

No. 719,470.

PATENTED FEB. 3, 1903.

J. L. KAIL.
DOOR OPERATING DEVICE FOR ELEVATORS.

APPLICATION FILED OCT. 12, 1901.

NO MODEL.

4 SHEETS—SHEET 1.

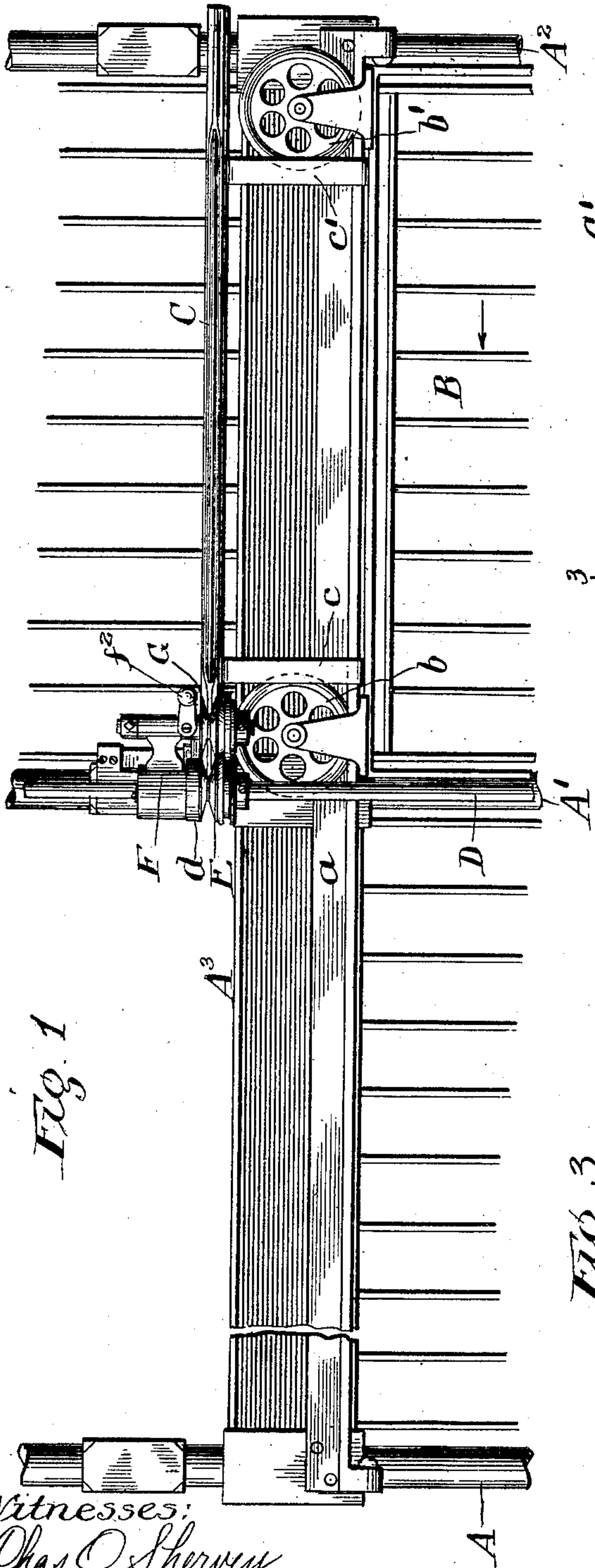


Fig. 1

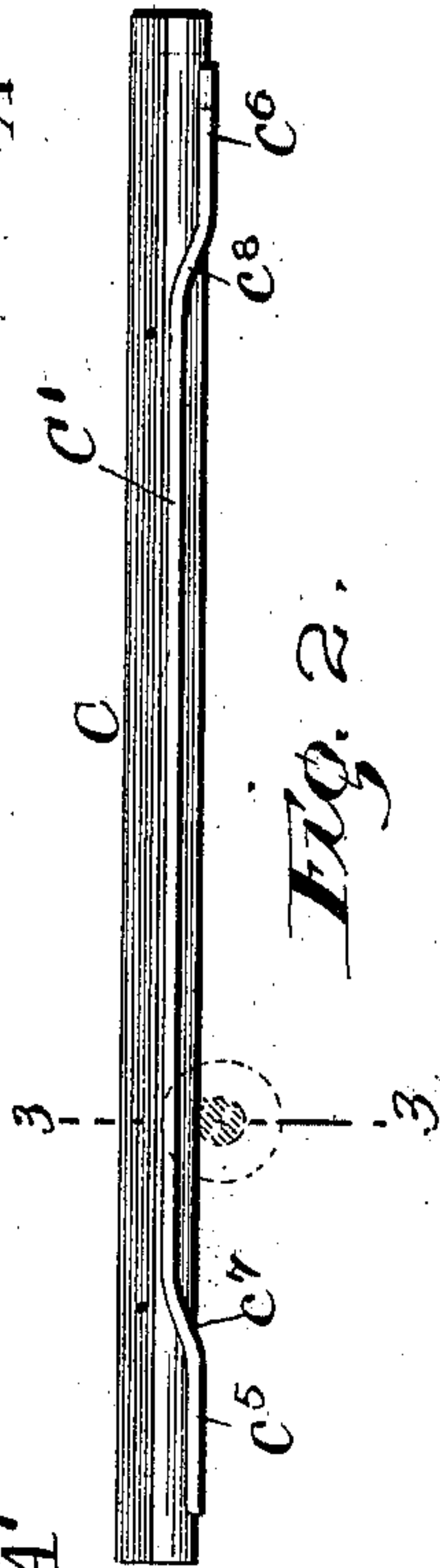
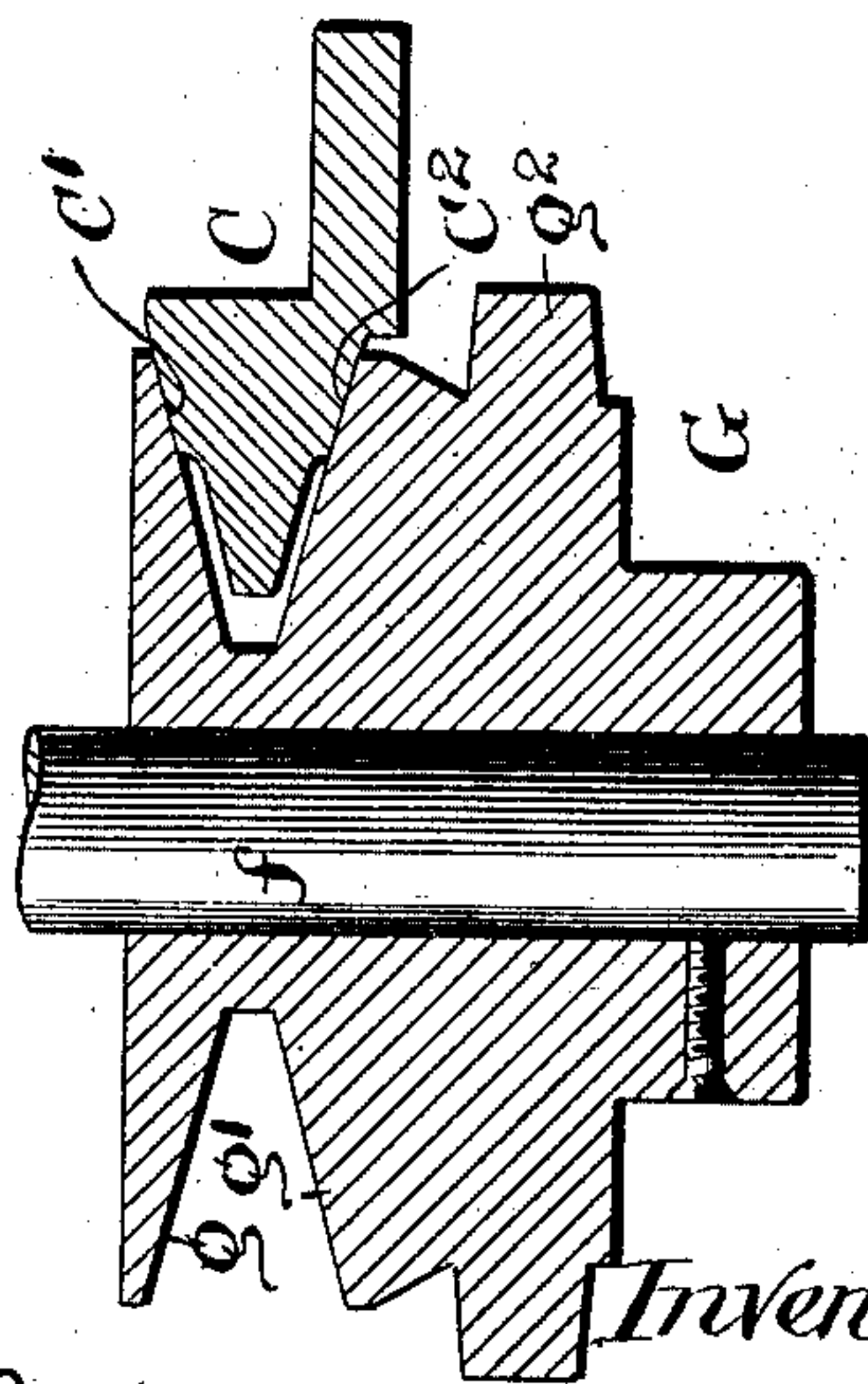


Fig. 2.

Fig. 3.



Inventor.

