

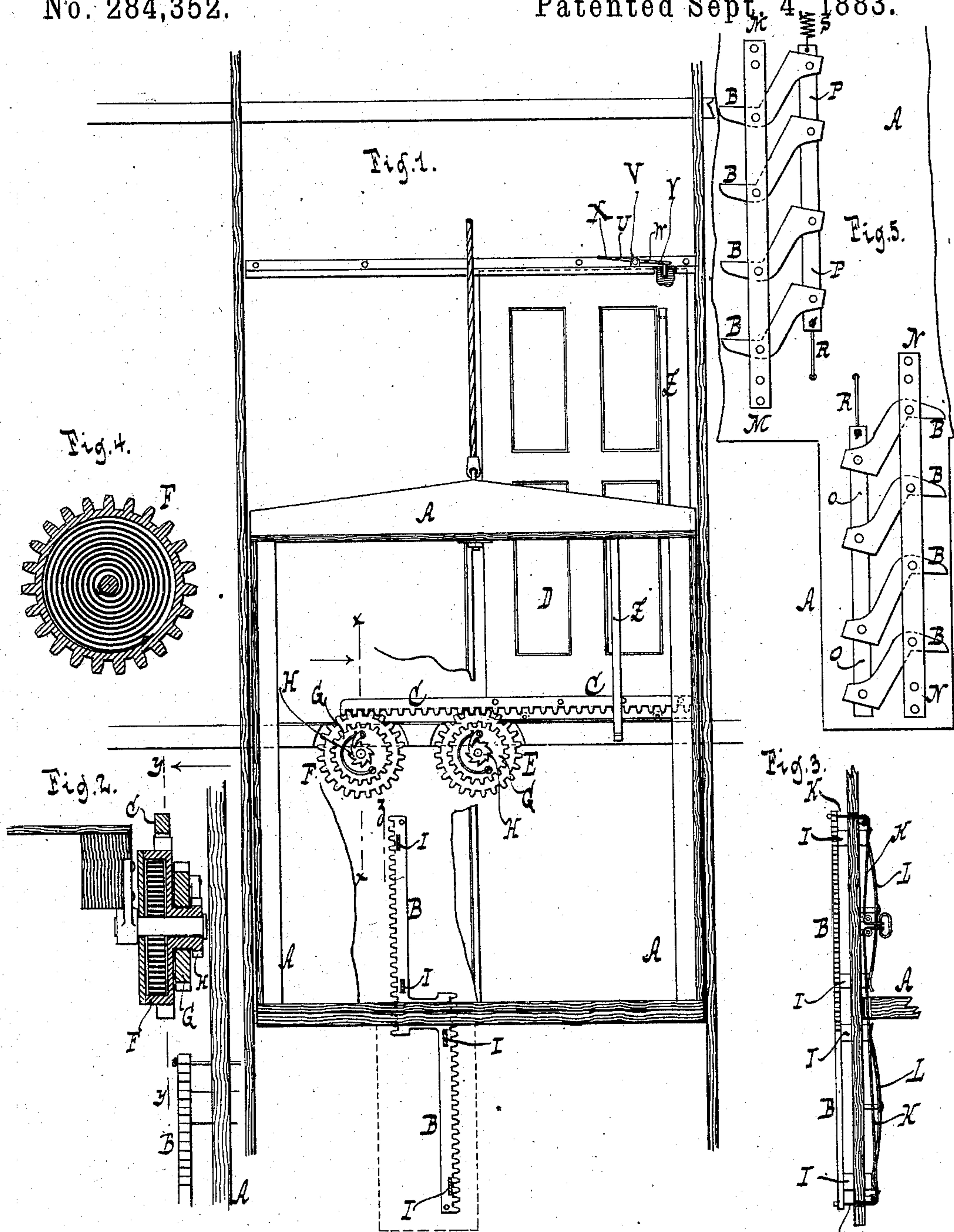
(No Model.)

2 Sheets—Sheet 1.

E. BACHMANN.  
ELEVATOR.

No. 284,352.

Patented Sept. 4, 1883.



WITNESSES:

*Otto Stufelund*  
*William Miller*

INVENTOR

*Emil Bachmann*

BY *Van Santvoord & Hauff*

ATTORNEYS

(No Model.)

