

(No Model.)

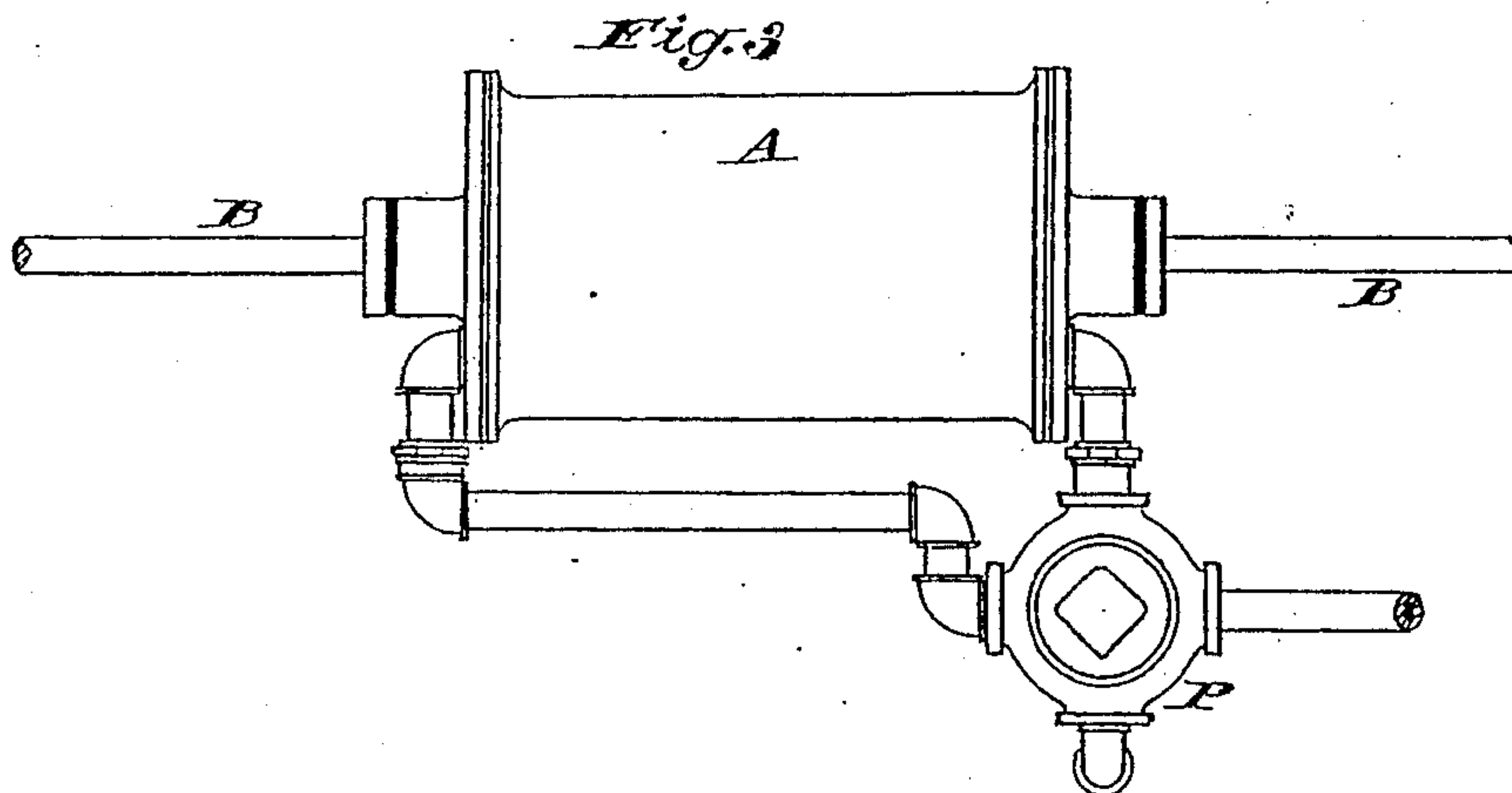
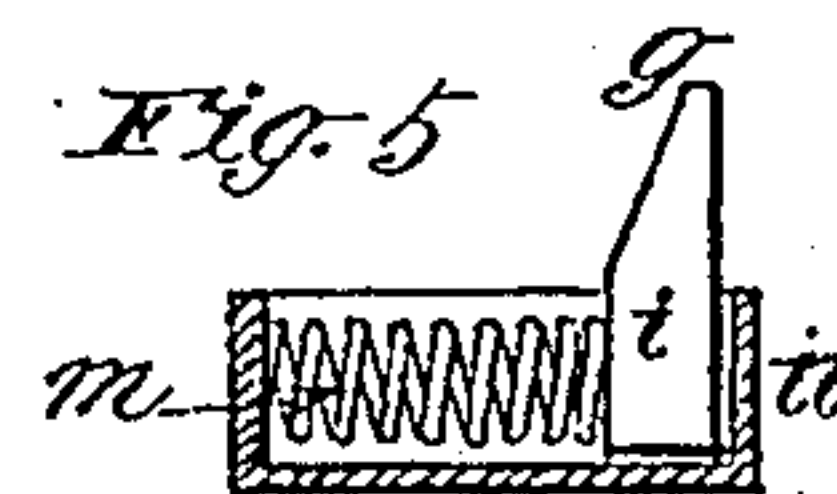
