

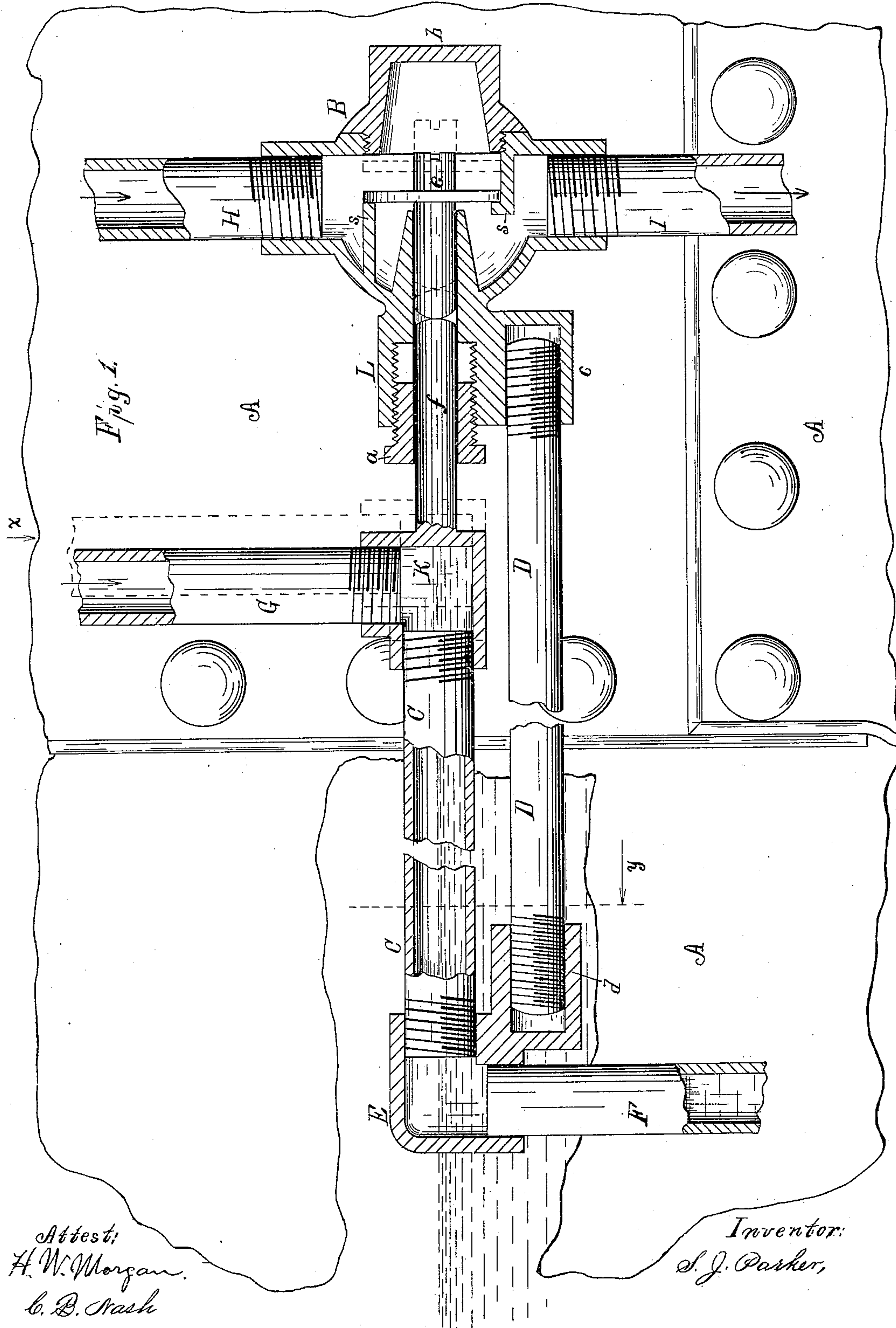
(No Model.)

2 Sheets—Sheet 1.

S. J. PARKER.
REGULATOR FOR FEED WATER.

No. 356,373.

Patented Jan. 18, 1887.

