T. G. MOUAT.

PRESSURE REGULATING APPARATUS.

APPLICATION FILED MAY 6, 1909.

967,812. Patented Aug. 16, 1910.

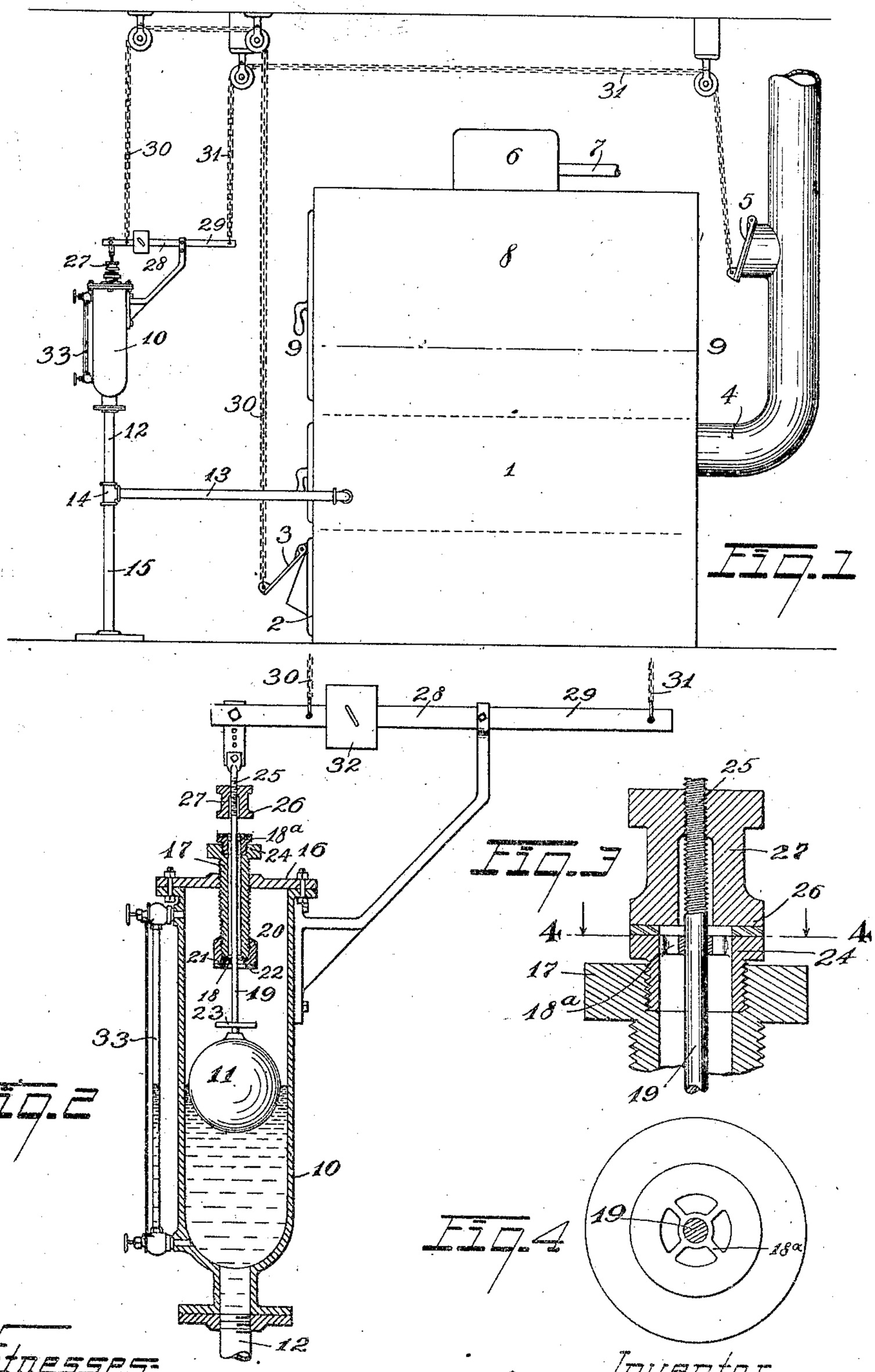

FIG. 1

FIG. 2

FIG. 3

FIG. 4

Witnesses:
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UNITED STATES PATENT OFFICE.

