

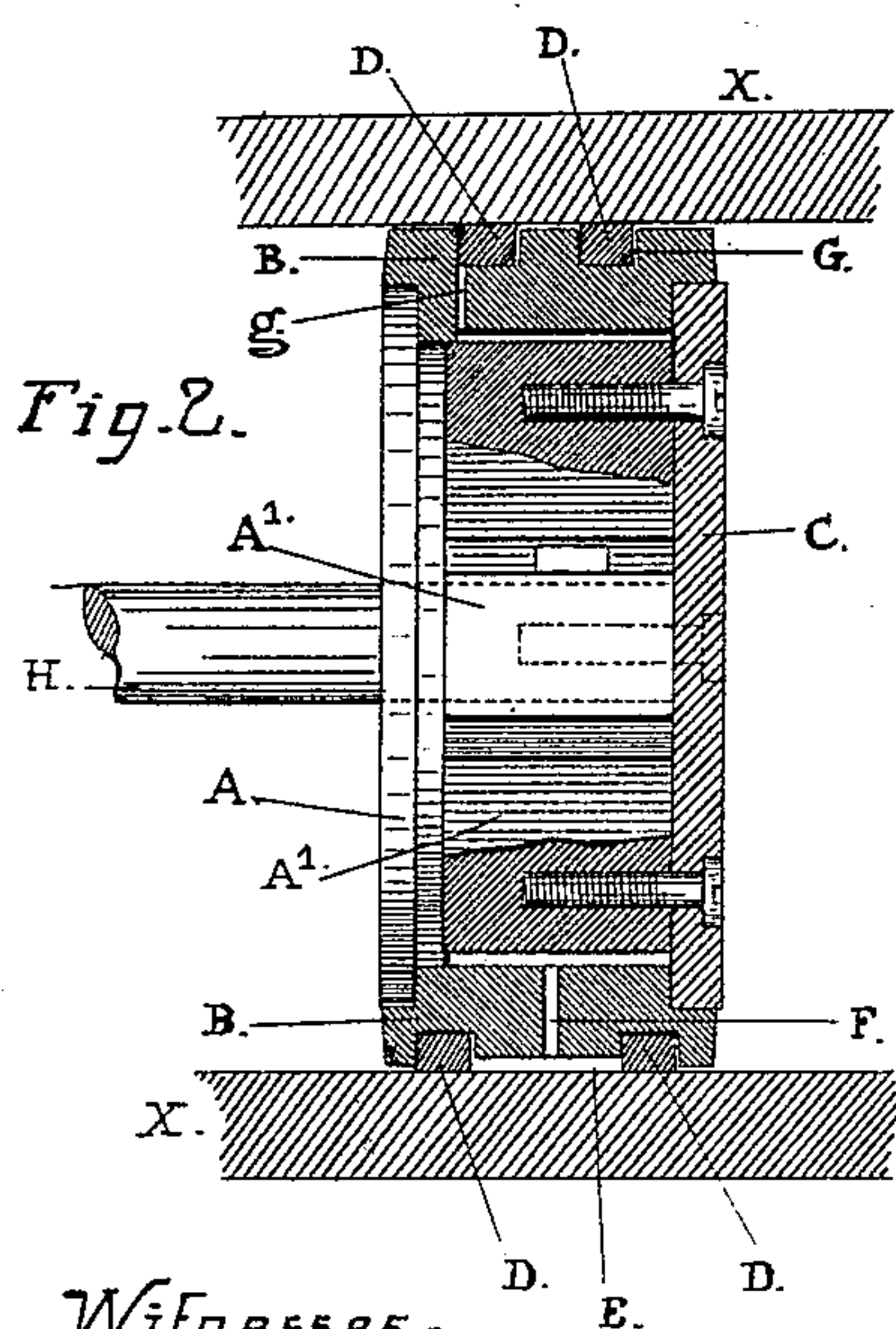
