(No Model.) 3 Sheets—Sheet 1.

J. LEE.

ELEVATOR.

No. 464,664. Patented Dec. 8, 1891.

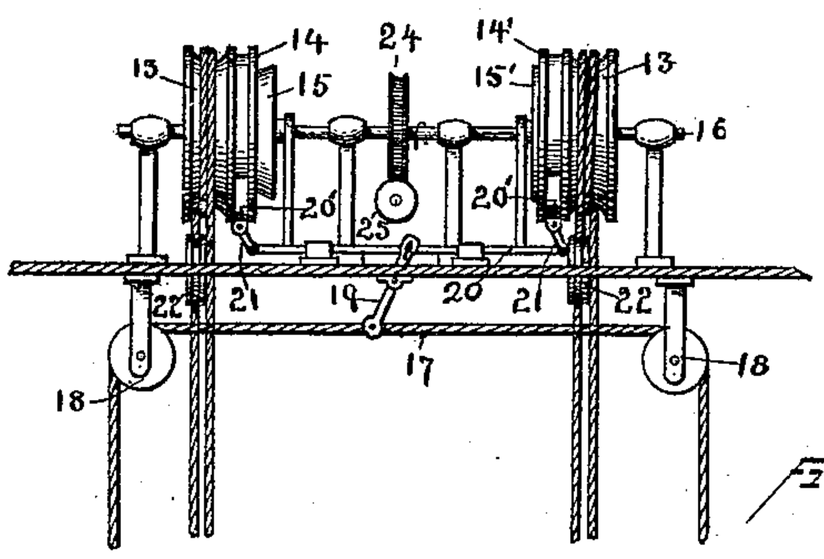


Fig. 1.

