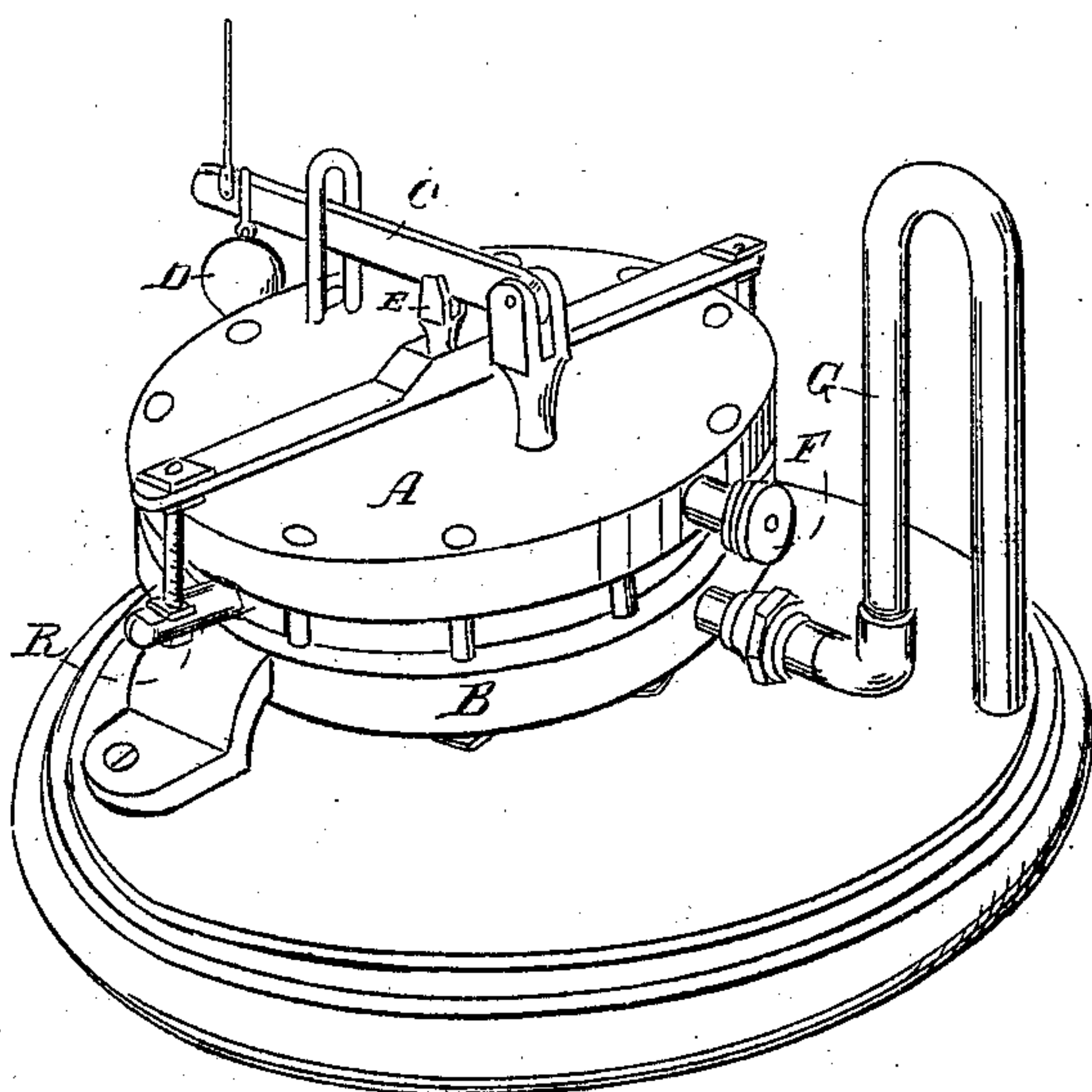


*H.E. Stager,*

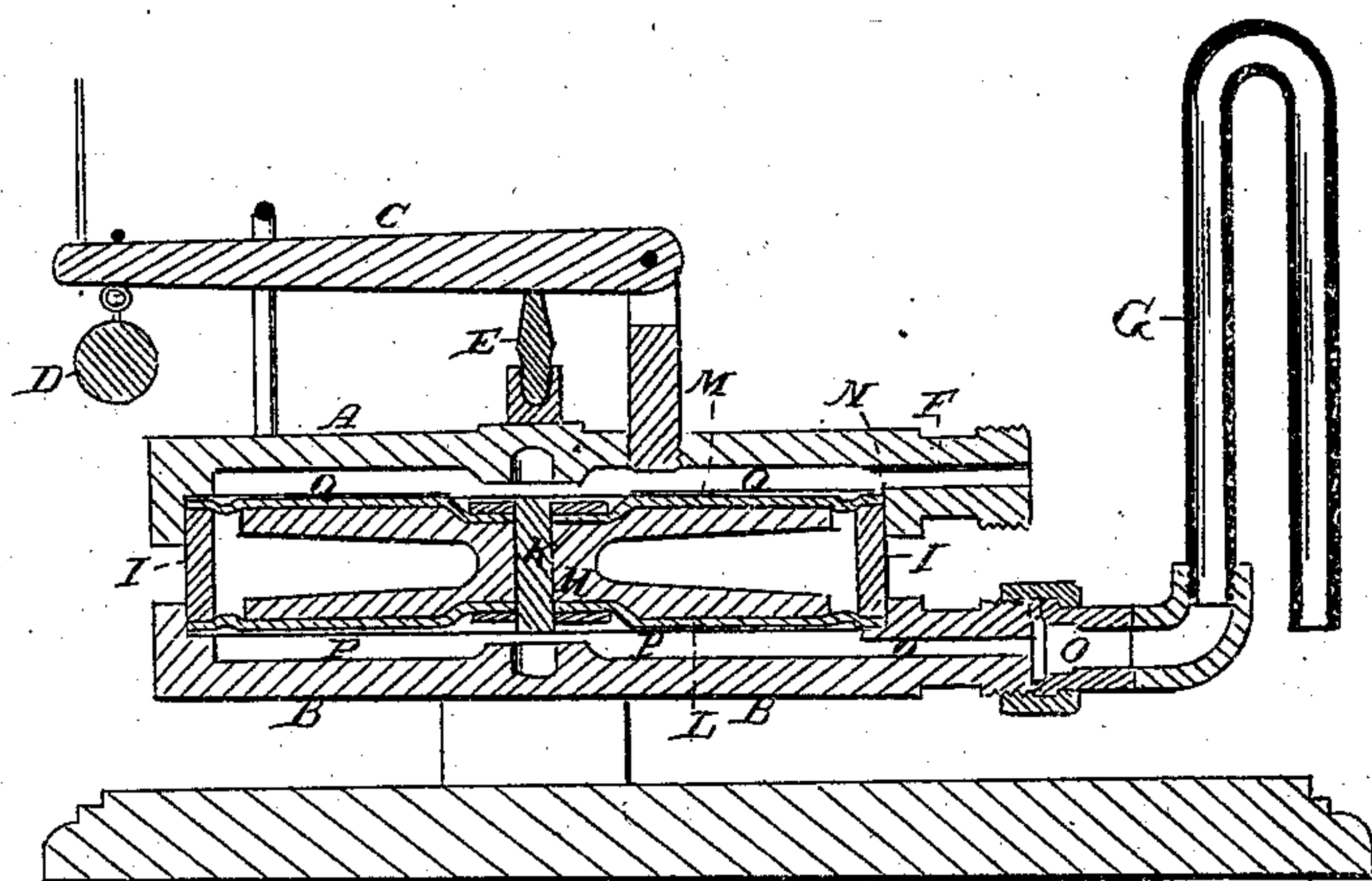
*Boiler Feeder.*

*No. 93,564.*

*Patented Aug. 10, 1869.*



*Fig. 1.*



*Fig. 2.*

*Witnesses*

*H. B. Smith*  
*Percy B. Smith*

*Inventor*

*Henry E. Stager*



# United States Patent Office.

HENRY E. STAGER, OF MILWAUKEE, WISCONSIN.

Letters Patent No. 93,564, dated August 10, 1869; antedated July 31, 1869.

## IMPROVEMENT IN AUTOMATIC BOILER-FEEDERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY E. STAGER, of the city and county of Milwaukee, and State of Wisconsin, have invented a new and useful Improvement in Steam-Boiler Feed-Water Regulator; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a perspective view.

