

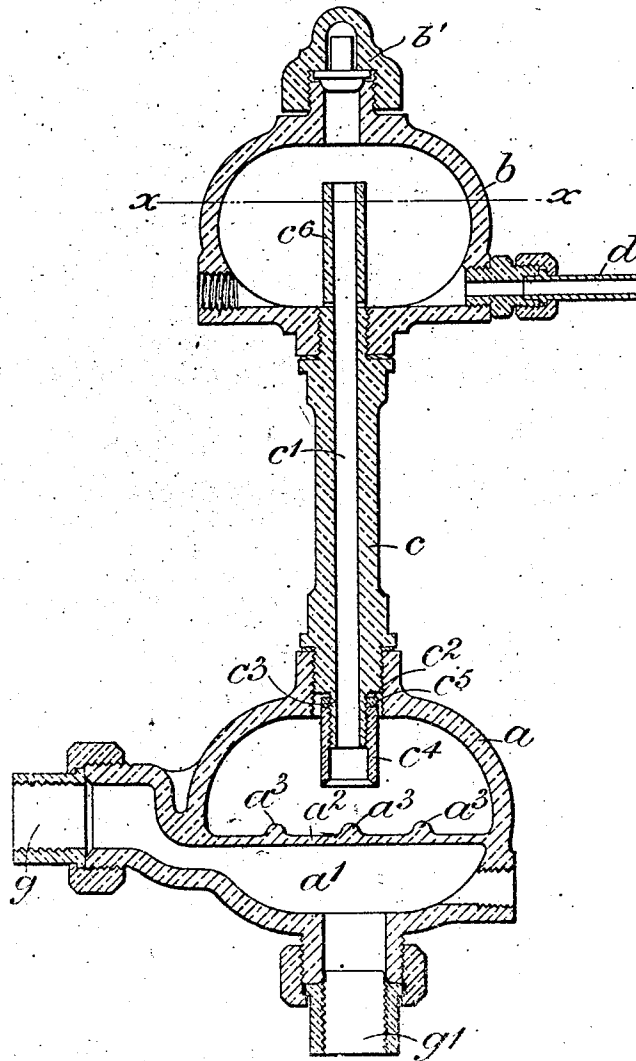
H. W. SPENCER.
 FEED WATER REGULATOR FOR STEAM BOILERS.
 APPLICATION FILED DEC. 27, 1910.

1,047,320.

Patented Dec. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
 B. H. Davis
 A. A. Eye.

Inventor.
 Henry W. Spencer
 By C. B. Clark
 Atty.

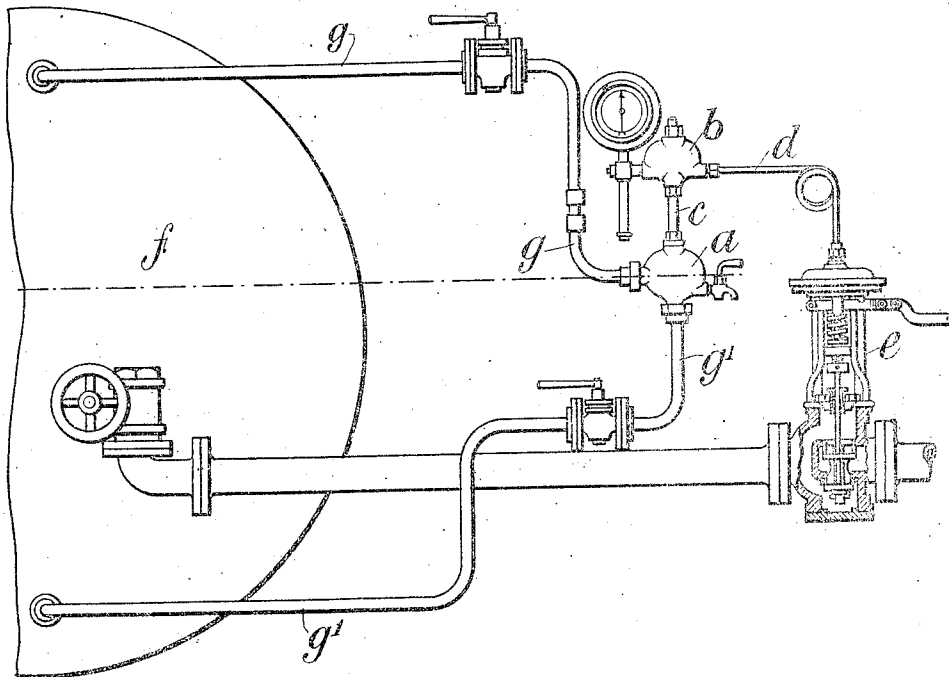
H. W. SPENCER.
FEED WATER REGULATOR FOR STEAM BOILERS.
APPLICATION FILED DEC. 27, 1910.

1,047,320.

Patented Dec. 17, 1912.

2 SHEETS—SHEET 2.

Fig. 2.



WITNESSES.

W. H. Cramford

E. H. Cramford

INVENTOR.

Henry H. Spencer
by C. Singer
att

UNITED STATES PATENT OFFICE.

HENRY WILMOT SPENCER. OF LONDON, ENGLAND.

FEED-WATER REGULATOR FOR STEAM-BOILERS.

1,047,320.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed December 27, 1910. Serial No. 599,411.