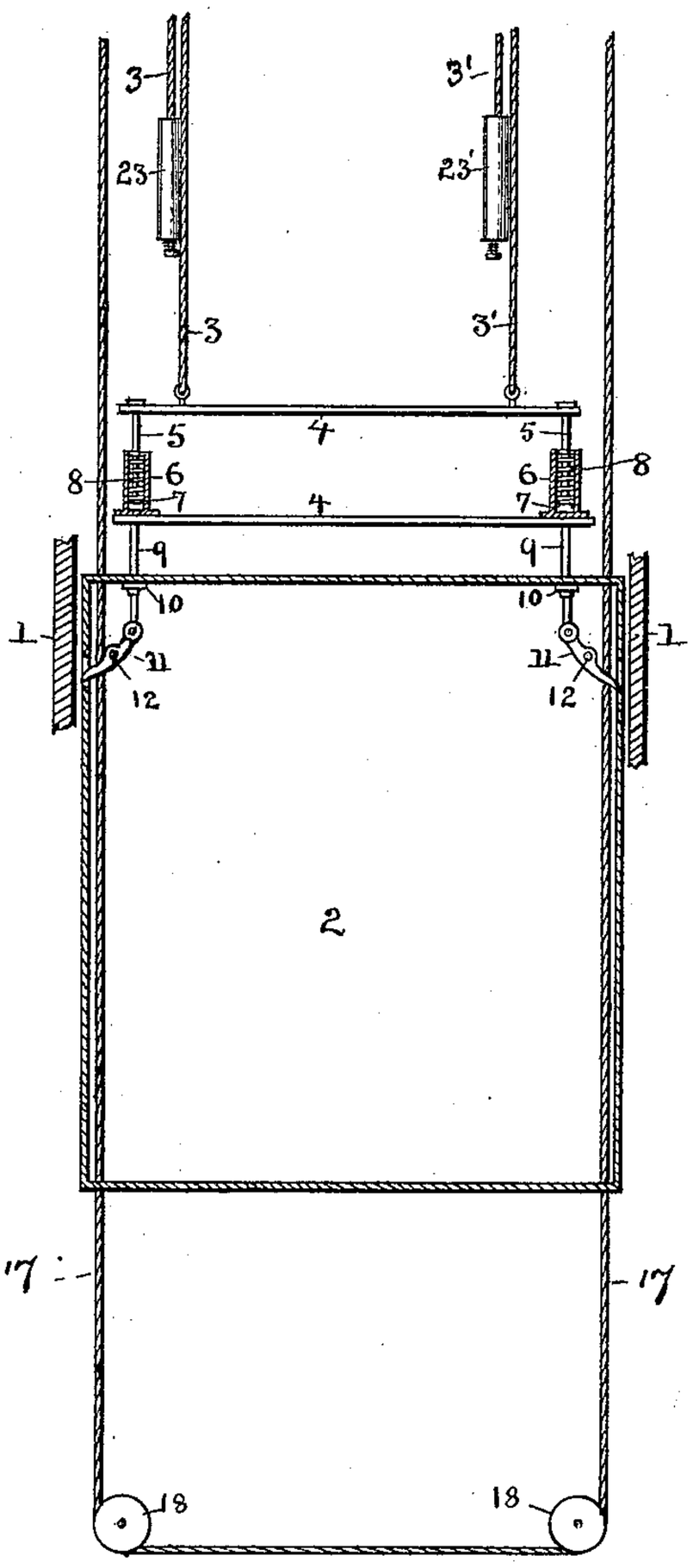
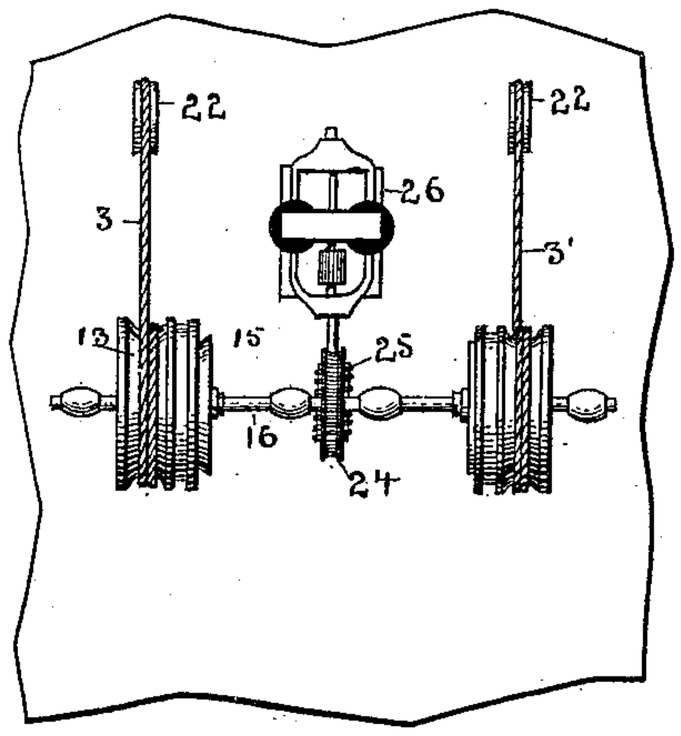


Fig. 2.



Witnesses
Norris A. Clark
E. Corcoran

Inventor
Joseph Lee
By his Attorneys
Dyer & Seely.

(No Model.) 3 Sheets—Sheet 2.

J. LEE.

ELEVATOR.

No. 464,664. Patented Dec. 8, 1891.

Fig. 3.

