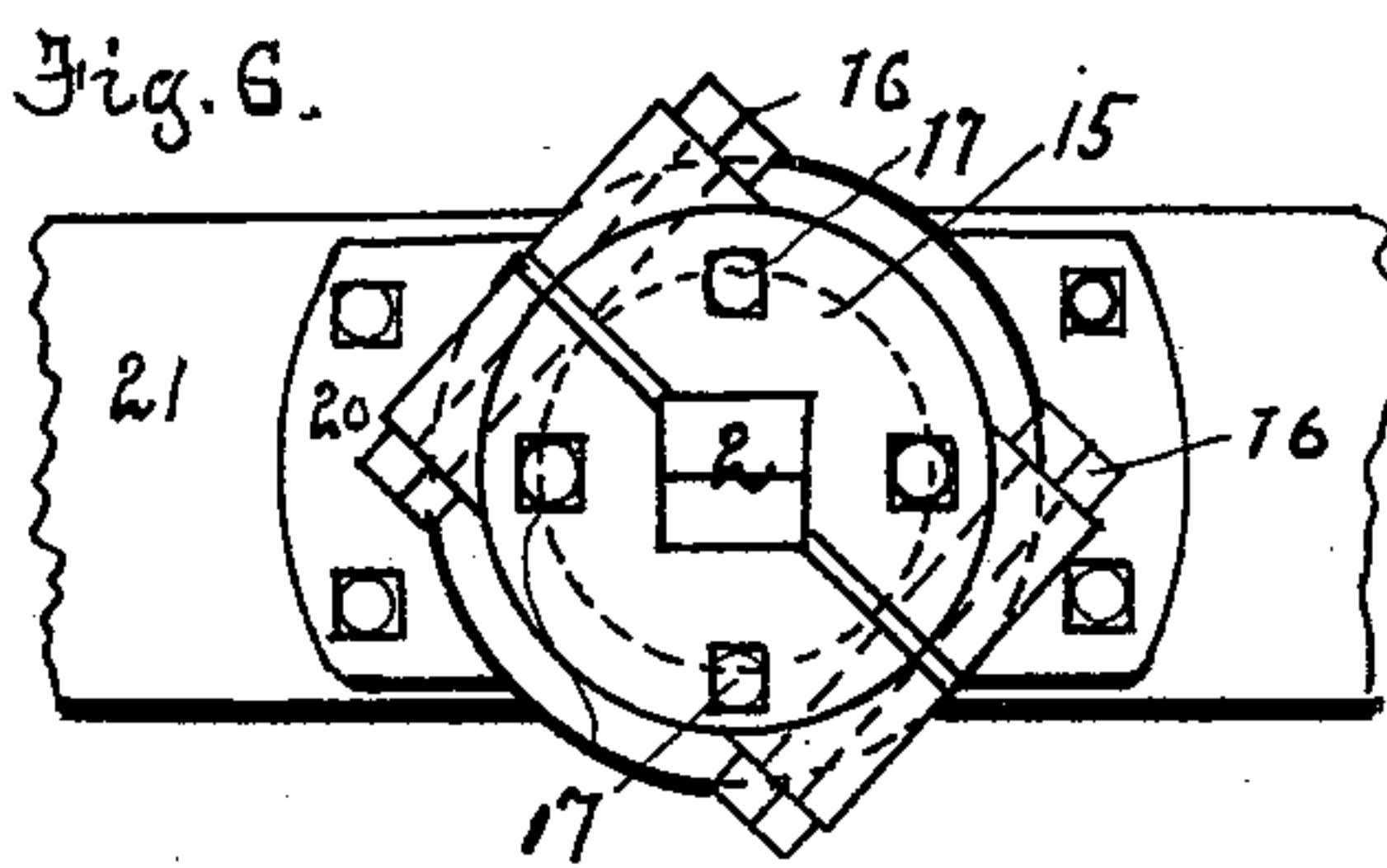
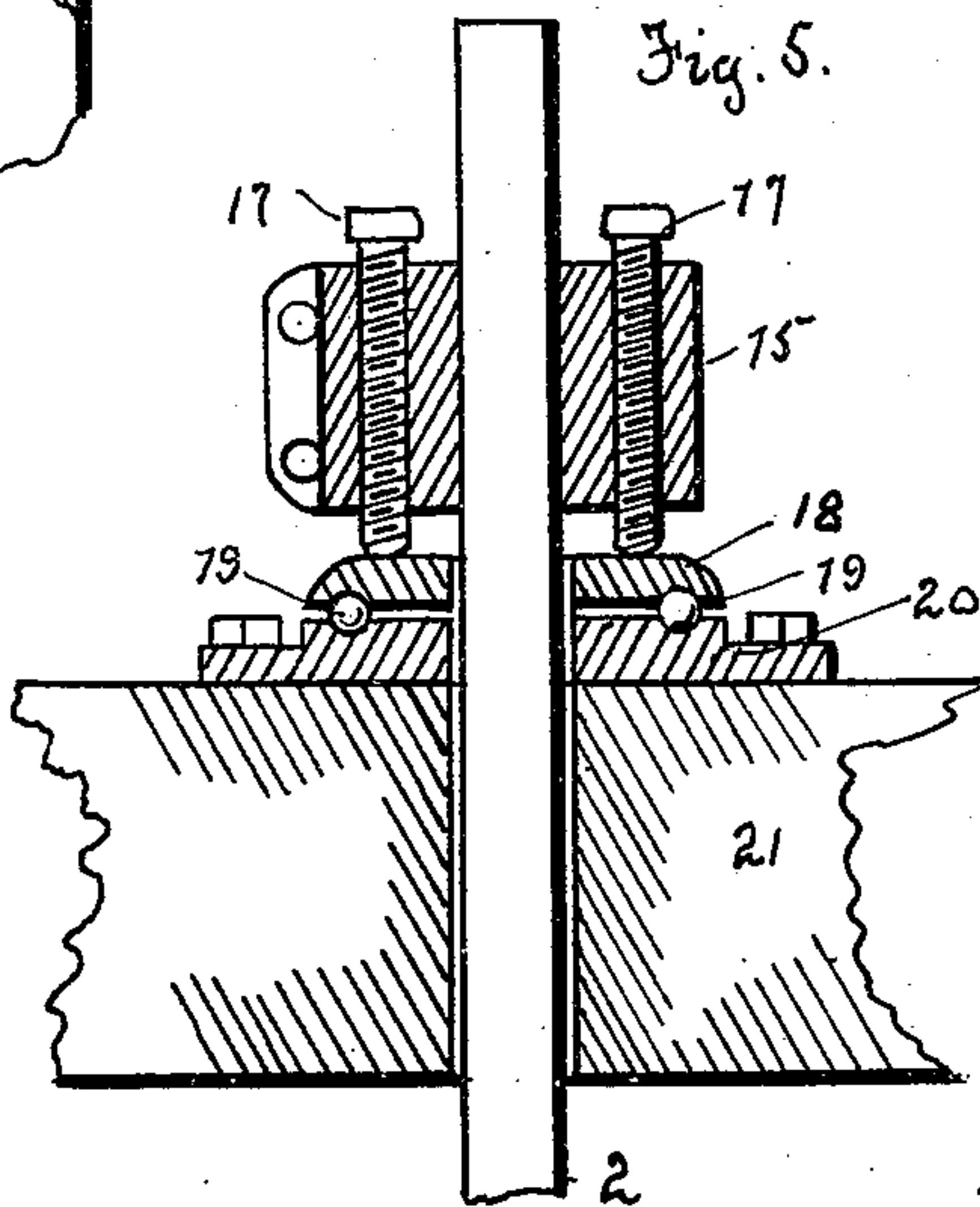