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PRESSURE-REGULATING APPARATUS.

967,812. Specification of Letters Patent. Patented Aug. 16, 1910.

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To all whom it may concern:

Be it known that I, THOMAS G. MOUAT, a citizen of the United States, residing at Bratenahl, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Pressure-Regulating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to regulating apparatus, and more particularly to apparatus for maintaining substantially constant the pressure and temperature of fluids, being especially well adapted for use in connection with low-pressure steam-heating systems.

It has for an object to provide an apparatus of this character which, while being extremely simple of construction and economical of production, is very sensitive and reliable in operation.

The invention may be defined further as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein—

Figure 1 represents a side elevation of a steam-boiler furnace having my apparatus applied thereto; Fig. 2 represents an enlarged sectional detail of the regulating apparatus; Fig. 3 represents an enlarged sectional view of the sleeve and coöperating valve by which the influx of air to the tank may be prevented, the valve being shown in closed position; and Fig. 4 a sectional view of the line 4—4 of Fig. 3.

Describing the parts by reference characters, 1 denotes a steam boiler furnace, the same being provided with an ash pit door 2 having an air supply damper 3 hinged thereto. 4 denotes a flue leading from the combustion chamber of said furnace and provided with a check draft damper 5. The boiler may be provided with a steam dome 6 from which any suitable number of pipes 7 may be led to radiators (not shown) to supply steam thereto.

The boiler proper is shown at 8 and may be of the type having water legs extending down on each side of the fire box. This boiler is shown as having a maintained water level therein, indicated by the broken line 9—9.

With the boiler I employ my regulating apparatus. This apparatus comprises generally a receptacle 10 having a float 11 therein, a lever operatively connected with said float, and connections between the opposite arms of said lever and the air supply and check draft dampers. The receptacle 10 extends above and below the water level of the boiler and communicates with the boiler. In the drawing it is shown as communicating directly with the boiler, being connected with the boiler at a point considerably below the water level therein, by means of pipe sections 12 and 13 connected by a tee 14, the lower end of said tee forming a connection for a standard 15 by means of which the receptacle is supported. Receptacle 10 is provided with a cover 16 having a threaded central aperture for the reception of an externally threaded sleeve 17. The sleeve 17 is of considerable length and is provided near the top and bottom thereof with a pair of spiders, 18 18^a constituting guides for the rod 19 of the float. These spiders center the float rod and at the same time normally permit the free passage of air into and out of the receptacle 10. On the lower end of sleeve 17 there is threaded a nut 20 having an inwardly projecting flange 21 serving to clamp the spider 18 between itself and the lower end of the sleeve 17. The lower end of this nut is provided with a valve seat 22 for a valve 23 which is mounted on the rod 19.

In the upper end of the sleeve 17 there is fitted a short sleeve 24, which is threaded into the upper end of the former sleeve and is provided with a bore constituting an extension of the bore of the former sleeve. The upper spider 18^a is carried by the sleeve 24. The upper end of the rod 19 is threaded, as shown at 25, and on this threaded portion of the rod there is mounted a valve 26 adapted to coöperate with the seat on the upper end of the sleeve 24. This valve is carried at the bottom of an upwardly projecting sleeve 27 having its upper end provided with a contracted threaded bore adapted to receive the threads 25. By this construction, the point of connection of valve 26 with the valve rod is carried so high as to permit the limiting of the threads on the rod 19 to the extreme upper portion thereof, whereby said threads will not interfere with the reciprocation of the rod 19 through the spider 18^a. The threaded connection prevents leakage of air into the receptacle. The upper end of rod 19 is

pivotally connected to one arm 28 of a lever, said arm being connected by means of a chain 30 to the air damper 3 and the opposite arm 29 being connected by means of a chain 31 to the check draft damper 5. The arm 28 is provided with a weight 32 thereon adapted to partly counterbalance the door 3. If desired, the receptacle 10 may be provided with a gage 33.