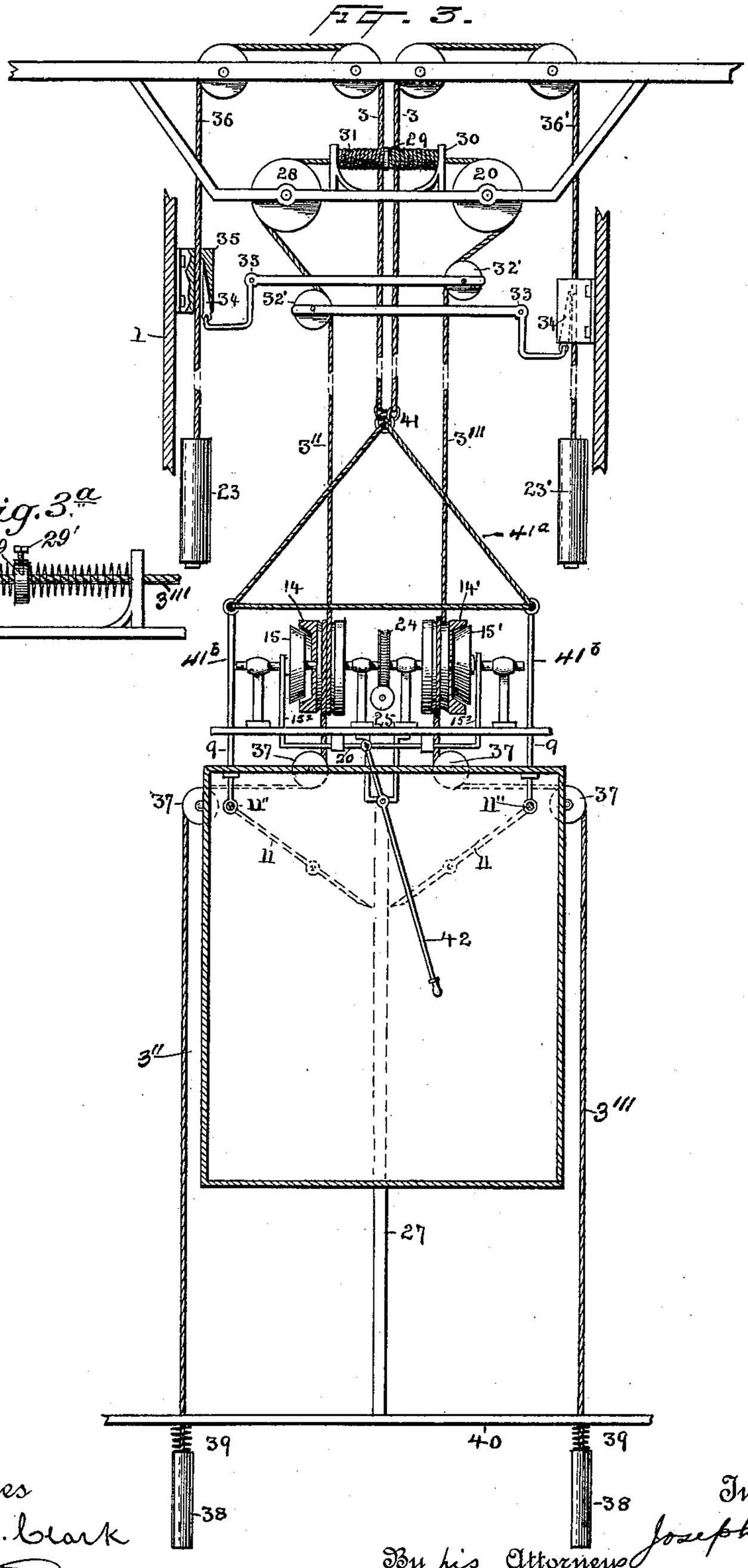


Fig. 3a.

Witnesses
Norris A. Clark
E. Curran

Inventor
Joseph Lee.
By his Attorneys
Dyer & Seely.

(No Model.) 3 Sheets—Sheet 3.

J. LEE.

ELEVATOR.

No. 464,664. Patented Dec. 8, 1891.

Fig. 4.