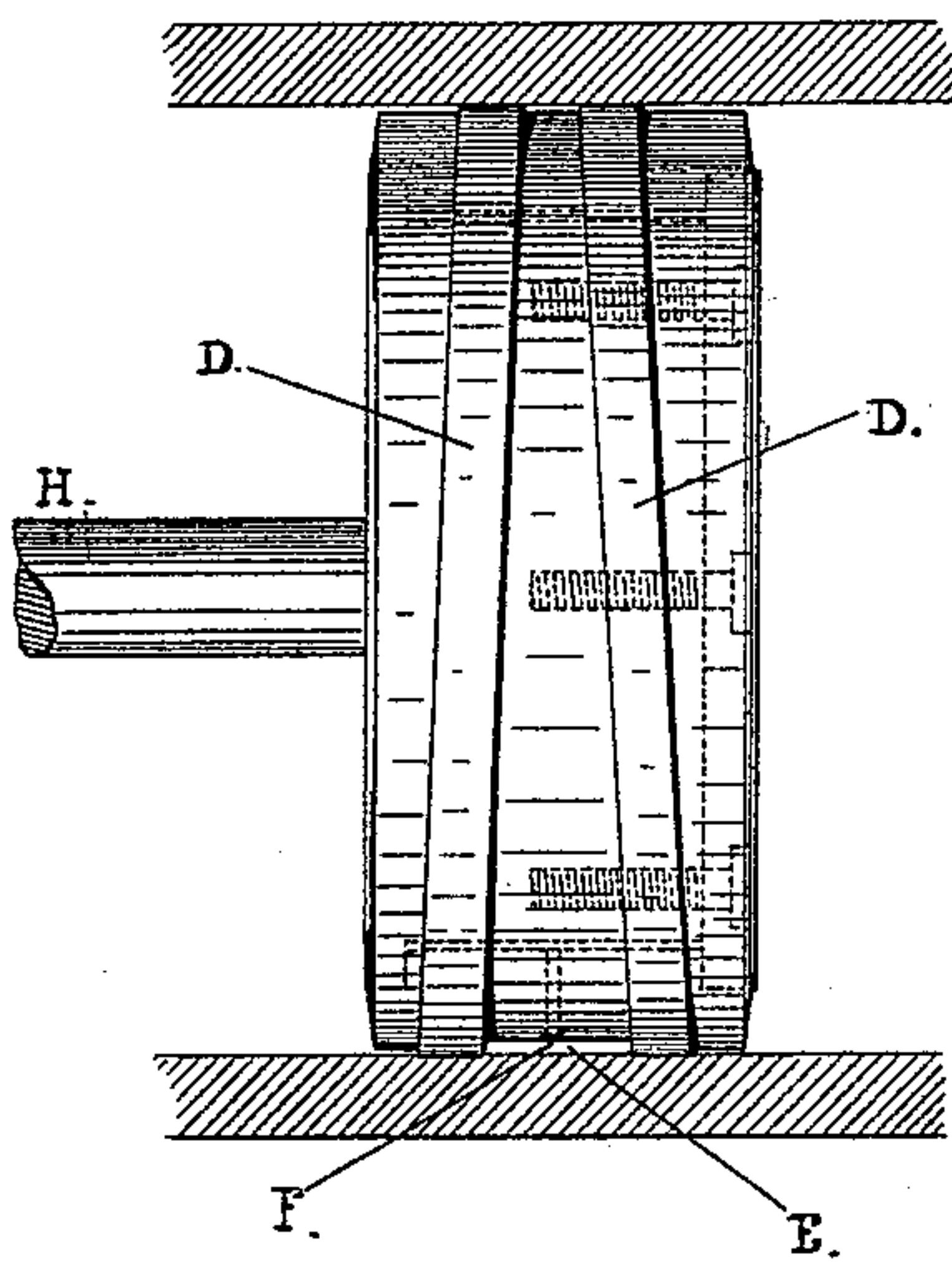
(No Model.)

