

C. R. Otis, Elevator.

N^o 46,580.

Patented Feb. 28, 1865.

Fig. 2.

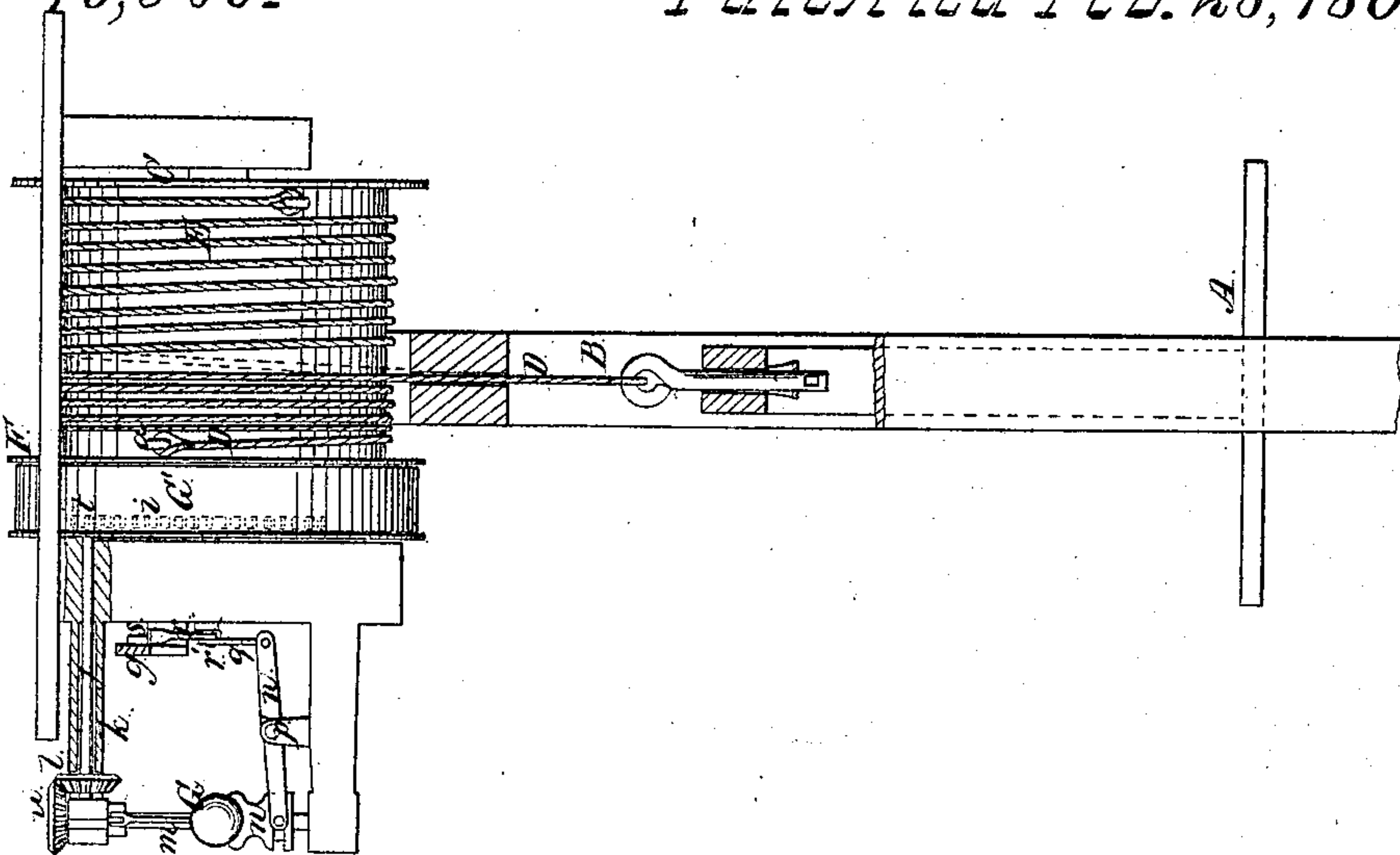
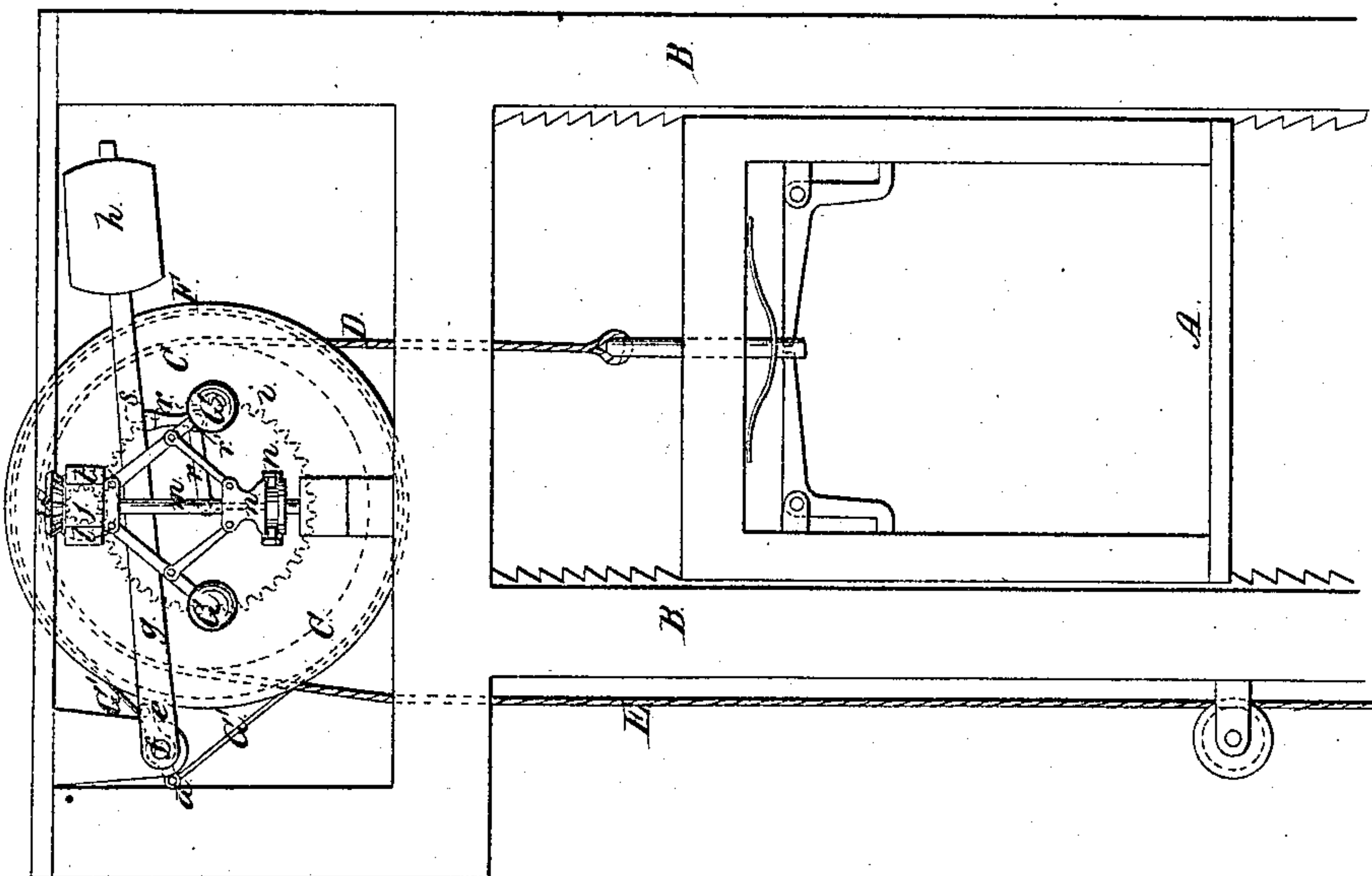


