(No Model.)

D. C. KELLAM.

STEAM PRESSURE REGULATOR.

No. 307,201. Patented Oct. 28, 1884.

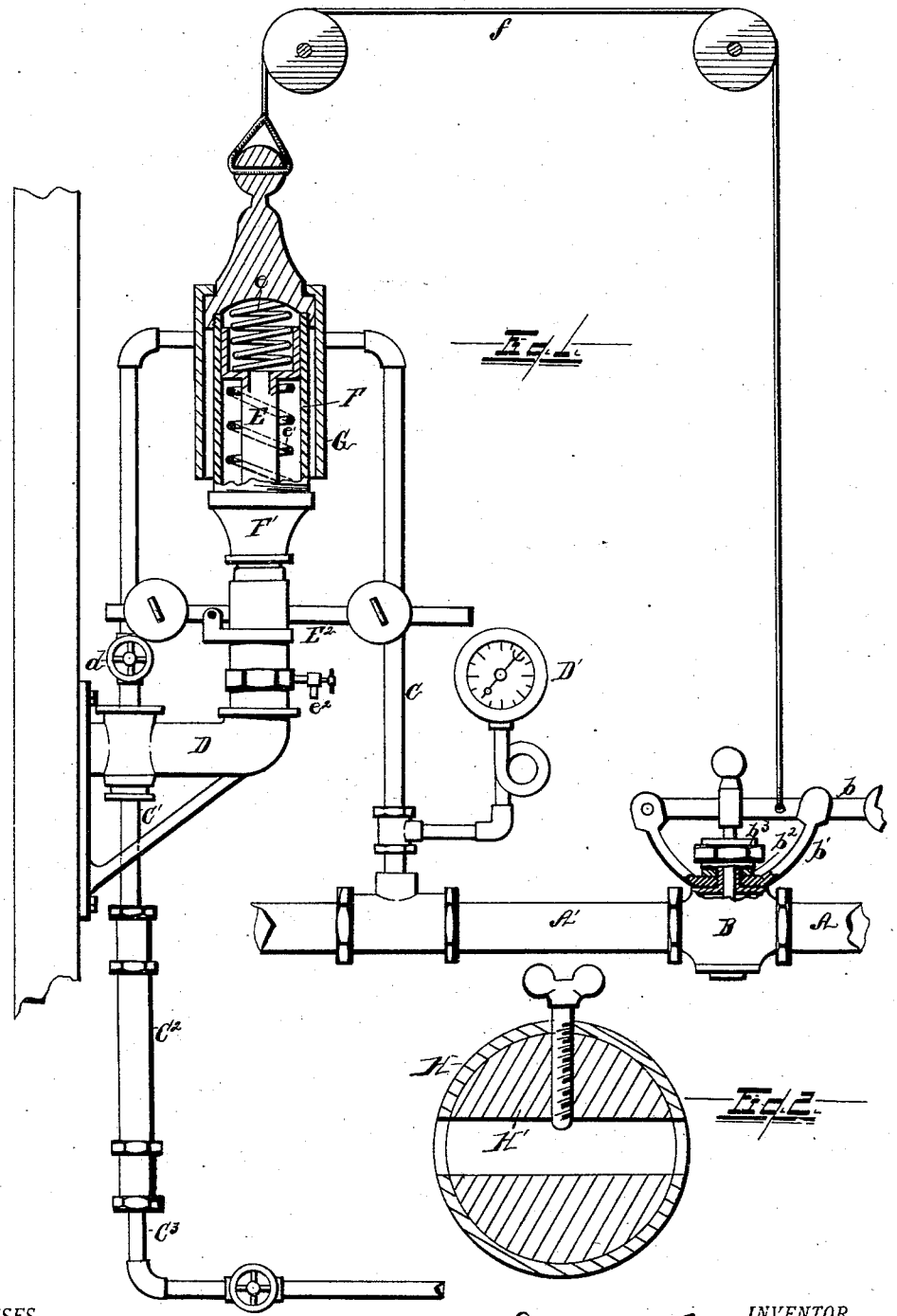

Fig. 1.