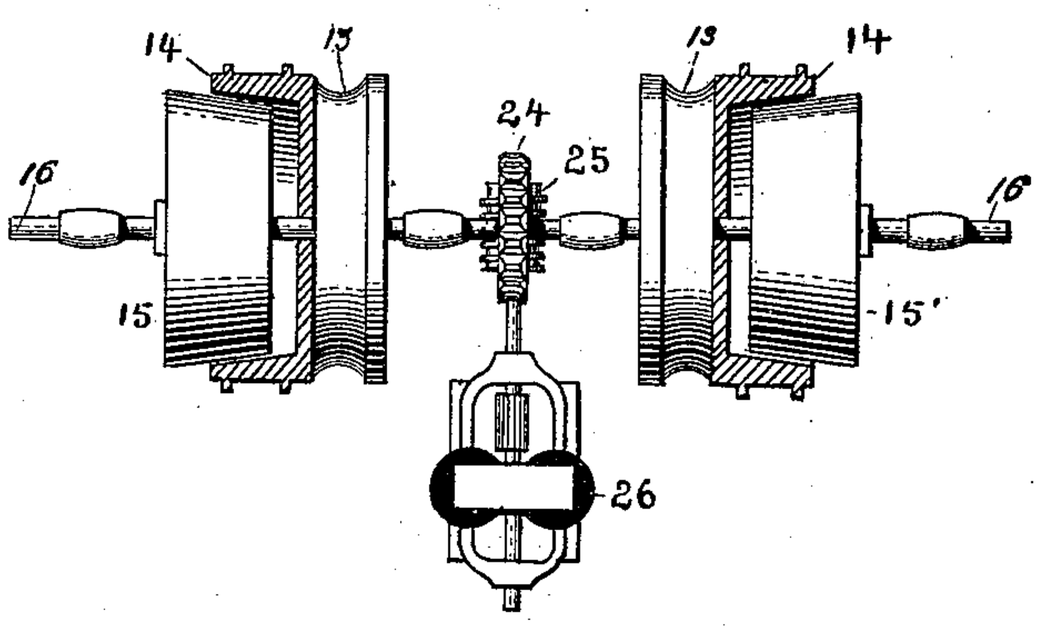
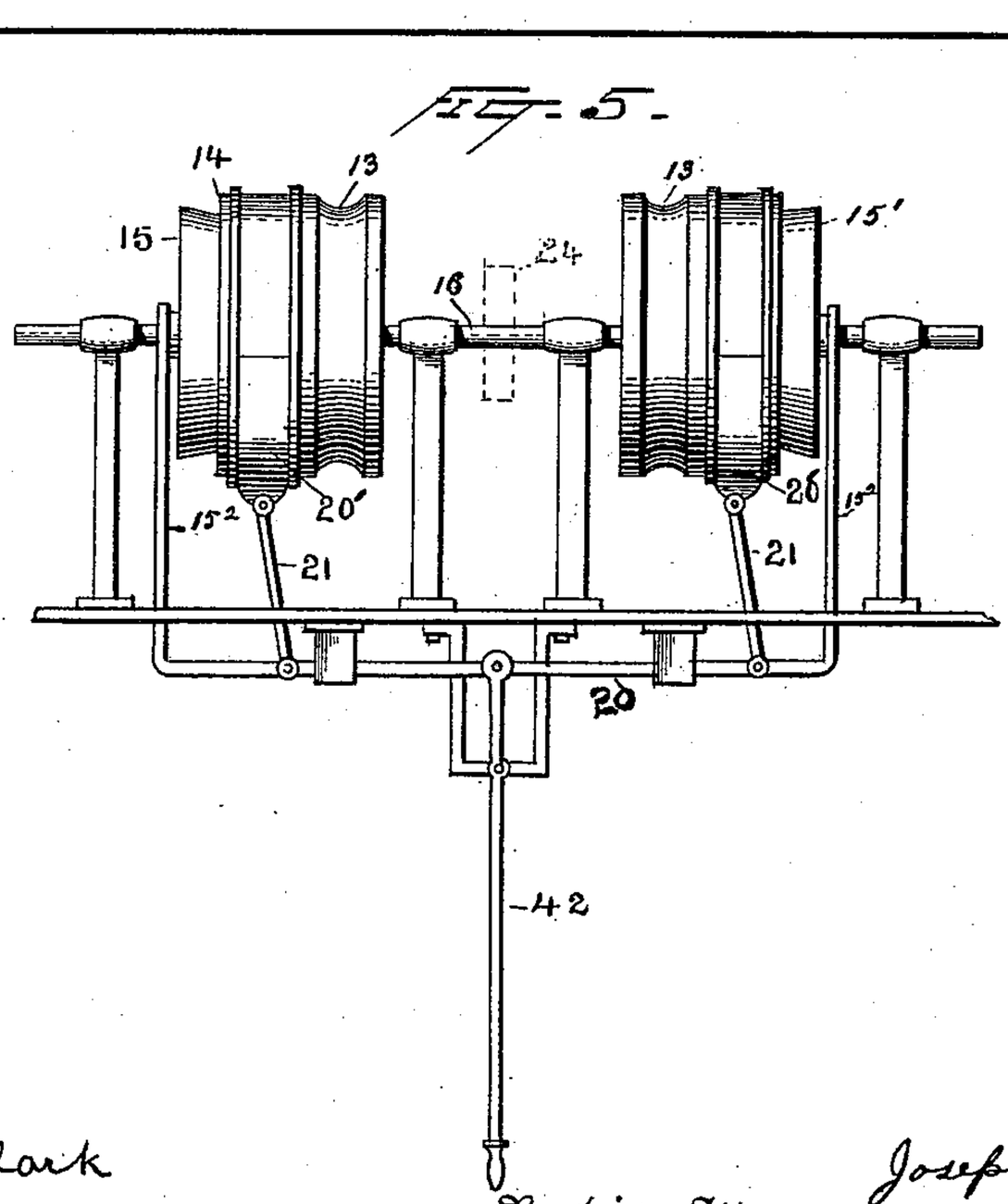


