

(No Model.)

2 Sheets—Sheet 1.

R. M. BECK.

GOVERNOR FOR STEAM ENGINES.

No. 317,285.

Patented May 5, 1885.

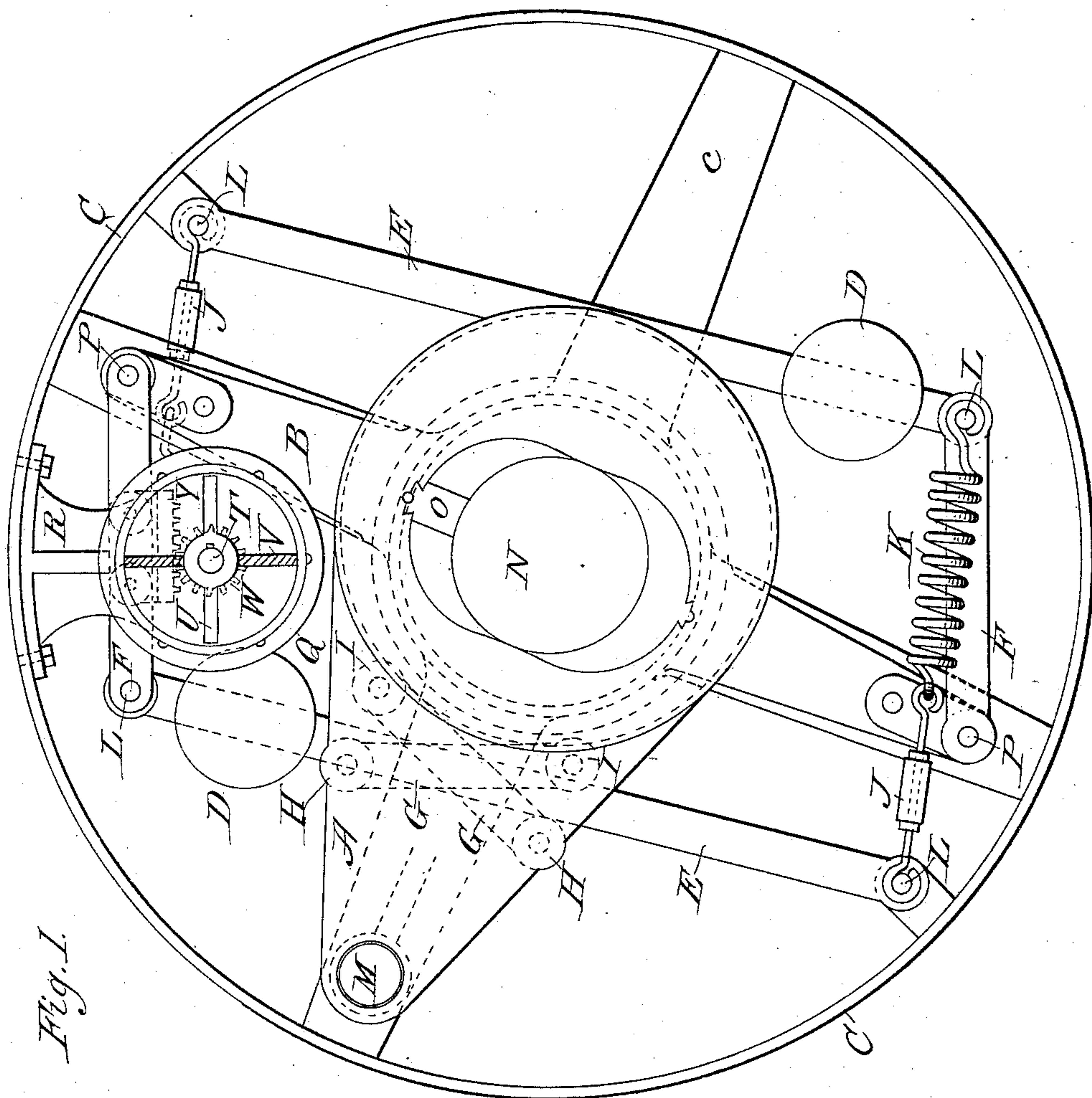


Fig. 1.

