

D. Hussey,
Elevator,
Nº 84,123, Patented Nov. 17, 1868.

Fig 4.

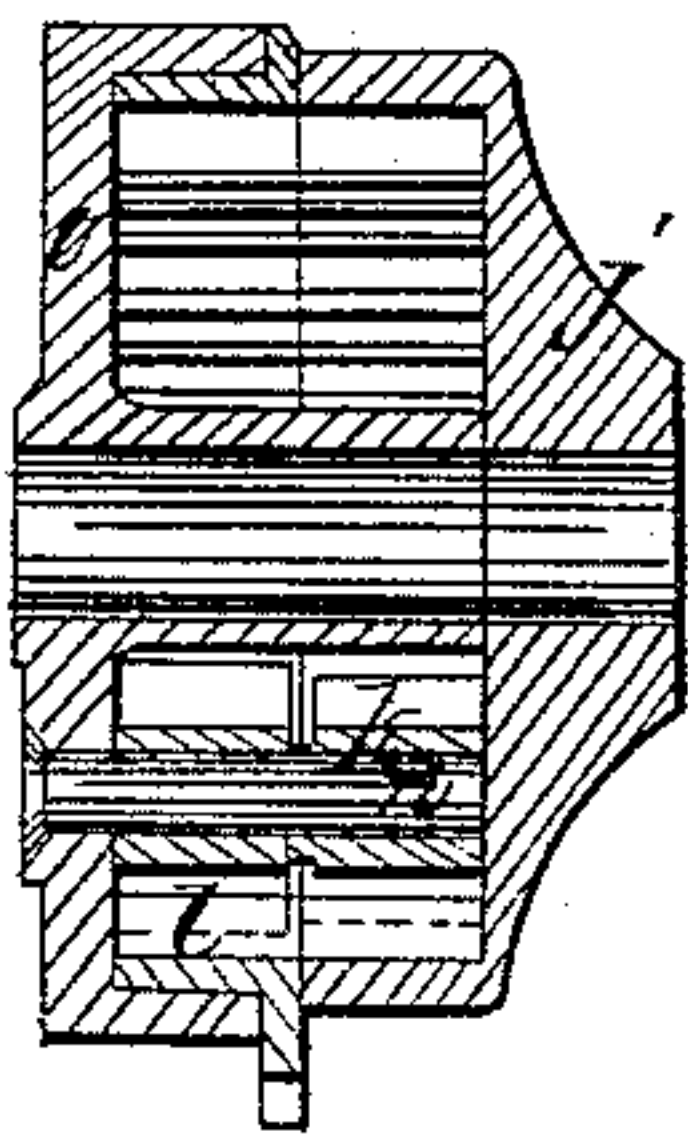


Fig 5.