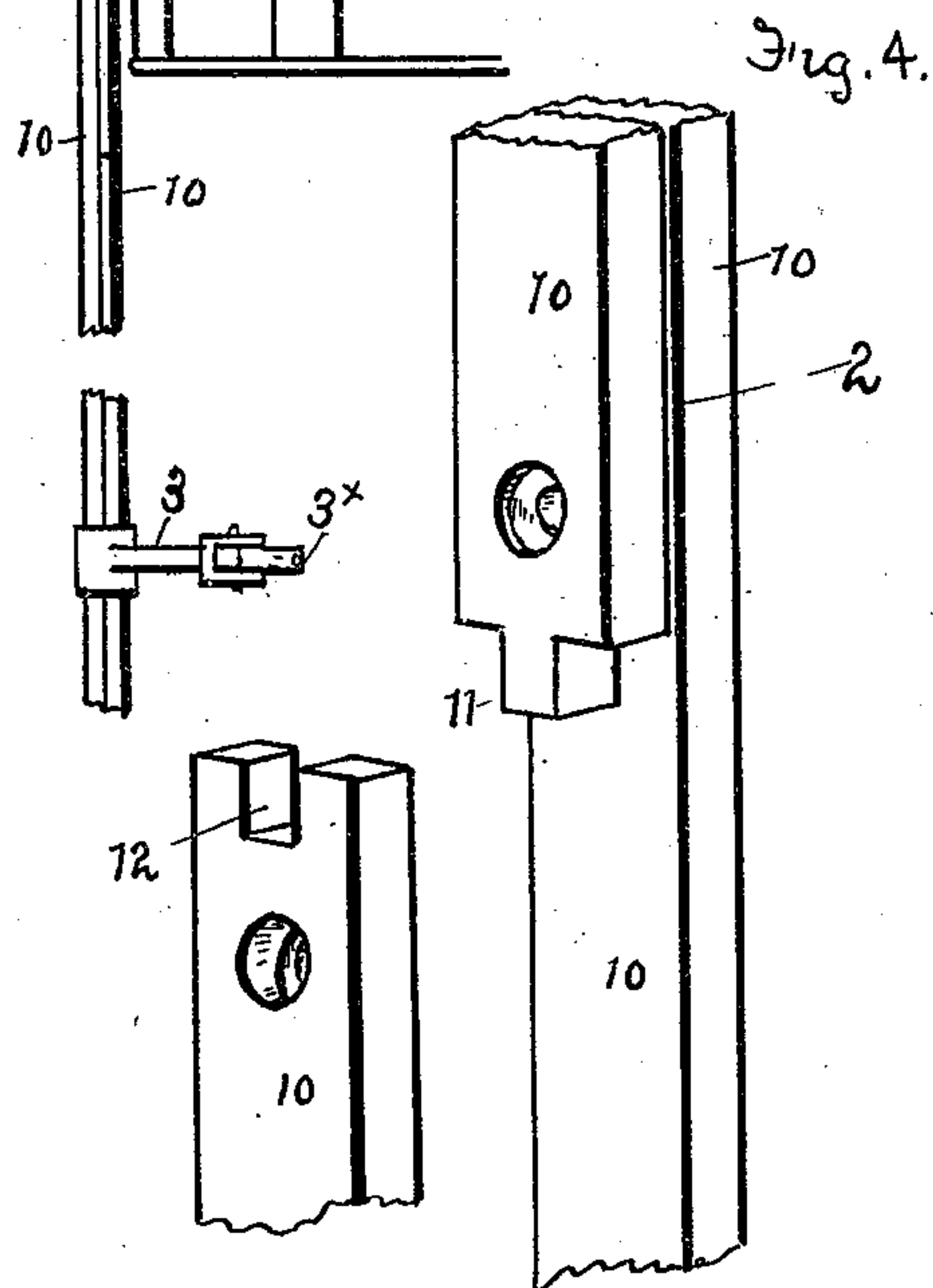
