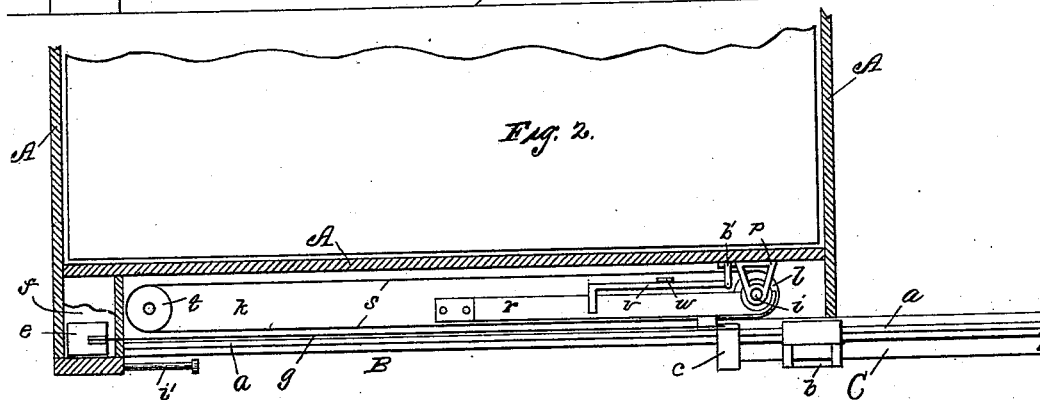


2 Sheets—Sheet 1.

MECHANISM FOR OPERATING THE DOORS OF ELEVATOR WELLS.

Patented Feb. 4, 1890.



Inventor:
Orion L. Davis.
By E. B. Whitmore, Atty.

(No Model.)

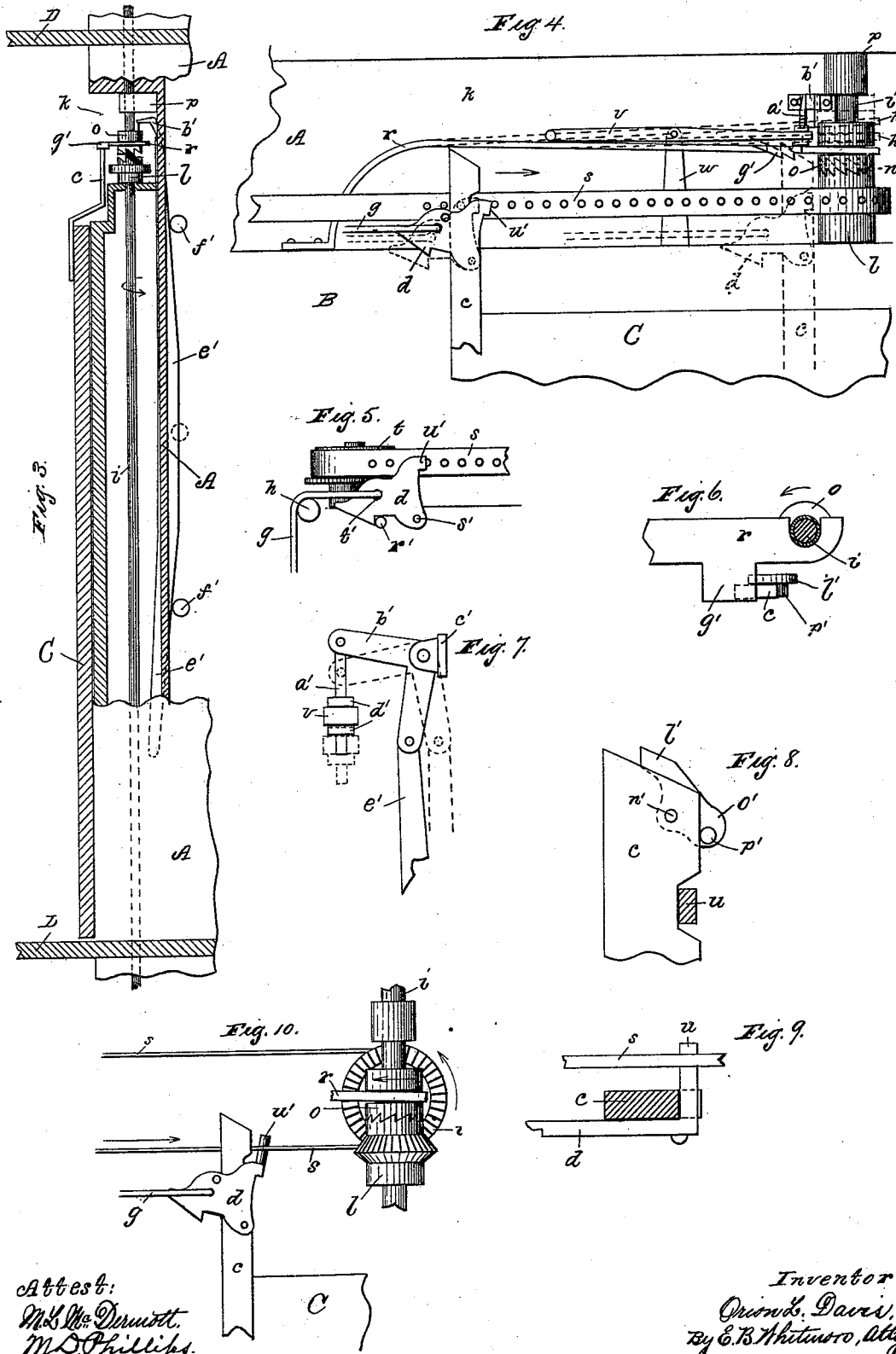
2 Sheets—Sheet 2.

