2 Sheets—Sheet 1.

W. D. ANDREWS.

HOISTING APPARATUS.

Patented Dec. 12, 1876.

No. 185,276.

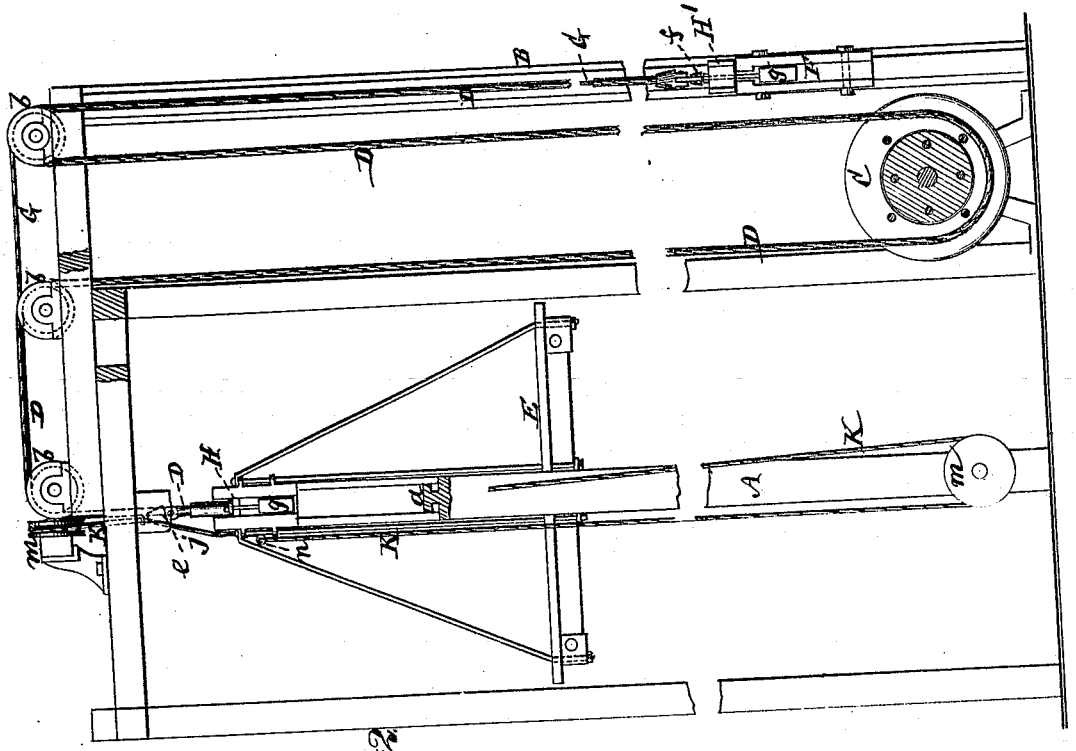

Fig. 2.

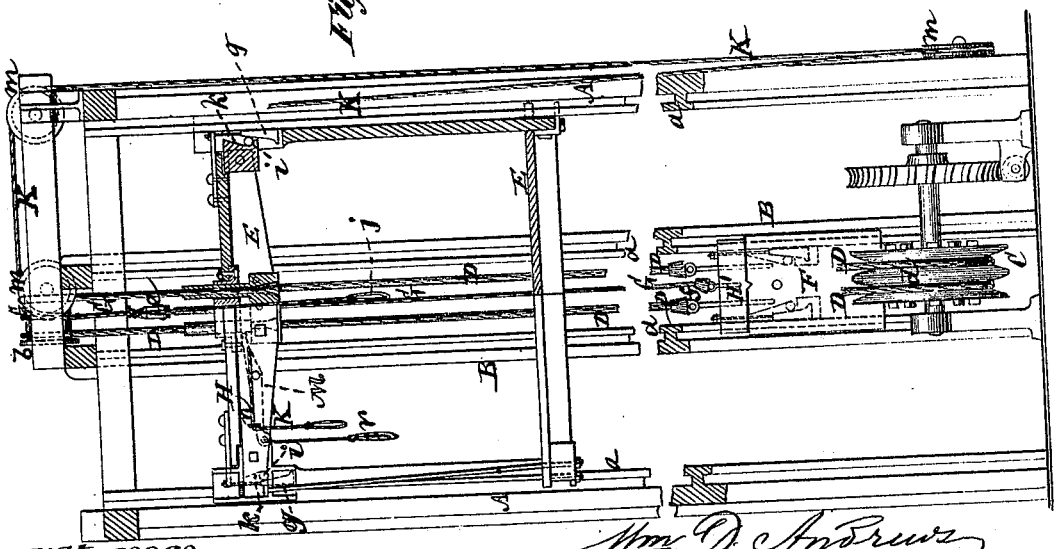

Fig. 1.

