

(No Model.)

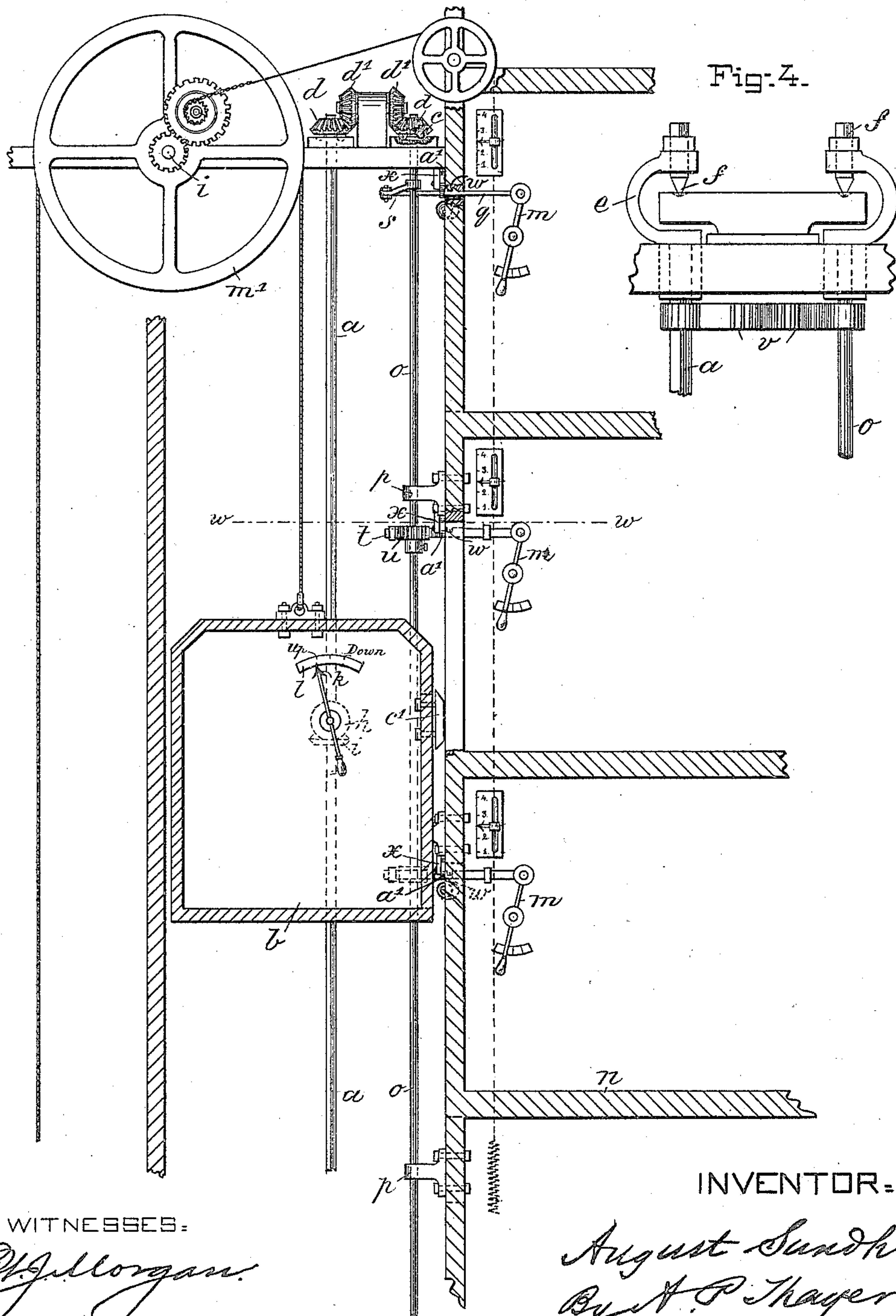
2 Sheets—Sheet 1.

A. SUNDH.  
ELEVATOR.

No. 446,397.

Patented Feb. 10, 1891.

Fig. 1.



WITNESSES:

*O. J. Morgan*  
*W. P. Call*

INVENTOR:

*August Sundh*  
*By A. P. Thayer*  
*att'y.*

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2 Sheets—Sheet 2.

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Fig. 2.