2 Sheets.—Sheet 2.

E. BACHMANN.  
ELEVATOR.

No. 284,352.

Patented Sept. 4, 1883.

Fig. 6

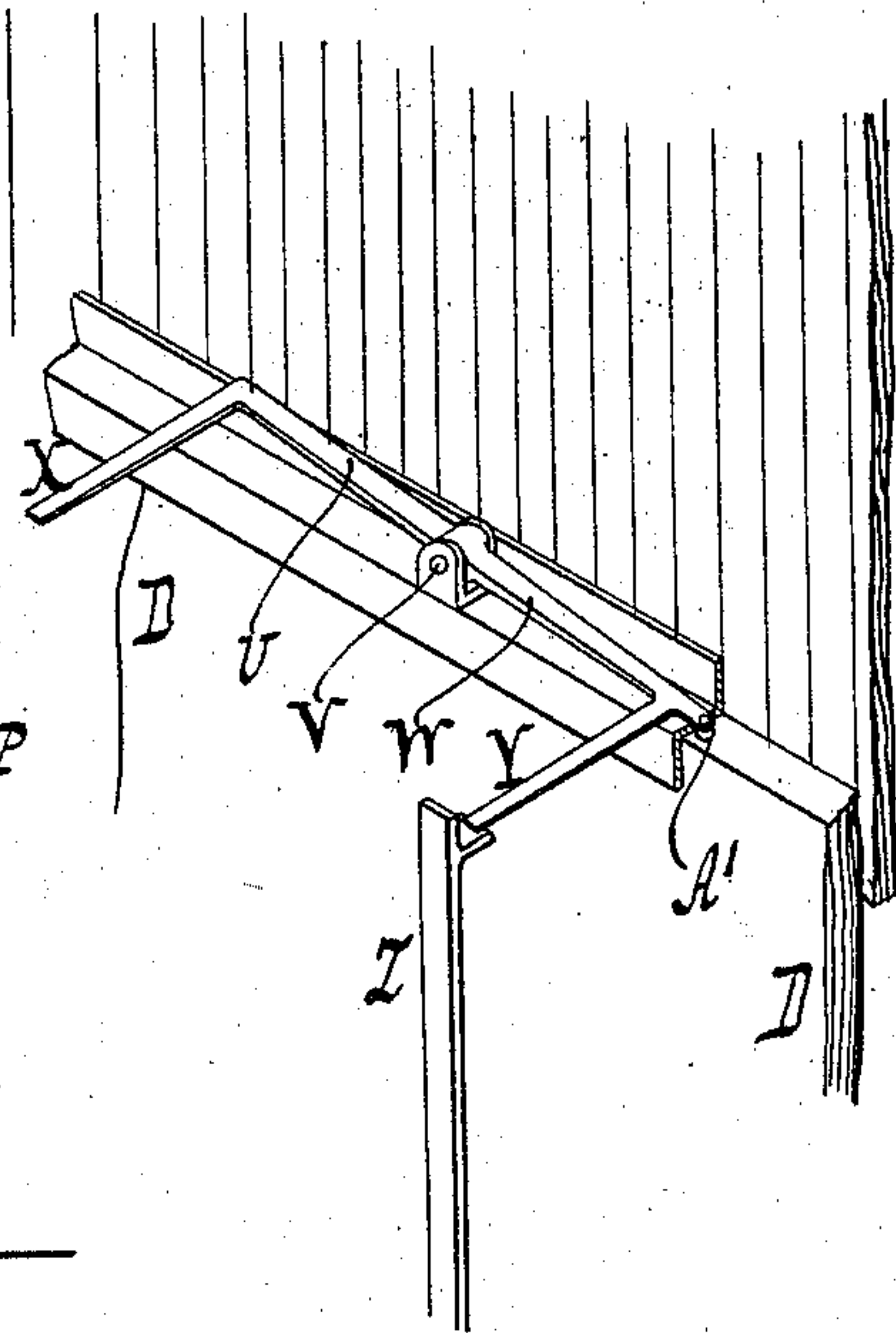


Fig. 9.