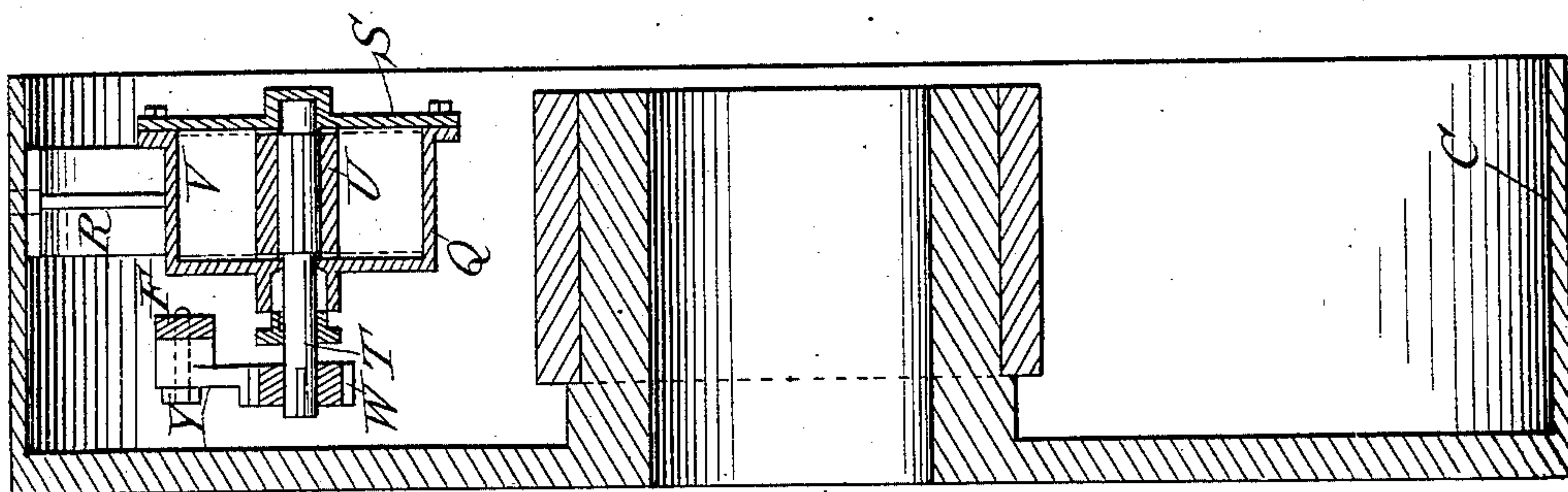


Fig. 2.

Attest:

J. H. Schott
Fred C. Tasker

Inventor:

Robert M. Beck
By John C. Tasker

(No Model.)

2 Sheets—Sheet 2.

R. M. BECK.

GOVERNOR FOR STEAM ENGINES.

No. 317,285.

Patented May 5, 1885.