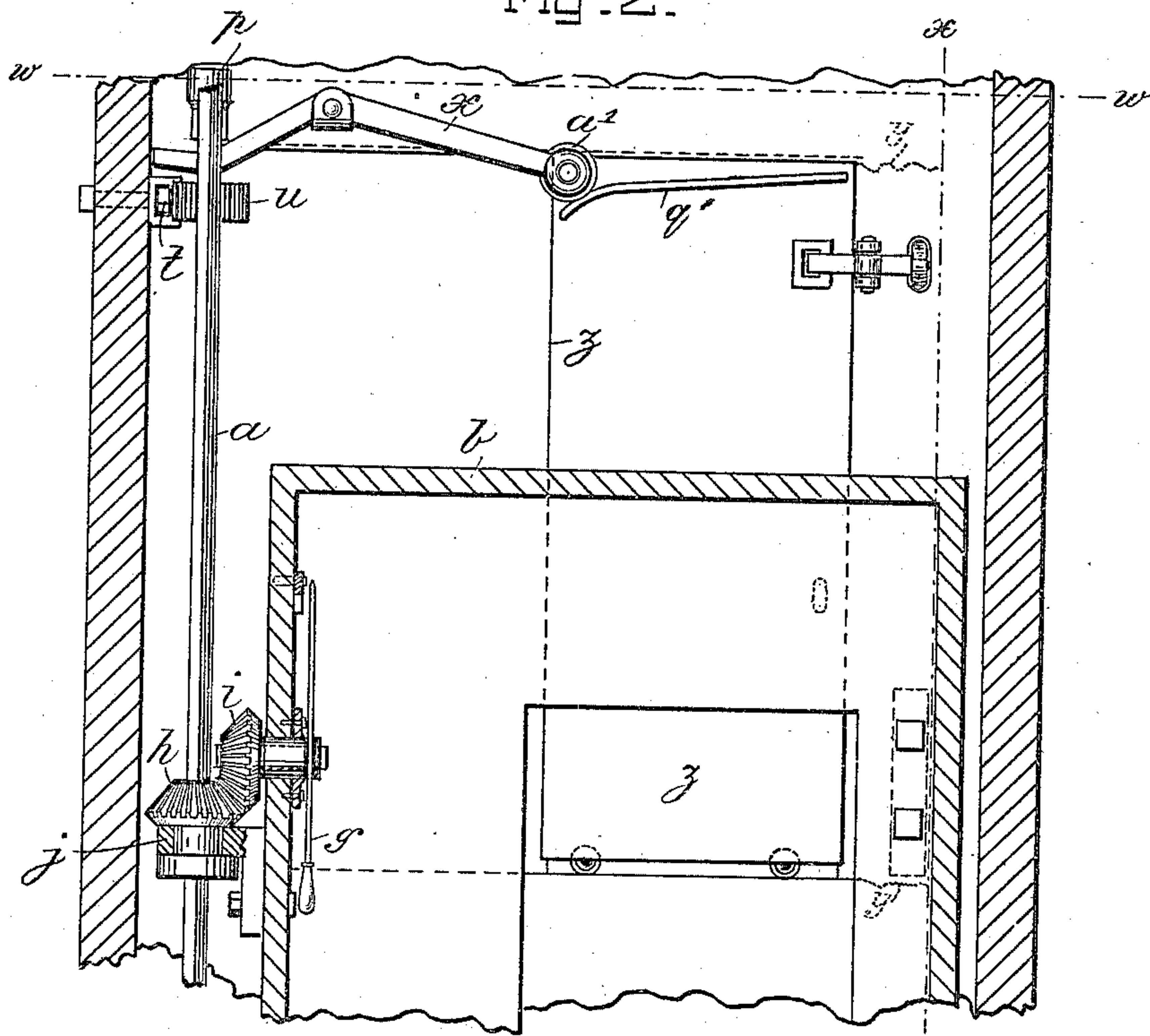
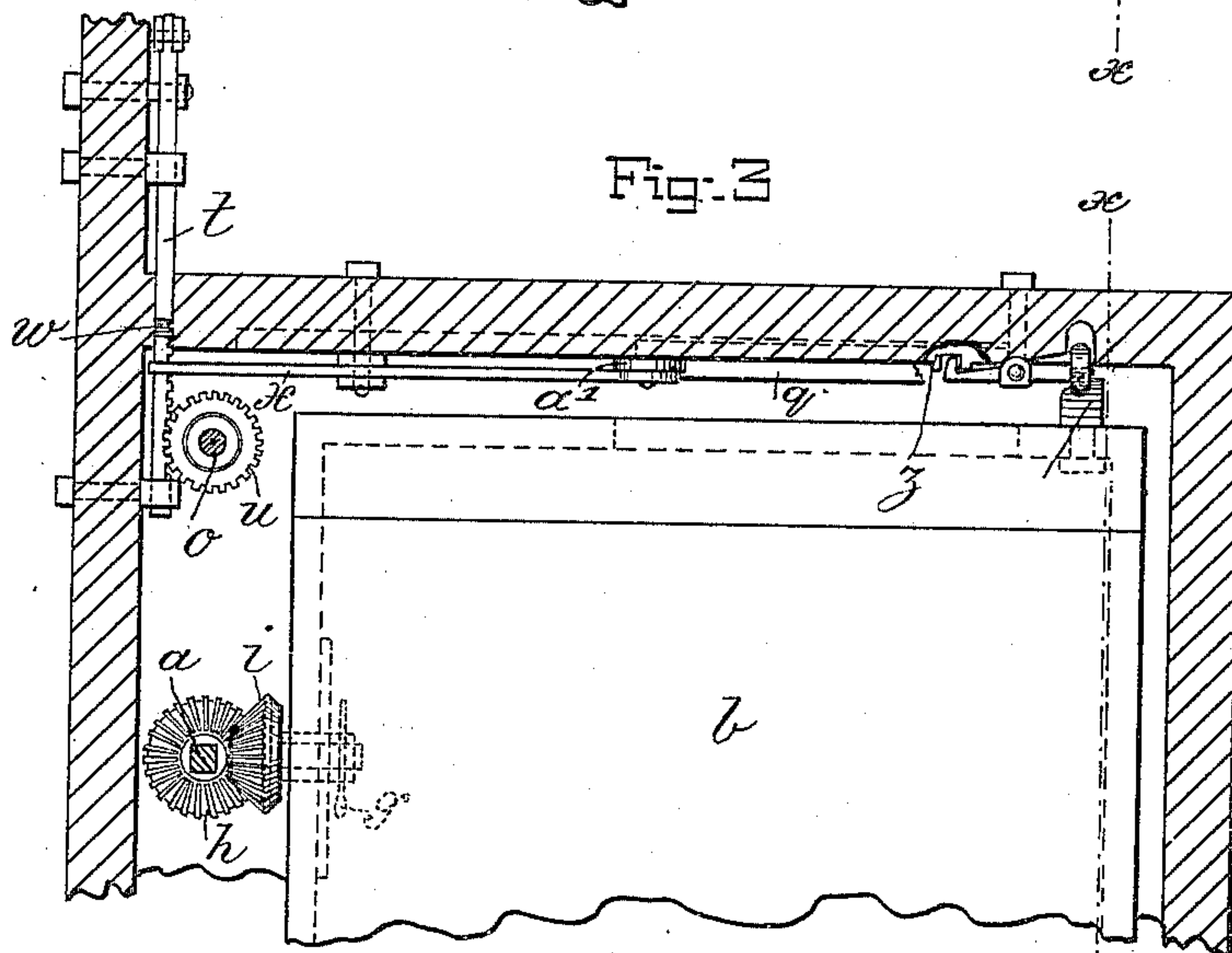


