

(No Model.)

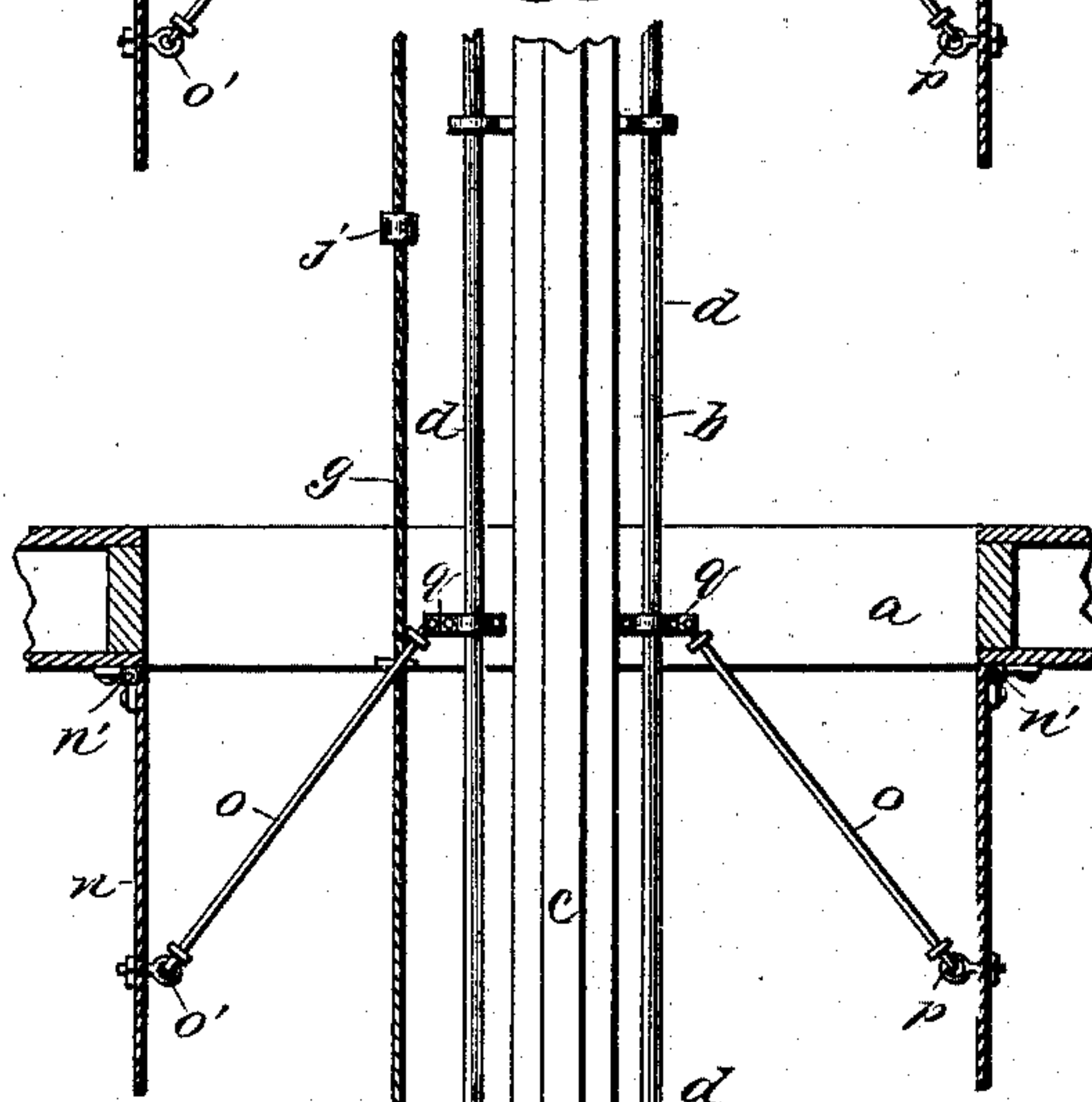