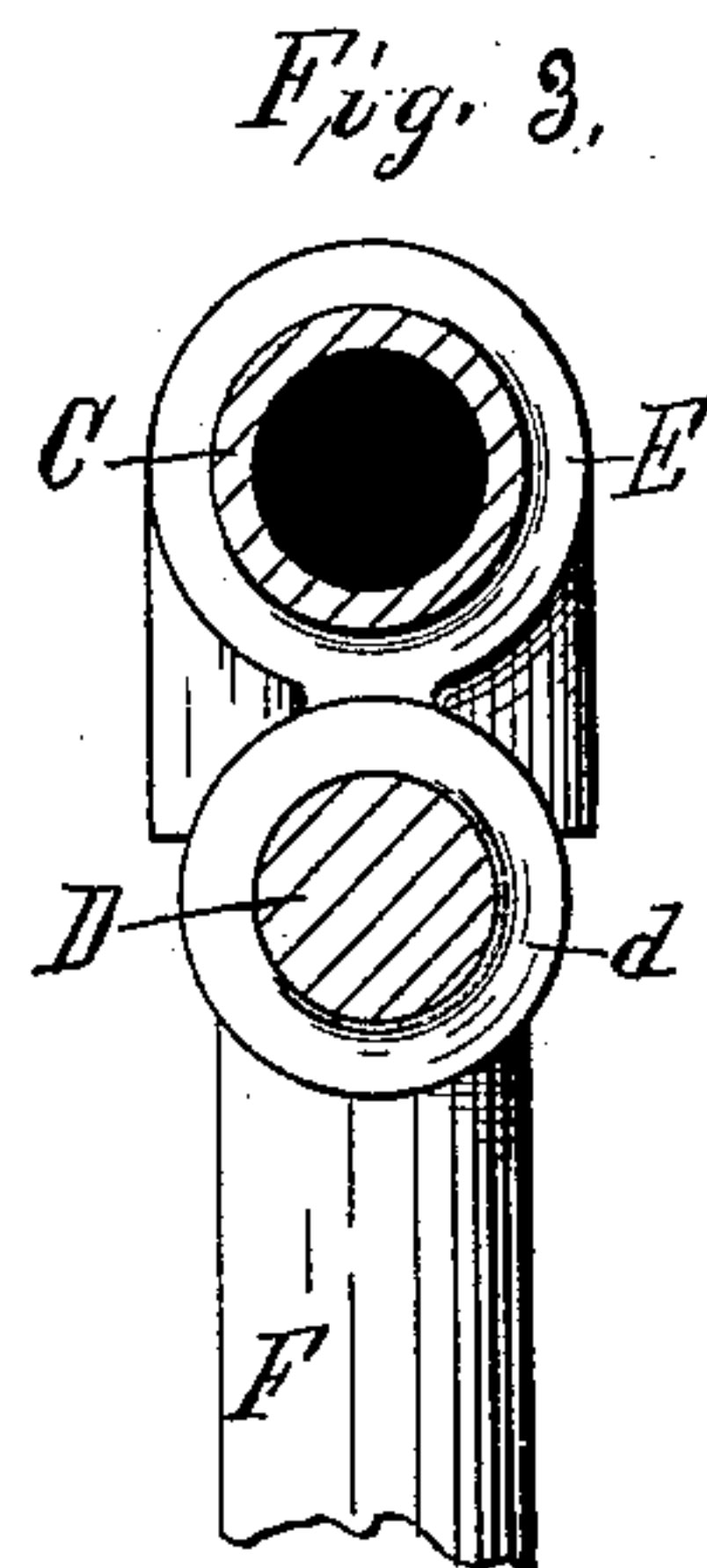
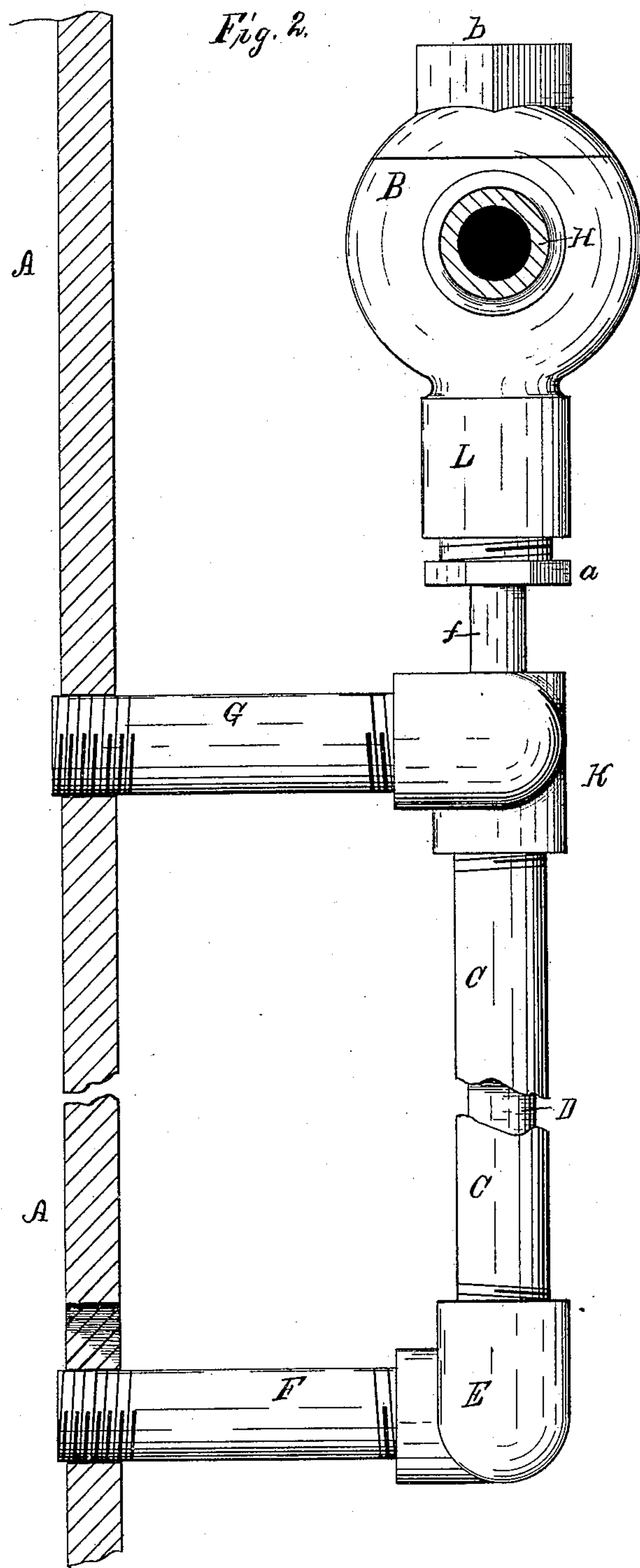


