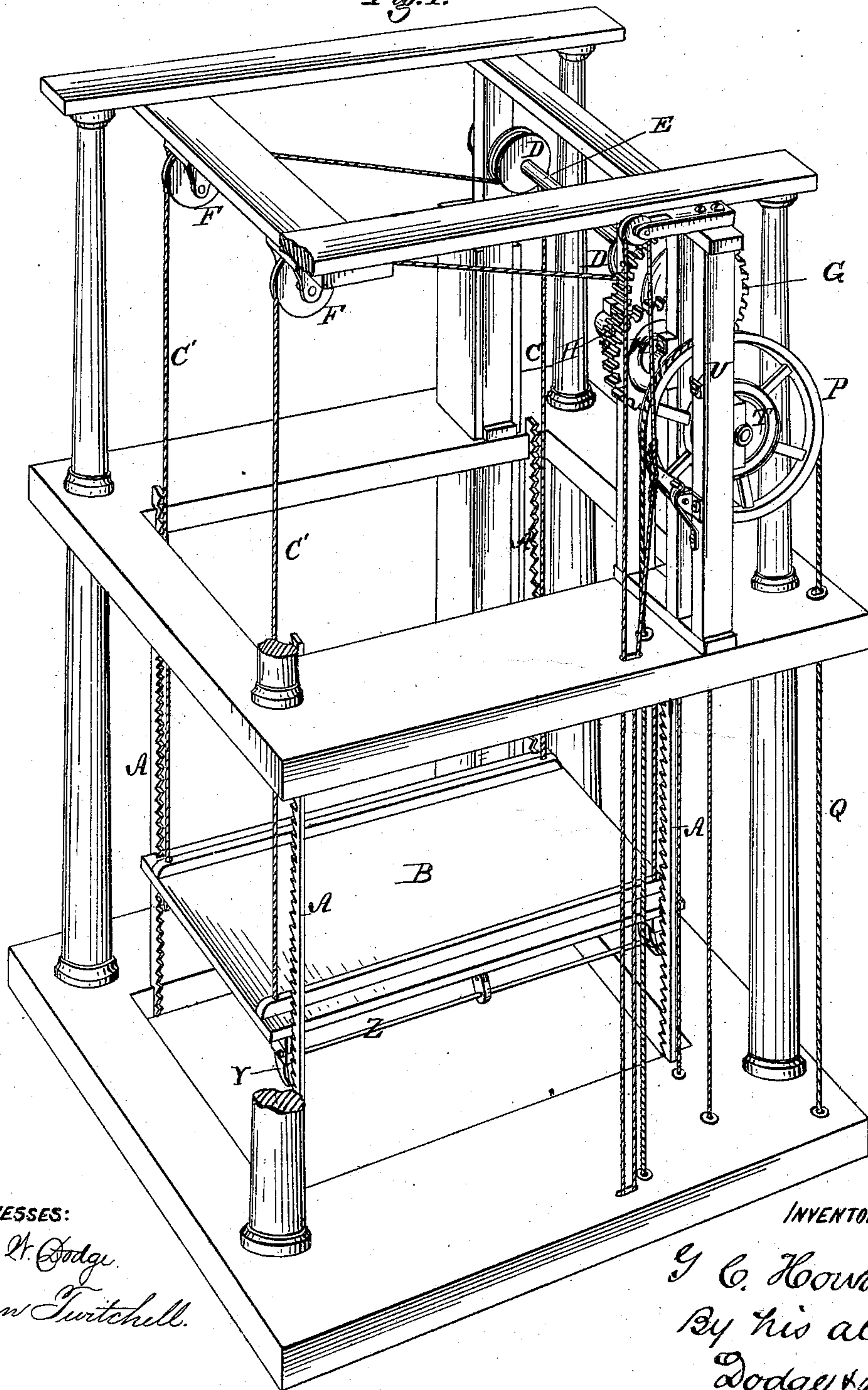


G. C. HOWARD.
PLATFORM ELEVATOR.

No. 170,087.

Patented Nov. 16, 1875.

Fig. 1.



