

*Bodley Reynolds & Van Emon,
Elevator.*

N^o 43,451.

Patented July 5, 1864.

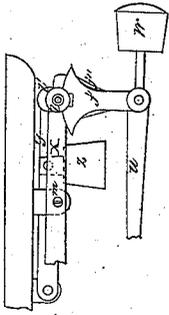


Fig. 6

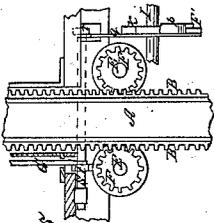


Fig. 5

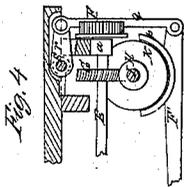


Fig. 4

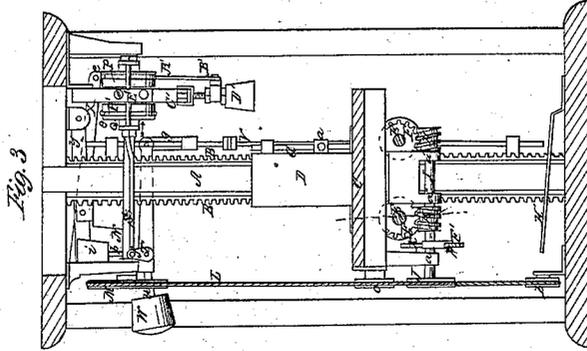


Fig. 3

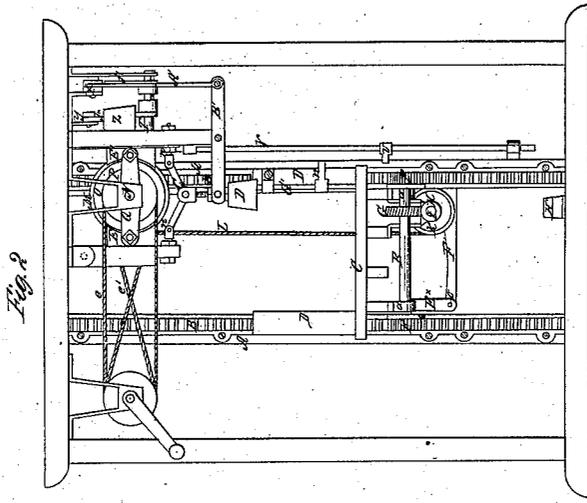


Fig. 2

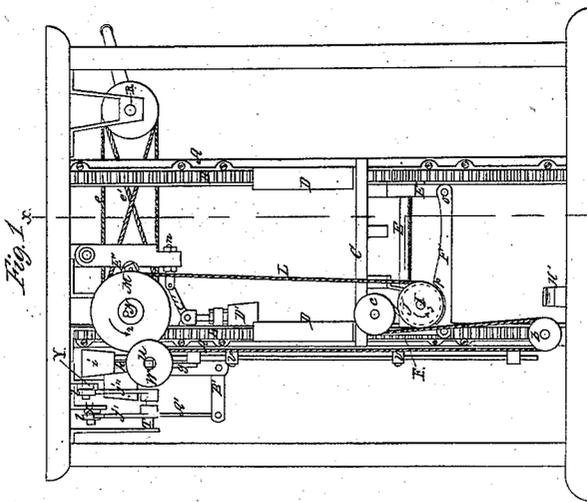


Fig. 1

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UNITED STATES PATENT OFFICE.

J. T. BODLEY, JABEZ REYNOLDS, AND SAMUEL VAN EMON, OF CINCINNATI, OHIO, ASSIGNORS TO J. T. BODLEY AND P. P. LANE, OF SAME PLACE.

IMPROVEMENT IN HOISTING APPARATUS.

Specification forming part of Letters Patent No. 43,451, dated July 5, 1864.

To all whom it may concern:

Be it known that we, J. T. BODLEY, JABEZ REYNOLDS, and SAMUEL VAN EMON, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and Improved Hoisting Apparatus; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figures 1 and 2 are side elevations of our invention; Fig. 3, a vertical section of the same, taken in the line *x x*, Fig. 1; Figs. 4, 5, and 6, detached sectional views of parts pertaining to the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain improvements in that class of hoisting-machines which are designed for elevating goods to the different floors in a building or from the hold to the deck of a vessel, and for other similar or analogous purposes.

