

(No Model.)

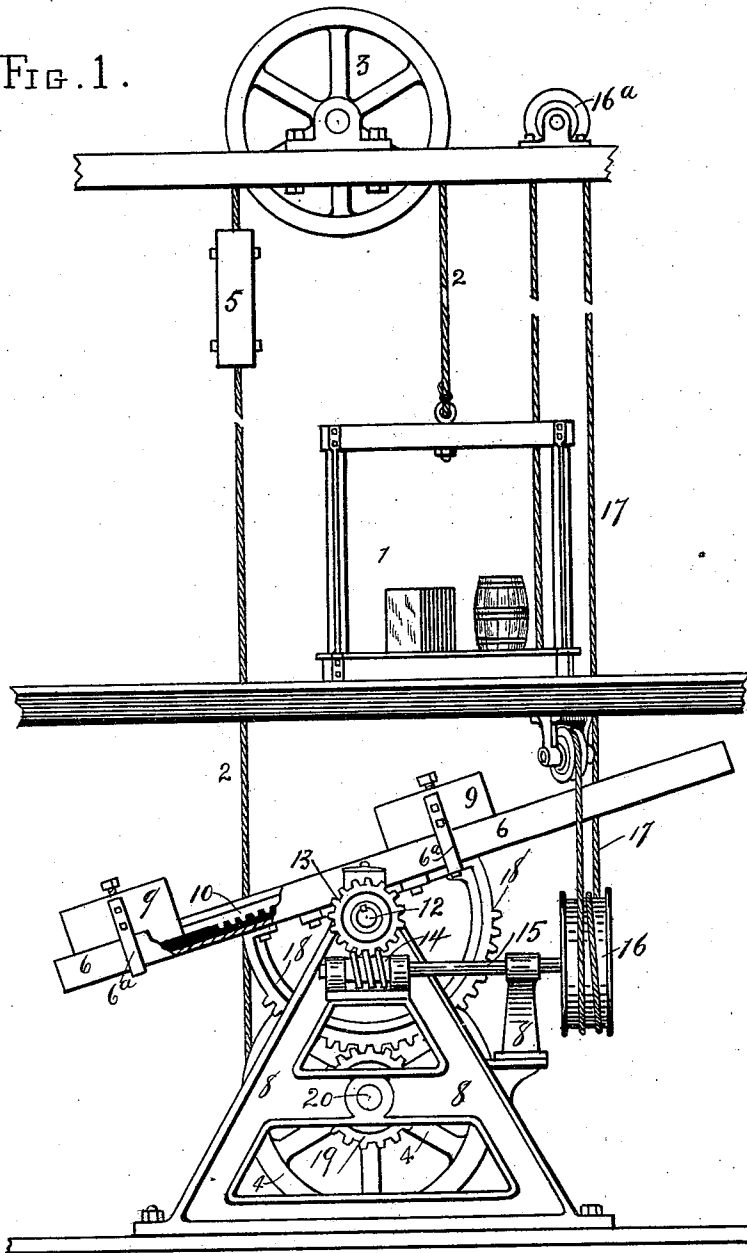
3 Sheets—Sheet 1.

J. E. PUTMAN.
MEANS FOR OPERATING ELEVATORS.

No. 564,313.

Patented July 21, 1896.

FIG. 1.



WITNESSES:

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(No Model.)

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FIG. 2.

FIG. 3.