To all whom it may concern:

Be it known that I, HENRY WILMOT SPENCER, a subject of the King of Great Britain, residing at 147 Queen Victoria street, in the city of London, England, engineer, have invented certain new and useful Improvements in Feed-Water Regulators for Steam-Boilers, of which the following is a specification.

- 10 This invention relates to apparatus for automatically controlling the supply of feed-water to a steam-generator, or similar receptacle, of the type wherein the boiler water and steam act alternately on a chamber containing a vaporizable liquid the pressure from which is transmitted through a reservoir to a chamber where it operates a diaphragm or other suitable device for governing the supply of feed-water.
- 20 In such devices it has heretofore been proposed to connect the expansion reservoir directly to the vaporizable liquid chamber and to effect communication between them by means of a bush piece having a partly constricted passage therethrough in which is mounted a pipe extending therefrom into the reservoir and furnished, preferably near its lower end, with apertures leading into said reservoir.
- 30 The object of this invention is to provide an improved form of regulator of the indicated kind which is capable of adjustment so as to accelerate or retard the generation of vapor from the vaporizable liquid, and which is so constructed and arranged as to be sensitive to very slight variations of pressure thereby providing for perfect control and rapidity of action.

In the drawings:—Figure 1 is a vertical central section of my improved feed water regulator and connections appertaining thereto. Fig. 2 is a view in elevation showing the application of my invention to a steam boiler.

45 Similar characters of reference designate similar parts throughout the different figures of the drawing.

In the drawing, *a* designates a liquid chamber, *b* a reservoir and *c* a tubular connection between the same.

50 *d* is the passage leading to the diaphragm chamber of a valve *e*.

g and *g'* are, respectively, steam and water connections from the boiler *f* to the space *a'*, under the liquid chamber *a*.

According to this invention I make the

liquid chamber *a* and the reservoir *b* as two separate and distinct vessels and connect them together by means of a comparatively long connecting tube or radiator *c* having a central passage *c'* therethrough of uniform bore and extending into the reservoir *b* and liquid chamber *a* respectively, as shown. The comparatively long connecting tube or radiator *c* affords considerable external cooling surface which assists rapid condensation within the reservoir *b* and so causes a rapid drop in pressure when water is present in the space *a'* under the vaporizable liquid chamber *a*.

The reservoir *b* is provided with a cap *b'* for the introduction of liquid into the device, and a threaded opening *g* may be provided to connect a gage in communication with this reservoir.

Inside the liquid chamber *a* the connecting tube *c* is shouldered at *c²* and the continuation *c³* beyond the shoulder is externally screw-threaded and provided with a threaded tubular extension *c⁴* with a lock nut *c⁵* for fixing the extension *c⁴* in any adjusted position on the continuation *c³* of the connecting piece *c*. By this means I am enabled to decrease or increase the depth of the film of liquid on the heat transferring partition *a²* of the liquid chamber *a* thereby accelerating or retarding the vaporization of the liquid.

In practice, a volatile liquid fills the space in chamber *a* below the tubular extension *c⁴*; the tube or radiator *c* and reservoir *b* up to substantially the lines *x—x*; and, the tube *b* up to the diaphragm in the diaphragm chamber.

I form or provide the partition *a²* with a rib or ribs *a³* inside the liquid chamber which ribs tend to make the partition stronger and also increase the heat radiating properties. These ribs also prevent the screwed tubular extension *c⁴* from being adjusted too low down on to the partition *a²* although this object may also be obtained by serrating or perforating the lower edge of the tubular extension *c⁴*.

I make the reservoir *b* of substantially globular form as shown instead of cylindrical as heretofore, thereby enabling me to shorten the length of the tube *c⁶* or extension of the connecting tube *c* within the reservoir *b* and thus reducing the surface heated or cooled during the operation of the apparatus. In devices heretofore proposed

the pipe extending into the reservoir is of considerable length and heats up the water in the reservoir and also the water in the connecting passage to the diaphragm chamber of the governor valve. In my device this heating effect is greatly lessened owing to the short length of the tube c^a within the reservoir b and the globular form of the latter, which causes the bulk of the water to be remote from the tube.

During operation of the device, it is understood that the vapor rising from volatile liquid in chamber a , responsive to action of steam in chamber a' , rises through tube c to the space above the fluid column in the reservoir b and the tube d , and actuates this column in the well-known manner.

I claim—

1. In a feed water regulator of the character described, the combination of a chamber for containing volatile liquid, a reservoir adapted to contain a liquid column, a conducting means interposed between said reservoir and the top of said chamber and having a threaded extension at the end communicating with said chamber, means for delivering the fluid adjacent the bottom wall of said chamber, and a tubular sleeve internally threaded complementary to the said threaded extension of said conducting

means and movable toward or from the said wall of said chamber to which the fluid is delivered, upon said threaded extension, substantially as and for the purpose set forth.

2. In a feed water regulator of the character described, the combination of a chamber for containing volatile liquid, a reservoir adapted to contain a liquid column, a conducting means interposed between said reservoir and the top of said chamber and having a threaded extension at the end communicating with said chamber and extending below the uppermost cavity of said chamber, for delivering fluid adjacent the bottom wall of said chamber, and a sleeve internally threaded complementary to the said threaded extension of said conducting means and movable thereupon toward or from the said wall of said chamber to which the fluid is delivered, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses this 12th day of December, 1910.

HENRY WILMOT SPENCER.

Witnesses:

HERBERT D. JAMESON,
C. P. LIDDON.