

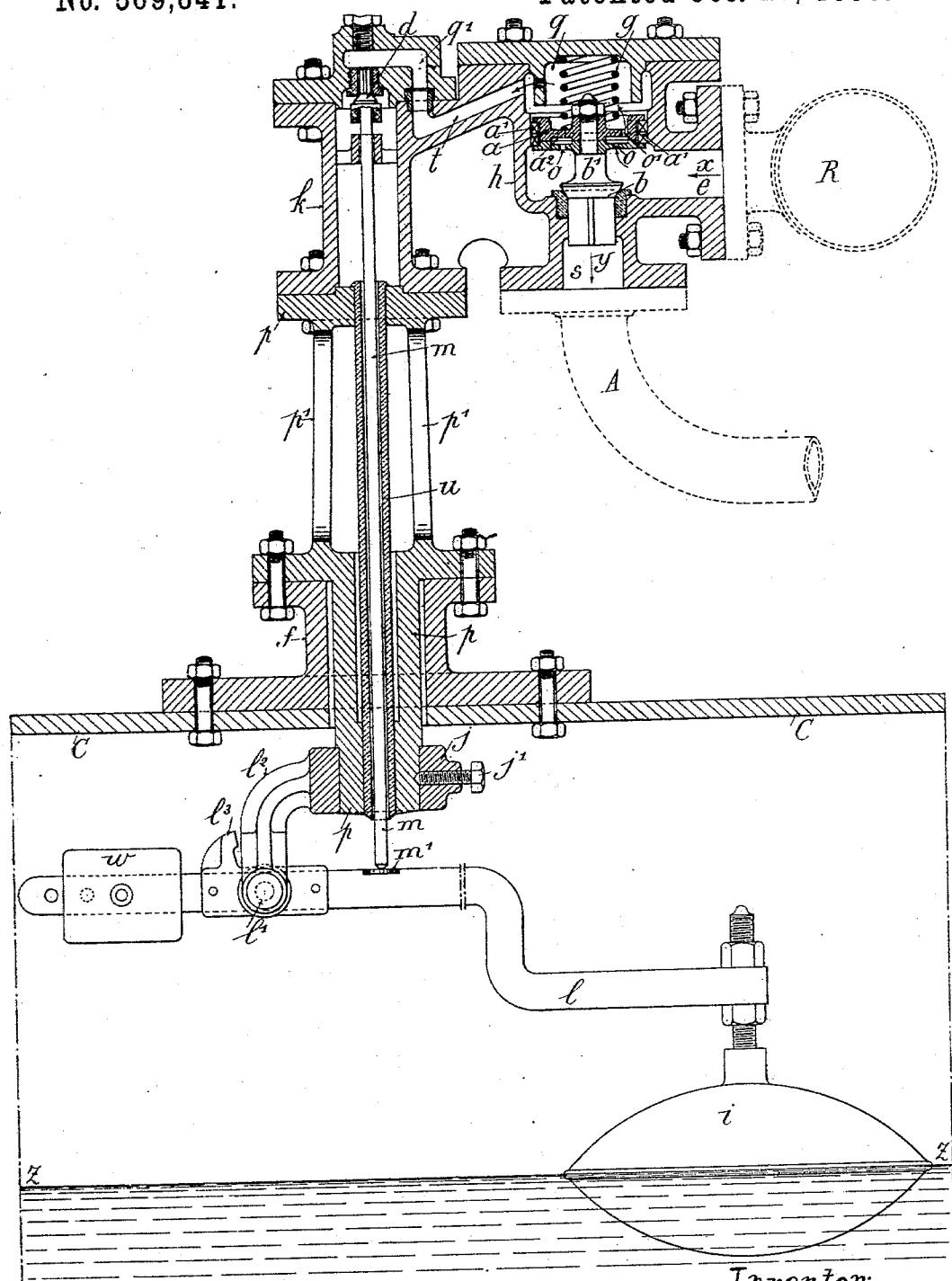
(No Model.)

F. M. SANDILLON.

AUTOMATIC FEED WATER REGULATOR FOR STEAM GENERATORS.

No. 569,841.

Patented Oct. 20, 1896.



Witnesses:

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UNITED STATES PATENT OFFICE.

FERDINAND MARIE SANDILLON, OF LAS PALMAS, CANARY ISLANDS.

