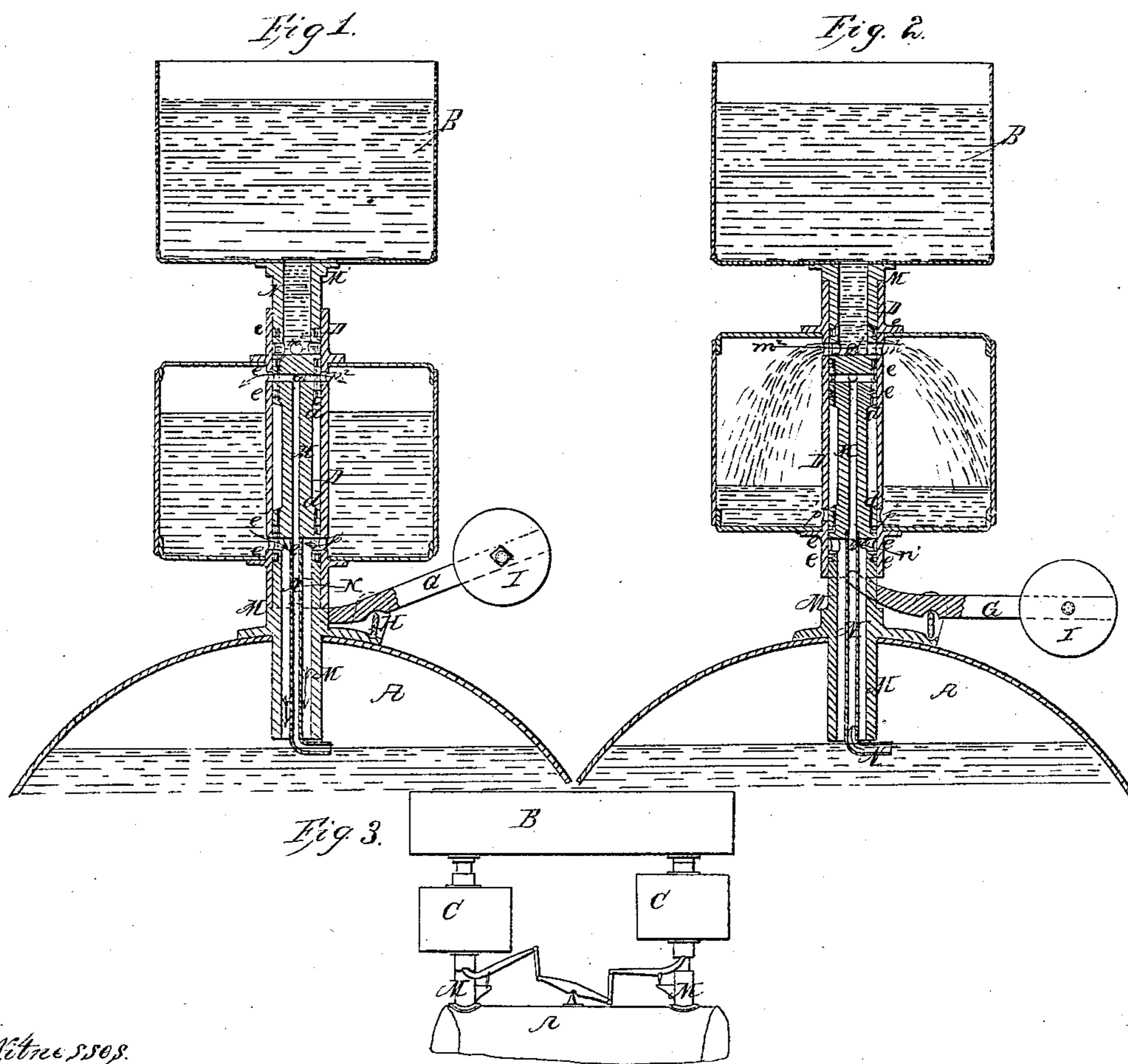


S. J. Parker,

Steam-Boiler Water-Feeder,

N^o 64,356.

Patented Apr. 30, 1867.



Witnesses.

Samuel W. Peterson
D. W. Peterson

Inventor.

