(No Model.)

T. B. SMITH.

WATER PRESSURE FEEDER FOR BOILER SCALING PREVENTIVES.

No. 526,643. Patented Sept. 25, 1894.

Fig 2

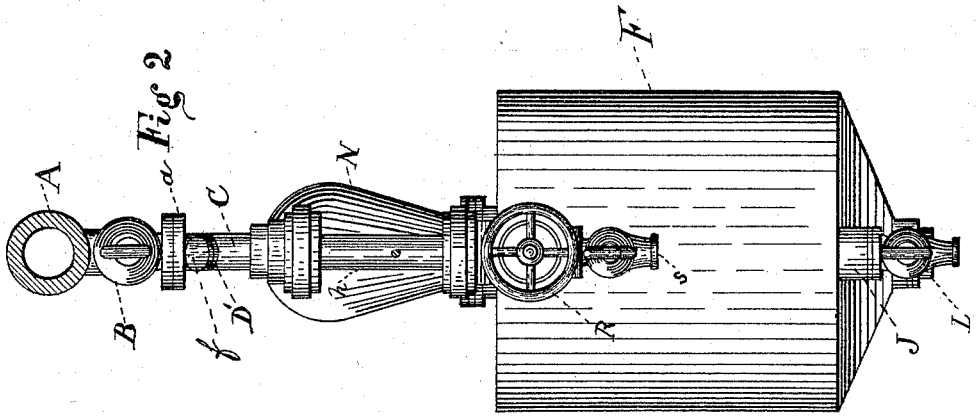
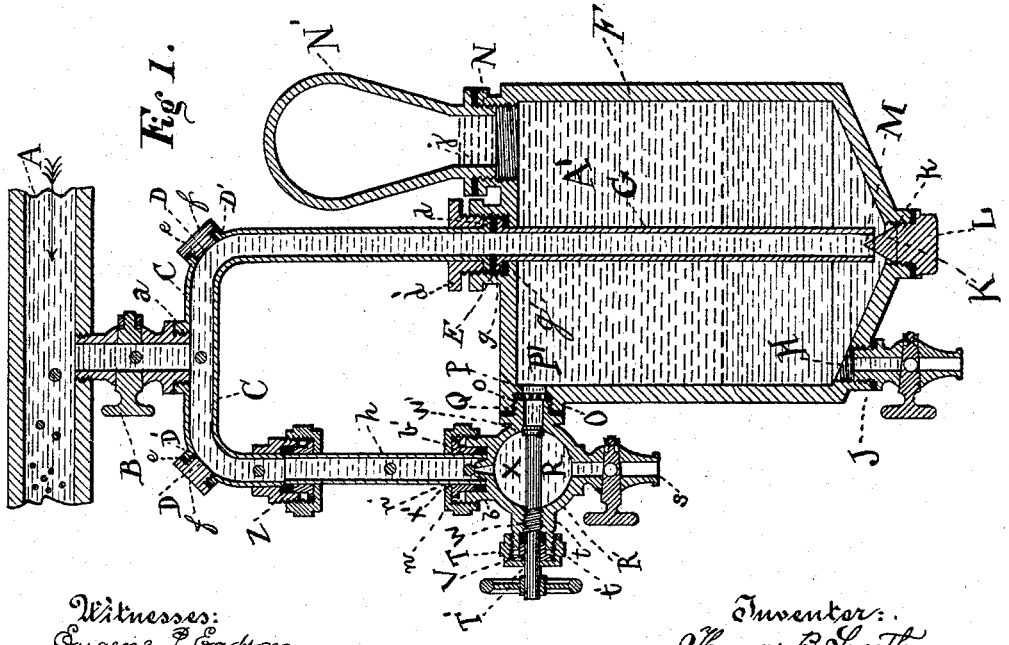


Fig 1.



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UNITED STATES PATENT OFFICE.

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WATER-PRESSURE FEEDER FOR BOILER-SCALING PREVENTIVES.