Fig. 3



INVENTOR.

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*W. J. Morgan*  
*W. P. Call*

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*By A. P. Meyer*  
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# UNITED STATES PATENT OFFICE.

AUGUST SUNDH, OF YONKERS, NEW YORK, ASSIGNOR OF ONE-HALF TO  
ERNEST BOENING, OF SAME PLACE.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 446,397, dated February 10, 1891.

Application filed March 28, 1890. Serial No. 345,675. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST SUNDH, a citizen of Sweden, and a resident of Yonkers, in the county of Westchester and State of New York, have invented new and useful Improvements in Elevators, of which the following is a specification.

My invention relates to passenger-elevators for dwelling-houses; and it consists, first, in improved means for working the controlling valve-rod by the operator in hydraulic elevators in the car; also, for working the rod with facility by a person on any one of the floors of the building, as well as in the car, for greater convenience in buildings not having a special conductor for the car.

It consists, second, of an automatic locking device to insure the retention of the car at the door of the elevator-way until the door is closed, all as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a sectional elevation of an elevator-way, car, and parts of several floors of a building, illustrating my invention, the section being taken on the line *x x*, Figs. 2 and 3, with a part broken out on lines *y*, Fig. 2. Fig. 2 is a sectional elevation of part of the same on line *z z*, Fig. 1, on an enlarged scale. Fig. 3 is a horizontal section on line *w w*, Fig. 1, also on an enlarged scale; and Fig. 4 is a detail inside elevation showing a modified arrangement of some of the parts.

I propose to employ the vertical shaft *a*, instead of the rope commonly used for working the regulating-valve of the hydraulic apparatus, from the car *b*, by the conductor, said shaft being suspended from the top of the elevator-way by any approved means and extending down to the hydraulic apparatus and connected in my approved way with the controlling-valve; but this connection I do not represent in the drawings, as it forms no part of the invention to be claimed herein. In this case I have represented said shaft as suspended on anti-friction balls *c* under the bevel-wheel *d* at the top, or it may be by the yoke *e* and pivot *f*. It is thus suspended in preference to supporting it by a step at the bottom, because it would in such case spring and wobble, owing to its great length and