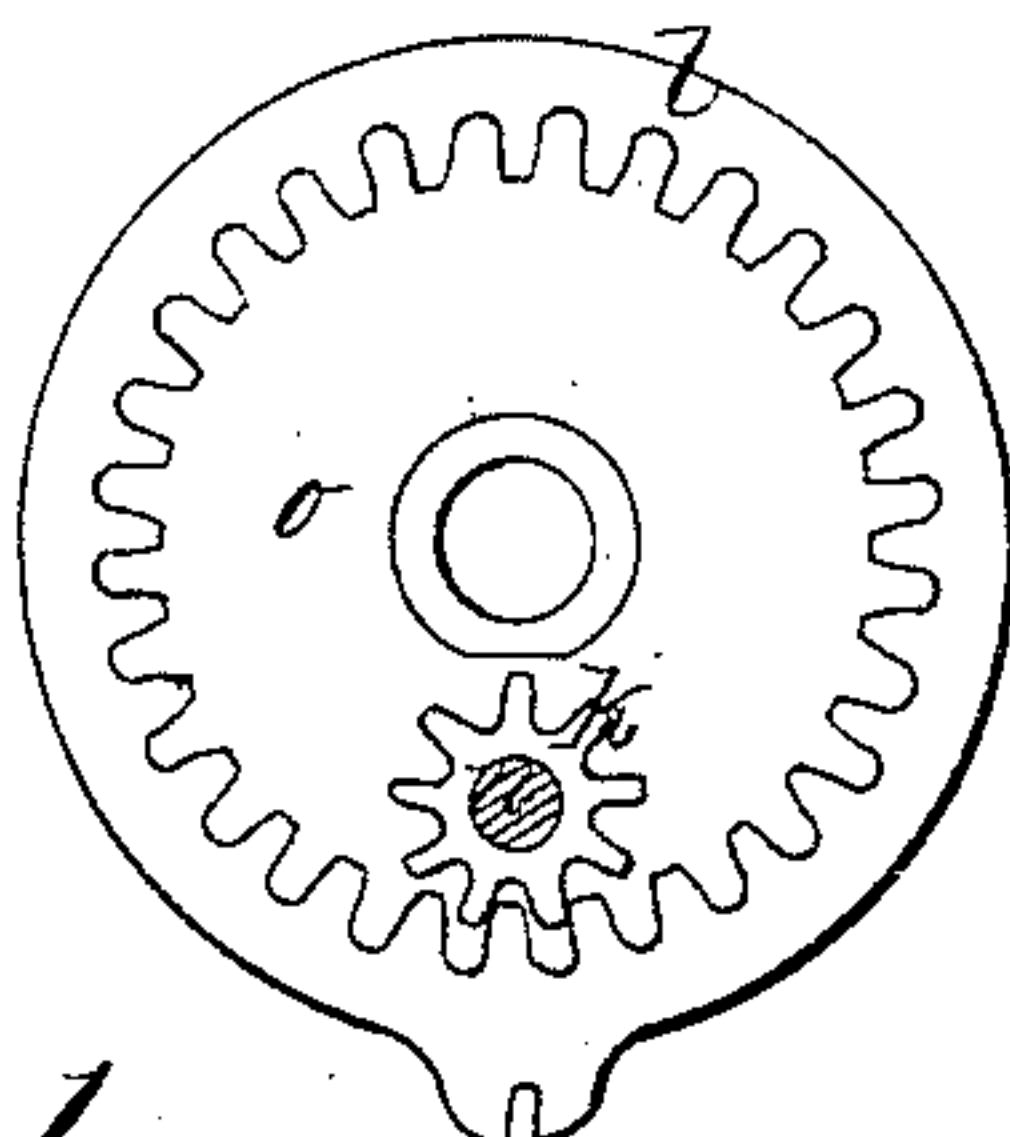


Fig 6.