Fig. 1.



Witnesses.

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CHARLES R. OTIS, OF YONKERS, NEW YORK.

IMPROVED HOISTING APPARATUS.

Specification forming part of Letters Patent No. 46,580, dated February 28, 1865.

To all whom it may concern:

Be it known that I, CHARLES R. OTIS, of Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Hoisting Apparatus; 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, forming part of this specification, in which—

Figure 1 is the front elevation of the upper portion of a hoisting apparatus with my improvement applied. Fig. 2 is a side elevation of the same, partly in section.

Similar letters of reference indicate corresponding parts in both figures.

The object of this invention is to provide, in a hoisting apparatus, for the stoppage or checking of the revolution of the drum to which is attached the rope or chain from which the load is suspended, whenever from any cause the revolution of the said drum becomes too rapid.

The invention consists in so applying a brake and centrifugal or other governor, in combination with each other and with the aforesaid drum, that while the revolution of the said drum does not exceed a certain velocity the brake will be kept out of operation by the governor, but that when such velocity of revolution is exceeded the governor will cause or permit the brake to come into operation, and so stop or check the revolution of the drum.

It also consists in applying a safety device at or near the highest point in the hoisting apparatus, for the purpose of stopping or checking the descent of the platform in case of the breakage of the hoisting rope or chain between the windlass or main drum and the pulley or drum at the top of the apparatus, in which case a safety device applied directly to the platform might fail to operate.

To enable others skilled in the art to apply my invention to use, I will proceed to describe it with reference to the drawings.