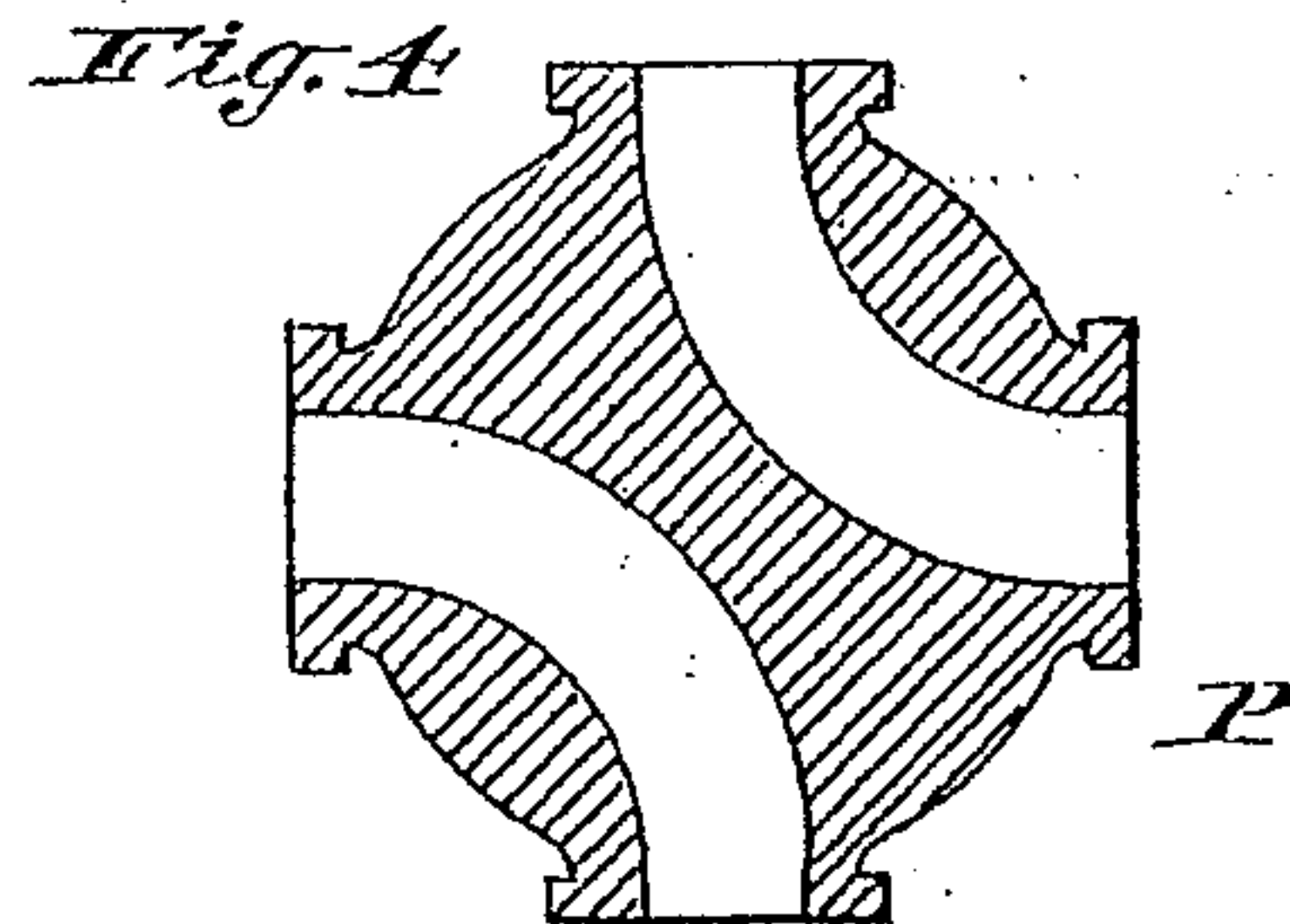
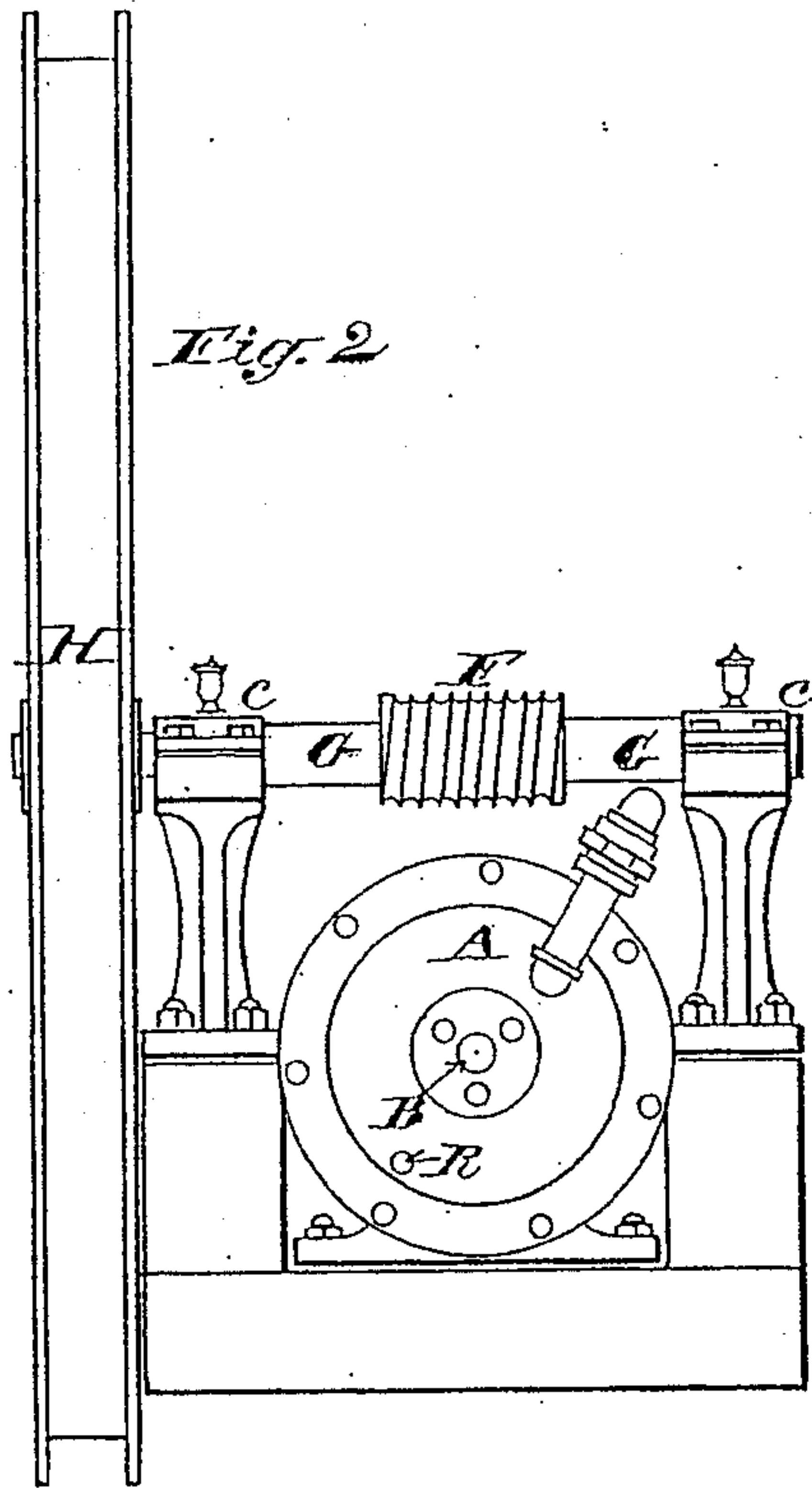
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A. GRANVILLE.