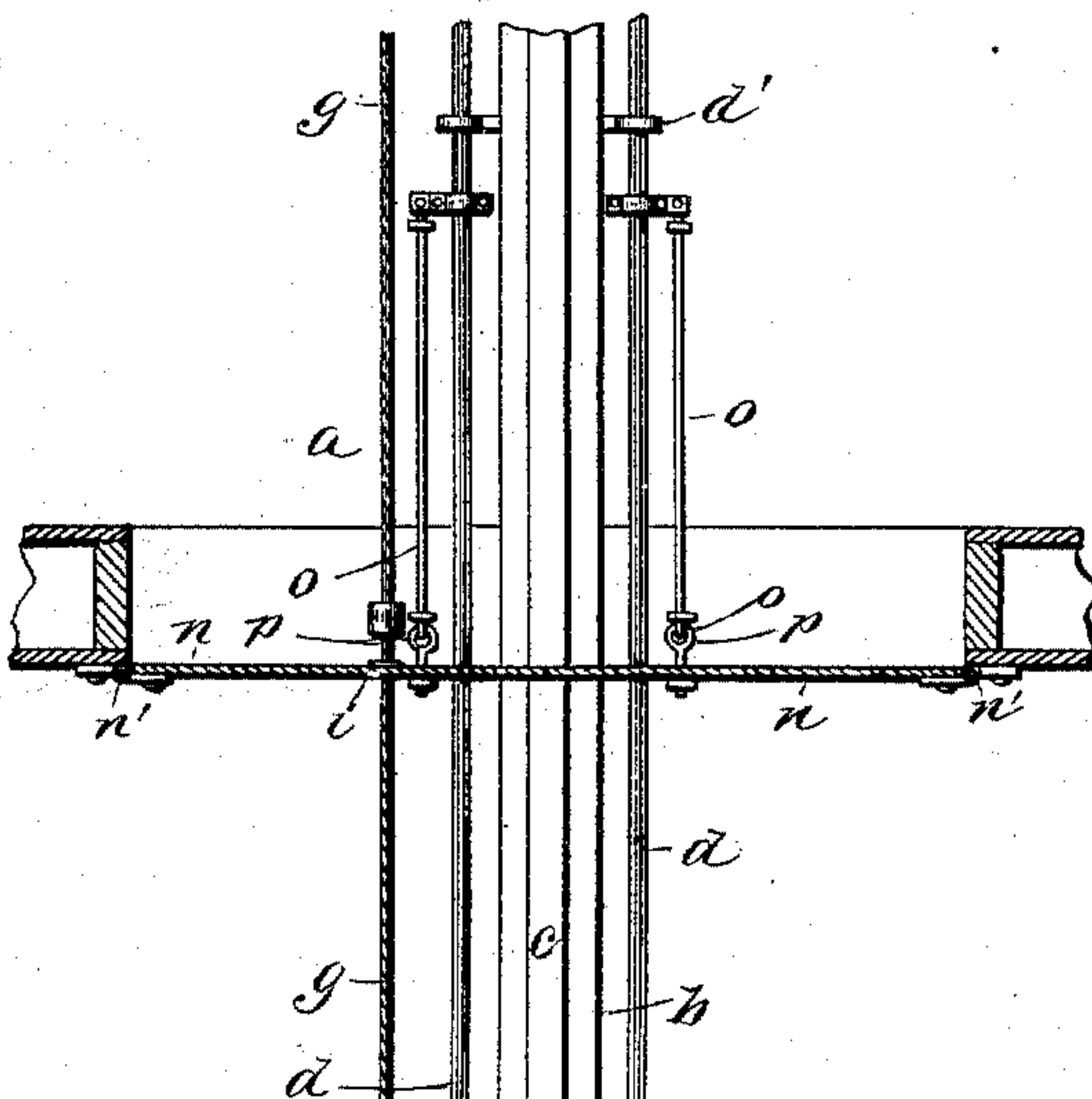
