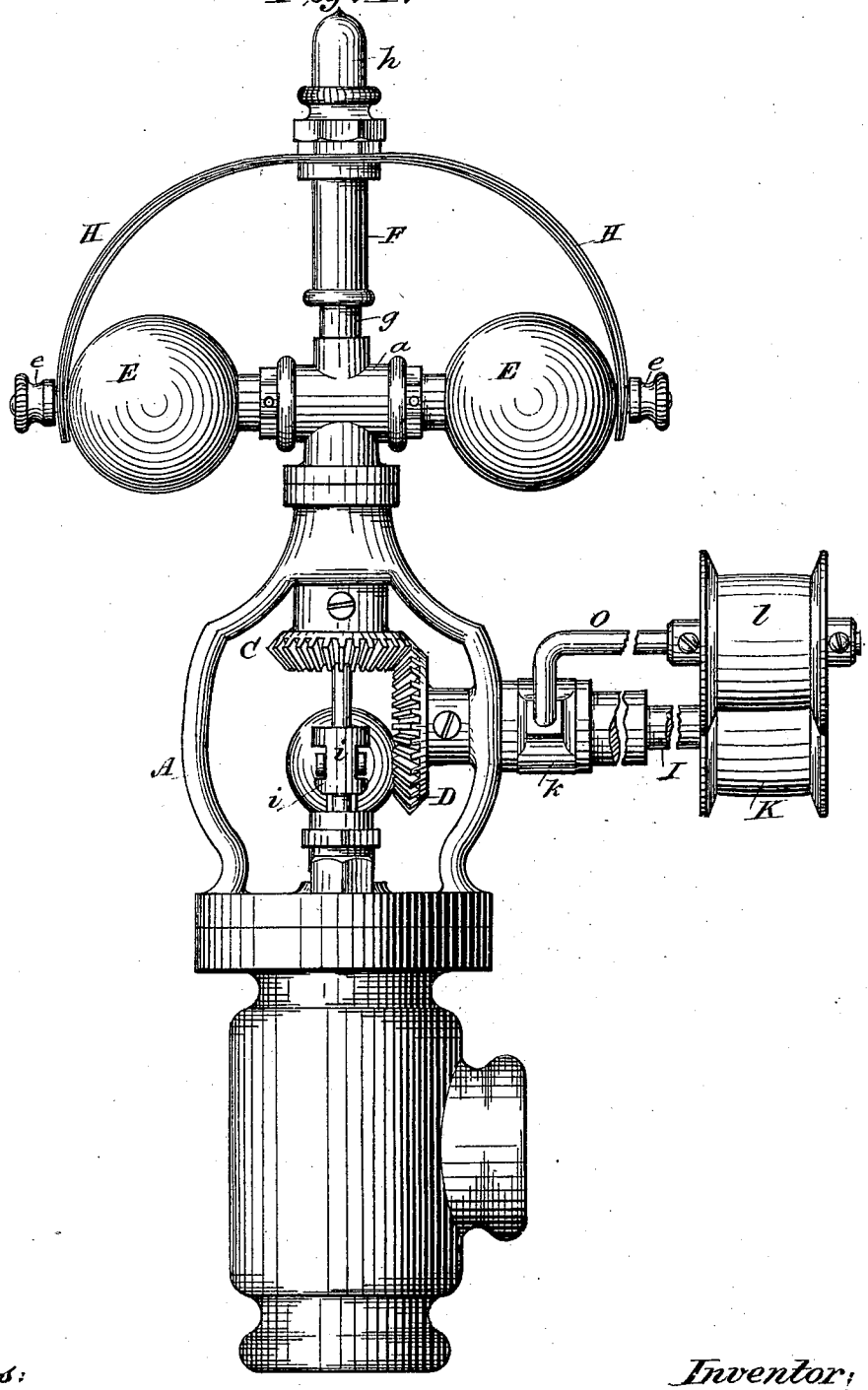
(No Model.) 2 Sheets—Sheet 1.

J. J. HAHN.

STEAM GOVERNOR.

No. 255,973. Patented Apr. 4, 1882.

Fig. 1.



