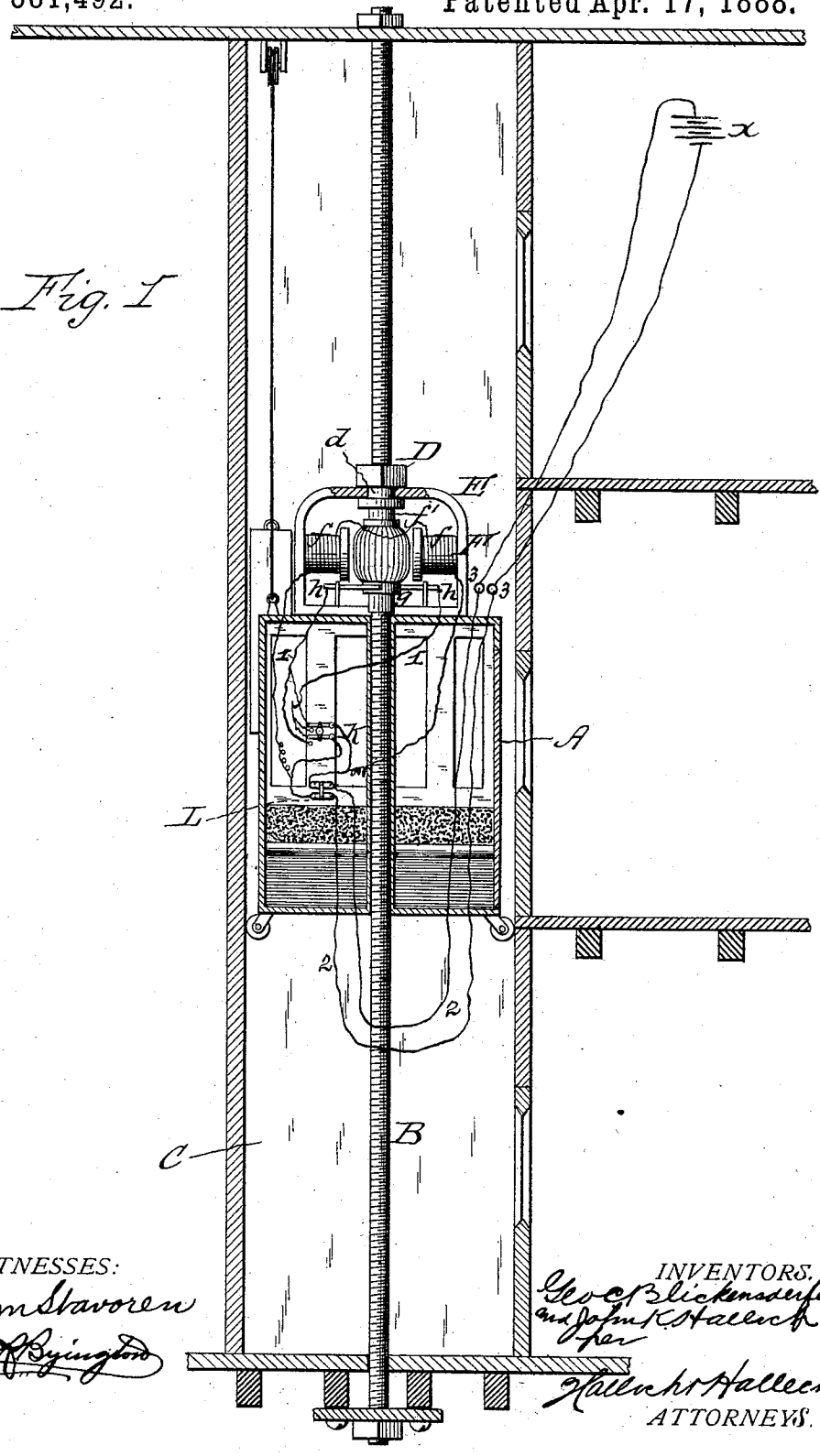
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G. C. BLICKENSDERFER & J. K. HALLOCK.

ELECTRIC ELEVATOR.

No. 381,492. Patented Apr. 17, 1888.