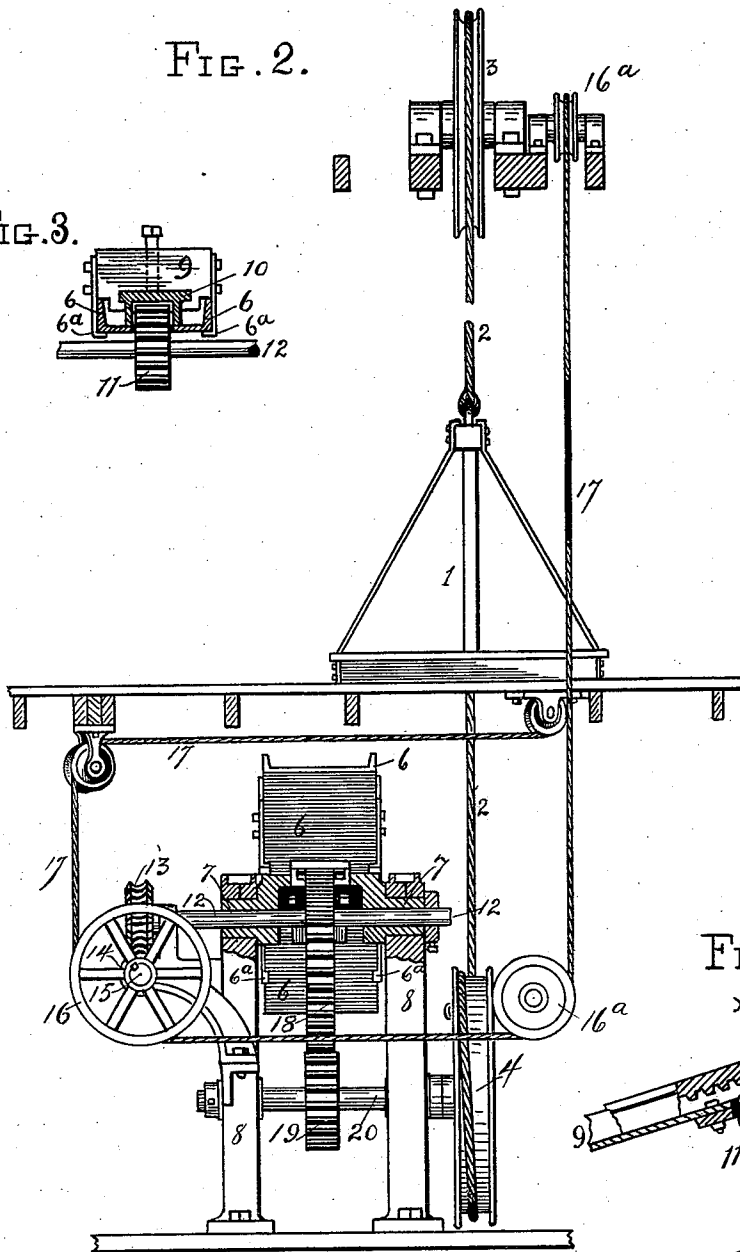
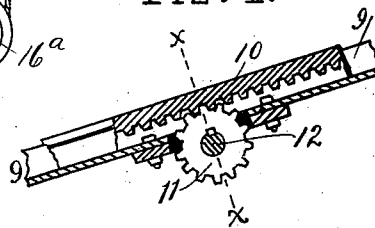


FIG. 4.



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FIG. 5.

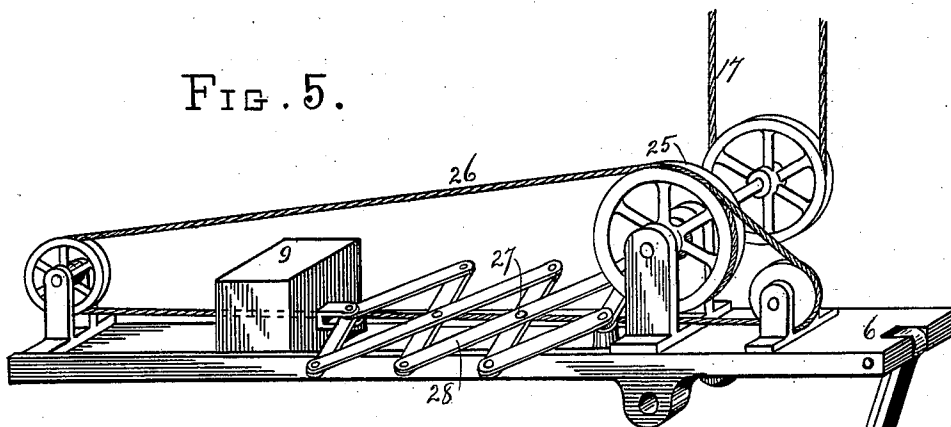


FIG. 6.

