

(No Model.)

2 Sheets—Sheet 1.

J. W. NYSTROM.
STEAM ENGINE GOVERNOR.

No. 272,307.

Patented Feb. 13, 1883.

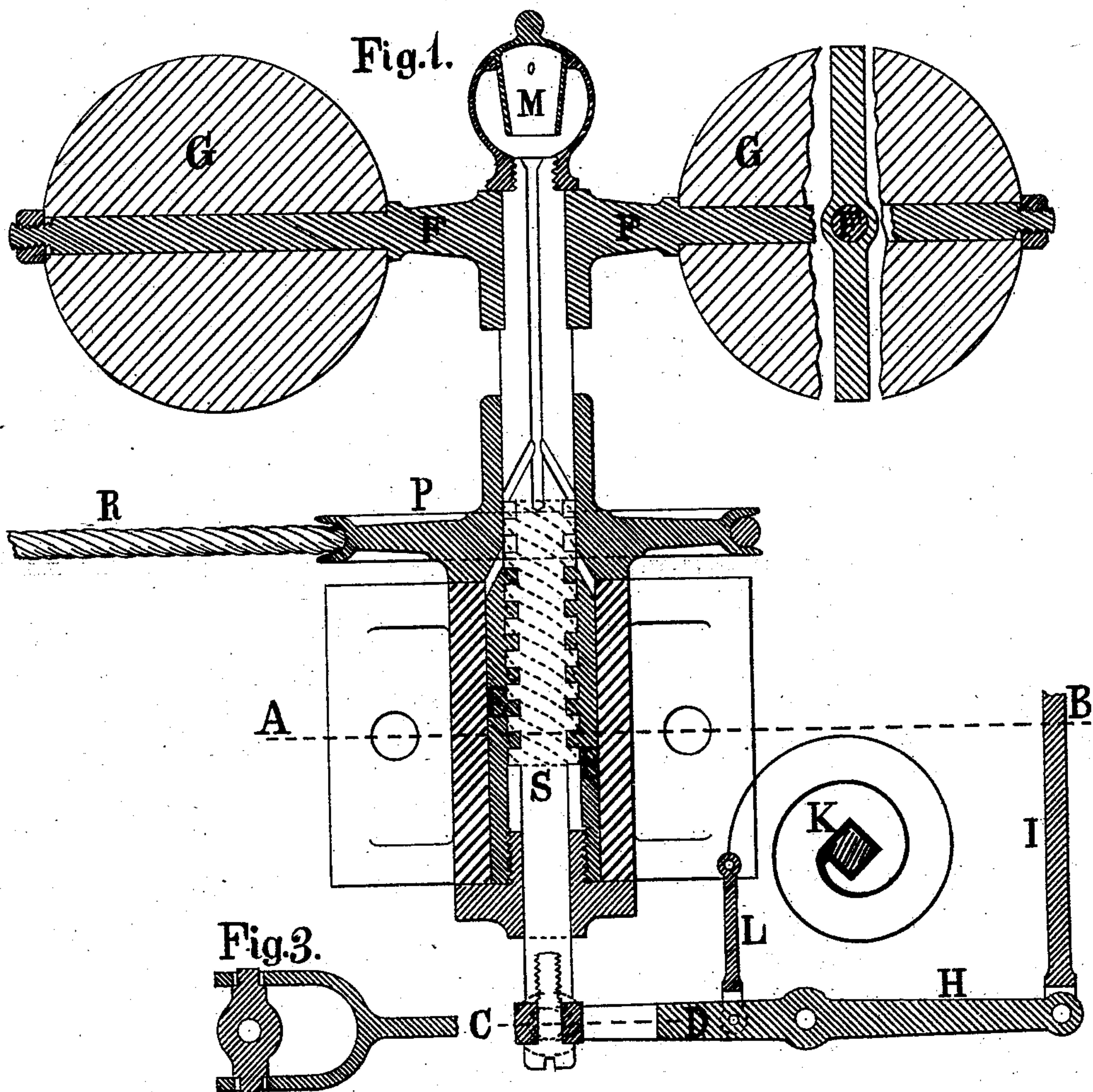


Fig. 3.

