(No Model.)

P. BAKER.

ELEVATOR.

No. 349,074. Patented Sept. 14, 1886.

FIG. 1.

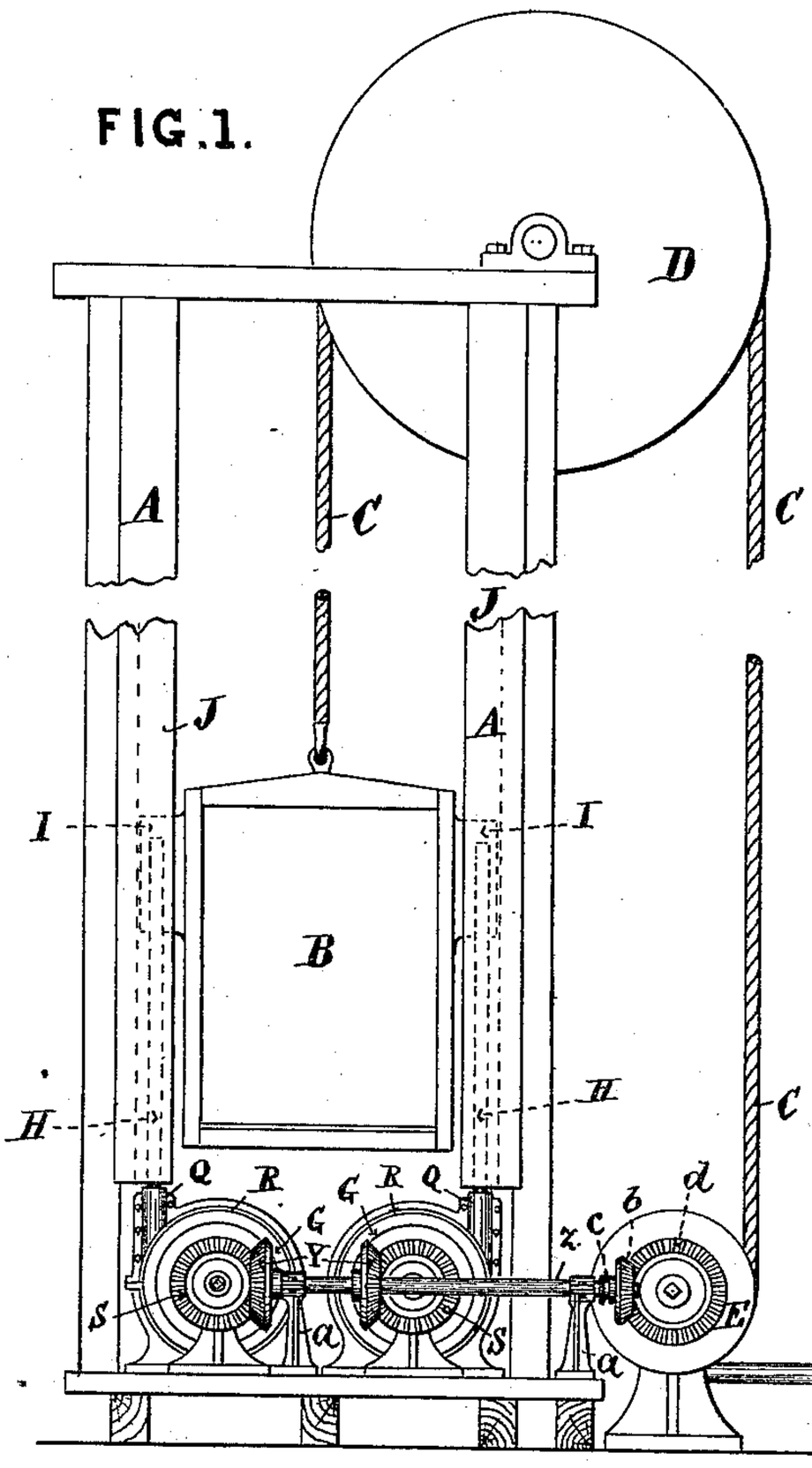


FIG. 3.