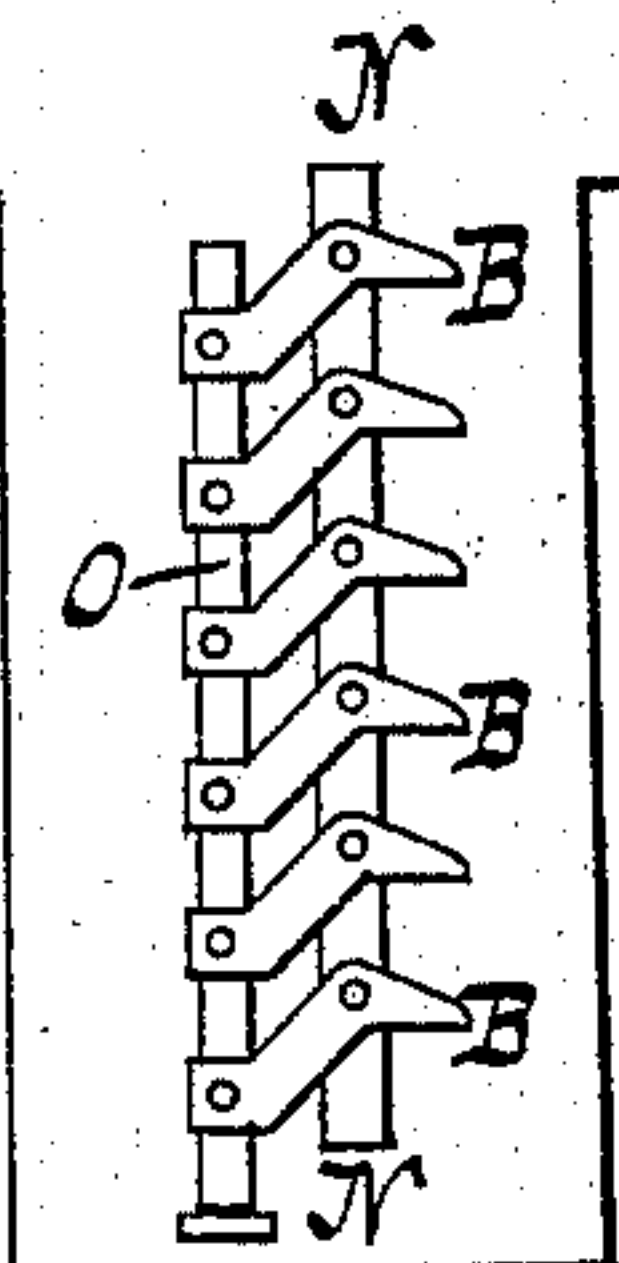