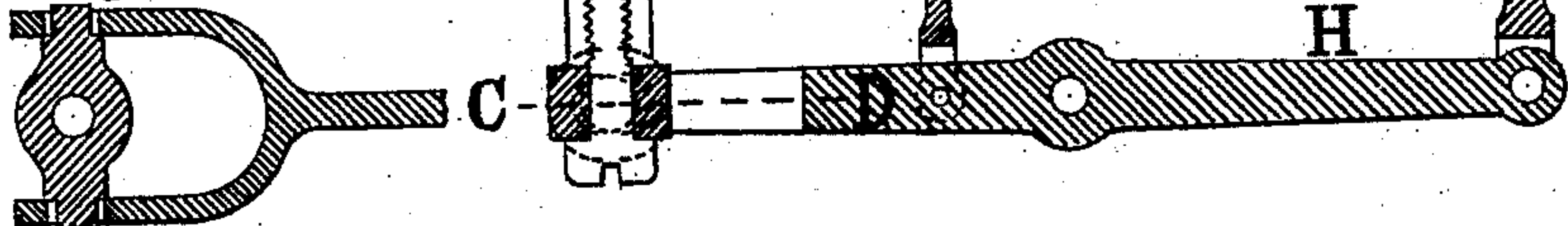
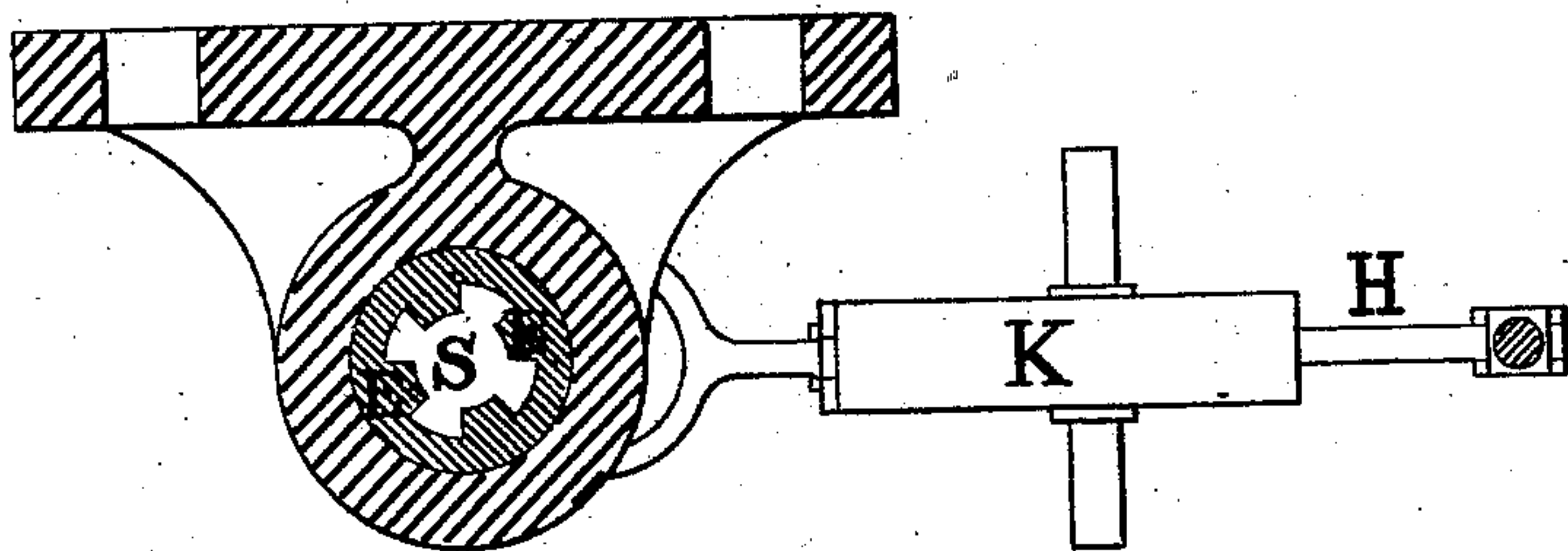


Fig. 2.



Witnesses.

James S. Phillips
Geo. T. Payne

Inventor

John W. Nystrom.

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2. Sheets—Sheet 2.

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Fig. 4.

