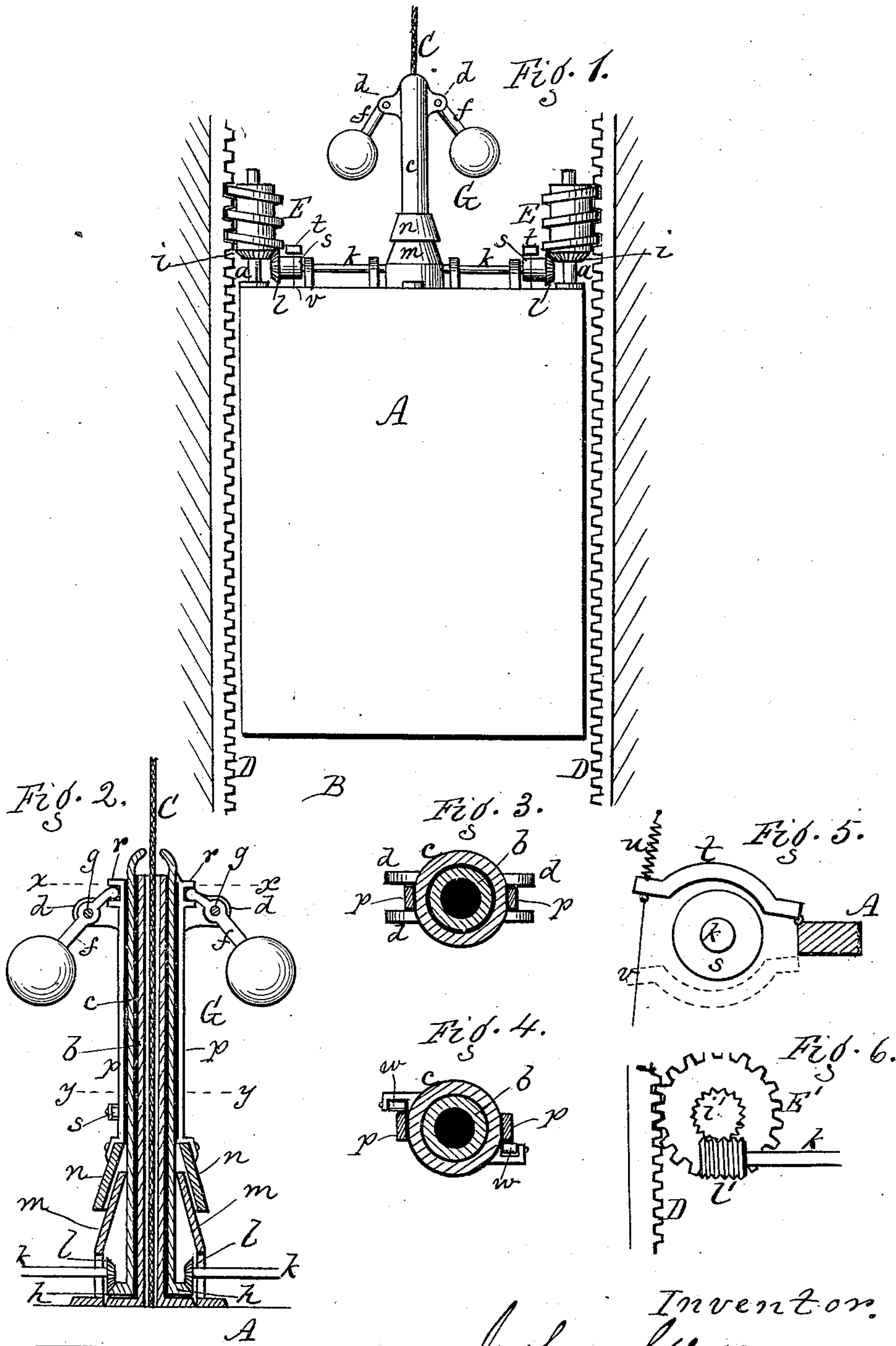


(No Model.)

J. GREENWOOD.  
ELEVATOR.

No. 273,273.

Patented Mar. 6, 1883.



Attest.  
Jacob Spahr  
Chas. J. Spencer

Inventor.  
John Greenwood,  
by R. F. Ogden,  
Att'y.



# UNITED STATES PATENT OFFICE.

JOHN GREENWOOD, OF ROCHESTER, NEW YORK.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 273,273, dated March 6, 1883.

Application filed June 14, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN GREENWOOD, a citizen of the United States, residing at Rochester, Monroe county, New York, have invented a certain new and useful Improvement in Elevators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of the apparatus located in the well. Fig. 2 is a longitudinal vertical section of the governor. Figs. 3 and 4 are cross-sections of Fig. 2 in the lines *xx* and *yy*. Fig. 5 is a view of the hand-brake. Fig. 6 is a modification.

My improvement relates to means for preventing rapid fall of the elevator in case the cable breaks or other accident occurs.

The invention consists in an arrangement of worm-wheels running in racks at the sides of the well and under control of a governor, as hereinafter more fully described.

In the drawings, A represents an ordinary elevator, which rests in a well, B, and is operated by a cable, C.

D D are racks on two opposite sides of the well, which extend from bottom to top, and have teeth which are set at such a pitch as to form segments of screw-threads.