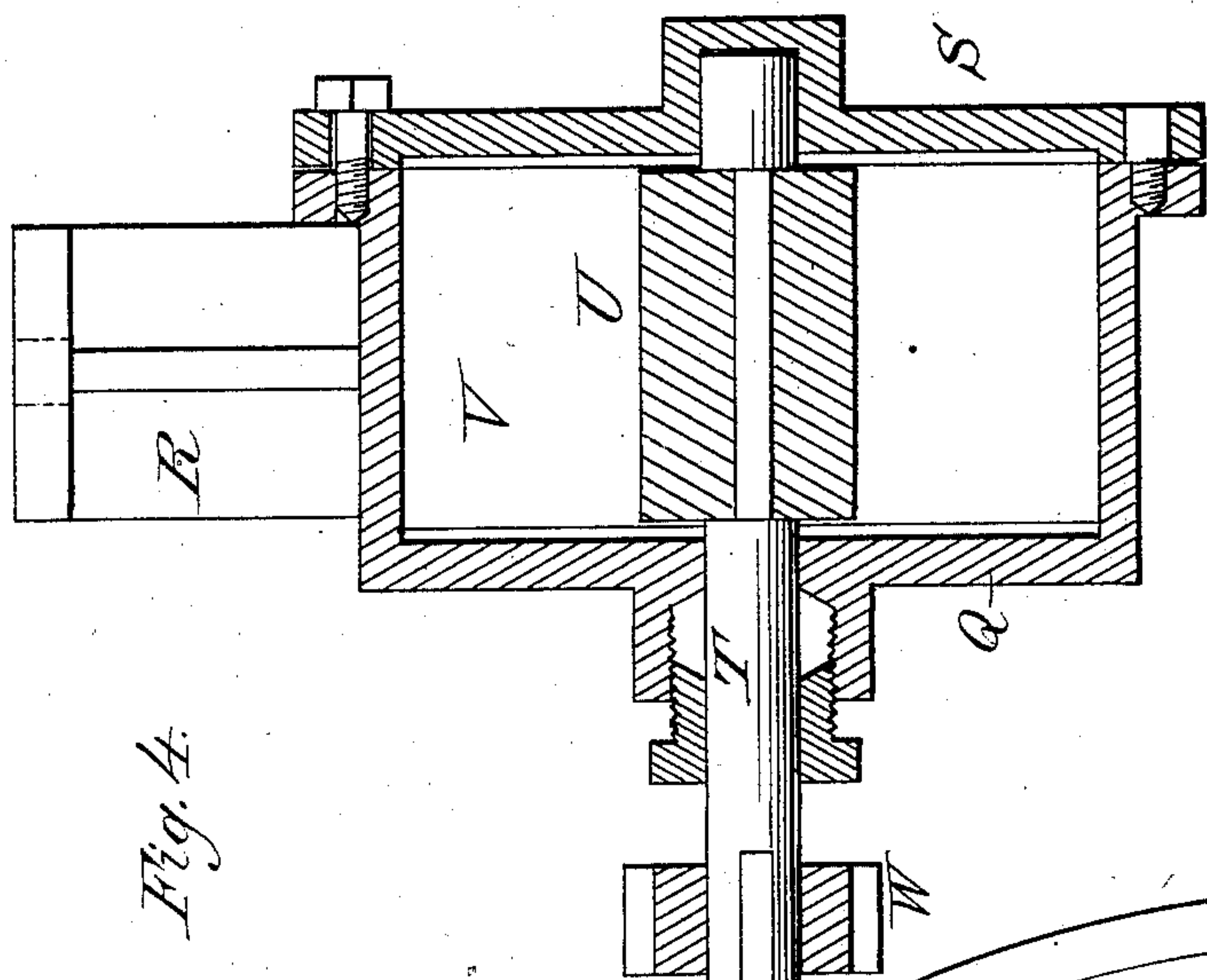


Fig. 4.