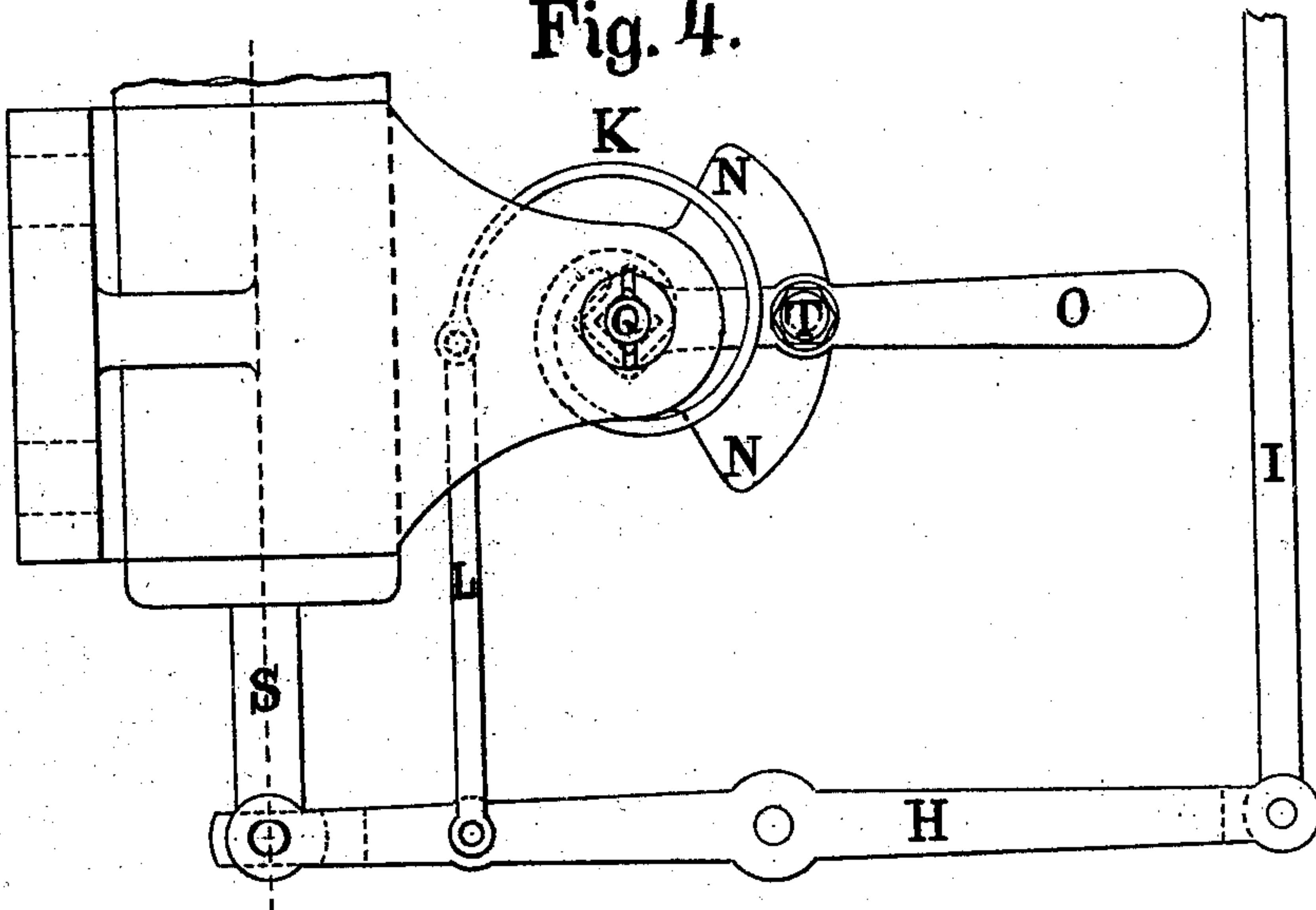