O. L. DAVIS.

MECHANISM FOR OPERATING THE DOORS OF ELEVATOR WELLS.

No. 420,866.

Patented Feb. 4, 1890.



Attest:
M. L. D. Davis.
M. D. Phillips.

Inventor:
O. L. Davis,
by C. B. Whitmore, atty.

UNITED STATES PATENT OFFICE.

ORION L. DAVIS, OF ROCHESTER, NEW YORK.

MECHANISM FOR OPERATING THE DOORS OF ELEVATOR-WELLS.

SPECIFICATION forming part of Letters Patent No. 420,866, dated February 4, 1890.

Application filed September 9, 1889. Serial No. 323,415. (No model.)

To all whom it may concern:

Be it known that I, ORION L. DAVIS, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Mechanism for Operating the Doors of Elevator-Wells, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

The object of my invention herein shown and set forth is to produce a new and improved mechanism for operating the doors or gates of elevator-wells.

In this invention the door is opened by means of a vertical revolving shaft arranged and geared so as to turn a toothed wheel or sprocket at the side of or upon the shaft, the wheel carrying a chain or perforated belt connected with the door. This device for opening the door may also be arranged to close the door; but I prefer to close the door by means of a cord and weight, as shown.

The invention is hereinafter fully described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a front elevation of a door of an elevator-well, with the operating mechanism shown as to its general features, parts being broken away and vertically sectioned; Fig. 2, a view of the same seen as indicated by arrow 2 in Fig. 1, sectioned as on the dotted line *x*; Fig. 3, a sectional elevation of the parts seen as indicated by arrow 3 in Fig. 1, the section being on the dotted line *y* in Fig. 1, with parts broken away. Fig. 4, drawn to a larger scale, is a front elevation of the more important parts of the device, various parts being shown in various positions by full and dotted lines; Fig. 5, a similar view of parts at the left of the door. Fig. 6, seen in the direction in which Fig. 2 is seen, better shows the clutch-shifter and associated parts. Fig. 7 shows the bell-crank with attached parts, some of the parts being shown in two positions by full and dotted lines. Fig. 8 shows a gravity-catch for detaining the door. Fig. 9 shows more fully the form of the latch and its connection with other parts, and Fig. 10 shows a simple change in the construction and arrangement of some of the parts.

Referring to the parts shown in the draw-

ings, A are the walls of an ordinary elevator-well.

B is the doorway opening into the well, and C the door for closing the same. This door, as shown, is of ordinary form, held to roll laterally on a horizontal track *a* by means of common hangers *b*, provided with rollers resting on the track.

The door is provided at the top with an arm *c*, to which is secured a latch *d*.

e is a weight for closing the door, moving in a cavity *f* in the wall of the well. The weight is connected with the latch by a cord *g*, passing over a pulley *h*.

i is a light vertical rotatory shaft incased within one of the walls of the well and extending from top to bottom of the latter through all the stories of the building. This shaft is turned by a belt, gear, or other common means, and it serves to open all the doors by means of the mechanism provided.