Witnesses:
J. C. Brecht
H. C. Fogle

Inventor:
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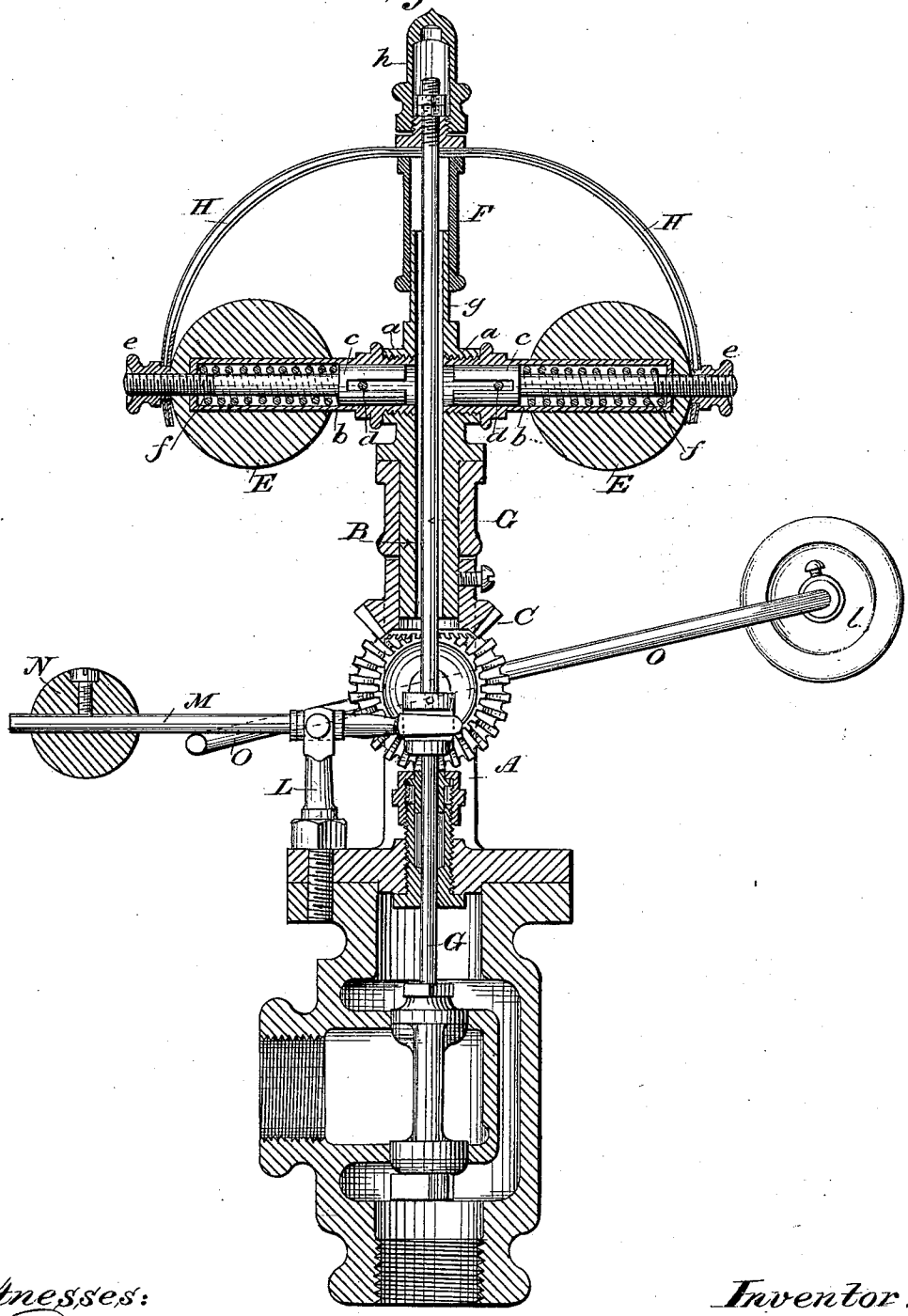
(No Model.) 2 Sheets—Sheet 2.

J. J. HAHN.

STEAM GOVERNOR.

No. 255,973. Patented Apr. 4, 1882.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH J. HAHN, OF CANTON, OHIO.

STEAM-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 255,973, dated April 4, 1882.

Application filed September 24, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. HAHN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Governors for Steam-Engines, of which the following, when taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention is designed as an improvement on that class of steam-governors in which sliding balls in their outward action radiate or diverge by centrifugal force from their center of motion to control the flow of steam to the operating parts of the engine; and to this end my invention consists, first, of hollow arms placed at right angles to the main driving-shaft on which the sliding balls are placed.

Second, my invention consists, further, of locating the spiral springs which serve to hold the balls nearer to the driving-shaft on a plunger within said hollow arms, whereby the springs are kept from direct contact with the balls, and a more perfect working of the balls toward and from the driving-shaft is insured.

Third, my invention consists, further, of plungers located within the hollow arms, and which pass through the balls and valve-controlling elliptical springs, the said plungers being provided with screw-threads and thumb-nuts on their outer ends, whereby the tension on the spiral and elliptical springs is adjusted and the amount of force or power requisite to operate the governor is regulated.

Figure 1 is a view in perspective, and Fig. 2 is a central vertical sectional view, of my device.

Referring to the drawings, A represents a bifurcated standard secured to the end of the steam-supply pipe, in which is located the well-known balance or other valve.

Sleeved into the upper cylindrical portion of the bifurcated standard A is a vertical hollow standard, B, to the lower end of which is secured the bevel-gear wheel C, which meshes into the bevel-wheel D, the shaft of which is supported in one of the arms of the bifurcated standard A. The upper portion of the hollow standard B is made with projections or enlargements *a a* at right angles thereto, which receive the hollow arms *b b* on which the governor-balls E E are supported, and are free to move to or from the center of motion on said arms.