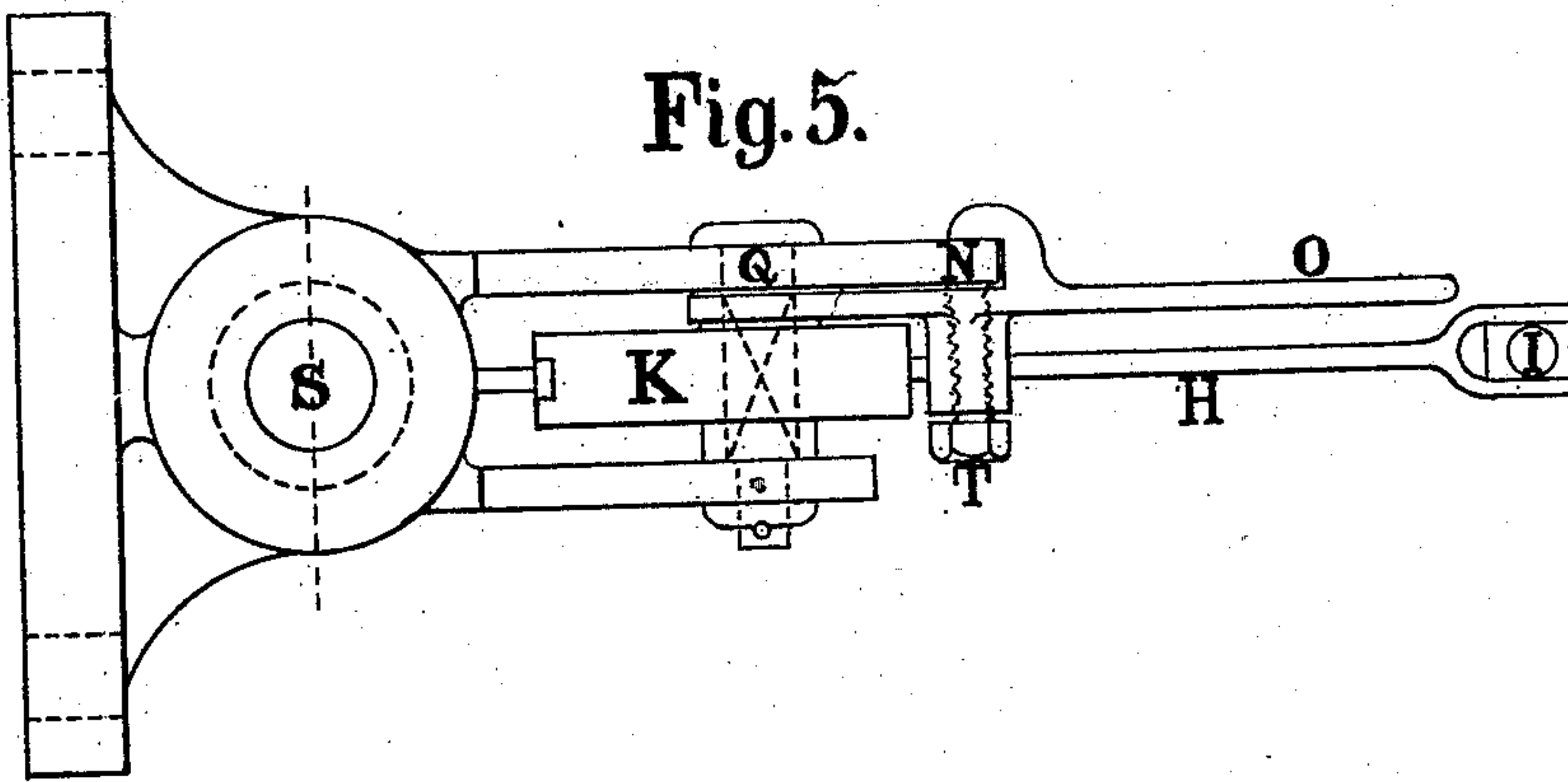


