

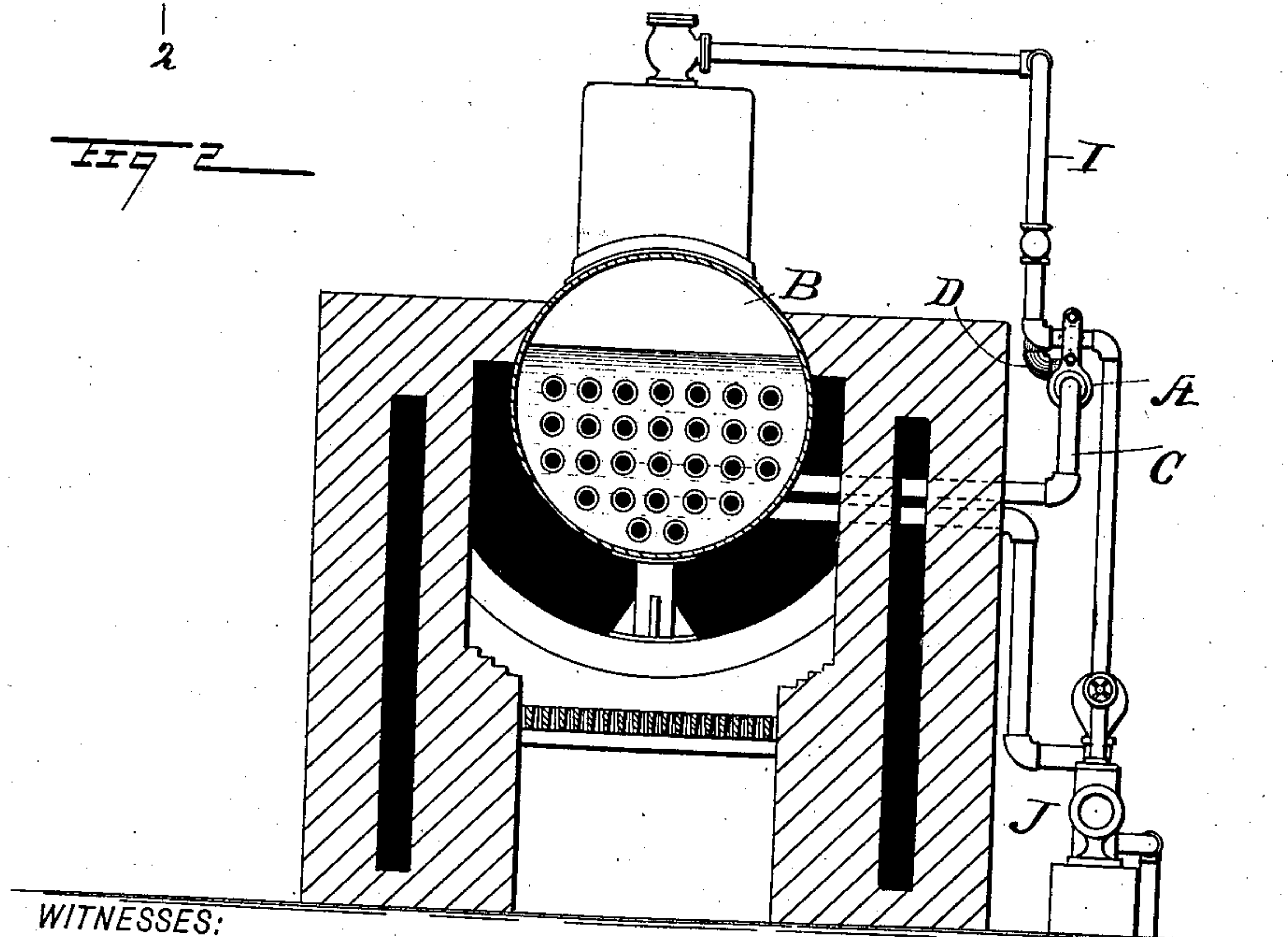
