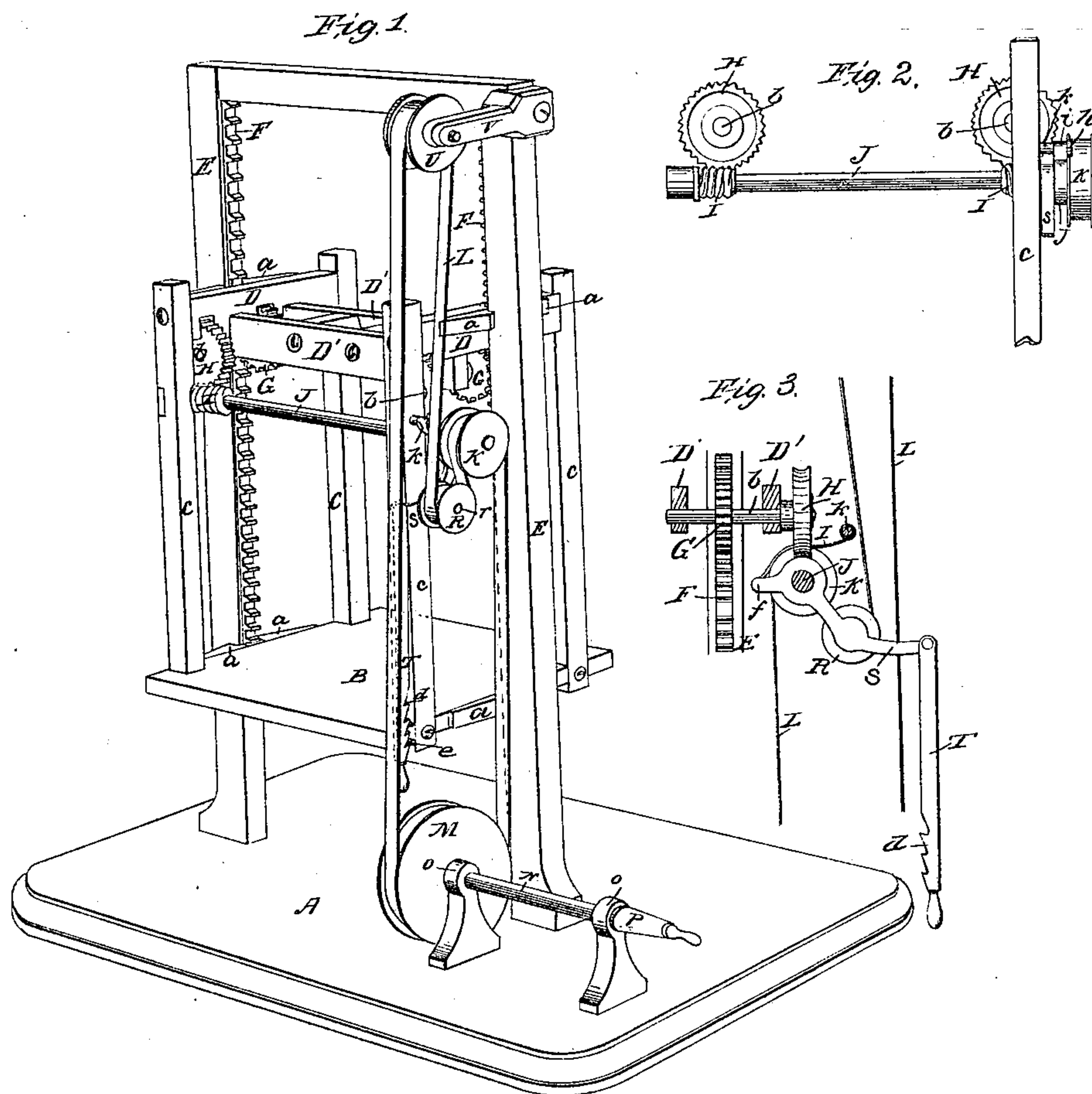


J. LEMMAN.
HOISTING APPARATUS.

No. 29,180.

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Witnesses
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HOISTING APPARATUS.

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To all whom it may concern:

Be it known that I, J. LEMMAN, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Hoisting Apparatus; and I do hereby declare that the following is a full and complete description thereof, reference being had to the accompanying drawings, and letters of reference marked thereon, making a part hereof.

My invention consists in the apparatus hereinafter described, designed for the purpose of hoisting and lowering merchandise and heavy bodies.