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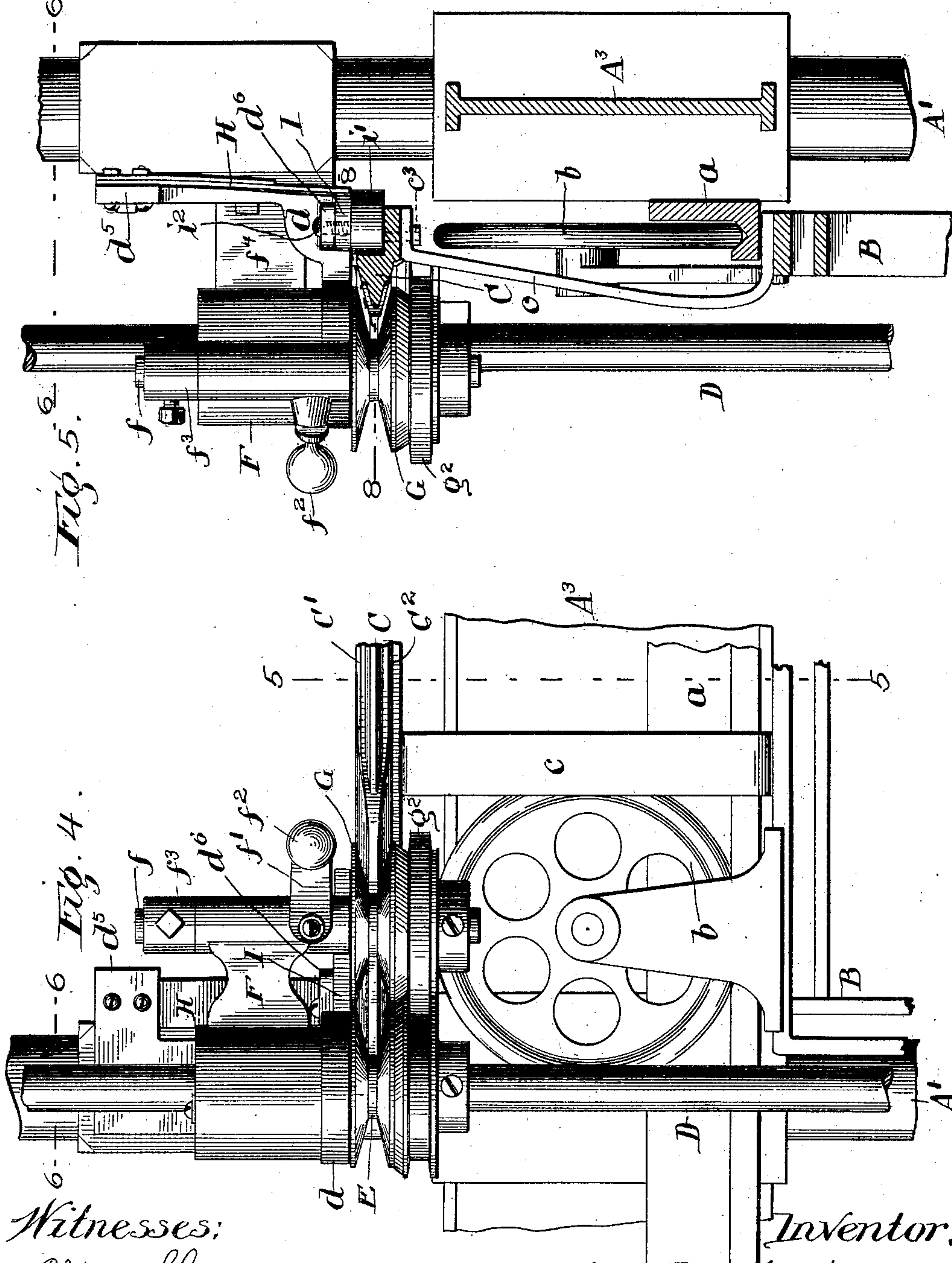
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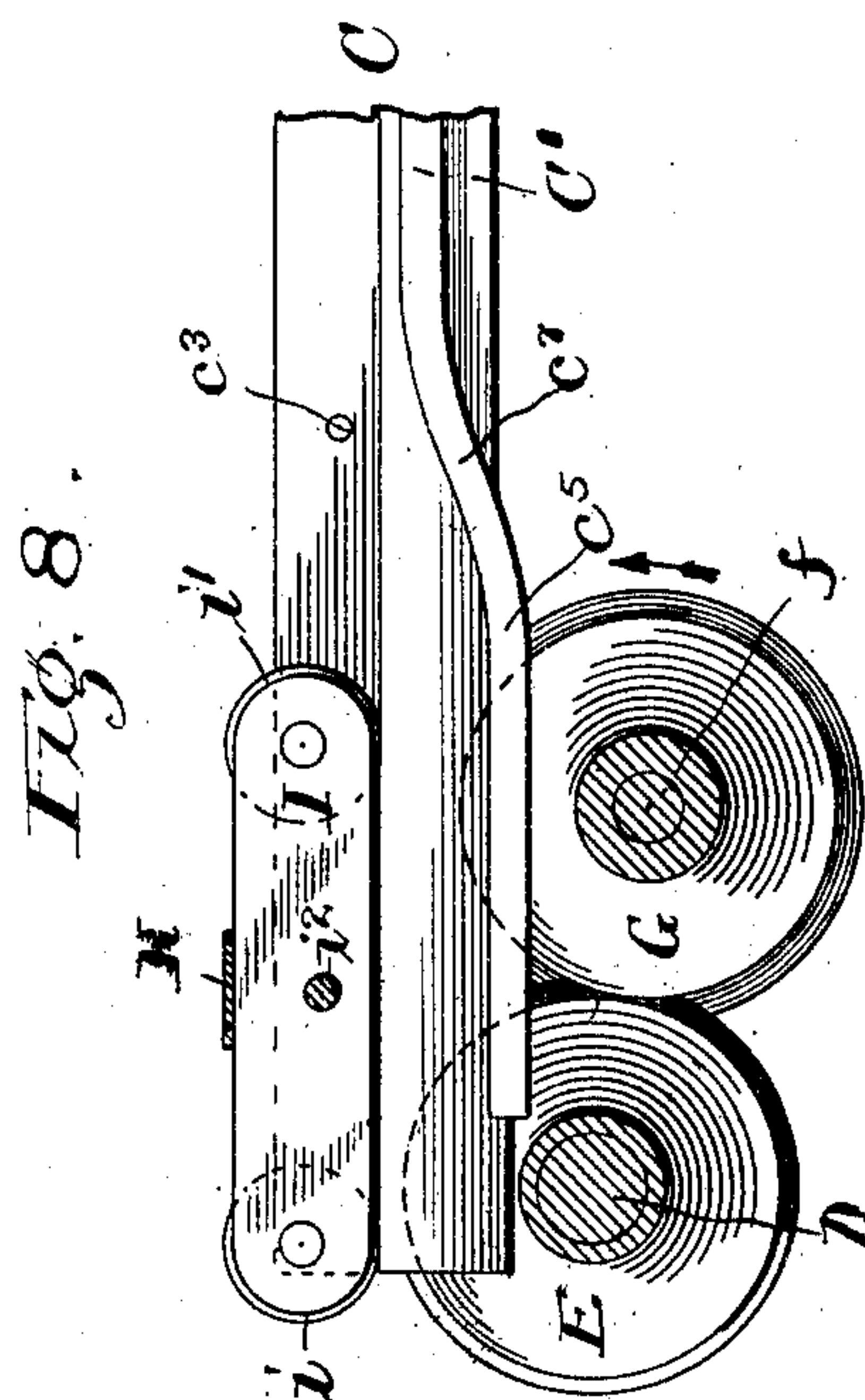