With the apparatus constructed as described, the operation will be as follows. When the pressure of steam in the boiler (or in the system connected thereto) exceeds that which it is desired to carry, this pressure forces water into the receptacle 10, elevating the float 11 and simultaneously closing the damper 3 and opening the check draft damper 5. Should this operation fail to check the fire in time to prevent the undue accumulation of steam pressure, the water rising further in 10 will cause the valve 23 to seat against 22 and thus prevent the escape of water from said receptacle. Any further transfer of water into the receptacle 10 will be resisted by the air confined in the uper portion of the receptacle. On the other hand, should the pressure in the boiler become unduly lowered, the valve 6 will seat on top of the sleeve 24 and cut off the access of air to the chamber 10. This is of great importance in connection with heating systems operating in connection with a partial vacuum, as the seating of the valve 26 will prevent the breaking of such vacuum.

A further point of advantage of my apparatus resides in the adjustability of the sleeve 17. This enables me to vary the pressure (positive or negative) at which the valves 23 and 26 will engage their seats. The apparatus is very sensitive, and the adjustability of the sleeve permits the closing of the damper 3 and the opening of the check draft 5 when the pressure of the steam is equal to the atmosphere or at any desired point thereabove, determined by the position of the lower end of the sleeve 17; it also permits the reverse operation of the damper at a lower pressure. It also enables me more readily to accommodate my apparatus to different boilers and to different levels of water in the same boiler.

Having thus described my invention, what I claim is:

1. In an apparatus of the character set forth, the combination of a boiler and means for maintaining substantially constant the pressure of steam generated by said boiler, said means comprising a receptacle communicating with said boiler, a float in said receptacle, a sleeve adjustably mounted in said receptacle and provided with a valve seat, a rod connected with said float and extending through said sleeve, a valve carried by said rod and adapted to engage the seat carried by said sleeve, and a pressure regulating device connected to said rod.

2. The combination of a boiler and means for maintaining substantially constant the pressure of steam generated thereby, said means comprising a receptacle, said receptacle communicating with the boiler and having a sleeve threaded into the top thereof, said sleeve having spiders therein forming guides and having at the upper and the lower end thereof a valve seat, a float in said receptacle, a rod carried by said float and extending through said guides, valves mounted on said rod and adapted to engage said seats, and a pressure regulating device connected to said rod.

3. The combination of a boiler and means for maintaining substantially constant the pressure of steam generated thereby, said means comprising a receptacle, said receptacle communicating with the water space of the boiler and having a sleeve adjustably mounted in the top thereof, said sleeve having one or more spiders therein forming guides, a float in said receptacle, a rod carried by said float and provided with a valve seat and extending through said guides, a valve carried by said float and adapted to engage said seat and a pressure-regulating device connected to said rod.

4. The combination of a boiler and means for maintaining substantially constant the pressure of steam generated thereby, said means comprising a receptacle communicating with the boiler, a float therein, a sleeve adjustably connected to said receptacle and provided with guides and having valve seats at its upper and lower ends, a float rod extending through said sleeve and having a valve adapted to coöperate with the lower valve seat and having on its upper portion a valve, the latter valve having an upwardly projecting portion provided with an internal thread engaging a corresponding thread on the float rod, and a pressure regulating device operatively connected with said rod.

5. The combination of a boiler and means for maintaining substantially constant the pressure of steam generated thereby, said means comprising a receptacle communicating with the boiler, a float therein, a sleeve connected to said receptacle and provided at its upper end with a valve, a float rod extending through said sleeve and having on its upper portion a valve, the latter valve having an upwardly projecting portion provided with an internal thread engaging a corresponding thread on the float rod, and a pressure regulating device operatively connected with said rod.

6. The combination of a boiler and means for maintaining substantially constant the pressure of steam generated thereby, said

means comprising a receptacle communicating with said boiler and extending above the level of the water therein, a sleeve adjustably fitted in the top of said receptacle and having an upper and a lower valve seat, a pressure regulating device, a connection between said float and said device, and valves operated by said float and adapted to engage said seats when the steam pressure exceeds and falls below predetermined limits.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

THOMAS G. MOUAT.

Witnesses:

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