AUTOMATIC FEED-WATER REGULATOR FOR STEAM-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 569,841, dated October 20, 1896.

Application filed April 9, 1896. Serial No. 586,775. (No model.) Patented in France April 25, 1894, No. 238,034; in England August 7, 1894, No. 15,076; in Germany August 8, 1894, No. 80,403, and in Switzerland August 10, 1894, No. 8,888.

To all whom it may concern:

Be it known that I, FERDINAND MARIE SANDILLON, a citizen of the French Republic, residing in Las Palmas, Canary Islands, have 5 invented certain new and useful Improvements in Automatic Feed - Regulators for Steam-Generators and the Like, (for which patents have been granted in France, No. 238,034, dated April 25, 1894; in Great Britain, No. 15,076, dated August 7, 1894; in Switzerland, No. 8,888, dated August 10, 1894, and in Germany, No. 80,403, dated August 8, 1894,) of which the following is a specification.

My invention relates to devices for automatically regulating the feed of water or other liquids to a closed reservoir containing a float, and my device is especially adapted for regulating the feed of a steam-generator in order to maintain a substantially uniform 20 level of the water therein.

The accompanying drawing illustrates an embodiment of the invention, the single figure being a vertical axial section through the feed-regulator and a part of a steam-generator with which it is connected.

C represents a steam generator or boiler of any kind in which the normal water-level is to be maintained at or about the line $z z$. Mounted on the generator is a tubular base-piece f , and mounted on said base-piece, so as to extend through the latter and down into the generator, is a tubular support p . Fixed on the support p is a valve-casing k , with which is connected, by preference integrally, 30 another valve-casing h . These valve-casings k and h have removable caps or covers, which form parts thereof. The support p may be, as here shown, open at the sides p' and a strong tube u be fixed in the head or top of 35 the support and extend down through and be fixed in the lower end of the same.

The water from the feed-pump arrives by a supply-pipe R and enters the valve-chamber h at the inlet e thereof above or back of 40 a valve b , which controls the outlet s of the valve-chamber to the feed-pipe A , through which the boiler is fed. The arrows x and y show the course of the feed-water. The main valve b is held down to its seat normally by 45 a spring g in the chamber g back of said valve. This chamber g communicates by a

passage t with a chamber q' , which connects with the chamber in the casing k through a passage or port, which is controlled by a small valve d , which for convenience of distinction 55 I will call the "depression-valve." This depression-valve has a long stem m , which extends down through the contracted tube u into the generator C and rests on a plate m' on the lever l of a float i in the generator. 60

In a bore in the chamber of the valve-casing h , back of the valve b , is fitted a piston a , which is alined with said valve and connected rigidly therewith by the stem b' of the valve. This piston, which has a much greater 65 area than the valve b , separates the chamber q from the inlet-chamber e and the valve-chamber in the casing h .

So far as described the operation is as follows: When the water-level in the generator 70 is normal, the float i holds the depression-valve d up to its seat, but when the water-level falls in the generator the valve d falls away from its seat and relieves the pressure in the chambers q and q' and passage t . The water 75 from the pump, entering the valve-casing h between the piston a and valve b under pressure, acts on the under side of the piston a to raise it and also the valve b . This it does by reason of the area of the piston being greater 80 than that of the valve. The water now flows into the generator by way of the pipe A , and a small part of it also flows through small ports $o o'$ in the piston a into chamber q , thence through passage t to chamber q' , thence 85 through the chamber in casing k , and down through the tube u to the generator. When the water rises in the generator to the normal level, the float i will rise again and close the depression-valve d , and this will cause the 90 pressure on both sides of the piston a to become equalized, when the spring g will at once close the valve b and stop the feed. Thus it 95 will be seen that normally—or when the apparatus is not feeding—the pressure on the faces of the piston a will be equalized; but when the pressure back of said piston is relieved by the opening of the depression-valve d the unbalanced pressure will instantly move the piston and open the valve b . 100

It will be noted that there is really but one small hole o' in the upper plate of the piston

a, the several holes *o* leading to the same, and the area of this hole *o'* is considerably less than that of the depression-valve *d*. When the valve *d* is open, the pressure back of or above 5 the piston *a* will be a little less than the pressure in the boiler *C*, while the pressure on the other or lower face of the piston *a* will be equal to that from the ejection side of the feed-pump, and this latter, being the greater, 10 will force the piston *a* upward with an energy equal to the difference between the area of the valve *b* and that of the piston *a* multiplied by the difference between the boiler-pressure and the feed-water pressure.