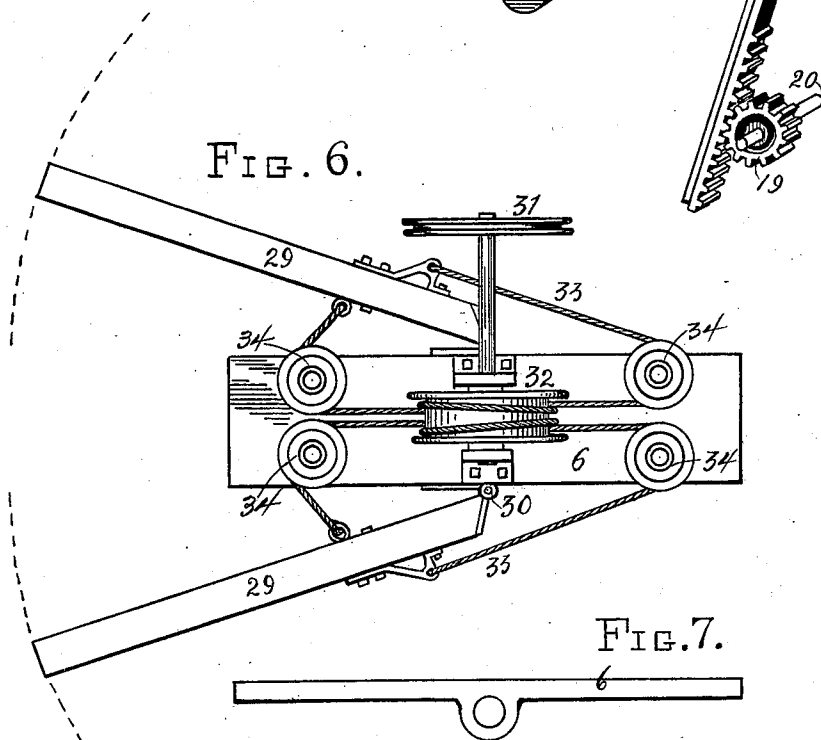


FIG. 7.



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UNITED STATES PATENT OFFICE.

JOHN E. PUTMAN, OF CHICAGO, ILLINOIS.

MEANS FOR OPERATING ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 564,313, dated July 21, 1896.

Application filed December 18, 1895. Serial No. 572,510. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. PUTMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Means for Operating Elevators, of which the following is a specification.

My invention relates to means for operating elevators or lifts for passengers and freight, and for other objects or structures which require to be raised and lowered or moved to and fro, and is a modification of the invention patented to me August 13, 1895, by United States Letters Patent No. 544,378. In the invention described in that patent the movement of the load is accomplished by means of a lever having a fulcrum adapted to be shifted in relation to the lever, one end of the lever being connected with the load through ropes, pulleys, and the like, the free end of the lever swinging through the arc of a circle, greater or less, according to the load to be moved. In that device means are provided for shifting the relative positions of the lever and its fulcrum.

The present invention relates to and its object is to provide an apparatus of the class above referred to in which the fulcrum and the lever shall permanently occupy the same relation to each other, the movement of the load being accomplished, through intermediate connections, by means of a weight or weights adapted to be shifted upon the lever.

In the accompanying drawings, illustrating my invention, made part hereof, Figure 1 represents a side elevation of one form of my device; Fig. 2, an end elevation of the same, partly in section; Fig. 3, a cross-sectional view of the lever with its rack and pinion hereinafter referred to; Fig. 4, a longitudinal side elevation of the same, partly in section; Fig. 5, a modified form of means for shifting the weight hereinafter referred to, together with a modified form of device for communicating motion to the shaft of the hoisting-drum hereinafter referred to; Fig. 6, another alternative device for moving the weight, hereinafter referred to, to and from the fulcrum-point of the working lever; and Fig. 7 a side view of the lever shown in Fig. 6.

