

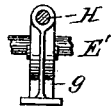
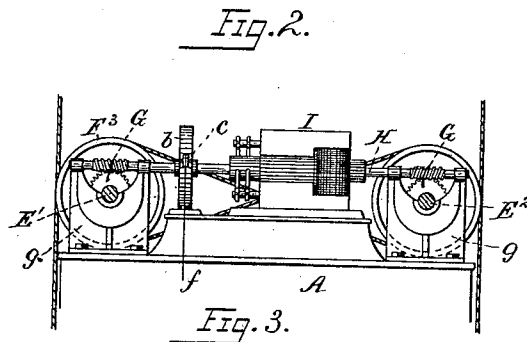
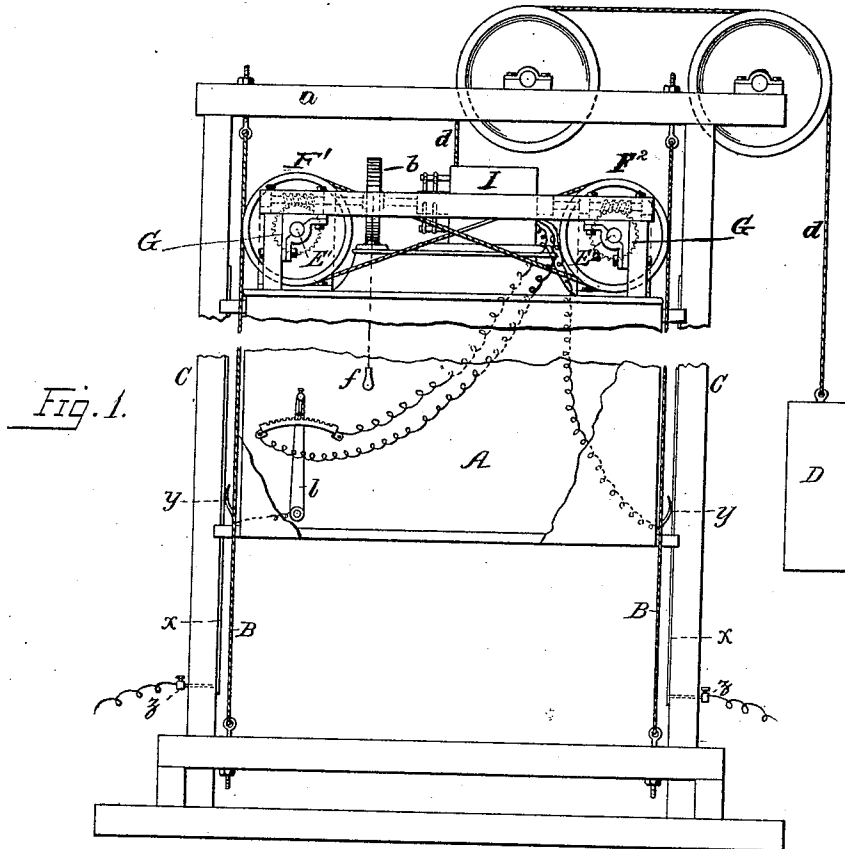
(No Model.)

2 Sheets—Sheet 1.

L. M. HOSEA.
ELEVATOR.

No. 479,943.

Patented Aug. 2, 1892.



Witnesses:
W. C. Jirdinston.
E. Hosea.

Inventor:

Lewis M. Hovea.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

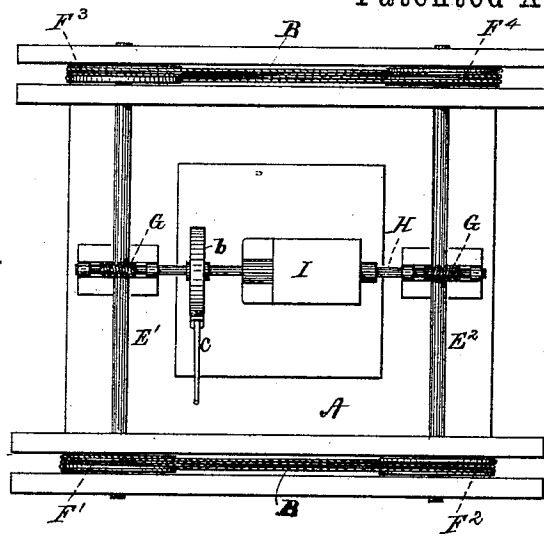


Fig. 5.