Fig. 5.



Witnesses
Norris A. Clark

Inventor
Joseph Lee
By his Attorneys
Dyer & Seely.

UNITED STATES PATENT OFFICE.

JOSEPH LEE, OF BROOKLYN, NEW YORK.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 464,664, dated December 8, 1891.

Application filed November 11, 1890. Serial No. 371,034. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LEE, a citizen of the United States, residing at Brooklyn, Kings county, New York, have invented a certain new and useful Improvement in Elevator Apparatus, of which the following is a specification.

My invention relates to means for raising and lowering elevator-cars; and the invention consists in the apparatus and in the several combinations hereinafter described and claimed.

My invention may be embodied in two forms of apparatus, both of which are illustrated in this specification. In one form the motor and the friction or other suitable clutch mechanism and the pulleys on which the elevator-cables are wound are stationary and are arranged at the top of the elevator shaft or way. In the second form the motor, clutch mechanism, and pulleys are mounted on the car and are carried up and down by the car.

In the accompanying drawings, which illustrate the invention, Figure 1 is a view, partially in section, showing the general construction and arrangement of mechanism of the first form. Fig. 2 is a plan view of the same. Fig. 3 is a view, similar to Fig. 1, of mechanism arranged in the second form. Fig. 3^a is a view showing a detail of the cable connection. Fig. 4 is a plan view of the elevator-car and mechanism mounted thereon, and Fig. 5 is a side view of the clutch and brake mechanism.

In any suitable shaft or hoistway, a section of which is represented at 1, Figs. 1 and 3, is an elevator-car 2, adapted to be raised and lowered by the cables 3 3′, which are attached directly or indirectly to the elevator-car. As illustrated in Fig. 1, said cables are connected to the car through a frame comprising suitable cross-pieces 4 and rods 5, extending into sockets 6 and carrying at their lower end suitable nuts 7. Between the nuts and the head of the socket are placed spiral or other springs 8. Other rods 9 extend from the frame through the top or other part of the elevator-car, and are provided with flanges or extensions 10, which rest against the under side of the top and support the weight of the car. To the lower ends of rods 9 are connected the safety-dogs 11, pivoted at 12.

The hoisting-cables pass to the top of the elevator-shaft and are wound one or more times around suitable pulleys 13, cable 3 being wound on its pulley from front to rear, as shown in the drawings, and cable 3′ being wound on its pulley in the opposite direction. Rigidly connected to said pulleys are clutch members 14 14′, the construction being more clearly shown in Fig. 4. Adjacent to each of these clutch members is a co-operating movable clutch member 15 15′, attached to arms 15″, which move back and forth with the sliding bar 20, operated by lever 19 or lever 42. A common shaft 16 passes through all of said pulleys and clutch members and is supported in suitable brackets. In Fig. 1 the member 15′ is shown in operative relation with the other member 14′, while clutch sections or members 15 and 14 are out of operative relation. By means of the endless shifting-rope 17, which passes over pulleys 18 at the top and bottom of the elevator-well and which passes through the car, the pivoted lever 19 can be thrown from the position shown to an opposite inclination, thus relieving 14′ 15′ from engagement and throwing 14 15 into engagement.