E E are two vertical worm-wheels, turning freely on shafts *a a*, which are made fast to the top of the elevator, and rise and fall with it. These worm-wheels have projecting threads which engage with and run in the threads of the racks. As the elevator runs up or down motion is imparted to these worm-wheels by the engagement, and the pitch of the threads is such as to cause the worm-wheels to run easily.

G is a governor, also set on the top of the elevator, and connected with the worm-wheels in such a manner that the worm-wheels will impart motion to the governor, and the latter in turn will control the worm-wheels.

The construction and operation are as follows:

*b* is a fixed central tubular standard, which forms the central support for the governor, and through which the cable C passes to be attached to the cross-head of the elevator. *c* is an exterior tube, which fits around the central

standard and revolves freely upon it. This tube forms the upright body of the governor. It has lugs *d d* on two opposite sides, in which the arms *f f* of the governor-balls are pivoted, as shown at *g g*. On the bottom of the tubular body *c* is a bevel-gear, *h*, and on the bottoms of the worm-wheels E E are corresponding bevel-gears, *i i*. These gears are connected with that on the tube *c* by two counter-shafts, *k k*, having bevel-gears *l l*. By this means it will be seen that the motion of the worm-wheels will impart rotary motion to the governor and its balls.

*m* is a fixed cone attached fast on top the elevator, and surrounding the governor. It preferably incloses the center gearing, as shown. *n* is another cone resting over the first, and so attached to the governor as to revolve with it.

*p p* are two straps or rods attached to the cone *n*, and extending up beside the tube *c* and resting between the lugs *d d*, as clearly shown in Fig. 3. The tops of the straps are provided with notches or slots *r r*, in which rest the inner ends of the governor-ball arms *f f*. It will be seen that as the governor-balls are raised or thrown out by centrifugal action the straps *p p* will be thrown down, thereby bringing the cone *n* in contact with the cone *m* and producing friction, thereby acting as a brake upon the worm-wheels; and as the governor-balls fall again the straps will be raised, removing the contact of the cones and allowing the worm-wheels to run free. By this means all danger from the falling of the elevator in consequence of the breaking of the cable or otherwise is obviated, as the more rapidly the elevator runs down the well the more powerfully is the friction applied, and by this means the elevator will regulate its own motion, so as to run down very slowly under all circumstances. By this means, also, all sudden shocks, such as are occasioned by throwing out pawls to engage with ratchets, are avoided. If desired, the gears connecting the worm-wheels with the governor may be located above instead of below the worm-wheels. I design to connect with the center gear, *h*, a ratchet and pawl, which will cause the governor to operate in going down, but will disengage and prevent motion of the governor in going up.



*s s* are friction-wheels on the counter-shafts *k k*; and *t t* are hand-brakes resting over the same, but held from contact therewith by springs *u u* or other suitable means. Cores *v* 5 *v* extend from these brakes down into the car, so as to be readily reached by the operator. By this means friction can be applied at any time independently of the governor arrangement; and the movement can be controlled by 10 the operator.

*w w* are small rollers, set into bearings attached to the tube *c* on the sides opposite to the motion of the governor in revolving. The edges of the straps *p p* rest against these rollers, and are held in place by them, so that no twisting and binding action can be produced on the straps when the friction of the cones is applied. 15

If desired, simple spur-gears, Fig. 6, standing vertically and engaging with the racks *D D*, may be used in place of the worm-wheels *E E*, and with the same effect, being connected by suitable gearing with the governor, a convenient form of gear being a worm-wheel, *i'*, 20 on the same shaft as the spur-gear and standing close beside it, and a worm-pinion, *i'*, on the counter-shaft *k*, engaging with it.

If desired, also, a brake similar to the brake *t*, Fig. 5, may be used on the under side of the friction-wheel *s*, as indicated by dotted lines, the upper brake having a pulley over which the cord *v* passes, and the end of the cord being attached to the lower brake, by which means both brakes will be applied at once to 30 the opposite sides of the friction-wheel.

Having thus described my invention, I do not claim, broadly, a governor for operating a device engaging with and disengaging from racks at the side of the well; but 40 I claim—

1. In an elevator, the combination, with

racks located at the sides of the well, of worm-wheels attached to the elevator, running up and down in the racks, and a governor connected by suitable gearing with the worm- 45 wheels for controlling the worm-wheels, as herein shown and described.

2. In an elevator, the combination of the racks *D D*, the worm-wheels *E E*, engaging therewith, the shafts *k k*, provided with gears 50 engaging with gears on the worm-wheels, and a governor, *G*, having a gear engaging with gears on said shafts, as shown and described, and for the purpose specified.

3. The combination of the stationary cone 55 *m*, the movable cone *n*, and the sliding straps or rods *p p*, connecting at the top with the governor-ball arms, as and for the purpose specified.

4. In an elevator, the combination of the 60 worm-wheels *E E*, the counter-shafts *k k*, connected therewith by gearing, and the friction-wheels *s s* and brakes *t t* on the counter-shafts, with cords extending through the top of the car, for the purpose of controlling the move- 65 ment of the worm-wheels by hand, as herein shown and described.

5. The combination, with the straps or rods *p p*, of the friction-rollers *s*, attached to the tube *c*, for the purpose of preventing strain and 70 binding on the straps, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN GREENWOOD.

Witnesses:

R. F. OSGOOD,  
DARRELL D. SULLY.