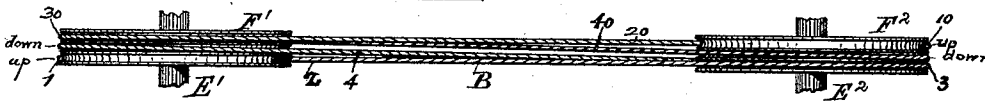


Fig. 6.

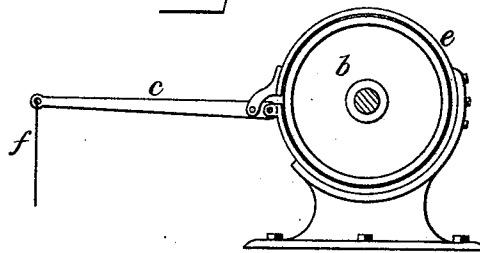
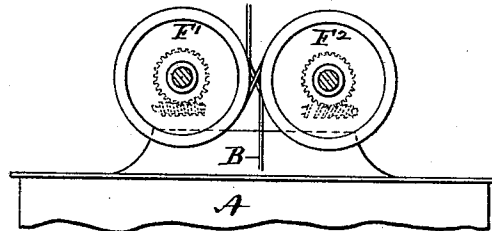


Fig. 7.



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UNITED STATES PATENT OFFICE.

LEWIS M. HOSEA, OF CINCINNATI, OHIO.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 479,943, dated August 2, 1892.

Application filed August 21, 1891. Serial No. 403,271. (No model.)

To all whom it may concern:

Be it known that I, LEWIS M. HOSEA, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful
5 Improvements in Elevators, of which the following is a specification.

My invention relates to elevators or "lifts," its object being to produce a simple, effective, and safe apparatus adapted especially
10 for the application of electricity as a driving force.

To this end it consists principally in an elevator platform or cab suspended upon one or more fixed ropes by means of interconnected sheaves engaging and traveling upon
15 said ropes and driven by a motor upon the platform-cab.

It also consists in the combination, with said carrying and propelling sheaves, of worm-wheels carried rigidly and concentrically with
20 said sheaves, and a screw-shaft interconnecting the same, whereby they are compelled to rotate relatively in opposite directions, and the screw forms a friction-lock to prevent
25 their rotation except by means of or as permitted by the rotation of the screw.

It consists, further, in the combination, with said suspending-ropes, carrying-sheaves, worm-wheels, and screw-shaft, of an electric
30 motor having its rotating armature concentric with said worm-shaft as a driving-motor for the same.

These being some of the principal features of my invention, the same consists, further,
35 in respect to the preferred constructive features, in certain details of construction and arrangements hereinafter more fully set forth.

Mechanism embodying my invention in a preferred form of construction is illustrated
40 in the accompanying drawings, in which—

Figure 1 is a general side elevation of my improved elevator complete, showing its salient constructive features; Fig. 2, an elevation of the screw-shaft and gears, showing its
45 constructive features and connections; Fig. 3, an end view of one of the oil-box bearings of the screw-shaft; Fig. 4, a top plan view of the elevator-cab, showing the relative arrangement of parts; Fig. 5, a plan view of a
50 pair of the carrying-sheaves, showing the manner of engaging the suspending-ropes; Fig. 6, a detail view of the brake device for

controlling the momentum of the armature; Fig. 7, a diagram elevation showing a mode of application for a single rope or group of
55 ropes used as one.

