

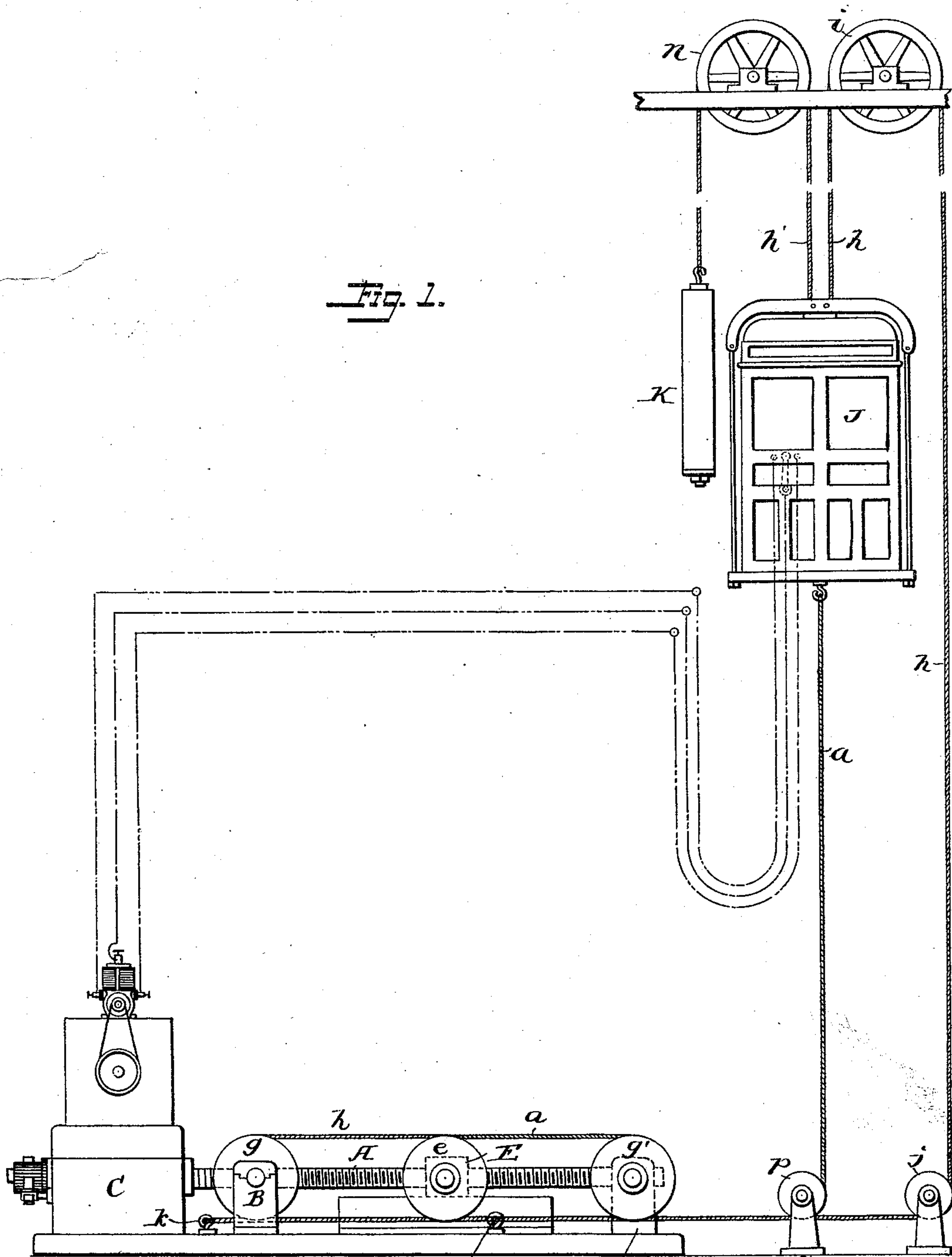
(No Model.)

2 Sheets—Sheet 1.

N. P. OTIS.  
ELEVATOR.

No. 543,630.

Patented July 30, 1895.



Witnesses  
J. G. Hinkel  
and  
Anderson

Inventor  
B Norton P Ohio  
BY Foster Freeman  
Attorneys

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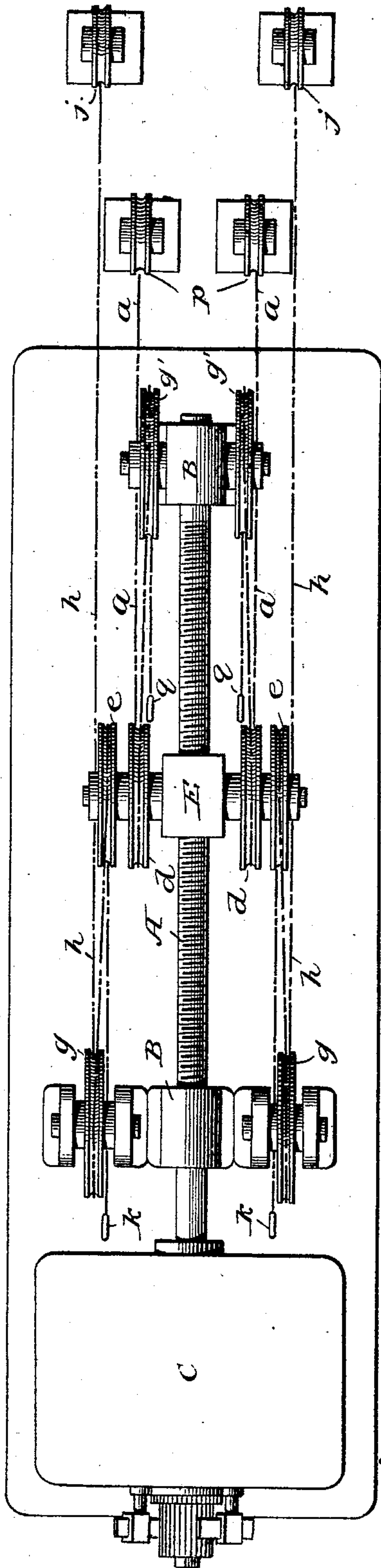
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Fig. 2



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# UNITED STATES PATENT OFFICE.