Like figures of reference indicate like parts throughout the several views.

In the drawings, 1 is the cage, traveling vertically on ways (not shown in the drawings) and supported, raised, and lowered by rope 2, passing over pulley 3, secured to hoisting pulley or drum 4, and provided with 5, the usual counterbalance to the cage.

6 is a lever, preferably a stout beam of iron, fulcrumed, in the example here shown, at its middle and mounted upon trunnions 7, journaled in supporting-frame 8.

9 are weights secured to the lever 6, which is channeled or grooved to receive the weights in such manner that the weights may be moved to and fro upon the lever without lateral displacement. The weights may be movably secured to the lever or walking-beam, as at 6^a, by means of metal straps secured to the weights and bent under the lower side of the beam. These weights are connected by a rack-bar 10, the teeth of which are engaged by a pinion 11, secured to shaft 12, which passes through and has its bearings in an axial bore in trunnions 7. Secured to one extremity of the shaft 12 is a worm-wheel 13, which is engaged and actuated by a worm 14. This worm is secured to a shaft 15, journaled in frame 8, which shaft carries a drum or pulley 16, over which and over pulley 16^a passes a rope 17, which in its course leads through the cage 1 within convenient reach of the operator.

Secured to the lower side of the lever 6 is a stout segmental rack 18, which has for its center of motion the axis of shaft 12, passing through trunnions 7. The segmental rack 18 is engaged by pinion 19 on shaft 20, journaled in frame 8. Upon shaft 20 is secured a hoisting drum or pulley 4, around which is wound rope 2, which leads over pulley 3 at the top of the runway of the cage, and which rope is secured to and supports the cage.

The operation of my device thus far described is as follows: Referring to Fig. 1, if the cage is to be raised, the operator pulls downwardly on that part of rope 17 which passes through the cage, causing the drum 16, shaft 15, and worm 14 to revolve, thus communicating motion through shaft 12 and pinion 11 to the toothed rack 10, to which the weights 9 are secured. The motion of the rope 17 causes one of the weights 9 to travel outwardly toward one extremity of the lever

while the other weight approaches the center of the lever. That end of the lever which has become the heavier by thus shifting the weights now by its own gravity begins to descend, giving motion to the segmental rack 18, which, through pinion 19, shaft 20, and drum 4, winds rope 2 upon this drum, causing the cage to ascend so long as the lever or walking-beam 6 continues to tilt. When it is desired that the cage shall descend, an upward pull on rope 17 causes the weights to travel in the opposite direction and produces an operation of the parts above referred to the reverse of that above described.

The advantage of actuating the weight through worm-gear 13 14 is that the weights 9 are thus held locked in any position to which they may be shifted upon the lever or walking-beam, so that their very great weight will not cause them to break loose or escape when their beam is tilted at an acute angle to the floor. Other methods of securing the movable weights 9 in constantly-locked position in their ways or grooves will suggest themselves to those skilled in the art, and I do not, therefore, limit myself to any particular mechanism for obtaining this result.

Though I have shown the hoisting-drum as actuated by a rack and pinion intermediate the tilting lever and the drum, it should be understood that I do not limit my invention to any particular form of power-transmitting mechanism connecting the tilting lever and the hoisting-drum.

For illustration I have shown two weights attached to the walking-beam 6, arranged on opposite sides of the fulcrum 12, but it should be understood that a single weight adapted to travel from end to end of the walking-beam will accomplish the same result, though not so rapidly or satisfactorily.

It should be understood that the cage is provided with suitable brakes (not shown in the drawings) placed as usual within convenient reach of the operator.