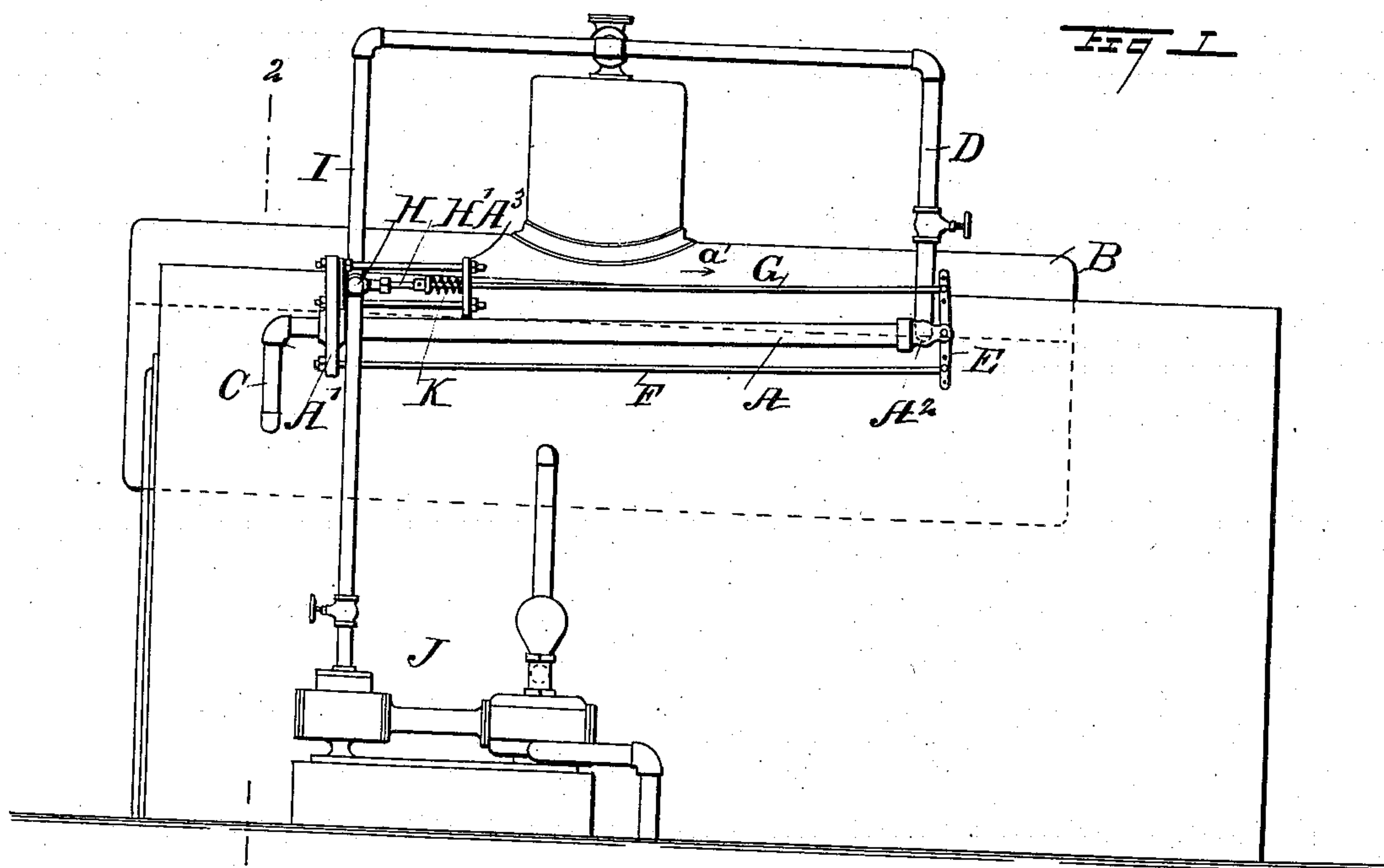
(No Model.)

