2 Sheets--Sheet 1.

J. H. BLESSING.

Steam-Boiler Feeders.

No. 134,972. Patented Jan. 21, 1873.

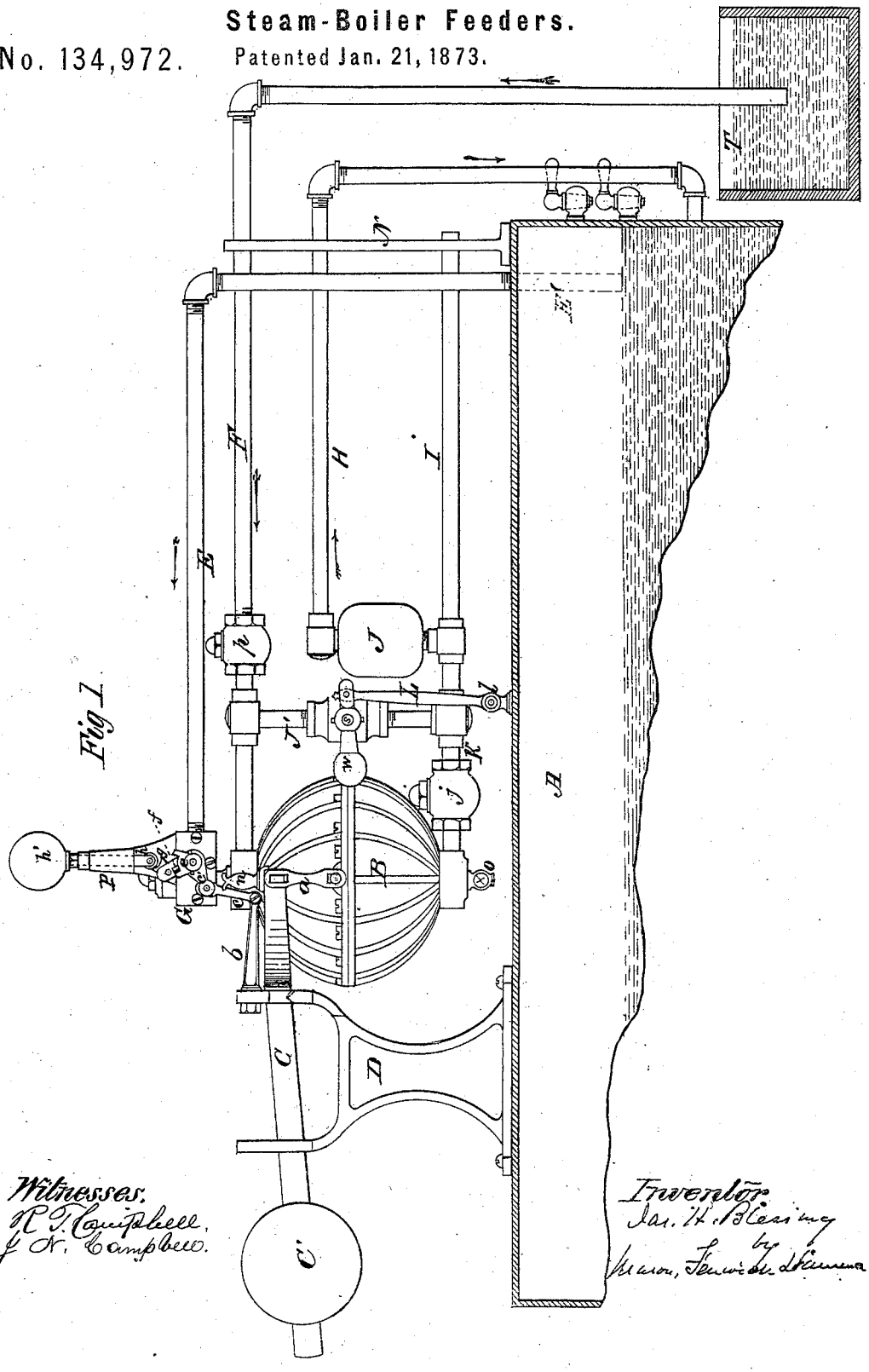

Fig 1

Witnesses.
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Inventor.
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by
Munson, Lewis & Munson