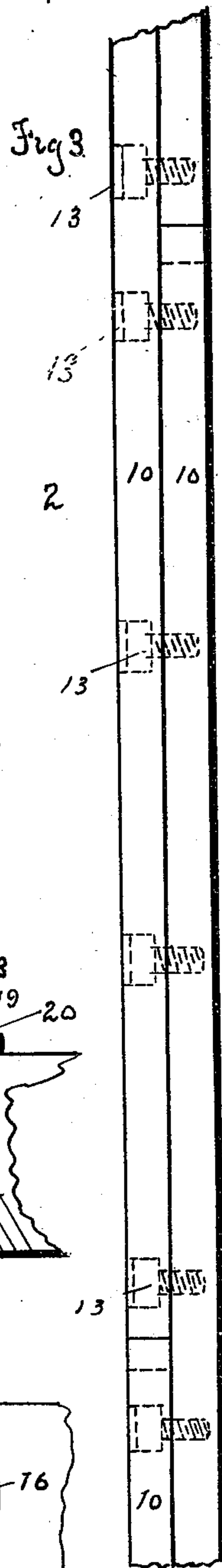
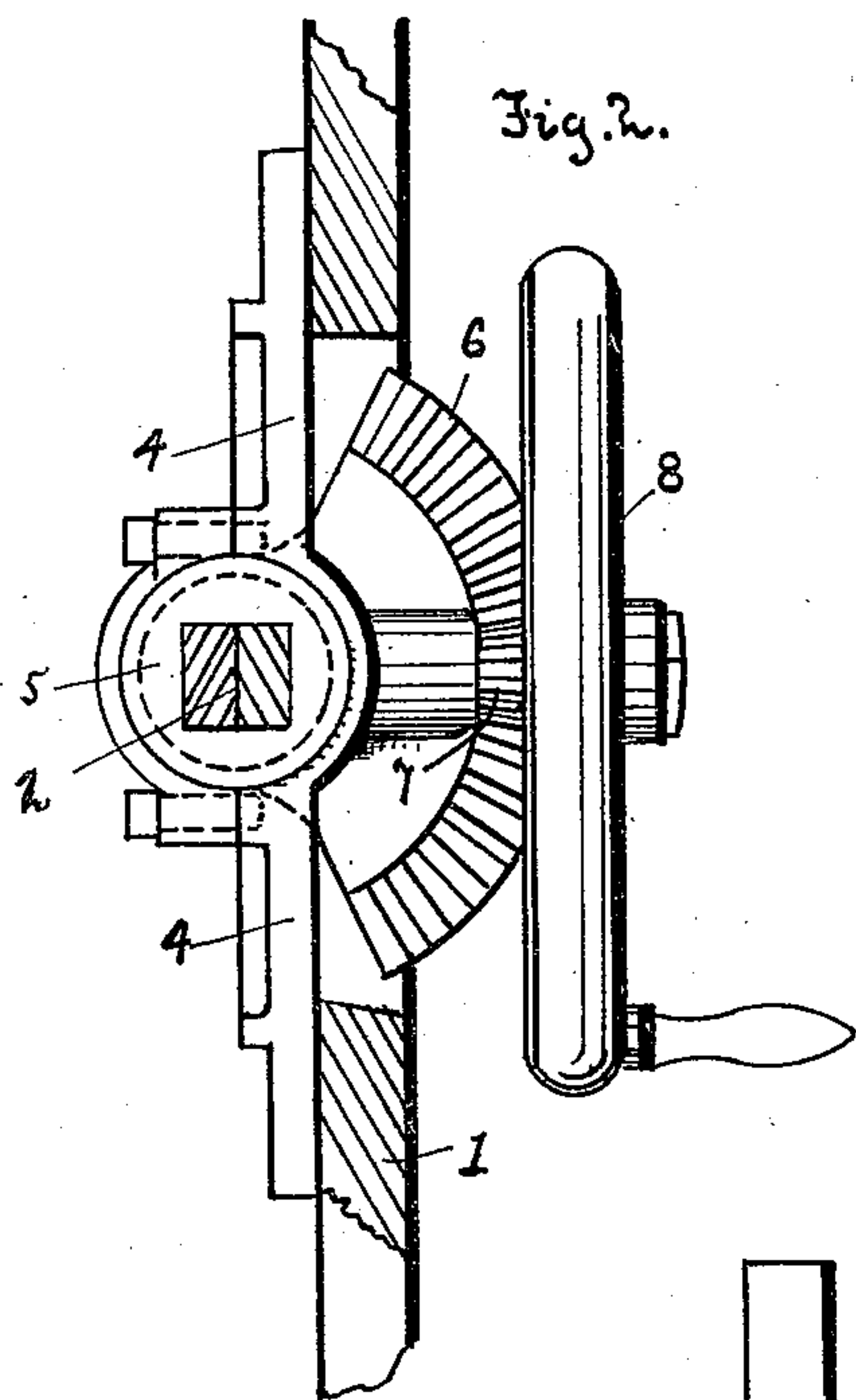