The object of the invention is to obtain a simple means to prevent the casual falling of the loaded platform, or the platform on which the goods are placed; and, further, to obtain a simple and efficient means for reversing the driving-power and applying brakes to the apparatus, all arranged in such a manner as to insure a substantial and perfect operative mechanism for the desired purpose.

To enable those skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A A represent two upright posts, which are placed at a suitable distance apart, and have each two racks, B B, secured to them at opposite sides, as shown clearly in Fig. 3.

C represents a platform, which is fitted horizontally between the two upright posts A A, and is provided with two guards, D D, which inclose or cover the inner sides of the uprights and racks, and prevent goods on the platform from coming in contact therewith, the platform having recesses cut in its ends to receive the uprights and their racks.

To the under side of the platform C there are secured in suitable bearings, *a*, two parallel shafts, E E, which have pinions F on each end of them. Said pinions gear into the racks

B, and are at two opposite sides of each upright. (See Figs. 3 and 5.)

On each shaft E there is fitted a worm-wheel, G, and these worm-wheels gear into screws H on a shaft, J, which is fitted in three bearings, *a' a'' a'''*, all of which are shown in Fig. 3. This screw-shaft J has a pulley, J', on its outer end, and has also a brake-pulley, K, upon it, the latter being near the bearing *a'* at its inner side. (See Fig. 3.) The shaft J is not fitted snugly in its bearings. The outer one, *a'*, admits of a certain degree of vertical play of said shaft, the bearing *a''* admitting of a little less play, and the bearing *a'''* simply admitting of the inner end of shaft J working in it as a center. The object of this will be presently shown.

The two screws H H on the shaft J have reverse threads, one being a right-hand and the other a left-hand thread, as shown at Fig. 3, and the two bearings *a'' a'''* are between these screws.

L represents a belt which passes around a pulley, *b*, at the bottom of the building or structure in which the apparatus is placed or fitted, said belt also passing around the pulley J' of shaft J, around a pulley, *c*, at one side of the platform C, and also around a pulley, M, on a shaft, N, which is fitted in a suitable framing at the upper ends of the uprights A A, as shown in Figs. 1, 2, and 3. This arrangement of the belt is shown clearly in Fig. 1.

On the shaft N there is placed and attached permanently a pulley, O, and there are also placed on said shaft N two loose pulleys, P P', which are connected by a frame, Q. The pulleys P P' are placed one at each side of the permanent pulley O, and either of the former may be connected with the pulley O by sliding the frame Q, the pulley O having a conical projection at each side of it which fits in corresponding shaped recesses in the inner sides of the pulleys P P', so that either of the latter pulleys will be connected to pulley O when pressed toward it. This, however, is a simple clutch-connection commonly used in various kinds of machinery.

R is a driving-shaft, from which the shaft N is rotated through the medium of belts *e e'*, the belt *e'* being a crossed one and passing

around the pulley P' , and the other belt, e , a straight one and passing around the pulley P . By means of these belts the shafts N may be rotated in two different directions according to which pulley— P or P' —is connected to the pulley O .

The pulleys $P P'$ are moved or adjusted on the shaft N by means of a rod, S , one end of which is connected to the frame Q of the pulleys $P P'$, and the other end connected to an arm, f , at one end of a rock-shaft, T , having a lever, W , attached to it, one end of said lever being connected by a link, g , to the upper end of a vertical sliding rod, V , and the opposite end having a weight, W , attached to it to counterbalance the shifting rod V . (See Fig. 3.) The shaft T also has an upright arm, h , attached to it provided with a weight, i , at its upper end. It also has two upright segments, $j' j''$, attached to it, the upper curved surface of j' forming a cam for engaging and disengaging the brakes $E' E'$ at the proper moment through the agency of a roller, l , at one end of a lever, X , having its fulcrum at m , and the other segment j'' , having on its upper curved surface a notch to receive the roller l' at one end of an arm, Y , which has a weight, Z , attached to it. The end of the lever X opposite to that where the roller l is attached is connected by a rod, A' , to one end of a lever, B' , the opposite end of said lever being attached to a toggle, C' , which has a weight, D' , suspended to it, as shown in Figs. 1 and 2. The outer ends of the toggle C' are connected to brake-bars $E' E'$, which are suspended at opposite sides of the pulley O , and are made to engage with or are thrown free from said pulley through the medium of the toggle C' . The ends of the toggle C' are attached to the brake-bars $E' E'$ by means of joints at the ends of screws n , as shown in Fig. 2, to admit of the proper adjustment of the arms of the toggles to compensate for shrinkage of the brake-bars.

