

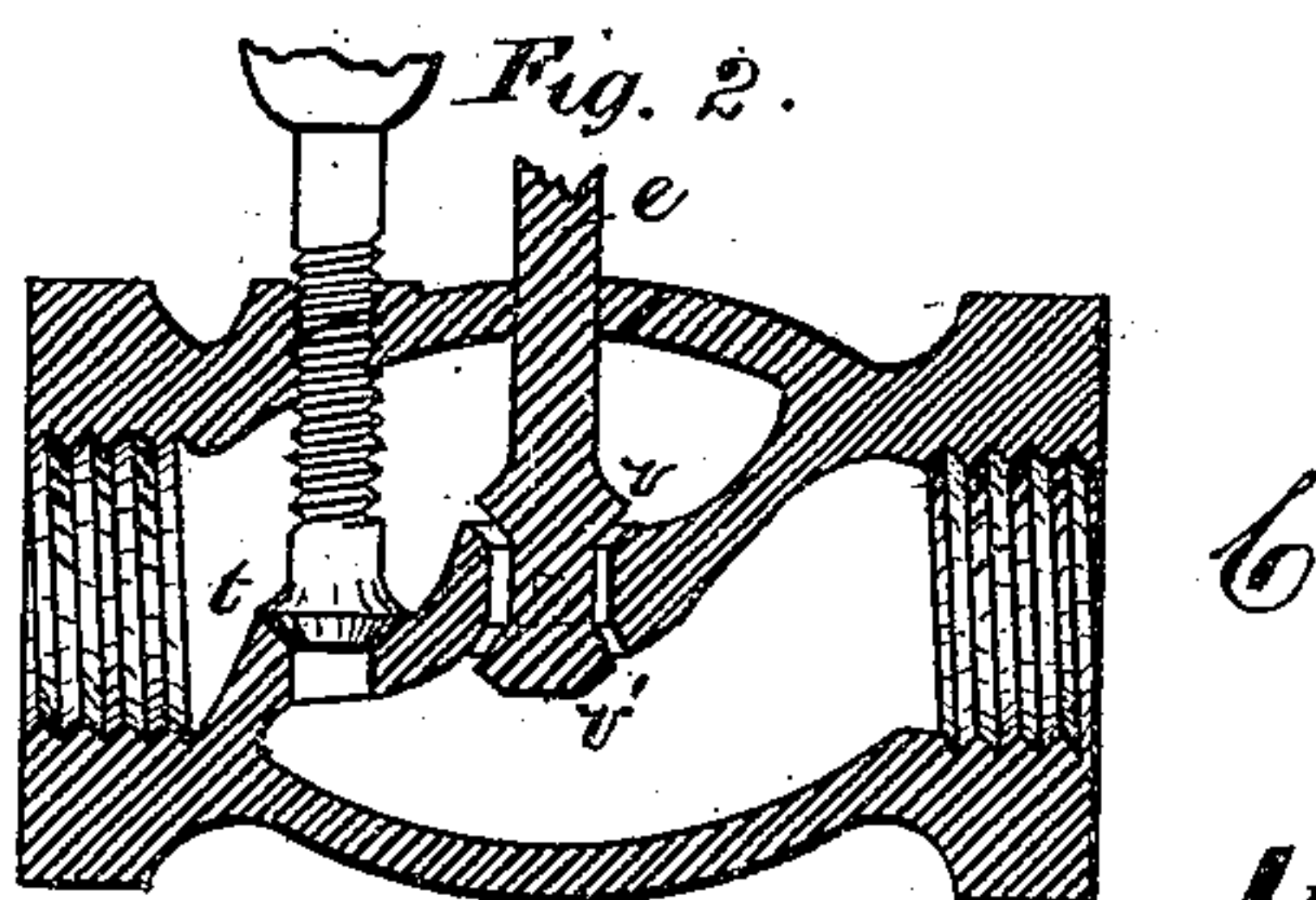
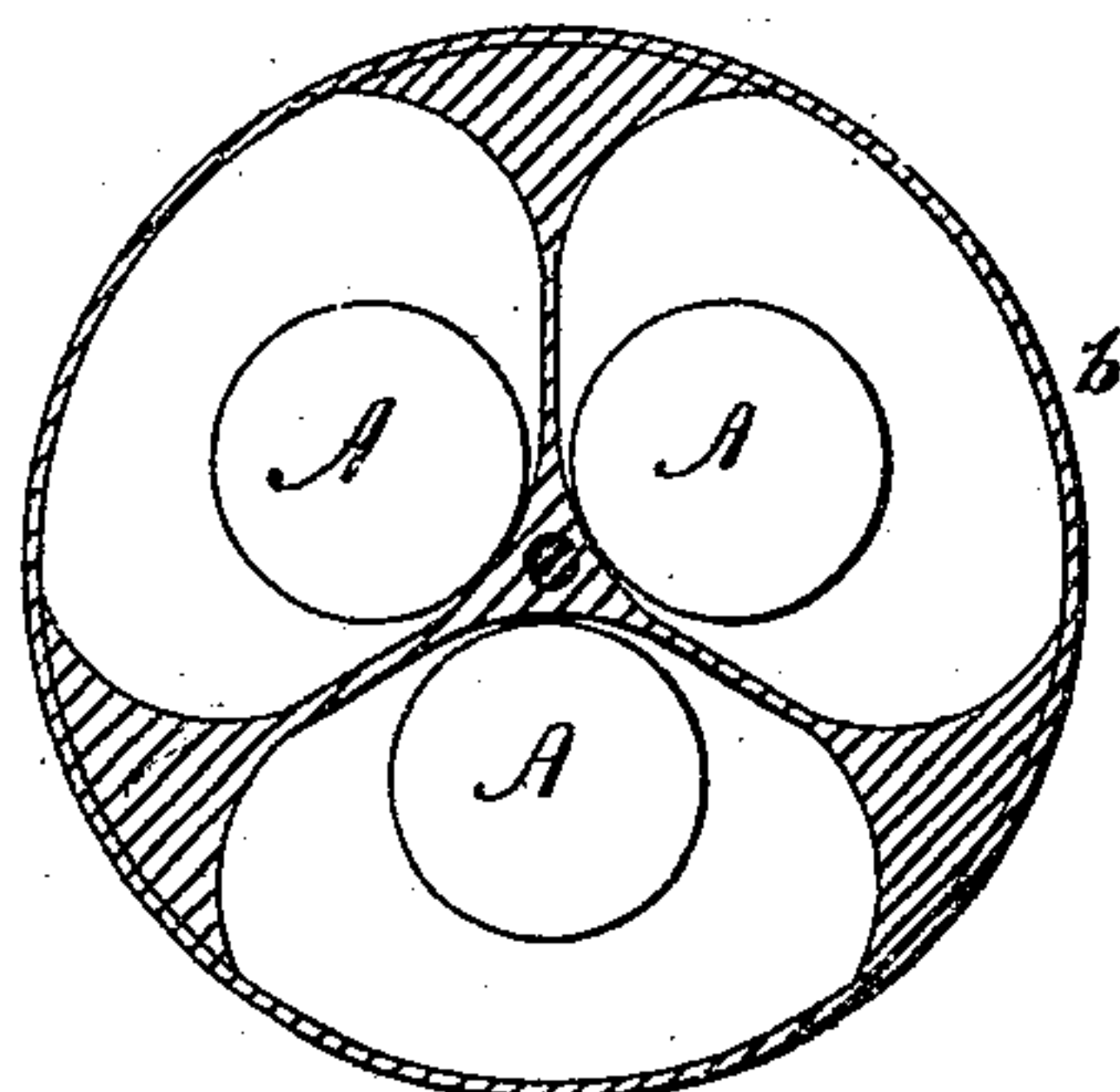