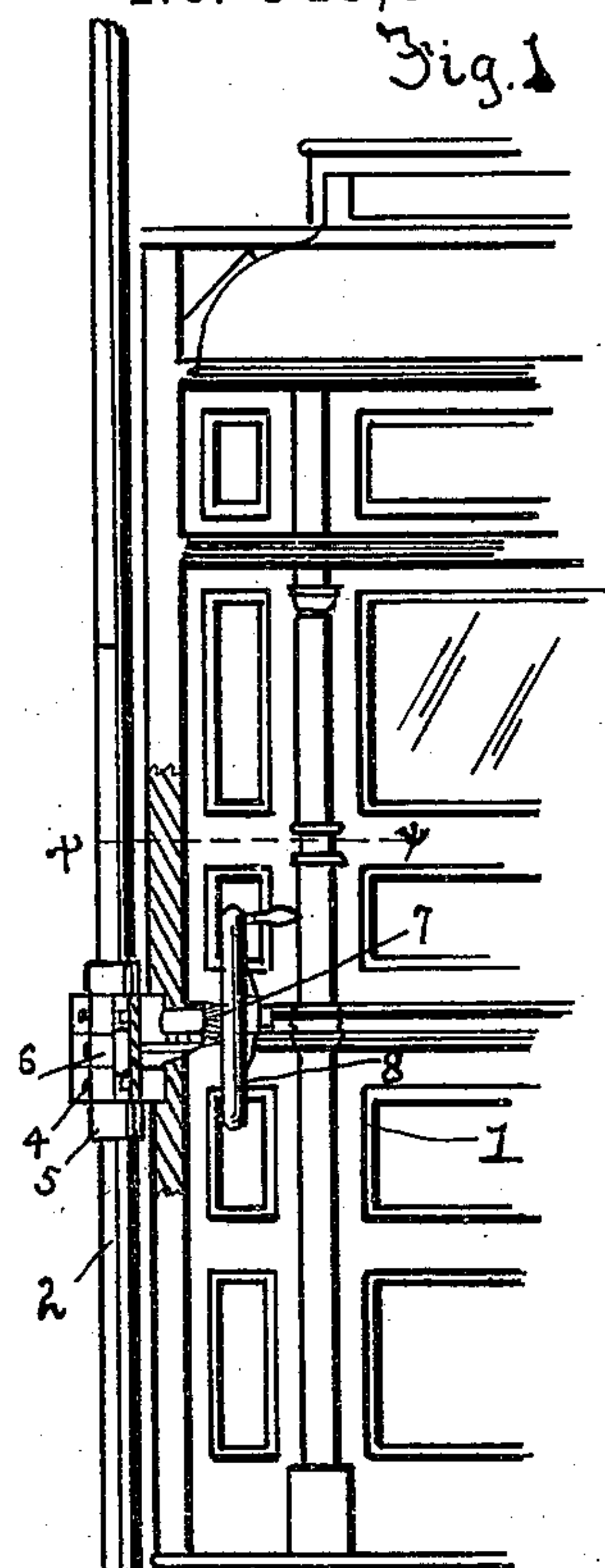