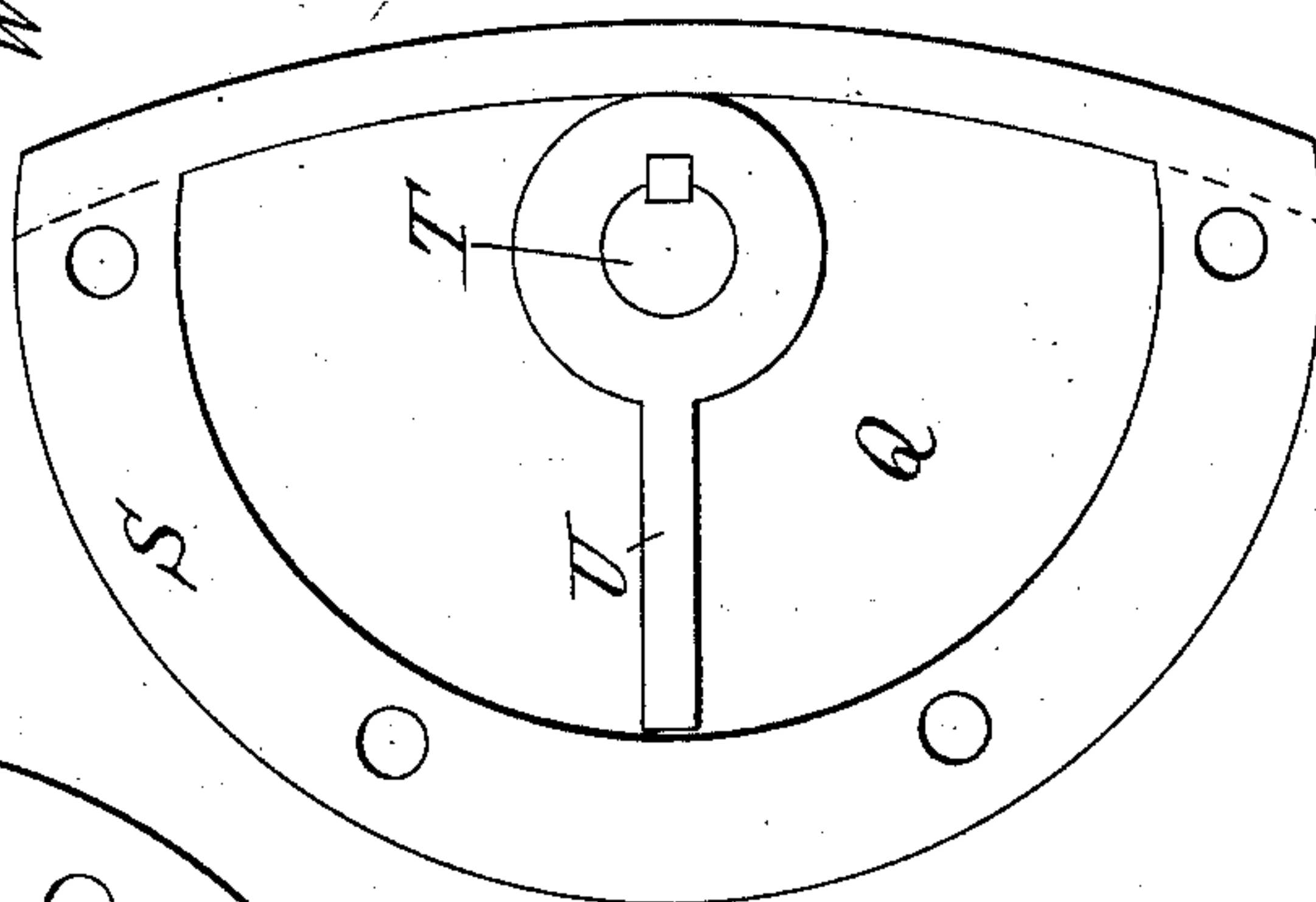


Fig. 5.