Fig. 2.

WITNESSES

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DANIEL C. KELLAM, OF DETROIT, MICHIGAN.

STEAM-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 307,201, dated October 28, 1884.

Application filed May 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, DANIEL C. KELLAM, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Steam-Pressure Regulators; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists of the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a device embodying my invention, with parts broken away. Fig. 2 is a separate view of the weight.

It has been found desirable in vulcanizing rubber, in the manufacture of paper, in canning-factories, &c., to reduce the pressure of steam below the boiler-pressure and to hold it at a given point, to insure safety and the steady maintenance of the degree of pressure desired.

It is the object of my invention to provide an improved steam-pressure regulator adapted to reduce the pressure to any point desired, and to hold it thereat without fluctuation, no matter what the superior boiler-pressure may be. My improved mechanism for accomplishing this object is as follows:

In the drawings, A is the steam-pipe communicating with the boiler, the steam in which is at boiler-pressure.

B is a balance or low-pressure valve. A′ is is the low-pressure steam-pipe extending therefrom to the desired work.

C is a steam-pipe leading from the pipe A′, and communicating with a hollow bracket, D, similar in construction to the bracket shown and described in a patent of the United States granted to me August 28, 1883, No. 284,023. This pipe may be provided with a governing-valve, *d*, and is also provided with an indicator, D′.

E is a regulating-piston secured to the hollow arm of the bracket D.

F is a movable piston-cylinder connected by a cable, *f*, passed over suitable pulleys and connected with the lever *b* of the balanced valve B. While the piston may be of any desired construction, I prefer to employ a hollow piston, as shown. The lower end of the cylinder has a screw-connection with the base F′, sleeved upon the hollow arm of the piston. *e* represents a cushion or spring located at the upper end of the cylinder. *e′* represents a similar cushion or spring located beneath the piston-head within the sleeved base F′, said cushions adapted to prevent immediate fluctuations of steam-pressure.

E^2 is a weighted valve located in the hollow arm of the bracket or in the piston, for regulating the admission of steam to the cylinder, which may be adjusted to operate at any degree of pressure desired.

e^2 is a drip-cock similar in construction and arrangement to that shown and described in my patent above referred to.

By constructing and arranging the piston and the cylinder as thus described, it is evident that I am enabled to dispense with the necessity of packing, thus avoiding all liability of variations from friction or wear, which might otherwise arise in case packing was necessary. The cylinder and the sleeved base may have any suitable provision for holding the cushions in place, the sleeved base acting also as a guide for the piston, as well as for a support for the spring.

G is a weighted cover located upon the cylinder to compensate the weight upon the arm of the lever E^2. The lever *b* of the valve is preferably weighted, as shown. The pipe C is provided with any suitable drip or trap to carry off water of condensation. I prefer, as shown in the drawings, to construct said trap in the following manner: C′ is a pipe extending downward from the hollow bracket. C^2 is a pipe or chamber of increased dimensions communicating therewith. C^3 is a pipe of smaller dimensions communicating with said chamber, and preferably provided with an elbow and valve adapted to let off the condensed water. This construction will effectually prevent the escape of steam, while it affords a ready and convenient trap to prevent condensed water from interfering with the piston in the cylinder F.

The operation of the device is as follows: The steam passes through the pipe A, valve B, pipes A′ C, and hollow bracket-arm D, and

the arm of the piston E. The weighted valve E^2 is adjusted for the pressure desired. It is obvious, should the pressure in the pipe A′ reach above the desired pressure, the valve E^2 will promptly open, admitting steam into the cylinder, in consequence of which the cylinder will be raised and the valve B caused to cut off the passage of steam from the pipe A. As there is no exit for the steam in the cylinder above the piston-head, it must return through the piston-stem, being mainly condensed in the operation, and passes off through the drip-cock e^2, the weight G aiding in overcoming the resistance on the part of the weighted valve E^2 to the return of said steam. The device by means of this weighted cover is made much more sensitive. The water of condensation in the pipe C and bracket D passes into the trap below said arm.