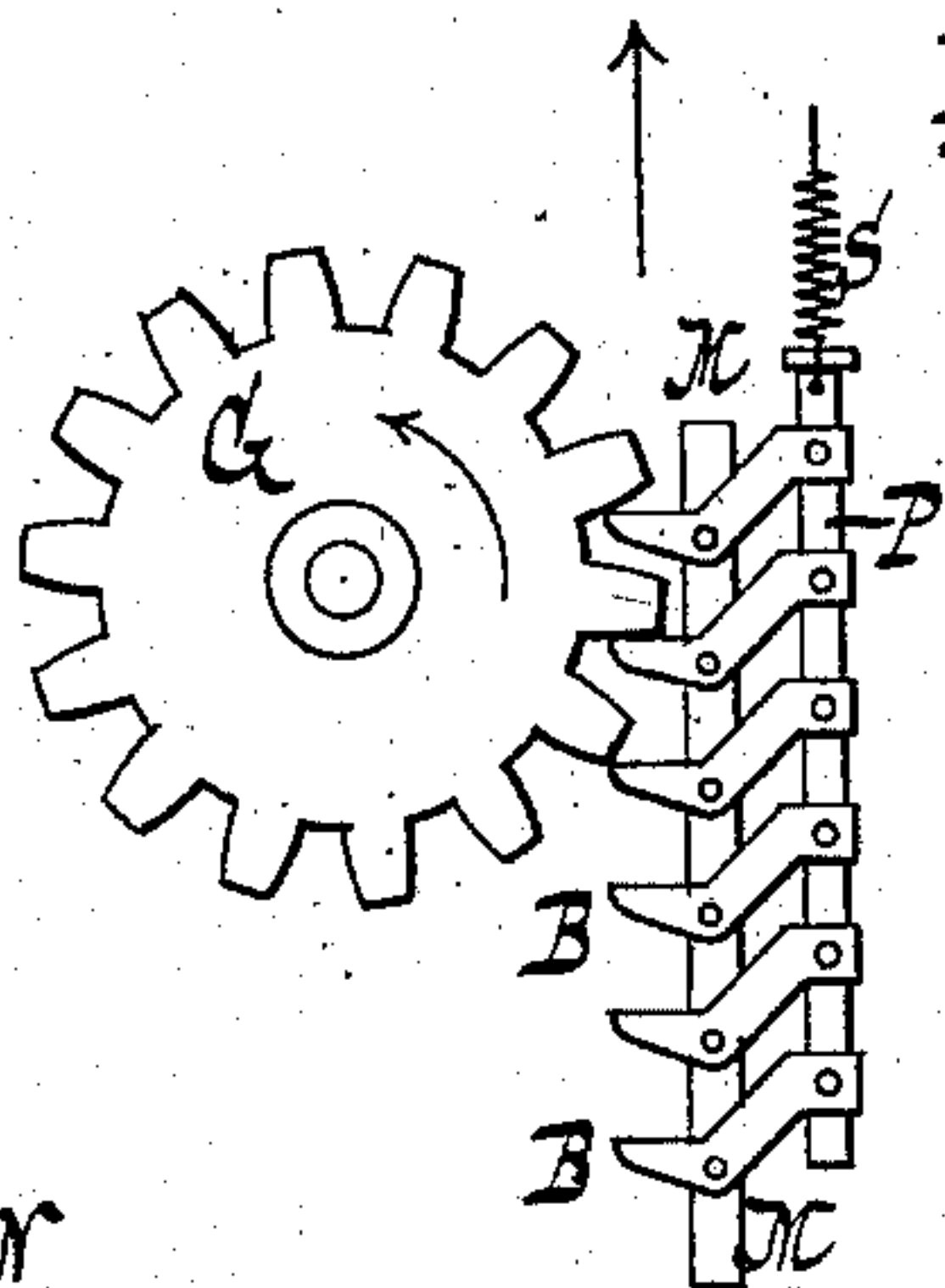