W. J. THOMAS.
BALANCED PISTON FOR STEAM ENGINES.

No. 405,132.

Patented June 11, 1889.

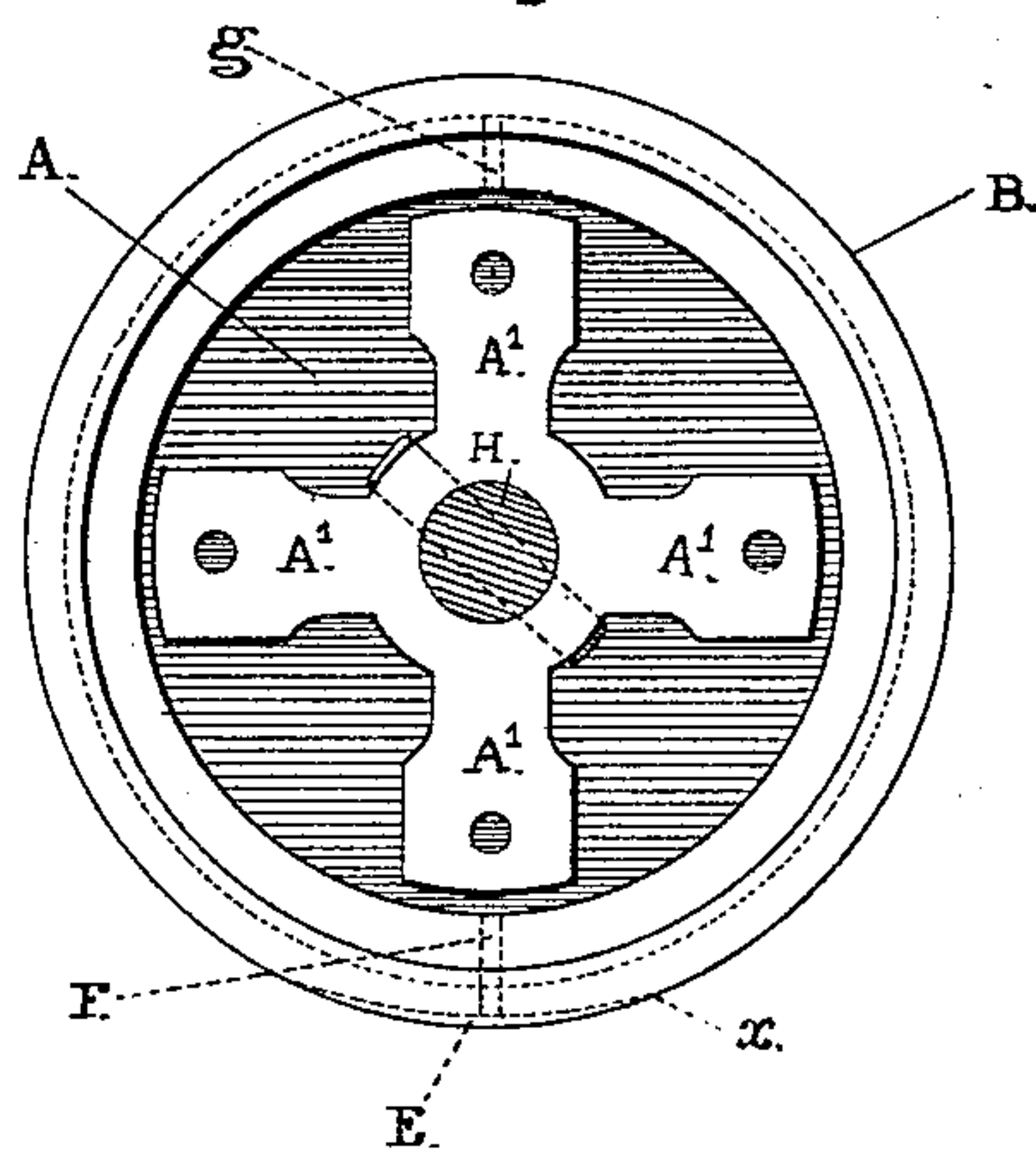
Fig. 1.