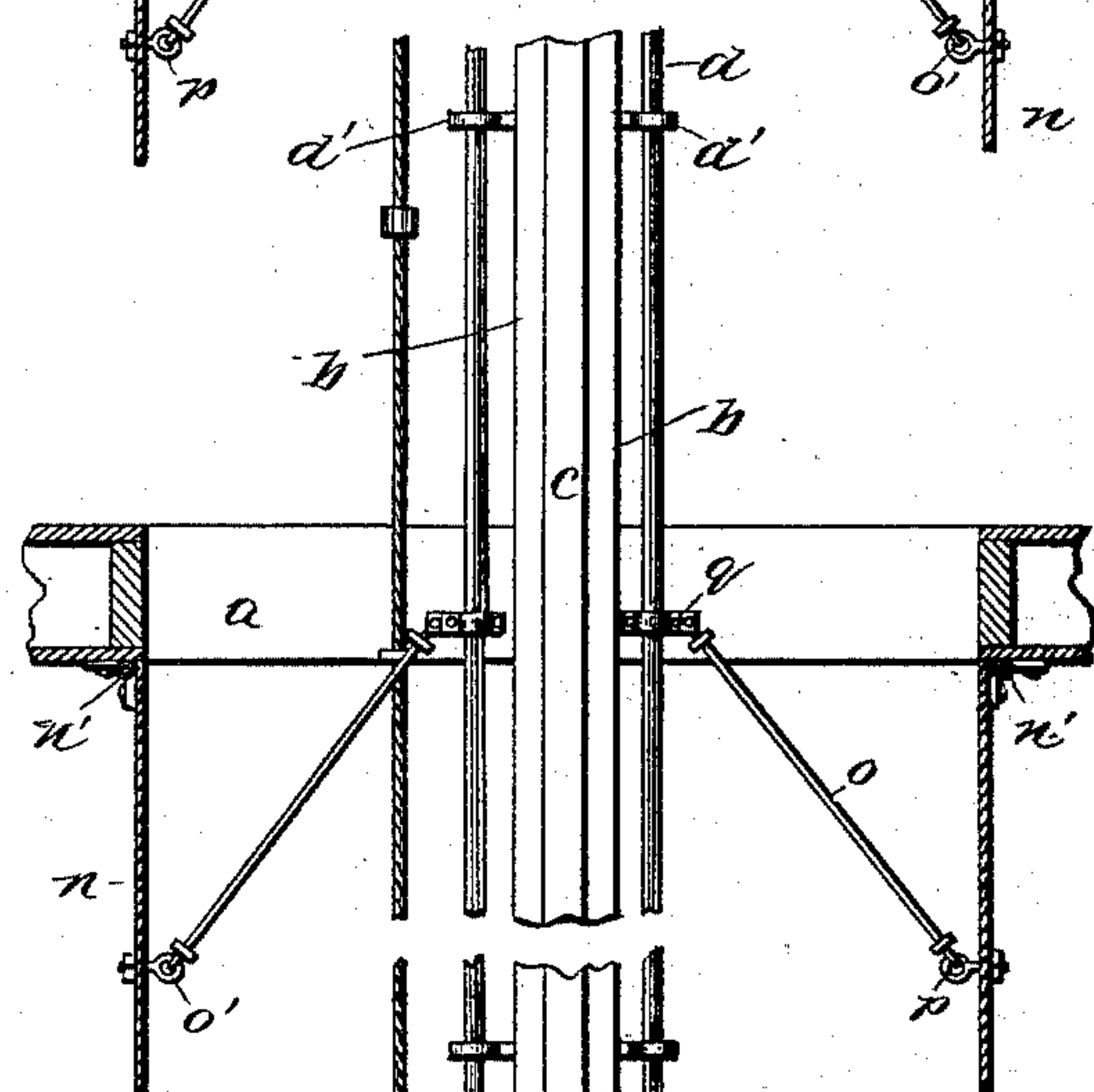
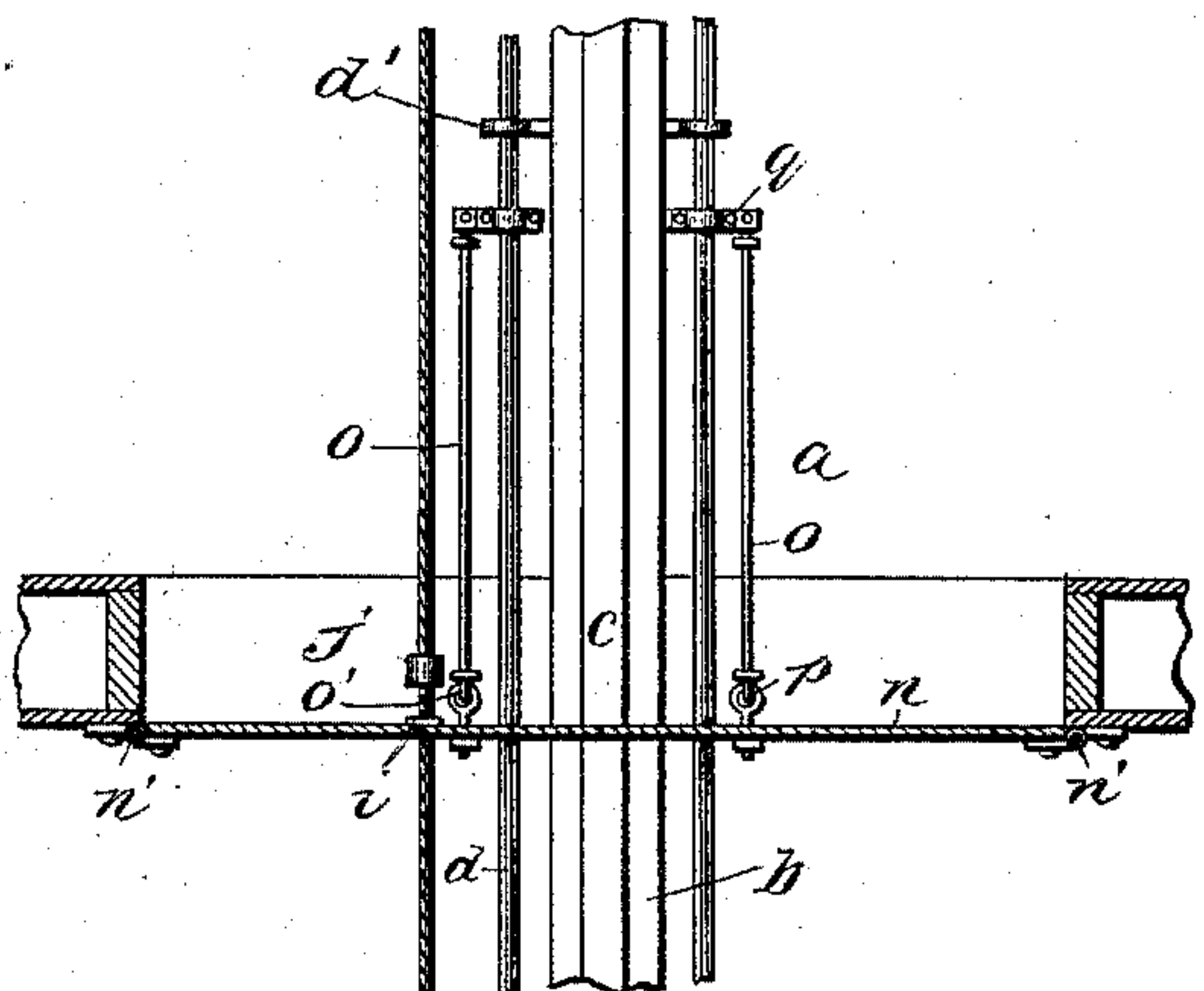