Fig. 1



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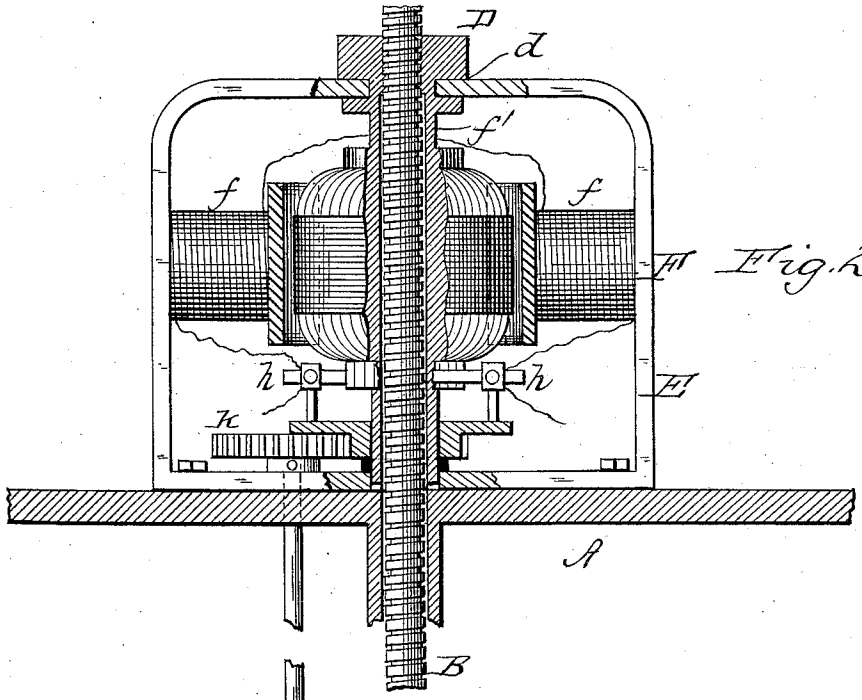
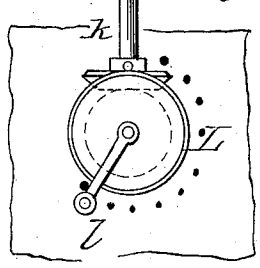


Fig. 2



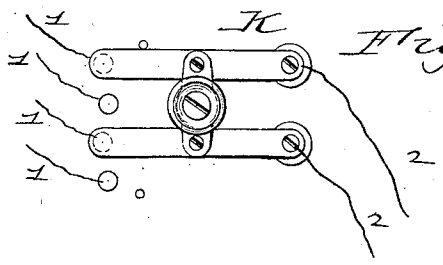


Fig. 3

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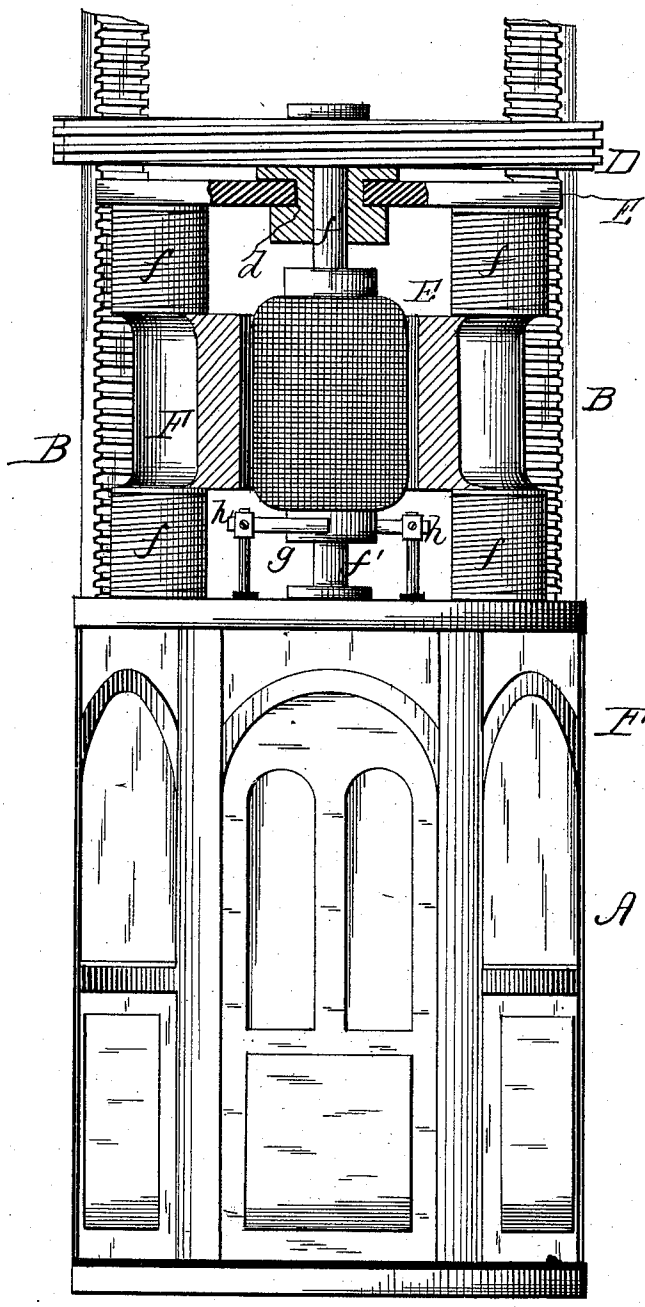


Fig. 4

A

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UNITED STATES PATENT OFFICE.

