(No Model.)

E. CONVERT.

FEED WATER REGULATOR.

No. 538,221. Patented Apr. 23, 1895.

Fig. 1.

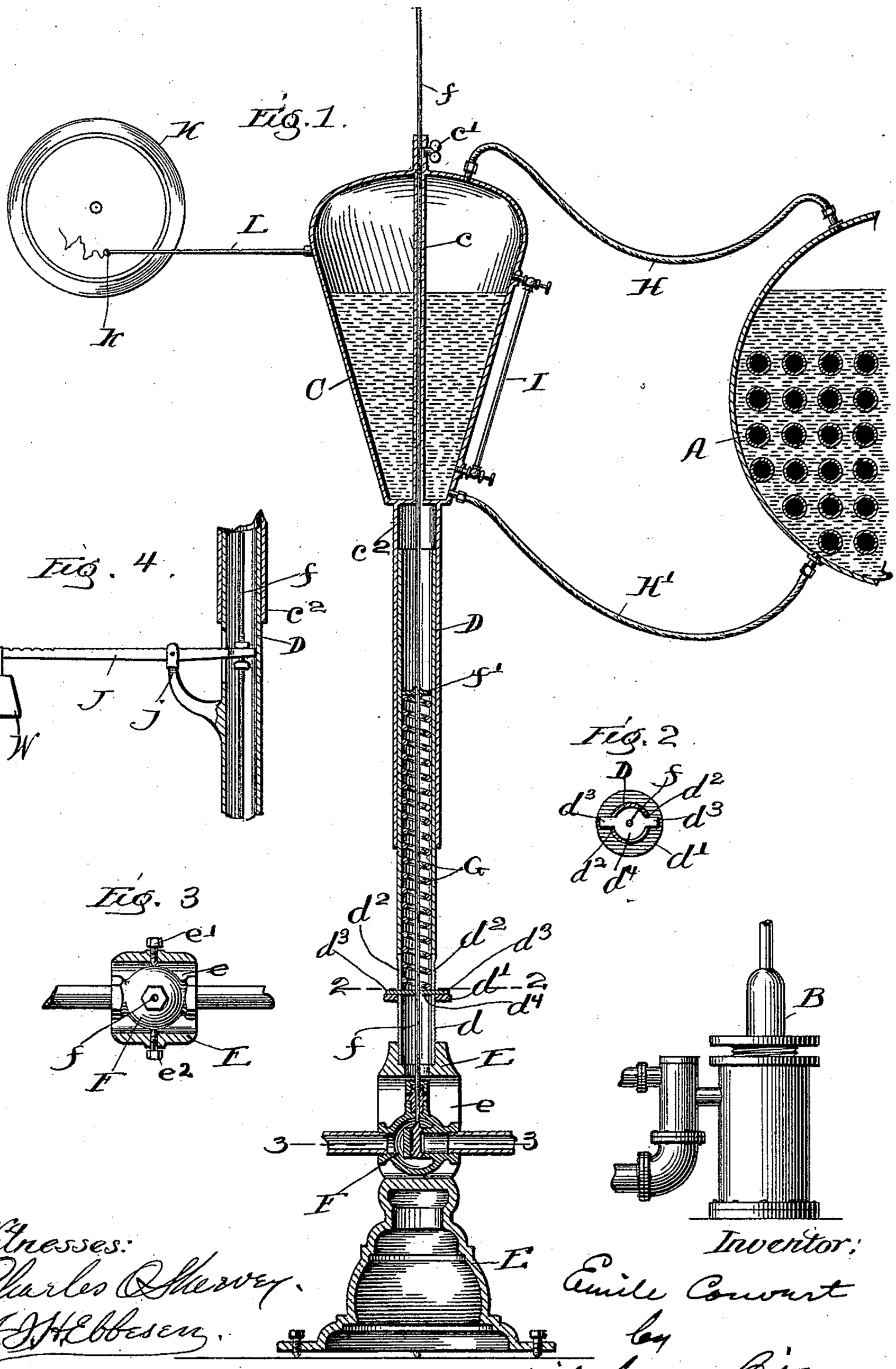

Fig. 4.

Fig. 2

Fig. 3

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UNITED STATES PATENT OFFICE.

EMILE CONVERT, OF CHICAGO, ILLINOIS.

FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 538,221, dated April 23, 1895.

Application filed December 3, 1894. Serial No. 530,683. (No model.)

To all whom it may concern:

Be it known that I, EMILE CONVERT, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feed-Water Regulators, of which the following is a specification.

My invention relates to a device for regulating the supply of water to boilers or other reservoirs under pressure and also for recording the height of the same throughout a given period.

To such end the invention consists in certain improvements contained in the preferred construction below described and definitely pointed out in the appended claims.