It is adapted to the ordinary hatchways of vessels and of warehouses and is constructed with reference to affording the means of raising and lowering merchandise or heavy bodies with ease and dispatch and with very much more security against the painful accidents, which so frequently attend the operation of hoisting and lowering by the ordinary means.

To enable others of competent skill to make and use my invention I proceed to describe its construction and operation.

In the annexed drawings Figure 1 is a perspective view of my entire apparatus. Figs. 2 and 3 are elevations of parts of the apparatus which will be described in their appropriate places or connections.

Like letters of reference indicate like parts in the different drawings.

A is the floor; it may stand for the lower floor of a building or for the lower deck of a vessel.

B is the platform upon which merchandise or heavy bodies to be raised or lowered from one floor or level to another are placed. It should have an area nearly as great as the hatchway or space through the floor or deck to which it is adapted. Framed or secured to the edges and near the four corners of the platform are the four upright corner pieces C, and these are connected together by the frame pieces D D and D' D', the whole making a rectangular frame of which the platform B is the bottom. The rectangular frame should be sufficiently high to accommodate the articles which are to be transported upon the platform without their interfering with the working parts attached to the upper part of the frame.

E E are heavy rack pieces; they are placed

vertically one upon either of two opposite sides of the space or hatchway through which the platform and frame are to be moved. They are firmly secured to the frame work of the building or vessel and extend, with a continuous face inwardly toward the hatch, from the lower floor to a point far enough above the upper floor to accommodate the working parts attached to the upper part of the rectangular frame which working parts will presently be described. Upon the inner faces of these rack pieces are secured the heavy metal racks F, extending their entire length. The space across the hatchway and the continuous vertical space between the two racks, that is, from the face of one rack across to the face of the other rack from the lower floor to the upper floor is occupied and traversed by the rectangular frame and platform B.

The frame is guided in its traverse up and down by brackets (a) fastened to the outer faces of frame pieces D D and to the corresponding outer edges of platform B. These brackets forming a recess which is occupied by the rack pieces E, thus causing the platform B to rise and fall in a direct line. The platform B and rectangular frame is caused to rise and fall by the action of gear wheels G which work in rack F. These are hung upon shafts b (see Fig. 3) which passing through frame pieces D' D' support the frame and platform. Upon the same shafts b respectively, are the gear wheels H, H, and these are acted upon by the screw gear wheels I I upon shaft J, and this is rotated by belt L acting upon pulley K placed at the outer extremity of shaft J.

Working in appropriate boxes in standards O O, which are well secured to floor A, is the shaft N carrying pulley M. This shaft and pulley are rotated by crank P. Or in case it should be required to work the apparatus by steam or any other sufficient motor, a pulley may be placed upon shaft N by which motion may be communicated to the parts through the belt L and system of gearing which has been described. The belt L embracing pulley M is continued upwardly to the pulley N, supported by an arm which projects from the upper end of one of the rack pieces E; passing around pulley N the belt returns downwardly and

around tension pulley R, thence upwardly and around the before-mentioned pulley K, and thence downwardly to the pulley M at the place of beginning.

5 The tension pulley R revolves upon a wrist or pin which is secured to the movable bar S, (see Fig. 3). This bar is hung to shaft J and has a short extension beyond the shaft J which will be referred to here-
10 after.

To the outer extremity of the longer arm of bar S is jointed the notched piece T. The notches (*d*) being adapted to the stationary pin *e* in edges of platform B. The bar S
15 carries a pin behind the point in the short arm of the bar marked (*f*) and to this pin is fastened the metallic friction band (*i*) which partly encircling an annular flange formed upon the rear of pulley K, extends
20 beyond the same and is secured to pin (*h*) which is itself secured to one of the upright frame pieces C.

The arrangement of the belt L upon the pulleys M, K, N, in combination with the
25 tension pulley R upon the long arm of bar S is such as that, when the bar S is elevated, carrying up the pulley R, the portion of belt L which forms the loop to inclose the pulley R being rendered to the main parts of the
30 belt, the whole becomes slack. The pulley M being at the bottom of the series and the belt L when slackened by the elevation of pulley R as has been described falling by its own gravity away from the said pulley
35 M it is permitted to revolve without imparting any motion to the belt L and consequently without any effect upon the gearing by which the frame and platform are raised or lowered. If, on the other hand, the bar S
40 is depressed, a portion of belt L is taken up to form the extended loop around the pulley R, and thus any required degree of tension may be exerted upon the entire belt, and the action of the driving pulley be transferred
45 to the running gearing by which the platform B is raised or lowered. Should the shaft N, carrying the pulley M, be rotated by steam or some other continuous motor the action of the rotating pulley M upon the
50 belt, and the action of the power upon the platform either to raise or lower it, would be perfectly controlled by the tension of the belt L, and this is perfectly regulated by raising or depressing the arm *s* carrying the
55 tension pulley R.