GEORGE C. BLICKENSDERFER AND JOHN K. HALLOCK, OF ERIE, PENNSYLVANIA, ASSIGNORS TO SAID GEORGE C. BLICKENSDERFER, TRUSTEE.

ELECTRIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 381,492, dated April 17, 1888.

Application filed April 13, 1887. Serial No. 234,582. (No model.)

To all whom it may concern:

Be it known that we, GEORGE C. BLICKENSDERFER and JOHN K. HALLOCK, citizens of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Electric Elevators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention has relation to electrically-propelled elevator cars or cages for buildings; and it has for its object simplicity of construction of parts, whereby an economical, effective, and durable form of elevator is provided, wherein safety catches or devices and appurtenances usually accompanying the same are dispensed with.

Our invention accordingly consists of the combination, construction, and arrangement of parts, as hereinafter described and claimed, having reference particularly to a fixed screw shaft or column, a revolving nut or gear engaging with the screw-shaft, an elevator car or cage suspended from or supported by said nut or gear, and an electric motor on the cage for rotating said nut or gear in reverse directions for raising or lowering the car or cage E, reference being had to the accompanying drawings, wherein—

Figure 1 is a sectional elevation showing the application of our improvements to a screw form of elevator; Fig. 2, an enlarged sectional view, partly in elevation, of the motor, car, and screw-rod; Fig. 3, a plan of reversing-switch for the motor, and Fig. 4 a longitudinal section showing modification.

A represents the car or cage, and B the screw rod or column of a screw form of elevator, which column may be constructed or provided for as desired; but we prefer a single central screw-rod, as shown in Fig. 1, which is fixed or immovable and extends from the top to the bottom of well C, and has a revolving gear or screw-nut, D, in engagement therewith, by means of which the car is raised or lowered.

The nut D (shown in Figs. 1 and 2,) is provided with an annular groove or bearing, *d*, in or on which is swiveled a frame, E, secured to the car A. This frame E serves as a support for the field-magnets *f* of an electric motor, F, the armature-shaft *f'* of which is tubular, surrounds the screw-rod B, and is firmly secured to or forms an integral part or extension of nut D. Upon the armature-shaft *f'* is the commutator *g*, as usual, and the brushes *h h* therefor are supported upon the field-magnet frame E in the usual or any other suitable manner, as indicated.

From such described construction it will be noted that the electric motor intervenes between the car and the nut upon the screw-rod, that the nut is a part of the armature-shaft, and that the nut or armature-shaft supports the field-magnets, their frame, and the car A, so that a rotation of the armature-shaft and nut in reverse directions raises or lowers the car, as desired.

From brushes *h h* lead divided or split wires or connections 1 1 to a reversing-switch, K, located in car A, and from switch K lead wires 2 2, including a cut-out switch, L', as desired, to a battery or generator, *x*, said wires 2 2 preferably leading to binding-posts 3 3, located half-way up the well C, as indicated, for well-known reasons. By suitably operating the reversing-switch K the direction of rotation of the armature is reversed, as desired, for changing the direction of travel of car A.

Instead of using the reversing-switch K, the brushes *h h* may be rotated to change the polarity of the armature in the well-known way by means of mechanical gearing *k k* in engagement with a rotating brush-holder, as indicated in Fig. 2, a pointer, *l*, and a dial, L, being employed in connection with said gearing for positively controlling the movement of the brushes to effect the necessary or required changes of travel of the car.

Instead of using a central screw-rod, as shown in Fig. 1, corner or other suitably-located screw-teeth racks engaging with gearing operated by the armature-shaft of the motor may be employed, and suitable counter-

balancing-weights may be employed to lessen the frictional wear on nut D, in a manner as heretofore practiced.