Figure 2, a sectional view.

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

The object of my invention is to regulate the flow of water into a steam-boiler, so that the water may be kept at a uniform height, no matter how much steam may be used.

A is the top, or crown-sheet.

B, the bottom.

C, lever.

D, weight on the lever C.

E, standard, resting on a cross-bar forming a fulcrum for lever C.

F, pipe connected with the upper part of the regulator, and with the boiler below the water-line.

G, pipe connecting the lower part of the regulator with the boiler, either above or below the water-line, according to the height of water in the boiler. This pipe is made in V-shape, or in the shape of a siphon, and is to have its end in the boiler, at the point where it is desired to have the water-surface the highest.

H, valve. This valve has an upper and lower plate, with a space between, except where connected in the centre.

I, a ring, forming a circular wall for the chamber, within which the valve H is placed.

K, centre-pin of the valve.

L, a round sheet of rubber packing, forming a diaphragm, fastened to valve H by the centre-pin K, projecting through and headed down. This rubber diaphragm is large enough to fill the space out under ring I, and under this rubber, and under ring I, is a metal ring, made flat, just as wide as the thickness of ring I, fitting into a recess turned in the bottom B.

M is a rubber diaphragm, on the top of valve H, secured and fitting in a recess over ring I, with a metal ring in same manner, a sheet, L, at the bottom, the upper and under pieces A and B secured firmly on to the ring I by the bolts shown in fig. 1, making a perfect steam-joint both at the top and bottom of ring I.

N is the opening in pipe F.

O is the opening in pipe G, both communicating with the boiler.

P, water-space under valve H.

Q, water-space over valve H.

Valve H is connected to the case of the regulator by the rubber sheet L and M, the elasticity of which will permit valve H to rise and fall as it may be acted on, and thus raise or lower the weighted end of lever C.

R is a pivot or pin in one side of valve H, there being a corresponding one on the opposite side, passing through openings in ring I, large enough to permit them to rise and fall sufficient for the object to be obtained.

To these pins is a standard, on which is secured the cross-bar on which rests the fulcrum E, forming a yoke.

### Operation.

The regulator is first connected with the boiler by pipe F, at a point always below the water-line in the boiler, and by pipe G with its end, just at the point in the boiler where it is intended to have the water-line when the water is at the highest point.

A rod, from the weighted end of lever C, is attached to a two-way cock, in a pipe leading from the reservoir of water to the boiler, and connected with the feed-pump.

When the end of lever C is elevated, the passage to the boiler is open, and water is forced into the boiler, but, when the end of lever C is depressed, the passage to the boiler is closed, and an opening made for an overflow, which returns the water to the reservoir from which it is taken; and this action is accomplished in this way:

When the water in the boiler is below the end of pipe G, that pipe is filled with steam in that leg connected with the boiler, and the pressure on the under side of valve H is greater than the pressure on the upper side, and the valve is raised, and with it lever C, by means of fulcrum E, resting on the yoke connected with the valve by the stems R, and the cock communicating with the boiler from the water-reservoir is open, and the water flows into the boiler, or is forced in by the feed-pump.

As soon as the water in the boiler rises above the end of pipe G, the steam in the pipe is condensed, and water takes its place, and, as water is heavier than steam, the pressure is taken off the lower side of valve H to the extent of the difference for the whole water-surface.

The pressure on the upper side being continuous, the valve falls, lever C is depressed, and the water-communication with the boiler is closed.

When the water in the boiler falls below the end of pipe G, the water is emptied to the summit of that leg, and steam takes its place, and the pressure is in-

creased on the bottom of valve H, and water is again communicated to the boiler, and thus the water is kept at or near a uniform height.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Valve H, diaphragms L and M, and ring I, arranged substantially as described.

2. The arrangement of the valve H with the yoke, resting on stem R, fulcrum E, and lever C, substantially as described.

3. Pipes F and G, in combination with valve H, sheets A and B, and ring I, whereby to increase and diminish pressure by alternations of steam and water, substantially as described.

HENRY E. STAGER.

Witnesses:

PERCY B. SMITH,

J. B. SMITH.