Witnesses:

J. E. Ford
E. Patten

Fig. 3.



Inventor:

William J. Thomas
By Smith & Osborn
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM JAMES THOMAS, OF SAUCELITO, CALIFORNIA.

BALANCED PISTON FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 405,132, dated June 11, 1889.

Application filed November 7, 1888. Serial No. 290,252. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES THOMAS, a citizen of the United States, residing in Saucelito, in the county of Marin and State of California, have invented certain new and useful Improvements in Balanced Pistons for Steam-Engines, of which the following is a specification.

My invention has for its object to prevent excessive and uneven wear of the piston and cylinder in locomotive-engines and other engines of the horizontal type; and the nature of my invention consists, essentially, in balancing the piston by introducing and applying the steam-pressure of the cylinder directly under the piston, or between it and the bottom of the cylinder on which the piston travels. I attain the desired end and object and produce my invention by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a piston and the top and bottom portions of the surrounding cylinder, to which my invention is applied. Fig. 2 is a similar view showing portions of the piston in section. Fig. 3 is a top view of the piston with the plate or disk that forms its head taken off to show the steam-space within.

The same letters of reference are used to denote corresponding parts in the several figures of the drawings.

In applying this improvement to pistons of the kind most generally used in locomotive-engines at the present day, I simply remove the "bull-ring," on which the packing-rings are set, and in its place I substitute a ring B, having two packing-rings D D in inclined positions, converging at the top or highest part of the piston, and from that point standing outward in opposite directions, so that the greatest width between the rings is at the bottom or lowest part of the piston. The grooves G in the bull-ring B are cut accordingly, to hold the packing-rings in this oblique position, instead of at a right angle to the surface of the cylinder, and when fixed in place between the two heads A C the piston is set for work in such position that the wider

space E at the point of greatest divergence of the two rings D D is lowermost and is directly upon the lowest part of the cylinder-surface along which the piston travels. At this point the face of the bull-ring is cut away or turned off, as indicated by the dotted lines *x* at the bottom of Fig. 3, to give a clear space between the cylinder and the bottom of the piston and of the full width between the packing-rings directly under the piston, and into this space a sufficient quantity of live steam from the cylinder is introduced by means of the passage *g* leading through the bull-ring into the hollow space inside the piston, and the outlet-passage F that opens into the space E. The passage *g* is carried from the bottom of one of the grooves G, and as the packing-ring has always more or less play in the groove there is sufficient space between it and the side of the groove for the live steam to pass into it and so through the passage *g* into the hollow space within the piston.

By locating the inlet-passage at this point the packing-ring is made to perform the office of a check-valve and keep the body of confined steam from being drawn out, or the pressure within the space E from being affected during the time of exhaust in the cylinder. If the inlet-passage is carried through either end of the piston, it will be seen that a check-valve is necessary to hold the steam in the piston-space and maintain steady pressure beneath the piston during work. In this manner I balance the piston in a horizontal cylinder and thereby overcome the tendency to wear the bottom of the cylinder and the portion of the piston that travels over such surface. The piston does not rise to the top of the cylinder at the first stroke of said piston, but the piston-head is charged with steam during the first stroke, and when the engine exhausts steam still remains in the piston. After the first exhaust the piston rises to the top of the cylinder and stays there as long as the steam is used.

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

A piston for steam-engine cylinders, having packing-rings set obliquely and divergently, as described, and the recess E, formed between them at the part of greatest divergence, in combination with ports or passages, as *g* F, which are adapted to connect the said recess E with the steam-space of the cylinder outside the piston, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

WILLIAM JAMES THOMAS. [L. S.]

Witnesses:

ARNOT G. DICKINS,
EDWIN MARTIN.