HYDRAULIC ELEVATOR OR DUMB WAITER.

No. 251,042.

Patented Dec. 20, 1881.



Witnesses

Robert W. Matthews
Thomas E. Crossman

Inventor

Arthur Granville
per James A Whitney
Atty

(No Model.)

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Fig. 6.

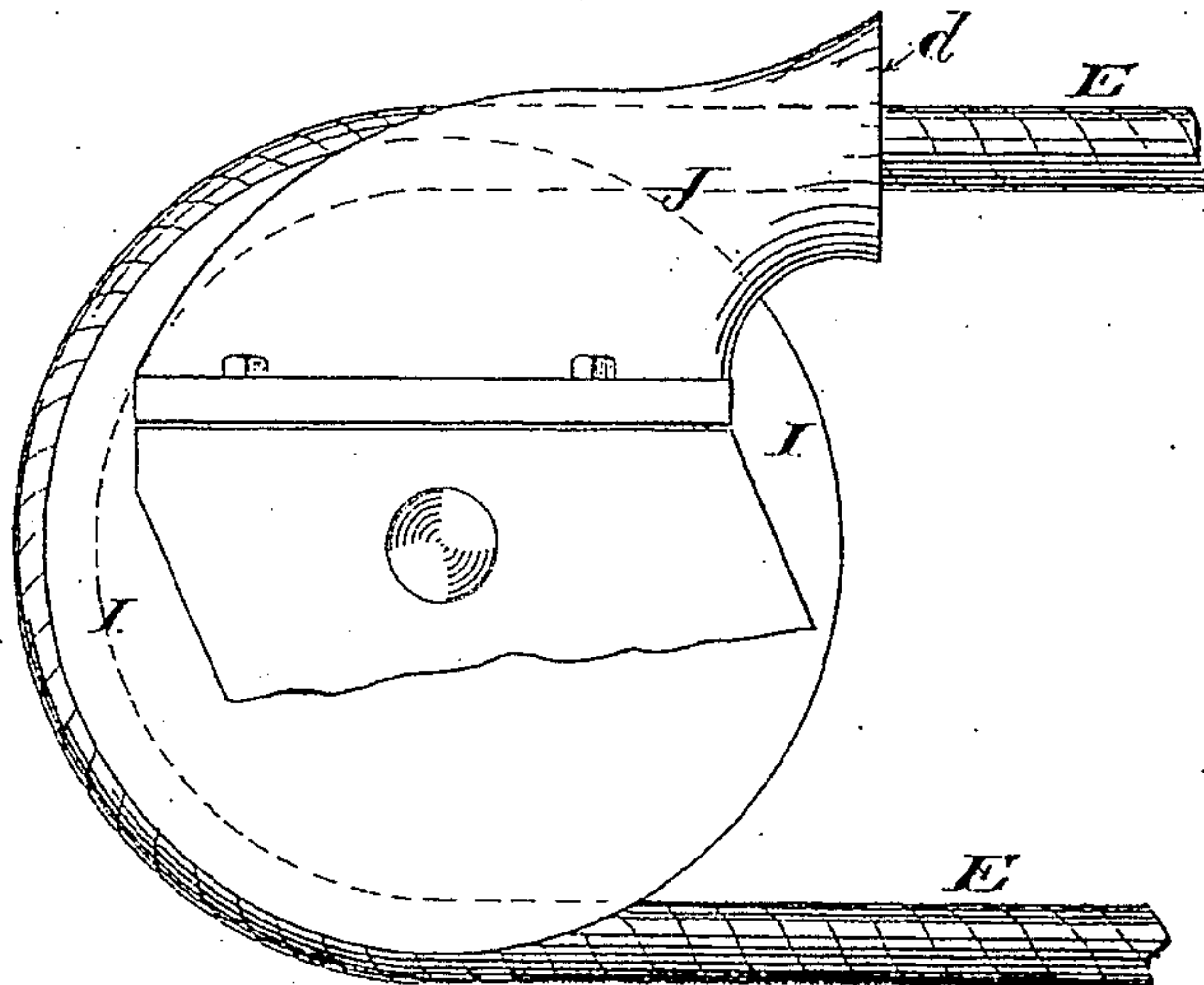
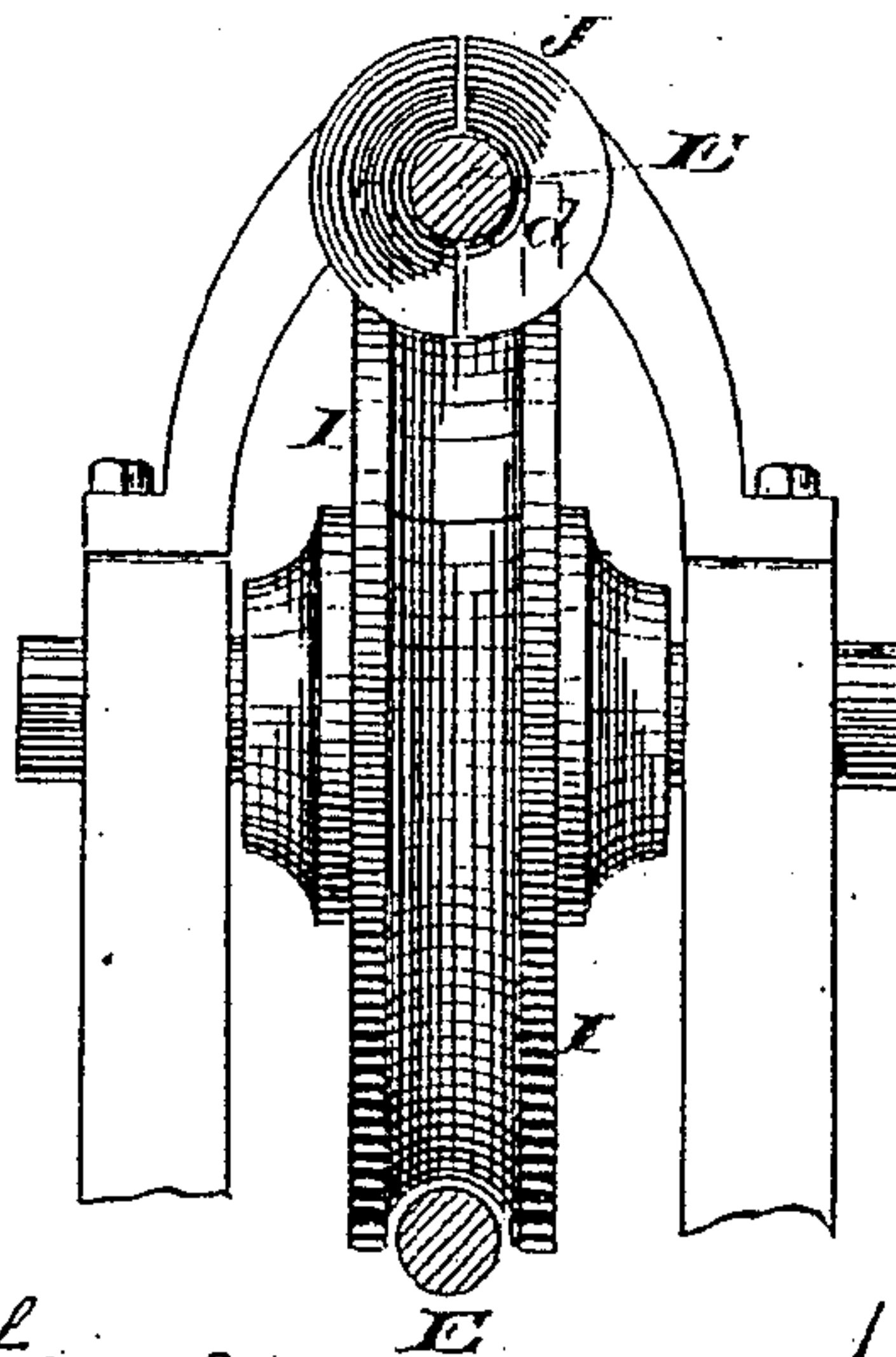


Fig. 7.



Witnesses

Robert W. Matthews
Thomas E. Crossman.

