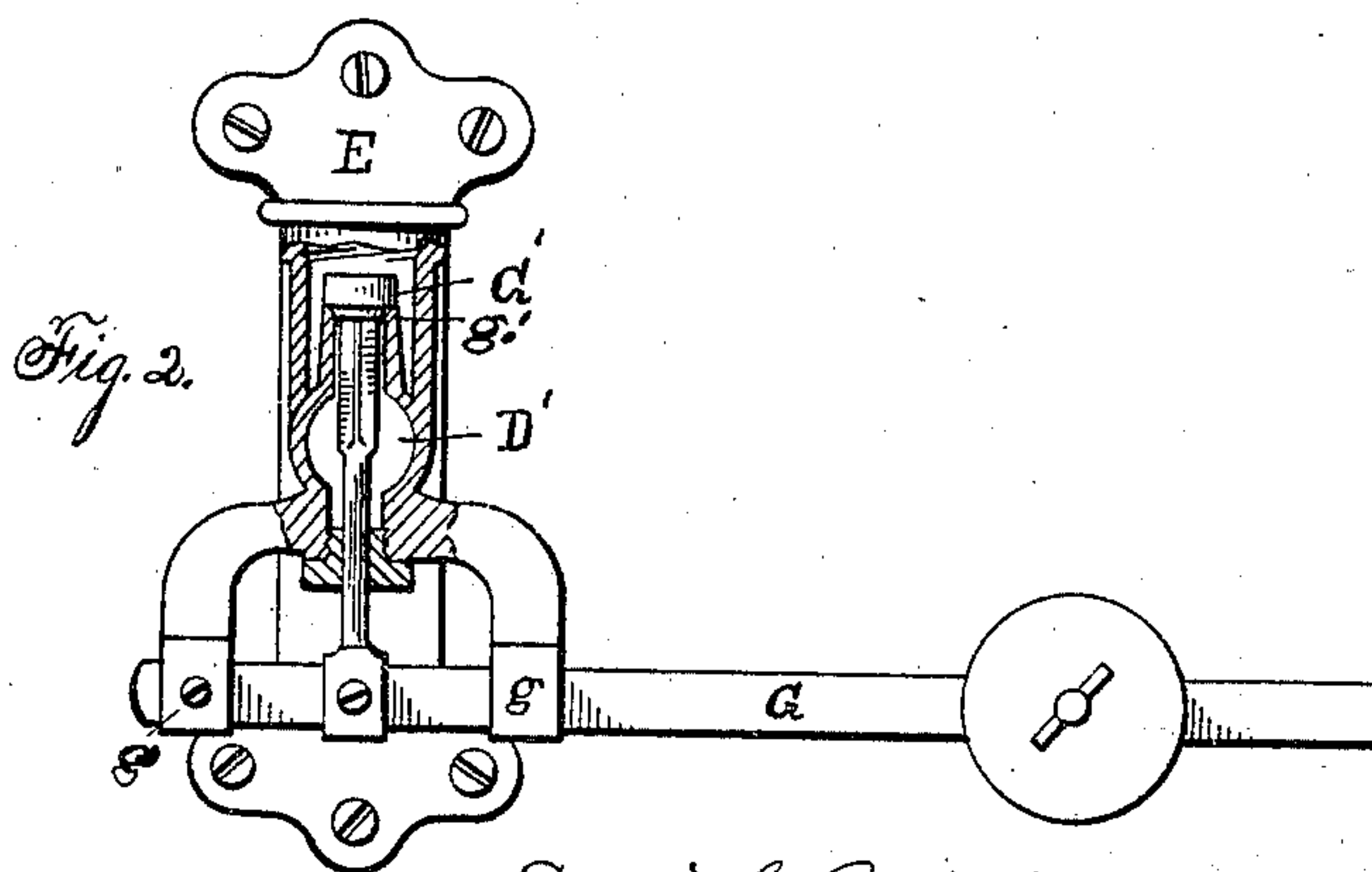
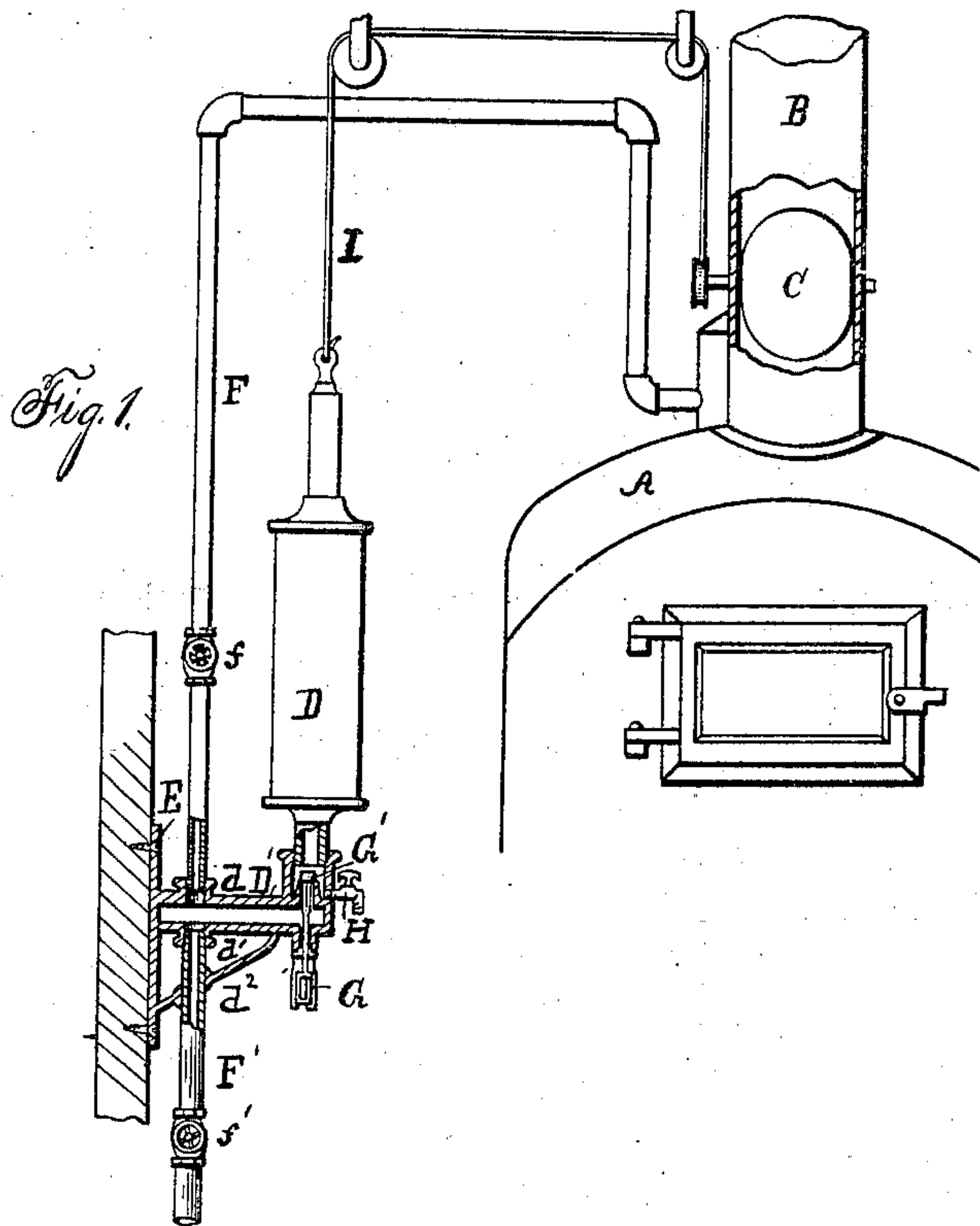