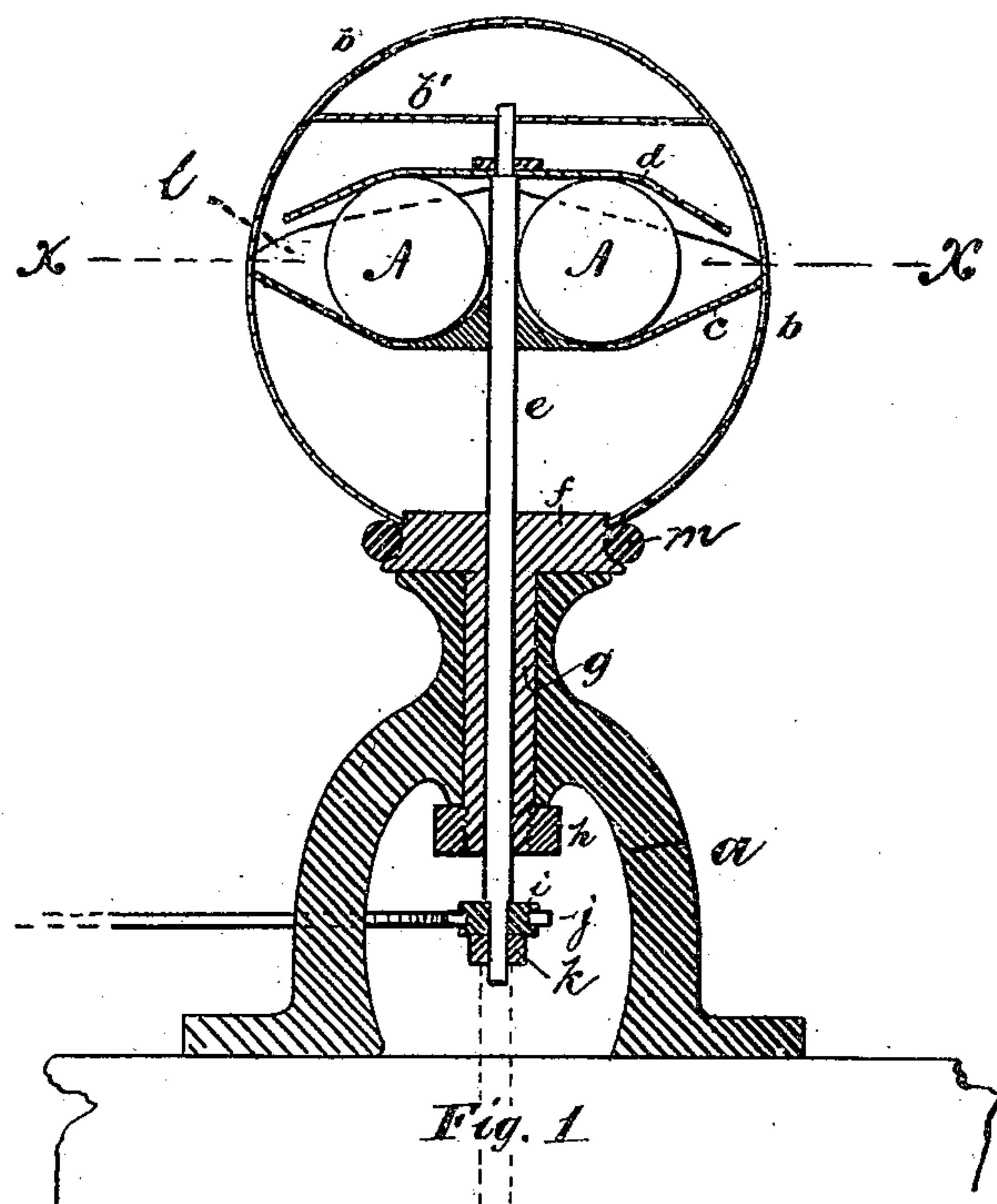
(No Model.)