Inventor

Arthur Granville
By James A. Whitney
His Attorney

UNITED STATES PATENT OFFICE.

ARTHUR GRANVILLE, OF NEW YORK, N. Y.

HYDRAULIC ELEVATOR OR DUMB-WAITER.

SPECIFICATION forming part of Letters Patent No. 251,042, dated December 20, 1881.

Application filed October 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR GRANVILLE, of the city, county, and State of New York, have invented certain Improvements in Hydraulic Elevators or Dumb-Waiters, of which the following is a specification.

This invention relates to that class of hydraulic elevators or "dumb-waiters," so-called, in which one cage or car descends while the other is ascending; and the object of the invention is to provide means whereby the said cars may be thus operated with very great certainty, rapidity, and smoothness of motion, and whereby, also, all jar or shock may be avoided when the motion of the cages is stopped.

The invention comprises certain novel combinations of parts whereby the aforesaid objects are effectually secured.

Figure 1 is an elevation and partial vertical sectional view of an apparatus embraced in my said invention. Fig. 2 is an end view of certain parts thereof. Fig. 3 is a plan view, also of certain parts thereof. Fig. 4 is a sectional view of a four-way cock intended to be used in connection with my said invention, and Fig. 5 a detail view of another part of said apparatus. Fig. 6 is a side view on a larger scale; and Fig. 7 an end view, also on a larger scale, representing in detail certain parts of said apparatus.

A is a horizontal cylinder, axially through which extends a piston-rod, B, which passes through suitable packing, hereinafter described. In the center of the cylinder A, upon the piston-rod B, is a piston, C, the peculiarities of which, as applied in its connection with the said cylinder, are also hereinafter set forth.

Connected with the ends of the piston-rod B by turn-buckles D are the ends *a* of a fixed band or rope, E, which in practice should be of a suitable quality of wire rope. The central portion, *b*, of this wire rope is coiled several times around a spirally-grooved drum, F, secured upon a shaft, G, above the cylinder A, and in a position transverse thereto, the said shaft being supported in suitable bearings *c* on the fixed frame of the machine, and having at one of its ends the winding-wheel H. The rope E passes over the two oppositely-arranged pulleys I, so placed and arranged that, with the rope passed around the spirally-

grooved drum F, as hereinbefore explained, the said rope is held taut, or, in other words, retained at the requisite degree of tension, so that when the rope is drawn in one direction or the other, as the case may be, it will cause the drum F, and consequently the winding-wheel H, to rotate in a contrary direction. Inasmuch, however, as the movement of the rope to its utmost limit in one direction will cause several revolutions of the drum F, it follows that the coils of the said rope upon the said drum will pass from one to another of the grooves of the drum, and consequently change the angle of the adjacent parts of the rope with reference to the cylindrical surfaces of the pulleys I. In order to permit this lateral movement of the rope with reference to the said pulleys, and at the same time prevent the possibility of the rope being displaced from the pulleys, there is arranged above and at the inner side of each of said pulleys a trumpet-shaped guide, J, attached to the adjacent fixed bearings of the pulleys, but with its throat *d* of flaring, funnel, or trumpet shape, so that while the rope while passing from one lateral limit to the other of the drum F will be permitted such movement without interference, yet in case of any tendency to transcend such limits it will be met and counteracted by the flaring sides or inner surfaces of the trumpet-shaped guides J aforesaid.

The winding-rope K is coiled around the winding-drum H with its opposite portions passed upward and over the pulleys L at the top of the elevator-shafts M, the extremity of each of said end portions of said rope being attached to the usual cage or car, N, such being the construction and arrangement of the parts that the movement of the piston C in one direction will be communicated through the piston-rod B and rope E to the drum F and winding-drum H, and thence through the winding-rope K to the cars or cages N, one of the said cars being allowed to descend as the other is raised by the movement of the winding-rope, and vice versa.

Provided at each end of the cylinder A are cocks *e*, by which, on occasion, air collected within the said cylinder may be allowed to escape. The water, under pressure, from any suitable source of supply, and impelled toward

the cylinder A by its own gravity, or otherwise, is admitted into the said cylinder by a four-way cock located at P in Fig. 3, and constructed with the curved passages, as represented in Fig. 4. This cock is actuated in the usual or in any suitable manner to admit the water alternately to the opposite ends of the cylinder A, to propel the piston C alternately in opposite directions within the said cylinder.