(No Model.)

D. C. KELLAM.  
STEAM DAMPER REGULATOR.

No. 284,023.

Patented Aug. 28, 1883.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

DANIEL C. KELLAM, OF DETROIT, MICHIGAN.

## STEAM DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 284,023, dated August 28, 1883.

Application filed February 5, 1883. (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 Damper-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 in the combination of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 represents a view in side elevation of the device embodying my invention. Fig. 2 is a separate view of the supporting-bracket.

It is the object of my invention to provide a damper-regulator for the smoke-stack of steam-boiler furnaces, though equally well adapted for other purposes where there is a pressure of steam to operate the mechanism.

My improvement consists, essentially, in so constructing and disposing the parts of the apparatus that the damper-regulator itself may be located at any convenient point in the engine-room or other contiguous location, and not, as heretofore necessary, on the boiler itself, or above the water-level of the steam-generator.

Heretofore in steam damper-regulators in which the damper is moved by a steam-actuated piston it has been deemed necessary to locate the apparatus above the water-level in the steam-generator, because steam entering the apparatus to operate the mechanism would condense, and therefore provision had to be made for the water to drip back into the steam-generator. This necessitated the location of the apparatus above the water-level and prevented it from being located at a point off away from the boiler and within convenient reach of the engineer.

I will now proceed to describe my invention.

A represents any ordinary steam-boiler; B, its smoke-stack; C, its damper to be regulated.

D is my improved damper-regulating mechanism, which consists, essentially, of a steam-actuated piston and a weighted valve for regulating the admission of steam to the piston when the pressure in the boiler shall have reached a predetermined limit. Of course any form of mechanism which provides a steam-actuated piston may be employed. I prefer, however, to employ a device in which the piston is in the nature of a cap surrounding an interior cylinder, substantially such as patented to me in Letters Patent No. 214,507, dated April 22, 1879.