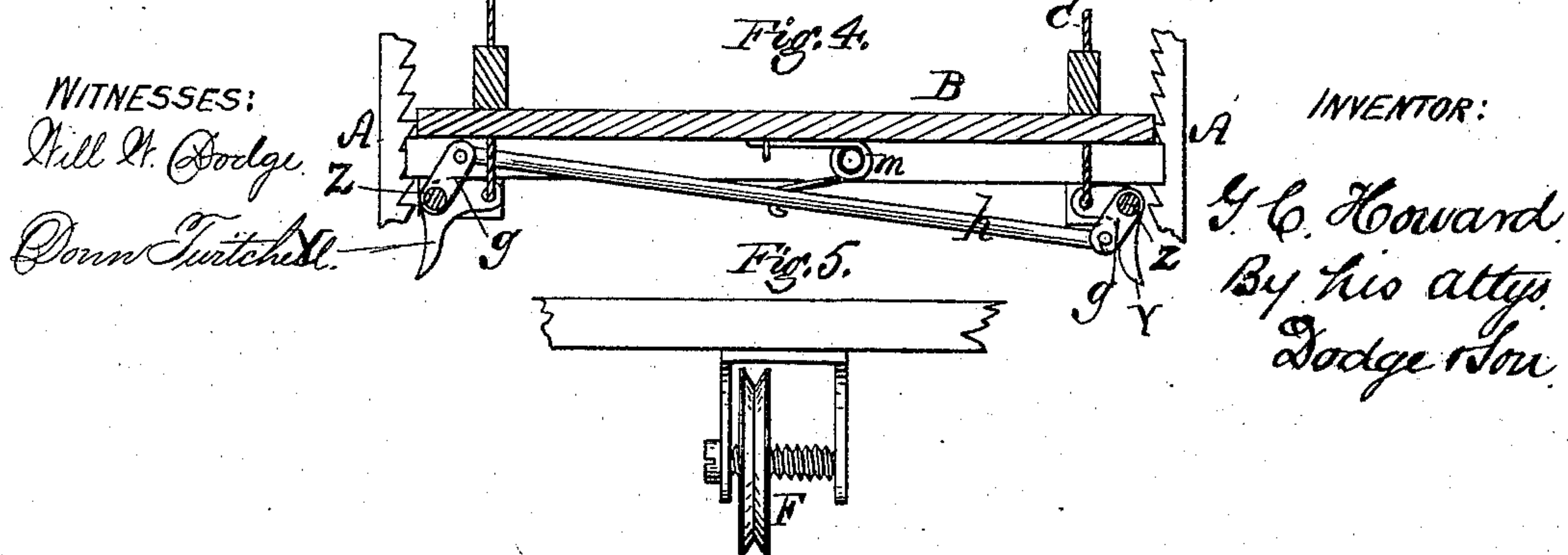
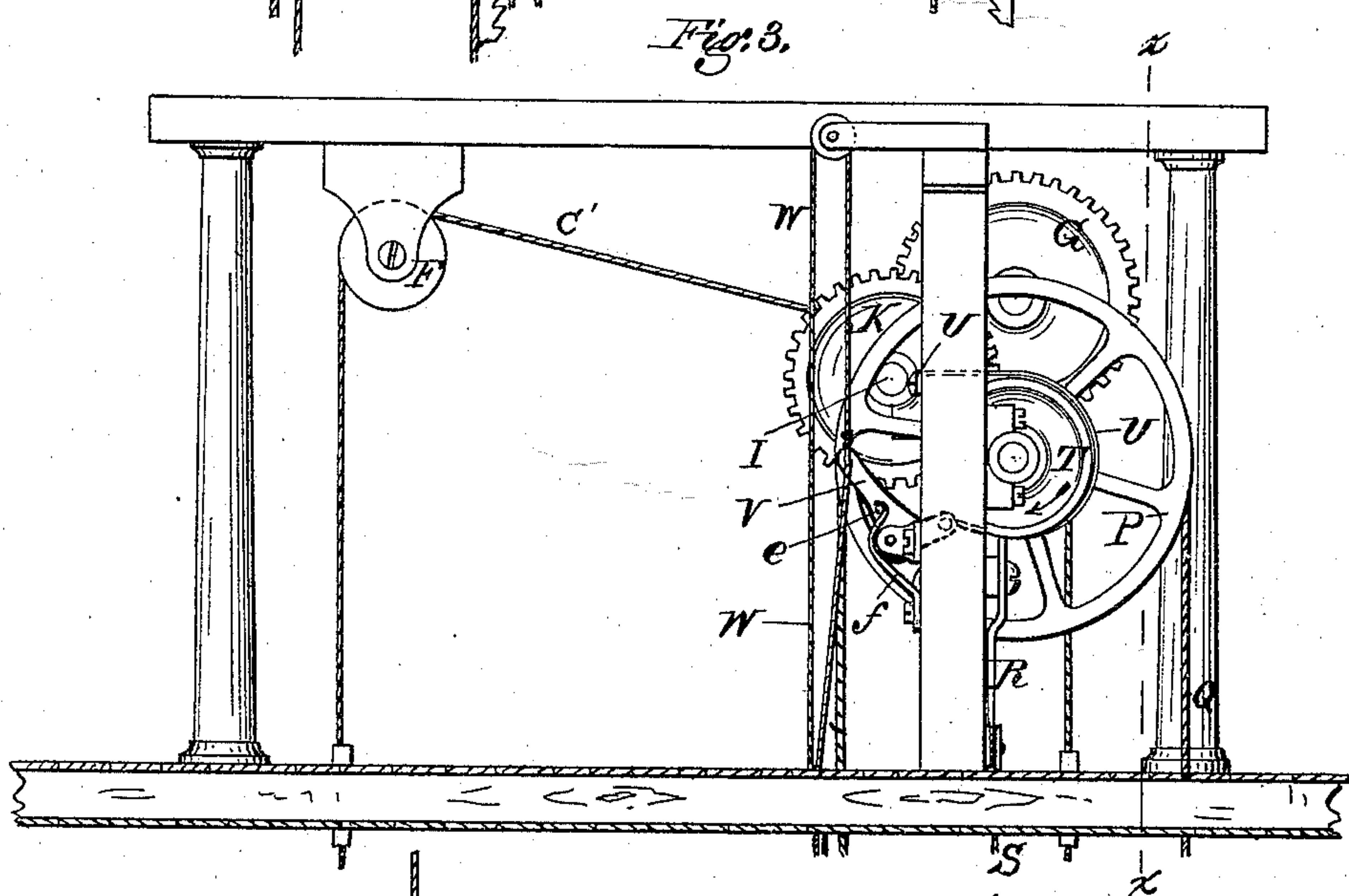
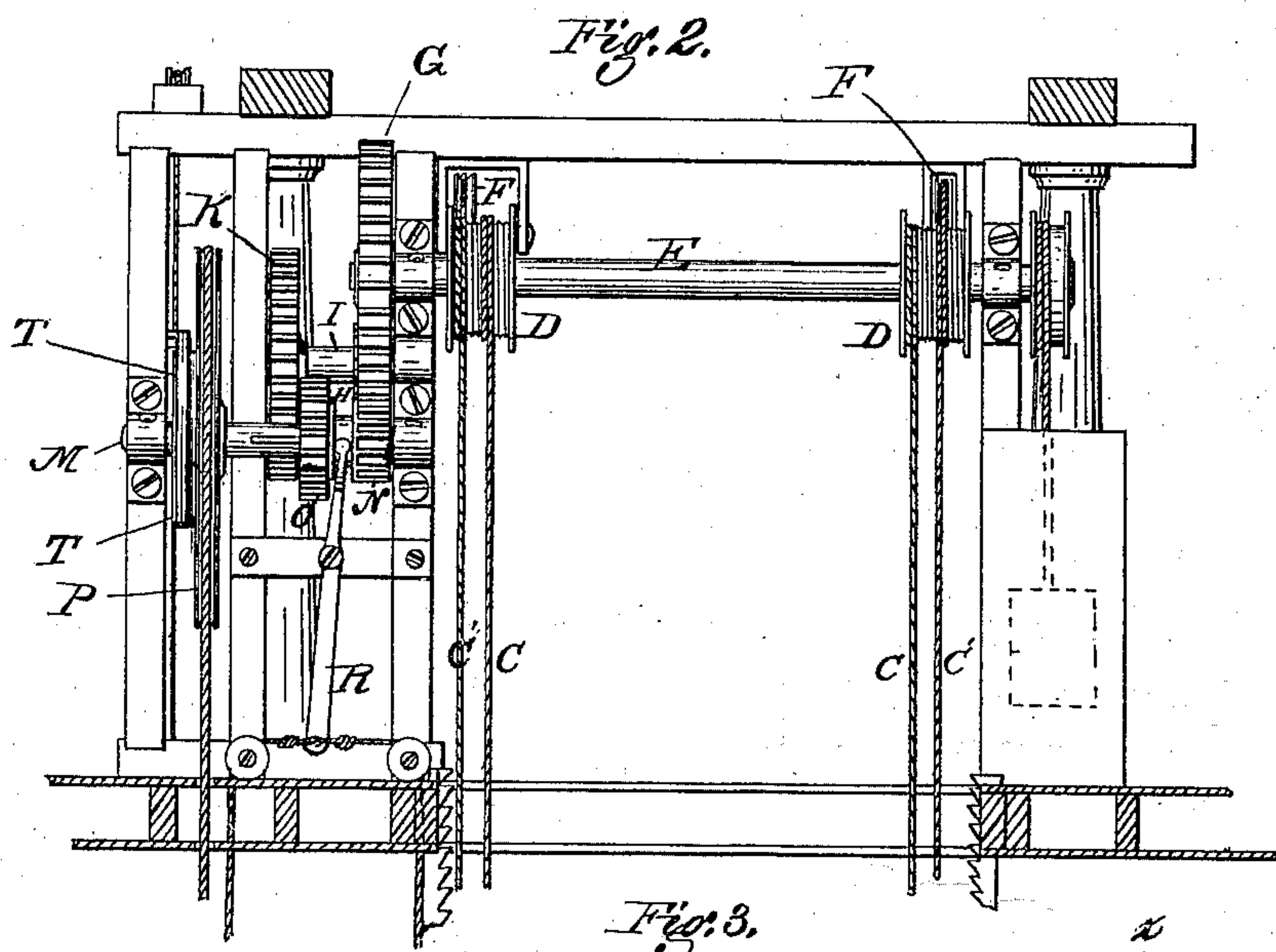
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UNITED STATES PATENT OFFICE.