Over each doorway, in a recess *k* in the front wall of the well, is placed the essential part of the mechanism for operating the doors. The shaft *i* passes through the recess, and is provided within the latter with a wheel *l*, fitted to turn loosely thereon and formed with clutch-teeth *n* upon its upper surface.

Upon the shaft above the wheel is a sliding clutch *o*, which turns with the shaft, and is provided with teeth on its lower surface to engage the teeth *n* of the wheel *l*.

p is a bearing for the shaft.

r is a shifter for the clutch, it being shown as a strong spring secured to the floor of the recess, having its free end in a circumferential groove in the clutch, it being notched at one side to receive the shaft *i*, as shown in Fig. 6. The spring-shifter tends to lift the clutch of the wheel *l*, so that ordinarily no motion would be communicated to the latter from the shaft.

The wheel *l* is provided with teeth upon its circumference, designed either to directly engage with a chain or a perforated belt *s*, as shown in Fig. 4, or to engage the teeth of another wheel *u*, as shown in Fig. 10. In the latter case the wheel *u* holds the chain or belt, it being formed with ordinary teeth for the purpose. The chain or belt rests at the opposite end upon an idle-pulley *t*, Fig. 5, at the left side of the door.

The latch *d* is connected with the chain or belt by means of an extended part or tang *u'*, by means of which the door *C* is caused to move along the track.

15 *v* is a lever held at the side of the clutch-shifter upon a standard *w*, the lever being turned at its free end across the shifter, Fig. 2, to bear thereon. At its opposite end the lever is connected by means of a threaded
20 bolt *a'* to a bell-crank *b'*, Fig. 7, held to turn in a vertical plane in a rest *c'*, secured to the rear wall of the recess. This bolt *a'* is provided with set-nuts *d'*, one above and one below the lever, so the connection of the latter
25 with the bell-crank may be adjusted.

e' is an arm occupying a vertical slit in the inner face of the front wall of the well, to be operated by the passing car. This arm is substantially the same as the arm referred to by H in Patent No. 402,411, of April 30, 1889, issued to me, and the arm *e'* here shown is also acted upon by the car by means of a roller like that referred to by *f'* in said patent, to which arm and roller reference is here made. The upper end of the arm *e'* is joined by a flexible joint with the lower arm of the bell-crank. Now it will be understood that when the passing car pushes the arm *e'* toward the left, as shown in Figs. 3 and 7, it
30 will cause the connected end of the lever *v* to be raised, and so force the clutch-shifter downward to the position shown in full lines in Fig. 4, causing the clutch *c* to engage and turn the wheel *l* in the direction indicated.
35 Assuming the door to be closed, then when the elevator arrives it will push the arm *e'* forward, as above stated, and throw the clutch in gear with the wheel *l*, which will cause the door to be drawn to the right, as shown in
40 Figs. 1 and 4, the door moving until the clutch is disengaged from the wheel *l*. This is effected when the door is drawn fully back by the following means: The clutch-shifter *r* is formed with a toothed or notched part *g'*, Figs. 4 and 6, which is encountered by the upper
45 inclined end of the arm *c* of the door when the latter is moved clear back. When the arm glides under the part *g'*, it raises the end of the shifter sufficiently to lift the clutch off the wheel *l*. This stops the motion of the door. In this upward lifting of the shifter the lever *v* and arm *e'* take no part, the shifter being only bent upward to the position shown in dotted lines at *h'*, the bend occurring at
50 the point when the lever bears upon the shifter. When the arm *c* catches behind a tooth at *g'*, the door is thereby held open against the action of the weight *e*. When the car passes away and releases the arm *e'*, the
55 lever *v* becomes inoperative, and the spring-shifter for the clutch moves farther upward to occupy the position shown in dotted lines at *k'*. This releases the arm *c* from the tooth *g'* and permits the weight to close the door.
60 The shock attending the closing of the door is relieved by means of an ordinary air-cushion *i'*.

The normal position of the clutch-shifter is that shown by dotted lines at *k'*. Left to itself this shifter not only raises the clutch away 70 from the wheel *l*, but it also lifts the left-hand end of the lever *v*, bringing the bell-crank *b'* and the arm *e'* to the respective positions shown in dotted lines in Fig. 7. When the parts are in these respective positions, the 75 door stands closed, and the arm *e'* is in position to be acted upon by the car as it arrives.