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by his Attorneys
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Fig. 5.

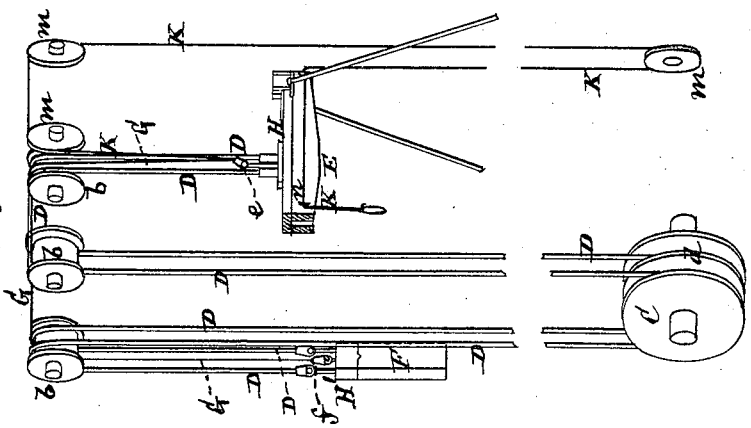


Fig. 4.

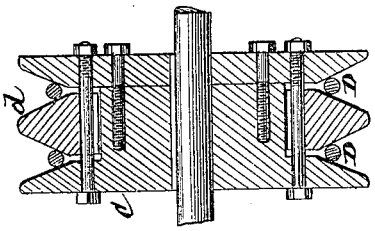
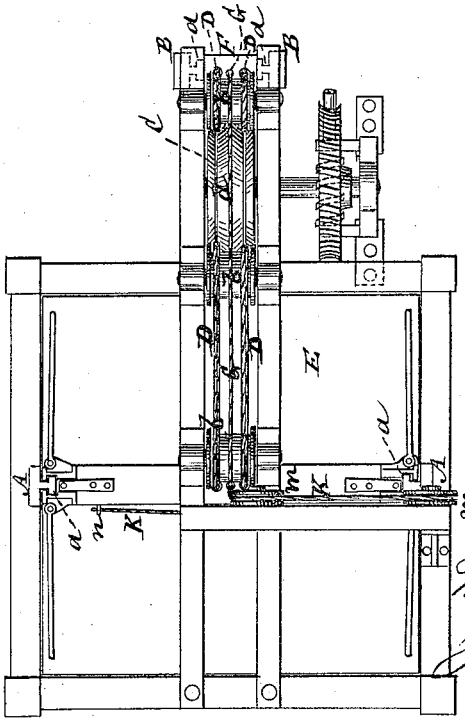


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM D. ANDREWS, OF BROOK HAVEN, NEW YORK.

IMPROVEMENT IN HOISTING APPARATUS.

Specification forming part of Letters Patent No. **185,276**, dated December 12, 1876; application filed November 27, 1875.

To all whom it may concern:

Be it known that I, WILLIAM D. ANDREWS, of Brook Haven, in the county of Suffolk and State of New York, have invented certain new and useful Improvements 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, which form part of this specification.

This invention relates to hoisting apparatus, in which a car or platform is raised and lowered within a hoistway for the purpose of transporting passengers or goods from any one floor or story of a building to another, or for other raising and lowering purposes.

One part of the invention relates to the employment of two or more independent hoisting ropes or chains, each of which may or shall be sufficient to sustain the load to be carried; and consists in a sectional or sliding ring-like construction of the peripherical portion of the hoisting-drum for passage of said ropes or chains within V-shaped tapering grooves formed between and by said rings to automatically equalize the strain upon the ropes or chains by the pressure of the latter upon the sides of the sliding rings. These ropes or chains may also be passed in a loose or belt-like manner around the hoisting-drum and between its rings, and, in addition to their attachment to the car or traveling platform, be connected with a counterpoise for the purpose of balancing the car and its load to a greater or less extent, and, whereby sufficient friction is superinduced between the ropes or chains and drum to effect the raising and lowering of the car or platform and its load by the turning of the drum.

The invention likewise consists in a peculiar safety attachment to the car or platform, or to the counterpoise of the apparatus, or to both, composed of a bar or weight which partly rests on top of the platform and counterpoise, or either, and which carries the locking devices, and loose wedge-shaped friction-blocks attached to said bar with or without loose rollers acting against fixed inclines at their backs, in combination with fixed guides attached to the guide-posts of the hoistway and counterpoise way, or either, which guides may be grooved on opposite sides to admit of the car or counterpoise grasping them and supporting them against pressure superinduced by the friction-blocks when the latter bear or produce friction upon the guides, as in case of breakage or any sudden slackening of the hoisting rope or chain, or ropes or chains. Rods, ropes, or chains, stretched from top to bottom of the hoistway, or counterpoise way, and secured at each end, may be substituted for the grooved guides, and these rods, ropes, or chains be entirely encompassed by the head of the car or counterpoise. The counterpoise, in each and every case, may either be an independent weight or a second car or platform, which ascends while the other descends, and vice versa.