Samuel J. Parker

United States Patent Office.

SAMUEL J. PARKER, OF WILLIAMSPORT, PENNSYLVANIA.

Letters Patent No. 64,356, dated April 30, 1867.

IMPROVEMENT IN AUTOMATIC BOILER FEEDERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SAMUEL J. PARKER, of Williamsport, in the county of Lycoming, and State of Pennsylvania, have invented certain new and useful improvements in Boiler Feeders; and I do hereby declare that the following is a full and exact description thereof.

The object of my invention is to maintain the supply of water in a steam boiler by receiving water from an elevated reservoir, or through a pipe otherwise supplied with water, at a slight pressure, and transmitting it at intervals into the boiler by filling an intermediate vessel alternately with water and steam under conditions and arrangements of the parts which afford considerable advantages over any analogous device previously known to me.

The accompanying drawings form a part of this specification.

Figure 1 is a vertical section through my apparatus, with the chamber in its lowest position, so that it receives steam from the boiler into the upper portion of the said vessel and discharges water into the boiler from the lower part.

Figure 2 is a corresponding section, showing the chamber in its highest position.

Similar letters of reference indicate corresponding parts in both of the figures, and to enable others skilled in the art to make and use my invention I will proceed to describe it by the aid of the drawings and of the letters of reference marked thereon.

A is a steam boiler, and B a tank of water. C is a strong chamber or movable vessel, mounted in an intermediate position, and adapted to slide vertically to a limited extent on the peculiarly-constructed rod or tube M. The tube D fits tightly upon M at certain points by the aid of packing, as indicated by *e e*, etc. This tube D is soldered to or otherwise made a part of the vessel C, and slides vertically therewith. F and G are the arms of a bent lever fitted to turn on a fulcrum, H. The arm G is loaded with the weight I, which is adjusted at such a distance from the fulcrum H as will enable it to properly balance the weight of the chamber C and its attachments, as will be more fully explained below. The lower end of the pipe M is hollow, and communicates from the boiler to openings, *m*¹, which allow the steam to escape outward or water to flow inward. The upper end of M is also hollow, and communicates from the tank B through openings *m*², and allows steam to flow inward through these openings and upwards into the tank B, and water to flow in the reverse direction. N N' is a bent pipe. The arm N' extends horizontally along the level of the water line of the boiler. The arm N extends upwards along the hollow interior of the pipe M and communicates with holes, *m*, which open through the sides of M, as represented. The end of N' is open. The stops M¹ M² are provided as represented on the rod M, which stops meet the ends of the tube D and arrest its motion at a definite point. Holes, *p*¹ *p*², are made through the tube D in the positions represented. The tank B being supplied with water, and the boiler set at work, the consumption of the water lowers its surface below the tube N', so that steam rises through the pipe N, and after properly heating the parts above, ultimately fills the upper portion of the vessel C by flowing outward through the openings *m* and through corresponding openings *p*², which are exactly in line therewith when the vessel C is in the depressed position indicated in fig. 1. The access of steam in this manner allows the water in the vessel C to descend by its gravity into the boiler, flowing inward through the orifices *p*¹ and the openings *m*¹, which are exactly in line therewith, and from thence flowing downward through the hollow interior of M, it being understood that the interior of M is of larger diameter than the exterior of the pipe N. This action proceeds until the vessel C is nearly emptied. When this period arrives an entire change in the conditions takes place by the descent of the weight I, the gravity of which overcomes the gravity of the vessel C and its connections. The weight I descends, elevating the chamber C until the upper end of the tube D strikes the stop M¹. The parts then remain again at rest for a considerable period. In this new position of the parts the passages *p*¹ are not in line with the openings *m*¹. Neither are the openings *p*² in line with the holes *m*. There is, in short, no communication between the chamber C and the boiler. But the openings *p*² are in line with the passages *m*², so that the interior of the chamber C is in communication with the tank B. The steam which fills C therefore escapes into the tank B by flowing inward through the openings *p*² and the passages *m*², and upward through the hollow interior of M. The steam imparts its heat to the water in the tank B and becomes condensed, and as soon as the pressure in the chamber C is sufficiently reduced the water in B descends by its gravity and commences to fill the chamber C, flowing downward through the hollow interior of M, and