2 Sheets--Sheet 2.

J. H. BLESSING.

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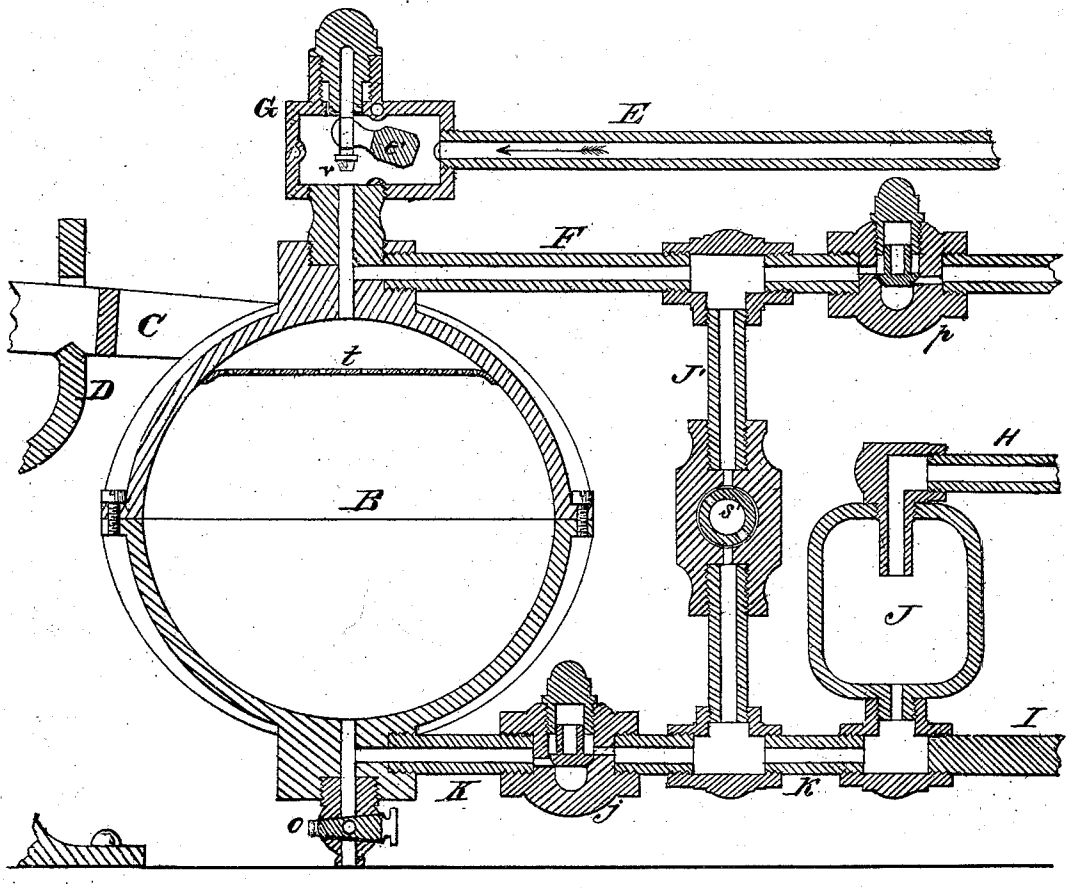
Fig. 2



Witnesses.
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Jas. N. Campbell

Inventor
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UNITED STATES PATENT OFFICE.

JAMES H. BLESSING, OF ALBANY, NEW YORK, ASSIGNOR TO HIMSELF AND FREDERICK TOWNSEND, OF SAME PLACE.

IMPROVEMENT IN STEAM-BOILER FEEDERS.

Specification forming part of Letters Patent No. **134,972**, dated January 21, 1873.

To all whom it may concern:

Be it known that I, JAMES H. BLESSING, of Albany, in the county of Albany and State of New York, have invented a new and Improved Steam-Boiler Feeder; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 shows the improved feeder applied to a steam-boiler. Fig. 2 is a section taken vertically through the apparatus.

Similar letters of reference indicate corresponding parts in the two figures.

The object of this invention is to employ a balanced gravitating supply-vessel, which communicates, by means of pipes, with the steam and water spaces of a steam-boiler, and also with a water-reservoir, said pipes being provided with valves which are so arranged that, as the supply-vessel rises and descends, water will be forced into it from said reservoir, and then allowed to flow into the boiler, as will be hereinafter explained.

The following description of my invention will enable others skilled in the art to understand it.

In the accompanying drawing, A represents the upper portion of a steam-boiler on which the improved feeder is mounted. B represents a water-supply vessel, which may be made spherical or of any other suitable shape, and which is suspended by links *a* from the yoked end of a lever, C, so as to rise and descend freely. The lever C is supported by a standard, D, upon a knife-edge bearing, and also guided by this standard, and on the outer arm of this lever a counterbalancing weight, C′, is adjustably applied. On top of the supply-vessel, and communicating with its interior, is a valve-chest, G, and also an air-escape cock, *n*. The chest G is provided with a valve, *v*, the stem of which is connected to the lifting-arm of a rock-shaft, *e′*, shown in Fig. 2. On the outer end of stem *e′* a forked segment, *e*, is keyed, and between this segment and the chest G a right-angular lever, *c′*, is applied loosely on the said stem *e′*, and provided with a tripping-lug, *f*, which plays between the forked ends of the said segment when lever *c′* is vibrated. To the upper extremity of the lever *c′* a lifting-piece, *g*, is pivoted, on the upper concave end of which rests an anti-friction wheel, which is on the lower end of a gravitating stem, *h*, which latter plays up and down in a sleeve, P, rising from the chest G, and has applied to its upper end an adjustable weight, *h′*. Between this weight *h′* and the upper end of the sleeve P a screw-collar is applied on the stem *h*, by which this stem can be set higher or lower. The lower extremity of the lever *c′* is connected, by a link, *c*, to an arm, *b*, which is rigidly fixed to the standard D.