2 Sheets—Sheet 1.

E. M. CARR.  
FEED WATER REGULATOR.

No. 495,302.

Patented Apr. 11, 1893.



WITNESSES:

W. Walker  
C. Sedgwick

INVENTOR

E. M. Carr  
BY Munn & Co

ATTORNEYS.

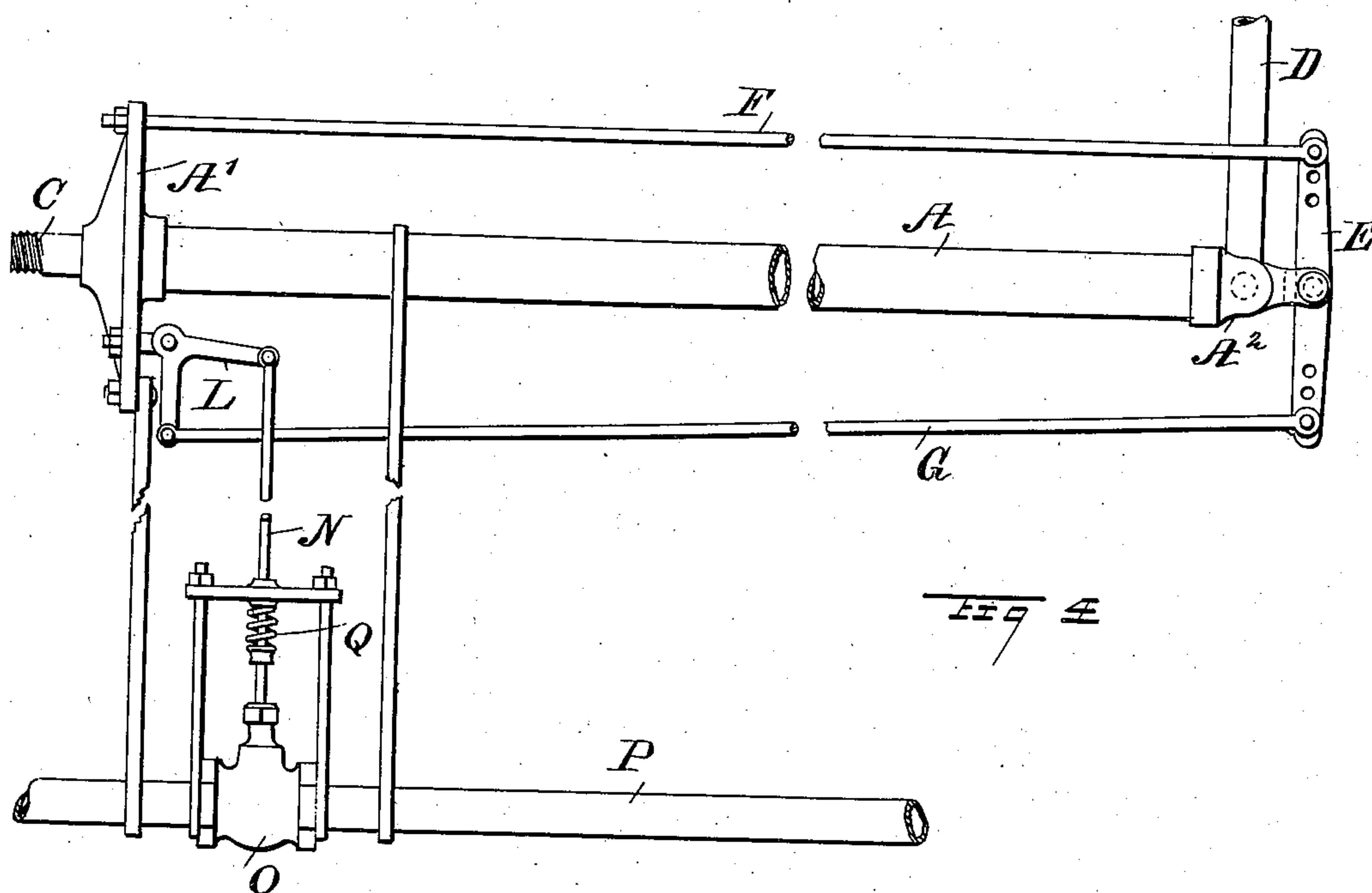
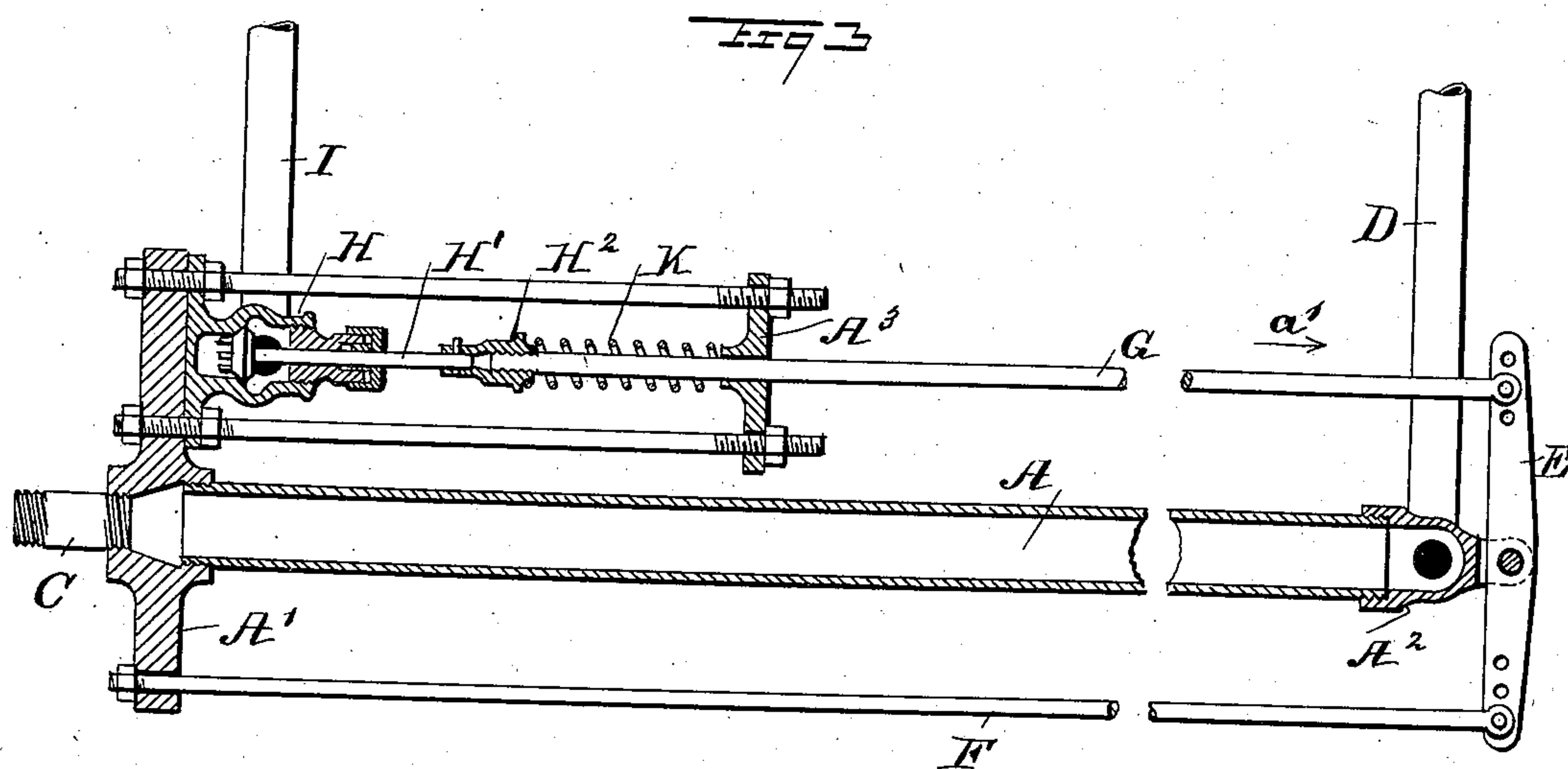
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# UNITED STATES PATENT OFFICE.