Referring now to the drawings, A designates the cab or platform of an elevator or lift; B, ropes upon which it is suspended; C, guide-stanchions, and D *d* a counterbalance-
60 weight and rope. All parts will be differentiated by numerals in connection with the designating-letter where necessary to distinguish between several parts of the same kind.

In the present illustration of my invention
65 the cab is carried upon four ropes and the mechanism constructed accordingly, as follows: Two shafts E' E² are journaled across the cab-frame at the top or bottom in parallel relations at opposite sides, provided with
70 terminal sheaves F' F² F³ F⁴ of equal size, each with three peripheral grooves. The suspension-ropes B are hung from supporting-beams *a* across the runway at vertical parallel
75 tangents with the outer arcs of the carrying-sheaves F and pass over and engage corresponding sheaves on opposite shafts at each side of the cab in pairs, as more fully shown
in Fig. 5, and indicated by the numerals 1 2 3 4 and 10 20 30 40, traced in each case con-
80 secutively, passing in appropriate grooves of the sheaves. The ropes may be provided with suitable take-up devices at top and likewise at the bottom, where they are correspondingly
85 secured in order to interadjust the ropes and equalize the distribution of the load. Thus mounted, the cab is moved up or down by the rotation of the sheaves, which thus engaging
upon and being interconnected in pairs by the ropes B can rotate only in relatively-opposite
90 directions. One of each pair of sheaves, as F' or F³, is connected by a cross-shaft E', and the corresponding pair, as F² F⁴, by the shaft E², and the rotation of the four sheaves is thus
95 exactly equalized.

The rotating power is applied to both sheaves of a pair equally through the medium of a screw-shaft in the following manner: Midway between its terminal sheaves each
shaft E E' is provided with a worm-wheel G,
100 and lying across and operating both worm-wheels simultaneously in opposite directions is a right-and-left screw-shaft H, suitably journaled. At its central portion the shaft

H is connected with the armature-shaft of an electric motor I or other driving engine or device secured to the cab-frame. It will be seen that the worm-shaft H, while it serves as a means of rotating the carrying wheels or sheaves, also serves by means of its oppositely-engaging screw with the worm-wheels G as a lock to prevent their rotation when the shaft is at rest. Thus the load upon the cab, which would otherwise tend to rotate the carrying-sheaves and cause them to travel down the ropes, may be neutralized by the worm-shaft. The pitch of the threads may be made too small to be effected by the back-pressure of the worm-gear teeth, so that power is required to depress as well as to elevate the cab. Further, as the screw-shaft engages by right-and-left connection with its worm-gears all end-thrust upon the screw-shaft is neutralized, and much of the friction usually an incident of worm-drivers is avoided. The connecting-bearings *g* for the screw-shaft H and the pulley-shafts E' E² are formed, as shown in Figs. 2 and 3, to embrace the screw-shaft at opposite sides of the worm-wheel and to carry the worm-wheel in a trough to partially submerge the worm-wheel in oil for constant and free lubrication.

The electric motor I may be of any common type of reversible revolving-armature motors and requires no description. The current may be delivered by flexible conductors or by the ordinary trolley. I have shown herein a metallic strip *x*, carried at the inner sides of the guide-stanchions, having connections *z* with the generator, (or with generator and ground, respectively,) and flexible brush-conductors *y*, attached to the sides of the elevator and moving in electrical contact with the strips *x*. I have also shown a reverse lever *l*, which may be provided with the usual resistance devices and proper conducting-wires. These, however, being common devices for the purpose, need no further description.

The screw-shaft H is provided with a brake-wheel *b*, upon which is carried a friction-brake (shown as a lever *c*) having a toggle connection with the ends of a divided strap *e*. I have shown an operating-cord *f*, attached to the lever *c*, to operate the brake by hand; but any suitable device may be used.

The operation of the device is as follows: The motor I being set in motion and the worm-shaft H rotated, the worm-wheels G transmit their rotation through the shafts E' E² to the respective carrying-sheaves F' F² F³ F⁴, which being set in motion in relatively-opposite directions, as explained, travel up or down the ropes B (as the case may be) until the motor-current is shut off and the momentum of the armature is checked by the brake.

