

(No Model.)

4 Sheets—Sheet 1.

R. M. BECK.
STEAM ENGINE GOVERNOR.

No. 359,006.

Patented Mar. 8, 1887.

Fig. 1.

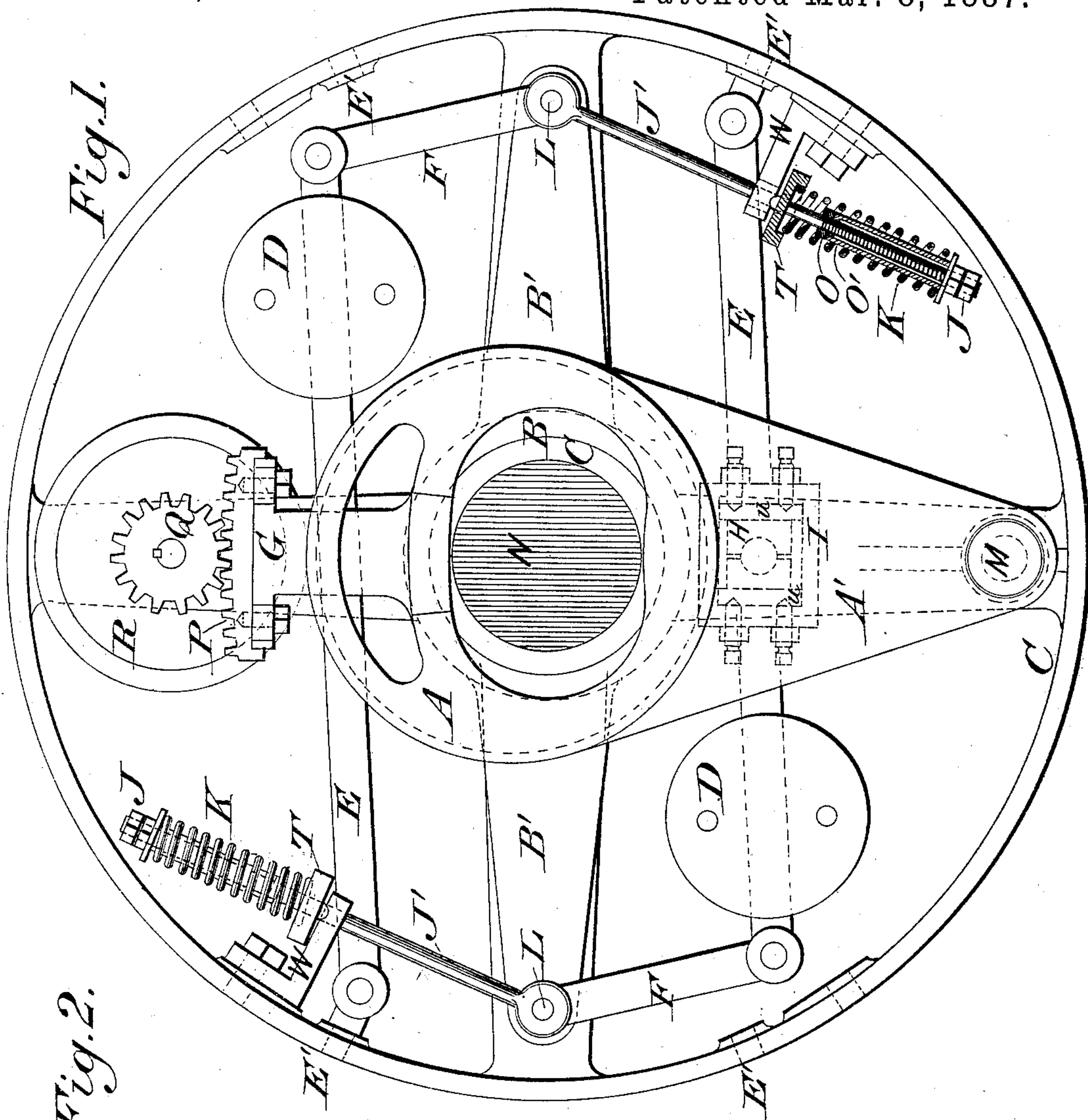
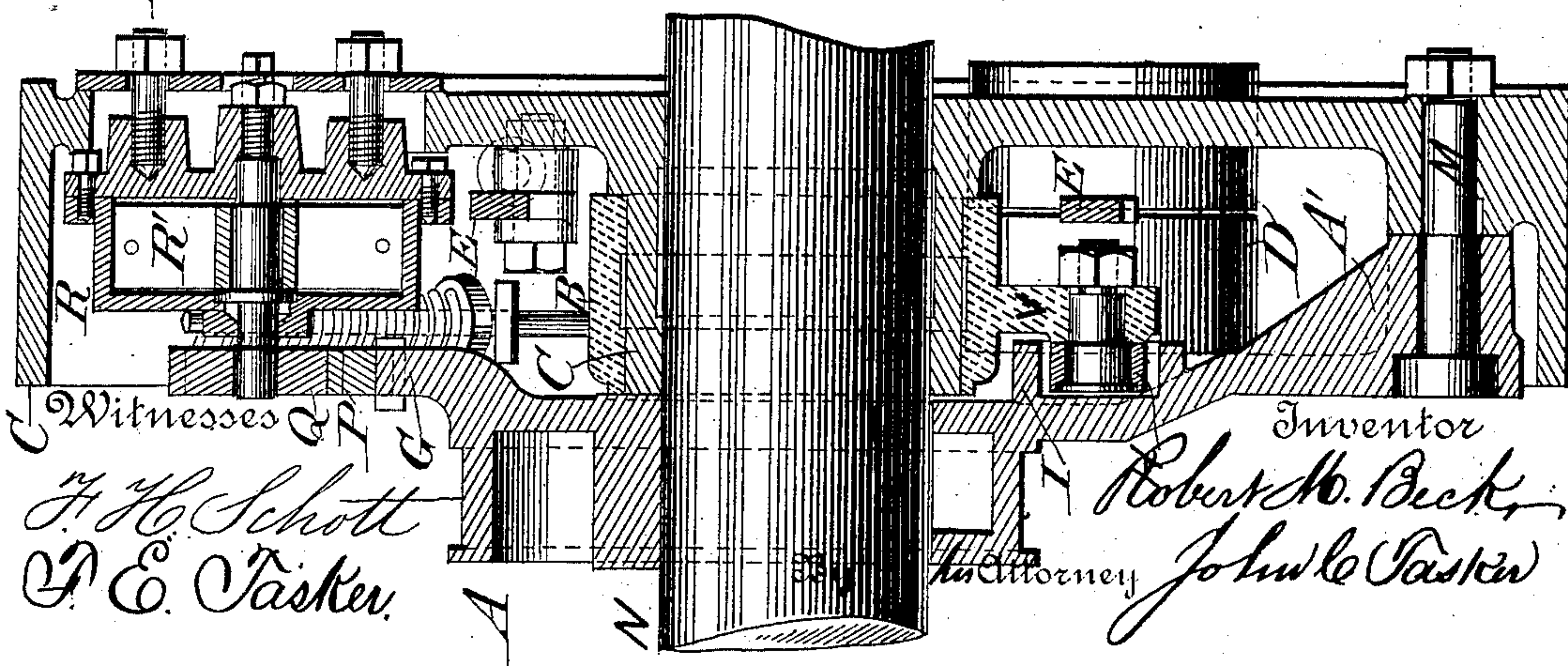


