sides of said pulley to said car and counterweight respectively, substantially as described.

4. In an elevator, a driving-pulley, a car and a two-to-one cable and pulley connection between the pulley and car; in combination with a one-to-one cable and pulley connection between said pulley and car arranged to produce a pull opposed to said two-to-one connection, substantially as described.

5. In an elevator, a driving-pulley, a car, a counterweight, and a cable connecting said pulley with said counterweight and car; in combination with a second cable connecting said pulley with the counterweight and car, arranged to produce a pull opposed to said first-named cable on both the counterweight and car, substantially as described.

6. In an elevator, a driving-pulley having two portions having diameters related as one to two, a car and a two-to-one cable and pulley connection between the larger portion of said pulley and car; in combination with a one-to-one cable and pulley connection between the smaller of said pulley parts and said car, substantially as described.

7. In an elevator, a car, a counterweight, and a driving-pulley; in combination with two separate driving-cables connecting said pulley with the car and counterweight and a tension device hung in a bight of one of said cables and arranged at right angles to the axis of the driving-pulley, substantially as described.

8. In an elevator, a car, a counterweight, movable pulleys on said car and counterweight, a driving-pulley and a driving-cable anchored at its ends and embracing said driving-pulley and both of said movable pulleys; in combination with a second cable connected to said car and counterweight and formed in three bights, one of said bights embracing said driving-pulley oppositely to the first driving-cable and two tension devices suspended respectively in the other two bights of said second cable, substantially as described.

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Witnesses:
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