FIG. 5

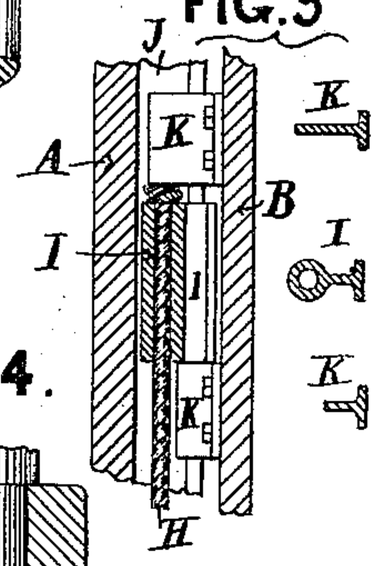
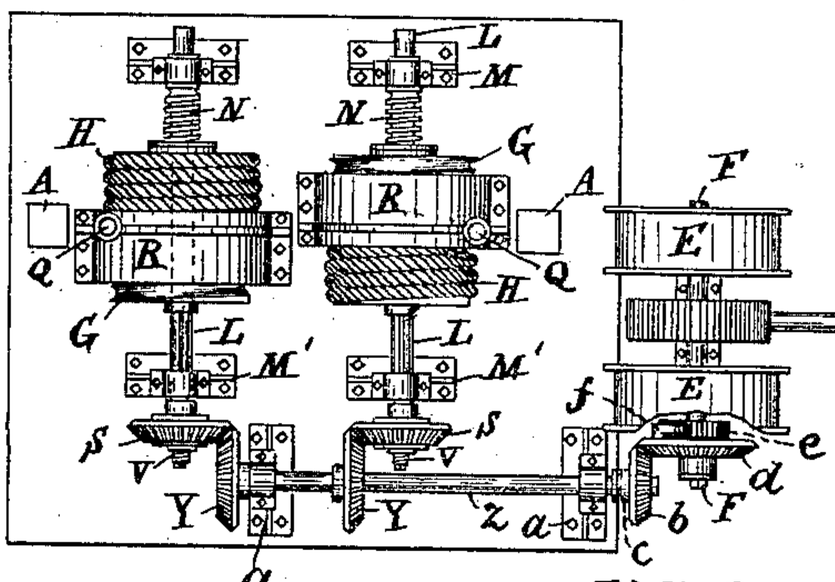


FIG. 4.

FIG. 2.



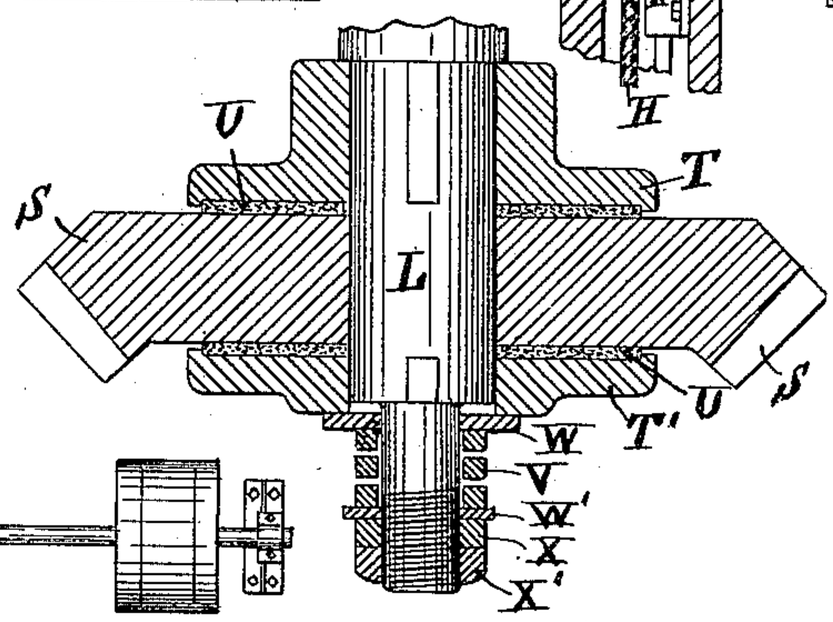


FIG. 6.