Fig. 2.



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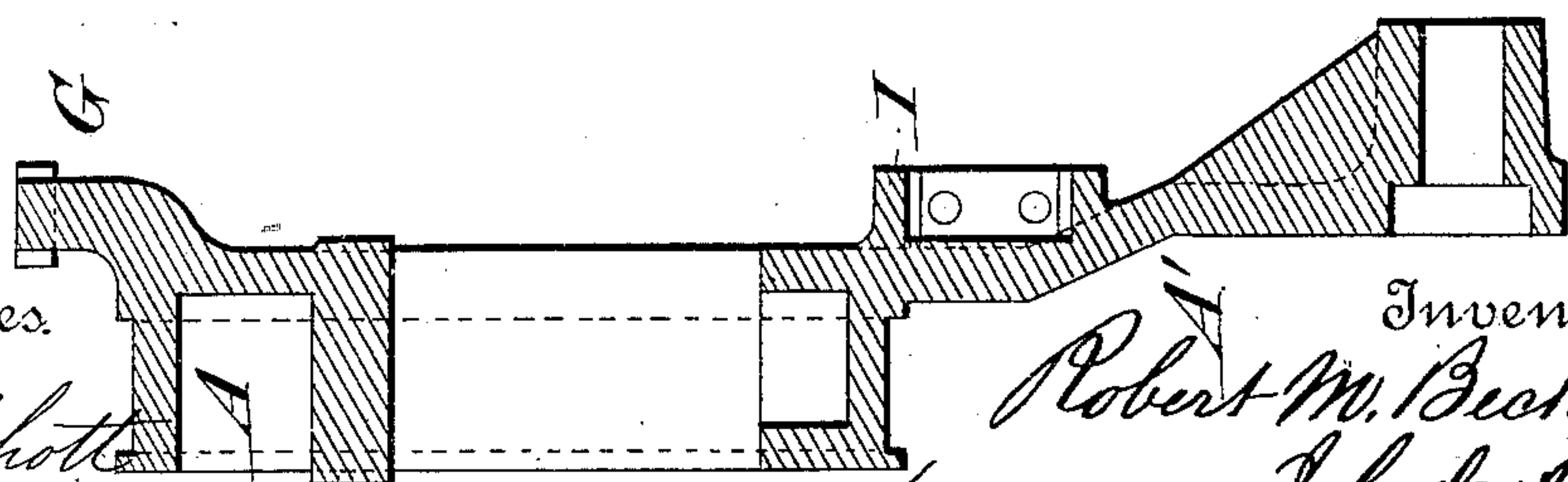