Fig. 7

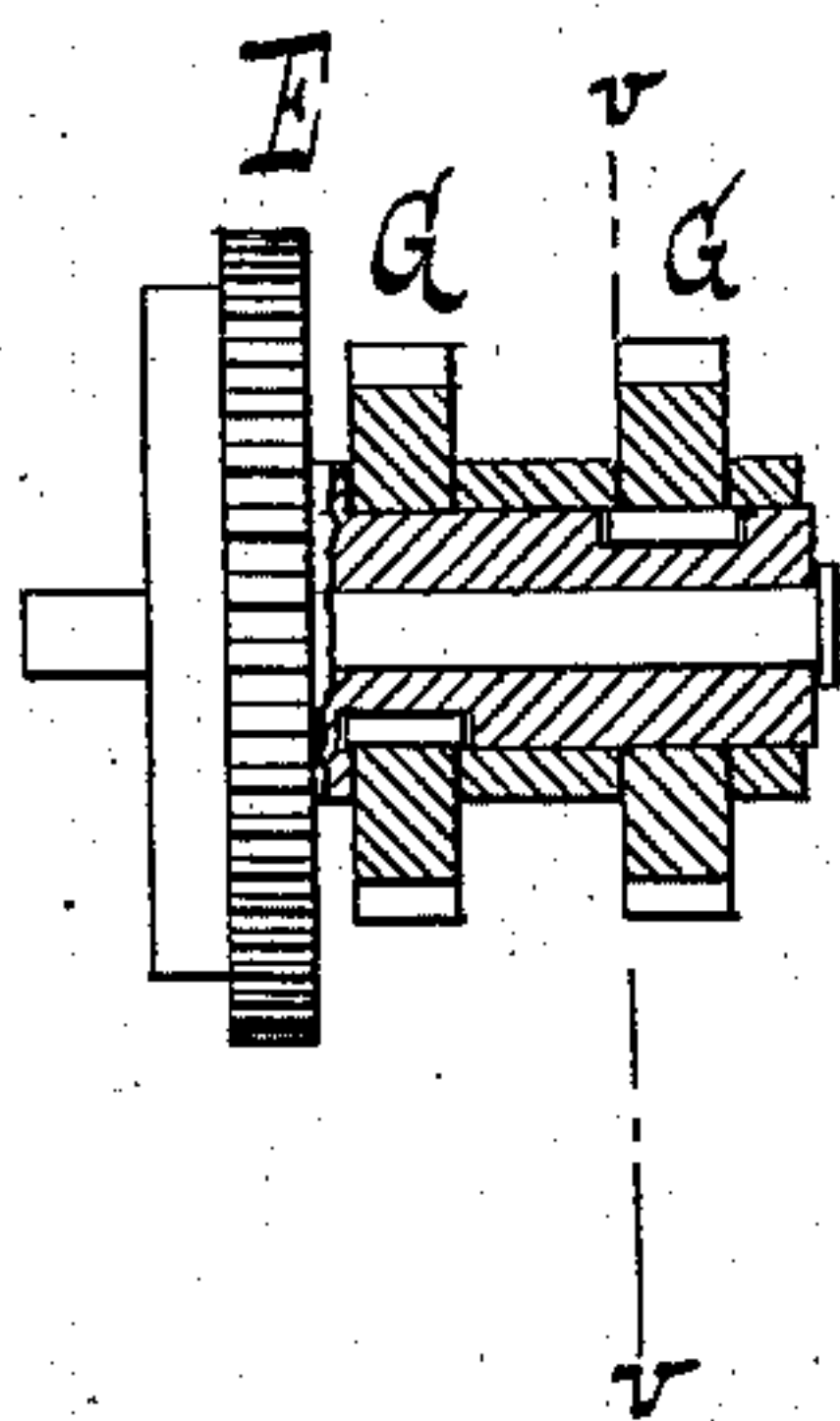
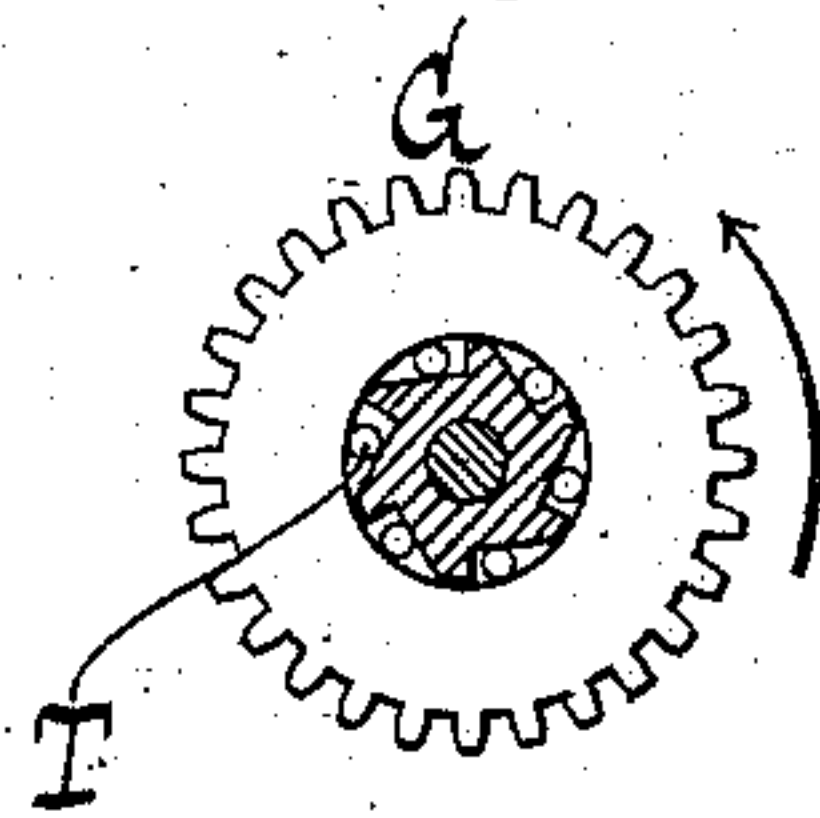


Fig. 8.