Various means of shifting the weight upon its walking-beam will suggest themselves to those skilled in the art, among which are obviously the screw, a piston driven by steam, hydraulic power, compressed air, or the like, and which do not require illustration here. Another method of actuating the weights upon its walking-beam is a lazy-tongs, as illustrated in Fig. 5. In this modification of my invention the rope 17 passes around a pulley, upon the shaft of which is a pulley 25, driving an endless rope 26, which in its course engages, as at 27, a joint in the lazy-tongs 28, fixed at one end to the lever, near its fulcrum, and at its other end to the weight. The motion of the rope 17 communicates motion through the endless rope and the lazy-tongs to the weight.

It will be observed that in Fig. 5 the lever is fulcrumed near one end, instead of at its middle, and it will be understood that the fulcrum-point will vary according to conditions,

such as the load to be moved, the space through which it moves, and the character of the hoisting-gear employed. In Fig. 5 it will also be seen that a straight rack may be substituted for the segmental rack above referred to by pivotally securing the straight rack to one end of the walking-beam. This straight rack may be caused to reciprocate in a pivoted guide, and to thus communicate motion to the shaft of the hoisting-drum through a pinion on said shaft engaged by the straight reciprocating rack.

Another method of shifting the weight which will suggest itself is shown at Fig. 6. In this modification of my device the weight consists of one or more beams 29, of any desired length and weight, pivoted or hinged at one end, as at 30, near the fulcrum of the walking-beam. Rope 17 passes around a pulley 31, upon the shaft of which is a drum 32. Around this drum passes rope 33, leading over pulleys 34 and secured at their opposite ends to the two vertical sides, respectively, of the swinging beam 29. When pulley 31 is revolved by the rope 17, the drum 32, through rope 33, causes the beam 29 to swing in a horizontal plane. Now, when the swinging beam is at a right angle to the walking-beam and in line with its fulcrum, its effect is *nil*, but upon the beam being swung in either direction the weight upon the walking-beam will be correspondingly increased in that direction, and the more nearly the beam approaches a line parallel with the walking-beam the greater will be the downward pull upon the walking-beam on the side toward which the beam is swung.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A means for operating elevators and the like, comprising a lever, a weight, such as a cage, suitable connections intermediate said weight and said lever, a weight movably secured to and adapted to move longitudinally upon said lever, and means for shifting said last-mentioned weight upon said lever, substantially as and for the purpose specified.

2. A lever, a shaft secured to and forming a fulcrum for said lever, a weight, such as an elevator-cage, suitable connections between said weight and said lever, and a movable weight upon said lever, in combination with means for shifting said weight upon said lever, substantially as and for the purpose specified.

3. A hoisting-lever, a weight, such as an elevator-cage, suitable connections intermediate said lever and said cage, and a movable weight upon said lever, in combination with a toothed rack movable longitudinally upon said lever and secured to said weight on said lever, a pinion engaging said rack, a worm-gear adapted to drive said pinion and means for actuating said worm-gear, substantially as and for the purpose specified.

4. A hoisting-lever, a weight, such as an

elevator-cage, another weight movable upon said lever, and means for shifting the latter weight, in combination with a segmental rack secured to said lever having for its center of motion the axis of the fulcrum of said lever, a hoisting-drum, a rope thereon adapted to control said first-mentioned weight or cage, and suitable connections intermediate said hoisting-drum and said segmental rack, substantially as and for the purpose specified.

5. A hoisting-lever, a weight, such as an elevator-cage, suitable connections intermediate said weight and said lever, a movable weight upon said lever and means for moving said latter weight longitudinally upon said lever, in combination with means for securing said weight against longitudinal and lateral displacement, substantially as and for the purpose specified.

6. A lever fulcrumed upon a trunnion, a weight movably secured upon said lever, a rack on said lever secured to said weight, a shaft having its bearings in an axial bore in said trunnion, a pinion on said shaft engaging said rack, a worm-gear adapted to actuate said rack and pinion, and means for actuating said worm-gear, in combination with a segmental rack secured to said lever, a weight, such as an elevator-cage, and suitable connections intermediate said segmental rack and said latter weight, substantially as and for the purpose specified.

JOHN E. PUTMAN.

In presence of—

E. W. LEWIS,
THOS. R. SHAW.