15 When the depression-valve *d* is closed, there is established on opposite sides of the piston *a*, through the small hole *o'*, a pressure equal to that of the feed-water, and the valve *b* will be seated and held to its seat by a pressure 20 equal to the difference between the boiler-pressure, acting to lift the valve *b*, and the pressure of the feed-water tending to close it. This latter will be assisted by the spring *g*.

25 For convenience in inserting or placing the packing-rings *a'* of the piston the latter will be by preference made in two disk-like sections, and it may have in it a hollow *a''*, into which the restricted apertures *o* *o'* open.

30 The float-lever *l* is fulcrumed at *l'* in a bracket *l''* on the boss *j*, secured to the shoul- 35 dered lower end of the support *p* by a set-screw *j'*, and on said lever, back of the fulcrum, is an adjustable counterweight *w* and a stop-detent *l''* to impinge upon the bracket *l''* and prevent the float from descending too 40 low when the generator is emptied. The lever *l* is broken across in the drawing for lack of room to show its full proportional length. The supply-pipe *R* and feed-pipe *A* are indicated in dotted lines, as they are not parts, properly speaking, of the feed-water regulator.

45 It will be obvious that the mechanical features and details of construction of this device may be varied somewhat without departing from my invention, the drawing of which shows one operative and practical construction thereof. The well-known form of movable piston, *a*, for example, might be replaced by an equally well-known diaphragm, which 50 would be a full equivalent. Both are movable pressure-receivers and perform the same functions.

55 The water flowing through the tube *u* will prevent the formation therein of incrustations, which would tend to impede the free movement of the valve-stem *m*. The valve-stem is also made to bear on a flat surface *m'* on the float-lever *l*, so as to avoid any sticking 60 of the parts from incrustation.

60 With my apparatus a difference of level of the water in the generator of one millimeter will suffice to open the depression-valve *d*.

Having thus described my invention, I claim—

65 1. In a feed-water regulator for steam-generators, the combination with the generator, a float therein and a depression-valve adapted

to open by the fall of the float, said valve controlling a passage leading from the generator to one chamber of a casing, of the said casing having in it two chambers separated by a movable pressure-receiver and having an inlet and outlet for the feed-water to and from one of said chambers, the said pressure-receiver having in it a small, always-open port 70 of less area than the said depression-valve, and a valve rigidly connected to the pressure-receiver and of less area than the latter, and controlling the flow of feed-water to the generator, substantially as set forth.

2. In a feed-water regulator, the combination with a casing having in it two chambers separated by a movable pressure-receiver, one of said chambers having an inlet and an outlet for the feed-water under pressure, the said pressure-receiver having in it a small always-open port or aperture for the passage through it of a part of the feed-water, a valve connected rigidly with said pressure-receiver and having a less area than the latter, said valve 80 controlling the outlet for the feed-water from the chamber, a spring for closing said valve, a casing having in it a passage adapted to connect the chamber, *q*, back of the pressure-receiver with the generator to be supplied, a valve controlling said passage, and a float to control said valve.

3. The combination with the casing *h*, having in it two chambers separated by a movable piston *a*, one of said chambers having an 100 inlet *e* and an outlet *s* for the feed-water, the said piston, having in it a small port for the water to flow through from the inlet side to the chamber *q* behind it, the valve *b*, connected with the piston and adapted to close 105 the outlet *s*, and the spring *g* for closing the valve, of the casing *k*, having in it a chamber *q'*, connecting with the chamber *q*, the support connecting the casing *k* with the generator and having in it a passage connecting 110 the chamber *q'* with the generator, the valve *d*, controlling the said passage and provided with a stem extending into the generator, the float-lever *l*, under said stem, and the float 115 on said lever, substantially as set forth.

4. The combination in an apparatus for the purpose specified, of the hollow base-piece *j*, adapted to be secured to the shell of a steam-generator or the like, the tubular support *p*, mounted on said base-piece and provided with a tube *u*, said support extending down through the hollow base-piece, the bracket secured to the lower end of the support *p*, the float-lever *l*, fulcrumed in said bracket, and the float *i*, on said lever, of the main and depression 125 valves, arranged to operate as described, said depression-valve being controlled by the float.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FERDINAND MARIE SANDILLON.

Witnesses:

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