(No Model.)

S. BRAGGINS.

DEVICE FOR CONTROLLING THE FLOW OF STEAM THROUGH PIPES.

No. 387,851. Patented Aug. 14, 1888.

Fig. 1.

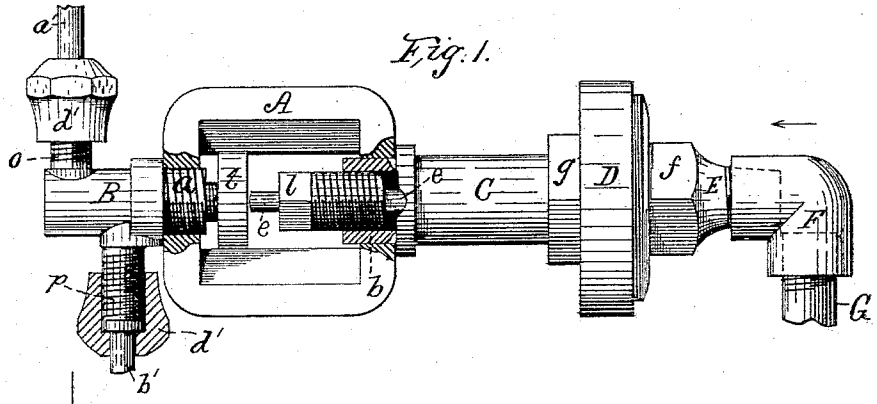


Fig. 2.

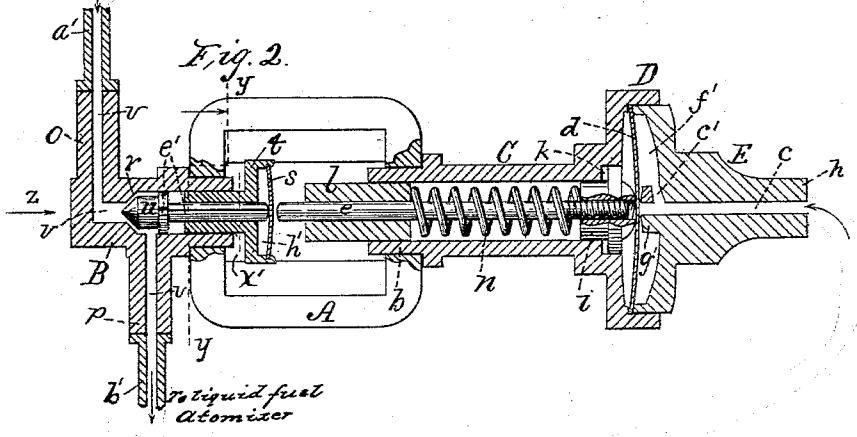


Fig. 3.

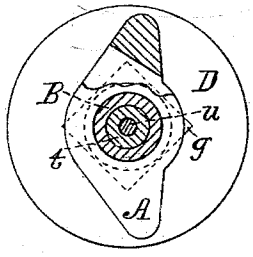


Fig. 4.

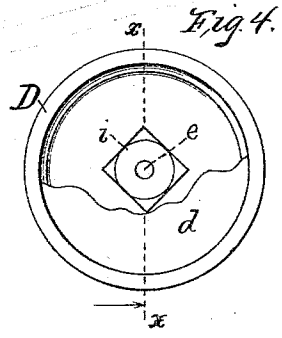


Fig. 5.

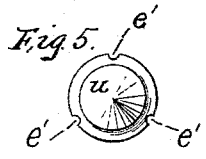


Fig. 6.

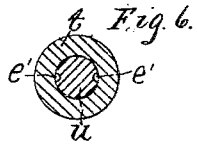
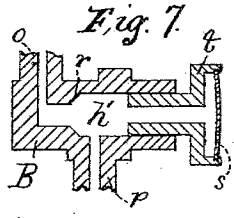


Fig. 7.



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UNITED STATES PATENT OFFICE.

SETH BRAGGINS, OF ROCHESTER, NEW YORK.

DEVICE FOR CONTROLLING THE FLOW OF STEAM THROUGH PIPES.

SPECIFICATION forming part of Letters Patent No. 387,851, dated August 14, 1888.

Application filed November 4, 1887. Serial No. 254,275. (No model.)

To all whom it may concern:

Be it known that I, SETH BRAGGINS, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in a Fluid-Pressure Regulator, which improvement is fully set forth in the following specification, and shown in the accompanying drawings.

