(No Model.)

W. H. SKERRITT.

ELEVATOR.

No. 263,603. Patented Aug. 29, 1882.

Fig. 1

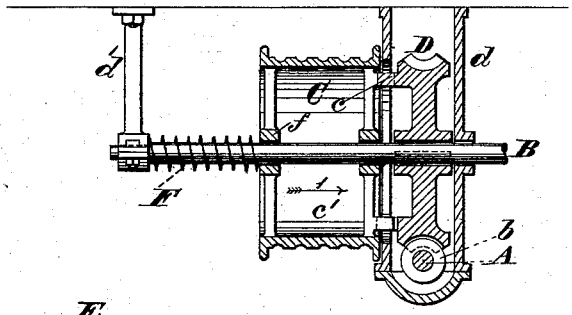


Fig. 2

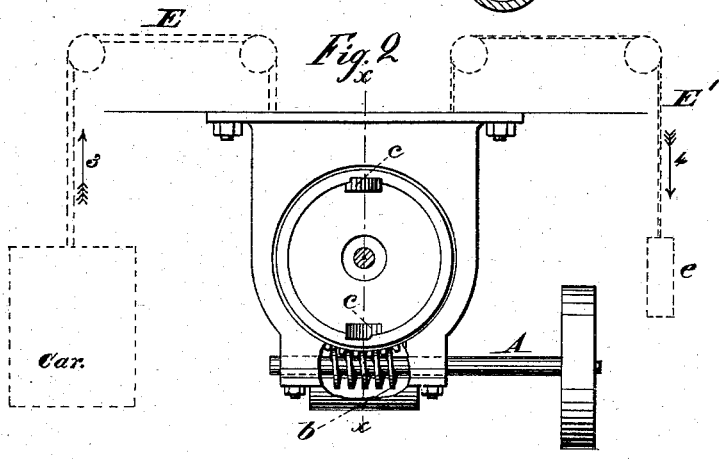


Fig. 3

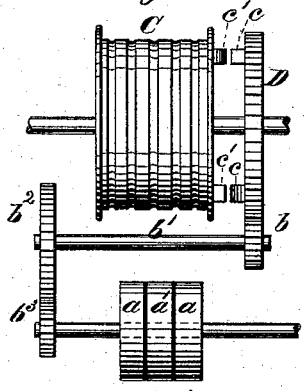


Fig. 5.

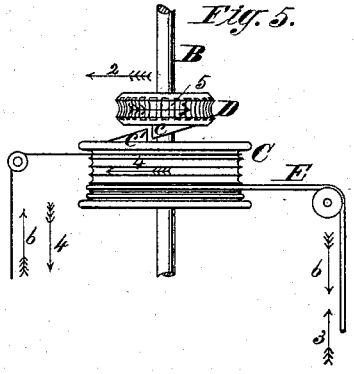
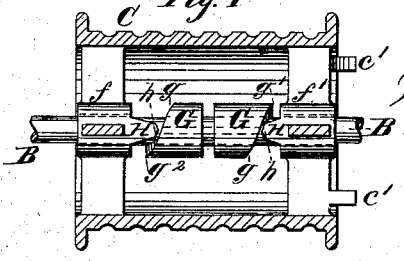


Fig. 4



Witnesses:
O. F. Malmborg.
Robt W. Matthews

Inventor:
Wm H. Skerritt
by A. W. Almqvist
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM H. SKERRITT, OF JERSEY CITY, NEW JERSEY.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 263,603, dated August 29, 1882.

Application filed June 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY SKERRITT, a citizen of the United States of America, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

My invention relates to that class of elevators operated by a rope and drum, and suitable gear for causing the drum to turn, and reversing-gear for changing its motion from one to the opposite direction, the object being to provide suitable construction whereby the torsion on the drum-shaft usual in elevators as heretofore constructed will be avoided, and whereby the hoisting rope or cable will be prevented from becoming slack and thus winding on the shaft and accidentally breaking by being cut between the cog-wheels when the platform is being lowered, and particularly when the platform or car is accidentally obstructed in its downward movement, while the driving-gears still keep on turning, and also to prevent the breaking of any machinery dependent upon such slackening of the rope or cable.