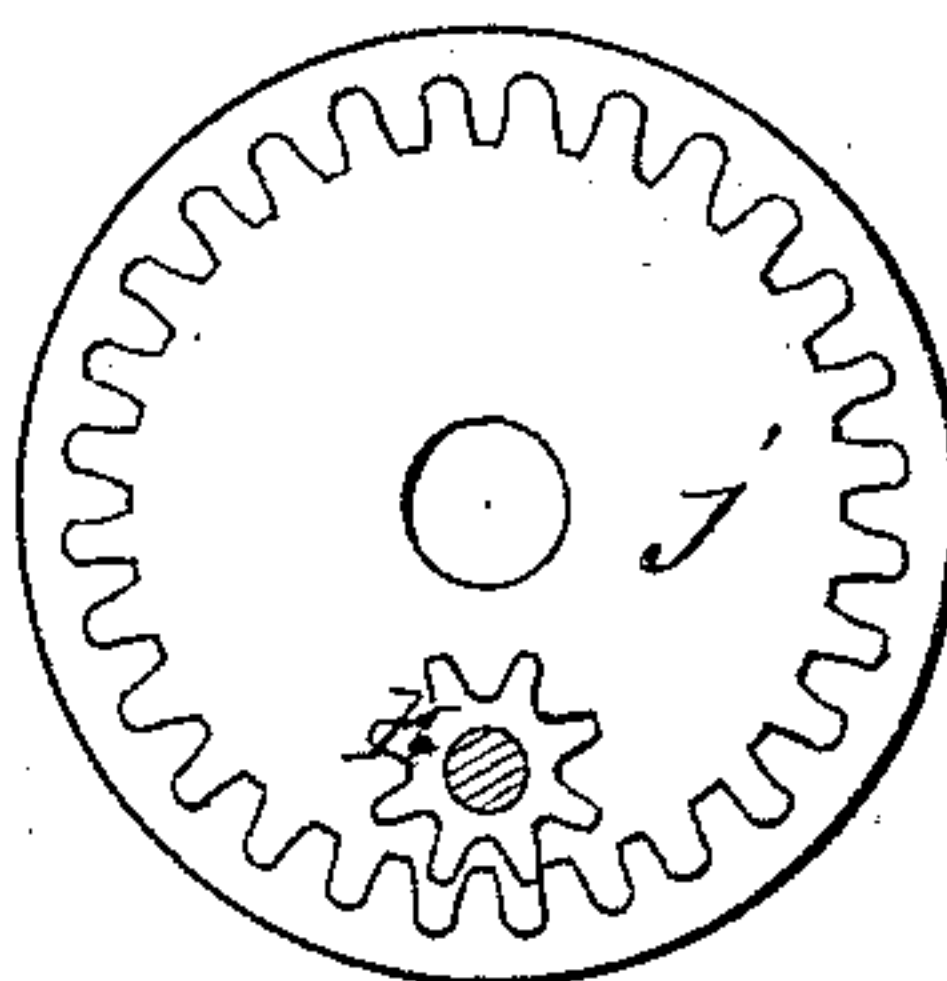
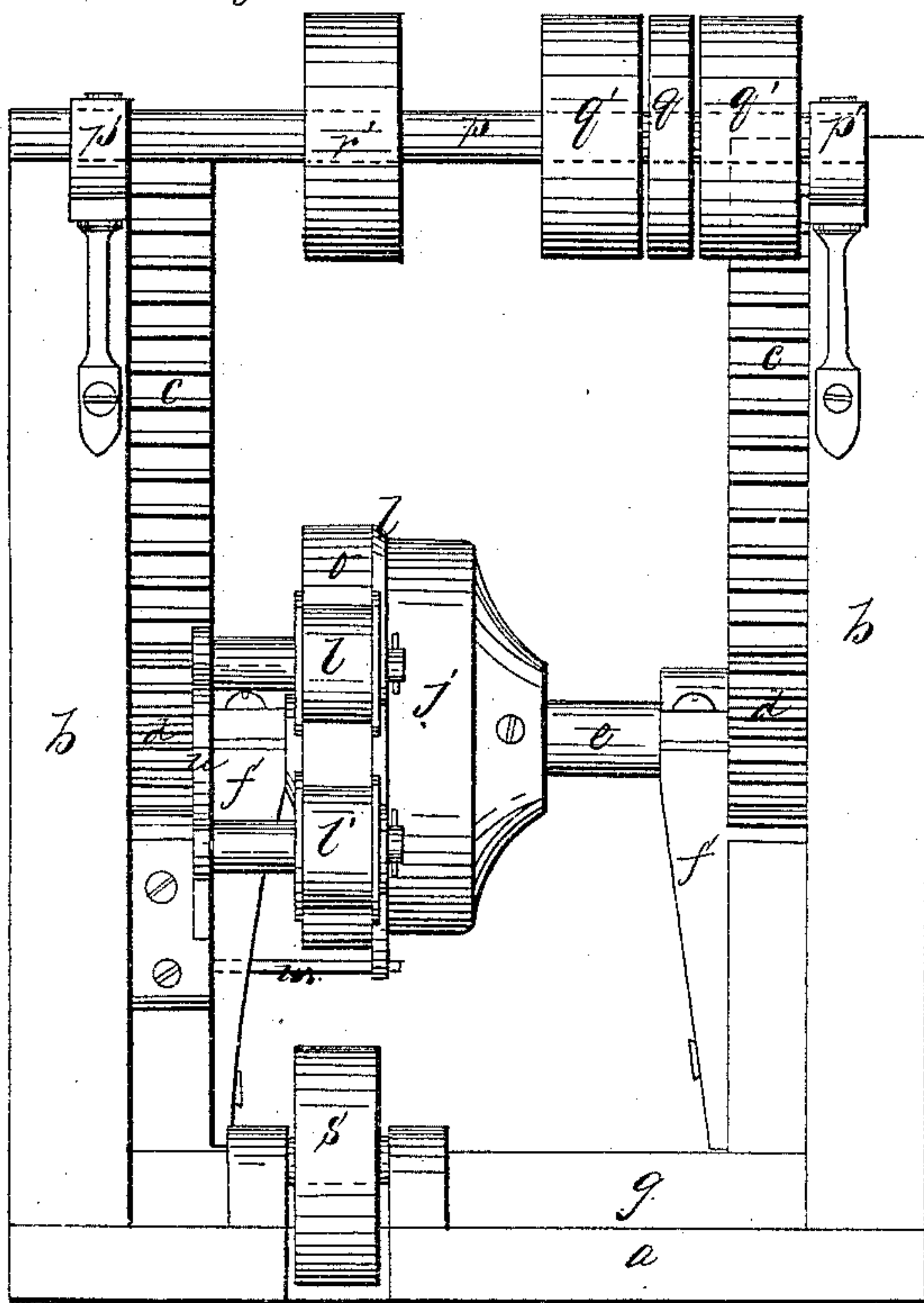