Another part of the invention specially relates to hoisting apparatus, in which not only the car or traveling platform is provided with a counter-balance, but in which said car or platform and counter-balance are connected or operated by or through the hoisting rope or chain, or ropes or chains, and drum of the latter. This part of the invention consists in a combination, with such a connection of the car or platform and counter-balance, of an auxiliary or safety rope connected at its one end with a locking device upon or carried by the car or platform, and at its opposite end with another locking device upon or carried by the counter-balance, the locking device or devices being of any desired construction. This auxiliary or safety rope not only comes into operation automatically in case of breakage or slackening of the hoisting-rope, but it may be actuated by hand from the car or platform.

Furthermore, the invention consists in a combination, with the car or platform, of an independent safety-rope connected at its one end with the car or platform, and at its other end with the locking devices upon the platform, and moving with the latter for operation either by a governor having a stationary relation and set in motion by said rope, or by hand from the outside, or by hand from the car or traveling-platform, to actuate the locking devices carried by the platform. These several safety attachments, as also independent means for operating the locking devices

on the car from the latter, may either be used separately or in combination.

The invention likewise consists in a combination, with automatic safety stopping devices on the platform or car, of a lever or equivalent device, whereby the said automatic devices may be brought into operation by manipulation from the car or platform, substantially as hereinafter described.

Figures 1 and 2 represent partly broken and sectional elevations, in planes at right angles to each other, of a hoisting apparatus constructed in accordance with my invention. Fig. 3 is a top view or plan of the same. Fig. 4 is a transverse section of the improved hoisting-drum, and Fig. 5 a perspective view, in elevation, showing the arrangement and connection of the several ropes or chains.

A A and B B represent the guide-posts of a hoistway, and of a counter-balance way connected therewith, and *a a* the guides attached to the inner faces thereof for the car or platform and counter-balance in their movement up and down between the guide-posts. C is the hoisting-drum, which may be arranged above, but which is here shown as arranged below, and so that its hoisting rope or ropes D D are passed over guide-pulleys *b b* above, and connected at their respective ends with the car or platform E and counterpoise F on opposite sides of the drum, around or under which, within V-shaped grooves, the hoisting ropes or chains pass as a band or belt, and are set in motion by the drum, through friction, as superinduced by the weight of the car with its load and of the counterpoise, combined. This mode of raising and lowering the car or platform gives increased facility, dispatch, and safety, with a diminished liability to accident or breakage of the hoisting rope or chain by overhoisting, or by the car or counterpoise having their motion arrested by an obstacle, or by the counterpoise striking the ground, the hoisting-drum, in each or all of such cases, then simply slipping without exerting any severe tension on the rope or chain.

When using two or more independent hoisting ropes or chains, D D, to give additional safety, each of said ropes or chains should be sufficient to sustain the load to be carried. These hoisting-ropes it is preferred, as hereinbefore described, to make the counter-balance ropes of the platform, but in some cases each of said ropes may be divided, and the rope sections thus produced be attached to the drum and to the platform and its counter-balance respectively, but in either case the platform and its counter-balance are connected or operated by or through the hoisting-drum, so that the rope sections or separated ropes in the same vertical plane have equal movements in opposite directions, and are always in the same relative position as measured through the connecting rope or ropes.

To automatically adjust or equalize the strain upon the several hoisting ropes or chains D D, the body of the drum C has arranged upon and around it any number of rings, *d*, placed in juxtaposition side by side with corresponding rings on said body, but capable of movement in direction of the length of the drum-body, and fitted to slide in said direction thereon. These several rings are made tapering at their sides to form between them V-shaped grooves, in which to receive the hoisting-ropes D D. The independent sliding action or fit of the adjustable ring or rings *d* on the body of the drum in direction of the length of the latter provides for the automatic adjustment of the several ropes D D to equalize the strain by admitting of the ropes varying their depth of insertion or position between the several rings, according to the excess of strain on one rope or chain over another, and according to any variations in the length or thickness of the ropes. G is an auxiliary automatic safety-rope, the one end of which is secured at *e* to a bar, H, which freely rests on top of the platform, and which carries or partly forms the locking devices here shown, but said locking devices may be changed. From the point or place of attachment *e* the rope G passes over the guide-pulleys *b*, and from thence to the counter-balance F, or to locking devices thereon, which may be similar to those on the platform, or of any other suitable description, so long as they hold on the guide-posts in the counter-balance way, *f* here representing such rope's attachment to the locking devices of the counter-balance, and H′ indicating a free bar or weight resting on the counter-balance, and serving to carry its locking devices. This rope G is free to move with the platform and its counter-balance, and is of such length that it runs in a slack or loose manner over its guide-pulleys with no other resistance than its own weight and friction, which the weight of the bars H H′, respectively, overcome during movement in opposite directions without raising either of said bars. Should the hoisting-ropes D break, however, or be unduly stretched, both the platform E and its counter-balance F will descend relatively to the auxiliary rope G, causing the latter to remain nearly stationary, with the locking devices or bars H H′ thereof suspended at its opposite ends, upon which the platform and its counter-balance, respectively, descend, and securely lock themselves. The loose or free bars H H′ are of sufficient weight to secure the travel of the rope G over its guide-pulleys without raising said bars from their respective inactive positions, or the same result may be effected by springs connecting said bars to the platform or car and its counter-balance, respectively.