small size, or would have to be stayed laterally by bearings contrived to shift away from the shaft to allow the car to pass and return again, which it is highly desirable to avoid, because such bearings must of necessity be rather complicated and expensive, besides not being very reliable. Such lateral bearing-stays may be and have been employed in an arrangement of them in such small size and applied to such small journals of the shaft as to enable a wrench-shaped lever device on the car for turning the shaft to slide past the bearings; but the shaft has to be larger in such arrangement than is required in my plan, in order that the journals shall have sufficient size for torsional strength. Said shaft is geared with the conductor's hand-lever *g*, pivoted to the inside of the car by the bevel-pinions *h i*, the former being carried along the shaft in the bracket *j*, attached to the side of the car, and the latter being attached to the lever-pivot. The lever has a pointer *k*, which traverses an indicator-scale *l*, showing the directions for working the carriage up or down. The shaft is angular in cross-section, and the hole in the pinion *h* is the same for allowing the pinion to shift freely along the shaft, and at the same time enabling the pinion to turn the shaft as desired. This means of working the controlling-valve is considered advantageous as compared with the rope commonly used, because it is easier for the conductor to work the lever than to pull the rope up and down; but the chief purpose of the shaft is to provide for coupling with other working-levers *m* in the different stories of the building, so that a person on any one of the floors *n* may have command of the car to bring it to his service without the aid of a conductor. To this end I provide another shaft *o*, extending along the elevator-way and supported in bearings *p* at suitable intervals and coupled in any approved way with said levers, as by the connecting-rod *q* and cranks *r* or the toothed rack *t* and pinion *u*, for shifting it by them, said shaft being geared at the top, as by the bevel-pinions *d d'*, spur-gears *v*, or other means for transmitting the motion from the levers *m* individually to the controlling-valve. This shaft is also represented as suspended in like manner as the other; but as it is stayed at in-



tervals by the bearings  $p$  it may, if desired, rest on a step at the bottom. Thus the car is alike subject to the control of persons on the different floors as well as in the car, and thus may be practically useful to all the occupants of a building without the expense of a special conductor; but the arrangement has also another advantage in affording a means of automatically locking the valve-operating shaft when the door of the elevator-way opens and keeping it locked while the door remains open for safety to unskilled persons using the elevator. This is accomplished by providing a notch  $w$  in the connecting-rod  $q$  or rack-bar  $t$  and a latch  $x$ , pivoted to the wall in such relation to each other that when the working-levers stand on the center position and the elevator is stopped said latch will swing into the notch and providing the inclined flange  $q'$  on the door  $z$  in such relation to the latch that when the door opens it will shift the latch and engage it with the notch, and thus lock the valve-working gear and effectually prevent starting the elevator while the door is open, and thus insures the closing of the door. The closing of the door releases the latch from the control of the flange and allows the latch to return to the normal position by the overbalancing gravity of the arm acted on by the flange, or it may be a spring, and thus prevents the shifting of the valve-shaft to start the elevator again. The latch has an anti-friction roller  $a'$  to roll on the flange for easy action.

Although I have represented the shaft  $a$  as arranged in the space between the car and the wall of the elevator-way, which is the arrangement that I prefer, I may of course have it extended through the car as the rope of the common arrangement does, and I do not limit myself to the arrangement shown.

I am aware that it is not a new device broadly to provide anti-friction bearings to sustain lengthwise thrusts on a shaft, as in the case of the screw-shaft of a baling-press, subject to excessive thrust lengthwise, and I do not claim such arrangement. My purpose

is to combine such device with the vertical valve-controlling shaft and appliances connecting the same with the car of an elevator, where such shaft must of necessity be too long and slender to keep its alignment without intermediate bearings if supported in a step and where such bearings are impracticable.

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

1. The combination, with the elevator-car, of the shaft for working the controlling-valve suspended in the elevator-way from an anti-friction support at the upper end and independently of intermediate bearings along the elevator-way, the working-lever pivoted to the inside of the car, and the bevel-wheels mounted on the car and gearing said lever and shaft together, one of said wheels sliding along the shaft, substantially as described.

2. The combination, with the elevator-car, of the shaft for working the controlling-valve suspended in the elevator-way and geared with the conductor's working-lever in said car, the intermediate shaft also arranged in the elevator-way and geared with the valve-working shaft, and a working-lever in each story geared with said intermediate shaft and through it with the valve-controlling shaft, substantially as described.

3. The combination, with the working-lever mechanism for shifting the valve-controlling rod, of the safety-stop consisting of the notched rod or bar connecting the working-lever with the intermediate shaft, the stop-latch, and the inclined flange on the door of the elevator-way, said stop-latch being automatically detachable from the notched bar when the door is closed, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 20th day of March, 1890.

AUGUST SUNDH.

Witnesses:

W. J. MORGAN,  
 ERNST LUNDGREN.