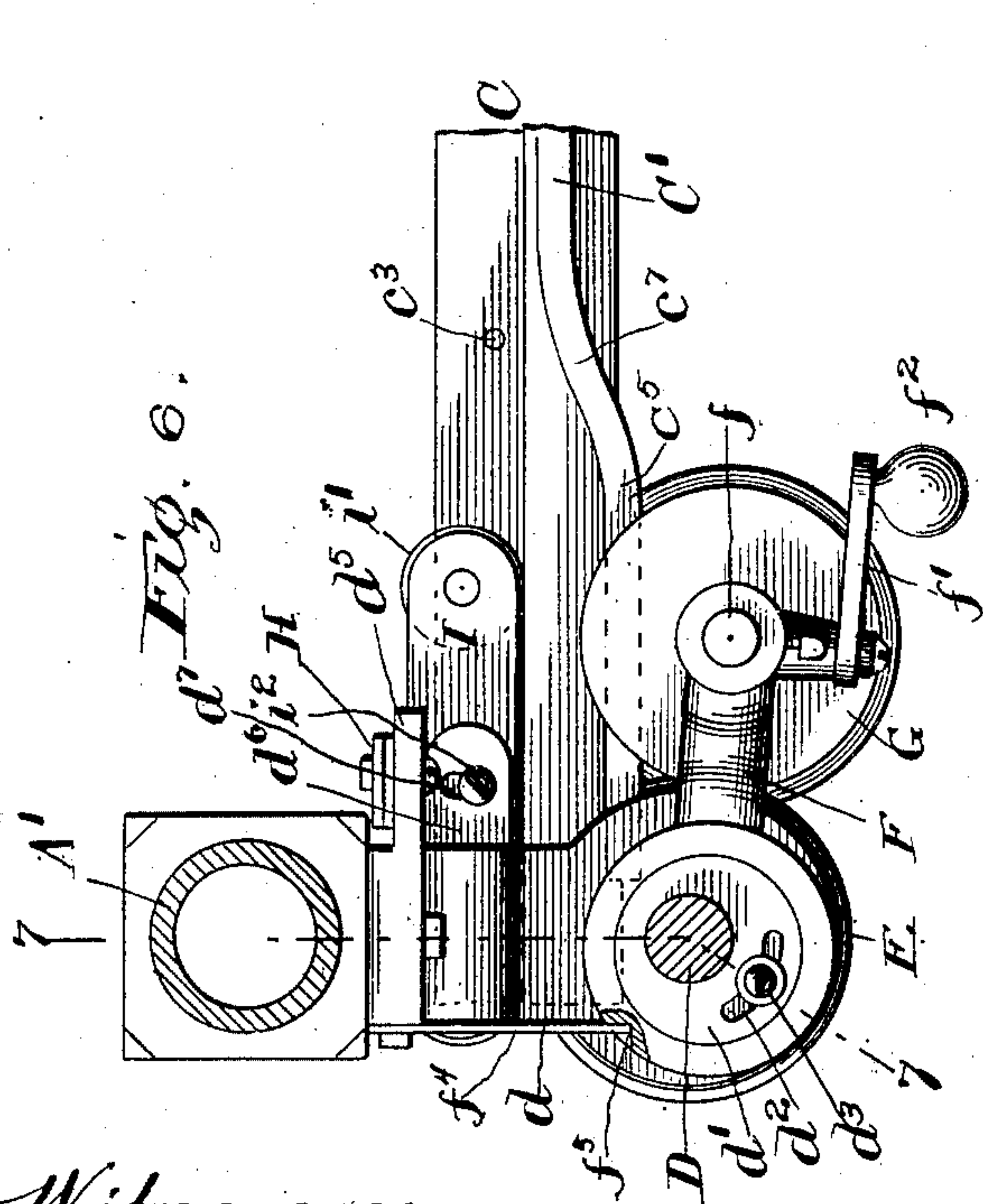
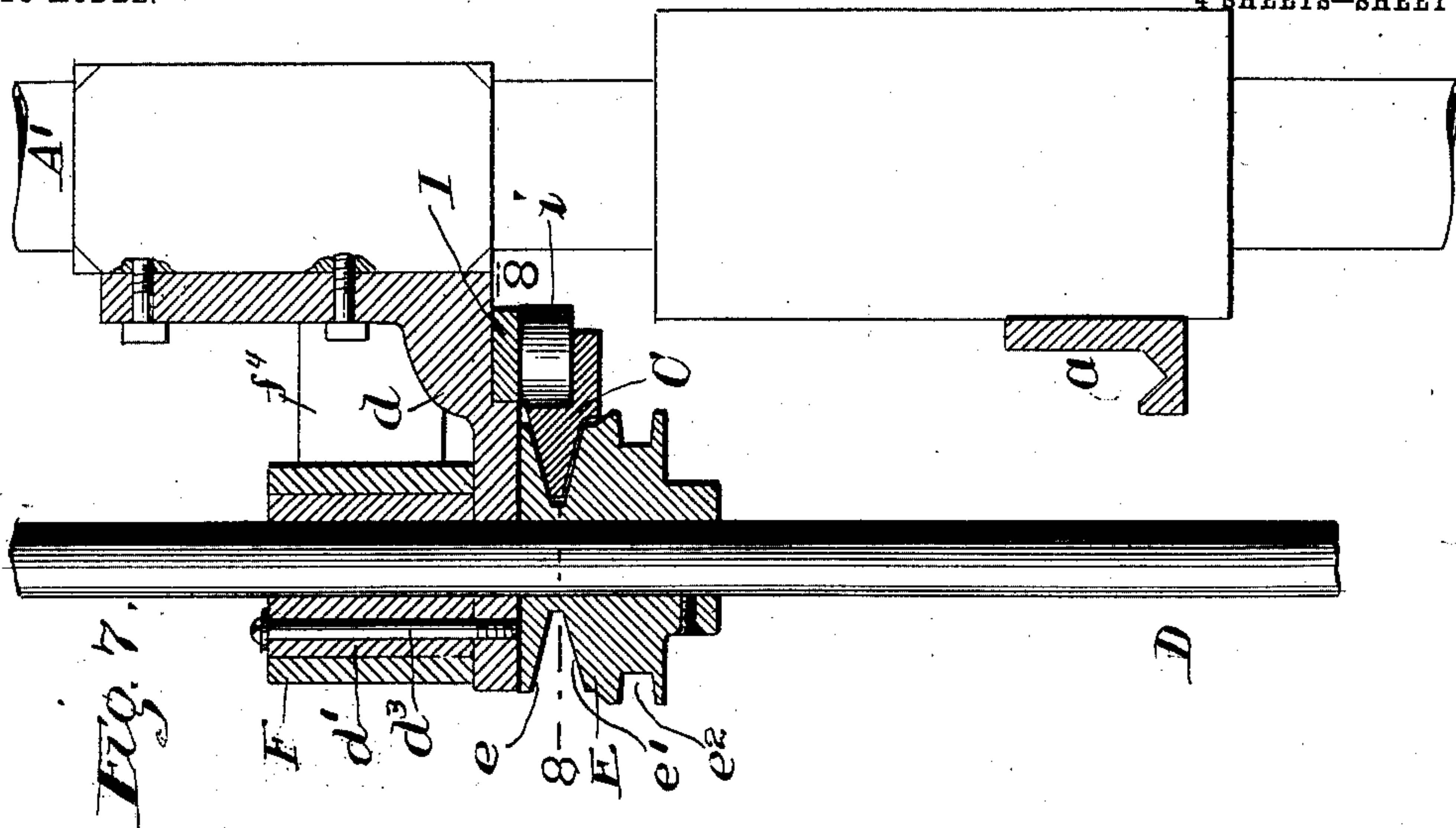
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APPLICATION FILED OCT. 12, 1901.

