

No. 616,096.

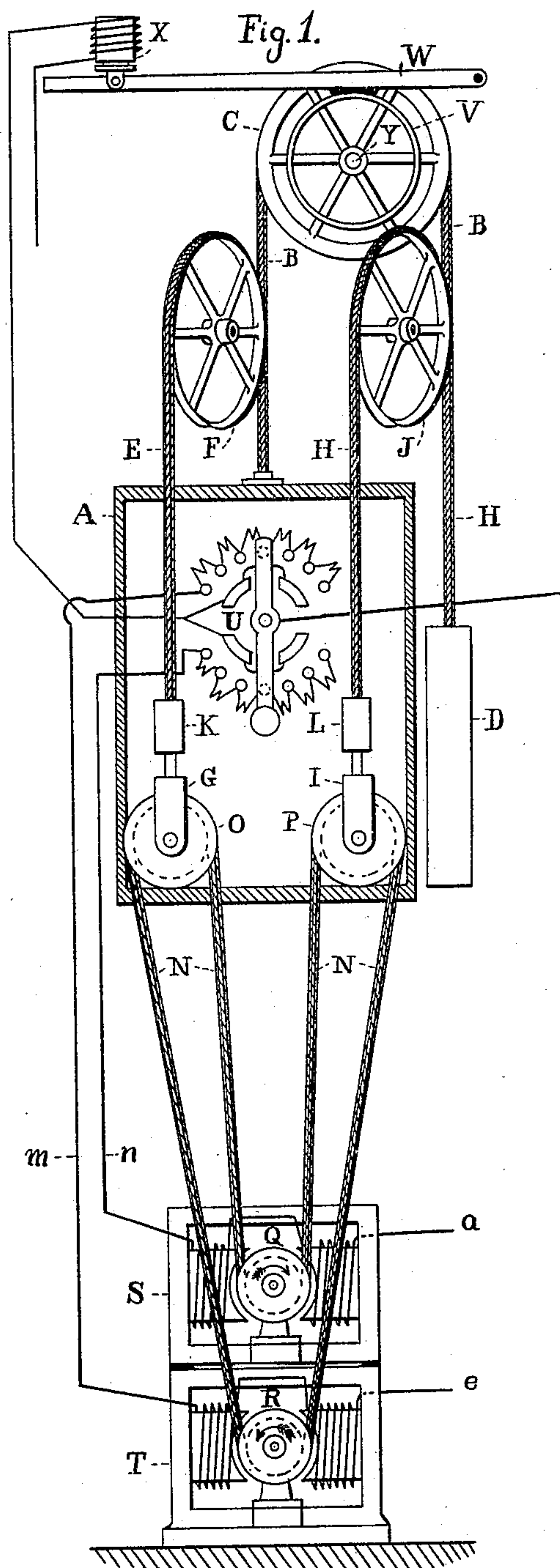
Patented Dec. 20, 1898.

E. M. FRASER.
ELEVATOR GEARING.

(Application filed May 15, 1895. Renewed Mar. 18, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

Edw S. Cobb.

Wilson D Bent, Jr.

Inventor:

Ethelbert M. Fraser

By John Richards

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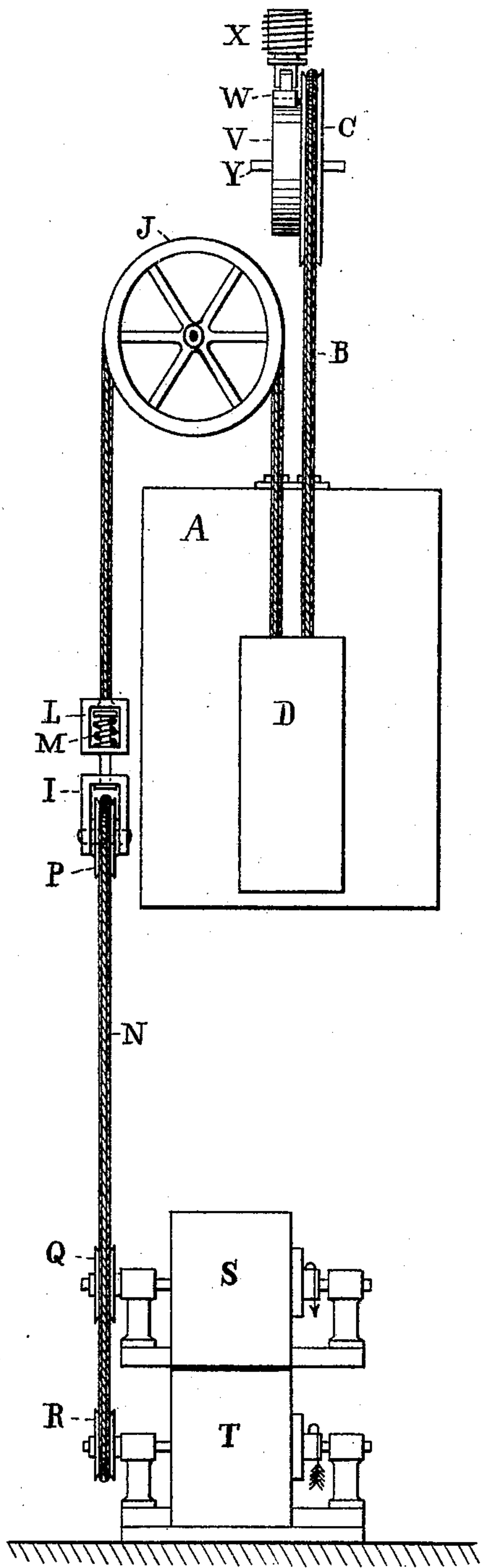
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Fig. 2.

Inventor:

Ethelbert M. Fraser

By John Richards
Atty

UNITED STATES PATENT OFFICE.

ETHELBERT M. FRASER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO
JOHN J. MAHONY AND C. E. GREEN, OF SAME PLACE.

ELEVATOR-GEARING.

SPECIFICATION forming part of Letters Patent No. 616,096, dated December 20, 1898.

Application filed May 15, 1895. Renewed March 18, 1898. Serial No. 674,393. (No model.)

To all whom it may concern:

Be it known that I, ETHELBERT M. FRASER, a citizen of Nova Scotia, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Gearing for Operating Elevators Employed for Raising and Lowering Passengers and Goods in Buildings; and I hereby declare the followingspecification and the drawings therewith to be a complete description of my improvements, with the manner of constructing and applying the same.

My invention relates especially to that class of elevators wherein a cage or platform is suspended, raised, and lowered by means of a cable, rope, or chain passing over a strong pulley at the top and attached to a counterweight that balances the cage and some predetermined portion of the loads to be raised and lowered, but is applicable to hoisting apparatus of any kind requiring an intermittent and variable rate of movement.

My invention consists, essentially, in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

My invention also consists in electrical devices to control the relative speed of the motors and consequent movement of the load and in gearing to connect the motors with the cage or platform, and counterweights therefor to arrest their movement either way, and other features of a constructive and operative kind required to carry out my invention.

A main object of my invention is to avoid starting, stopping, and reversing the motive power or motors, permitting these to run continually in the same direction whether the load is being raised, lowered, or is standing still, thus avoiding certain complications and resistances that exist when the motive power is directly connected to and moves coincident with the load to be raised and lowered and also the avoidance of tooth or tangent gearing commonly employed to vary the rate of movement between the motor and the load to be moved.

Referring to the drawings herewith and forming a part of this specification, Figure 1 is a front view of an elevator cabin or cage with the suspending and impelling gearing

therefor arranged according to my invention. Fig. 2 is a view of the same gearing, taken in a plane opposite to that of Fig. 1.

Similar letters of reference are employed to designate like parts in both figures of the drawings.