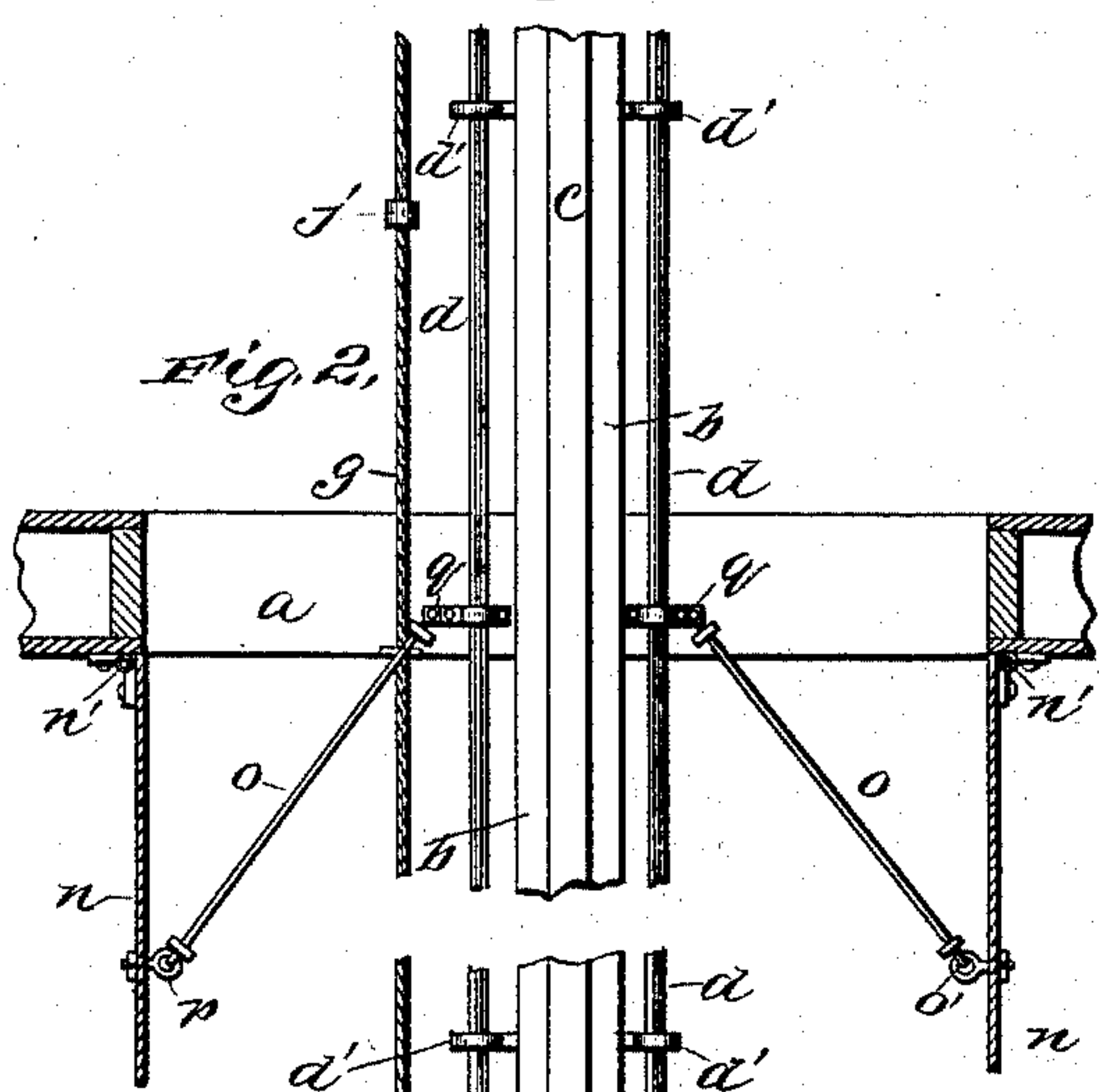