(No Model.)

L. S. GRAVES.  
ELEVATOR CONTROLLER.

No. 543,010.

Patented July 23, 1895.



Witnesses:

Thomas Durant  
Wallace Murdock

Inventor.

Lorenzo S. Graves  
by Church & Church  
his Attorneys.



# UNITED STATES PATENT OFFICE.

LORENZO S. GRAVES, OF ROCHESTER, NEW YORK, ASSIGNOR TO THE  
GRAVES ELEVATOR COMPANY, OF SAME PLACE.

## ELEVATOR-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 543,010, dated July 23, 1895.

Application filed August 1, 1894. Serial No. 519,195. (No model.)

*To all whom it may concern:*

Be it known that I, LORENZO S. GRAVES, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Elevator-Controllers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to that class of controlling devices for elevators in which a vertical rock-shaft is arranged in an elevator-well and connected to a valve or belt-shifting device governing the car-operating motor, said rock-shaft being adapted to be operated from the car. In devices of this class great difficulty has been experienced in providing a long shaft which will stand the torsional strain to which it is subjected when being operated from the car and one which can be made in lengths suitable for transportation and capable of being set up in position and in which the joints between the sections are so perfect that the parts are not liable to get out of alignment and catch on the operating devices on the car which slide over them, and my present invention has for its object to obviate these objections.

In the drawings, Figure 1 is a side elevation of a portion of an elevator-car, showing the application of my invention thereto; Fig. 2, a horizontal sectional view on the line  $x x$ ; Fig. 3, front and side elevation of a rock-shaft constructed in accordance with my invention; Fig. 4, a perspective view of a portion of the same; Fig. 5, a section, and Fig. 6 a plan of the supporting devices for said shaft. Similar reference-numerals in the several figures indicate similar parts.