The locking devices here shown consist of losse or pendent friction-blocks *g* on the ends of the free bars H H′, said friction-blocks bearing at their backs when pressed outward against the guides *a a* of the posts, but at other times being free from contact with said guides. These friction-blocks are of a wedge

shape on their faces, against which rest loose rollers *i* contained in inclined pockets *k*, made in the cross-beams of the platform and counter-balance, so that the descent of the platform and counter-balance relatively to the free bars H H′, or the lifting of said bars relatively to the platform and counter-balance, will force the friction-blocks *g* of the locking devices out against the posts or guides thereon. Such locking devices may be applied to both the top and bottom of the platform and its counter-balance, or either, and may, if desired, be operated by hand from the car or platform, as by a pendant, *j*, from the rope G.

When the rope G is directly connected at its one end with the counter-balance, and at its opposite end with locking devices carried by the platform, then the rope G and its attachment will require to be of greater strength, to sustain the counter-balance, the weight of which will be transferred to the rope G by the breaking of the hoisting-rope, and should the rope G also break it will result in the fall of the counter-balance only as the platform will be locked by the first motion. K is an additional safety-rope, having its one end connected at the point *e* to the locking devices at the top or one end of the traveling car or platform, and, after passing through or over suitable guides and pulleys *m*, to give it the required direction, having its other end connected with the cross-beam or other fixed portion of the platform, as by means of a stop, *n*, so that said rope, which may extend throughout the height of the hoistway, moves in common with the car or platform, and may be operated by hand from the outside of the platform at different points in the height of the hoistway, to actuate the locking devices on the platform, or so that said locking devices may be automatically operated by a stationary governor operated by said rope by passing the latter in the course of its length over or round pulleys used to drive the governor. The locking devices on the platform may also be operated by hand from the latter by pulling on the inner pendent end of the rope K, outside of the rope K, outside of the stop *n*, through which said rope is free to be drawn.

The bar H of the locking devices on the platform should be of sufficient weight to keep the rope K taut for the proper operation of the governor, when the latter is used, and to keep said locking devices out of action except when automatically or purposely thrown into action, as hereinbefore described.

Additional special means, which may be varied, may be independently applied also, for lifting the bar H to put the locking devices on the platform into action by the hand of the operator from the platform. Thus M is a lever, having its fulcrum in the upper cross-head of the car, and having attached to its one end a rod or rope, *r*, the pulling down of which causes the opposite end of said lever to lift the bar and so put the locking devices into action.

I claim—

1. The combination of two or more hoisting ropes or chains with a hoisting-drum, having one or more independent longitudinally-sliding rings arranged around the body of the drum, and constructed to automatically equalize the strain upon the ropes or chains by the pressure of the latter upon the sides of the rings, essentially as shown and described.

2. The combination, with the platform or counterpoise and the friction-blocks or wedges *g*, of the bar H or H′, and the auxiliary automatic safety-rope G, all applied and operating substantially as herein described, for the purpose set forth.

3. In a hoisting apparatus, in which the car or platform and its counter-balance are connected and operated by or through the hoisting rope or chain on opposite sides of the hoisting-drum, the combination therewith of a safety-rope, G, connected at its one end with the locking devices carried by the car, and at its opposite end with a locking device on the counterpoise, for operation in relation with the hoisting rope or chain, essentially as herein described.

4. The independent safety-rope K, connected at its one end directly with the car or platform, and at its other end with the locking devices upon the car or platform, and moving with the latter throughout or in direction of the height of the hoistway, substantially as specified.

5. The combination, with automatic safety-stopping devices on the platform or car, of a lever, M, or equivalent device, whereby the said automatic devices, may be brought into operation by manipulation from the platform or car, substantially as herein described.

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