SPECIFICATION forming part of Letters Patent No. 526,643, dated September 25, 1894.

Application filed June 1, 1894. Serial No. 513,140. (No model.)

To all whom it may concern:

Be it known that I, THOMAS B. SMITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new Improvement in Water-Pressure Feeders for Boiler-Scaling Preventives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to the special arrangements, construction and combination of parts, forming an automatic device whereby a liquid compound contained within a chamber, constituting part of the invention, is intermittently or regularly fed to the feed-water pipe, supplying water to boilers for use with steam engines, or other purposes, by the pressure of the water contained in the feed-water pipe; and the objects of my invention are, first, to provide an apparatus that will automatically discharge or feed a compound or oily ingredient, in any quantity desired, into the feed-water pipe, or supply pipe, for boilers, by the action of the water pressure in the feed-water pipe, and thereby supplying an improved means of supplying and feeding ingredients to boilers, possessing the qualities of cleansing, and freeing the boiler of scale, or preventing the formation of scale in boilers, and thus supplying a ready and efficient means of separating the mineral deposits or incrustation, which is invariably formed and deposited on the plates of boilers without having to resort to any manual or mechanical operation, such as chipping off the scale with tools, &c.; such methods or mechanical means being costly in labor and injurious to the plates of the boiler; second, to supply a machine for the purposes as set forth, which will be exceedingly simple in construction, reliable in its operation, and inexpensive to manufacture.

To accomplish the various objects of my invention, I construct a vessel having a cylindrical or other suitable form, and whose base is funnel shaped, somewhat similar to an inverted cone. At one side of this coned base, at its extreme limit or juncture with the vertical sides of the vessel, there is a threaded opening into which is secured a blow-off cock or valve, and at the lowest point of the coned bottom of the vessel, is provided a threaded aperture into which is screwed a flange-faced threaded plug having a coned extremity. The top or crown of the chamber or vessel has a central, annular flanged threaded opening, provided with a faced seat near its base. Into this central opening a flanged inner pipe, with its flange resting on the seat of the central opening, and its lower end projecting downwardly to a distance below the outlet or aperture of the blow out cock. From the central opening a flanged pipe, seating itself with the lower and interior pipe, rises in a vertical position, and turns, assuming the shape ⌐ similar to an inverted U, from the center of which, by suitably arranged connections, there is provided a stop valve, this valve being connected directly to the feed-water pipe, or provided with a length of pipe interposed between the valve and feed-water pipe, as may be required for convenience of manipulation. At each of the turns of the inverted U shaped pipe, are arranged threaded flanged openings, having threaded plug screws for convenience of cleaning the pipe. From the shorter end of the inverted U shaped pipe, extending downwardly in a vertical position, there is an ordinary glass gage tube, suitably connected with the pipe, and its lower end connecting by a union joint formed integrally with a spherically chambered pressure stop valve, of special construction, having at the base of the spherical chamber, a small blow-out cock, integrally formed with the spherical pressure chamber. On one side of the spherical pressure chamber, there is provided an externally threaded projecting stem, over which an internally threaded annular cap screws on, this cap having a central opening for the valve rod to pass through. At the juncture of this stem with the spherical pressure chamber, the central opening, through which the valve rod passes, is provided through its length with an integral formed screw thread, in which a corresponding thread on the valve rod works, securing finer adjustment of the tapered valve at the end of the rod, seating itself in

the inlet opening on the opposite side of the spherical pressure chamber, and connecting point with main reservoir. This arrangement of the screw threaded valve rod relieves the cap from all pressure or thrust and secures more perfect working of the valve. On the opposite side of the crown or top of the main chamber or reservoir, and on a central line with the center pipe aperture, and spherical pressure chamber and valve, there is a projecting flanged opening, provided with an internal thread. This opening serves the double purpose of filling or replenishing the reservoir, as a vent, and by the stopper or plug being made in the form of an ordinary air pressure chamber, it affords great elasticity to the contents contained within the reservoir, and which are susceptible to any variation of the water pressure.