While I have shown four suspended ropes herein upon which the cab is suspended and by means of which it is operated, it will be obvious that two only may be employed, the

carrying-pulleys being in such case arranged upon a central line of the cab. It will also be obvious that more than four may be employed by increasing the number of carrying-pulleys or grooves in the carrying-pulleys upon the shafts accordingly. The suspension and operation may also be by one rope only or by two or more ropes employed as one passing side by side over two pulleys interconnected in the manner hereinbefore described, as indicated in Fig. 7. These applications of the principle being obvious, I have not thought it necessary to illustrate or describe the same further.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In an elevator, the combination of the cab, two interconnected carrying-sheaves of equal diameter journaled thereon, one or more fixed suspension-ropes secured at the top of the runway and wound in reverse over the sheaves, thereby suspending the cab, and means for rotating said sheaves simultaneously in relatively-opposite directions, substantially as set forth.

2. In an elevator, the combination of suspension-ropes secured at opposite ends to the top and bottom of the runway, a cab provided with two equal sheaves journaled thereon to rotate in a common plane and engaging the suspension-ropes in opposite bights formed by reversed winding over the sheaves as a pair, right-and-left worm-gears, and a right-and-left worm-shaft connecting and driving said sheaves in relatively-opposite directions, substantially as set forth.

3. The combination, in an elevator, of one or more fixed suspension-ropes, a cab provided with carrying-sheaves suspending the cab in bights of the suspension-ropes, worm-wheels to operate the carrying-sheaves, worms engaging the worm-wheels, an electric motor upon the cab engaging and driving said worms, a moving connection for delivering the electric current to said motor, and controlling devices upon the cab for regulating the delivery and action of the current, substantially as set forth.

4. The combination, in an elevator or lift, of the cab or platform, the suspension-ropes, the carrying-sheaves, the right-and-left worm-wheels, the right-and-left worm-shaft, and the electric motor, substantially as set forth.

5. The combination, in an elevator, of the cab, the suspension-ropes, the carrying-sheaves, the worm-wheels, the electric motor, the motor-shaft having screws engaging the worm-wheels, and the brake upon the motor-shaft, substantially as set forth.

6. In an elevator of the character described, the combination of the cab, two equal interconnected sheaves arranged to rotate in a common plane at opposite sides upon the cab, each sheave having peripheral grooves, and two or more fixed suspension-ropes forming suspending-bights by winding each from

above under its primary sheave, and thence over and around under the opposite sheave, and thence back over its primary sheave and downward, substantially as set forth.

5 7. In an elevator of the character indicated, the combination of two opposite parallel shafts journaled upon the cab, two sheaves upon each shaft of equal diameter each with each throughout and arranged in parallel
10 planes in pairs of opposites, a worm-wheel upon each shaft between its sheaves, a cross-shaft having right-and-left worms, respectively, engaging the worm-gears, four suspending-ropes fixed in the elevator-runway in outer
15 tangential relations with the sheaves, respectively, and engaging the same by reversed winding-bights, as shown, a rotating armature carried by said cross-shaft, field-magnets carried upon the cab-frame surrounding
20 said armature and constituting with it an electric motor, and electrical connections with

said motor for driving the same, substantially as set forth.

8. In an elevator of the character indicated, the combination of a cab provided with inter- 25 connected propelling-sheaves, two or more ropes secured at the top of the runway and winding over said sheaves, forming bights in which the cab is suspended and extended thence to the bottom of said runway, and 30 take-up devices for said ropes at their top and bottom holdings for adjusting and maintaining the ropes in proper relation and taking up the slack, substantially as set forth.

In testimony whereof I have hereunto set 35 my hand in the presence of two subscribing witnesses.

LEWIS M. HOSEA.

Witnesses:

E. R. DONOHUE,
WM. G. HOSEA.