(No Model.) 2 Sheets—Sheet 1.

N. C. BASSETT.

GEARING FOR ELEVATORS.

No. 485,163. Patented Nov. 1, 1892.

Fig. 1.

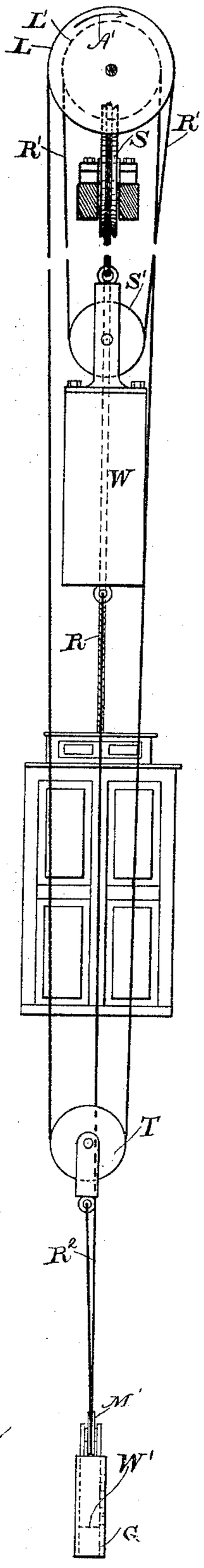
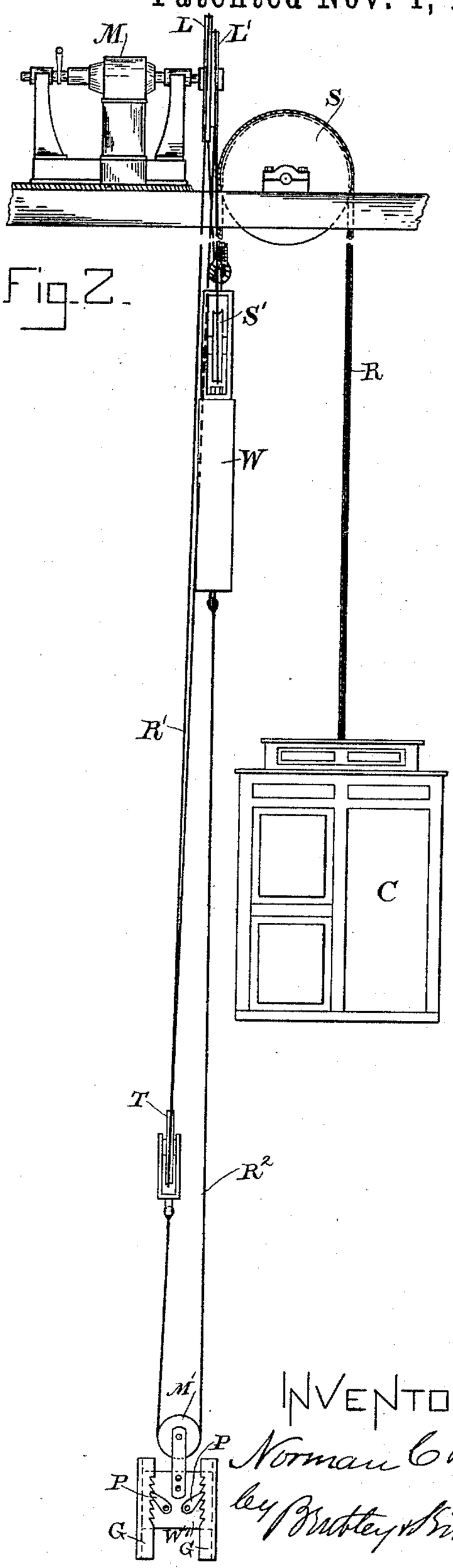


Fig. 2.



WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

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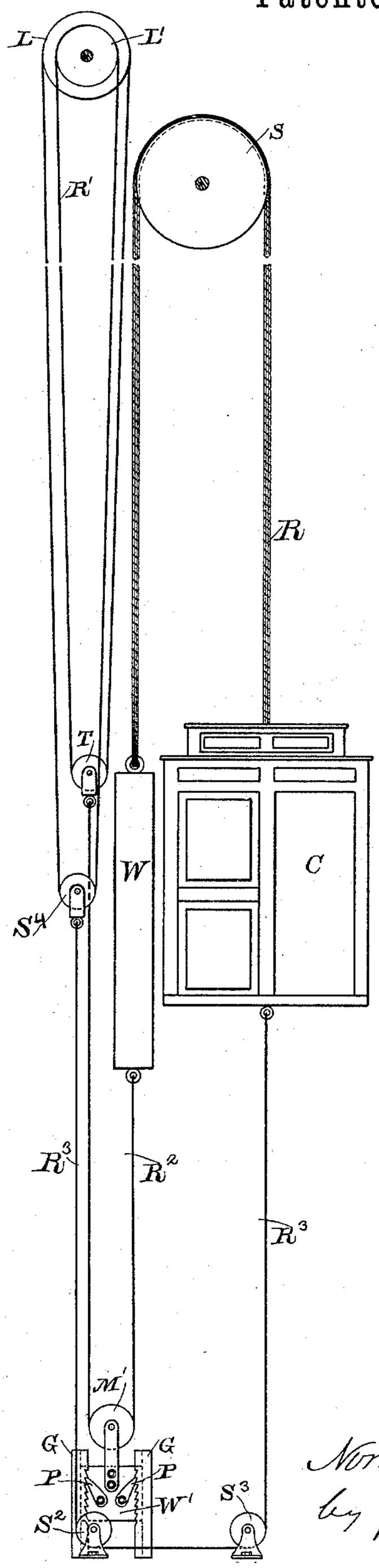
Fig. 3.



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UNITED STATES PATENT OFFICE.

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GEARING FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 485,163, dated November 1, 1892.

Application filed October 11, 1890. Serial No. 367,835. (No model.)

To all whom it may concern:

Be it known that I, NORMAN C. BASSETT, a citizen of the United States, residing at Lynn, county of Essex, and State of Massachusetts, have invented a certain new and useful Improvement in Gearing for Elevators, of which the following is a specification.

In the application of electric or other fast-running motors to the driving of elevators many difficulties are encountered in providing a simple, effective, and noiseless mechanism for transmitting the power and reducing the high speed of the motor to the comparatively-slow speed of the car. The present invention aims to overcome these difficulties by the use of a differential rope device for the power-transmitting mechanism, and it differs from all such previous constructions by relieving the fast-running differential pulley-shaft of the main portion of the load and transferring the same to a comparatively-slow-running sheave, which arrangement materially reduces the loss from friction and wear upon the power-transmitting mechanism. Other forms of power-transmitting mechanism than the differential rope device specifically described may be also used, but always in such a way that the main portion of the load is divided into two portions balanced upon a slow-running sheave, while the power-transmitting mechanism takes only the unbalanced portion of the load, which is only a small proportion of the total weight.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of one form of structure embodying my improvements. Fig. 2 is a front view of the same, and Fig. 3 shows a modification differing only in certain details of construction.

The elevator-car C is attached to one end of a cable or cables R, which pass over a sheave or sheaves S, journaled in the usual manner at the upper end of the hatchway, and to the opposite end of this cable is fastened the counter-weight W. This counter-weight will preferably be made heavy enough to overbalance the car by about one-half the maximum load the elevator is designed to lift, and as the weight of the car is usually as great or greater than that of the load it is designed to carry it will be seen that the major portion of the total load, comprising the car, counter-balance, and load, will be divided into two portions, balanced upon the slow-running sheave S. Since, therefore, the counter-weight overbalances the car by one-half the maximum load the power of the motor is exerted to pull down the car when it is empty, or, in other words, to raise the counter-weight and to lift the car when fully loaded; but in either case the capacity of the motor needs to be equal only to one-half the maximum load carried by the car. Ordinarily but a comparatively-small proportion of the total load is all that resists the power-transmitting mechanism and the rapidly-running parts immediately connected with the electric motor represented at M, which operates the elevator. Of course the total strain exerted by the car, weight, load, and motor falls upon the sheave S.

