C. R. & N. P. OTIS.

HOISTING APPARATUS.

No. 113,555. Patented Apr. 11, 1871.

Fig: 1.

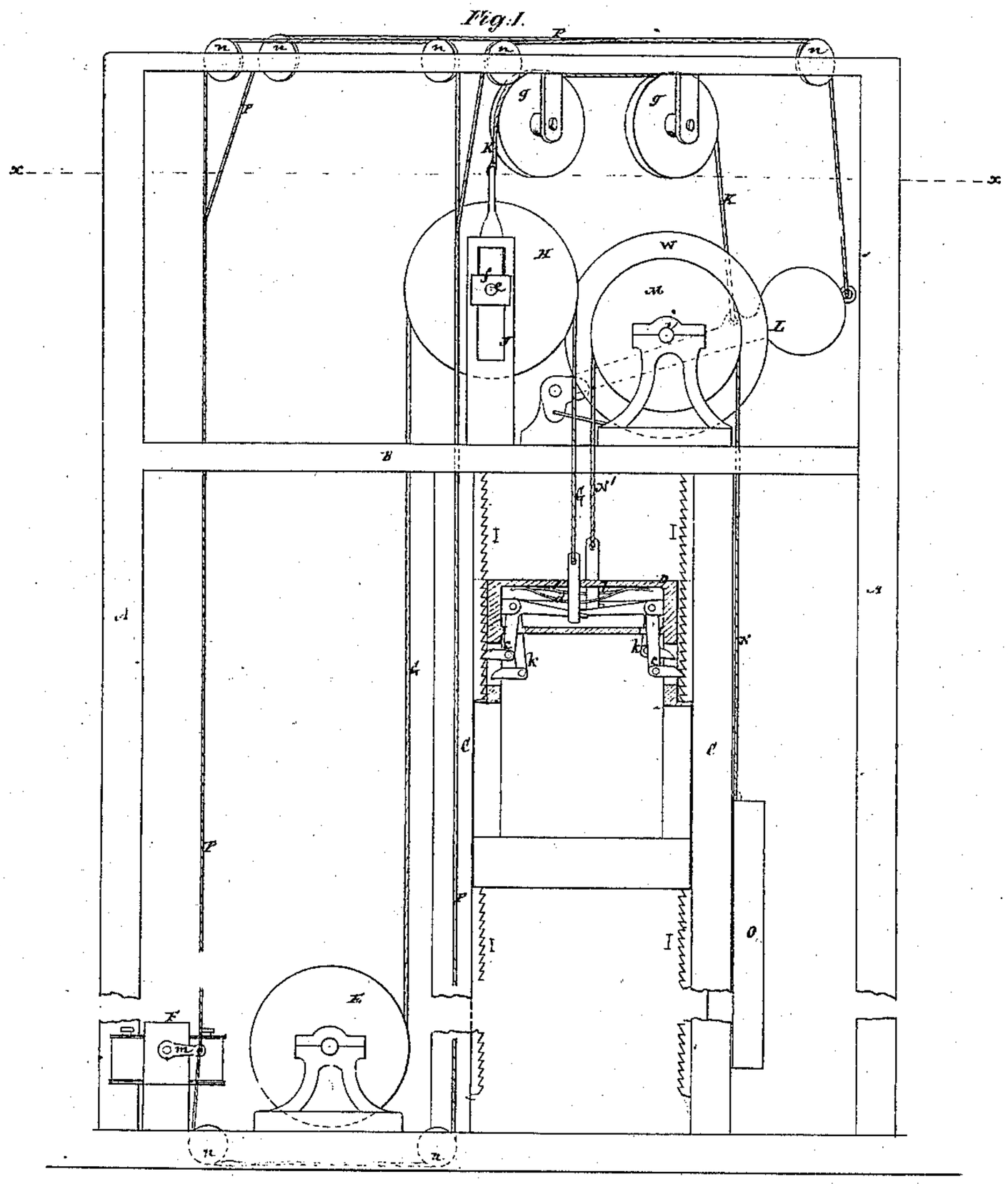
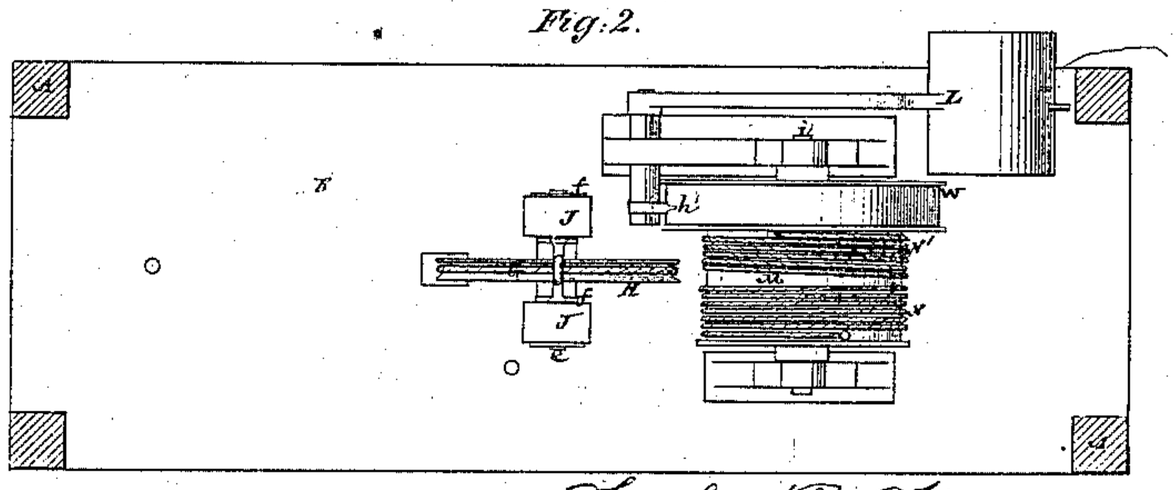


Fig: 2.