outward through the passages m^2 and the openings p^2 . This action proceeds until the water has nearly filled the chamber C. At this period an entire change in the conditions again occurs by the descent of the chamber C and its attachments, its gravity being now sufficient to overcome that of the weight I. It descends until the lower end of the tube D meets the stop M^2 , when it rests in the position first described, where the operation of the steam from the boiler, in flowing upward through N and outward through m and p^2 , heating the parts and allowing the water to descend through p^1 and m^1 , and the hollow interior of M, is again repeated until the gravity of the chamber C and its load is so reduced as to be again overcome by the weight I and lifted as before. I take care to bend the lever F G in the manner represented, so that the movement shall never commence until the load in C has become so little or so great as to fully and rapidly effect the complete movement desired. This results from well-known laws of the lever, but which have never, I think, been applied in such combination before. I so proportion the length of the arms F G, and the angle at which the arms stand relatively to each other, that either shall be exactly horizontal when in its lowest position, so that the weight depending thereon shall exert its greatest leverage in that position. The leverage of the load on either arm is evidently much less when said arm is in an inclined position; and when the load on either arm in its inclined position is sufficient to start or commence the motion of lifting the load on the other arm when said other load is at its greatest leverage, the leverage of the load on the descending arm constantly increasing during each stage of the motion, and the leverage of the load on the other arm as constantly decreasing, it follows that the movement will be rapid and certain so soon as it has once commenced. The several packings e , each, of course, extends complete around the rod M. I form them by preference of steel springs and cast-iron rings or partial rings, ranged in the manner similar to the packing of steam engines. I consider this the best mode of securing a perfectly durable and reliable packing, which shall offer but slight friction to the proper motion of the parts, but I do not confine myself to this style of packing; I propose to use any which shall fulfill the conditions properly.

I have tested this invention for several months, and am now relying on it altogether as the only means of feeding a boiler which is used in my shop. The moment the water level rises so as to cover the horizontal arm N' of the pipe through which the steam rises into the chamber C the action of the apparatus ceases, because steam cannot rise under those conditions to fill the chamber C, and the latter consequently remains filled with water, and holds the arm F of the lever F G in its lowest position for any period required. But so soon as the water level sinks below the pipe N', the water in the pipe N N' flows down or is vaporized, and the steam rises and discharges the water from the vessel C, and causes the latter to rise and become again filled, and thus the operation is repeated as often as is necessary. I find the variation in the level of my boiler so slight as to be scarcely appreciable.

Steam is liable to gather under the packing e and to press the latter outward with such violence as to disturb the action, if not altogether prevent it under some conditions. To avoid a possibility of this, I drill small passages, e , communicating from the tank B to the inside or bottom of the grooves in which the packings e lie. These holes or slender passages e are sufficient to allow any steam which shall accumulate under the packing to flow freely upward, and to escape and be condensed. They insure against a possibility of any considerable pressure of steam to force the packings outward.

I can make my apparatus double, if desired, by connecting two of the movable chambers C to a single lever or to a series of levers operating together, as indicated in fig. 3, and in such case the gravity of one when loaded will elevate the other.

I prefer to mount the lever F G on a knife-edged bar or plate, as indicated, because such mounting offers less resistance by friction; but this device, although important, is not absolutely essential to the success of the other features of my invention.

The fact that the vessel C with its tube embraces and slides upon the tube M makes the entire apparatus very compact and easy of attachment and removal, and tends to remove the objection of complication and multiplicity of pipes which has been urged against the previously known automatic feeders for boilers.

Having now fully described my apparatus, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. The within-described arrangement of the vessel C, with the tube D and fixed pipe M, in combination with suitable packing e , and a boiler and a water tank, substantially in the manner and for the purposes herein set forth.

2. I claim, in combination with the above, the arrangement of the passages d relatively to the movable part C, adapted to discharge steam from beneath the packings e , substantially in the manner and for the purpose herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

SAMUEL J. PARKER.

Witnesses:

SAML. S. SWEEBY,
J. D. WALLACE.