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JENNIE L. ROSS, AND LAURIE A. MORGAN, ALL OF SAME PLACE.

REGULATOR FOR FEED-WATER.

SPECIFICATION forming part of Letters Patent No. 356,373, dated January 18, 1887.

Application filed May 1, 1886. Serial No. 200,855. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL J. PARKER, of the city of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Regulators for the Feed-Water to Steam-Boilers; and I do hereby declare that the following is a clear and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 represents a side elevation. Fig. 2 represents a plan or top view as attached to the boiler. Fig. 3 represents a sectional view of elbow E.

The object of my invention is to provide a new mechanical arrangement by which the flow of feed-water may be uniformly regulated into steam-boilers; and it consists of an expansion-pipe, C C, Fig. 1, placed on a level with water-line of the boiler, connected at one end by elbow E and pipe F with water-space in boiler, and at the other end by elbow K and pipe G with steam-space in boiler, which makes a free circulation through said pipes, connected as it is with steam and water of boiler, causing the water to rise and fall in said pipe, same as in boiler. At elbow K is attached the piston *f*, which forms a continuation to the expansion-pipe C C.

The valve *e* is surrounded by its casing B, which is connected at *c* with elbow E at *d* by the adjustable rod D D. To the valve-casing B are connected pipes H and I. Pipe H is connected with steam-space of boiler. Pipe I leads to steam-pump, the valve-stem *e* passing through its casing to meet piston *f*. The opposite end of the valve-stem is provided with a slot in which a screw-driver may be inserted to grind the valve-seat *s*. The threaded cap *b*, forming part of the valve-casing, and squared at the outer end, so as to receive a wrench, can be readily removed to insert the valve.

After attaching the "regulator" to the boiler I allow the boiler to fill with water sufficiently to fill the expansion-pipe C C with water, then the rod D D, which is provided with a right-hand screw at one end and a left-hand screw

at the other end, I adjust so that the piston *f* will allow the valve *e* to rest on its seat *s s*. The valve will then be kept closed by the pressure of the steam from the boiler through pipe H, as shown by arrows.

When the water lowers in the boiler sufficiently to allow steam to enter the expansion-pipe C, the steam being considerably hotter than the water, the pipe C is caused to expand, forcing the piston *f*, which works through the stuffing-box L, to push against the stem of the valve *e* and causing the valve to open, as shown by the dotted lines, allowing the steam to pass through the valve from pipe H and into pipe I to steam-pump, which, when receiving the steam, starts to pump water into the boiler.