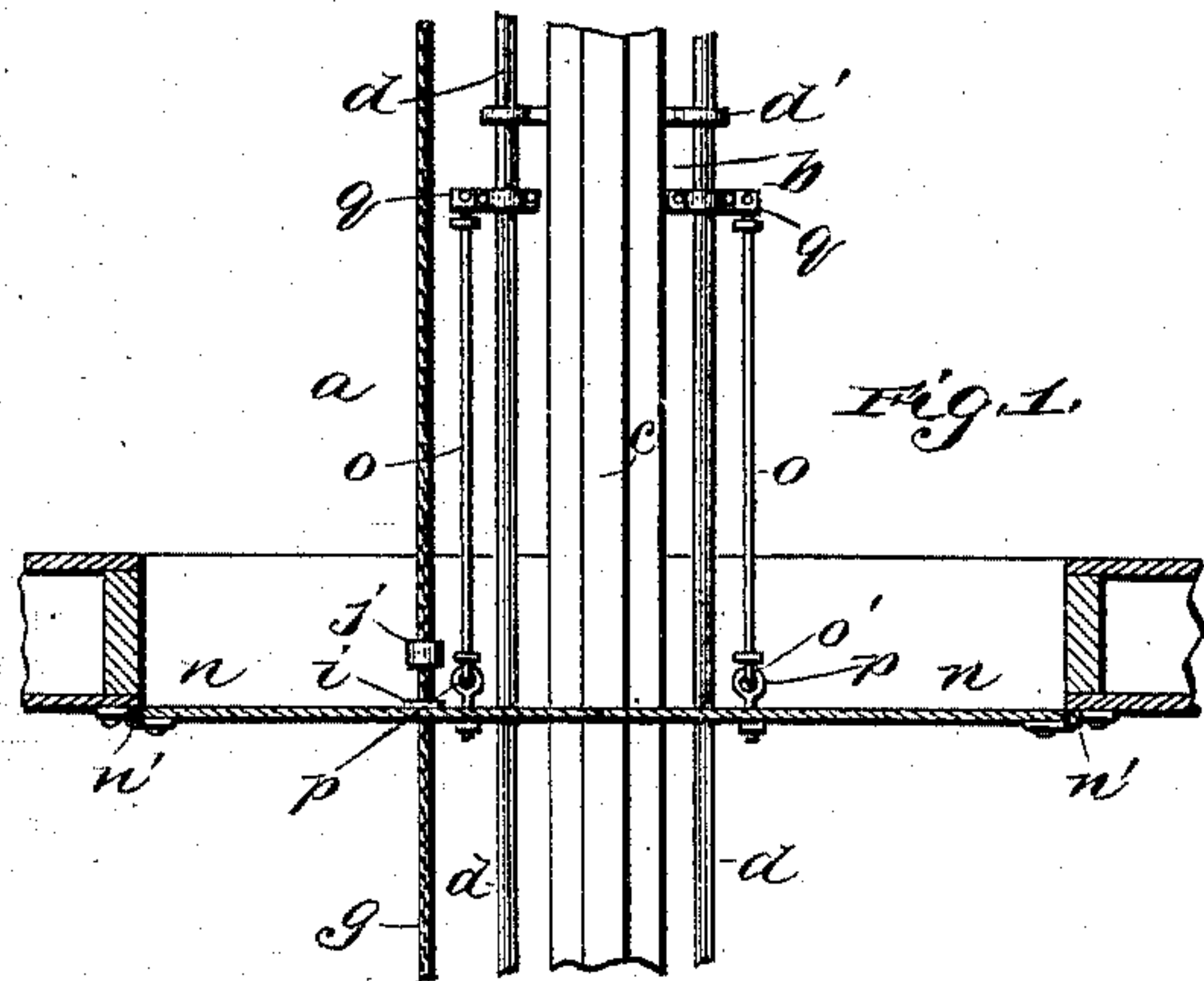
2 Sheets—Sheet 1.

