

E. HAUG.  
Balance Slide-Valve.

No. 225,370.

Patented Mar. 9, 1880.

Fig. 1.

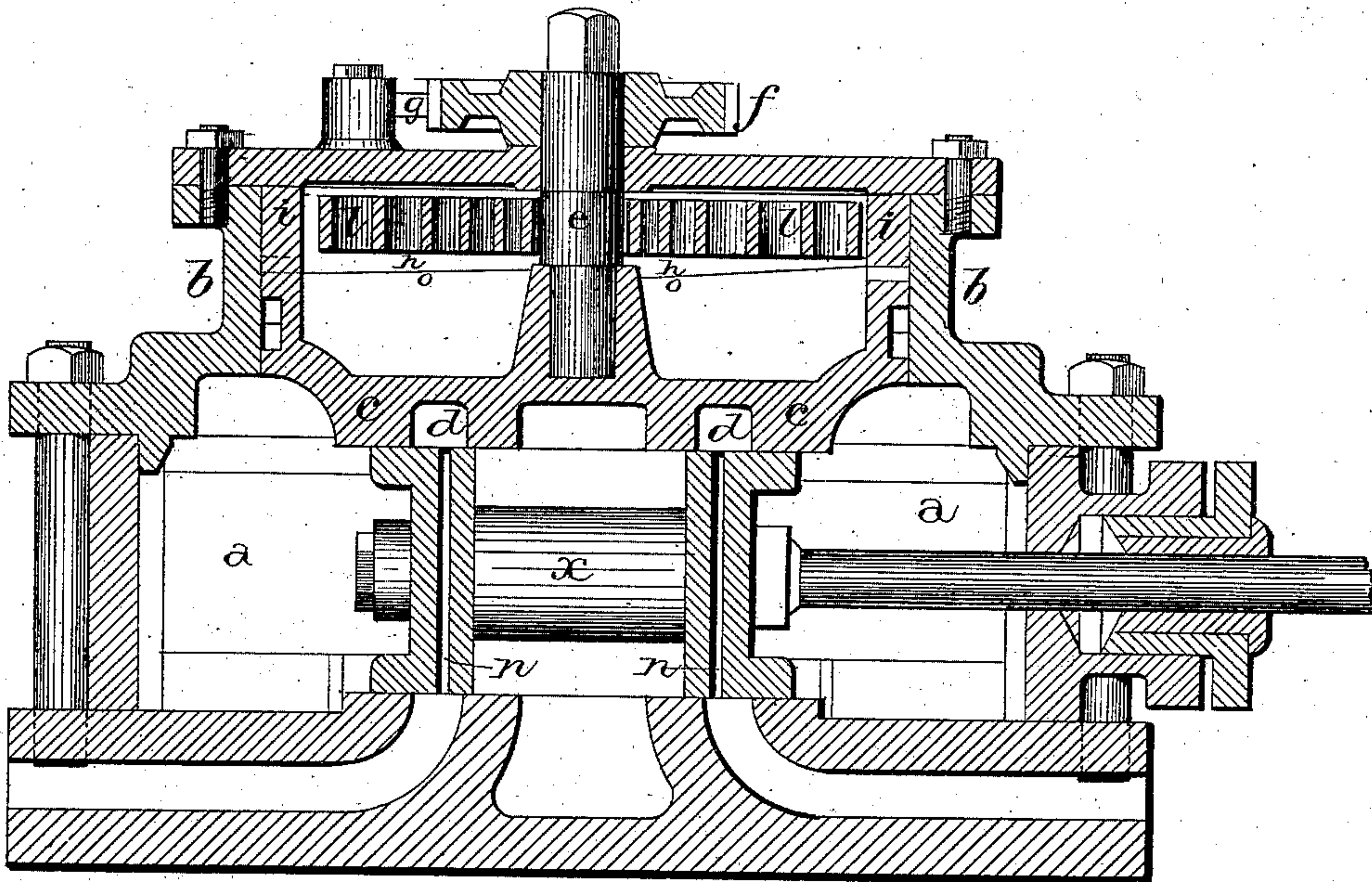
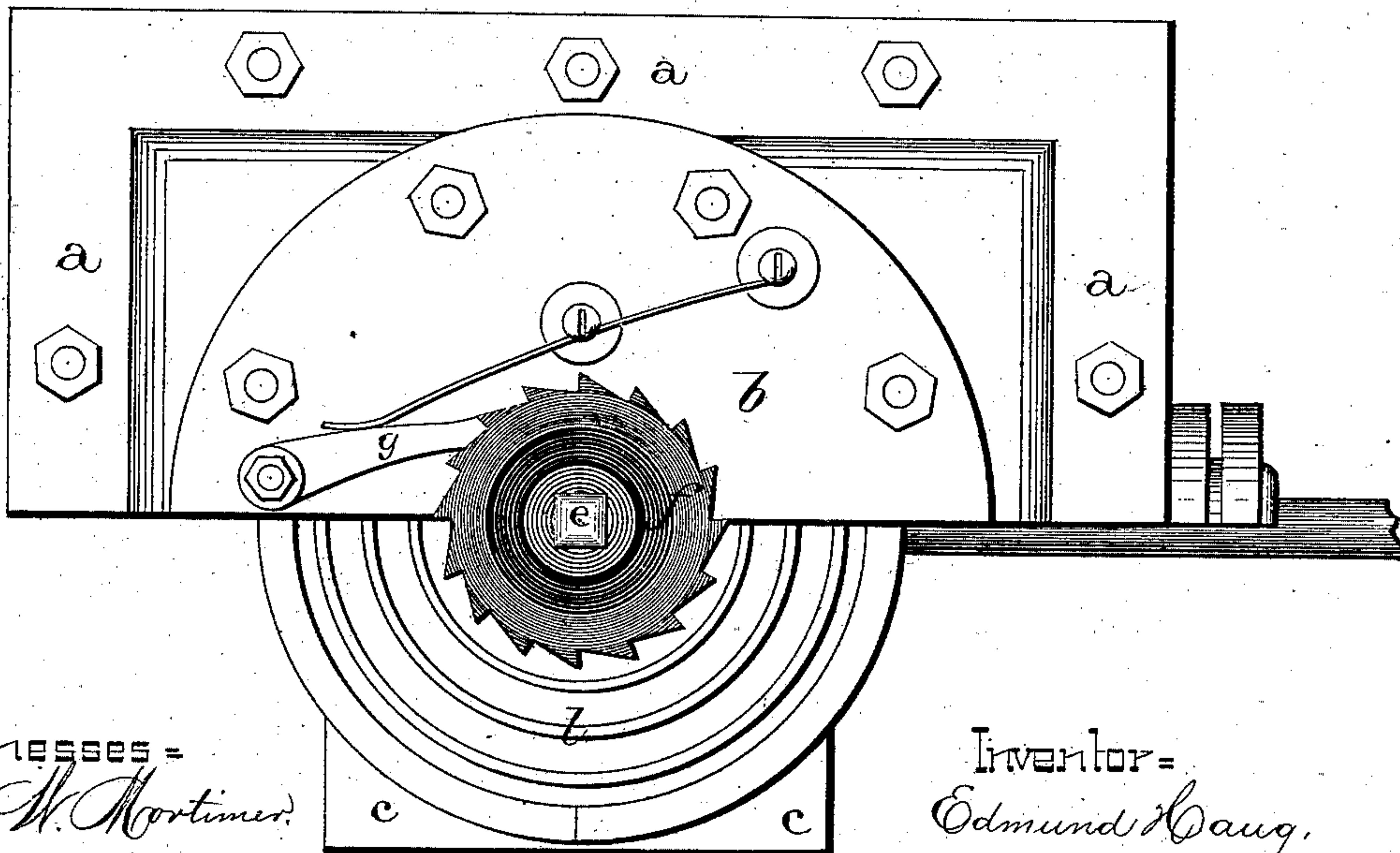