In the accompanying drawings: Figure 1 shows a central vertical section of the invention and a portion of a feed water pipe also in section. Fig. 2 is a front elevation.

Similar letters of reference refer to the same parts in the figures of the drawings.

A represents the feed-water pipe leading to a boiler. Not shown in the drawings.

B shows the stop cock connected with the feed water pipe A, and connected to the inverted U shaped pipe C by the annular internally threaded flange *a* formed integrally with the pipe C.

D D are openings in the pipe C and formed with the integral annular flanges D′ D′ and internal thread *e e* in which the screw plug *f* is screwed, securely closing the openings D D. The end of the pipe C is provided with a flange *d* fitting down inside of the annular threaded flanged opening E formed in the center of the crown or top of the cylindrical reservoir F, and having any suitable packing *g*, interposed between its flange and the flange *g′* of the pipe G, which descends through the reservoir or main chamber F to a distance beyond or below the opening or outlet H of the cock J. The annular flanged opening K at the center of the coned bottom or base of the reservoir F is provided with the internal thread *k* into which is screwed a threaded plug L, provided with a tapering or conical end M, which is so fitted that by screwing in the plug L, the conical or tapered end of the plug L enters the aperture or end of the pipe G, and acts as a regulating valve to control the water pressure by obstructing its passage at the base of the pipe G, and retarding its entrance to the reservoir F.

N is the annular threaded flanged opening, forming a vent to the reservoir vessel F and providing an opening whereby any ingredients desired to be used or supplied to the reservoir F, this opening being securely sealed by means of the hollow or air chambered plug N′. The vessel F has an integral flanged projection O for strength, and having an internal thread *o* provided near its outlet or entrance to the vessel F, with a seated recess P, which retains in position a filtering disk of wire gauze P′ which is secured in its position by the threaded end projection Q of the spherical chambered valve R. The spherical chambered valve R is provided at the base of the chamber R′ with a drain or blow-off cock *s* and a lateral externally threaded projection *t*, with a packing chambered recess *t′* and a flanged gasket ring V which is secured by the annular internally threaded cap T, provided with its central aperture T′ through which the screw threaded valve rod W engages and operates the cone faced seated flanged valve W′. At the top of the pressure chamber X, a finely tapered outlet channel X′ is formed integrally with the pressure chambered valve R, at the base of the externally threaded cup *b*, provided with the gasket ring *b′* and internally threaded annular cap *n* provided with a central aperture *n′* for the glass gage tube *h*, which is securely sealed and connected to the short end of the pipe C by an ordinary coupling Z for glass gages.

By the particular form of the vessel F, having its funnel shaped base, and the location of the blow off cock J, there is always sufficient water left in the vessel to effectually seal the end of the pipe G, and prevent any oil or other ingredient, which may be placed in the vessel F, when refilling, from entering the pipe G.

Having thus described the general construction of my invention, I will further describe the operation of the same, and the effective advantages attained by the special construction, combination, arrangement and location of the several parts.

After attaching the invention to the feed-water pipe A, the pressure chambered valve R is closed, the blow-off cock J is also closed, and the air chambered filling plug N′ is removed. The main stop valve B is then slightly opened, and the water descends the pipe C on one side as far as the pressure chambered valve R, filling the sight gage glass, and on the other side, descending by the pipes C and G into the vessel F, sufficient water being allowed to enter so as to form an effective water seal at the end of the pipe G. The valve B is then closed and the oil or oily compound, or other agent, whose specific gravity is less than that of water, is filled into the vessel or reservoir chamber F through the opening *j*. This part of the operation being finished, the air chambered plug N′ is tightly screwed in place, and the valve B is gradually opened until the full or desired pressure of the water is allowed on the oil or compound A′. The valve R is then opened and adjusted to permit the oil A′ to filter through the wire gauze P′ into the enlarged pressure chamber X of the valve R, the pressure in this valve chamber being the same as that in the large reservoir F. The small quantity of oil, &c., passing from the chamber F through the gauze may be divided into sev-

