R. RAFAEL.

AUTOMATIC BOILER FEEDER.

No. 49,919. Patented Sept. 12, 1865.

Fig 1.

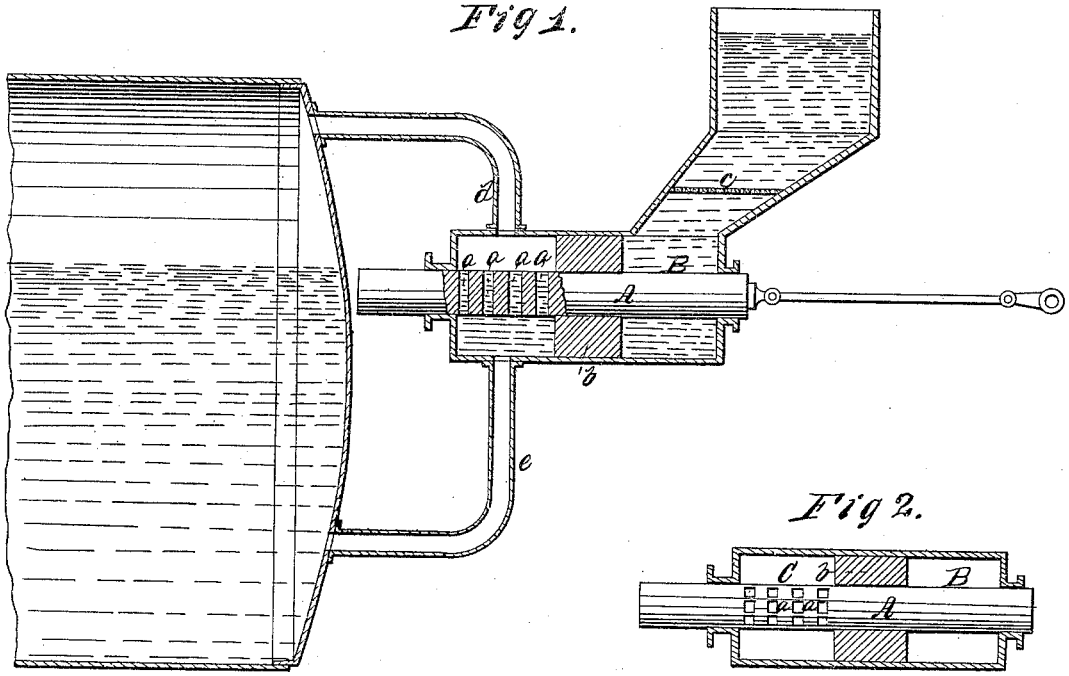

Fig 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

R. RAFAEL, OF NEW YORK, N. Y.

IMPROVEMENT IN AUTOMATIC BOILER-FEEDERS.

Specification forming part of Letters Patent No. **49,919**, dated September 12, 1865.

To all whom it may concern:

Be it known that I, R. RAFAEL, of the city, county, and State of New York, have invented a new and Improved Automatic Boiler-Feeder; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention, showing its application to a steam-boiler. Fig. 2 is a horizontal section of the feeding-chamber and plunger detached.

Similar letters of reference indicate like parts.

This invention relates to a boiler-feeder which is composed of a many-chambered plunger, which is fitted transversely through two chambers, and to which a reciprocating motion is imparted by an eccentric, a rock-shaft, or any other suitable means. The two chambers are separated from each other by a vertical partition, and one of them is in direct communication with the feed-tank or water-supply pipe, whereas the other communicates by a pipe extending from its top with the steam-space, and by a pipe extending from its bottom with the water-space of a steam-boiler. If the plunger is situated on a level with the mean water-line of the steam-boiler and a reciprocating motion is imparted to it, the cells in said plunger fill with water in passing through the first or open chamber and the water contained in said cells is carried into the second chamber, whence it descends into the boiler, provided the water therein has sunk below the mean water-line. By these means the water in the boiler will always be at the proper level, and the feeder requires no further attention after it has been once properly adjusted.

A represents the plunger, which is made of metal or any other suitable material, in the form of a solid cylinder, or in any other suitable form or shape. It is pierced transversely to its axis with a series of chambers, *a*, which pass clear through the same, and are open at the top and bottom. This plunger passes through two chambers, B C, which are situated side by side, and separated from each other by a vertical partition, *b*, as clearly shown in the drawings. Suitable stuffing-boxes in the ends of the chambers B C and the partition *b* prevent leakage.

The chamber B communicates with a cistern, tank, or reservoir containing water, or it is kept continually supplied with water, a strainer, *c*, being arranged in its upper part to prevent the entrance of impurities.

The feed-chamber C communicates, by means of a pipe, *d*, emanating from its top, with the steam-space, and by a pipe, *e*, emanating from its bottom, with the water-space, of a steam-boiler, D, and the chambers B C are put up in such a position that the plunger is on a level with the mean water-line of the boiler. Said plunger is intended to connect by a suitable rod with an eccentric, or with a rock-shaft, or any other device arranged so that a reciprocating motion is imparted to the same as soon as the engine starts.

When the cells *a* in the plunger come into the supply-chamber B they fill with water, and as the plunger moves toward the feed-chamber C the water contained in said cells is carried into the feed-chamber. The pressure in this chamber is equal to that in the boiler, and if the water in said boiler has sunk below the mean water-line the water contained in the cells sinks down and enters the boiler, and by these means a certain quantity of water is introduced into the boiler for each stroke of the plunger.

When the water in the boiler is up to the mean water-line the cells of the plunger, on arriving in the feed-chamber C, do not empty, and they carry the water contained therein back and forth as long as the water in the boiler maintains its level.

It will be readily seen that by this arrangement the water in the boiler is kept at a uniform level, for whenever a diminution of the water in the boiler takes place from any cause whatever, either from evaporation or from leakage, the loss is immediately made up by a portion or the whole of the contents of the cell in the plunger.

The apparatus is very simple in its construction. It is not liable to get out of repair, and its action is entirely automatic.

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

The reciprocating plunger A, provided with a series of cells, *a*, and operating, in combination with a supply-chamber, B, and feed-chamber C, substantially as and for the purpose described.

The above specification of my invention signed by me this 12th day of June, 1865.

R. RAFAEL.

Witnesses:
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