Fig 1.



Witnesses,
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Geo C. Perry

Inventor,
Daniel Hussey

Sheet 2-2 Sheets.

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Fig 2.

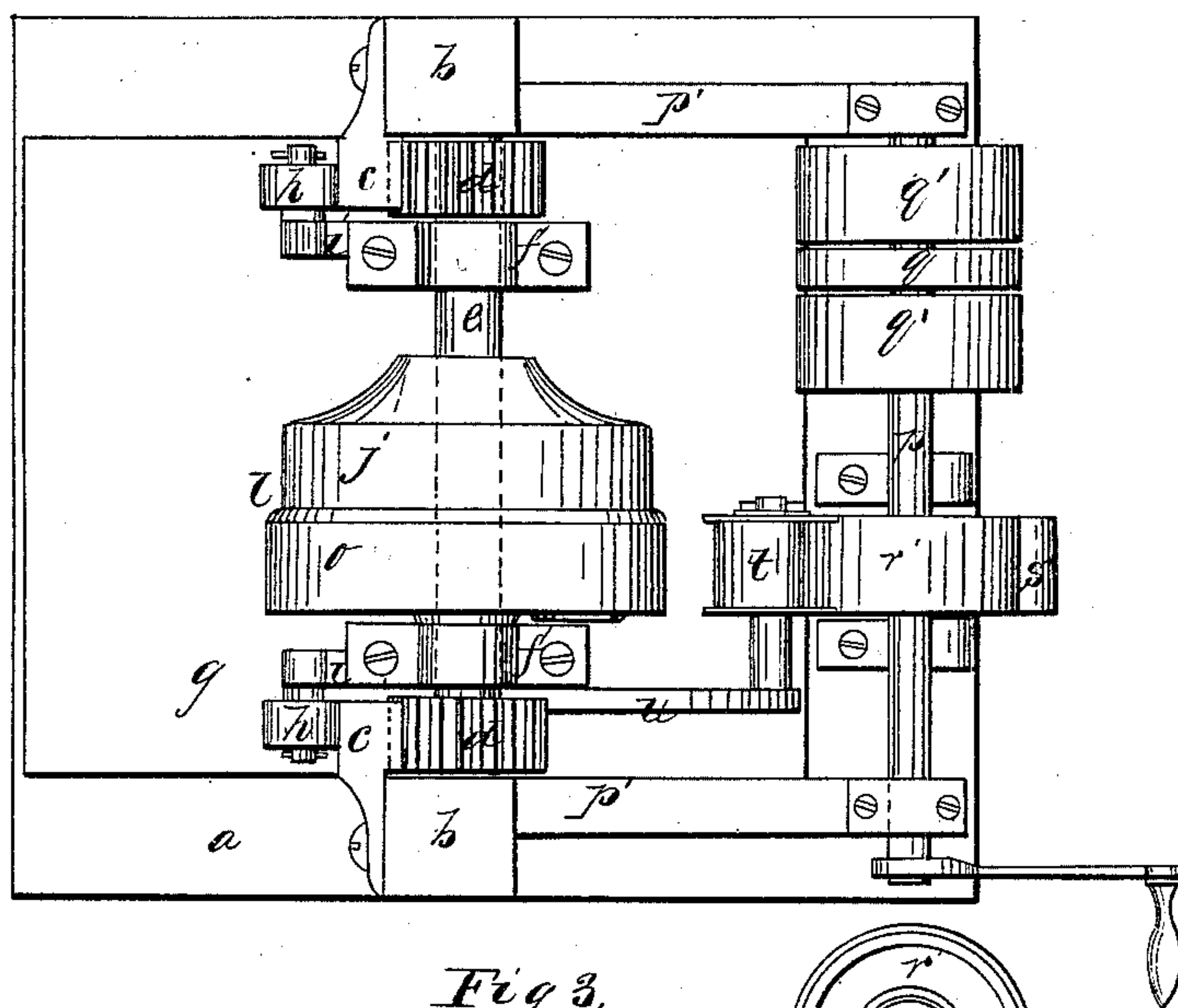
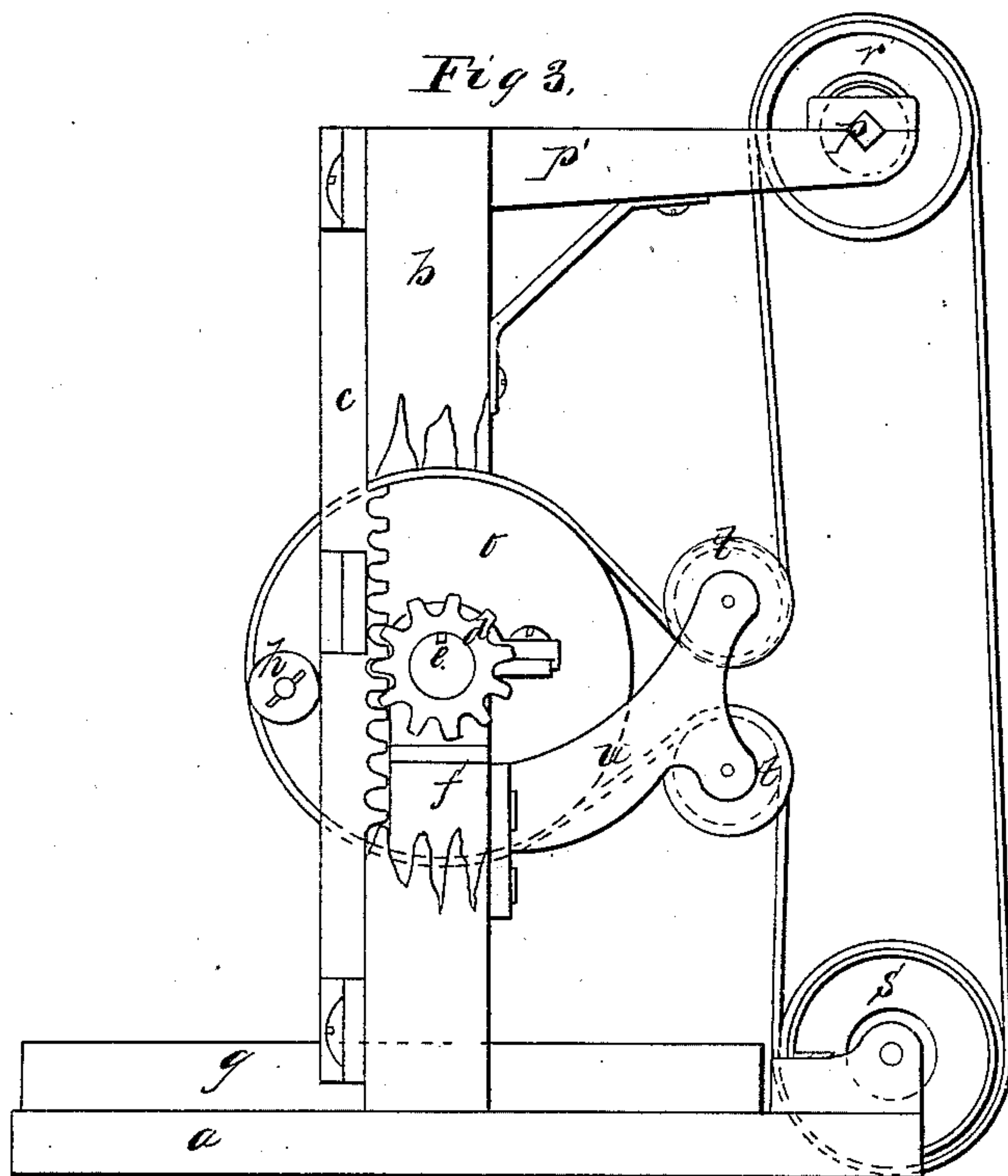