GEORGE C. HOWARD, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PLATFORM-ELEVATORS.

Specification forming part of Letters Patent No. 170,087, dated November 16, 1875; application filed September 20, 1875.

To all whom it may concern:

Be it known that I, GEORGE C. HOWARD, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Platform-Elevators, of which the following is a specification:

My improvements are intended more especially for application to those machines in which the platform is raised and lowered by means of a hand-rope acting, through intermediate gearing, upon drums on which are wound ropes sustaining the platform.

My improvements consist in a novel arrangement of grooved drums and laterally-moving guide-pulleys for taking up the ropes which sustain the platform; in a peculiar arrangement of changeable gearing, whereby the speed of the platform and the power of the apparatus may be varied as required; in a peculiar manner of arranging and operating a friction-brake for controlling the operation of the gearing; and in a novel construction and arrangement of safety-catches on the platform.

Figure 1 is a perspective view, showing my machine arranged in a building of two stories; Fig. 2, a section of the machine on the line $x x$ of Fig. 3; Fig. 3, a side elevation of the hoisting-gear; Fig. 4, a longitudinal vertical section of the movable platform; Fig. 5, an edge view of one of the pulleys by which the suspending-ropes are guided.

A A represent four vertical guides, arranged at the corners of the hatchway and provided on their inner edges with teeth to receive the safety-catches on the platform. The platform B is arranged to slide freely between the guides, and sustained by four ropes, C C', which are attached to its corners, and wound at their upper ends upon two drums, D, which latter are mounted on the ends of a horizontal shaft, E, arranged in a side frame at the top of the apparatus, as shown in Figs. 1 and 2. It will be noticed that the ropes C, attached to one end of the platform, pass directly to the drums D, while the ropes C', attached to the other end of the platform, pass over two guide-pulleys, F, and thence to the drums, the latter being mounted directly over one end of the platform, and the guide-pulleys over the other end of the same. In order to prevent the platform from being drawn sidewise, and being

thereby caused to bind as the ropes shift sidewise on the drums in winding and unwinding, I arrange the ropes so that they all shift inward and outward together, whereby they are caused to counteract each other and keep the carriage suspended at all times freely between the guides.

The manner in which this is accomplished will be readily understood upon referring to Figs. 1, 2, and 3, in which it will be seen that the two drums D are grooved spirally in opposite directions, and the guide-pulleys F mounted, one on a right, and the other on a left hand screw, so that, while the ropes C are shifted in opposite directions by the grooves, the ropes C' are shifted in like manner by the guiding-pulleys moving laterally on the screws.

In order that the power and the speed communicated to the winding-drums may be varied as circumstances require, a peculiar arrangement of shifting or changeable gear is employed between the rope-wheel and the drums, as shown in Figs. 1 and 2. The drum-shaft E is provided at its end with a wheel, G, which gears permanently into a pinion, H, mounted on a shaft, I, which is also provided with a large gear-wheel, K. Parallel with the shaft I there is mounted a driving-shaft, M, provided with a grooved rope-wheel, P, and with two sliding pinions, N and O, secured together, and so arranged that the former may be engaged with the wheel G, as shown in Fig. 2, to transmit motion directly to the drum, or the latter engaged with the pulley K, so as to transmit motion to the drum through the wheel H and K, which give greatly-increased power with, however, a corresponding decrease in speed.