To the under side of the platform C there is attached a pendent bar, E^x , having one end of a lever, F' , secured to its lower end by a fulcrum-pin, o . This lever F' performs the office of a brake, and it has a concave surface, p , which is directly under the pulley K on the screw-shaft J , as shown clearly in Fig. 4. The opposite end of the lever F' is connected by a rod, q , with an arm, r , on a shaft, s , which is directly under the platform C , said shaft s also having a similar arm, t , attached to it, the outer end of which is connected to a vertical shaft, G' , which passes up through the platform C at one side of it, and has a certain amount of end motion, and also a short horizontal arm, u , attached to it. Two similar arms, $v v'$, are attached to the vertical sliding rod V .

To the flooring at the bottom of the building, and underneath the platform C , there is attached a spring, H' , which is shown more particularly in Fig. 3.

The operation is as follows: When the plat-

form is down and the device inoperative, both of the pulleys $P P'$ are out of gear with or disconnected from the pulley o , the pulleys $P P'$ being retained at equal distances from the pulley O in consequence of the roller l' being in the notch of the segment j'' , and holding the arm f of the shaft T in an upright position, which keeps the pulleys $P P'$ in the position relatively with the pulley O , as aforesaid. (See Fig. 3.)

In order to set the apparatus in motion and elevate the platform C , the rod V is shoved down, and the lever v is thereby actuated; the cam j' , through the medium of roller l , lever X , rod A' , and lever B' , disengaging the brakes $E' E'$ from the pulley O , and immediately subsequent to this the shaft T is turned, so that the arm f will, through the medium of the rod S , move the frame Q of the pulleys $P P'$ in the direction indicated by the arrow 1 in Fig. 3, and cause the pulley P' to be engaged with the pulley O , the weighted lever h now standing at an inclination and keeping the pulleys $O P'$ in contact after the pressure upon the rod V has been discontinued, so that the shaft N will be turned in the direction indicated by arrow 2 and the pulley J' on the screw-shaft J rotated through the medium of bell L in the direction indicated by arrow 3. When the shaft J is rotated in this direction, the screws H and worm-wheels G will turn the shafts E , so that the pinions F , which gear into the racks B , will elevate the platform C . By this arrangement of the two racks and two pinions to each upright A the latter are prevented from springing or warping out of a vertical position, and the pinions are consequently always kept in gear with the racks, so as to prevent the casual falling of the platform C ; and in case of anyone of the worm-wheels G or screws H becoming loose on its shaft, or its thread becoming stripped, the platform will still be held up, as the two bearings $a' a''$ of the shaft J hold the latter in proper position, preventing any lateral movement, and the deranged worm-wheel or screw serves as a support for the platform when rendered useless as an elevating medium. The belt L , by its action on the pulley J' , keeps the screw H in gear with the worm-wheels G , because said belt has a tendency to pull the shaft J upward, and if said belt should break or part at any one of its joints the shaft J would drop by its own gravity and also by the action of the worm-wheels G on the screws H , which have a tendency to throw said shaft downward. This downward movement of the shaft J causes the brake-pulley K to bear upon the concave surface p of the lever F' , and the rotation of the shaft J , and consequently the descent of the platform C , will be stopped. When the platform C has reached its highest or culminating point, the dog-stop or projection u on the upright shaft G' comes in contact with the fixed stop or projection v on the upper part of the shifting rod V , and the latter is thereby elevated and the contact of