NORTON P. OTIS, OF YONKERS, ASSIGNOR TO THE OTIS BROTHERS & COMPANY, OF NEW YORK, N. Y.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 543,630, dated July 30, 1895.

Application filed March 2, 1893. Serial No. 464,416. (No model.)

*To all whom it may concern:*

Be it known that I, NORTON P. OTIS, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

In Letters Patent No. 447,899, granted to me March 10, 1891, I have described an elevator apparatus having standing and running multiplying sheaves and operating screw-shaft and cables, together with a counter-balance-weight, which is connected with cables passing around a second set of standing and multiplying sheaves, and which has proved very effective for the purposes for which it is intended, but which necessitates the extension of the counterweight-cable through the entire length of the well and the use of an amount of such cable which it is desirable to avoid; and my present invention consists in a construction and arrangement in this class of apparatus whereby I am enabled to avoid the objections above specified as well as secure other advantages, hereinafter fully set forth.

In the accompanying drawings, Figure 1 is an elevation of sufficient of an elevator apparatus to illustrate my improvements, and Fig. 2 is a plan view of the apparatus shown in Fig. 1.

The general features of the apparatus are very similar to those of Patent No. 447,899—that is, there is an electric motor or other suitable motor C, which imparts rotation in one direction or the other to a screw A, which has its ends in bearings B B, and upon which moves a traveling nut or carriage E.

There are two sets of sheaves *e d* carried by the carriage E, and the bearings B B carry sheaves *g g' g' g'*, and the cage is shown as suspended by two cables *h*, each of which passes over an upper guide-pulley *i*, downward around a lower guide-pulley *j*, and under and around a sheave *g*, and thence over and around a sheave *e*, with its end secured to an eye-bolt *k*.

Another pair of cables *a*, connected to the bottom of the cage, passes each around the guide-pulley *p* and beneath a pulley *g'*, and

around a pulley *d*, and back around the pulley *g'*, and to an eye-bolt *q*.

The counterweight-cable *h'* extends from the top of the cage over a guide-pulley *n* and supports the counterweight K, which is preferably greater in weight than the cage J. For instance, assuming the cage J to weigh one thousand pounds, the weight K is at least of equal weight, and preferably will weigh, say, fifteen hundred pounds.

It will be evident that if the traveling sheaves *e* were employed alone in connection with the sheaves *g* and the cable *h*, and if the counterweight K, connected with the cable *h'* and the top of the cage, should weigh more than the cage, the weight of the counterweight would lift the cage so long as the latter was empty or insufficiently loaded, and it would be impossible to descend. At the same time it is desirable, in many instances, to thus connect the counterweight directly to the top of the cage, avoiding the necessity of extending the counterweight-cable down the whole length of the well alongside of the cage, and for other reasons, and therefore I have provided for connecting another cable *a* to the bottom of the cage and passing it around another set of sheaves, one of them being traveling sheaves, connected with the nut E, so that when the carriage or nut E travels to the right and draws upon the cable *h* the cage J is elevated, the cable *a* being relaxed, while, when the carriage E moves to the left, it relaxes the cable *h* and draws upon the cable *a* around the sheaves *d g'* and draws down the cage if it should not be loaded or if it should be insufficiently loaded. If, however, as generally happens, the weight upon the cage is more than sufficient to overcome the weight of the counterweight K, then in that case the cage will descend, as fast as permitted, by gravity, so that there is no power expended in drawing it down, while when the cage next ascends the superior weight of the counterweight K will, to a very great extent, overcome the load upon the cage, thereby requiring less power to lift it.

While I have shown a certain arrangement of cables and sheaves whereby the cage is



drawn down, notwithstanding the excessive weight in the counterweight, and also positively elevated when required, it will be evident that various cable-operating appliances will effect the same result.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. In an elevator apparatus, a cage and its suspensory cable, a counter-weight and its cable connected with the top of the cage, a draft cable connected with the bottom of the cage, and traveling sheaves all on one movable carriage receiving the draft and suspensory cables and operating to draw upon one and simultaneously relax the other and a motor imparting movements to the carriage of the said sheaves, substantially as and for the purpose set forth.

2. The combination in an elevating apparatus, of the cage, its suspensory cable, the counter weight and its cable connected with the top of the cage, a draft cable connected with the bottom of the cage, two sets of standing sheaves, and a traveling carriage carrying two sets of running sheaves the suspen-

sory cable passing around one set of standing sheaves and one set of running sheaves, and the draft cable passing around the other set of standing sheaves and the other set of running sheaves, substantially as and for the purpose set forth.

3. The combination in an elevating apparatus, of a cage, suspensory cable, a cable *h'* attached to the top of the cage, a counter-weight connected with said cable *h'* a draft cable connected to the bottom of the cage, a screw connected with a motor and a carriage connected to travel by the rotation of the screw and supporting two sets of traveling sheaves, and two sets of stationary or standing sheaves, the suspensory and draft cables extending around said sheaves, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NORTON P. OTIS.

Witnesses:

HENRY L. BRANT,  
W. L. RICKARD.