Witnesses.

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PHILANDER BAKER, OF ROXBURY, MASSACHUSETTS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 349,074, dated September 14, 1886.

Application filed February 4, 1884. Serial No. 119,703. (No model.)

To all whom it may concern:

Be it known that I, PHILANDER BAKER, a citizen of the United States, residing at Roxbury, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

My invention relates to certain improvements in elevators, with especial reference to that patented to me September 7, 1880, No. 231,891. It is found that the safety-rope used in the elevator referred to is subject to considerable inequality of tension at different times, owing to atmospheric changes, and to inequalities in the machine and other causes, which tend to interfere with the proper working of the machine.

It is the object of my present invention to overcome the defect, which I effect by means of friction applied to the spirally-grooved cylinder, and in the present case operated by the power imparted from the hoisting-drum. The shaft of the hoisting-drum is provided with a ratchet-wheel and pawl, so that when the car is being elevated no resistance is offered to the unwinding of the safety-ropes from the spirally-grooved cylinders, or to their moving in the vertical tubes precisely in conformity with the motion of the car. A reversed motion of the hoisting-drum causes the ratchet to engage the pawl connected with the friction-gear, which is inclined to increased speed, and effects the required tension upon the safety-ropes, the friction-gear yielding to any overstrain upon said ropes while being wound upon the incased cylinders.

Referring to the accompanying drawings, Figure 1 is a side elevation of my improved elevator. Fig. 2 is a plan view of the operative parts. Figs. 3 to 6 are enlarged views of details.

A A represent the frame-work of an elevator.

B is the car attached to the hoisting-rope C, which passes over a pulley, D, and is wound on the drum E, secured to the shaft F, which is rotated by any suitable power.

G G are the spirally-grooved cylinders, upon which the ropes H are wound. I I are plungers or tubular pistons that fit snugly but so as to move freely within vertical tubes J J in the frame of the elevator on each side. The upper ends of the ropes H H are passed through and secured to the plungers I, and the latter are maintained in proper position by means of T-pieces K K, secured to the car-frame, as shown in Fig. 5. The plungers I are caused to move up and down with the car by means of the T-pieces K K, which are secured to the car above and below the said plungers. By this means any variation there may be in the distance between the two vertical tubes J J, caused by inequality in the frame or otherwise, is provided for. The grooved cylinders G G are mounted on shafts L L, carried in bearings M M′.

Upon the shaft L, at one end, is mounted a sleeve, N, which is held in the bearing M′, and is provided externally with a screw-thread, (see Fig. 3,) which works in a stationary threaded sleeve or collar, P, secured to a boss at one end of the cylinder G. The boss at the other end of the cylinder is provided with a spline or feather that fits in a groove in the shaft L, so that as the shaft is rotated in one direction the cylinder will be drawn forward, and when rotated in the opposite direction the cylinder will be drawn back, by which means that portion of the cylinder upon which the rope is unwinding or winding will always be directly under the guide-tube Q in the casing R. On one end of each shaft L is a bevel-gear, S, a section of which is shown enlarged in Fig. 4, and is loose on said shaft.

T T′ are disks or hubs placed on each side of the bevel-gear S, and are retained in position on said shafts by means of grooves and feathers, so as to allow them to slide on the shafts but turn with them.

U U are washers, of leather or other suitable material, placed between the washer and the disks T T′.

W W′ are metal washers, between which is placed a strong spiral spring, V.

X is a nut, and X′ a set-nut.