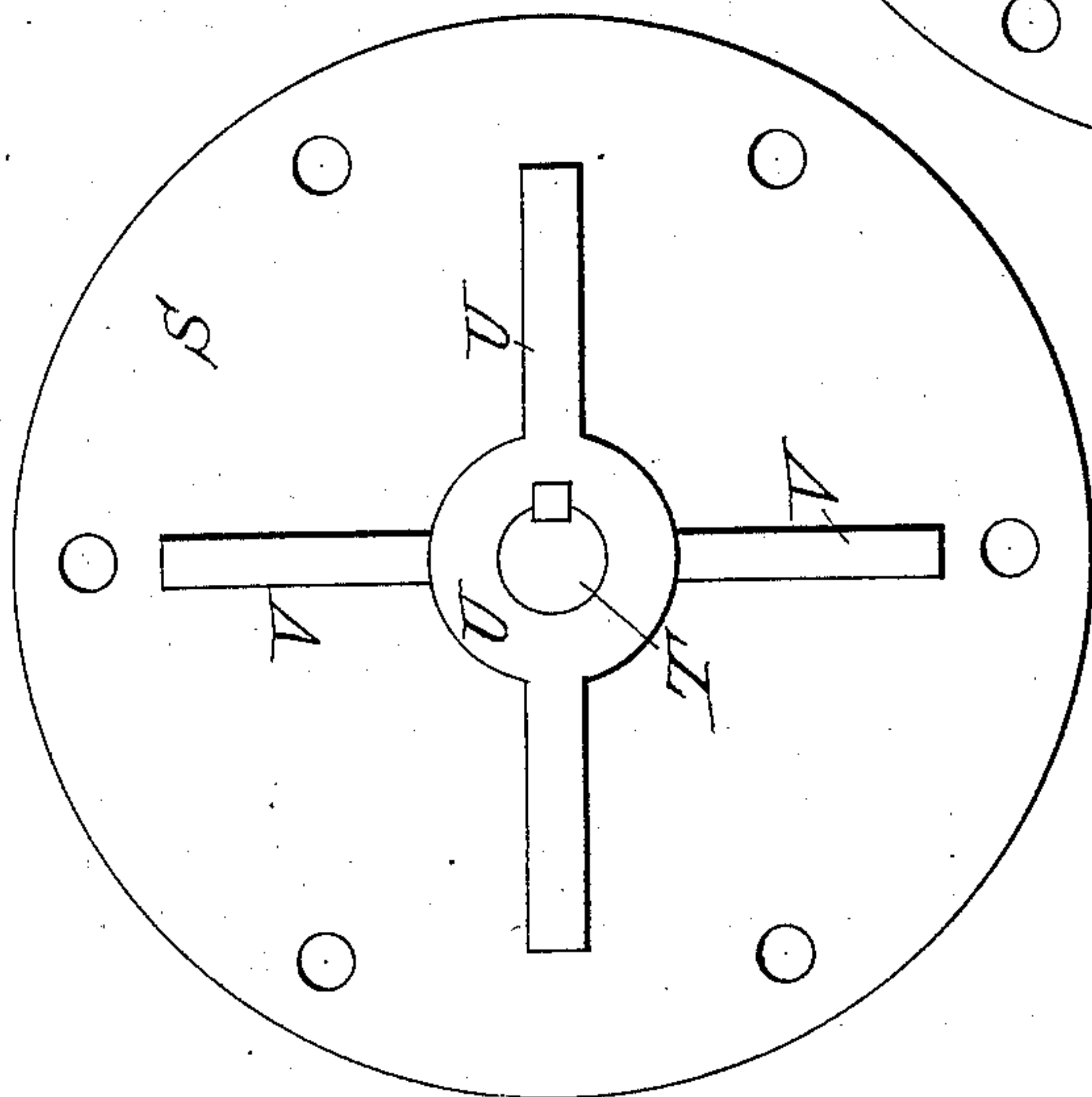


Fig. 3.

Attest:

H. H. Schott
Fred E. Tasker.

Inventor:

Robert M. Beck
By John C. Tasker, atty

UNITED STATES PATENT OFFICE.

ROBERT M. BECK, OF CHAMBERSBURG, PENNSYLVANIA.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 317,285, dated May 5, 1885.

Application filed March 7, 1885. (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 Governors for Steam-Engines; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The object of my present invention is to provide an improved means of obviating the effects of sudden movements in the parts of a fly-wheel governor and shifting eccentric, thereby producing a steady motion of such parts and an accurate and reliable action of the cut-off valve.

My invention consists in the combination, with relatively movable parts in a fly-wheel governor, of a tight casing for containing oil, air, or other fluid, and inclosing a paddle-wheel or movable vane that is mounted on a shaft geared to some movable part of the governor, said paddle-wheel or vane being adapted to act in connection with the resisting fluid to prevent sudden movements of connected parts and impart the requisite steadiness and regularity of motion to the movable parts of the governor, the eccentric, and the valve-gear.

The invention is applicable to various kinds of fly-wheel governors for steam-engines; but for convenience will be here described in connection with a governor-wheel that is keyed to the engine-shaft and carries weighted levers connected by links to the arms of a vibratory sleeve, which is mounted on the hub of said governor-wheel and connected with a shifting eccentric, as shown and described in my former application for patent, filed February 12, 1885, Serial No. 155,678.

In the annexed drawings, illustrating the invention, Figure 1 is a face view of a governor-wheel embodying my present improvements. Fig. 2 is a vertical transverse section of a governor-wheel, representing the paddle-wheel and its casing in sectional detail. Fig. 3 is a plan view of the paddle-wheel and casing with front plate removed. Fig. 4 is a

vertical transverse section of the paddle-wheel and its casing. Fig. 5 represents a modified form of paddle-wheel and casing in plan view.

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

A is the eccentric. B is the two-armed vibratory sleeve. C is the governor wheel. D D are adjustable weights on the pivoted levers E E. F F are links that connect the opposite arms of the sleeve B to the free ends of the weighted levers. G G are links by which connection is made between bosses H H on the eccentric and bosses I I on the vibratory sleeve. J J are adjustable sleeved connections for the attachment of springs K K, by which the free end of each weighted lever is connected with the fulcrum of the other. L L are pins for connecting the springs K, levers E, and links F at one end, and for attaching the sleeved connections J to the pivotal lugs of the weighted levers. M is a pin by which the eccentric-arm is pivoted to the governor-wheel. N is the engine-shaft, over which the eccentric is arranged to swing; and O is a removable stop that is keyed in either side, as required, between the eccentric and shaft, in order to prevent the eccentric from passing mid-gear. P P are bolts or pins for connecting the links F F to the two-armed vibratory sleeve B, that is supported on the hub of the governor-wheel.

All the parts above referred to are shown and described in my former application, above mentioned, and need not be further explained in this place.