Fig 3.



Witnesses
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DANIEL HUSSEY, OF NASHUA, NEW HAMPSHIRE.

Letters Patent No. 84,123, dated November 17, 1868.

DIFFERENTIAL-GEAR ELEVATOR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, DANIEL HUSSEY, of Nashua, in the county of Hillsborough, and State of New Hampshire, have invented new and useful Improvements in Differential-Gear Elevators; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the application and arrangement of differential gears to elevators, whereby power can be gained or increased, and the elevator can be held at any point desired, without the use of a worm, ratchet, and pawl, being free and perfectly safe at all times, its construction conducive to cleanliness, strength, durability, and safety.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure 1 represents an end elevation of my improved elevator.

Figure 2 represents a plan of the same.

Figure 3 represents a side elevation of the same, with parts broken out showing its operation.

Figure 4 represents a longitudinal section of the differential device.

Figures 5 and 6 represent details of the same.

Similar letters in the different figures indicate corresponding parts.

In the application of my device for use, different locations require correspondingly different arrangements of its several parts to locate the same, but in the device, as represented in the drawings, *a* represents the floor; *b b*, the stationary posts, to which are secured the racks *c c* by screws or bolts. Connected and gearing into these racks are the pinions *d d*, which are secured to the shaft *e*, at each end, by a spline or otherwise, this shaft *e* running in the required bearings or stands *f f*, which are firmly secured to the platform or car, *g*, of the elevator, this car operating between the posts *b b*, the pinions *d d* being kept in gear with the racks *c c*, by aid of the friction-rollers *h h*, which are furnished with journals and stands *i i*, they being secured to the stands *f f*.