eral globules or parts, but by its natural affinity, assembles at the top of the valve pressure chamber X and by the action of the water pressure in the valve chamber, it passes through the tapering outlet X′ in an unbroken drop or globule, thus insuring every time, the full and exact quantity; a feature that is not achieved by any of many devices known, and which have been constructed for the same purposes as my invention. The valve R after being adjusted for the proper discharge of the oil or agent employed, it is desirable that the valve B should be left open to its fullest extent, to allow free egress and passage of the agent used, and prevent any slight arrestation, or assembling at that point; so, that this desirable feature may be attained, I provide a plug L at the bottom of the reservoir F, and threaded, its end being sufficiently coned or tapered to a point so that it may enter the mouth of the pipe G, as at M, forming a valve, and by screwing this plug inwardly to any desired extent, thus controlling the water pressure entering the vessel or reservoir F. The flanged and screw plugged openings D afford a simple and convenient means of cleaning out the pipe C, or removing any articles that might enter the pipe with the water, and that one which is located on the side nearest to gage glass affords the means of cleaning the glass tube without removal.

Another of the advantageous features of the invention is the location and combination of the air chambered filling plug N′, which affords a cushion for any unevenness in the water pressure, and prevents all undue strain on the machine, and avoids unequal pressure on the agent A′ employed.

An air chamber has been employed in connection with a machine for the same purpose as my invention, but the inventor distinctly states that he may dispense with the air chamber. It is obvious that an air chamber located any where on a pipe between the drop feeding devices or apparatus, will surely allow the congregation of oil or agent of a similar gravity, to occur in undesirably large quantities, and to efficiently aid, or possess any desirable and practical advantages, the air chamber must be located so that no oil or other agent, after leaving the regulating or measuring device, can possibly assemble within any part of it.

In attaining the several objects and advantages of my invention, as described by the specification and drawings describing my invention and its various mechanical features, I am aware that some of the devices I use are not entirely new, as they are used in many devious ways for widely different purposes, but, I claim the right of their use and adoption in combination with my new and improved water pressure feeder for boiler scaling preventives, or as adapted or added to any other machine now in use for the same purposes.

Changes in the form and minor details of the general construction may be resorted to without departing from the principles or sacrificing any of the advantages of my inventon.

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

1. The improved water pressure feeder for feeding oil or scale preventives to boilers, comprising in its construction a funnel shaped bottomed reservoir F, and the integral, annular flange and internal thread K, and threaded plug L, provided with its conical end M; the blow-off cock J, located above the base outlet of plug L; the air chambered filling plug N′, and flanged pipe G, and pipe C, with the plug openings D D, glass gage pipe *h*, and spherical pressure chamber valve R, and filtering gauze disk P′, all in combination, operating substantially as shown and described and for the purpose specified.

2. In combination with the lubricant vessel F, comprising in its construction, the pressure chambered valve R, having the enlarged pressure chamber X, and provided with the integrally formed blow-off cock *s*, at the base of said chamber, and provided with the integral projection *t*, having an external thread with which the cap T engages, and an internal threaded portion W with which, and through which the valve rod is screwed, and supplying the means of finely adjusting the flange tapered end of the rod at W′, and the externally threaded projection, having at its opening the filtering gauze wire disk P′, and securely attached to the lubricating vessel F, by its internally threaded projection O, and the tapering outlet channel X′, formed integrally with the projecting externally threaded flange, provided with the annular, internally threaded cap W, provided with the opening *n′* and providing a union joint for the lower end of the glass gage tube *h*, formed integrally with the said enlarged pressure chambered valve R, all combined, or operating substantially as shown and described and for the purpose set forth.

In testimony whereof I have affixed my signature in the presence of two witnesses.

THOS. B. SMITH.

Witnesses:
FRED. J. SCHAEFER,
JOS. C. SMITH.