In this class of fly-wheel governors, in order to insure a steady motion of the eccentric and valve connections, it is necessary to devise means for overcoming the tendency of certain occasional disturbing causes—such as the force of gravity and the inertia of movable parts—that are liable when unchecked to change the position of the eccentric independent of the speed of the engine-shaft. It is well known, for instance, that when the heavy side of an eccentric is shifting from a lower to a higher position there is ordinarily a tendency thereof to fluctuate in its movement under the influence of gravity, especially if the speed of the engine has been diminished. Instead of overcoming this difficulty by means of an auxiliary spring; as described in my former appli-

cation, I now propose to employ a light casing for containing oil, air, or other liquid or fluid, and inclosing a paddle-wheel or vane mounted on a shaft that projects through said casing. 5 and is geared to some movable part of the governor—as, for instance, one of the links F, that connect the weighted levers E E to the vibratory sleeve B, which in turn is connected to the shifting eccentric, as before described, 10 and so controls its movements. A tight casing, Q, is attached to a lug, R, on the inner face of the governor-wheel rim, as shown in Figs. 1 and 2. This casing Q is provided with a detachable back plate, S, and in the casing and 15 its back plate are formed journal-boxes for a shaft, T, to which is secured a paddle-wheel, U, having one or more blades or vanes. The interior of the casing Q may be provided with a partition, V, if desired, for confining 20 the liquid or fluid with which said casing is to be filled. This partition may, however, be dispensed with. To the projecting end of the paddle-wheel shaft T is keyed a pinion, W, that is actuated by means of a toothed 25 rack or quadrant, Y, attached to any movable part of the governor. In the drawings this rack Y is shown attached to one of the links F, that connect the weighted levers E and vibratory sleeve, the paddle-wheel being thus 30 actuated by the movements of the weighted levers. The air, oil, or other fluid confined in the casing Q acts as a resisting medium for the blades of the paddle-wheel, and so counteracts any tendency to sudden movements in the 35 movable parts of the governor when subjected to the influence of temporary disturbing causes. The blades of the paddle-wheel operate each in its respective chamber or division of the casing Q, or may rotate entirely 40 around the case when no partition or division plate is employed. The paddles or blades can be made slightly smaller than the case Q, or be provided with perforations for the passage of the resisting fluid, if desired, thus securing 45 any required degree of resistance.

The pinion W can be made of any requisite diameter to produce a slow or rapid movement of the paddle-wheel, as may be found necessary, the resistance of the confined fluid depending 50 on the velocity of the paddles or blades.

In operation the centrifugal action of the weighted levers E E tends to vibrate the armed sleeve B on the hub of the wheel C, the travel of the levers being controlled by the centripetally-acting springs K K, the tension of which 55 can be regulated as required by means of the adjustable sleeved connections J J. Should the speed of the engine become excessive, the

contraction of the springs K K will be overcome and the sleeve B enabled to vibrate sufficiently to shift the eccentric through the connecting-links G G, so as to automatically actuate the valve-rod and diminish or cut off the supply of steam. As the revolutions of the engine-shaft decrease the centrifugal force of the 60 weighted levers E E is diminished, and the springs K K are enabled to exert a relatively greater power, whereby the governor mechanism is caused to resume its normal position. 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 movements (in contact 65 with the confined fluid in the casing Q) of the paddle-wheel Q, actuated by the pinion W, 75 and the moving part to which said pinion may be geared. The various parts of the governor are thus caused to move steadily, and so produce a reliable and correct action of the cut-off valve. 80

The casing Q may have a circular form, as shown in Fig. 1, or a semicircular form, as shown in Fig. 5. In the latter case the division-plate is dispensed with, and the paddle-wheel U has only one blade, the flattened side 85 of the casing Q being arranged to come in contact with the hub of the single-bladed wheel, so as to confine the oil or other fluid on each side of said blade, and the operation of the device being the same as that already explained. 90

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

1. In a fly-wheel governor, the combination, with relatively movable parts, of a tight casing for containing a fluid and inclosing a paddle-wheel or vane that is mounted on a shaft geared to some movable part of the governor, substantially as described. 95

2. In a fly-wheel governor, the combination, with the governor-wheel C, the vibratory sleeve B, mounted on the hub of said wheel, the eccentric A, weighted levers E E, links F F, springs K K, and connections, of the tight casing Q, attached to the governor-wheel and containing a fluid, the paddle-wheel U, mounted 100 within said casing on a shaft, T, the projecting end of which carries a pinion, W, and the rack Y on one of the movable links F, for meshing with said pinion, substantially as described. 105

In testimony whereof I affix my signature in presence of two witnesses. 110

ROBERT M. BECK.

Witnesses:

J. M. DOUGHERTY,
D. K. WUNDERLICH.