NO MODEL.

4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 11.

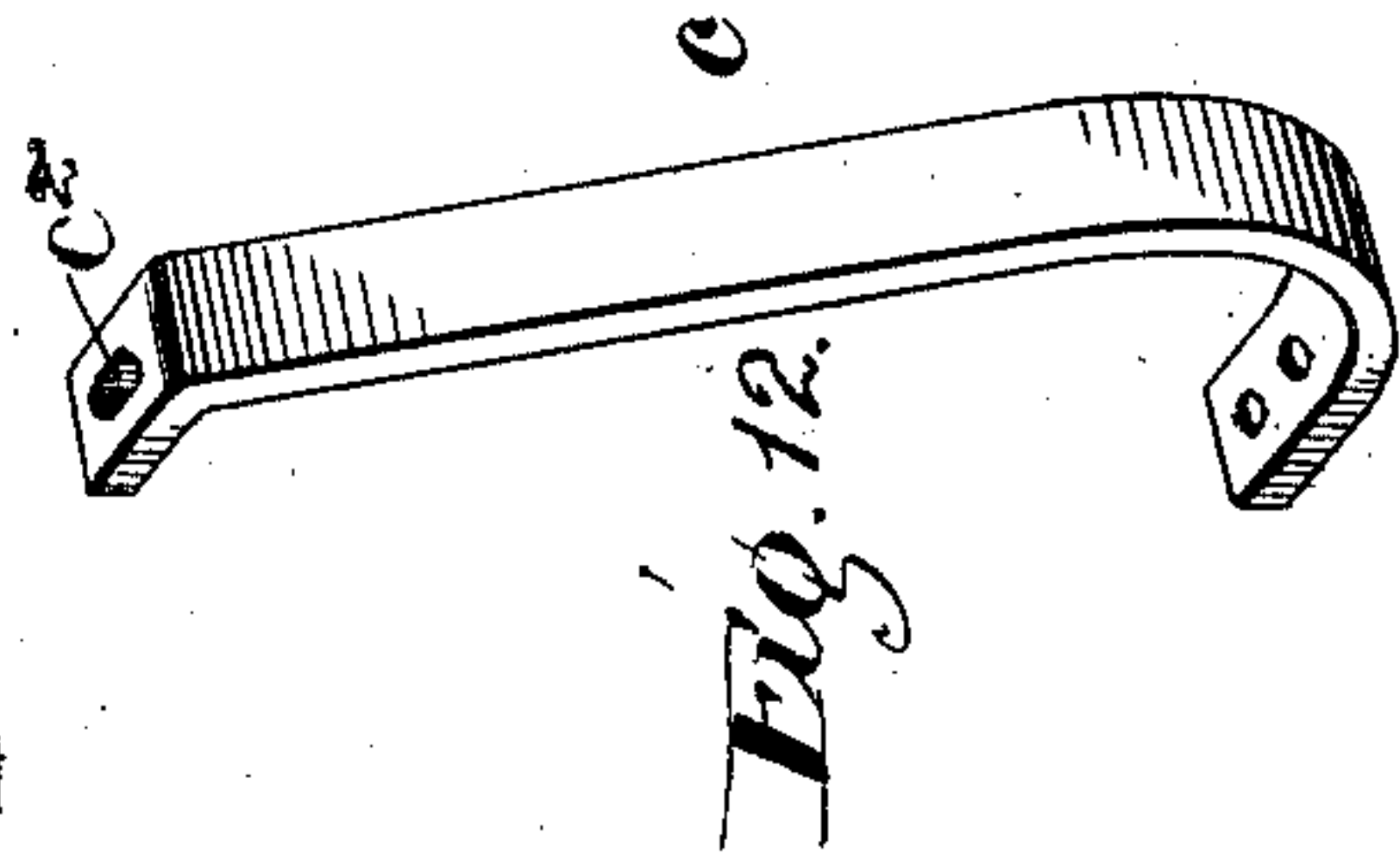
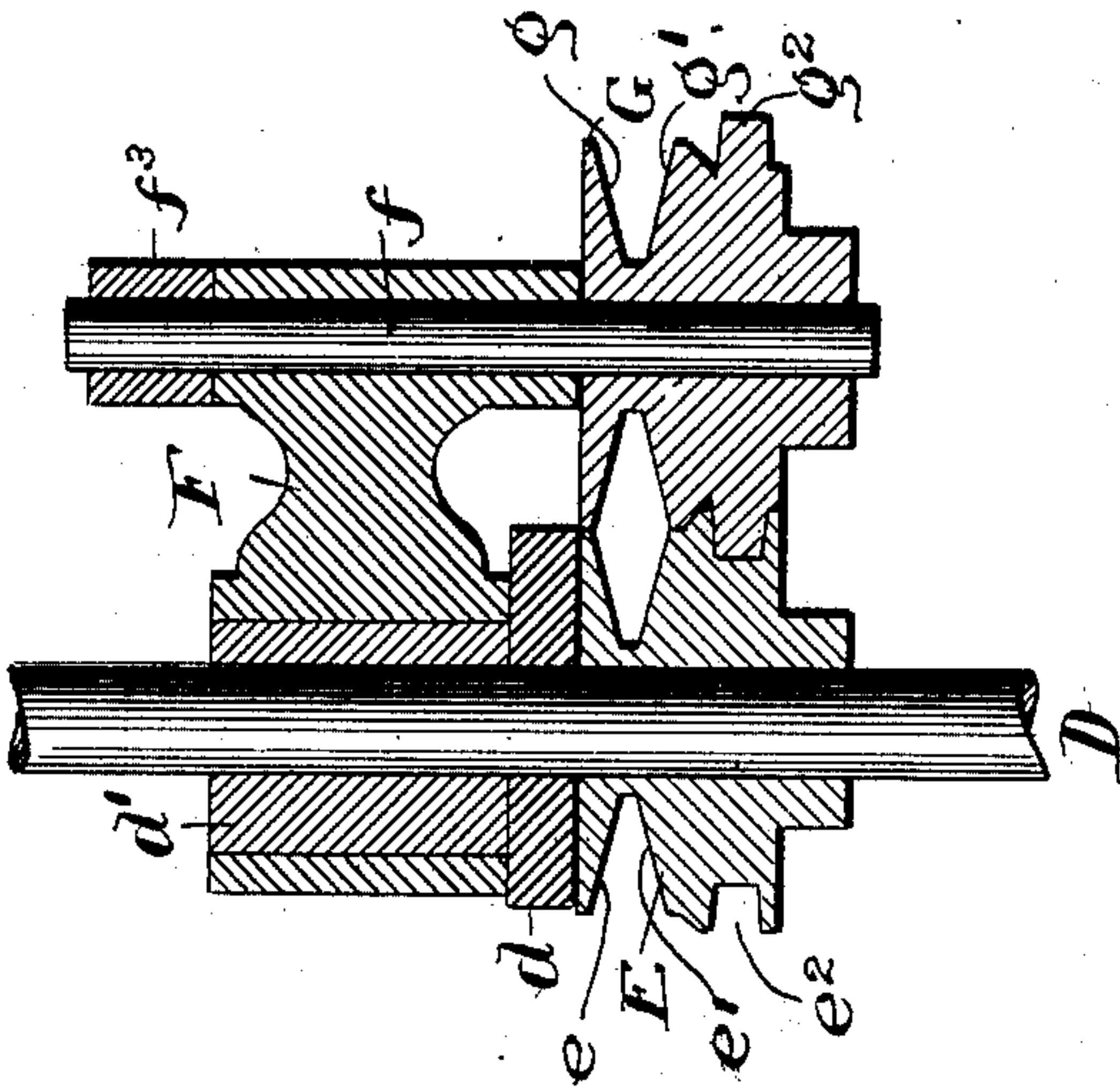