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Letters Patent No. 113,555, dated April 11, 1871.

IMPROVEMENT IN HOISTING APPARATUS.

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

To all whom it may concern:

Be it known that we, CHARLES R. OTIS and NORTON P. OTIS, both of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a side elevation, with the car, cab, or platform in section, of a hoisting apparatus having our invention applied to it; and

Figure 2, a horizontal section taken as denoted by the line *x x* in fig. 1.

Similar letters of reference indicate corresponding parts.

This invention consists in novel means of producing the operation of the stop-pawls in the ratchets provided on the upright guides between which the car, cab, or platform works; and of producing the operation of a friction-brake to provide against accident in case of the breaking of the lifting-rope; and in cases where the said rope does not break, as, for instance, where its weight in slackening might be sufficient to prevent the action of the stops; and to provide generally against accident consequent on any tendency to the too rapid descent of the cab, car, or hoisting-platform, or in case of the slackening of the lifting-rope from whatever cause; such means to be used either alone or in addition to other means which may be employed to effect the said stoppage, or check the descent of the cab, car, or platform under similar circumstances.

The invention likewise includes a combination of a weight and a brake-lever with the stop-lever of the engine, for the purpose of arresting the driving-power of the apparatus in case of the hoisting.

Referring to the accompanying drawing—

A represents an outside frame; and

B, a floor at top of the hoist-way.

C C are the guides or posts, up or down within which the car, cab, or platform D of the hoisting apparatus works.

E is the hoisting-drum; and

F, the engine for operating the same, both arranged to occupy a lower position relatively to the rest of the apparatus.

G is the lifting-rope, made fast at its one end to the hoisting-drum E, and arranged to run up over a sheave or pulley, H, situated at the top of the hoist-way, and from thence down to the levers of the usual stop-pawls *c c*, which are connected with the car, and are under the control of a spring, *d*, to cause them to lock with safety-ratchets or racks I I in case of the hoisting-rope breaking, or of its slackening during the descent of the car.

The sheave or pulley H, over which the lifting-rope passes, has its axle *e* hung in boxes *f*, which are fitted to slide in an upright stationary guide, J.

These boxes are connected by a chain or rope, K, passing over pulleys *g g*, with a brake-lever, L, to which is attached a weight, L′, that, when in action, applies the brake-strap *h* to a wheel, W, fast on a shaft, *i*, which carries a safety-drum, M, arranged at top of the hoist-way.

N and N′ are ropes, made fast at their one end to the safety-drum M, around which they pass, or are wound in reverse directions.

The free end of the rope N has attached to it a counterbalance, O, which serves to revolve the safety-drum and wind up the safety-rope N′ during the ascent of the platform.

The free end of the safety-rope N′ is connected with the levers of a second set of stop-pawls, *k k*, that, when released, are also made to bite or gear, by the action of a spring, *l*, with the ratchets I I.

Connected with the stop-lever *m* of the engine is a rope or chain, P, arranged to run over pulleys *n*, and made fast to the brake-lever L, so that, when said lever is lowered by the weight L′ to apply the brake to the safety-drum, the rope P pulls on the stop-lever *m* to shut off steam from the engine, and thereby arrest the movement of the lifting-rope.

When the weight of the car, cab, or hoisting-platform D is on the lifting-rope G the said rope draws down the sheave or pulley H and its axle-boxes within the guide J, and so acts upon the chain or rope K as to lift the brake-lever L and the weight L′, and thereby prevent its action on the brake; but in case of the breakage of the hoisting-rope, or its slackening from any cause, the pulley H is free to rise under the influence of the weight L′, which is thereby caused to take up the slack of the lifting-rope G, and so prevent it from getting foul of the gearing or any other part of the apparatus. The said weight, at the same time, causes the lever L to act upon the brake and stop the safety-drum M, while the stop-pawls with which the hoisting-rope is connected are left free to act upon the ratchets I I.

In case of the safety-rope breaking or slackening from any cause the second set of stop-pawls *k k* will bite or gear with the racks I I, thus giving additional security, especially in case the stop-pawls *c c*, owing to the weight L′ not taking up the slack of the lifting-rope sufficiently, or if, from any other cause, the weight of the slack of the lifting-rope should hold back the said pawls *c c*.

A spring of sufficient strength and range of action

might be applied to operate the movable sheave H and brake-lever instead of and as an equivalent to the weight L.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The employment, in connection with a safety hoisting apparatus, of the sheave H, arranged to change its axial position automatically in case of accident or derangement to any part of the apparatus with which it is connected, substantially as described.

2. The combination of the movable sheave H and connected weight with the lifting-rope, substantially as and for the purpose herein described.

3. The combination of the movable sheave, its connected weight, and the stop-lever or throttle-valve of the engine, substantially as and for the purpose herein described.

4. The combination of the movable sheave H with the brake-lever L of the safety-drum, substantially as and for the purpose herein specified.

5. The cab or platform, constructed with two sets of stop-pawls, *c c* and *k k*, arranged to operate independently of each other, substantially as specified, for the purpose of obtaining greater safety.

6. The combination of the two independent sets of stop-pawls with each other and with the lifting and safety-drum ropes, substantially as herein set forth.

7. The counterbalance O and its rope N in combination with the safety-drum M and its rope N′, substantially as described.

8. The combination of the brake-lever L of the safety-drum with the stop-lever or throttle-valve *m* of the engine, by connections for automatic action, essentially as specified.

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