S. Rue Jr.,

Steam Boiler Injector,

No. 81,822, Patented Sept. 1, 1868.

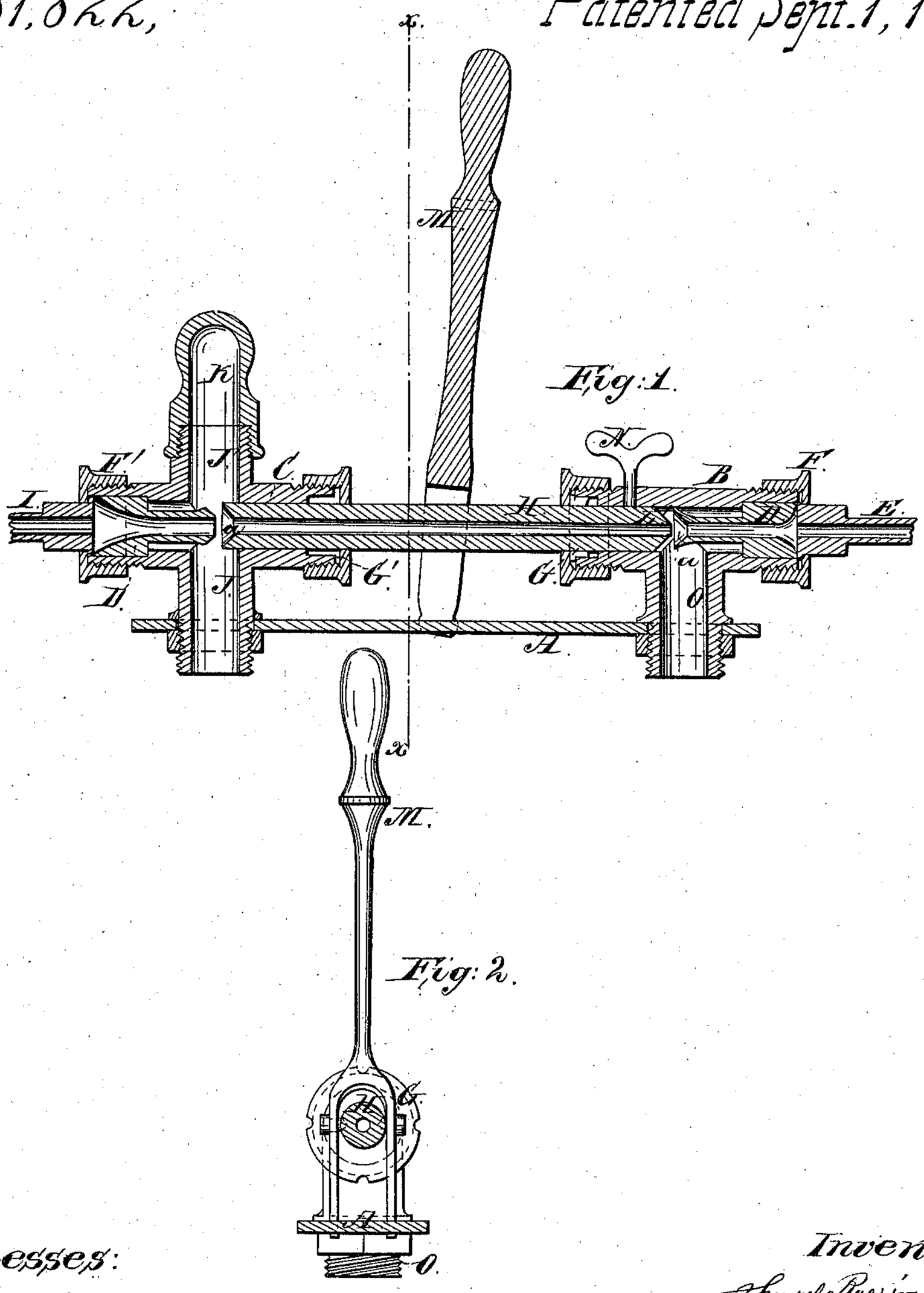

Fig: 1.

Fig: 2.

Witnesses:

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Inventor:

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By his attorney

Stephen Wetick

United States Patent Office.

SAMUEL RUE, JR., OF PAOLI, ASSIGNOR TO HIMSELF, SAMUEL McCAMBRIDGE, AND EDWARD G. MARTIN, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 81,822, *dated September* 1, 1868.

IMPROVEMENT IN INJECTORS FOR STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and maki[illegible] part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SAMUEL RUE, Jr., of Paoli, in the county of Chester, and State of Pennsylvania, have invented a new and useful Improvement in Injectors for Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists, in the first place, in the construction of the injector with valves and valve-seats, and dispensing with the nozzles heretofore used in injectors, the said valves and valve-seats being formed on the ends of an intermediate adjustable pipe, between the steam and feed-pipes, at one end, and the supply or discharge-pipe, which leads to the boiler, at the other end, and on the ends of hollow plugs, which are combined with the steam and discharge-pipes.