Fig. 9.

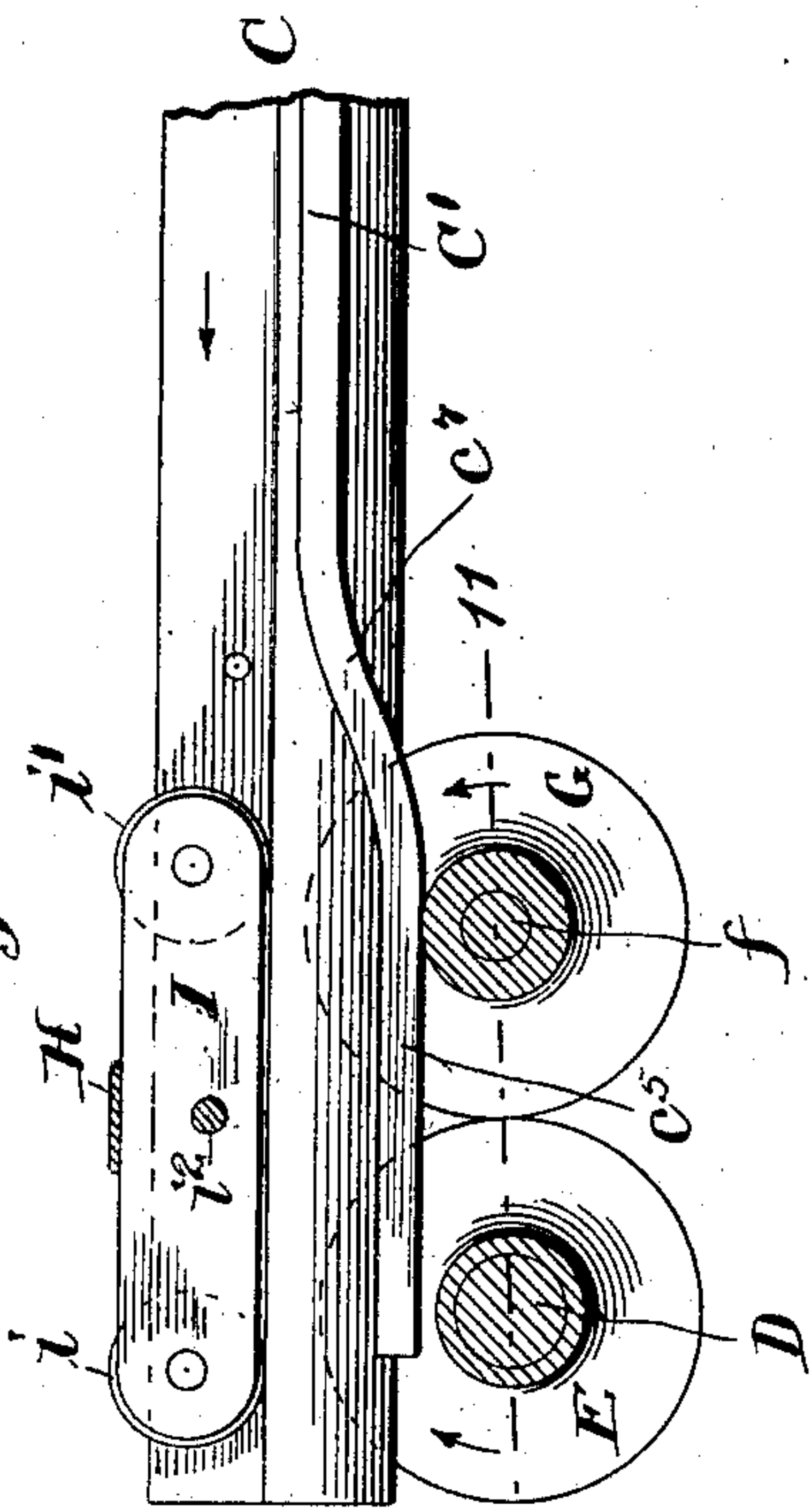
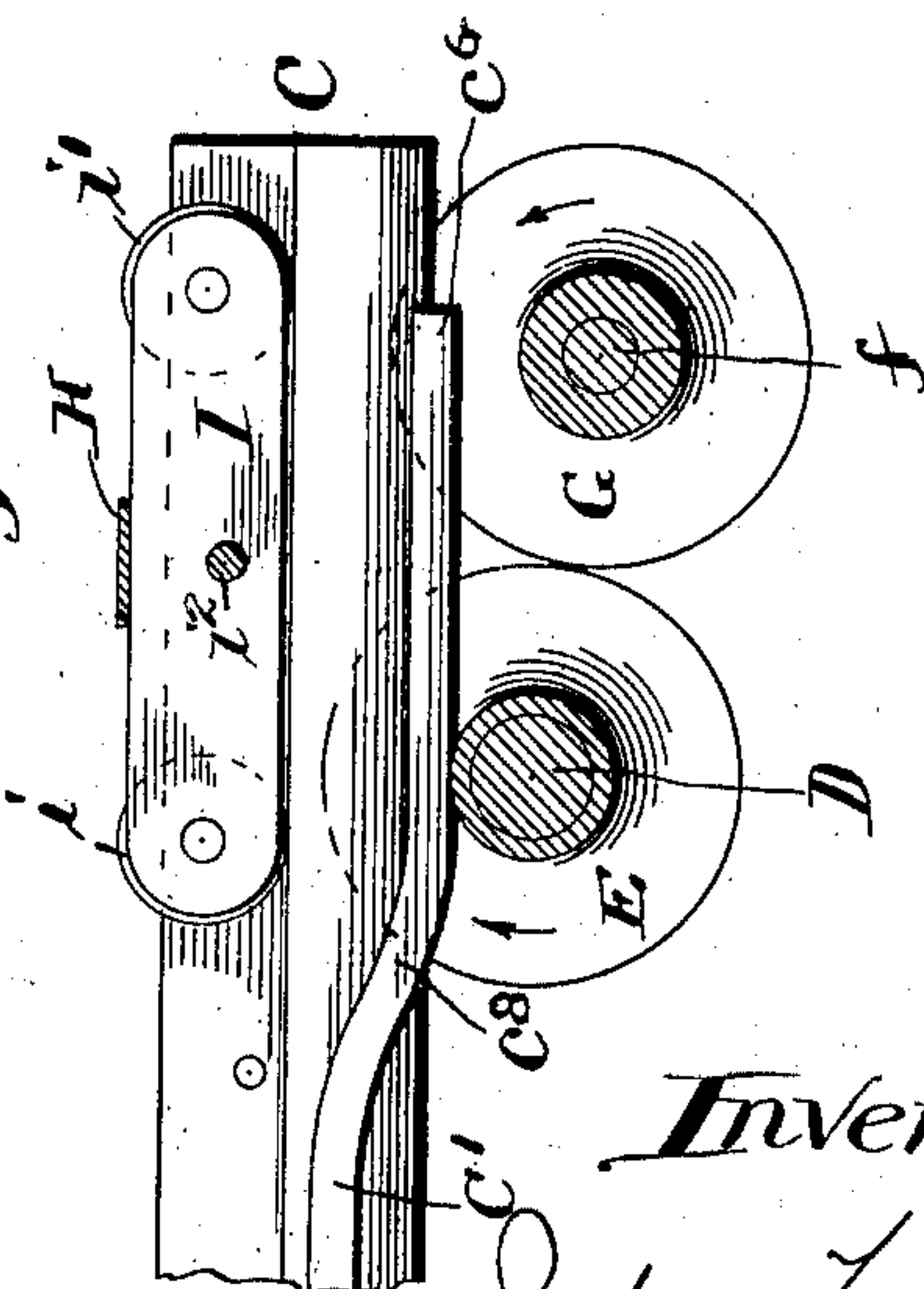