E is a bracket, which supports my damper-regulator. Its horizontal arm D' is made hollow for the passage of steam to the apparatus, and at *d* and *d'* are pipe-connections. I prefer to employ a brace beneath a bracket, which may be perforated or forked at *d''* for the passage of the waste-pipe.

F is a steam-pipe leading from the steam-generator, and connected at *d* with the bracket-arm D'.

F' is a waste-pipe connected with the bracket at *d'*.

*f* is a cock governing the admission of steam to the apparatus, and *f'* a smaller cock governing the waste of condensed water through the waste-pipe F'.

G is a weighted lever, which holds the valve G' upon its seat against the pressure of steam. The valve-seat *g'*, I prefer to locate in the end of the bracket, with the valve-stem projecting downward, so that the weighted lever rests beneath the bracket. This enables me to dispose the metal uniformly above the valve-seat, and this is important, since if the metal should be disposed more upon one side of the valve-seat than upon another the effect of the heat would be to expand the metal unequally and cause a constant leakage of steam past the valve into the regulator, and so impair its efficiency.

The lever G may be pivoted at either of the points *g*, and so project out in either direction, thus enabling me to accommodate it to different locations and conditions; and instead of employing a weighted lever for the purpose of governing the valve G', the valve may be held to its seat by a graduated spring, or



by simply a graduated weight hung to the lower end of the valve-stem.

H is a drip-cock located in the valve-chamber above the valve, the object being to draw off water of condensation from the cylinder or chamber of the regulator.

I is a suitable cable or chain for transmitting the motion of the regulator to the damper.

The operation of the device is as follows:

10 The regulator having been located at any desired point, without regard to the level of water in the generator, the weight upon the valve is adjusted to correspond with the limit of pressure desired within the generator.

15 Now, in its normal condition, the valve stands closed, while the cock *f* is wide open, and the cock *f'* is very slightly open, so as to permit condensed water to drip through it. The damper also stands wide open. When the

20 heat in the furnace causes the steam to generate and acquire a pressure up to a point near the fixed limit, the steam, in passing through the pipe F and through the horizontal bracket-arm, will leave the valve G' and enter the

25 cylinder or chamber of the regulator D, thus actuating its piston and closing the damper. The temperature will now fall in the furnace, and as soon as the steam-pressure is slightly decreased the weight will close the valve G',

30 the piston will descend, and the damper will be again opened. It will be observed that steam standing in the pipe F will condense with more or less rapidity, and would otherwise rise against the valve G' and prevent access into the regulator; but the pipe F is provided to meet this contingency. Whatever

35 water of condensation forms in the pipe F, it descends into the pipe F', and the cock *f'*, being slightly opened, will permit this water to drip away as rapidly as formed, and by carefully regulating the cock it will simply accommodate the outflow of the water of condensation as rapidly as formed, and without

40 permitting live steam to pass. On the other hand, when the valve G' closes, the confined steam in the chamber above will condense and drip from the drip-cock H, which is always left very slightly open for this purpose.

It will be understood that in use the valve

50 G' will open and close at frequent intervals when steam is near the limit of pressure, and so this drip-cock H is quite essential to drain away the water of condensation, so as to leave the valve always free.

I prefer, as above explained, to locate the valve-seat, its surrounding chamber, and the drip-cock H all in the end of the bracket; but they may of course be located above or below the bracket, contiguous thereto, without departing from the principle of my invention.

I am aware that a damper has been controlled by pistons located in cylinders which are arranged on a boiler and connect with a closed box within the boiler, such box containing air which serves to actuate the pistons by its expansion, and thereby close the damper.

What I claim is—

1. In a damper-regulator, the combination, with the cylinder and piston, of a bracket constructed with a hollow supporting-arm, having means to connect it with the steam-space of a boiler and with the piston-cylinder, and a pipe leading from the hollow arm for conducting off the water of condensation from the same, substantially as described.

2. In a damper-regulator, the combination, with the cylinder and the piston which connects with the damper, of a bracket constructed with a hollow arm, having means to connect it with the steam-space of a boiler, and with the cylinder, which it serves to support, for conveying steam to the cylinder, substantially as described.

3. In a damper-regulator, the bracket E, having a hollow arm, D', provided with means to connect it with the steam-space of a boiler, and to the end of the cylinder D which contains the damper-actuating piston, for conveying steam to said piston, a valve, G', arranged on a seat, *g*, provided at the end of the hollow arm, and having a depending valve-stem, and a weighted lever, G, connected with said stem, substantially as described.

4. In a damper-regulator, the combination, with the cylinder and the piston which connects with the damper, of a bracket, E, constructed with a hollow arm, D', having means to connect it with the boiler and the piston-cylinder, a valve, G', seated on said hollow arm, and a pipe, F', leading from the hollow arm, to carry off water of condensation, substantially as described.

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

DANIEL C. KELLAM.

Witnesses:

N. S. WRIGHT,  
A. E. INGLIS.