H. C. HUNT.

GOVERNOR FOR STEAM ENGINES.

No. 270,546.

Patented Jan. 9, 1883.



Attest:

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UNITED STATES PATENT OFFICE.

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GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 270,546, dated January 9, 1883.

Application filed May 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. HUNT, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Governors for Steam-Engines; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 is a vertical transverse section of a governor embodying my improvements; Fig. 2, a horizontal section taken through that portion of the said governor indicated by line *x*, and Fig. 3 is a vertical longitudinal section of the governor-valve.

Similar letters of reference indicate like parts in each of the figures.

In Fig. 1, *a* is a bracket or support upon which the governor rests, and consists in a piece of metal cast or wrought to a convenient size and form to adapt it to the particular pattern or style of engine to which it is to be applied.

b is a hollow sphere or shell, which may, for convenience of manufacture, be separated into hemispheres and arranged and secured together. Said sphere contains the governing device.

To the base of the sphere *b* is rigidly attached a grooved pulley, *f*, or a suitable gearing, if preferred, by means of which motion is imparted to the said governing device. Said pulley is preferably arranged upon said bracket, as shown, having a shaft or spindle, *g*, passing downward through the bracket *a*, and secured therein by means of the nut *h*, screwed upon the end of said spindle, the nut, however, being not so rigidly screwed as to prevent a free rotation of the same.

c is a diaphragm rigidly secured to the sphere and subdivided into ball-receptacles by suitable partitions.