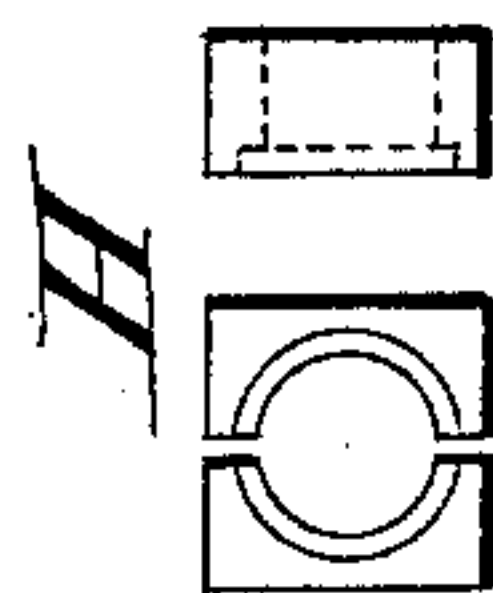
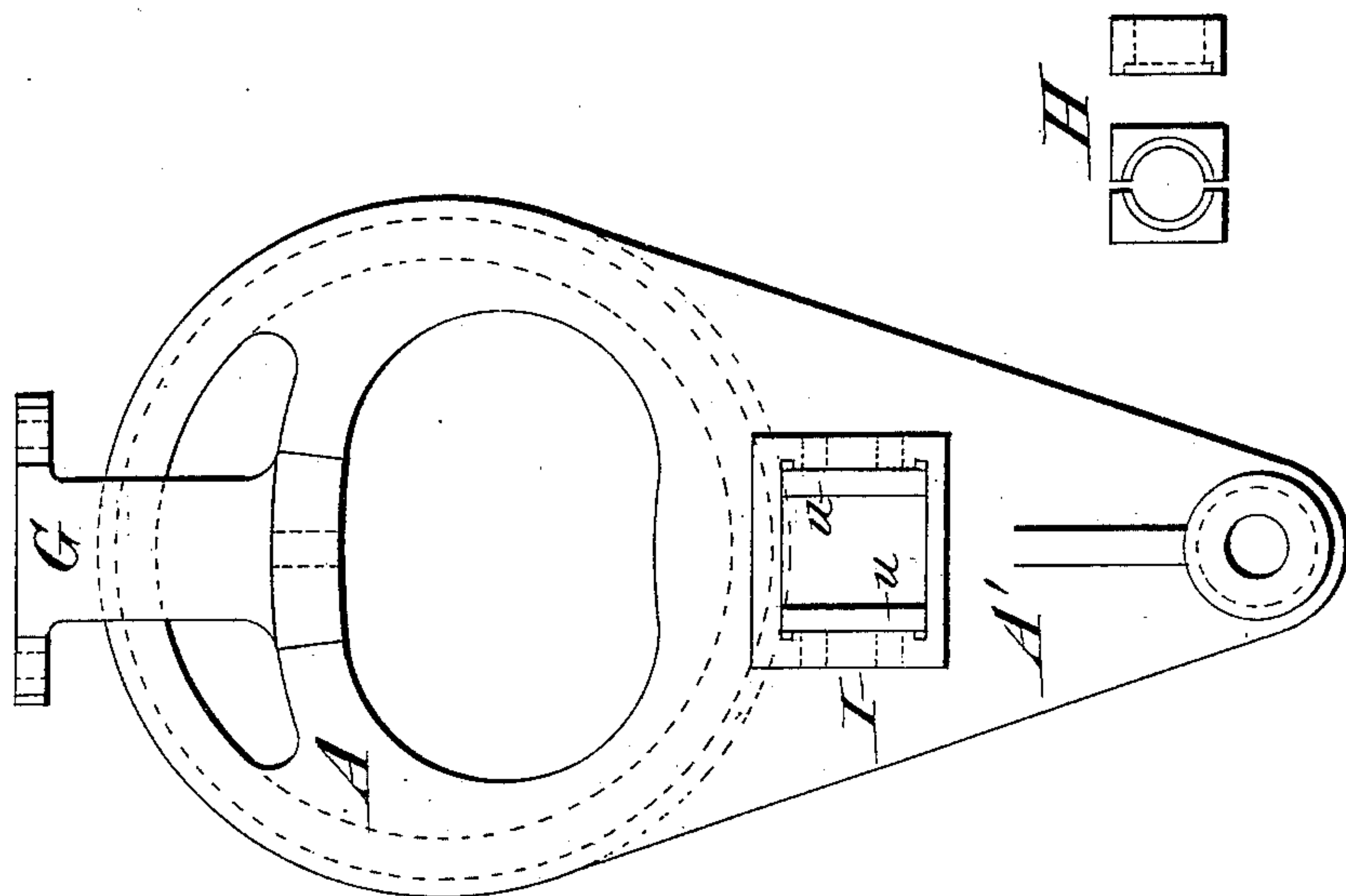
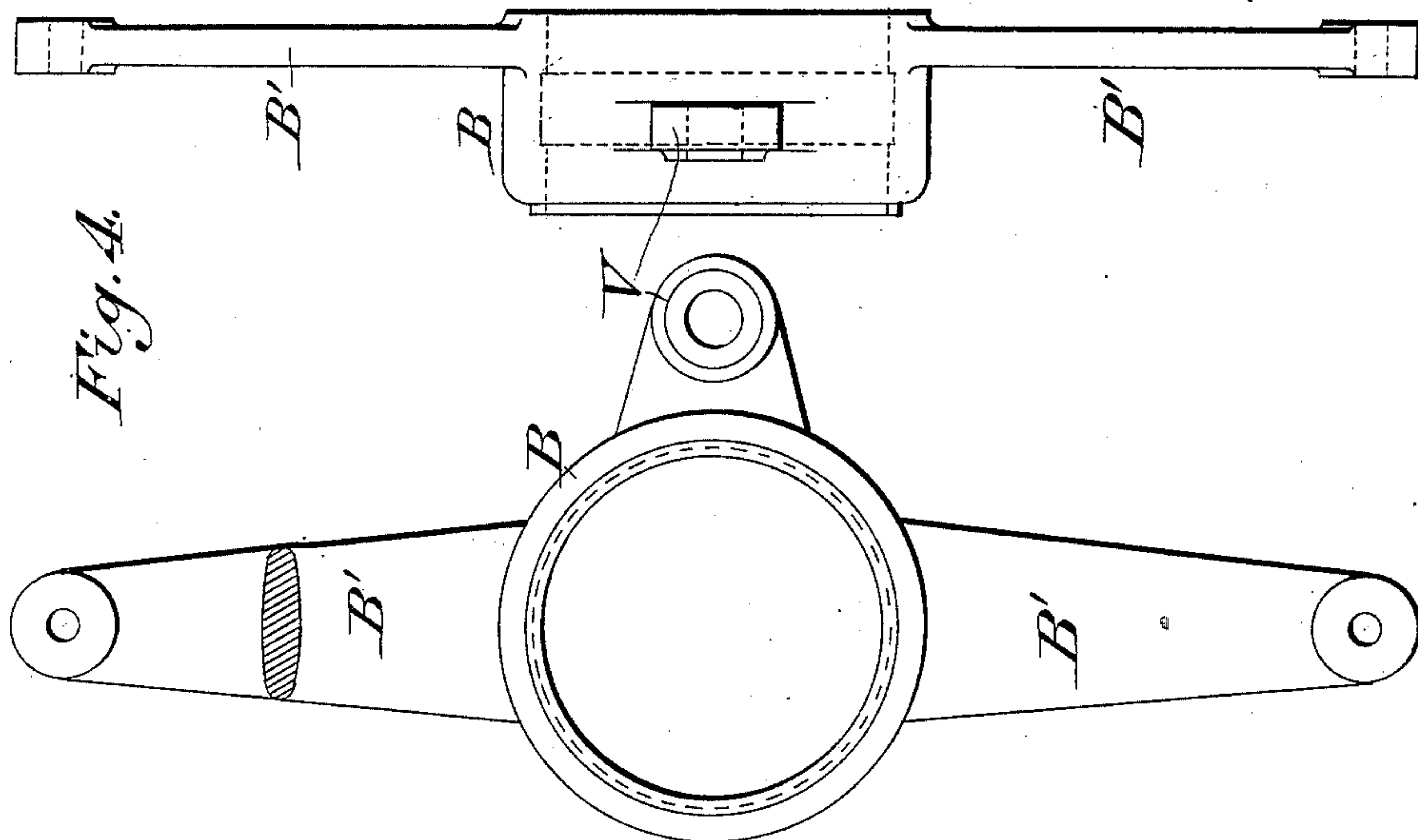