When the bar S is required to be fixed permanently at a point giving a continuous tension to the belt L, the notches (*d*) in the bar T may be brought into a range with
60 stationary pin (*e*) and one of them giving the required tension made to take hold of the pin. Let it now be observed that when the long arm of the bar S is elevated, thus reducing the tension of the belt as has been
65 described and assisting the communication

of motion to the gearing and platform, the short arm of the lever *s* is depressed; but to a pin in the short arm as has been described there is attached a friction band (*i*) which partly encircling an annular flange upon
70 the pulley K is secured at its other extremity to the pin *h*. Now as the short arm of *s* is depressed the band (*i*) is brought into contact with the above named annular flange or ledge, and the motion of the ap-
75 paratus thus arrested by the friction of the band upon the flange.

Let it now be proposed to put the apparatus in operation for the purpose of elevating and then lowering a certain burden which
80 may be upon the platform. The shaft N carrying the pulley M, being in motion, the belt L not being under tension and not being in adhesive contact with the pulley; is not acted upon and the platform and burden
85 remain stationary. The bar S is now depressed, so as to exert a sufficient tension upon the belt, by the taking up of a loop to accommodate the pulley R, the belt is
90 put in motion by the pulley M and communicates motion to pulley K upon the end of shaft J, and this carrying the screw gear wheels I, which act upon the gear wheels H, giving motion to the two pinion shafts (*b*),
95 the pinions G upon the shafts (*b*) now having motion and working appropriately in the rack F, cause the platform carrying the burden to be elevated regularly and securely at a rate proportioned to the revolutions of shaft N.
100

It now being desired to suspend the operation of raising the platform and burden at an exact point, the operator with his hand upon the notched bar T gently relieves the
105 belt L of its tension, allowing it partly to adhere and partly to slip upon the pulley M, thus reducing the motion of the platform to any required speed and ultimately by wholly releasing the belt L from close contact with pulley M stopping the platform
110 and burden at the precise point desired. The weight of the platform and burden will not usually be sufficient to cause the gearing to lower without the attention of the operator. But if the burden is required to be
115 lowered from one level or floor to another, the motion of the shaft N carrying pulley M will require to be reversed, when the reverse motion of the parts which have been described as raising the platform, will lower
120 the same, the bar S controlling the tension of belt L and affording the means of assisting the descent at any desired exact point, except that in case of lowering burdens at considerable speed the bar S may sometimes
125 require to be, not only elevated sufficiently to render the belt L entirely slack, but it may be required to carry it up far enough to bring down the friction band (*i*) which is
130 controlled by the short arm of *s* upon the

annular flange which has been described and thus arrest the rapid descent of the platform by friction.

Should any part of the apparatus give way, other than the rack or pinions, the platform and burden will remain stationary or if inclined to return downwardly it would do so, slowly and without danger to the attendants. But if the supporting arrangements, that is, either the rack or pinion upon one side were to give way, the whole burden being thrown upon the other side, or rather, the other side supporting its own share of the burden the side which had been released by the occurrence falling slightly, the rectangular frame carrying the platform and burden would be forced obliquely into the space between the two upright rack pieces, and would in all probability lock itself and thus descend no farther. Should the danger from this source be regarded as of any moment, the apparatus could be furnished with a fall or dog upon either side adapted to the teeth of the respective racks which would place the matter beyond any danger.

I desire to state a modification of my apparatus not presented in the drawings. By placing the parts M, N, O, O, P, upon the

platform B and securing them to the same in a position to permit the pulley M to range with the pulley K, then belting direct from one to the other, that is from the pulley M as arranged upon the platform B, to the pulley K as now arranged upon the end of shaft J an attendant standing upon the platform B and operating the crank P may raise or lower himself with a moderate burden from one floor to another, and thus in many instances avoid the employment of two hands in the particular minor service thus accomplished by one.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is—

1. The pulleys M, K, U, and the tension pulley R carried by the bar S, all arranged and operating substantially as and for the purpose described.

2. The system of gearing composed of gear wheels G, G, H, H, I, I and racks F F all arranged and operating substantially as and for the purpose described.

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