In devices heretofore used for controlling the flow of steam through a pipe to operate the atomizer for the fuel for furnaces heated by atomized fuel the valve (or some part connected with it) regulating the passage through the pipe is made to pass through a stuffing-box or packing of some kind to prevent leakage. This construction is found objectionable, for the reason that the friction between the valve and the packing interferes materially with the ready operation of the valve, thereby preventing prompt action by the atomizer both as to delivering fuel to and cutting off fuel from the furnace.

The main object of my invention herein described is to produce a device by means of which the flow of steam to the atomizer may be controlled by a valve without the use of a packing-box, thus avoiding the friction resulting from its use, said invention being hereinafter fully described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of my improved device for regulating the flow of steam to the atomizer, parts being longitudinally sectioned; Fig. 2, a central vertical section taken as on the dotted line *x x* in Fig. 4, drawn to more fully show the interior of the device; Fig. 3, a transverse section taken on the broken dotted line *y y* in Fig. 2; Fig. 4, a view of the interior of the diaphragm-case, with a part of the diaphragm seen as indicated by arrow in Fig. 1; Fig. 5, a view at the end of the valve, indicated by arrow *z* in Fig. 2, drawn to a larger scale to better show the valve; Fig. 6, a transverse section of the valve and its holder, taken on the dotted line *x'* in Fig. 2, drawn also to a larger scale to better show the same; and Fig. 7, a central longitudinal section of the steam-chamber for holding the valve, with the latter omitted.

Referring to the parts shown in the drawings, A is an open frame or coupling, into one end of which a short piece of steam-pipe, B, is fitted by means of a threaded part, *a*.

C is a hollow cylinder or barrel fitted to the opposite end of the frame by means of a threaded part, *b*, the axes of said steam-pipe and barrel being in the same straight line. This barrel contains an axial rod, *c*, the outer end of which passes through a plug, *l*, fitted by a screw-thread in the open end of said barrel within the frame, said rod having a slight longitudinal motion within the barrel.

The pipe B is formed with a branch, *o*, connected by means of a pipe, *a'*, with the steam-generator to which this device is attached, and further formed with a branch, *p*, connected with the atomizer by a pipe, *b'*, there being a continuous steam-passage, *v*, through said pipes from the steam-space within the steam-generator to the atomizer. The branches *o* and *p* are offset from each other, with a valve-seat, *r*, formed between them in the steam-passage *v*.

t is a hollow cylindrical piece fitted by means of a screw-thread into the open end of the pipe B, within the frame A, serving to close said open end of the pipe, the piece *t* being provided with a flexible part or disk, *s*, forming an integral part of the wall of the inclosure *h'* within said piece *t* and the pipe B. A valve, *u*, placed in the steam space or inclosure *h'*, rests in the axial cavity within the part *t* in position to meet the valve-seat *r*, above described, it being also held to touch the inner surface of the disk *s* at the center thereof. This valve, as will be seen, is wholly within the steam-space *h'*, and has no connection with any part outside of the walls of said steam-space, or, in other words, no part of the valve or part joined to it passes out through any of the walls of said steam-space. This is an essential feature of my invention. The axes of the valve and of the rod *c* are in the same straight line and at right angles with the plane of the disk, and it will be observed that the outer end of the rod touches or nearly touches the disk immediately opposite the point said disk is touched by the valve within. I design to have the rod serve as an actuator for the

valve through the instrumentality of the yielding disk, the rod being urged against the disk by the steam-pressure within the generator by some convenient or ordinary means. For instance, the rod may be provided with a piston at the end opposite from the disk, against which the steam or water from the steam-generator may be permitted to press, though I prefer to employ an ordinary diaphragm, *d*, to receive the pressure from the generator and act upon the rod. To hold the diaphragm, the barrel C is expanded at D to form a case in which to receive it, said case being closed by a cap, E, threaded within it, the cap and barrel being formed, respectively, with squared parts *f* and *g*, to which to apply a wrench when putting the parts together. The cap is formed with a bore, *c*, through which steam or steam-pressed water may flow to the diaphragm, said cap being connected with the generator by means of a pipe, G, a coupling, F, being fitted to a threaded part, *h*, of the cap. A spiral spring, *n*, is placed upon the rod *e* within the barrel, between the plug *l* and an enlarged part, *i*, of the rod, which serves to keep the rod at all times in contact with the diaphragm. The pressure from the generator against the diaphragm, when sufficiently high, overcomes the strain of the spring and urges the actuator (composed of the parts *e* and *i*) against the disk *s*, and so urges the valve against the seat *r*, to close the steam-passage *v* between the generator and the atomizer. A reduction in the boiler-pressure will allow the spring to force the actuator back from the disk *s*, which releases the valve and allows the steam to force it back and reopen the passage to the atomizer.