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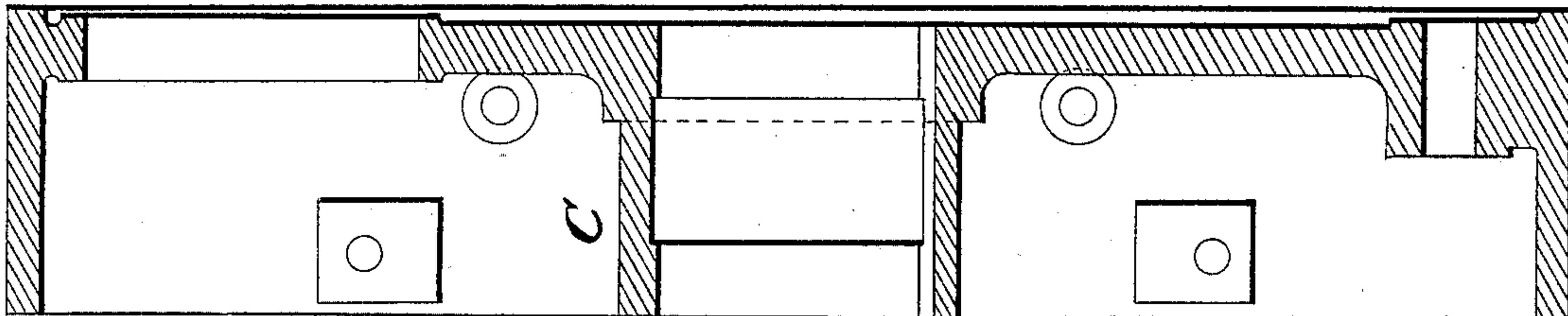
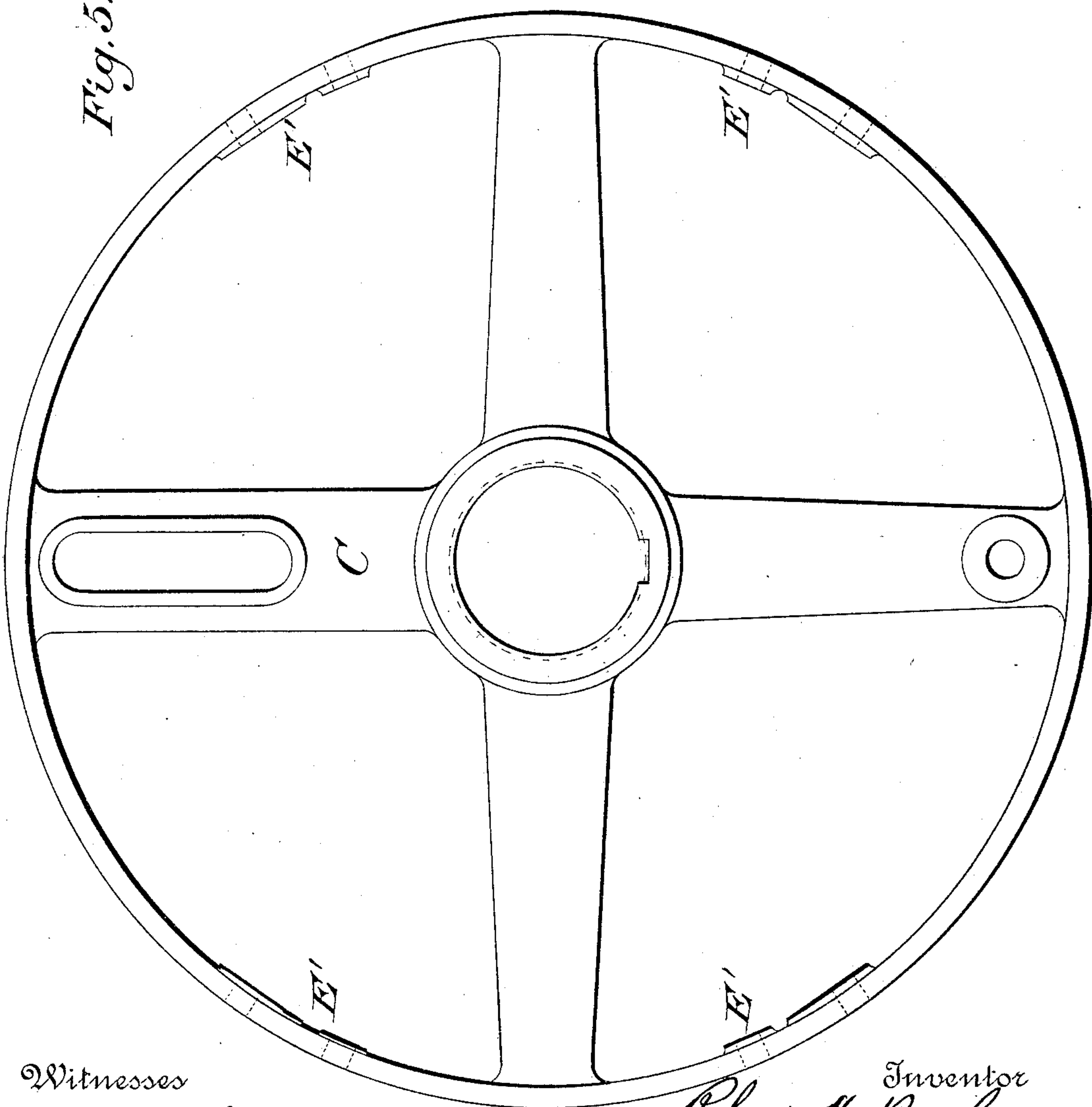