To make the arm *c* more surely catch a tooth at *g'* of the clutch-shifter each time the door is brought back, I provide it with an 80 auxiliary gravity-catch *l'*, Figs. 6 and 8, pivoted to the arm at *n'*. The weighted part *o'* of the catch tends to hold it in the position shown, a stop-pin *p'* assisting to hold it in its proper position. When the door is closed, the 85 latch *d*, Fig. 5, catches on a horizontal rigid pin *r'*. The latch turns on a pivot *s'* in a vertical plane, and the cord *g* being attached to the latch at a point *t'* above the pivot *s'* enables the weight to hold the latch firmly down 90 upon the pin *r'*, to hold the door in its closed position, and the tang *u'* of the latch joining the chain or belt at a point also above the pivot *s'* enables the chain or belt to lift the latch off the pin against the action of the 95 weight previous to the backward movement of the door.

What I claim as my invention is—

1. A movable door for an elevator-well, in combination with a rotary shaft, a clutch-section on the shaft and turning therewith, a 100 wheel loose on the shaft having companion clutch-teeth, a chain or belt connecting said wheel with the door, and a shifter for the clutch-section, substantially as shown. 105

2. In combination with the door of an elevator-well, an operating-shaft, a clutch-section carried by the shaft, a wheel having companion clutch-teeth turned by the clutch-section, and a shifter for the clutch-section, 110 said wheel being connected with the door to move the latter, substantially as shown and set forth.

3. In combination with the door of an elevator-well, a driving-shaft, a clutch-section 115 turning with the shaft and fitted to slide longitudinally thereon, a wheel having companion clutch-teeth fitted to turn independently of the shaft, a belt connecting said wheel and the door, and a shifter for said clutch, substantially as shown and described. 120

4. In combination with the door of an elevator-well, a driving-shaft, a clutch-section on said shaft, a loose wheel on said shaft opposite the clutch-section, a belt on said loose 125 wheel, a pivoted latch on the door, and a catch-pin for said latch, said belt being attached to the latch at a point at one side of the center of the motion of the latch, substantially as shown, and for the purpose set 130 forth.

5. In combination with the door of an elevator-well, a driving-shaft, a clutch-section on said shaft, a loose wheel on said shaft op-

posite the clutch-section, a belt connecting said loose wheel with the door, a gravity-latch on the door, a catch-pin for said latch, and a weight connected with the door, substantially as and for the purpose specified.

6. In combination with an elevator-car, a door, a rotatory shaft, a sliding clutch-section on the shaft, a yielding shifter for the clutch-section, a loose wheel turned by the clutch-section, a connecting-belt for the wheel and door, a depressor for the clutch-shifter, and an actuating arm connected with the depressor and operated by the car, substantially as shown.

7. The door of an elevator-well, in combination with a driving-shaft, a clutch-section on the shaft, a loose wheel operated by the clutch-section, a latch on the door, a catch-pin for the latch, and a weight to close the door, said weight and loose wheel being each connected with the latch at a point at one side of the pivot of the latch, substantially as shown.

8. A driving-shaft to operate the door of an elevator-well, and a shiftable clutch-section on the shaft, in combination with a shifter for the clutch, a depressor for the shifter, and

a lifter for the shifter to raise the latter part way from the lowest to its highest position, substantially as and for the purpose set forth.

9. In combination with the door of an elevator-well, a rotatory shaft, a clutch-section on the shaft, a loose wheel on the shaft opposite the clutch-section, a connecting-belt for said wheel and door, a shifting-spring for the clutch, a depressor for the shifting-spring, and a lifter for the shifting-spring, substantially as shown and described.

10. In combination with a movable door of an elevator, a driving-shaft, a driving clutch-section on the shaft, a loose wheel opposite the clutch-section, a connecting-belt for said wheel and door, a shifter to raise the clutch-section, a depressor for the shifter, and a movable catch for the door, substantially as specified.

In witness whereof I have hereunto set my hand, this 7th day of September, 1889, in the presence of two subscribing witnesses.

ORION L. DAVIS.

Witnesses:

E. B. WHITMORE,
M. L. McDERMOTT.