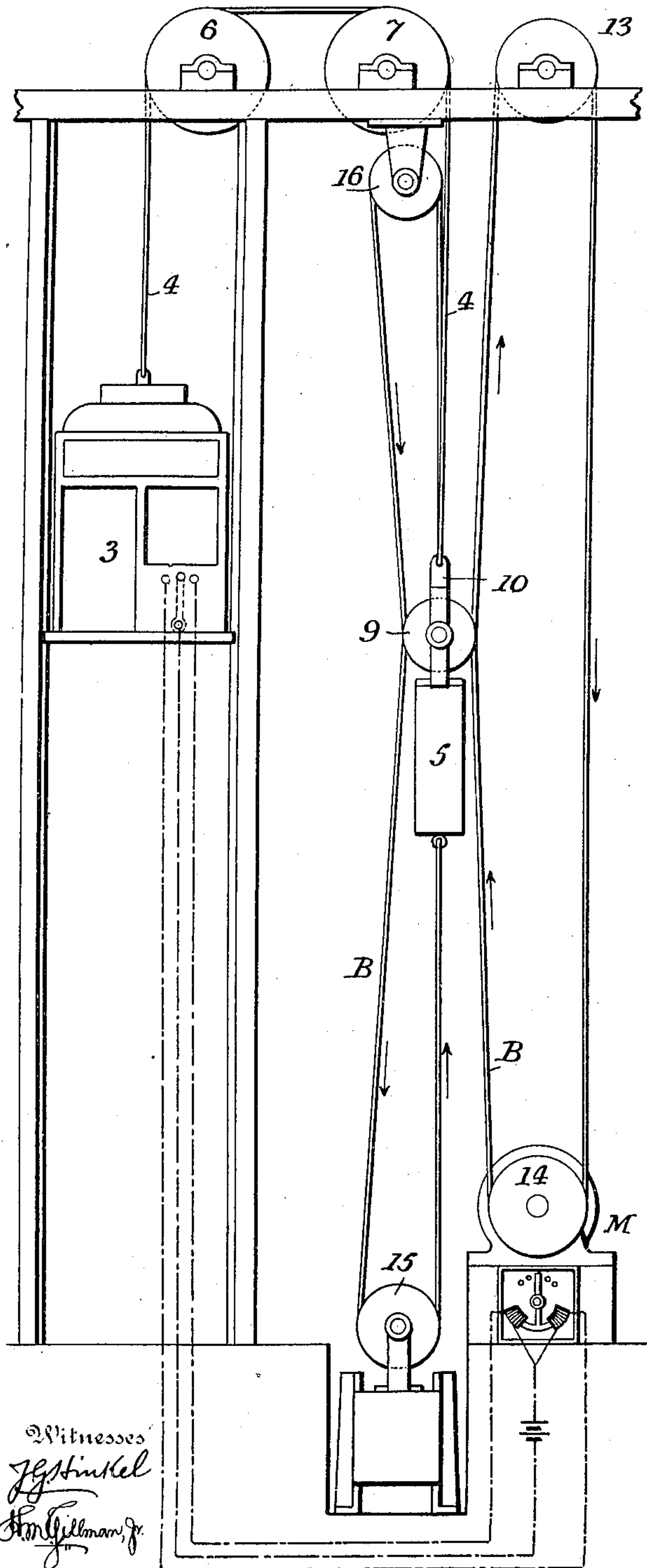


No. 789,765.

PATENTED MAY 16, 1905.

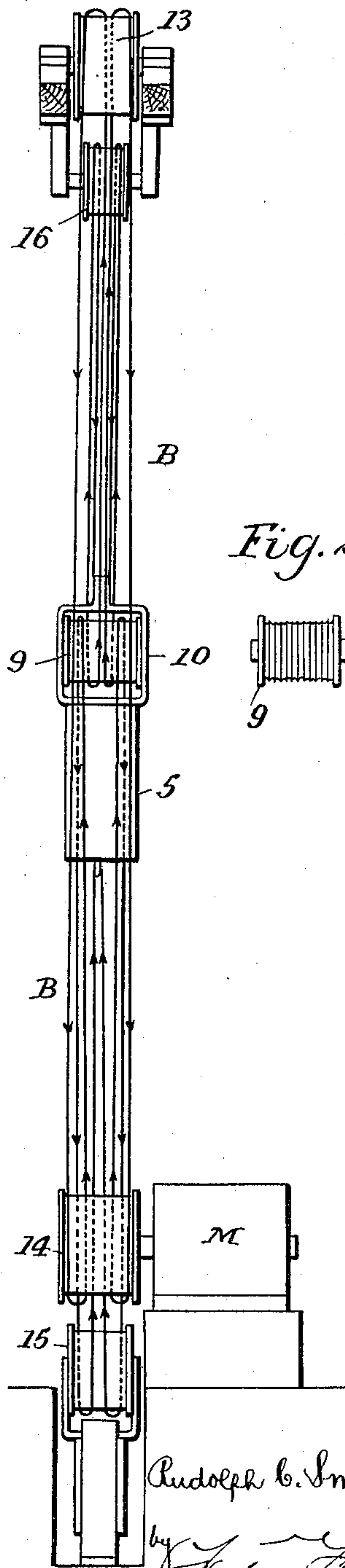
R. C. SMITH.  
ROPE DRIVE FOR ELEVATORS.  
APPLICATION FILED JAN. 7, 1903.