The part *e* of the actuator for the valve is fitted to the part *i* by means of a screw-thread, on account of which the actuator as a whole is adjustable as to length. This actuator is adjusted so as to stand normally slightly away from the disk *s*, so that the valve shall not be moved by it the instant the diaphragm begins to yield under the pressure from the generator. The valve is thus relieved from the effects of slight fluctuations in the steam-pressure within the generator, and is urged against the valve-seat only after a steady pressure of some little duration has been exerted against the diaphragm and caused the latter to move sufficiently to take up the space between the end of the actuator and the disk. The degree of pressure that the actuator exerts against the diaphragm from the action of the spring, and also the steam-pressure carried within the generator, are both regulated and controlled by means of the plug *l*, which may be turned to exert a less or greater pressure against the spring, as desired.

Attention is called to the fact that when the actuator is in contact with and pressing the disk against the valve said actuator and the valve and that part of the disk immediately between them constitute a rigid column of metal—as rigid as if all three of these parts were a single piece. This is important, for on account of it I obtain, virtually, a single rod or shaft of metal formed into a valve at one end within a steam-chamber, with the other end acted upon by a steam-pressed diaphragm in an entirely separate and distinct steam-chamber, without said rod or shaft being passed through a stuffing-box to prevent the escape of steam.

The cap E is hollowed at *f'*, which constitutes a steam or water chamber, with the diaphragm forming a flexible wall thereof. The cap is formed with a central projection, *g'*, to support the diaphragm, so that it may not at any time be overstrained and injured from the pressure exerted by the screw-plug *l*. *c'* is a branch opening from the bore *c* to insure a ready flow of steam or water into the chamber *f'*.

The valve *u* is formed with longitudinal grooves *e'*, so that steam may flow past it to all parts of the steam-chamber *h'*. These grooves may, however, be dispensed with by loosely fitting the valve within the part *t*.

The pipes *a'* and *b'* are held to the respective branches *o* and *p* by ordinary screw-cups, *d'*.

The part *i* of the actuator for the valve is made angular and held within a corresponding cavity, *k*, within the barrel, so that it shall not turn when the part *e* is turned one way or the other within it in the act of adjusting the actuator as to length.

I prefer to connect the pipe G with the lowest part of the water-space of the steam-generator, so that the diaphragm shall be acted upon by comparatively cool water instead of live steam. These regulators are generally constructed and connected with the generator, so as to have live steam act against the diaphragms. This steam, becoming frequently superheated, raises the temperature of the diaphragms so high as to destroy their elasticity, and in consequence their usefulness, causing a frequent renewal of them to be necessary.

What I claim as my invention is—

1. A fluid-pressure regulator having a chamber connected with a generator, said chamber having a yielding side or wall, and a valve in said chamber held to move independently of other parts of the device, in combination with an actuator for said valve outside of said chamber operated by the pressure within said generator.

2. A device for controlling the flow of steam or other fluid, having a chamber connected with a pressure-generator, said chamber being formed with a yielding side, and a valve in said chamber not joined to any part of the device without said chamber, in combination with an actuator for said valve outside of said chamber, said valve and actuator therefor both being urged or operated by the pressure within said generator.

3. A device for controlling the flow of steam, having a steam-chamber connected by a passage for steam with a steam-generator and formed with a valve-seat and a yielding side

or wall, and a valve in said steam-chamber in contact with said yielding side or wall, in combination with an adjustable actuator for said valve outside of said steam-chamber, and a flexible diaphragm to operate said actuator.

4. A device for controlling the flow of steam, having a steam-chamber connected by a passage for steam with a steam-generator and formed with a valve-seat and a yielding side or wall, and a valve in said steam-chamber in contact with said yielding side or wall, in combination with an adjustable actuator for said valve outside of said steam-chamber, a flexible diaphragm to operate said actuator, a spring to urge said actuator against said diaphragm, and an adjustable compressor for said spring.

5. A device for controlling the flow of steam, having two separate steam or water chambers, each having a flexible side or wall, a valve-seat and a valve in one of said chambers, an actuator for said valve operated by the flexible wall of the other of said chambers to act upon the flexible wall of said chamber holding the valve.

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Witnesses:
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M. L. MCDERMOTT.