When the pump has supplied sufficient water to the boiler to again fill the expansion-pipe C C, the water in expansion-pipe C, being of lower temperature than the steam, causes the pipe C to contract and withdraw the piston *f* from the stem of the valve *e*. The valve is then closed against its seat *s s* by the pressure of the steam from boiler through pipe H, thus cutting off the supply of steam to the pump, and consequently the supply of water to the boiler, the valve automatically opening and closing as the water in the boiler rises and falls, causing the expansion-pipe C C to expand and contract, the valve-casing B being held by the rod D D rigidly to elbow E.

Where two or more boilers are supplied with water by one pump, I attach two regulators to each boiler, one supplying steam to pump as heretofore specified; the feed-water from pump passing through the other regulator to the boiler, by attaching pipe H, Fig. 1, to feed-water pipe from pump, and pipe I to boiler. Each boiler supplies steam to pump, through the regulator, when boiler requires water; the larger regulator through which the water passes to boiler, through pipe I, opening simultaneously with steam-regulator and receiving its portion of water.

If one or more of the boilers fill with water before the others, its two regulators are closed, as before described, and steam is supplied to the pump by the remaining boilers, which also receive the water. When the regulators on all of the boilers are closed, the supply of steam

to pump will be entirely cut off, and likewise the supply of water to all of the boilers, one or more automatically opening as the boiler needs water. Thus the water-supply to each boiler is regulated independently.

I find it desirable to make the expansion-pipe C C of brass, it being more susceptible to expansion and contraction than iron; but I do not confine myself to any particular metal, any kind or length may be used, to suit location.

Where the boiler is supplied with water by a pump on engine or a belted pump, I regulate the supply of water to the pump by attaching the pipe H, Fig. 1, into the suction-pipe to the pump, instead of into the steam of boiler, as is the case where a steam-pump is used and the pipe I connected to the pump, then proceed as before. When the water in the boiler lowers, steam enters the expansion-pipe C through pipe G, pipe C expands, forcing the valve open, as before. The pump can then draw the water through the suction-pipe H and through the valve *e* and pipe I into the pump, which forces it into the boiler through the ordinary pipe so provided. When the water rises in the boiler sufficient to fill the expansion-pipe C C with water, the pipe C contracts and withdraws the piston *f* from stem of valve *e*. The suction of the pump then closes the valve *e* against its seat *s s*, which cuts off the supply of water to the pump until the valve *e* is forced open again by the water lowering in the boiler and the steam-expanding pipe C.

I find it desirable to elevate the end of expansion-pipe C at elbow K a trifle above the end at elbow E, Fig. 1, to allow the water to settle back more readily from expansion-pipe C into pipe F as the water lowers in the boiler, and the steam to enter from pipe G more gradually, in which case the pipe C expands and contracts more gradually, which throttles the supply of water to the boiler to the extent that steam is being used from boiler, keeping a steady supply of water to the boiler, which keeps the water at one height in the boiler continuously.

I claim as my invention—

1. In combination with a boiler and a water-supply pump, a feed-water regulator consisting of an expansible pipe connected with the water-space of the boiler at or near its low-water line and communicating with a return-pipe leading to the steam-space, and a fixed pipe communicating with the pump and provided with a valve, said valve being moved positively in one direction upon an increase of temperature in the expansible pipe, and in the other direction by the pressure of a fluid in the fixed pipe.

2. The combination, with a boiler, a pump, and a steam-pipe communicating with the pump, of a valve within the steam-pipe, and an expansible device in contact with the valve and communicating with the interior of the boiler at its low-water line, whereby the valve may be raised from its seat by the expansible device and positively seated by the flow of steam in the steam-pipe upon the contraction of the expansible device.

3. The combination, substantially as described, of two or more boilers, a water-supply pump, and two regulators, substantially such as described, interposed between each boiler and the pump.

4. In a feed-water regulator, a pipe-elbow and valve-casing adjustably secured at a distance apart by a non-expansive coupling, an expansible pipe connected to the elbow, and the valve having its stem arranged in the path or line of movement of the expansible pipe.

5. In an automatic feed-water regulator for steam-boilers, the expansion and contraction pipe C C, situated on or near the water-line of boiler, in combination with the threaded rod D D, the valve-casing, and the valve, substantially as shown.

6. The expansion and contraction pipe C C, adjustable threaded rod D D, water-pipe F, steam pipe G, piston *f*, and valve *e*, all in combination, substantially as shown and described.

SAMUEL J. PARKER.

Witnesses:

H. W. MORGAN,
ALEX. ROSS.