Fig. 10.



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UNITED STATES PATENT OFFICE.

JACKSON L. KAIL, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WINSLOW BROS. CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DOOR-OPERATING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 719,470, dated February 3, 1903.

Application filed October 12, 1901. Serial No. 78,398. (No model.)

To all whom it may concern:

Be it known that I, JACKSON L. KAIL, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Operating Devices for Elevators, of which the following is a specification.

My invention relates to certain improvements in door-operating devices for elevators, the object being to provide a simple and practical mechanism for opening and closing elevator-doors; and to such end it consists in certain novel features of construction and arrangement, a description whereof will be found in the following specification and clearly pointed out in the claims.

In the drawings furnished herewith, Figure 1 is a front view of a portion of an elevator-inclosure and a door looking from the well side of the inclosure with my improved door-operating mechanism applied thereto. Fig. 2 is a plan view of a friction-bar used in the device. Fig. 3 is a detail vertical cross-section of a friction-pulley and the bar seen in Fig. 2, the line of section being indicated at 3 3 in said figure. Fig. 4 is a front view of the mechanism upon a larger scale. Fig. 5 is a view, partly in side elevation and partly in vertical cross-section, the line of section being indicated at 5 5 in Fig. 4. Fig. 6 is a view, partly in plan and partly in horizontal section, the line of section being indicated at 6 6 in Figs. 4 and 5. Fig. 7 is a cross-section in the broken line 7 7 of Fig. 6. Fig. 8 is a horizontal section in line 8 8 of Figs. 5 and 7. Figs. 9 and 10 are views similar to Fig. 8, but showing the friction-bar in other positions. Fig. 11 is a vertical section in line 11 11 of Fig. 9, and Fig. 12 is a perspective view of a bracket adapted to support the friction-bar.

In Fig. 1, $A A' A^2$ represent three of the uprights which go to make up the inclosure of an elevator-well, and A^3 the transom. The door B is shown in a closed position in Fig. 1 and moves to a position between the uprights $A A'$ when open. The track a is supported upon the uprights in the usual manner and carries the door-hanger pulleys $b b'$. A friction-bar C is supported above the door by brackets $c c'$, and said bar is capable of a

slight lateral movement on said brackets, the brackets having transverse slots c^2 to receive bolts c^3 upon the friction-bar. Adjacent to the upright A' is a continuously-rotating shaft D , journaled in brackets d , Fig. 7, secured upon the upright A' , and upon this shaft below the bracket is secured a grooved friction-wheel E , adapted by frictional contact with the friction-bar C to move the door in one direction. Above the bracket is an eccentric block d' , having a slot d^2 , Fig. 6, through which a screw d^3 extends, said screw being threaded in the bracket to clamp the eccentric block thereto in the desired position. Upon said block d' is rotatably seated a lever F , having journaled in its free end a short shaft f , which has secured upon its lower end a second friction-wheel G , adapted for frictional contact with the friction-wheel E and with the friction-bar C to move the door in the direction opposite to that in which the friction-wheel E moves the door. The shaft f is supported in said lever by a collar f^3 , secured to it and resting upon the lever. (See Figs. 4 and 11.) An arm f' is secured to the lever F and has upon its end a knob f^2 , lying in the path of a shoe or other suitable mechanism carried by the elevator and adapted by engagement with the knob f^2 to move the friction-wheel G into engagement with the bar C and wheel E .