WITNESSES:

Otto Stufelund  
William Miller

INVENTOR

Emil Bachmann

BY Van Santvoord & Hauff

ATTORNEYS



# UNITED STATES PATENT OFFICE.

EMIL BACHMANN, OF NEW YORK, N. Y.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 284,352, dated September 4, 1883.

Application filed July 12, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, EMIL BACHMANN, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Elevators, of which the following is a specification.

This invention relates to an improvement in elevators, whereby the door or opening leading into the elevator is automatically opened and closed, so that accidents will be prevented, while the mechanism is so arranged that, if desired, the opening leading into the elevator may remain closed—as, for example, when it is desired to have the elevator pass said opening without stopping.

Figure 1 shows a view of the entrance to the elevator-hatchway and the mechanism for operating the same. Fig. 2 is a section in the plane  $xx$ , Fig. 1. Fig. 3 is a section in the plane  $zz$ , Fig. 1. Fig. 4 is a section in the plane  $yy$ , Fig. 2. Fig. 5 represents a modification hereinafter described. The remaining figures represent modifications hereinafter described.

Similar letters indicate corresponding parts.

The letter A indicates the elevator, to which are attached the racks B B.

D indicates a door leading from a floor of a building into the elevator-shaft.

C is a rack attached to said door, and which rack C is in gear with toothed wheels E F, so that on revolving either of said wheels in the proper direction such revolution of the wheel will cause the door D to slide back and give access to the elevator-shaft.

To the elevator A, as stated, are attached racks B B, which, upon the rising and descending of the elevator A, come into gear with toothed wheels G G, revolving on sleeves or tubular extensions of the toothed wheels E F, but capable of turning independently of said wheels, Fig. 2. On the sleeves or tubular extensions of the wheels E F, just referred to, are keyed or firmly mounted toothed wheels H H, so that said wheels H H and the wheels E F revolve together. On one of the faces of each of the wheels G are pivoted pawls, which, by suitable springs, are held against the teeth of the wheels H, which latter teeth are undercut, as seen in Fig. 1, so that if either of the wheels G should be revolved in a particular

direction the pawl will gear into the teeth of the particular wheel H, and cause said wheel H, and with it the particular toothed wheel E or F, to revolve, while if said wheel G is revolved in the opposite direction the pawl is free to glide over the inclined faces of the teeth on the particular wheel H without compelling a revolution of the wheel E or F. The result accomplished by the arrangement just described, as is seen, is a clutch mechanism, and any other form of clutch mechanism which will serve the same result may of course be substituted, as will suggest itself to a mechanic.

Taking the case of the elevator A rising or moving toward the upper part of its shaft, it will be seen from Fig. 1 that the rack B, which extends above the floor of the elevator A a certain distance, will, by reason of the clutch device just described, cause the wheel F to revolve in such a direction as to open the door D, which latter result will have been accomplished when the floor of the elevator A is on a level with the floor of the passage shown as closed by the door D. Upon the elevator rising farther, a spring coiled within the wheel F, Fig. 4, and which, by the revolution of the wheel F just described, has been put under tension, will cause a closing of the door D as soon as the rack B, just mentioned, has passed out of gear with the toothed wheel G. Upon a descent of the elevator the rack B, extending below the floor of the elevator A, will cause a revolution of the wheel E, so as to have the door D open when the floor of the elevator is even with the floor of the passage of the door D, while the arrangement of clutch mechanism described leaves the upper rack, B, inefficient as regards the wheel F during the descent of the elevator A, and accomplishes a like result as regards the wheel E during the rising of the elevator. It will be noticed that the revolution of the wheel E to operate the rack C will, through the medium of said rack C, revolve the wheel F and put the spring therein contained, Fig. 4, under tension, so that on the release of the mechanism said spring will close the door D, and it is thus only necessary to have one wheel, F, provided with a closing-spring, although two will give greater power. Said spring, Fig. 4, as is seen, is at one end fixed to the wheel F and at the other



to the axle of said wheel, which axle is fixed firmly to the wall or other convenient support, Fig. 2. A weight attached to a cord passing over pulleys or other convenient means may also be used to close the door D.