*Fig. 1.*

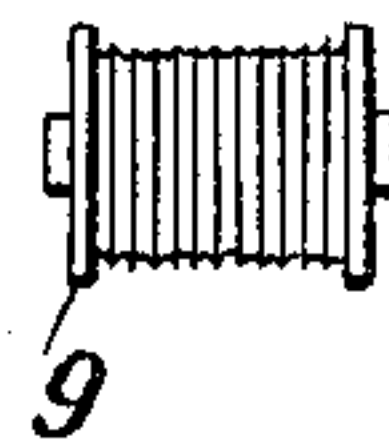


Witnesses  
*J. H. Stinkel*  
*Samuel Gillman, Jr.*

*Fig. 2.*



*Fig. 2<sup>a</sup>*



Inventor

*Rudolph C. Smith*

by *John Freeman*

Attorneys

# UNITED STATES PATENT OFFICE.

RUDOLPH C. SMITH, OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## ROPE-DRIVE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 789,765, dated May 16, 1905.

Application filed January 7, 1903. Serial No. 138,180.

*To all whom it may concern:*

Be it known that I, RUDOLPH C. SMITH, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented a certain new and useful Rope-Drive for Elevators, of which the following is a specification.

This invention relates to a rope-drive for electric and other elevators, the object being to provide a simple and effective apparatus with a minimum of friction and consequent minimum of wear and tear.

The present invention is a modification of the device shown in the United States Patent No. 483,203, dated September 27, 1892, issued to Norman C. Bassett.

This invention describes an arrangement of pulley-blocks for a rope-drive in combination with a car which is connected to a balance-weight by means of additional independent cables in such a manner that only a fractional part of the unbalanced load has to be overcome when set in motion by the motor.

The details of the invention will be described with reference to the accompanying drawings, in which—

Figure 1 is an elevation of an elevator-drive, showing a side view of the pulley-and-sheaves arrangement in connection with the elevator-car, the balance-weights, and the motor. Fig. 2 is an end elevation, and Fig. 2<sup>a</sup> is a side elevation, of the sheave 9, showing the grooves upon the circumference.

My invention is used in connection with an elevator apparatus having traveling elements, as a car 3 and counterweight 5, a flexible connection 4 between the two, a motor M, and a traveling cable or cables supported to travel round pulleys at the top and bottom of the well and connected at the ends to one of said elements. With these features is combined a sheave and the loops of cable extend in opposite directions round the sheave in such manner as to balance the strains tending to tilt the sheave. Thus the upper and lower pulleys are arranged to form two upper and two lower cable-loops which are arranged in equal number on opposite sides of the center of the

sheave 9, as shown, and any draft in either direction will have no effect to tilt the sheave. As shown, the ends of the cable are connected with the traveling counterweight 5 through the medium of a frame or yoke 10, which supports both the counterweight and the shaft of the sheave 9. The motor M is provided with a driving-pulley 14 and is reversible, being controlled from the car as usual by any suitable means, an electric control to stop or start in either direction and regulate the speed being indicated diagrammatically. As thus arranged the cable or cables and pulleys constitute two sets of multiple or reducing blocks and tackle which act in opposite directions, according as the pulley 14 rotates in one direction or the other, to raise or lower the counterweight. It will be evident that the load to be lifted or lowered is only the difference between the car and its load and the counterweight, and that according to the extent of the reducing action of the blocks and tackle the draft upon the motor is reduced, while the same may rotate at a high speed.

Any of the well-known tension devices may be used; but I prefer to hang a weight to the pulley 15 and guide the latter as shown.

The reversible motor 14 imparts motion to the car and weight by hauling in the same amount of rope on the one side and letting out an equal amount on the other side, while the tension device keeps the whole system in proper tension; but the opposite loops on the same traveling sheave equalize the pull of the loops and lessen the friction and consequent wear and tear, at the same time enabling the driving-rope to be made endless by connecting it through the traveling sheave 9.

Without limiting myself to the construction shown, I claim—

1. The combination in a counterbalanced elevator apparatus, of a cable supported to travel round pulleys at the upper and lower ends of the well, a traveling element to which both ends of the cable are connected, and a sheave, the cable formed into a plurality of loops passing round the sheave in opposite directions to balance the strains tending to tilt



the center of the sheave, substantially as set forth.

2. The combination with an elevator-car, flexible suspensory and counterweight, of a sheave connected to move with a traveling element of the structure, a traveling cable connected at both ends to parts adjacent to the sheave to travel therewith, upper and lower guide-pulleys round which the cable passes forming loops some of which pass round the sheave in opposite directions, and a reversible motor and driving-pulley actuated thereby and engaging one of the loops, substantially as set forth.

3. The combination with a movable element of an elevator, of a sheave, a traveling cable having its ends connected with said movable element and guide-pulleys supporting the same to form loops some of which pass round said sheave in opposite directions, and a reversible motor having a drive-pulley engaging said cable and means for stopping, starting and reversing this motor from the car, substantially as set forth.

4. The combination in a counterbalanced

elevator apparatus, of a cable supported to travel round pulleys at the upper and lower ends of the well, a traveling element to which both ends of the cable are connected, and a sheave, the cable formed into a plurality of loops passing round the sheave in opposite directions and in equal number on opposite sides of the center of the sheave, substantially as set forth.

5. The combination of an elevator-car and balance-weight, an independent flexible connection from the car to the balance-weight, a sheave connected to travel with the balance-weight, and a traveling cable with two opposite loops passing around the sheave, both ends of this cable being connected to travel with the weight, substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 5th day of January, A. D. 1903.

RUDOLPH C. SMITH.

Witnesses:

W. H. BRADY,

E. W. MARSHALL.