A is the platform, fitted to slide between the sides of an upright frame, B, to the upper part of which are secured the bearings of the shaft *c* of the drum C, with which the platform is connected by a rope, D, which is represented attached to the platform by a safety device, which is part of the subject-matter of

Letters Patent granted to E. G. Otis, January 15, 1861.

E is another rope, which connects the drum C with a drum or windlass suitably situated and driven, and which serves to give to the drum C the necessary motion for winding up the rope D, and thereby raising the platform. The rope D is connected with the drum C at *a*, Fig. 2, near one end, and the rope E is connected with the said drum at *b*, near the opposite end, and the two ropes wind upon the drum in opposite directions, so that each is wound thereon as the other is unwound by the revolution of the said drum. To one end of the drum C or to its shaft *c* there is firmly secured a brake wheel, F, to which is fitted a brake-strap, G', the opposite ends of which are connected with the two short arms *d e* of a shaft, *f*, which is arranged in suitable bearings. To this shaft *f* there is secured a lever, *g*, loaded with a weight, *h*, which, when the said lever is not held up, has the effect of tightening the brake-strap upon the wheel and preventing or checking the revolution of the drum. The drum or brake or their shaft *c* has secured to it a spur-gear, *i*, gearing with a pinion, *t*, on end of a shaft, *j*, which works in a fixed bearing, *k*, and on the other end of which there is a bevel-gear, *l*, gearing with a bevel-gear, *u*, on the spindle *m* of a rotary governor, G, which is attached to a frame, B, or to any other suitable fixed support, and which receives rotary motion from the drum at a suitable speed through the gearing and shaft *f*. The sliding sleeve *n* of the governor is connected by a lever, *p*, working on a fixed fulcrum, *p'*, and a rod, *q*, with one arm of an elbow-lever, *r*, which works on a fixed fulcrum, *r'*, and the other arm of which, when the drum is not revolving beyond the desired speed or is at rest, is situated below a projection, *s*, on one side of the brake-lever *g*, as shown in Figs. 1 and 2, and thereby made to support the said lever in such manner as to prevent its operation on the brake-strap, and cause the said strap to embrace the wheel F loosely.

In case of the rope E breaking at any time, and leaving the drum under the uncontrolled influence of the weight of the platform and load, the rapid revolution of the drum C and descent of the platform, which immediately commences, gives such a velocity to the gov-

ernor that the rise of its sleeve *n* moves the lever *r* to a position in which its upper arm is withdrawn from under the projection *s* on the lever *g*, which is thus left free to be depressed by the weight *h*, and thereby caused to tighten the brake-strap *G'* upon the wheel *F*, and so to stop or check the revolution of the drum and the descent of the platform and load. In case of the rope *D* breaking during the hoisting operation, a similar action takes place, as the governor and brake will operate in a similar manner upon the drum in case of the velocity of its rotation exceeding a certain degree, whichever may be the direction of such rotation; and, in fact, whatever may be the cause of such excess of velocity of the drum a similar action of the governor and brake takes place.

The brake-wheel *F*, instead of being attached directly to the drum *C* or on the same shaft therewith, may be on another shaft geared with the drum.

A very important result obtained by the application of a brake or equivalent safety device at or near the highest point of the apparatus, as represented in the drawings, is, that it insures the stoppage or checking of the descent of the platform in case of the breakage of the rope *E*, which connects or passes between the main drum or windlass and the drum or pulley at the top of the apparatus.

A proper safety device applied directly to the platform insures its stoppage in case of the breakage of the rope *D* between the platform and the drum or pulley at the top of the apparatus, and in some cases in case of the breakage of the rope *E*; but in case of the apparatus being of great height and the main drum being at or near the bottom and the rope *E* breaking near the bottom, the weight of the broken rope hanging from the drum or

pulley *C* may be sufficient to prevent the operation of the safety device applied directly to the platform, and under such circumstances the brake or equivalent safety device applied at or near the highest point in the apparatus, substantially as represented in the drawings, will not fail to act, and hence when a safety device is applied at the top of the apparatus and another to the platform the platform cannot possibly descend too rapidly, except in case of some imperfection in those devices.

The safety device may be applied at the top of the apparatus with equal effectiveness when a single rope is employed in place of the two ropes *D E*; but such rope should be secured to the drum *C*.

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

1. The combination of a governor and brake with each other and with the drum of a hoisting machine, to operate substantially as herein specified under the circumstances herein set forth.

2. Combining the governor with the loaded lever of the brake by means of a lever, *r*, or its equivalent, deriving motion from the governor and acting as a support under a portion of the said loaded lever while the rotation of the governor does not exceed a certain velocity, but escaping from under the said loaded lever when such velocity is exceeded, substantially as and for the purpose herein described.

3. Applying a safety device at or near the highest point of a hoisting apparatus, to operate substantially as and for the purpose set forth herein.

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Witnesses:

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