As shown in the drawings, the rack C is a rigid bar, and on the opening of the door D a recess or space must be provided for the movement of said rack C. To economize space the rack C may be made in sections connected by knuckle-joints which yield in one direction only, so that the various sections of the rack C, in passing away from the wheel F during the opening of the door D, will swing downward and hang in the elevator-shaft, while on the closing of the door sections of the rack C will be drawn over the wheels E F and resume the horizontal position shown.

The racks B B are held on arms I I, Fig. 3, passing through openings in the front of the elevator, and resting against springs L, which springs L press the racks outward into position to gear with the wheels G. Should it be desired to have the elevator pass on without opening the door D, the ropes or chains K, by means of a handle, stirrup, or other appliance to be operated by the foot or hand of the attendant, allow the racks B to be pulled inward against the resistance of the springs L a sufficient distance to prevent said racks B gearing with the wheels G. Upon being released the springs L force the racks B outward again.

In the modification shown in Fig. 5 the racks B are replaced by teeth B, swinging on pivots in the bearings or bars M N, which bearings or bars are firmly fixed to the elevator A. The teeth B have arms or extensions, on which hang, by pivots, the links O P, and by pulling the link P downward and the link O upward by the cords R, passing to the interior of the elevator, the teeth B will be turned about the pivots in the bars M N and drawn toward these bars M N, so as not to gear with the wheels G of Fig. 1. Upon releasing the cords R the weight of the link O causes it to fall downward and into the position shown in Fig. 5, while the spring S causes the link P to rise and resume the position shown in Fig. 5, by which movements the teeth B are forced outward and into a position to near with the wheels G. The arrangement of Fig. 5 also offers a substitute for the clutching device shown in Fig. 1, as, on the rising of the elevator, the teeth B on the bar M catch into the wheel G, which is now fixed firmly to the wheel F, and cause it to revolve and open the door D, while the teeth B on the bar N are pressed downward and caused to swing toward the bar N upon coming into contact with the wheel G, now fixed to the wheel E, thus leaving the teeth B on the bar N inefficient. Upon the descent of the elevator the teeth B on the bar N act, while the teeth B on the bar M become inefficient, thus accomplishing the same result of opening the door D. As already remarked, when the teeth B are left

free, the weight of the link O and the action of the spring S on the link P always force the teeth B outward into a position to act. As by my arrangement the door D will only be open when the elevator is in position before the passage closed by said door, accidents will be avoided.

I am aware that the Patent No. 257,182, of May 2, 1882, shows toothed wheels having clutches and racks to operate said toothed wheels and open an elevator-gate.

I may also simplify the construction of the device, as shown in Figs. 7 and 8, in which case the toothed wheels E F are replaced by a single toothed wheel, E. Upon a sleeve extending from this toothed wheel E, and which sleeve is firmly attached to said wheel E, or forms a part thereof, are mounted two toothed wheels, G, which are intended to gear with the arms of the rack B. The racks B are now placed with the teeth of said racks facing each other, and in such position that one of said racks gears into the teeth of one of the wheels G at a point opposite to that at which the other rack B gears into the other wheel G, so that said racks, on the rising and descending of the elevator, cause said wheels G to revolve in opposite directions. The wheels G are mounted loosely on the sleeve of the wheel E, and connected with the same by roller-clutches T, as shown in Fig. 8, which is a section in the plane *v v*, Fig. 7. These roller-clutches are respectively arranged so that the revolutions of the wheels G G will cause the wheel E to revolve in but one direction—namely, that which is required to open the door D. When any one of the wheels G turns in the wrong direction, the roller-clutches pass out of action and allow the turning of the respective wheel G without affecting the wheel E.

By mounting both the actuating-wheels G upon a single wheel, E, the device is simplified, and the rack C, Fig. 1, may be considerably shortened, making the whole device cheaper and lighter and economizing space.

Of course any other form of clutch which will answer the purpose may be used in place of the roller-clutches T.