Fig. 2.



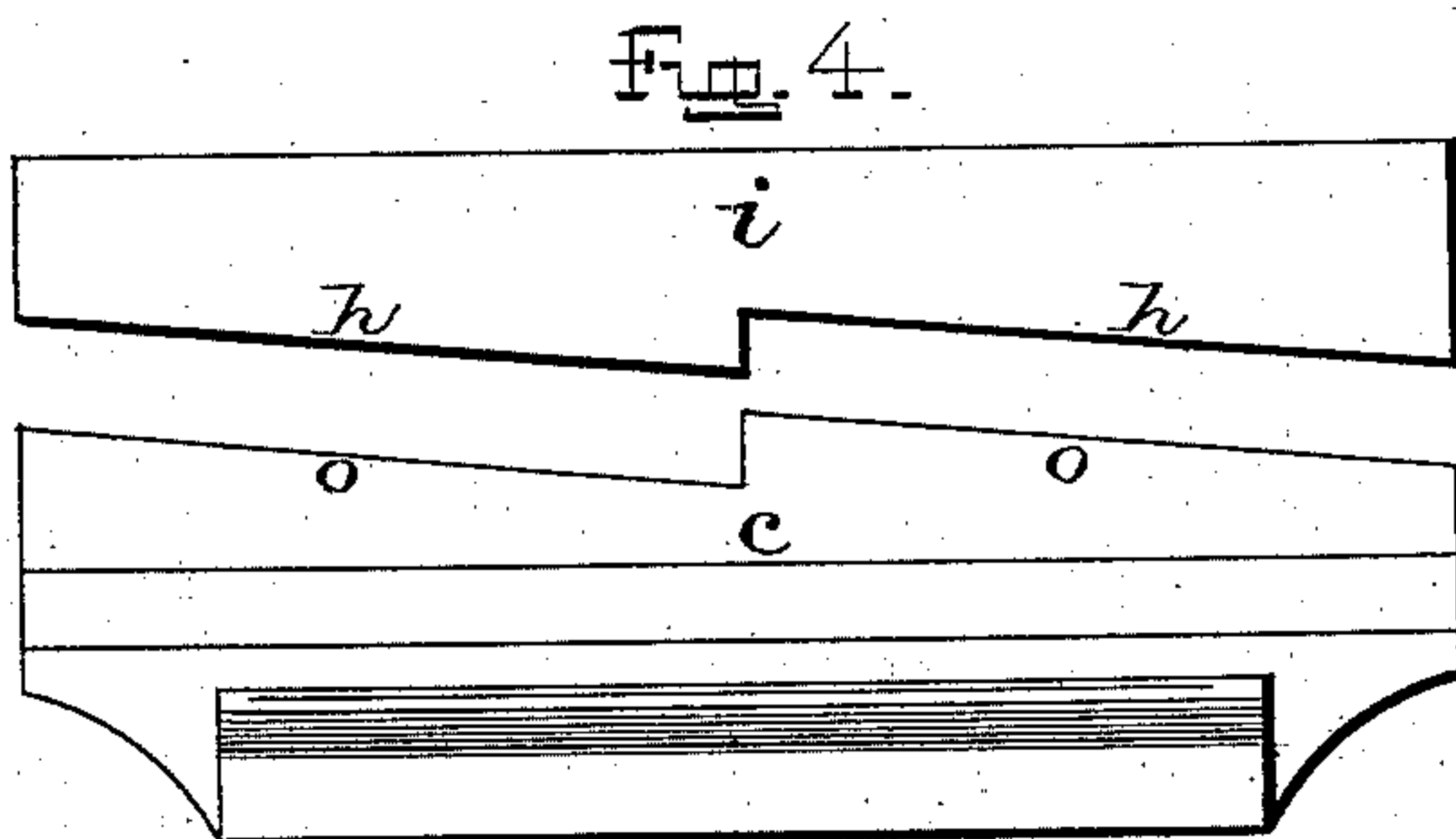
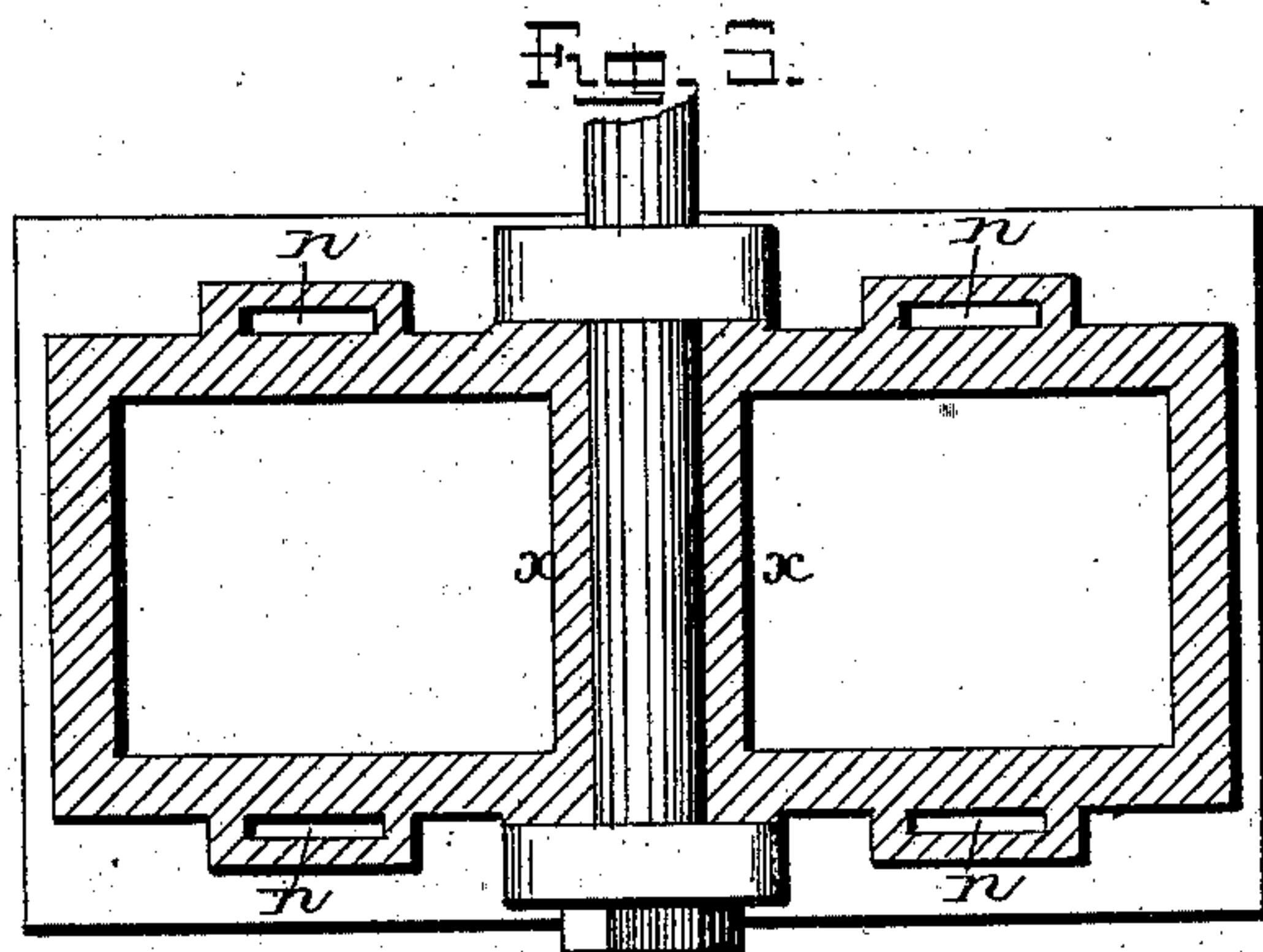
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# UNITED STATES PATENT OFFICE.