Fig. 5.



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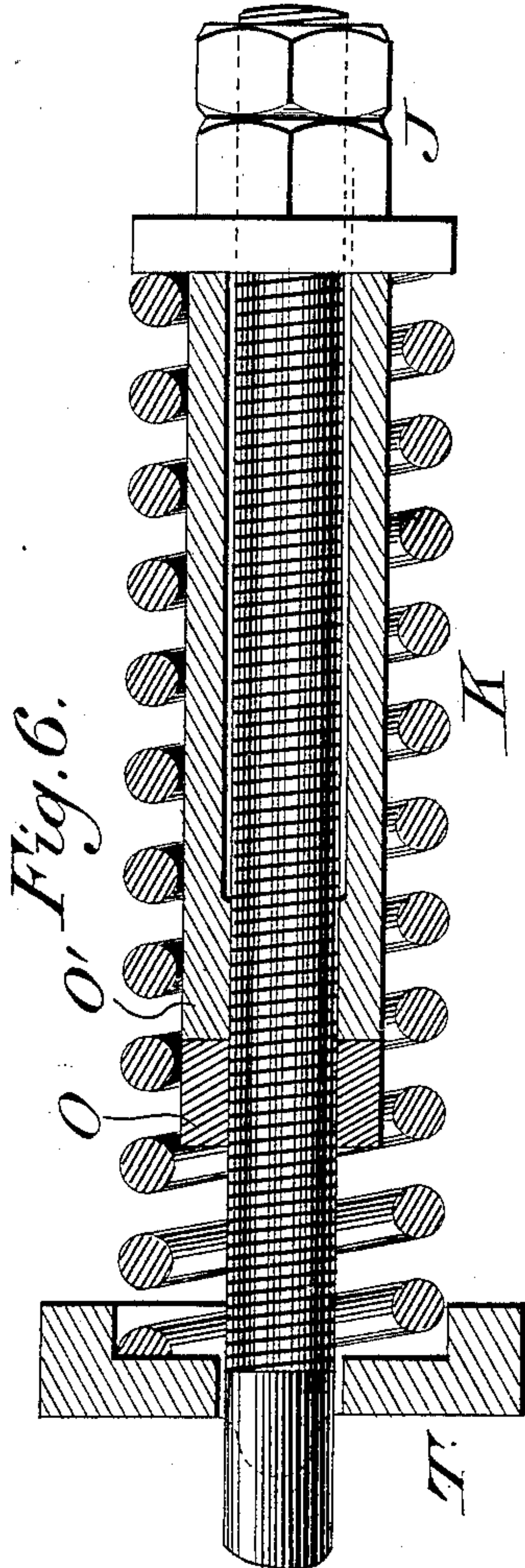


Fig. 6.