In the drawings furnished herewith, Figure 1 is a vertical diametrical section of the main portion of my apparatus showing other portions connected therewith. Fig. 2 is a horizontal section in line 2—2, of Fig. 1. Fig. 3 is a horizontal section in line 3—3, of Fig. 1. Fig. 4 is a vertical diametrical section similar to Fig. 1 of a portion therein shown, the construction of which is modified.

Looking at the figures the boiler is represented at A, and the feed pump B. Near the boiler and on a level with the same is a reservoir, C, preferably shaped like an inverted cone, having a pipe, *c*, extending through it from top to bottom in the line of the axis of the cone and provided with a set screw, *c'*, at the point where it extends through the upper end of the reservoir. From the lower end of the reservoir is a downwardly projecting tube of greater size c^2 which incloses a second tube, D, supported upon a base, E. This base has an opening, *e*, directly through it, in which is located a balanced valve, F, interposed in the pipe which supplies the feed water pump with steam. The valve stem, *f*, is adjusted into the line of the axis of the base and the parts resting thereon by means of set screws, *e'*, e^2, and said valve stem extends upward through the tubes, D, c^2, *c*, and is engaged by the set screw, *c'*. The tube, c^2, is adapted to slide freely up and down upon the tube, D, so that the weight of the reservoir is thrown directly upon the valve stem, *f*. The tube, D, bears an external screw-thread, *d*, upon its lower end upon which is threaded a collar, *d'*. Said tube, D, has also oppositely arranged vertical slots, d^2, which are shown in the plane of the section in Fig. 1, and through said slots extend oppositely arranged ears, d^3, upon a disk, d^4, arranged to slide up and down upon the valve stem as is shown in Fig. 2. Upon this disk rests a coiled spring, G, which bears at its upper end upon a second disk, *f'*, surrounding and fast upon the valve stem, *f*. The reservoir, C, is connected by means of flexible tubing H, $H_,$, with the boiler, the pipe, H, connecting the upper portion of the reservoir with the steam space of the boiler and the pipe, H', connecting the lower portion of the reservoir with the water space of the boiler. The communication thus opened, causes the water to rise to the same level as the reservoir, C, as that of the boiler, and any variation in the amount of water in the boiler produces a corresponding variation in the amount of water in the reservoir. A water gage, I, may be applied to the reservoir to indicate to the eye the height of said water at any moment.

In operation, an increase of water in the boiler and consequently in the reservoir increases the weight of the latter, overcoming to some extent the upward pressure of the spring, G, and closing the valve, F. A decrease on the other hand reduces the weight of the reservoir and allows the spring to open the valve. The height of the water may be regulated by means of the screw-threaded collar, *d'*, upon which rests the lower end of the coiled spring, G, through the disk, d^4. Fig. 4 shows an equivalent for the coiled spring and the adjusting collar, such an equivalent being a weighted lever, J, pivoted at *j* and engaging directly with the valve stem. In this case the adjustment is made by moving the weight, W, toward or away from the pivot or fulcrum.

To preserve a record of the movements of the reservoir, C, and, consequently, of the changes in the height of the water, I have provided a recording surface, K, turned by clockwork, upon which a line is traced by the means of a pencil, *k*, carried by an arm, L, extending laterally from the reservoir, C.

I prefer to form the reservoir as shown with a much smaller cross-section at the bottom than at the top, so that a given fall of water when the same is near the top shall bear a

greater ratio to the entire amount of water in the reservoir than if the same were of equal cross-section throughout.

I claim as new and desire to secure by Letters Patent—

1. The combination with a boiler and feed water pump, of a spring supported reservoir increasing in cross section from bottom to top, said reservoir communicating freely with the steam and water spaces of the boiler, respectively, a valve controlling the action of the pump, connecting devices between the valve and the reservoir by means of which the gravity of the reservoir may operate the valve; whereby, as the sensitiveness of the spring decreases because of greater compression, the same may be compensated for by the greater cross-section of the reservoir, substantially as described.

2. The combination with the boiler, A, and feedwater pump, B, of the base, E, having the upwardly extending pipe D, containing the spring, G, provided with means for adjusting its lower end, the reservoir, C, connected at top and bottom with the steam and water spaces of the boiler, respectively, and provided with the two tubes, c, c^2, the latter of which incloses and slides up and down upon the tube, D, the valve, F, having the stem, f, extending up through the tubes, D, c^2, c, and clamped to the latter and the disk, f', secured to the valve stem and resting upon the top of the spring, G; substantially as described.

3. The combination with the boiler, A, and feed-water pump, B, of the base, E, provided with the adjusting screws, e', e^2, and having the upwardly extending tube, D, the reservoir, C, having the tubes, c^2, c, the latter of which extends above the reservoir and is provided with a set screw, c', and the former of which incloses and slides up and down upon the tube, D, the valve, F, adjustably secured within the base by means of the adjusting screws, e', e^2, the valve stem, f, clamped by means of the screw, c', and bearing the disk, f', and the spring, G, bearing upon the disk, f', at one end and adjustably supported upon the tube, D, at the other; substantially as described.

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