When the apparatus is raising a light load, and when the platform is being lowered, the adjustment shown in Fig. 2 is employed to give the parts a rapid movement; but when the load is a heavy one the pinion O is thrown in gear, and the extra gear brought into action in order to give the increase in power, as before mentioned. The grooved wheel P is provided with an endless rope, extending down through the various stories of the building, as usual. The double pinion N O is grooved around its middle, and is shifted by means of a forked lever, R, which has attached to its

lower end the two ends of a cord, S, which is passed in opposite directions over two pulleys, and thence downward in parallel lines through the floor, and around a pulley at the bottom, so that a person standing on either of the floors or on the platform can, by drawing one side or the other of the cord, shift the gearing as may be required.

For the purpose of controlling the speed of the gearing during the descent of the platform, a pulley or hub, T, is formed on the side of the rope-wheel and encircled by a brake-strap, U, having its upper end secured rigidly to the frame in which the gearing is mounted, and its lower end attached to the upper end of a lever, V, which is also attached to the frame. Owing to the arrangement of the band, in the manner described, it can be drawn upon the pulley with great force. During the descent of the platform the friction of the pulley tends to draw the band away from the point at which its upper end is attached to the frame, so that the band is drawn tightly around the pulley by the friction, and thereby caused to hug automatically with an increased force in proportion to the increase in strain.

I am aware that friction brake-bands have been applied in a variety of ways, and therefore I make no claim thereto, except when it is arranged in the manner shown, with one end secured to the frame, and so that it will be drawn around the pulley by the friction, as described. The brake-lever is provided on one side with a stud or pin, *e*, which rests on the end of a spring, *f*, which is attached to the frame, as shown, for the purpose of throwing the lever back and holding the brake out of action when released. To the end of the brake-lever there is attached an endless cord, W, passing through the different floors, and around pulleys at top and bottom, so that it serves as a means by which the brake may be operated from either floor. For the purpose of holding the platform in the event of the suspending ropes, or either of them, breaking, the platform is provided with four catches, Y, at its corner to engage in the toothed guide-bars A. The catches are secured to the ends of two parallel rock-shafts, Z, which are mounted under opposite sides of the platform, and provided with arms *g*, which are connected by a cross-bar, *h*, so that the two shafts must move together, and consequently all the catches or dogs engage and disengage simultaneously. The catches are made in the form of elbow-levers, and have the ropes which sustain the platform connected to the ends, as shown, so that the strain of the ropes tends to hold the catches back clear of the teeth on the guides. In order to force the catches outward against the teeth, when either of the ropes breaks, a spring, *m*, is secured to the under side of the platform in such manner as to

press downward on the cross-bar *h*, as shown in Fig. 4. This spring has its strength so proportioned to the ordinary weight of the platform that, while it will yield and allow the dogs or catches to remain clear of the teeth, while the ropes are perfect, it will throw the catches outward the instant that either of the ropes, breaking, destroys the equilibrium.

It is obvious that the laterally-moving guide-pulleys may be arranged in pairs to guide the ropes to and from each other on smooth drums, and also that they may be used singly for the purpose of simply guiding the ropes evenly upon the drums, whether the latter be plain or grooved.

I am aware that friction brake-bands have been employed in various ways, and that among other arrangements two short bands, pivoted above the pulley and carried down on opposite sides to a single lever below, have been proposed; but by my arrangement of the band it is given a large contact-surface and a firm support, and is caused to hug the pulley with a tightness which cannot be otherwise attained.

Having described the construction and operation of my machine, what I claim is—

1. In combination with the platform of a hoisting-machine, two sustaining-ropes attached to opposite sides thereof, and connected to a take-up drum or drums, and two guide-pulleys, located between the platform and the drum, and mounted upon right and left hand screws, substantially as shown and described.

2. In combination with a sustaining-rope of a hoisting-machine, and a take-up drum therefor, a guide-pulley mounted on a screw in such manner as to have a lateral movement for the purpose of laying the rope properly upon the drum.

3. The combination of the platform B and its sustaining-ropes C C', with the right and left hand grooved drums D, and the guiding-pulleys F mounted on right and left hand screws, substantially as shown.

4. In combination with the drum-shaft E, provided with the wheel G, the shaft I, provided with the pinion H and wheel K, and the driving-shaft M, provided with the double sliding pinion N O, as and for the purpose described.

5. The combination of the brake-lever V, having the stud *e* and the spring *f*, arranged as shown.

6. In combination with the toothed guides A, the platform B, and the ropes C C', the catches Y, rock-shafts Z, provided with arms *g*, connecting bar *h*, and spring *m*, as shown.

GEO. C. HOWARD.

Witnesses:

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WILLIAM C. WIMES.