the pulleys O and P' is broken, and the cam j' instantly, through the medium of roller l , lever X, rod A' and lever B', drops the weight D', so that the latter will depend from the toggle C', and through the angle of the arms of the toggle the power of the weight will be multiplied many fold, bringing the brakes E' E' in contact with the periphery of the pulley O with great force, quickly absorbing the momentum of the quick motions connected with the machine and stopping the platform with certainty at the desired point—say level of upper floor. The rock-shaft T now stands in such a position that the pulleys P P' are equidistant from pulley O, and the weighted arm h stands perpendicular, while the roller l' at the extremity of the weighted lever Y has dropped into the notch of segment j'' , preventing any casual resumption of motion by the machinery.

In order to lower the platform, the rod V is pulled up until the brakes E' E' are lifted from the pulley O, and the conical surfaces of the pulleys O and P brought in contact.

We would remark that in arresting the ascent of the platform the weight of platform and load acts as an auxiliary to the brakes, but in descending imposes no additional duty upon them, and hence the utility of an auxiliary brake beneath the platform, which is inoperative in stopping the ascending platform, but in stopping the descending platform attacks the momentum of the quickest-motioned shaft in the series a moment before the brakes are applied to pulley O and with what force is necessary to actuate the shifting rod V.

When the platform has descended to within a few inches of lower floor, the stop or projection u comes in contact with the fixed stop v' , near the bottom of the rod V, and, after lifting the brake-lever F' until the brake p comes in contact with pulley K, it moves the shifting rod V down, disengages the pulleys O P, applies the brakes E' E' to pulley O, as before described, and so arrests the descent of the platform. Should it be necessary to stop at intermediate stories, swivel-stops are placed on shifting rod V, so that they can be made to engage with the stop or projection u on shaft G' or not, at pleasure. Should the use of the auxiliary brake be deemed unnecessary—as for instance, in the lighter class of machines—the use of the shaft G' is still necessary provided, as described, with a certain amount of end motion to arrest the platform at the level of the floor ascending and descending, for if the shifting rod V was actuated by a fixed stop or projection on the platform that would arrest its motion at the level of a floor descending, it would stop it several inches below the floor in ascending. Should the fixed stop v' near the lower end of the shifting rod V break, or if for any other reason the driving power fails to be disconnected and the brakes E' applied to pulley O in time to arrest the

motion of the descending platform before it settles to a solid bearing at the foundation of the machine, where the power would be expended in destroying the gearing, the spring H' will act as a safeguard and press the brake p against the pulley K while there are still some inches of descent, and thereby retard the revolution of the machinery, so that some one of the belts will be thrown off before any damage can occur; but in the ordinary use of the machine the spring H' is inoperative.

We would remark that the racks B, instead of being placed at opposite sides of the same uprights, may be placed at opposite sides of a framing, or at opposite sides of independent uprights or columns connected at any suitable points. The same result would be attained in either case.

We do not claim as of our invention the employment of the two racks B applied to each upright A at two opposite sides thereof, in combination with the pinions F gearing therein.

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

1. The worm-wheels G G on the shafts, in connection with the screws H on the shaft J, when the latter is hung in the bearings a' a'' a''' to admit of the platform being properly supported in the event of the giving way of any one of the screws or worm wheels.

2. The shaft J, underneath the platform C, suspended from one end by a journal-box or bearing a''' , and at the opposite end by the belt L, in combination with a brake composed of the pulley K and a concave, p , the latter being either fixed or attached to lever F', as and for the purpose specified.

3. The brake composed of the brake-bars E' E', toggle C', and weight D', arranged with the mechanism, substantially as shown, so as to be operated through the medium of the rod V, for the purpose specified.

4. The weighted arm h on the rock-shaft T, in connection with the sliding pulleys P P' and fixed pulley O, arranged to operate as and for the purpose set forth.

5. The spring H', attached to the bottom of the building or structure, and in relation with the platform C, and pulley K, to operate in the manner and for the purpose specified.

6. The shaft G', with the projection u attached, connected with the lever F' as shown or in any equivalent way, or disconnected from it, and having either a fixed amount or having an adjustable amount of end play for the purpose set forth.

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