The lever F is normally held in a position in which the friction-wheel G is out of contact with the friction-bar C by a spring f^4 , secured upon the bracket d , Fig. 6, and bearing upon the lever F at f^5 .

The friction-wheels E and G are formed with grooves, the opposite sides $e e'$ and $g g'$ of which are adapted to engage bearing-faces $C' C^2$ upon the friction-bar C , and said bearing-faces extend along the upper and lower edges of said friction-bar on the greater portion of its length in a straight line and terminate in offset portions $c^5 c^6$, connected to the main portions by oblique portions $c^7 c^8$. These terminals of the friction bearing-faces $C' C^2$, it should be noticed, are nearer the bottoms of the grooves of the friction-wheels, and consequently when in engagement therewith are moved at a lower rate of speed than when the parts $C' C^2$ are in engagement therewith, thus making

the starting and stopping of the door less violent than if it were started or stopped at the maximum speed. The friction-wheel E is also formed with a second groove e^2 , Fig. 11, fitted to a circumferential rib g^2 upon the friction-wheel G and adapted by frictional contact therewith to rotate the latter. These two friction-wheels are normally held out of contact with each other by the spring f^4 ; but when the friction-wheel G is moved into frictional contact with the bar C it is also brought into engagement with the rotating friction-wheel E upon the shaft D.

The friction-bar C is normally held toward the friction-wheels, but out of contact with either one of them, by a spring H, one end of which is secured upon a laterally-extending arm d^5 of the bracket d , the other end bearing upon a movable bar I, which carries rollers i upon its ends engaging the friction-bar C. The bar I is supported from an ear d^6 of the bracket d by means of a screw i^2 , extending through a transverse slot d^7 in the ear d^6 , and thereby limiting the movement of the bar I.

Fig. 8 indicates the relative positions of the friction-bar C and friction-wheels E and G. If the friction-wheel G be now swung in the direction of the arrow indicated thereon, it will engage the terminal friction-faces c^5 of the friction-bar and move the same against the action of the spring H until it comes into frictional engagement with the friction-wheel E, Fig. 9, when it will be rotated by the latter, and thus, because of its frictional engagement with the bar C, move the door in the direction indicated by the arrow, and thereby open the same. The movement of the door continues until the terminal c^6 runs off the wheel G, in which position the door is open to its fullest extent. As soon as the lever carrying the friction-wheel G is released the spring f^4 swings the latter back to its normal position—namely, that seen in Figs. 6 and 8—which permits the spring H to crowd the terminal c^6 into contact with the rotating friction-wheel E, which closes the door, the terminal c^5 running off the wheel when the door is fully closed, Fig. 8.

I am aware that great variation in detail is possible, and I do not limit my invention to the specific construction above described.

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

1. In a door-operating mechanism, the combination of a rotatable shaft, a friction-wheel thereon, a door, a friction-bar supported thereon and capable of a slight transverse movement with respect thereto, said friction-wheel lying in the normal path of the friction-bar and adapted to move it in one direction, a second and oppositely-rotatable friction-wheel adapted for engagement with the friction-bar, and means for moving the second wheel into working engagement with the friction-bar and for moving said friction-bar transversely from its normal path and thus

preventing its contact with said first wheel; substantially as described.

2. In a door-operating mechanism, the combination with a rotatable shaft and a friction-wheel thereon, adapted to move a door in one direction, of a lever eccentrically journaled with respect to said shaft, a second friction-wheel journaled in said lever, a door, a friction-bar upon said door, adapted for engagement with both of said wheels, the second wheel being normally out of engagement with the bar and the first wheel, and means for swinging the second wheel into engagement with said bar and wheel; substantially as described.

3. In a door-operating mechanism, the combination with a rotatable shaft and friction-wheel thereon, of a lever eccentrically journaled with respect to said shaft, a second friction-wheel journaled upon said lever, a friction-bar having a limited transverse movement and adapted for frictional contact with either of said friction-wheels, a spring engaging said lever and adapted to yieldingly hold the second-named friction-wheel away from the friction-bar, and a spring adapted to press said friction-bar toward the friction-wheels; substantially as described.

4. The combination with a suitable means of support, of a sliding door, a rail secured to said door against longitudinal movement, but having a limited transverse movement thereon, a rotatable shaft, a wheel thereon adapted for engagement with the rail and arranged in the normal path of said rail, means for yieldingly holding said rail in said normal position, a second wheel rotatably mounted out of the normal path of said rail and also adapted for engagement therewith, and means for moving said second wheel into engagement with the rail and for moving said rail transversely from its normal path and thus preventing its contact with said first wheel; substantially as described.

5. The combination with a suitably-supported sliding door and a friction-rail mounted thereon, of a rotatable wheel adapted to engage said rail and thereby to move said door and a spring adapted to effect relative transverse movement of the rail and wheel and thereby to bring the surfaces of the rail and the wheel into alinement; substantially as described.

6. The combination with a support and sliding door, of a friction-rail on the door, a rotatable wheel adapted for engagement with said friction-rail and arranged to normally engage the same and close the door whenever the door is open, a second rotatable wheel adapted for engagement with said rail and to move the door in the opposite direction and means for simultaneously effecting engagement of the second wheel with the rail, by moving the wheel toward the rail and preventing engagement of the first wheel with the rail by moving the rail away from said first wheel; substantially as described.

7. The combination with a support and a sliding door, of a spring-backed friction-rail on the door, a rotatable friction-wheel adapted for engagement with the rail and in the path thereof, a second wheel adapted for engagement with the first and with the rail, and eccentrically mounted with respect to the first wheel and normally out of engagement with the first wheel and with the rail, and means
5 for simultaneously moving the second wheel into engagement with the first and with the

rail and moving the rail so as to prevent its engagement with the first wheel; substantially as described.

In witness whereof I have hereunto set my
hand, at Chicago, in the county of Cook and
State of Illinois, this 19th day of July, A. D.
1901.

JACKSON L. KAIL.

Witnesses:

CHAS. O. SHERVEY,
S. BLISS.