I would have it understood that I do not limit myself to any definite construction of the valves employed in my device. It is found very essential that the weight for the weighted valve E^2 shall be small in dimensions, and yet of considerable heft, and also be capable of receiving a high polish to make a finished job, and, in order to make it fitly accompany the finish of the rest of the work, it has hitherto been found impracticable to cast a heavy ball of iron or other cheap metal which will have the desired heft, and which will also be capable of receiving the desired polish in plating. I have, however, overcome these difficulties by casting a shell for said weight of finished metals capable of receiving a polish and the finish desired, and then filling this shell with lead or any other weighty substance. I have found by experience that a weight thus constructed may be made smaller in area, and yet possess the desired heft and capable of a fine finish, more economically than can be done with weights otherwise constructed.

As illustrated in Fig. 2, H is the shell, and H′ the filling.

I desire to construct the valve B and its operative mechanism so that the lever-arm may be turned in any direction desired, so as to permit of its location under any given surroundings. This may be accomplished in any proper manner—as, for instance, the yoke b' may be sleeved upon an extended portion of the valve-case, as shown, having a jam-nut, b^2, and stuffing-box b^3 above, the construction being such that the circular valve-stem may be rotated so as to bring the lever in any position found desirable.

What I claim is—

1. A steam-pressure regulator consisting of a valve located in the steam-pipe communicating with the boiler, and a piston secured upon a hollow bracket, a movable cylinder in connection with said piston, steam-connection between said bracket and said steam-pipe, said cylinder connected with the valve in the steam-pipe, and a valve for controlling the admission of steam to said cylinder, substantially as described.

2. The combination, with the steam-pipe communicating with the boiler, of a valve, a movable piston-cylinder connected therewith, a piston secured upon a hollow bracket, steam-connection with said steam-pipe and with the bracket, a valve for controlling the admission of steam to the cylinder, and cushions located above and below the piston-head, substantially as and for the purposes described.

3. The combination, with the steam-pipe communicating with the boiler, of a valve, a movable piston-cylinder connected therewith, a piston secured upon a hollow bracket-arm, steam-connection between said pipe and said bracket, a valve for controlling the admission of steam to the cylinder, a drip-cock, and a trap to carry off water of condensation, substantially as described.

4. The combination, with the steam-pipe communicating with the boiler, of a valve, a movable piston-cylinder connected with said valve, a piston secured upon a hollow bracket, steam-connection between said pipe and said bracket, and in connection therewith a trap consisting of the pipes $C' C^2 C^3$, having an outlet-valve located therein, substantially as described.

5. The combination, with the steam-pipe communicating with the boiler, of a valve, a movable piston-cylinder connected therewith, a piston secured upon a hollow bracket, s eam-connection between said pipe and said bracket, a weighted valve for controlling the admission of steam to the cylinder, and a weighted cover for said cylinder, substantially as described.

6. The combination, with the steam-pipe communicating with the boiler, of a valve, a movable piston-cylinder connected therewith, a piston secured upon a hollow bracket, steam-connection between said pipe and said bracket, and a valve for controlling the admission of steam to said cylinder, the construction being such that the cylinder and piston will operate one in relation to the other without the use of packing, substantially as described.

7. A steam-pressure regulator consisting of the balance-valve provided with a weighted lever located in the steam-pipe communicating with the boiler, a movable piston-cylinder connected with said valve, a hollow piston secured upon a hollow bracket, steam-connection between said bracket and said pipe, a weighted valve for regulating the admission of steam to the cylinder, said cylinder provided with a hollow head, and cushions located above and below said head, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

DANIEL C. KELLAM.

Witnesses:
N. S. WRIGHT,
M. B. O'DOGHERTY.