EDMUND HAUG, OF WHISTLER, ALABAMA.

## BALANCE SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 225,370, dated March 9, 1880.

Application filed February 3, 1880.

*To all whom it may concern:*

Be it known that I, EDMUND HAUG, of Whistler, in the county of Mobile and State of Alabama, have invented certain new and useful Improvements in Balance Slide-Valves; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in balanced slide-valves; and it consists in a valve having a wearing face or surface on both top and bottom of exactly the same size and form, the bottom face or surface of the valve working on the valve-face of the steam-cylinder, while the top face of the valve slides steam-tight under the bearing-plate of a chamber located in the top of the chest-cover.

It further consists in a chamber formed in the cover of the steam-chest, and in which are placed two rings, having their adjoining edges formed into inclined planes, one of the rings being connected to a spiral spring, and a mechanism for adjusting the tension of the spring, whereby the pressure of the bearing-plate on the top of the slide-valve can be adjusted at will.

It still further consists in forming three cavities in the bottom of the valve-face of the bearing-plate and forming small openings through the edges of the slide-valve, so as to connect the outer cavities with their corresponding inlet-ports of the steam-cylinder, all of which will be more fully described hereinafter.

Figure 1 is a longitudinal vertical section of my invention. Fig. 2 is a plan view, part of the frame being removed. Fig. 3 is a longitudinal section of the valve alone. Fig. 4 is a side elevation of the two rings.

*a* represents the valve-chest, which has a cylindrical chamber, *b*, fitted into or formed on the chest-cover. The part *c*, fitted to this chamber, is formed by a bearing-plate having its upper side hollowed out, and having in its lower bearing-face three cavities, *d*, formed, which cavities correspond in dimensions and form to the two inlet-ports and the exhaust-port of the steam-cylinder. The diameter of the cylindrical part of the chamber corresponds to the rectangular part of the bearing-plate *c*,

in which the three cavities are formed, and which rectangular part rests directly upon the top of the slide-valve.

The two outer cavities become filled with live steam at the same moment that their corresponding inlet-ports of the steam-cylinder become filled. The pressure above and below the valve being exactly equal, the valve is perfectly balanced in whatever position or part of its travel it may be.

The valve has an exhaust-opening through its center, from top to bottom face, making the valve but a rectangular shell, so as to relieve it from all pressure of the exhaust-steam. Through the outer edges of this shell are made a number of vertical openings, *n*, which serve to connect the two inlet-ports with their corresponding cavities *d*. These openings *n* are so placed that as soon as the valve has traveled far enough to separate the steam inside of the cylinder from the live steam in the chest a connection is accomplished, in order to equalize the difference in the pressure above and below the valve.

Passing vertically down through the chamber *b*, and having its lower end centered in the top of the bearing-plate *c*, is the shaft *e*, which has a ratchet, *f*, secured to its upper end for the dog *g* to engage with, and thereby hold the shaft in any desired position. In the top of the chamber is placed the ring *i*, which has its lower edge formed into inclined planes *h*, and to which ring is secured one end of the coiled spring *l*. The other end of this spring is fastened to the shaft, so that by applying a wrench or other tool to the top of the shaft and turning the shaft partially around the tension of the spring can be increased or decreased at will. As the tension is increased the whole power of the spring is exerted in an effort to rotate the ring, and this effort is resisted by the inclined planes on the lower edge of the ring, which planes fit in and correspond to the planes *o* on the top of the bearing-plate *c*. As the ring cannot turn, on account of the inclined planes, but a very slight degree, the tension of the spring causes the ring, through its inclined planes, to bear down upon the top of the bearing-plate *c*, and thus the bearing-plate *c* can be made to bear down upon the slide-valve with any desired degree of force. In this manner the pressure of the bearing-



plate *c* may be regulated with the greatest precision, so as to overcome the friction caused by the packing-rings with which the bearing-plate is provided, in order to prevent live steam from passing up into the chamber. In this manner all necessary pressure can be regulated from the outside of the chest without removing or disarranging a single part.

With an automatic means of adjustment inside of the chamber it is impossible for the valve to so wear that this wear cannot be instantly taken up. This adjustment can be applied to any steam-chest of engines in which a slide-valve is used, and will always insure a tight valve without any one side steam-pressure upon it.

The valve rod or stem passes entirely through the center of the valve, and, in order to prevent live steam from passing into the exhaust-opening, the valve has a tube, *x*, cast longitudinally across its center, and through this tube the rod passes. The hole through this tube is made oblong, so as to allow the valve to sink as it wears away without in any man-

ner affecting the position of the rod. The valve, which is made reversible, so that either face can be used up or down, is held in place upon the rod by suitable nuts and a collar.

Having thus described my invention, I claim—

1. The chamber *b*, placed upon the top of the steam-chest, in combination with the ring and bearing-plate, having their adjoining edges provided with inclined planes and a means of operating them, substantially as set forth.

2. The combination of the steam-chest, a chamber placed thereon, a shaft, coiled spring, ring, and bearing-plate *c*, the ring and bearing-plate having their adjoining edges provided with inclined planes, substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of January, 1880.

EDMUND HAUG.

Witnesses:

F. H. BRIGGS,  
GEO. W. DALY.