A is a cabin or cage to raise and lower passengers or goods, suspended on a rope or ropes B, that pass over a strong pulley C at the top and attached to a counterweight D, that is by preference as heavy as the cage A plus one-half of an average load to be raised. The object of this excess of counterweight is to divide the impelling power between the upward and downward trips of the cage A, and thus render this work more uniform, and also to reduce the maximum amount of power required in proportion to what is applied in moving the cage downward. Attached also to the cage is a second rope or ropes E, that pass over a pulley F and are attached to a pulley-shackle G, as seen in Fig. 1. A third rope H is attached to the counterweight D, passes over the pulley J, and is attached to a second pulley-shackle I.

Between the ropes E and H and the shackles G and I are interposed the shells K and L, containing coiled springs M, as seen in Fig. 2, to cause a degree of elasticity in the suspending-ropes, and thus assist in maintaining a uniform tension of the driving-ropes N, that pass over the pulleys O and P and around the pulleys Q and R of the armature-shafts of the electric motors S and T.

On the pulley C or on its axis Y, I place a brake-drum V, on which bears a lever W, preferably operated by an electric solenoid X, that is controlled by electrical connection with the rheostat U in the cage A, so that the lever W will be raised and the brake released whenever the current is varied between the motors S and T and the cage A is to be moved up or down.

The fields of the two motors S and T are connected by the wires *a* and *e* with a supply-circuit and by the wires *m* and *n* with the rheostat U, that can be placed in the cage A and from there control the motors S and T or can be fixed in any other convenient position, the armatures of the motors remaining connected directly with the main line.

It is obvious that opposite and coincident movement of the pulleys O and P and of the shackles G and I will produce a like movement of the cage upward or downward accordingly, and this is accomplished in the following manner: If the motors S and T are revolving at the same rate, the endless rope N is driven continuously around the two pulleys O and P, which remain stationary in respect to the cage A; but if the speed of the motors S and T is changed relatively then the pulleys O and P will move oppositely upward and downward in proportion to the change in the motors. If, for example, the motors S and T and the pulleys Q and R are running at like rate in the direction indicated by arrows in Fig. 1 and the speed of the motor S is decreased or the speed of the motor T is increased then the pulley P and shackle I will ascend and the pulley O and shackle G will draw the cage upward and the counterweight D will descend at a speed in proportion to the difference in the relative speed of the motors S and T. The downward movement of the cage is performed by a reversal of the relative speeds of the motors S and T—that is, if the speed of the motor S is increased or the speed of the one T is diminished the pulley O will rise and the one P descend, the cage A being lowered accordingly. In this manner it will be seen that there is complete control of all movements of the cage A upward or downward and also that it can be stopped and held still at any point in its range by adjusting the motors S and T to run at a uniform rate. The load is gradually started and stopped, and the power consumed in raising and lowering loads is directly as the work performed, less frictional losses.

The positions of the cage and motors relatively can be arranged to suit the circumstances in any case. The ropes N can be of any number and led in any direction from the bottom of a shaft or wellway. I have shown the gearing in its most direct and simple form.

Having thus explained the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an elevator, the combination of the cage and counterweight and two electric motors, the armature-shafts of which are adapted to run in opposite directions at the same or at different relative speeds, a pulley on the armature-shaft of each motor, a third pulley and connections between said third pulley and the cage, a fourth pulley and connections between said fourth pulley and the counterweight, and an endless rope passing around all of said pulleys, substantially as described.

2. In an elevator, a cage or platform and the counterweight, in combination with movable pulleys, ropes connected to said cage or platform and to said counterweight, spring connections between said ropes and said movable pulleys, electric motors having their armature-shafts rotating in opposite directions, and an endless rope passing around said movable pulleys and around pulleys on said armature-shafts, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

ETHELBERT M. FRASER.

Witnesses:

ALFRED A. ENQUIST,
WILSON D. BENT, Jr.