EMORY MORTON CARR, OF NEW CASTLE, INDIANA.

## FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 495,302, dated April 11, 1893.

Application filed December 5, 1892. Serial No. 454,071. (No model.)

*To all whom it may concern:*

Be it known that I, EMORY MORTON CARR, of New Castle, in the county of Henry and State of Indiana, have invented a new and Improved Feed-Water Regulator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved feed water regulator which is simple and durable in construction, very effective and automatic in operation, and arranged to automatically control the feeding devices, to hold the water in the boiler at all times at about its normal level.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied. Fig. 2 is a transverse section of the same on the line 2-2 of Fig. 1. Fig. 3 is an enlarged sectional side elevation of the improvement; and Fig. 4 is a like view of a modified form of the same.

The improved feed water regulator is provided with a pipe A arranged alongside the boiler B and placed in a slightly inclined position, the upper end of the pipe being approximately in line with the normal level of the water in the boiler B. On the ends of the pipe A are secured the heads A' and A<sup>2</sup> of which the former is connected by a pipe C with the water compartment of the boiler B, while the other head A<sup>2</sup> is connected by a pipe D with the steam compartment of the said boiler.

On the head A<sup>2</sup> is fulcrumed a lever C connected at one end with a rod F extending longitudinally alongside the pipe A and secured in the other head A'. The other end of the lever E is pivotally-connected with a rod G, also extending longitudinally and attached to the valve stem H', of a valve H arranged in the steam supply pipe I connecting the boiler B with the feed water pump J, pumping the water into the boiler. The forward end of the rod G is guided in a bracket A<sup>3</sup> supported from the head A' and on this bracket presses

a spring K, coiled on part of the rod G and pressing on the head H<sup>2</sup> of the valve stem H'. The spring K has the tendency to hold the valve on its seat in the steam supply pipe I.

As illustrated in Fig. 4, the rod G is connected with a bell crank lever L, fulcrumed on the head A' and connected with a valve stem N of a valve O held on the feed water pipe P discharging into the boiler B, it being understood that the water passes through this feed water pipe P under sufficient pressure to pass into the boiler whenever the valve O is opened. A spring Q presses on the valve stem N to hold the valve to its seat in its casing.

The operation is as follows: When the water in the boiler B is at or above its normal level, the water also fills the pipe A through the pipe C. The valve H or O is then closed, so that the feed water pump J is at a standstill. Now, when the water in the boiler B falls, the water in the pipe A likewise falls correspondingly, so that steam from the steam compartment of the boiler B can pass through the pipe D into the upper end of the pipe A, so that the latter is heated by the steam and consequently expanded. This expansion causes an outward movement of the lever E, but as the latter is fastened at one end to the fixed rod F, a swinging motion is given to the said lever, so that a pull is exerted on the rod G in the direction of the arrow a', whereby the valve H is opened and steam can pass through the pipe I from the boiler to the feed water pump J to actuate the same. It will be seen that the pipe A is heated by the incoming steam throughout its length in case the water falls sufficiently in the boiler, so that more expansion of the pipe takes place and consequently, the valve H is opened fully, to admit more steam to the feed water pump, thus working the latter to its full capacity. As the boiler fills by the incoming water discharged by the feed pump J, the water rises in the pipe A, and finally fills the same at about the time the water is at its normal level in the boiler. Contraction thus takes place by the cooling influence of the water in the pipe A, so that the lever E returns to its normal position, the spring K assisting in closing the valve H to shut off live steam from the feed pump J. A similar operation takes place when the modified form shown in Fig.



4, is employed, the pull on the rod G causing a swinging of the lever L, so as to open the valve O in the feed water pipe P. On the contraction of the pipe A the lever L swings in an opposite direction, and the valve O is closed, assisted by the action of the spring Q. By placing the pipe A in a slightly inclined position, the expansion is gradual, as the incoming steam gradually heats the pipe A at the upper end, as the water in the pipe recedes.

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

1. A feed water regulator comprising an expansion and contraction pipe arranged alongside a boiler in an inclined position, the upper end of the said pipe being in line with the normal water level in the boiler, one end of the said pipe being connected with the water compartment of the boiler, and the other with the steam compartment, a lever fulcrumed between its ends on the upper free end of the said pipe, a rod fixed at one end to a stationary head A' supporting the inner end of the said expansion pipe; and pivotally-connected with one end of the said lever, a second rod pivotally connected at its outer end with the other end of the said lever

and extending inwardly toward the head A', and a valve connected with the inner end of said second rod and arranged in the water feeding devices, substantially as shown and described.

2. A feed water regulator comprising the expansible and contractible feed water pipe A connected with the steam and water space of the boiler, a head A' fixedly supporting the inner end of the pipe A and through which the pipe C leads from said water space to the pipe A, a valve H extending from the head A' controlling the steam pipe I of the feed water pump and having a valve rod II parallel with the pipe A, a bracket A<sup>3</sup> mounted on head A, a lever E pivoted between its ends on the free end of the pipe A, a rod G extending from one end of said lever through the bracket A<sup>3</sup> and coupled to the rod H' by a coupling H<sup>2</sup>, a spring between the bracket and coupling for closing the valve, and a stationary rod F secured at one end to the head A' and at its opposite end to the other end of the lever E, substantially as set forth.

EMORY MORTON CARR.

Witnesses:

LON WISEHART, Jr.,  
WILSON A. SHOFF.