In the accompanying drawings, Figure 1 represents a longitudinal sectional elevation of an elevator-drum and worm-gearing constructed according to my present invention and mounted in suitable hangers, the section being taken on the line *x x* of Fig. 2. Fig. 2 is an end elevation of the worm-gearing and casing, (seen in direction of arrow 1, Fig. 1.) Fig. 3 is a side elevation, showing my improvement as applied to a rope-drum connected to spur-wheel gearing instead of worm-gearing. Fig. 4 is a longitudinal section of the drum arranged to be thrown in and out of gear according to my invention by the action of a spiral cam or cams secured on the drum-shaft, and Fig. 5 is a detail view simply explanatory of the operation.

A is the counter-shaft, receiving motion by straight and cross belts from reversing clutch-pulleys on the main shaft through pulleys *a a a'*, in the usual way, so as to cause the shaft A to turn in one or the opposite direction, or stop its motion, as may be required.

B is the shaft of the hoist-drum C. The hoisting-drum has a gear-wheel, D, keyed on to the shaft B in case the latter is to revolve with the former, otherwise mounted loosely. When worm-gear is used, as is preferable, the worm or screw *b*, gearing into the wheel D, is keyed directly on the shaft A, as in Fig. 1; but when spur-wheels are used the wheel *b*, gearing into the wheel D, is secured upon an intermediate counter-shaft, *b'*, and connected by gear-wheels *b''* and b^3 to the shaft A. The wheel D is inclosed in a casing, *d*, which is bolted to the beams in the ceiling or floor, and in which also the shaft B has its bearings at one end thereof, while the other end is mounted in a hanger, *d'*, in the usual manner.

In elevators as heretofore constructed the drum C is keyed upon the shaft B, and thus the entire strain in a loaded elevator when being hoisted acts upon the shaft B to twist the same in the opposite direction to that of the action of the driving-wheel D, thus subjecting the shaft to severe torsion. E E' (shown in dotted lines in Fig. 2) are the hoisting-ropes of the car and the rope of its counter-weight, *e*, respectively, the said ropes being secured to the drum C so as to occupy the same surface thereon, one winding on the drum while the other is unwinding, and vice versa. When the drum C is rigid upon the shaft and the car descends it is evident that if an obstruction should stop the car the drum will still keep turning and the cable E unwinding. This occurs occasionally and causes the rope to get off the drum C and become entangled between shafts and gear-wheels, or between the drum and the casing *d*, until it is worn off or cut, causing disastrous consequences and breaking of machinery. To avoid this I have made the drum C loose upon the shaft B and capable of operation by a simple clutch from the wheel D, in the following manner: Upon the side surface of the wheel D, adjacent to the end surface of the drum C, are formed in diametrically opposite places two teeth or projections, *c*, constructed as shown in Fig. 5, the face or working-surfaces of the teeth aforesaid forming a right angle, or less than a right angle, with the side surface of the wheel D, and the back of the teeth being an inclined plane. Upon the arms or end surface of the drum C are two similarly-arranged teeth or projections, *c'*, the position of which is reversed relatively to the teeth *c*

on the wheel D, so that if the wheel D turn in direction of arrow 2 (see Fig. 5) the face of the teeth *c* will impinge upon the face of the teeth *c'* and cause the drum C to revolve with the wheel D, and if the wheel D be moved in the opposite direction, or as indicated by arrow 5, the drum C, which is loose upon the shaft, is revolved merely by the weight of the car, and thus the tooth *c'* is resting upon the tooth *c* and the drum is prevented from turning any faster than the wheel D, and if the wheel D be moved in the direction of arrow 5 and the drum C be prevented from moving the tooth *c'* will slide with its inclined back against and slip over the inclined back of the tooth *c*, thereby allowing the drum C to remain stationary on the shaft, while the wheel D continues turning. The latter event occurs when, from any obstruction, the car is stopped in its downward movement, while the driving-wheel still keeps on turning in the direction, allowing it to descend. When the car stops and the cable E thereby begins to slacken, the counter-weight *e* preponderates, and thus tends to turn the drum upon the shaft in the direction opposite to that of the movement of the wheel D, thus keeping the cable E taut and holding the drum stationary while the gearing turns the shaft B, and consequently preventing any accident due to the slackening of the cable.