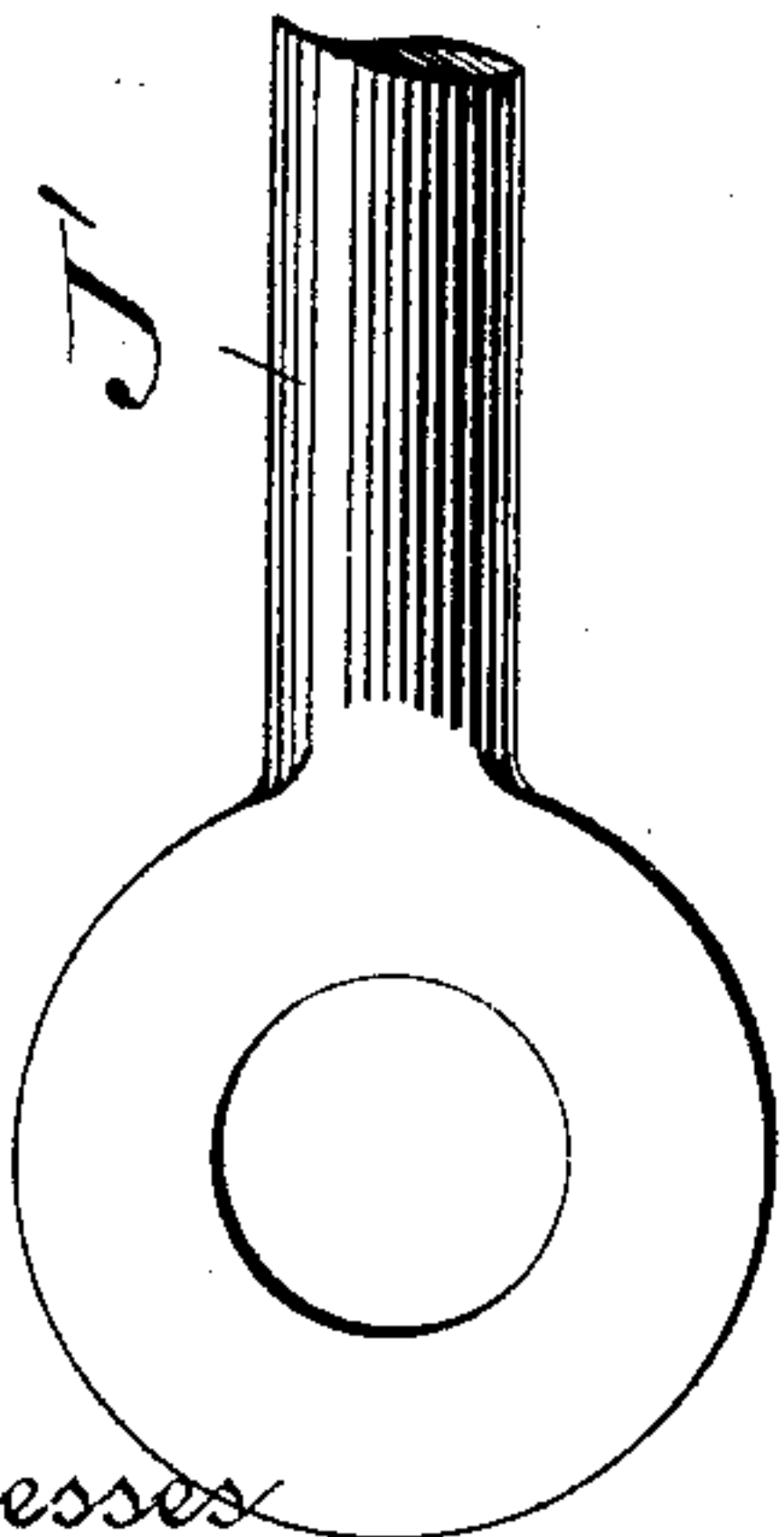
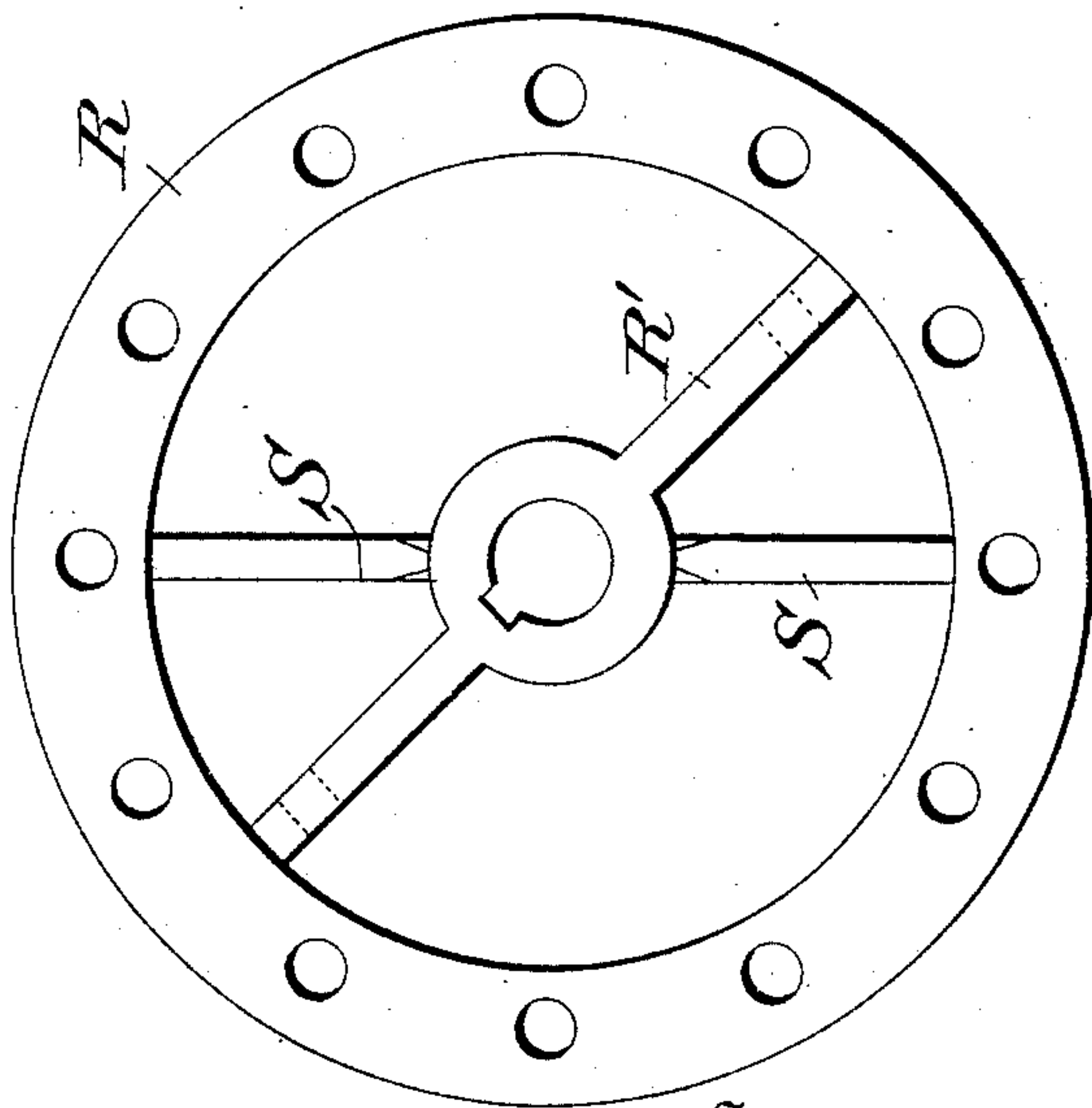