Within the hollow arms, and projecting through the outer ends thereof, are located the plungers *c c*, the inner ends of which are bifurcated or slotted to receive pins *d d*, which guide and center them in their to-and-fro motion. The outer ends of the plungers *c c* are screw-threaded to receive the thumb-nuts *e e*, while the inner ends of said plungers are provided with shoulders against which spiral springs *f f* abut, the other or outer ends of spiral springs being held against the outer end of the hollow arms *b b*.

It will be observed that the hollow arms extend nearly through the central diameter of the governor-balls, and that the plungers extend entirely through, so that by means of the thumb-screws on the outer ends of the plungers the speed of the governors or the centrifugal pressure requisite to operate the balls can be adjusted to a nicety. It will be further noted that by having the spiral springs incased with the hollow arms, and the governor-balls free to move to and fro on said hollow arms, they (the balls) have much more freedom to move thereon, and are more certain and positive in their action than they would be if the spiral springs came in direct contact with the sides of the openings in said balls, as is the case in some of the governors of this class.

The hollow standard B has a hollow extension, *g*, on the upper end, over which the spring and valve-stem supporting sleeve F is free to slide up and down. The upper end of the sleeve F is perforated to receive and support the valve stem or rod, and is also provided with a lateral opening for receiving and supporting the double elliptical spring H. The elliptical spring H is provided with a central opening through which the valve rod or stem passes, and is perforated at the outer ends, through which perforations the outer ends of the plungers pass, and are held thereon, and the tension of said elliptical spring is adjusted by means of the thumb-nuts *e e*.

The upper end of the valve rod or stem is screw-threaded to receive a nut, by which means the valve rod or stem is adjusted.

The sleeve F is provided with a screw-cap,

h, which covers the upper end of the valve rod or stem.

Power is applied to the governor through the shaft I, pulley K, and gear-wheel D, and as the governor-balls and ends of the elliptical spring are driven off from the central shaft or center of motion by the centrifugal action the central portion of the elliptical spring is drawn down, bringing with it the sleeve F and valve rod or stem G, which opens or closes the supply-valve more or less, according to the speed of the revolution imparted to the governor.

It is obvious that the elliptical spring H aids in resisting the centrifugal force of the balls, if properly bent and tempered, and that two or more leaves of metal may be used in each spring to increase the strength of the springs. It is also obvious that the number of hollow arms, balls, and springs can be increased to any desired number without departing from the spirit of my invention.

L is a standard secured to the casing or head of the steam-supply pipe, to the upper end of which is pivoted a bar, M, said bar being provided at its outer end with an adjustable weight, N. The inner end of the bar M is bifurcated, so as to embrace a grooved sleeve, *i*, which is secured to the valve-stem G.

O is a rod sleeved onto the shaft I, as shown at *k*, Fig. 1. The inner end of the rod O is bent at a right angle, so as to project under the weighted lever M. The outer end of the bar O is also bent at a right angle in a reverse direction from the bend on the inner end, and is provided with an idler-pulley, *l*, which rests on top of the band (not shown) which drives the pulley K and shaft I. By this arrangement it will be readily seen that in case the driving belt or band should break or become detached the end of arm O on which the idler-pulley is attached will drop, and in doing so will elevate the outer end of the weighted lever M and close the valve of the governor.

The weighted lever can be used to advantage for regulating the steam by hand independently of the governor-balls and springs, where it is necessary at times to run slower or faster than the rated speed to which the governor is set, as in running a saw-mill or traction-engine.

I am aware that balls of governors have been secured to the ends of rods having thereon tension-springs, and that such rods have been connected to the valve-operating devices for regulating or controlling the supply of steam.

I am also aware that springs have been placed within the governor-balls and the extensions thereof, said springs being arranged to encircle the radial or guiding arms which support said balls, and such I do not claim.

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

1. In a steam-governor, the hollow arms *b b*, on which the governor-balls are supported and are free to move thereon toward and from the center of motion, as set forth.

2. In a steam-governor, the hollow arms *b b*, with the balls E E mounted thereon, in combination with the spiral springs *f f* and plungers *c c*, located therein, and set-screws *e e*, whereby the springs are kept from direct contact with the balls, and a more perfect working of the balls toward and from the center of motion is secured, and the amount of force necessary to move the balls is regulated or adjusted, as set forth.

3. In a steam-governor, the driving-shaft B, provided with the hollow arms *b b*, in combination with the spiral springs *f f* and plungers *c c*, located within said hollow arms *b b*, balls E E, elliptical spring H, set screws *e e*, sleeve F, and valve-stem G, as set forth.

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

JOSEPH J. HAHN.

Witnesses:
ELISHA D. ELY,
HENRY C. FOGLE.