To keep the drum C against the surface of the wheel D, so as to enable the catches *c* and *c'* to always engage when the wheel D is moved in direction to hoist the car, I have applied a strong spiral spring, F, upon the shaft B between the hanger *d'* and the nearest end hub, *f*, of the drum. It is evident that when the drum is prevented from moving while the wheel D turns in direction of the arrow 5 in Fig. 5 the spring F will be compressed, while the catch *c'* slides over the catch *c*, and immediately thereupon will expand, pushing the drum in position ready for contact with the wheel D. When the drum moves in the direction of arrow 2 (see Figs. 2 and 5) the suspension rope or cable E and car move in the direction of arrow 3 and the car goes up, the counter-weight moving down, as indicated by arrow 4, and when the wheel D moves in direction of arrow 5 the car goes down and the counter-weight *e* up, as indicated by the arrow 6. The counter-weight *e* must be lighter than the car, for if it were heavier it would turn the drum in the direction of arrows 4, Fig. 5, independently of the movement of the wheel D, causing the rope E' to unwind and the cable E to wind on the drum and the car to ascend and remain at the upper end of the elevator-shaft.

Instead of bringing the drum-catches *c'* in contact with the wheel-catches *c* by the elasticity of the spring F, I much prefer to accomplish the same result by absolute and positive movement; and I have therefore devised for that purpose the construction shown in Fig. 4, in which G is a cylindrical hub, keyed upon the shaft B, and preferably made in two pieces, so as to more easily adjust the proper distance between its working or end surfaces. The opposite ends of the said cylindrical hub G are cut off to form a half-helix, or a thread increasing for one-half of the circumference and then receding for a half of the circumference until it meets its starting-point at *g*. The said spiral or helix-shaped working-surfaces at the opposite ends of the cylindrical hub G are precisely parallel with each other, as in Fig. 4, and the hub G is fixed upon the shaft between two hubs, *f f'*, of the drum C, and each of the said hubs has upon its inside, adjacent to the working-surfaces of the hub or cam G, a projection, H, said projections being placed directly opposite to each other in the line of the shaft, and the ends or working-surfaces of the projections H contiguous to the said helices are beveled in both directions at *h*, to correspond with the increasing or decreasing pitch of the helix, according as the shaft B is moved in one or in the opposite direction. As the working-surfaces of the helix-cam G are always in contact with the working-surfaces *h* of the projections H, and as the drum C is loose upon the shaft B, while the cam G is secured upon the said shaft, it follows that when the shaft B, during its revolution, brings the point *g'* of the cam-surface in contact with the projection H of the hub *f'* the drum will move in clutch-contact with the wheel D, and when the shaft B is moved in the opposite direction, so as to bring the point *g''* of the cam-surface in contact with the projection H of the other hub, *f*, the drum C will be moved out of clutch-contact with the wheel D.

From the foregoing it will be clearly understood that the power to turn the drum is not at all transmitted through the shaft, but is transmitted directly from the wheel to the drum by the projections *c c'* at or nearly at the point of resistance. There is therefore no torsional strain upon the shaft, whatever be the weight upon the elevator-platform, the shaft simply acting as the pivot upon which the wheel and drum turn, and when a spring, F, is used, as in Fig. 1, to maintain contact between the wheel and drum, the wheel D also may just as well be made to turn loose upon the shaft, as does the drum, though the keying it on the shaft within the casing *d* affords a strong and steady means of preventing end-play of the shaft.

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

1. In an elevator, the combination of the wheel D, revolving upon the axis of the drum-shaft B, and having teeth or gripping-projections *c*, the drum C, fitted to turn and slide upon the shaft B, and having gripping-projections *c'*, facing the said projections *c*, and means tending to produce contact between the said projections *c* and *c'*, substantially as and for the purpose set forth.

2. In an elevator, the combination of the

wheel D, mounted upon the drum-shaft B, and having gripping-projections *c*, the drum C, fitted to turn and slide upon the shaft B, and having gripping-projections *c'*, facing the said projections *c*, and the cam G, secured upon the said shaft B, and provided with parallel semi-helical and return working-surfaces *g*, acting against two contact-surfaces, *h*, which are situate opposite to each other and project from the drum, substantially as and for the purpose set forth.

3. The combination of the wheel D, revolving upon the axis of the shaft B, and having catches *c*, the drum C, loose upon the said shaft, and having catches *c'*, and means tending to produce contact between the catches *c* and *c'*, with the ropes E E', winding upon the drum C in opposite directions, and the suspended car and counter-weight, said weight being lighter than the car, substantially as and for the purpose herein set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 1st day of June, 1882.

WILLIAM HENRY SKERRITT.

Witnesses:

A. W. ALMQVIST,

B. S. CLARK.