It will be noticed from the foregoing that as the screw shaft or column is fixed and the nut or gear D only is rotated the speed of its rotation, and consequently the speed of travel of the car, may therefore be as fast as desired, and the slow motion heretofore incident to screw-shaft elevators necessitated by the revolution of the screw column or shaft is avoided. It will be further noted that we prefer to use no part of the column or shaft or the fixtures in the well as conductors leading to the car-motor, but employ separate conductors therefor, one end of each of which is secured to fixed or line conductors at a point about half-way up the well, and these conductors rise and fall with the car as it moves; hence there is less liability of short-circuiting and of danger from their use, and they are readily placed in position and are correspondingly removable when repairs are necessary either for the conductors themselves or for the other parts of the elevator.

What we claim as our invention is—

1. The combination of a fixed screw shaft or column, a revolving nut or gear in engagement with said shaft, a cage or car supported by or suspended from said gear, and an electric motor and circuit-connections for effecting the rotation of said gear to raise and lower said cage, substantially as set forth.

2. The combination of a fixed screw shaft or column, a revolving nut or gear in engagement with said shaft and affixed to an electric-motor armature-shaft, a car or cage supported by said armature-shaft, field-magnets for said armature located upon said cage, circuit-connections for said motor, and devices for reversing the direction of rotation of the armature-shaft and revolving nut, substantially as set forth.

3. The combination of an elevator-car, an electric motor secured to the car, having an armature and shaft therefor separate from the car, and provided with a screw nut or gear which engages with a fixed screw-shaft, substantially as set forth.

4. In combination with a fixed screw-rod, an armature-shaft having a threaded nut engaging with the screw-rod, a field-magnet frame swiveled to said nut, and an elevator-car attached to said frame, substantially as set forth.

5. In combination with a fixed screw-rod, an elevator-car suspended or supported by a revolving nut or gear on said shaft, an electric motor on the car for revolving said nut, and separate and movable conductors leading from the car to terminals of fixed conductors located at or about half-way up the elevator-well, substantially as set forth.

6. The combination of a fixed screw-rod, an elevator-car, an electric motor on the car having a tubular armature-shaft, gear-connection between said armature-shaft and the screw-rod, and devices for reversing the direction of rotation of the armature for changing the direction of travel of the car, substantially as set forth.

7. The combination of a fixed screw-rod, an elevator-car, an electric-motor field-magnet frame secured to said car and having a bearing or support on the motor armature-shaft which is separate from the car, and a gear-connection between said armature-shaft and the screw-rod, substantially as set forth.

8. The combination, with an elevator-car and a fixed screw-rod, of an electric motor on said car having a hollow or tubular armature-shaft for engagement with said screw-rod, substantially as set forth.

9. The combination, with an elevator-car and a fixed screw-rod, an electric motor on said car the armature-shaft of which is in engagement with said screw-rod, as and for the purpose set forth.

10. In combination with a traveling car on a fixed screw-rod, an electromotor the armature-shaft of which engages directly with said screw-rod, as and for the purpose set forth.

11. The combination of a fixed screw-rod, a revolving gear on said rod, a car or cage suspended or supported by said gear, and a motor for rotating said gear to raise and lower the car, substantially as set forth.

12. In combination with a fixed screw-shaft of an elevator-car and its operating devices, an electromotor having a hollow armature-shaft in engagement with said devices, substantially as set forth.

13. In combination with an elevator-car, an electric motor having its field-magnets and frame secured to the car, and its armature-shaft journaled in said frame and supported directly upon the elevating mechanism, substantially as set forth.

14. The combination of a fixed screw-shaft, an elevator-car, an electric motor, a rotating gear on the motor armature-shaft in engagement with the screw-shaft, a generator or battery, and reversing and cut-out switches, substantially as set forth.

15. The combination of fixed screw-shaft, an elevator car or cage, an electric motor therefor having tubular armature-shaft in engagement with said screw-shaft, and reversing and cut-out switches located in said car, substantially as and for the purpose set forth.

16. The combination, with an elevator-car, an electric motor for actuating said car, flexible circuit connections or conductors 2 2 for the motor connected at one end to the car and at the other to fixed terminals of a line of conductors, and a cut-out switch and devices for reversing the motor included in said circuit-connections, substantially as shown and described.

17. The combination, with an elevator-car, an electric motor for propelling the car, devices for controlling the movement of and re-

versing the direction of rotation of the motor armature-shaft, and flexible electric conductors 2 2 in circuit with said motor and secured to and hanging pendent from the car and the fixed ends or terminals of a line or working circuit, substantially as set forth.

18. The combination of an elevator-car having an actuating or propelling electric motor, brushes for the commutator of the motor, a dial and indicator, and gearing interposed between said indicator and brushes, substantially as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEO. C. BLICKENSDERFER.
JNO. K. HALLOCK.

Witnesses:
S. J. VAN STAVOREN,
M. F. HALLECK.