The bevel-gear S will cause the shaft L to turn, owing to the friction exerted by the spring V and nuts X X′, and is free to slide on the shaft when the latter is held, by reason of the rope H being wound up so as to be tightly drawn. The bevel-gears S S engage with the

corresponding gears, Y Y, mounted on a shaft, Z, supported in suitable bearings, *a*. On the outer end of shaft Z is fitted a bevel-wheel, *b*, which is loose on said shaft, but by means of a clutch, *c*, causes the shaft to rotate. The bevel-wheel *b* engages with a bevel-gear, *d*, mounted on the shaft F, that carries the winding-drums for the hoisting-rope.

On the shaft F, at the rear of the bevel-gear *d*, is secured a ratchet-wheel, *e*, and to the back of the gear-wheel *d* is pivoted a pawl, *f*, so that when the shaft F is turned to wind up the rope C on drum E, the pawl *f* will ride over the ratchet-wheel *e*, but when turned in the opposite direction the pawl *f* will engage with the ratchet-wheel *e*, and so turn the bevel-wheel *d*, thus transmitting motion through intermediate shafts and gearing to the cylinder G.

In some cases it may become necessary to use ropes of greater rigidity when in a vertical position than the ordinary wire or hemp rope, as shown at H, and in such case I employ a rope composed of wires closely coiled and flattened on their contiguous sides. Extending through the interior of the said coiled-wire rope is a small wire rope, *h*, (see Fig. 6,) for the purpose of holding the coils together, at the same time allowing the coiled wire to be wound upon the drums H, the small wire rope serving to keep the inner edges of the coil together, while the outer edges will be free to expand, and when in an upright position the coiled wire will have the effect of a solid column. One end of the interior wire rope is secured to the lower end of the spiral coil and the other end to the tubular piston J.

The operation is as follows: The car B being at its lowest point motion is imparted to the drum E upon which the hoisting-rope C is wound, causing the car to rise. The ropes H are at the same time drawn up and unwound from the grooved cylinders G, the pawl *f* riding over the ratchet-wheel *e*. When the car is being lowered, the pawl *f* engages with the ratchet-wheel *e*, causing the bevel-gear *d* to rotate, and thus communicate motion to the bevel-gear *b*, shaft Z, and bevel-gears Y Y, which in turn cause the wheels S S to rotate and communicate motion to the cylinders G, through shaft L, screw N, and threaded collar P. The bevel-gears Y Y are set to turn the drums or cylinders G rather faster than the ropes H can be wound upon them, and in order to prevent too great a strain being exerted upon the ropes H the friction on the wheels S is regulated by means of the nuts X X', so that if, as the gears Y Y rotate, the rope H should be fully wound upon the cylinders G, the wheels S will slide on the shaft L, and by this means the ropes H H will always be kept at their full tension, and thus avoid any packing when the mechanism is in running order; but in case the hoisting-rope should break or give away the ropes H will become packed in the vertical tubes J, and thus serve practically as a positive means to prevent the car from falling.

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

1. In combination, the tubular slotted guide-posts, the inclosed safety-ropes, and the friction-drum windlass operated by the hoisting power of the elevator, substantially as and for the purpose set forth.

2. The combination, with the grooved cylinder G, of the screw-threaded collar P, the screw-threaded sleeve N, and shaft L, provided with a feather for turning the cylinder G, as shown and described.

3. The frictional gear consisting of the bevel-gear S, disks T T', the interposed washers U, the washers W W', spring Y, and nuts X X', in combination with the shaft L, cylinder G, and the casing R, as set forth.

4. In an elevator substantially such as described, the combination, with the frame A, and tubular piston I that carries the rope H, of the T-pieces K K, arranged the one above and the other below the said tubular piston, as and for the purpose described.

5. In an elevator, the combination, with the grooved cylinder G, the tubular piston I, and tubular passage-way J, of a rope, *g*, composed of coiled wire and provided with a rope, *h*, extending through said rope *g*, as and for the purpose set forth.

6. In an elevator, the combination of the shaft F, ratchet-wheel and pawl *e f*, bevel-gears *d b*, shaft Z, bevel-gears Y Y, frictional gears S S, and shafts L, 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.

PHILANDER BAKER.

Witnesses:
J. H. ADAMS,
E. PLANTA.