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT M. BECK, OF CHAMBERSBURG, PENNSYLVANIA.

STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 359,006, dated March 8, 1887.

Application filed November 15, 1886. Serial No. 218,931. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. BECK, a citizen of the United States, residing at Chambersburg, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engine Governors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a steam-engine governor, and has for its object the improvement of that class of wheel-governors for slide-valve steam-engines in which the governor-wheel is keyed to the engine-shaft and carries weighted levers that are pivoted within the wheel-rim, said levers being connected by links to the arms of a vibratory sleeve, which is mounted on the hub of the governor-wheel, and connected with a shifting eccentric having an arm which is pivoted to said wheel; and the invention has further in view the improvement in that class of fly-wheel governors in which a casing containing a paddle-wheel immersed in some fluid substance is combined with the relatively-movable parts of the governor. In short, this invention is an improvement upon that shown and described in my former Letters Patent No. 317,285, May 5, 1885, and Letters Patent No. 318,852, May 26, 1885; and the invention consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating my invention, Figure 1 is a face view of a governor-wheel embodying my present improvements. Fig. 2 is a transverse vertical section of Fig. 1. Fig. 3 represents a plan and longitudinal section of the eccentric. Fig. 4 is a plan and elevation of the vibrating armed sleeve. Fig. 5 is a face view and a transverse vertical section of the governor-wheel, the interior mechanism being removed. Fig. 6 is an enlarged detail sectional view of spring, rod, jam-nuts, sleeve, and cup, and shows the manner of their arrangement to prevent the eccentric from passing mid-gear. Fig. 7 is a plan view of the paddle-wheel and casing with front plate removed.

Like letters of reference designate like parts in the several views.

A represents the eccentric, which is provided with an arm, A', and is arranged to swing over the engine-shaft N from a pin, M, by which said arm is pivotally connected with the governor-wheel C, which is securely keyed to the engine-shaft, so as to rotate therewith. A sleeve or collar, B, having two arms, B' B', is mounted on the hub of the wheel C back of the eccentric, and is vibrated by means of links F F, that connect the arms B' B' with the free ends of levers E E, which are fulcrumed to the lugs E' E' within the rim of the wheel, and which carry adjustable weights D D.

On the flanged casing or governor-wheel C, and in close proximity to the lugs E' E', are secured, by means of bolts or otherwise, the knee-plates W W, which are fashioned to afford pivotal bearings for the cups T T, and through which pass the rods J', that are pivotally connected with the ends of the arms B' B' of the vibratory sleeve.

L L indicate pins which pass through and connect together the arms B' B', links F F, and rods J' J'. These rods J' J' are inclosed by springs K K, coiled about that portion of the rods between the cups T and their free extremities, said extremities being provided with jam-nuts J J, for adjusting the tension of the springs K to suit different speeds of the engine. The rods J' J' are further provided with jam-nuts O O, screwed thereon, and preferably with the sleeved nuts O' O', which jam with the nuts O O and serve to prevent the springs from lapping during compression. These spring-inclosed rods and their accompaniments are shown in enlarged detail in Fig. 6. They serve to govern the travel of the weighted levers, and may be so arranged as to prevent the eccentric from passing mid-gear, for the position of the jam-nuts O O may be varied, and thereby regulate the degree of movement of the two-armed vibratory sleeve.

On the eccentric-arm A' is cast a box, I, which incloses a steel die, H, said die being made in halves, for the purpose of taking up wear. The die H moves between steel gibs u u, placed on either side thereof within the box I, so as to form wearing-surfaces, and they are adjustable by means of set-screws, as shown.