In the embodiment of the invention shown in the drawings, 1 indicates the elevator-car adapted to travel up and down in the well in the usual manner and operated by a suitable motor.

2 indicates the vertical rock-shaft forming the subject-matter of my present invention arranged in and extending the length of the well, having a suitable arm 3 thereon connected by an arm 3\* mediately or immediately

to the valve, belt-shifter, or other device for governing and controlling the movements of the car.

Arranged upon the car is a bracket or casting 4, supporting a sleeve 5, shaped to fit around the rock-shaft 2 and having connected to it an operating portion, such as a gear-sector 6, with which meshes a pinion 7, attached to a hand wheel or lever 8 inside the car. The general construction of these parts being well known and the arrangement being such that when the operator in the car rotates the hand-wheel, the shaft 2 is oscillated on its center in one or the other direction, actuating the controlling-valve, and the car is moved by the motor, the sleeve sliding on the rock-shaft, which may, of course, be rocked at any time and the movements of the car readily controlled. Devices of this class have not been extensively used because of the difficulty of obtaining long shafts (capable of being used in buildings of more than two or three stories) that will stand the torsional strain required without twisting and that can be made in sections for shipping and secured together in such manner that the joints between them will remain firm and rigid without the liability of the ends coming loose to catch on the sleeve on the car. I find that all these objections can be obviated by making said rock-shaft 2, as shown herein, of two series of flat steel strips or plates 10 10, secured rigidly together in such manner that the points of connection between the strips of each series will break joints with those of the other series, and the connection being further strengthened and the shaft made more rigid by forming upon one end of each of the strips a tongue or projection 11 adapted to enter a corresponding recess 12 in the end of the adjacent section, the strips of the two series in the arrangement shown being connected by screws 13 having their heads countersunk in the surface of one series of the strips. The strips 10 can be made in any convenient lengths for shipping, and the tongues and recesses 11 and 12 are accurately formed by milling, so that the shaft may be made of any length desired in the elevator-well, and even if a hundred feet long will be found perfectly rigid, and capable of standing without twist-



ing any reasonable torsional strain to which it is liable to be subjected.

The means for supporting the shaft 2 is shown more particularly in Figs. 5 and 6, consisting of a split sleeve 15, clamped by bolts 16 to the upper end of said shaft and having supporting and adjusting screws 17, which rest upon a rotary collar or plate 18, having an angular aperture through which the shaft 10 passes to turn it, (though not rigidly connected thereto,) said collar resting in turn upon anti-friction rollers or balls 19 held in a groove in a plate 20, secured to a cross-beam 21, at the top of the elevator-well. This arrangement 15 provides for the adjustment of the rock-shaft, if necessary, and also enables it to be oscillated with little or no friction. The lower end of the shaft may be guided in any suitable manner; but the shaft is preferably supported at the top.

The steel strips 10 are accurately formed, being die-drawn, and may be readily obtained on the market, practically the only fitting required being that obtained when milling or 25 cutting the tongues and recesses and forming the screw-apertures. This construction materially lessens the first cost of the rock-shaft and its erection and more than all obviates the necessity of the formation of longitudinal 30 tongues or grooves and the services of skilled persons in joining such sections without pos-

sibility of their coming loose so as to interfere with the operation of the car.

I claim as my invention—

1. In a controller for elevators, the combination with the vertical rock-shaft arranged 35 in the elevator well and adapted to be oscillated on its vertical axis, said shaft being composed of two series of connected flat strips; the strips of each series having interlocking tongues and recesses and the points 40 of connection of the strips of each series breaking joints with those of the other series and a motor-controlling mechanism connected to and actuated by said shaft, of the car, and 45 the devices on the car having a running hold on said rock-shaft for causing its oscillation on its center, substantially as described.

2. In a controller for elevators, the combination with the vertical rock-shaft arranged 50 in the well, the sleeve secured thereto, the collar loosely engaging the shaft, the vertical screws on the sleeve engaging the collar, the supporting plate and antifriction devices between it and the collar, of the car and 55 devices on the car having a running hold on the rock-shaft for causing its oscillation, substantially as described.

LORENZO S. GRAVES.

Witnesses:

F. F. CHURCH,  
G. A. RODD.