It will be seen that the same mechanism which moves the clutches, as just described, also controls the application of the brake-shoes 20′ to the cable-pulleys by means of the links 21. By means of the links the brakes used are moved positively both toward and away from the pulleys. These parts are so arranged that the brake-shoes will be applied to the pulleys before a clutch is thrown entirely out of gear and will not be relieved until the opposite clutch is thrown partially into gear. This is accomplished by making the links 21 of such length that when in the position shown in Fig. 5—that is, nearly but not quite vertical—the brake-shoes are applied (and before they reach the position shown) to the pulleys with sufficient force to hold the car, but not with all the force which they are capable of exerting. When the sliding bar 20, to which links 21 are connected, is moved in such direction as to bring said links to a vertical position, the brake-shoes are more firmly applied, and they do not release the pulleys until the links have moved some distance by the vertical position. As shown in

the drawings, the cables after being wound around their respective pulleys are extended to the rear of the pulley mechanism and over the pulleys 22, and the free end of each cable carries a weight 23 23′.

On the shaft 16, preferably at its center, is rigidly mounted a worm-wheel 24, and gearing with said wheel is a worm-shaft 25, driven by a suitable motor, preferably an electrical motor 26, as shown in Fig. 2.

In Fig. 3 the hoistway, the elevator-car, the hoisting-cables, the pulley and motor mechanism, and the weights are lettered as in Fig. 1 and need not be described in detail. In this figure the brake mechanism is omitted to avoid complication of the drawings. In this form of apparatus the motor and clutch mechanism are carried on a frame supported just above the top of the car, the frame being like that described in connection with Fig. 1, but without the spring connection. The safety devices 11, which are preferably mounted on the outside of the car and connected to the rods 9 by cross-rods 11″, co-operate with a wood or other strip 27, which extends through the whole length of the hoistway in the well-known manner. The cables 3″ 3‴ extend from their connection with the elevator-car to the top of the hoistway over suitable pulleys 28 and are both connected to a block 29—for example, by a clamping-bolt 29′. Between said block and standards 30 are stiff spiral springs 31. These cables also pass by other pulleys 32 32′, which are carried at the end of safety devices pivoted at 33. At the opposite end of these safety devices are wedge-shaped pieces 34 34′, which extend into correspondingly-shaped sockets in blocks 35, and through which the cables 36 36′ pass to the weights 23 23′. The cables 3″ 3‴ are connected to the car by being wound one or more times around their respective pulleys, but in opposite directions, thence by pulleys 37 to the bottom of the hoistway, where they are connected with weights 38. Above the weights are placed springs 39, bearing against the beam or floor 40. The cables 36 36′ referred to are connected at 41 to a rope 41^a, which is connected to suitable rods 41^b, attached to the elevator-car.

42 is a pivoted lever in the elevator-car for operating the clutch and brake mechanism above the car.

The reference-letters used in Figs. 4 and 5 correspond to those in the other views and further description of said figures will be unnecessary.