In order to retard or diminish the velocity of movement of the piston C whenever the latter is interrupted in its stroke, as in stopping the movement of the cars or cages N, or when it has reached the limit of its stroke, provision is made for the injection of water in front of the cylinder to cushion its stroke at the part just mentioned. This is done by means of the pipes R, one of which connects with the interior of each end of the cylinder A, and in each of which is a spring-faucet, *f*, the "thumb-piece," so called, or actuating-lever *a'*, of which is so arranged in relation with tappets *g* on the adjacent part of the piston-rod B that as the latter reaches the end of its stroke toward the spring-faucet the tappet *g* will be brought in contact with the latter; so that the tappet, pressing upon the lever of the faucet, will open the same and admit a quantity of water in front of the piston to check or retard its movement in that direction; but, inasmuch as the cock *f* must be held open during an appreciable length of time while the piston-rod B is in motion, it follows that the tappet *g* must be attached by elastic connections to the piston-rod B. This may be most conveniently secured by placing each tappet upon a slide, *i*, which works in a box, *n*, provided on an arm which projects laterally from the piston-rod B.

A spiral spring, *m*, as shown in Fig. 5, is arranged to press the slide toward the outer end of the box, which said outer end acts as a stop to limit the outward movement of the slide, care being taken that the spring *m* be of greater strength or tension than the spring of the adjacent spring-faucet *f*, so that the lever of the latter will be actuated by the tappet before the latter is made to yield upon the piston-rod B, after the lever of the spring-faucet has reached its limit of movement.

It is to be observed that the water injected in front of the piston to check its movement, as just described, must, of course, be under a less pressure than that of the water behind the piston, which gives it its working or operative power.

The packing around the piston-rod B, at the ends of the cylinder A, is of the "cup" variety, as shown in Fig. 1. The piston C is composed of two cup packing-rings, *r*, which may have between them a gasket, *s*, of any suitable kind, and compressed between the disks *w*, which latter are themselves firmly secured upon hubs *u*, shrunk upon the piston-rod B.

It will be observed that the use of the cup packing at the ends of the cylinder and around the piston-rod has a special advantage in connection with the hydraulic hoisting apparatus such as is herein described, for the reason that the water, being a comparatively dense fluid, exerts a positive pressure upon and around the adjacent surfaces of the rod of the several cups, the latter being made of leather or other equivalent material, and forces them against the adjacent surfaces of the piston-rod, thereby causing the pressure itself to tighten the packing at the joints, whereas in the use of the ordinary stuffing-boxes the pressure of the water would almost inevitably lead to leakage unless the stuffing-boxes were packed with extreme tightness upon the piston-rod, which would induce another and equally great evil—namely, excessive friction, which would impair the working of the machine.

What I claim as my invention is—

1. The combination, with the two shafts M and pulleys L L, of the winding-ropes K K, winding-drum H, drum F on the shaft of said winding-drum, the cylinder A, having both its ends closed, its piston C, and piston-rod B, extended through the opposite ends of said cylinder, the whole combined, constructed, and arranged to give motion in alternating opposite directions to the ropes K K and the cages N N, suspended thereon, all substantially as and for the purpose herein set forth.

2. The combination of the flaring or trumpet-shaped guides J, the pulleys I, rope E, piston-rod B, piston C, cylinder A, and drum F, the whole constructed and arranged for joint use and operation, substantially as and for the purpose herein set forth.

3. The combination of the pipes R, provided with spring-faucets *f*, cylinder A, piston C, the piston-rod B, having tappets *g*, the pulleys I, rope E, and drum F, the whole constructed and arranged for joint use and operation, substantially as and for the purpose herein set forth.

4. The combination of the cylinder A, having the piston C and piston-rod B, the latter extended through the opposite ends of the said cylinder and provided with tappets *g*, the pipes R, and spring-faucets *f*, the rope E, the pulleys I, the flaring or trumpet-shaped guides J, the spirally-grooved drum F, and the winding-drum H on the shaft G of the said drum F, the whole constructed and arranged for joint use and operation, substantially as and for the purpose herein set forth.

ARTHUR GRANVILLE.

Witnesses:

THOMAS E. CROSSMAN,
ROBERT W. MATTHEWS.