Secondly, the construction of the said intermediate adjustable pipe, which is smaller at its receiving-end than the steam-pipe, so as to obtain an increased pressure of steam.

Thirdly, in the construction of said intermediate adjustable pipe with a diminished taper from its receiving or rear end to its forward end, so as to obtain a greater pressure at its receiving-end, upon the stream of water, than is communicated to the same at the discharging-end, and thus to resist the check of the check-valve, between the injector and the boiler.

Fourthly, in the construction and arrangement of the said intermediate adjustable pipe in relation to the supply or discharge-pipe, leading to the boiler, as to admit of the front valve entirely closing, when there is no pressure of steam, to prevent the water passing through the overflow, and to make it take a straightforward course through the supply-pipe into the boiler.

Fifthly, in the combination of the air and water-chamber with the injector, opposite the feed-pipe, to commence the supply of water to the injector.

In the accompanying drawings—

Figure 1 is a vertical section of the injector.

Figure 2 is a cross-section at the line $x\ x$ of fig. 1.

Like letters in both figures indicate the same parts.

A is the bed-plate, with the front end of which is connected the casting, B, and with its rear end the casting, C.

The casting B has in its front end the hollow plug D, with which is connected the supply or discharge-pipe E, which leads to the boiler, the connection being made by means of the coupling F.

The casting has in its rear end a stuffing-box, G, and the front end of the casting C is provided with a stuffing-box, G′.

There is an adjustable intermediate pipe, H, between the steam-pipe and feed-pipe, at its rear end, and the supply-pipe, which leads to the boiler, at its front end. The said pipe H is sustained by the stuffing-boxes G and G′.

The rear end of the casting C is provided with a hollow plug, D′, to which is connected the front end of the steam-pipe I, by means of the coupling F′. The coupling also holds the said plug firmly, in connection with the casting C, as seen in fig. 1, and the coupling F in like manner holds the plug D, in connection with the casting B.

To the branch J, of the casting C, the front end of the feed-pipe is connected.

Opposite the branch J, there is a branch-pipe, J′, to which is connected a chamber, K, into which water first rushes when let into the injector from the feed-pipe, the air in said chamber forming a cushion for the water. The object of the said air and water-chamber is to commence the supply of water to the injector, as hereinafter described.

I dispense with the use of the nozzles heretofore used in injectors, and employ valves for opening and closing the communications between the passages, as follows:

I construct the stationary plug D′, in the casting C, with a valve, L, which has its seat, *a*, in the rear end of the adjustable pipe H.

The said pipe is adjusted, by means of the lever M, to regulate the flow of water from the feed-pipe, and is then held securely in position by means of the set-screw N, in the casting B.

There is a valve, L′, on the front end of the pipe H, the seat, *a′*, of which is in the contiguous end of the plug D.

When there is no pressure of steam, the valve L′ is closed, so as to cut off the communication between the pipe H and the overflow O, and make the stream of water through said pipe H take a straightforward course through the supply or discharge-pipe into the boiler.

I make the front end of the steam-pipe, or of the plug D, of larger bore than the bore in the rear end of the pipe H, so as to increase the pressure upon the water as it enters said pipe from the feed-pipe.

The pipe H has a diminished taper from its rear to its front end, as seen in fig. 1, so as to have an increased pressure from its front to its rear end, to resist the check of the check-valve, between the injector and the boiler.

The plugs D and D′, as well as the adjustable pipe H, are removable, so as to provide for supplying their places with other pieces of an increased or diminished bore, as may be required, in altering the capacity of the injector, without altering the dimensions of its other parts.

When water is first let into the injector from the feed-pipe, as before stated, it rushes into the chamber K, opposite to the feed-pipe, the air in said chamber forming a cushion to the water, and preventing a sudden jar. The air and water contained in said chamber afterwards, in starting the injector, commence their action, the air forcing the water into the pipe H, and thereby facilitating the flow from the feed-pipe.

I do not claim anything contained in the patents of H. Gifford, dated April 24, 1860; of James Gresham, two patents, dated February 11, 1863; of William Sellers, dated July 21, 1865; of James Gresham, dated August 7, 1866; and that of John Robinson and James Gresham, dated May 29, 1866.

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

1. The arrangement of the adjustable intermediate pipe H with the plugs D and D′, when said parts are provided with the valves L and L′ and the valve-seats *a* and *a′*, substantially in the manner hereinbefore described.

2. The arrangement of the adjustable pipe H, being smaller at its receiving-end than the front end of the steam-pipe, whereby to increase the pressure upon the water through the former, substantially as specified.

3. The diminished bore of the pipe H, for effecting a greater pressure at its receiving than at its discharging-end, whereby to resist the check of the check-valve, between the injector and the boiler, substantially as described.

4. The combination of the air and water-chamber K with the injector, opposite the feed-pipe, whereby to facilitate the supply of water to the injector at the commencing of its flow, substantially as described.

In testimony that the above is my invention, I have hereunto set my hand and affixed my seal, this 18th day of June, 1868.

SAMUEL RUE, Jr. [L. S.]

Witnesses:
STEPHEN USTICK,
JOHN WHITE.