The operation of the mechanism illustrated in Figs. 1 and 2 is as follows: The electric motor (if such a motor is used) is kept constantly revolving at quite a high rate of speed, since this is the most efficient manner of using electric motors. This keeps the clutch members 15 15′ in constant motion. When the elevator-car is at rest—for example, at the bottom of the hoistway—the lever 19 will occupy a vertical position and both of the clutches will be out of gear. At the same time the brake-shoes will be applied to both pulleys. Should it be desired to raise the elevator-car, the shifting-cable 17 will be pulled by the operator in the car in such direction as to move the lever 19, so that it shall have an inclination opposite to that shown in the drawings. This throws the left clutch into operation and turns its pulley, raising the car by means of cable 3, and at the same time weight 23 at the opposite end of the cable descends. At the same time, also, weight 23′ descends, turning the pulley on which cable 3′ is wound, that pulley being free from its clutch. When it is desired to stop the car—for example, at the top story of a building—the shifting-cable 17 is pulled, again bringing 19 to a vertical position, applying the brake. Then, to cause the car to descend, the rope 17 is pulled still farther in the sam direction, throwing 19 into the position shown and thereby putting the right clutch into operative condition and simultaneously relieving the brake, as already indicated. Should either of the hoisting-cables break, the frame above the elevator-car will tend to descend, moving slightly relatively to the top of the car, thereby throwing the outer end of the pivoted safety devices 11 against the side of the hoistway and stopping the car. The operation of the apparatus shown in Fig. 3 is somewhat more complicated than that above described. As already pointed out, two sets of cables are employed—viz., 3″ 3‴—which are wound on pulleys driven by the motor and clutch mechanism and are secured at each end, and the cables 36 36′, connected at one end to the elevator-car and at the opposite end to counterbalance-weights. The springs 31 and 39 permit a slight yielding of the cable and obviate to some extent unpleasant shock so often noticeable in starting and stopping. Suppose it were desired to raise the car. The lever 42 would be thrown to the position shown, putting the clutch at the right into operation, thus turning the pulley on which 3‴ is wound in the direction to pull the car up on said cable. At the same time the opposite pulley would be turned freely by cable 3″, its clutch being out of operation. At the same time the counterbalance-weights 23 23′ would descend, as well understood. Should the cables 3″ 3‴ break, the corresponding safety device 33 would force the wedge 34 into its socket, tightly clamping the cable 36 or 36′, or both, and stopping the car. If at any time cables 3″ 3‴ and also 36 36′ should break, the frame above the car would descend slightly relatively to the car-top, carrying the pivoted safety devices 11 against the strip 27 and stopping the car.

It will be evident that the details of the apparatus may be varied in several particulars without departing from my invention. I do not, therefore, limit myself to all the features and details specifically described; but

What I claim as my invention is—

1. The combination, in an elevator mechanism, of a motor, two clutch members driven thereby, means for alternately throwing said members into operative relation to corresponding clutch members, pulleys connected to the latter members, and cables wound on said pulleys, one in one direction and one in the opposite direction, and each connected at one end to an elevator-car and each connected at the other end to a counterbalance-weight, substantially as described.

2. The combination, in an elevator mechanism, of a motor-shaft, two clutch members driven thereby and connected to a sliding bar for throwing one or the other of said clutch members into operative relation to a corresponding clutch member, a pulley rigidly connected to each of said latter members, a cable wound on each of said pulleys and connected to an elevator-car to raise or lower the same, and friction-brakes moved by said sliding bar toward and away from the clutches, substantially as described.

3. The combination, in an elevator mechanism, of a motor-shaft, two clutch members driven thereby, means for throwing one or the other of said clutch members into operative relation to a corresponding clutch member, a pulley rigidly connected to said latter member, a cable wound on said pulley and connected to an elevator-car to raise or lower the same, a friction-brake having two shoes, one for each cable-pulley, and a single device for applying said shoes to the pulleys, substantially as described.

4. The combination, in an elevator mechanism, of a motor-shaft, two clutch members driven thereby, means for throwing said members alternately into operative relation to corresponding clutch members, pulleys connected to the latter members, cables wound on said pulleys and connected to an elevator-car, and two brake-shoes co-operating, respectively, with the two latter clutch members and simultaneously controlled by said means, substantially as described.

5. The combination of two clutch members driven by a suitable motor, corresponding members for each of the first members, brake-shoes for each of the second members, a slidable bar and a lever for throwing one clutch out of operation and for throwing the other clutch into operation, and links forming the sole connection between said bar and said brake-shoes, whereby the brakes used will move positively in each direction, substantially as described.

This specification signed and witnessed this 9th day of October, 1890.

JOSEPH LEE.

Witnesses:
CHARLES M. CATLIN,
D. H. DRISCOLL.