Fig. 6 shows a latching device for holding the door D, Fig. 1, closed when the elevator is not in front of said door D, thus preventing accidents through said door D being pushed open at improper times. In the top of the door D is an indentation or hole, A', into which catches a tongue or lug attached to the under side of the arm W of the lever U W, swinging on a pivot, V. This pivot or fulcrum V is attached to the wall or fixed part of the elevator-shaft. On the rising of the elevator an arm, Z, attached to the elevator catches under the finger Y and lifts the arm W, holding it up until the door D has begun to open. On the descent of the elevator a second arm, corresponding to the arm Z, catches the finger X and presses it down, thereby again lifting the arm W and releasing the door by lifting the lug on the arm W out of the eye A'. When



said lug rests in the eye A', the door D is held shut, as will be readily understood. The fingers X Y are made yielding or springy, so that when the arm Z, or its corresponding arm, acting on the finger X, moves in the wrong direction, the fingers X Y will yield without breaking. Of course the arm Z is placed above the floor of the elevator a certain distance, so that on the rising of the elevator the door D will be released before the elevator-floor has risen to a level with the floor of the passage closed by the door D. For a similar reason, the arm operating on the finger X on the descent of the elevator extends a certain distance below the floor of the elevator.

A similar arrangement to that for drawing the racks B B inward and out of action, Fig. 3, may also be provided for drawing the arms acting on the latching mechanism, Fig. 6, inward toward the elevator and out of action when the elevator is to pass the door D without unlatching.

The mechanism has thus far been described in connection with an elevator; but it is evident that it can be otherwise applied—as, for example, the teeth or racks B B may be applied to a railway-train and serve to open or close the guard-gates at a station or crossing; or the device may be applied to other analogous uses.

The modification shown in Fig. 9 shows the movable teeth described in connection with Fig. 5 applied to operate a single wheel, E, Fig. 7. This arrangement attains a still further simplification, as but one actuating-wheel G is in this case required, which may be firmly connected with the wheel E, both turning together. In ascending, the teeth B pivoted on the bar M catch into the teeth of the wheel G and revolve the same in the direction of the arrow, while the teeth B pivoted on the bar N glide over the teeth on the wheel G inefficiently. On the descent of the elevator the teeth B on the bar N turn the wheel G in the same direction of the arrow, while the teeth B on the bar M are inefficient. The door is thus opened both by the rising and descending of the elevator.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an elevator provided with racks B B, and a door, D, adapted to be operated by said racks, of gears with which said racks successively engage, substantially as and for the purpose described.

2. The combination, with an elevator provided with teeth B B, and a door, D, adapted to be operated by said teeth, of links O P, for putting said teeth into and out of gear, and pinions E F, with which they may engage, substantially as and for the purpose set forth.

3. The elevator-racks B B, provided with mechanism for putting said racks into and out of gear, in combination with toothed wheels E F, provided with clutching mechanism, substantially as and for the purpose set forth.

4. The elevator-racks B B, provided with mechanism for putting said racks into and out of gear, in combination with toothed wheels E F, provided with a closing-spring, (one or more,) substantially as and for the purpose set forth.

5. The combination, with an elevator and with a door, D, of mechanism for automatically opening and closing said door D, said mechanism adapted to be put into or out of operation, substantially as and for the purpose set forth.

6. The combination, with an elevator provided with teeth or racks B B and mechanism for putting said racks into and out of gear, of a toothed wheel, E, and actuating-wheels G G, mounted upon said toothed wheel E, and adapted to be operated by said teeth or racks B B, for imparting a motion to said wheel E in but one direction, substantially as and for the purpose set forth.

7. In an elevator, the lever pivoted to a stationary part of the elevator-shaft, and having the lateral finger Y, and a tongue or lug adapted to engage an aperture in the upper edge of the door, in combination with the elevator-car having an arm, Z, substantially as described.

8. The combination, with an elevator provided with teeth B and links O P, of a toothed wheel, E, and actuating-wheel G, mounted upon or connected to said toothed wheel, and adapted to be operated by said teeth B, for imparting a motion to said wheel E in but one direction, substantially as set forth.

9. The combination, with an elevator provided with shifting teeth B, of a toothed wheel, E, and actuating-wheel G, mounted upon or connected to said toothed wheel, and adapted to be operated by said teeth B, for imparting a motion to said wheel E in but one direction, substantially as set forth.

10. The combination, with an elevator provided with teeth or racks B B, of a toothed wheel, F, adapted to be operated by said racks, and provided with a closing-spring, substantially as and for the purpose set forth.

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

EMIL BACHMANN. [L. S.]

Witnesses:

W. C. HAUFF,

E. F. KASTENHUBER.