A lug, V, on the sleeve B carries a pin that enters the die H, and thus establishes a connection between the vibratory sleeve and the shifting eccentric, so that the movements of the former may actuate the latter.

An arm, G, is secured upon the upper portion of the eccentric, and to this arm is bolted or otherwise rigidly fastened the segment-gear P, which meshes with the gear-wheel Q, keyed upon a shaft that carries the paddle-wheel R' within the casing R. This casing is fastened within the governor-wheel rim in any suitable manner, and contains oil, air, or other liquid or fluid, and incloses the aforesaid paddle-wheel, which is mounted on a shaft geared to the shifting eccentric. It is obvious that the purpose of this arrangement is to obviate the effects of sudden movements in the parts of the governor, and thereby produce a steady motion of such parts and an accurate and reliable action of the cut-off valve. The interior of the casing R may be provided with division-plates S S, if desired, for confining the liquid or fluid with which said casing is to be filled. These plates may, however, be dispensed with; but when they are employed the blades of the paddle-wheel will operate each in its respective chamber or division of the casing. The blades can be made smaller than the case Q, and may be provided with perforations for the passage of the resisting-fluid, (see Fig. 7,) thus securing any desired degree of resistance.

From the foregoing description the operation and advantages of my improved governing mechanism for steam-engines will be readily understood. The centrifugal force consequent upon the rapid rotation of the governor-wheel will influence the weighted levers E E to move in a direction tangential to the wheel and its shaft, and this movement of the weighted levers will tend to vibrate the armed sleeve B on the hub of the wheel, the travel, however, of the levers being controlled by the spring devices, consisting of the rods J', springs K, and the other accompanying parts; but as the speed of the engine becomes excessive the tension of these spring devices is overcome, and the armed sleeve B is enabled to vibrate sufficiently to shift the eccentric A, through its connection with said eccentric, so as to automatically actuate a valve-rod which is connected in any suitable manner with the said eccentric, and thereby diminish or cut off the supply of steam. In order to prevent the eccentric from passing mid-gear, the jam-nuts O O on the rods J' J' may be adjusted relatively to the other parts of the spring devices to regulate the movements of the arms B' B' and accomplish this result. When the revolutions of the governor-wheel decrease, the centrifugal action of the spring devices is more than sufficient to counterbalance the centrifugal force exerted by the weighted levers, and the mechanism is caused to resume its normal position. As above explained, the eccentric is geared to a wheel on the paddle-

wheel shaft. By this means any tendency to sudden movements of the levers E E, due to gravity of the weights D D or eccentric A, or other disturbing causes, will be counteracted by the uniformity of movement of the paddle-wheel within the confined fluid which surrounds it.

It will be seen that the rim of the wheel C is provided with two sets of seats for the fulcruming-lugs E' E' of the weighted levers E E, so that the mechanism can be readily reversed, and that the wheel C is further provided with two sets of seats for the knees W, so that the centripetally-acting spring devices may be correspondingly rearranged to suit the reversal of the governor mechanism.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the governor-wheel, the shifting eccentric having a pivoted arm provided with a box or die, the two-armed vibratory sleeve connected with the eccentric-arm by a pin that enters the box or die, the weighted levers fulcrumed to the wheel, the connecting-links, and the centripetally-acting spring devices connected to the armed sleeve, all constructed and arranged to operate substantially as described.

2. The combination of the engine-shaft, the flanged governor-wheel secured to said shaft, the eccentric adapted to swing over the shaft and having an arm pivoted to the wheel, the two-armed vibratory sleeve mounted on the hub of the wheel, the weighted levers fulcrumed to the wheel, the connecting-links between the armed sleeve and the weighted levers, and the spring devices for governing the travel of the weighted levers, consisting of rods pivoted to the armed sleeve passing through knees on the wheel-rim, said rods being each provided with a cup, an inclosing-spring, jam-nuts, and sleeved nut, all arranged substantially as shown and described.

3. The combination of the shifting eccentric, the governor-wheel having fulcruming-lugs and knee-plates adjacent to said lugs, the two-armed vibratory sleeve mounted on the wheel-hub and connected with the eccentric, the reversible weighted levers, the links for connecting said levers with the armed sleeve, and the spring devices, consisting of rods J', cups T, springs K, jam-nuts J, sleeved nuts O', and jam-nuts O, substantially as described.

4. The combination, with the weighted levers, shifting eccentric, and vibrating armed sleeve, connected and arranged as shown, of the centripetally-acting spring devices for governing the travel of the weighted levers, consisting of rods J', passing through the knee-plates W, the cups T, having a pivotal bearing in said plates, the springs K, jam-nuts J, sleeved nuts O', and jam-nuts O, substantially as described.

5. The combination, with a shifting eccentric having an arm which carries a segment-gear, of a casing containing a fluid and in-

closing a paddle-wheel or vane that is mounted on a shaft which carries a gear meshing with the said segment, substantially as described.

6. The combination, in a fly-wheel governor,
5 of the governor-wheel C, the vibratory sleeve B, mounted on the hub of said wheel, the eccentric A, having a segment-gear, P, weighted
levers E E, links F F, spring-inclosed rods J',
J', the fluid-containing casing R, attached to
10 the governor-wheel, and the paddle-wheel R',

mounted within said casing on a shaft, the projecting end of which carries a pinion that meshes with the segment P, substantially as described.

In testimony whereof I affix my signature in 15
presence of two witnesses.

ROBT. M. BECK.

Witnesses:

BENJ. F. NEAD,
D. K. WUNDERLICH.