To the shaft *e* is firmly secured the internal gear *j*, which receives its motion and power from the differential pinion *k*, which connects with the stationary internal gear or rack *l*, this gear *l* being held in position by means of suitable arms or studs, *m*, which are secured to the stand *f*, these two gears, *j* and *l*, having the same number of teeth in each; the differential pinion *k* having one tooth more or less on one end than on the other, as represented in figs. 5 and 6 of the drawings, although the same results would be obtained by the pinion *k* having the same number of teeth in each end, and applying the differential device to the gears *j* and *l*, one of these gears having one or two teeth more or less than the other; this differential pinion *k* revolving on the stud *n*, which passes

through the centre, and is attached and secured to the plate of the pulley *o*, as represented in the drawings, or a gear, as may be desired, which would produce the same results, and oftentimes be required.

p is the main shaft, which is suspended by the arms *p' p'*, they being secured to the posts *b b*, and supplied with suitable bearings.

q is the driven pulley, firmly secured to the shaft *p*.

q' q' are loose pulleys, located on each side of this driven pulley *q* to receive the requisite belts, cross and straight, from the driving-pulley.

To this shaft *p* is attached the driving-pulley *r*, which connects with the pulley *o*, by means of an endless belt, which passes down and under the stud-pulley *s*, and between the flanged binder-pulleys *t* and *t'*, which are provided with suitable studs, they forming bearings for the same, being secured to the binder-frame *u*, which is attached to the stand *f*. By this arrangement of belting the elevator, the same tension is preserved to the belt in the ascent or descent of the platform or car *g*.

The differential gear *k*, the end of which that gears into the stationary gear *l*, having one more tooth than the end that gears into the revolving gear *j*, as shown in figs. 5 and 6, augments and produces the required power, which will be found and is demonstrated that the pulley *o* requires to make nine revolutions, or as many revolutions as there are teeth in the end of the pinion *k*, that gears into the stationary gear *l*, to produce one revolution of the pinions *d d*, which gear or connect with the racks *c c*, thus elevating or depressing the platform or car *g* at will, by means of the change or shift, of the straight and cross-belts alternately from tight and loose pulleys *q' q'*; the differential gear *k* acting in a twofold capacity, first, for the greater increase of power, which is obtained by the decrease of speed, when the machine is in motion; second, when the machine is at rest, and it is necessary to stop the car *g* at any given point of elevation, under any circumstances, either from the breaking of the belt or any other cause, the stationary gear *l* performs the office of a rack, and its working differential pinion *k* performs the office of a pawl to the rack by its having one tooth more or less than the other end of the pinion *k*, which is represented in the drawings as having one tooth more, although the results would be similar if the pinion *k* had the same number of teeth in each end, but the power gained, "as in my device," would be lost, as the speed of the internal gear *j* or pinions *d d* would be the same as the pulley *o*; consequently there would be no gain of power.

This gives a safe and reliable stop-motion to the car *g* at any point required, without the aid, "as in ordinary elevators," of side racks and pawls, or their equivalent devices.

Where great weight is required to be raised, two or more differential pinions, *k*, can be attached to the

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plate of the pulley *o*, thus giving strength in elevating, and additional stop-motion, as the weight demands.

The motion of the pinions *d d* in the racks *c c* being so slow, supersedes the necessity of little or no lubricating, as in ordinary cases of worm and gear, and by this simple arrangement the whole external part of the machine can be kept clean from oil, dust, and dirt; also, the differential gear *k* and internal gears *j* and *l*, with their bearings and working-surfaces, which require lubricating, being encased of themselves, are secure from dust and dirt, the lubricating-fluid prevented from oozing out through on to the outside, the whole being so arranged and secured that no accident can possibly occur to life or limb of the operator.

I do not wish to confine myself to the general ar-

rangement, as herein described, for the differential device, as represented in figs. 4, 5, and 6 of the drawings, can be located, as circumstances may require, under or over the car *g*, or at either side.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the racks *c c*, pinions *d d*, internal gears *j* and *l*, and differential gear *k*, when constructed and operating substantially as and for the purposes described.

DANIEL HUSSEY.

Witnesses:

THOS. F. BURGESS,
GEO. E. PEVEY.