D. TUFTS.

APPARATUS FOR OPERATING ELEVATOR DOORS.

No. 483,407.

Patented Sept. 27, 1892.



Witnesses:

James T. Chambers  
D. L. Dorsey.

Inventor:

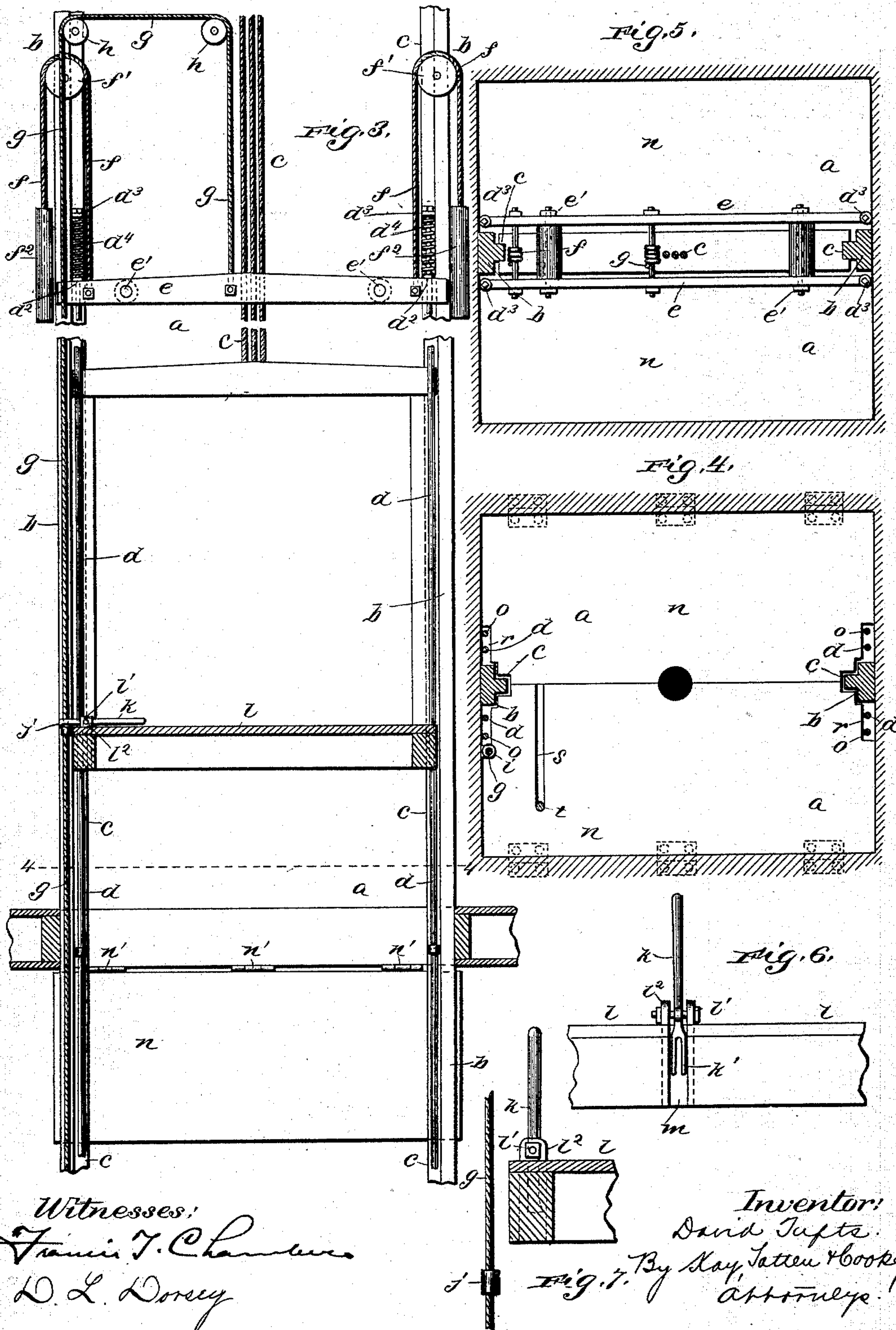
David Tufts.  
By Kay, Tatten & Cooke  
Attorneys.



2 Sheets—Sheet 2.

# APPARATUS FOR OPERATING ELEVATOR DOORS.

Patented Sept. 27, 1892.