It will thus be seen that when the supply-vessel B is caused to descend by the weight of water in it, the valve *v* in the steam-chest G will be lifted from its seat and establish a communication between the interior of the chest G and the supply-vessel B, and when this vessel is caused to rise by the escape of said water from it the valve *v* will shut and close such communication.

The chest G communicates with the steam-boiler by means of a pipe, E, which may terminate at the crown of the boiler, or it may be extended down to the high-water mark, as indicated by the dotted lines E in Fig. 1. T represents a reservoir for supplying the feed-water, and F represents the supply-pipe which communicates with the supply-vessel B at its upper end, and which is provided with a valve, *p*. Just below the inlet-passage for this pipe is a horizontal thickly-perforated diaphragm, *t*, on which the water strikes upon entering the supply-vessel, which has the effect of distributing the water over a large area, and converting the same into fine spray, thereby facilitating the condensation of any steam which is in the supply-vessel. A draw-off cock, *o*, is applied to the lower end of the supply-vessel; also a pipe, K, through which latter the water escapes from the vessel B on its way to the steam-boiler. In the pipe K is a valve, *j*, which opens upward, and between this pipe K and the pipe H, which communicates with the water-space of the boiler, is a cool-water vessel, J, which, with the pipe K, may be supported by a rod, I, resting in a standard, N. Between the point where the vessel J communicates with the pipe K and the point where valve *j* is applied to this pipe K, is a vertical

branch pipe, J′, which forms a communication between the two pipes K and F when a valve, *s′*, is open. The valve *s′* is of the oscillating kind, and to the outer end of its stem *s* a loaded lever, W, is keyed, one end of which is connected, by a link, L, to a fixed pivot-block, *l*. The standard N supports the two pipes F and H, as well as the rod I, which pipes and rod are sufficiently flexible to allow the supply-vessel B to rise and descend freely.

To start the feeder the supply-vessel B is caused to descend by canting the lever C. This will open the valve *v* in the steam-chest G, and admit steam into said vessel, directly from the boiler A, through pipe E. The lever C is then released and the supply-vessel B allowed to ascend again by the action of weight C′, which will close valve *v*. When the steam in the vessel B is condensed there will be a partial vacuum therein, and cold water from the reservoir T will be forced by the pressure of the atmosphere through pipe F into vessel B. When a sufficient amount of water has entered the vessel B to counterbalance the weight C′ this vessel will descend and open the valve *v*, thus allowing steam to enter and balance pressures, when the water which was forced into the vessel B will flow into the boiler through pipes K H, and vessel J, leaving the latter partially filled.

When the water has been thus discharged from the vessel B the latter will rise and close the valve admitting steam from the boiler, and when the vessel has nearly reached its highest point the valve *s′*, which was slowly turned about its axis as the vessel B ascended, will be opened and the boiler-pressure in the feed-pipe force some of the cold water remaining in the receiver J back into the vessel B through pipes J′ and F. This injection of cold water into the vessel B instantly condenses the steam therein, and water from the reservoir will supply the vacuum necessarily formed. When a sufficient amount of water has in this manner entered the vessel B to cause this vessel to descend, the operation, as above described, will be repeated until the feeder is shut off.

It will be observed that if the pipe E, which furnishes steam to the vessel B to balance pressures, is continued down to the water-level in the boiler, as above described, the water in the boiler may be kept at about that level; for if the water in the boiler rises so as to cover the end of said pipe, no steam can enter the vessel B, and the feeder will cease working; but as soon as the end of the pipe E is again uncovered by the descent of the water in the boiler, steam will pass into the vessel B and cause the feeder to renew its operation.

By this latter arrangement of the pipe E, when the feeder stops work the vessel B will always be down by the weight of water which is driven back into it from the reservoir or receiver; the valve *v* will consequently be open ready to admit the steam into said vessel when the water in the boiler sinks below the end of pipe E.

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

1. The combination of the valve *v* applied and actuated, as shown, single gravitating vessel B, arranged and actuated as described, and the pipes E, F, K, and H, with their appropriate valves or cocks, substantially in the manner and for the purpose set forth.

2. The cold-water supply-receiver J, communicating with a gravitating vessel, B, by means of the feed-pipes and a branch pipe, J′, which latter is provided with a valve, *s′*, all for the purpose of facilitating the condensation of steam in said gravitating vessel, substantially as described.

3. The cold-water receiver J, for the purpose of retaining some of the feed-water, and allowing the same to be forced by steam from the boiler back into the vessel B, thus producing a vacuum therein, substantially as described.

4. The combination of valves *p*, *j*, and *s′*, and their respective pipes, with a gravitating vessel, B, substantially as described.

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Witnesses:

A. P. STEVENS,

PETER HALLER.