Fig. 5.



Witnesses.

Witnesses.
H. B. Hall
H. J. Good

Inventor:

John W. Nystrom.

UNITED STATES PATENT OFFICE.

JOHN W. NYSTROM, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 272,307, dated February 13, 1883.

Application filed August 28, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. NYSTROM, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain
5 new and useful Improvements in Governors for Steam-Engines, by which more or less steam can be regulated into the steam-cylinder, according to irregularities of the load, while the engine runs with a nearly uniform velocity.
10 The following specification, with the accompanying two drawings, is a full explanation of my invention.

The ordinary pendulum or centrifugal governors must be run with higher or lower speed
15 for admitting less or more steam into the cylinder, but my improved governor admits more or less steam while running at the same speed, which potency makes it isochronous; but I have named it "screw-governor."

20 Figure 1 represents a vertical section through the axis of rotation, showing the internal arrangement of the screw-governor. Fig. 2 represents a horizontal section through the dotted line A B, Fig. 1. Fig. 3 is a horizontal
25 section through the line C D. Figs. 4 and 5 show how to set the governor for regulating different speeds.

As represented on the drawings, the screw-governor is rotated by a rope, R, over a pulley, P; but the rotation can also be accomplished by bevel-wheels like in the ordinary centrifugal governors. The rope R rotates
30 only the sleeve E, which is fixed to the pulley, and the screw-spindle S, on which are fixed the arms F and vanes G, is rotated by the inclined helicoidal surfaces of the screw S. The screw, as represented on the drawings, is four-
35 threaded, and the helicoidal surfaces form an angle of about forty-five degrees with the axis of the screw. The wings or vanes G are made heavy, of solid metal, for the purpose of serving as a fly-wheel in storing discharging energy when regulating steam to the cylinder. The number of vanes should be two, three, or
40 four; but they need not be round plane disks, as shown on the drawings, for concave surfaces toward the direction of motion will increase the resistance of the air. Light vanes fixed on a fly-wheel would answer the same
45 purpose. The vanes are placed on the arms so

as to be set at any desired angle, if such should be considered expedient; but they can also be made solid with the arms.

When the governor is in motion the resistance of the air to the revolving vanes tends to
55 raise the screw, which tendency is counteracted by the weight of the system, which tends to lower the screw, and thus the system G F S is balanced between two opposing forces when run at a proper uniform speed; but the
60 moment the speed changes one of the opposing forces overcomes the other, and the screw moves up and down for regulating the steam.

The governor being attached to and driven by the steam-engine, in which speed is to be
65 regulated, and when the pulley P, with its sleeve E, is driven faster than the normal speed, it will screw up the system G F S, by which less steam is admitted to the cylinder; and when run slower than the normal speed the screw
70 will descend and admit more steam by suitable connections with the throttle-valve or valve-gear.

The universal joint shown in Fig. 3, with the lever H, operates the rod I, which is connected either to a throttle-valve or to the valve-gear for changing the grade of expansion as
75 required by the load. The throttle-valve can also be connected direct to the center spindle, S, and the screw-governor mounted on the valve-head, like in the ordinary centrifugal governors. The spring K is connected to the lever H by the link L for the purpose of regulating the proper speed of the engine, which
80 can be accomplished while the system is in motion by making the spring to push or pull more or less on the lever, so as to make it act either with or against the weight of the system G F S. This action of the spring K is equivalent to increasing or diminishing the weight
85 of the system G F S, and when this weight is increased the vanes, and consequently, also, the engine, must run faster in order to balance the opposing forces on the helicoidal surfaces. When the weight is diminished, by pulling of the spring K, the system must run slower
90 to balance the same forces. The spring K need not have the form of a spiral, as shown on the drawings, but can be made straight or of any desired curve, or may be made in the form of
95 100

a screw-spiral, applied in any convenient direction for accomplishing the purpose of regulating the speed.

5 The arrangement for setting the spring K so as to act either with or against the weight of the system G F S can be made in a great variety of ways, depending also upon what kind of spring is used. For the spiral spring K, as shown on the drawings, a lever, O, Figs. 10 4 and 5, can be placed on the square part of the shaft Q, (indicated by the dotted diagonal lines,) close to where the spring is fixed, and the other end of the lever extending over a circle-arc, N N, upon which it can be clamped 15 by the set-screw T, or by notches, like the reversing-lever in marine engines. The lever and spring should be so adjusted that when the lever stands on or near half the arc, there should be no tension on the spring; when the 20 system G F S stands in the middle of the limited vertical space, it can move. Then, when the system falls, the spring will act against the weight, and when the system rises, the spring will act with the weight. By setting the lever O in different positions on the circle-arc N N the tension of the spring is made to act with 25 more or less force, either with or against the weight of the system G F S, for the whole vertical space the system moves. When the spring is made in the form of a screw-helix its tension 30 can be regulated either by a screw or by a lever.

The oil-cup M is for lubricating the governor

through the holes in the center of the spindle, and also the slanting holes in the sleeve, which 35 is readily understood from the drawings. A slight change of speed of the engine is necessary for operating the governor; but after the admittance of steam is regulated the engine resumes its normal speed, while the governor 40 admits the steam required for the load. For a sudden change of speed of the engine, the momentum of the heavy vanes will instantly screw up or down the system G F S, and thus regulate the admittance of steam to suit the 45 load. The system G F S is perfectly isochronous, and is consequently an unstable regulator; but with the aid of the spring K, which action varies with its tension, the combination makes the regulation stable. 50

I claim as my invention—

The combination of the vanes G, screw-spindle S, and spring K, so arranged and proportioned that the resistance of air to the vanes 55 when in motion for regulating speed balances on helicoidal surfaces the weight of the solidly-connected vanes and screw-spindle by the aid of tension of the spring acting by means of suitable mechanism either with or against the weight of said vanes and screw-spindle, substantially as and for the purpose described. 60

JOHN W. NYSTROM.

Witnesses:

JAMES S. PHILLIPS,
GEO. F. PAYNE.