Witnesses:  
Francis T. Chambers  
D. L. Dorsey

*Inventor:*  
*David Tufts.*  
*Ray, Tatten & Cook,*  
*Attorneys.*



# UNITED STATES PATENT OFFICE.

DAVID TUFTS, OF PITTSBURG, PENNSYLVANIA.

## APPARATUS FOR OPERATING ELEVATOR-DOORS.

SPECIFICATION forming part of Letters Patent No. 483,407, dated September 27, 1892.

Application filed June 3, 1892. Serial No. 435,433. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID TUFTS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Operating Elevator-Doors; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for opening and closing doors in elevator-shafts, its object being to provide means whereby all said doors may be closed simultaneously.

In the case of the breaking out of fire in large buildings where elevators are employed, the strong upward current of air in the elevator-shaft carries the flames rapidly from one floor to another, so that it is practically impossible to confine the fire to a single floor. To remedy this evil I, propose to employ doors at each floor in the elevator-shaft, and to arrange these doors to be closed simultaneously at any floor, so that upon leaving the warehouse at night the operator may close all the doors from any floor to cut off the current of air in the shaft in case of the breaking out of fire in the building.

To these ends my invention comprises, generally stated, in conjunction with an elevator-shaft, doors mounted therein, connections between said doors, and vertical rods or chains, said rods or chains depending from a suitable yielding support, and means whereby the yielding support is adapted to be raised, and consequently the rods or chains connected to said doors, and so operate to close the same.

My invention further consists in certain details of construction and combination of parts, all of which will be fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 shows a side view of a section of an elevator-shaft with my improved device applied thereto and showing the doors closed. Fig. 2 is a like view showing the doors open. Fig. 3 is front view looking toward the rear wall of the shaft. Fig. 4 is a section on the line 4 4, Fig. 3. Fig. 5 is a plan view of the

yielding support. Figs. 6 and 7 are views showing the operating-lever.

Like letters indicate like parts in each of the views.

My invention is applicable alike to passenger and freight elevators, whether open or inclosed, and the form in which it is illustrated may be varied in the details of construction and arrangement of parts, according to the construction of the car and shaft to which it is to be applied.

In the accompanying drawings I have illustrated my invention as applied to a car and shaft of ordinary construction. The shaft *a* has secured to the side walls thereof the vertical guide-posts *b*, provided with the guide-strips *c*, with which correspondingly-shaped grooves on the elevator are adapted to engage to retain said car in proper alignment with the parallel walls of the shaft in its ascent and descent therein. Vertical rods *d* pass up through suitable eyebolts *d'*, secured to the guide-posts. In the term "rods *d*" I include ropes, chains, or equivalent device. By this arrangement of the rods *d* at the sides of the guide-posts *b* the said rods in no way interfere with the ascent and descent of the car. The rods *d* depend from a cross-beam *e*, said cross-beam in turn depending from the chains or ropes *f*, secured thereto and which pass up over suitable sheaves *f'*, while counter-weights *f<sup>2</sup>* on the ends of said chains or ropes properly balance said beam. The cross-beam *e* thus provides a yielding support for said rods *d*. The beam *e* is composed of two bars or plates bolted together, as at *e'*, and having a space between them for the passage of the ropes *c'*, which support the car. The rods *d* pass up through the bars or plates of the cross-beam *e*, and are supported therein by means of the nut or head *d<sup>3</sup>* and the washer *d<sup>2</sup>*, with the spring *d<sup>4</sup>* interposed between said nut or head *d<sup>3</sup>* and the washer *d<sup>2</sup>*, whereby said rods have a certain amount of play as they are raised and lowered.

I find it convenient to construct the rods *d* from two sections of pipe of small diameter connected by suitable couplings. A wire rope *g* is secured to the cross-beam at about its midpoint, and passing up over the pulleys *h* passes



down the side of the shaft through eyebolts *i* and parallel with the adjacent rod *d*. This wire rope *g* is provided with lugs *j* at points thereon a short distance above each floor. A lever *k* is pivoted to the platform *l* of the car at one side close to the edge thereof, said lever being pivoted on the journal *l'*, mounted in the uprights *l''*. These uprights *l''* are secured within the recess *m*, formed in said platform *l*, so that when said lever *k* is in its vertical position, as shown in Fig. 7, the forked end *k'* of said lever will enter said recess *m*. When the said lever *k* is brought to its horizontal position, as shown in Fig. 3, the forked end *k'* of said lever is adapted to inclose the wire rope *g* and engage one of the lugs *j*. Doors *n*, formed of metal or of wood incased with tin, are mounted at each floor, as at *n'*, being preferably hinged and adapted to hang below the floors parallel with the walls of the shaft, so as not to be in the path of the platform of the car. The doors *n* are connected to the rods *d* by means of the links *o*, the eyes *o'* at the lower ends of said links engaging with the staples or eyebolts *p* on the doors *n*. The upper ends of the links *o* are pivoted to the straps *q*, secured to the rods *d*. The doors *n* are recessed, as at *r*, to permit of the passage of the rods *d* and the wire rope *g* when the said doors are closed, as shown in Fig. 1. One of each pair of said doors is further provided with the slot *s*, through which the operating-rope *t* can pass when the doors are closed. By having the doors hinged at the several floors and adapted to hang down within the shaft they open by their own gravity.