e is a rod which connects the governing device with the governor-valve, and ordinarily passes directly from said device through the engine-casing, as shown in Fig. 1, and actu-

ates the valve, as shown in Fig. 3. However, this may be changed as occasion requires—as, for instance, a lever may intervene between the governor and valve, which method is also illustrated by Fig. 1. In this last case the drawing shows the ends of a lever, *j*, split and working astride of a collared nut, *i*, adapted to be screwed upon the rod *e*, so that said lever may be adjusted in its relation to the governor-valve to increase or diminish the opening of the valves. The rod *e* passes through a central perforation in the diaphragm and connects with a disk, *d*, which latter rests upon the balls *A*, of which there may be any desired number, according to the number of divisions in the sphere *b*, which divisions are formed by the partitions *l* of the diaphragm, as shown more clearly in Fig. 2. Said partitions of the diaphragm may be made separately, or all cast in one piece with said diaphragm, forming receptacles for the balls to operate in. The walls of the receptacles are preferably curved, which curves are larger than those of the balls, so that the latter cannot touch more than one point of the diaphragm at a time. This construction renders the balls noiseless in their action in the said receptacles, as will be apparent. The track over which the balls travel from the point of bearing, when the same are at rest, to the highest point near the circumference of the sphere is preferably straight. The partitions *l* are curved from a perpendicular until they reach the sphere *b* and the above-mentioned straight line, the curve, as before stated, being a little greater than the curve of the balls, as indicated in Fig. 2. The disk *d* is preferably downwardly concaved. By this construction, when the balls are brought to bear upon the disk and diaphragm the two points of bearing are thrown largely out of line with the center of gravity of the ball, thus giving to each of said balls a leverage-power that it would not have if the points of bearing were directly opposite one another. The rod *e* is flattened or squared above the disk *d*, and is made to slide in a corresponding orifice in the bar or partition *b'*; or it may be arranged in any other convenient manner to prevent its turning in the spindle *g*.

It is very evident that changes may be made in details of construction without departing

from the spirit of my invention. Therefore I do not wish to be understood as limiting myself to any positive statements made in the description, but only as broadly set forth in the claims.

The operation of the governor is as follows: The revolution of the sphere under the influence of the belt *m* and pulley *f* creates a centrifugal force which causes the balls to separate the disk *d* and diaphragm *c*. The disk *d* raises the valve-rod *e*, which latter engages with the valve, all as will be understood.

In connection with the governor I use a double valve, *C*, the object of which is to secure safety by automatically shutting off the steam and stopping the engine in case of accidental shifting or breaking of the governor-belt.

The peculiar construction of the valve consists in having compound or double valves *v* *v'*, with their seats located between them, so that (when the lever is used) when the engine is in motion, if running too fast, the upper valve will be forced down upon its seat by the raising of the balls, and when at rest the lower valve would be raised to its seat by the dropping of the same, thus shutting off the steam in case of accidental disconnection of the belt. When the lever is not used, of course the actions last described will be reversed, in which case the engine will not start upon opening the throttle-valve, as the governor-valve is held closed by the action of the steam. As the balls must start before they will release the valve, I arrange a thumb-valve, *t*, which closes an opening in the partition *P*. When the engine is started this valve is opened, and the steam thus admitted to the cylinder through said opening causes the engine to start, and consequently give motion to the balls *A*, which latter hold the first-mentioned valves open during the subsequent operation of the machine, the thumb-valve *t* being closed after the machine is in full operation.

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

1. A steam-engine governor composed of a hollow sphere having therein independent balls working in suitable receptacles, one for each ball, said balls being arranged and adapted to raise the valve-rod, substantially as herein set forth.

2. In a steam-engine governor, a chamber adapted to rotate under the influence of the pulley *f*, a diaphragm within said chamber, having ball-receptacles therein, a co-operating disk attached to the valve-rod, and balls arranged within said receptacles, the whole being arranged and combined substantially as herein set forth.

3. In a ball-governor for steam-engines, ball-receptacles with curved walls, the curves thereof being greater than the curves of the balls, substantially as and for the purposes set forth.

4. In a ball-governor, the disk *d*, adapted to actuate the valve-rod influenced by the balls, substantially as herein set forth.

5. In a governor, the ball-receptacles and disk curved and adapted to throw the points of bearing of the balls, while in motion, on a line outside their centers of gravity, substantially as shown and described.

6. The compound valve *v v'*, having two seats, and the thumb-valve *t*, in combination with the governor, as herein set forth and shown.

7. In combination, the bracket *a*, pulley *f*, working thereon, and carrying the rotating chamber *b*, the diaphragm *c* within said chamber, the disk *d* and valve-rod *e*, secured together, the balls *A*, and the governor-valve, all arranged and combined substantially as herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of March, 1882.

HENRY C. HUNT.

Witnesses:

OLIVER DRAKE,
C. T. WINTERS.