Mounted upon the armature-shaft of the motor or driven thereby through intermediate gearing are the differential drums L L′. An "endless rope" (by which term I include also a belt or equivalent power-transmitting connection) R′ passes from drum L′ around pulley S′, (shown in Figs. 1 and 2,) journaled in hangers upon the counter-weight, thence around drum L, traveling pulley T′, and back to drum L′. The traveling pulley T is connected by a rope R^2 with the counter-weight W and passes around a pulley M at the bottom of the hatchway, from which is suspended a take-up weight W′. This latter weight is provided with pivoted pawls P P, which engage ratchet-bars G G and allow the weight to descend freely to take up any slack in the connections, but prevent upward movement.

The operation of my invention will be apparent by observing that when the driving-drums are revolved in the direction of the arrow A′, Fig. 1, the rope R′ is wound on drum L faster than it is unwound from L′, which tends to raise the driving-pulley T, pulling down the counter-weight and lifting the car, while at the same time the rope is wound off from the other side of L faster than it is wound upon L′, which allows the counter-weight and pulley S′ to descend at the same rate of speed at which T is drawn up. In Fig.

3 the arrangement differs somewhat from that in Figs. 1 and 2, but only in details of construction, the principle of operation remaining the same. The movable pulley S^4 is connected to the bottom of the car by a rope R^3, passing around pulleys S^2 S^3, the arrangement of pulley T and driving-rope R′ remaining the same as before. This change simply results in pulling down upon the car C, rather than lifting upon the counter-weight W, the resulting movement being the same in either case. In both these arrangements it is to be observed that the car and counter-weight are moved positively by the motor in either direction; but the main balanced portion of the total load comes upon the comparatively-slow-running sheave S, where the loss due to friction is a minimum, while the weight actually bearing upon the differential drum-shaft will be equal only to that portion of the total load which the motor is called upon to move. It is this transfer of a large proportion of the total load from the fast to the slow running bearings which constitutes the basis of my invention.

I am aware that an elevator-car and its counter-weights have been suspended directly by a differential rope mechanism. I am also aware that an elevator-car has been counter-balanced and provided with a hydraulic plunger or other mechanism to move it. I do not claim any such devices. My invention is confined to an elevator in which the weight of the car is overbalanced, so that the driving-motor has only to lift the unbalanced part of the load on the car, the motor being a fast-running one and connected with the car by differential rope mechanism which reduced the speed.

What I claim is—

1. The combination of the elevator-car, counter-weight, slow-running sheave, and cable passing around the sheave and attached to the car and weight, whereby the main portion of the total load divides into two portions balanced upon and carried by said sheave, with a motor, a fast-running differential drum driven thereby, and a rope power-transmitting mechanism driven by the drums and communicating a slow speed to the car, whereby only the unbalanced portion of the total load is brought upon the drum, substantially as described.

2. The combination of a cable passed around a sheave at the upper end of the hatchway and the car and counter-weight attached to the opposite ends of the said cable, with a motor, a differential drum operated by said motor, and rope power-transmitting mechanism driven by said drum and furnishing means for positively moving the said car and weight in either direction.

3. The combination, with an elevator-car and counter-weight attached to the opposite ends of a cable passed around a slow-running sheave, as described, of a motor, a differential drum operated by said motor and driving a rope power-transmitting device connected with the counter-weight for moving the car and weight, for the purpose set forth.

4. The combination, with an elevator-car and counter-weight attached to the opposite ends of a supporting-cable, as described, of a motor and a differential rope power-transmitting device having two connections with the counter-weight, and thereby furnishing means for moving the said weight and car positively in either direction, as described.

5. The combination, with an elevator-car and counter-weight suspended by a cable from a sheave journaled at the upper end of the hatchway, of an electric motor, differential drums driven thereby, the traveling pulleys, and an endless rope passing around said drums and pulleys, as described, and thereby furnishing means for moving the said car and weight in either direction.

6. The combination, with an elevator-car, counter-weight, slow-running sheave, and cable passing around said sheave and attached to the car and counter-weight, of a motor and intermediate rope power-transmitting connections adapted to overcome the resistance of the unbalanced portion of the load, and a take-up device for keeping the connections taut, consisting of a weight provided with a pawl, and a rack with which said pawl engages, as described.

NORMAN C. BASSETT.

Witnesses:
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JOHN W. GIBBONEY.