The operation of my improved device is as follows: If the car is at the first floor, for instance, and it is desired to close all the hatchways before leaving for the night, or in case of breaking out of fire, the operator allows the car to ascend to a point just above the lug *j*, adjacent to said floor, where the car is brought to a standstill. The lever *k* is thrown down to its horizontal position, as shown in Fig. 3, when the forked end *k'* of said lever will inclose the wire rope *g*. The car is then allowed to descend to the level of the floor, when the forked end *k'* of the lever *k* will engage the lug *j* adjacent thereto. The descent of the car, with the forked end *k'* of the lever *k* in engagement with the lug *j*, will draw down the wire rope *g* at the same time, which will act to raise the cross-beam *e*, and consequently the rods *d*, to which the doors are connected. This movement of the rods *d* will act to raise all the doors simultaneously at the several floors, and when said doors have been raised to their horizontal position, as shown in Fig. 1, the car is brought to a standstill and the doors are held in their closed position. When it is desired to open the doors, the car, with the lever *k* still in engagement with the rope *g*, is allowed to ascend until the doors open to their full extent. The lug

*j*, engaging with said lever *k'*, prevents the weight of the cross-beam *e*, together with the weight of the doors, from acting to open said doors too suddenly. When said doors are open to their full extent, the lever *k* is thrown back to its vertical position.

The closing of the doors may be effected in another manner. In case it is desired to close the doors without entering the car the operator pulls the elevator-rope to cause the car to ascend. The car is free to ascend without interference until the top of said car comes in contact with the yielding cross-beam *e*, when said cross-beam ascends with the car. This movement on the part of the car, together with the ascent of the cross-beam *e*, will, through the connections before described, operate to close the doors at every floor. In this manner of operating the device it will be necessary to have the car ascend for a short distance beyond the top floor.

In order to regulate the height to which the car can ascend, the operating-rope *t* may be provided with an ordinary stop at a suitable distance above the top floor, with which the car is adapted to engage to raise said operating-rope *t* and stop the further ascent of the car when all the doors have been closed. This manner of closing the doors is applicable where fire breaks out in the building, when by simply starting the car on its ascent, upon reaching the top without the assistance of the operator it operates to close the doors at all the floors. The elevator doors may also be closed or operated by any suitable mechanism or connection with the beam by which the rods connected to the doors are supported. Other forms of mechanism might be employed with like effect, and I do not confine myself to the particular construction described and illustrated.

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

1. In combination with an elevator-car and its shaft, doors mounted within said shaft, vertical rods, connections between said doors and rods, and a vertically-movable support from which said rods depend, substantially as and for the purposes set forth.

2. In combination with an elevator-car and its shaft, doors mounted within said shaft, vertical rods, connections between said doors and said vertical rods, and a yielding support from which said rods depend, said yielding support being in the path of said car, whereby said yielding support is raised by the movement of said car, substantially as and for the purposes set forth.

3. In combination with an elevator-car and its shaft, doors mounted within said shaft, vertical rods, connections between said doors and said vertical rods, a yielding support at the upper end of said shaft, from which said vertical rods depend, a rope secured to said support and passing down said shaft, and mechanism on said car for lowering said rope,



substantially as and for the purposes set forth.

4. In combination with an elevator-car and its shaft, doors mounted within said shaft, 5 vertical rods, connections between said doors and said vertical rods, a yielding support at the upper end of said shaft, from which said vertical rods depend, a rope secured to said support and passing down said shaft, lugs on 10 said rope, and a lever on said car to be thrown into engagement with said lugs, substantially as and for the purposes set forth.

5. In combination with an elevator-car and its shaft, doors mounted within said shaft, 15 links connecting said doors to vertical rods,

a yielding support counterbalanced at the upper end of said shaft, from which said rods depend, a rope secured to said yielding support and passing down said shaft, lugs on said rope, and a lever having a forked end on said 20 car, adapted to be thrown into engagement with said lugs, substantially as and for the purposes set forth.

In testimony whereof I, the said DAVID TUFTS, have hereunto set my hand.

DAVID TUFTS.

Witnesses:

ROBT. D. TOTTEN,  
J. N. COOKE.