How & Copeland,

Boiler-Furnace Draft-Regulator.

No. 19,249. Patented Feb. 2, 1858.

Fig. 3.

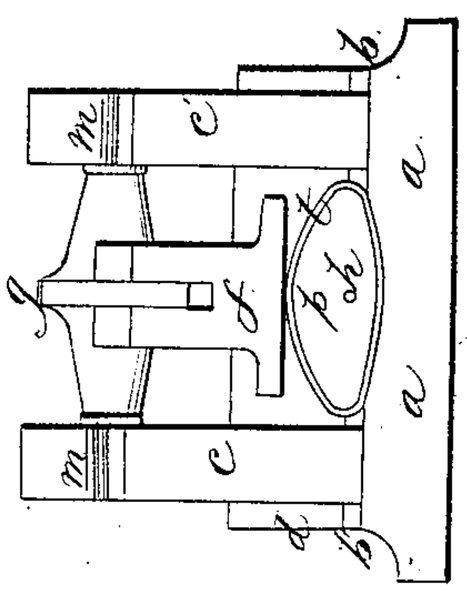


Fig. 2.

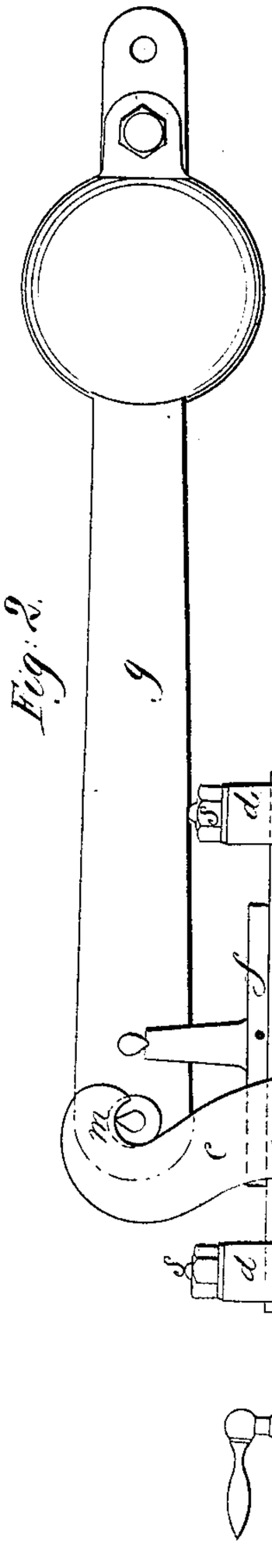
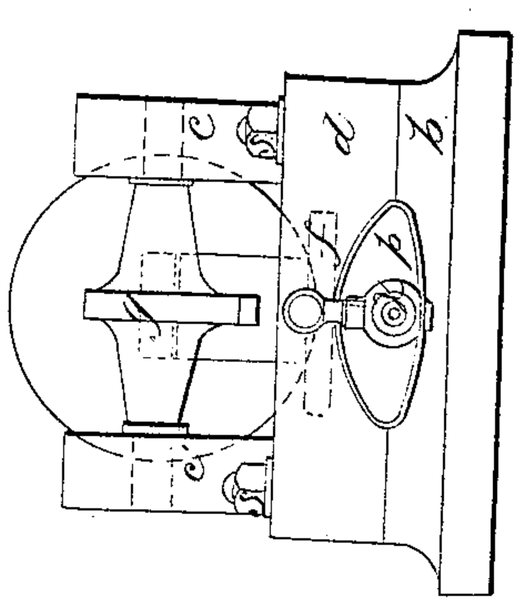


Fig. 1.



UNITED STATES PATENT OFFICE.

JAMES HOW AND CHARLES W. COPELAND, OF BROOKLYN, NEW YORK.

DAMPER-REGULATOR.

Specification of Letters Patent No. 19,249, dated February 2, 1858.

To all whom it may concern:

Be it known that we, JAMES How and CHARLES WILSON COPELAND, of Brooklyn, New York, have invented certain new and useful Apparatus for Regulating the Position of Dampers of Chimneys Used in Connection with Steam-Generators, and that the following specification, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is an end view or elevation of the whole apparatus from the side to which steam is admitted from the generator. Fig. 2 is a side elevation of the same parts, and Fig. 3 is a cross section through the flexible tube, compressor lever, etc.

Our invention relates to that class of apparatus by which the amount of effective aperture in a stack or chimney is governed by the motions of a damper whose position depends to a greater or less extent upon the pressure of steam existing in a generator which is heated by a furnace in connection with such a chimney. And the nature of our invention consists in the employment of a flexible or partially elastic and flexible tube closed at each end and used in combination with a presser block and a bed plate; the interior of the tube being in connection with the steam generator and the presser plate being employed to actuate a damper or other apparatus for regulating the quantity of air passing through a furnace, or as an indicator of pressure, or both, substantially as hereinafter set forth. In order to carry our invention into effect a tube of flexible material which may be to a greater or less extent elastic is procured and in the two open ends thereof are fitted two plugs of wood or metal, and the extremities of the tube thus closed up are clamped between clamps much like ordinary pillow blocks. A hole is pierced through one of these plugs and through it the interior of the tubular space is by means of proper pipes put in connection with a steam generator. Upon the tube thus clamped and closed at the ends a presser block is laid, and below the tube a proper bed plate is provided and this block is held down either by its own gravity or by weights or springs acting through the intervention of levers or otherwise. The presser may by means of proper rods and levers or their equivalent be attached to a damper so that it may be moved by the presser whenever it rises or descends the connection being such that an increase of steam pressure will shut the damper either wholly or partially; or it may be connected to other apparatus for regulating draft or to control the amount of air delivered by a blower or it may be used as a pressure gage if fitted with a suitable scale. If the tube have little or no elasticity its ends must be closed by oval plugs, or those whose cross section is a reëntering curve, one of whose diameters is longer than the other, and the presser should be applied to the tubes with its pressing face (taken as a whole) parallel or nearly so to the longer diameter of the plug.

In the drawings a proper bed plate is represented at *a a* to which are attached two clamp jaws *b b′*, as also two standards *c c′* hooked at their upper ends. The elastic tube is shown at *t* and in each end thereof are exhibited plugs *p p′* whose exterior circumference is a little greater than that of the interior of the tube, these plugs are driven in tight. The tube thus closed is laid upon the bed plate *a* resting on it, while its ends lie in jaws *b b′* and two other jaws *d d′* properly shaped are brought down upon the tube compressing its ends against the plugs, and are held there by proper screws as at *s s s* a hole *h* is pierced through one of the plugs and a pipe as at *x* connects the interior of the tube with the generator. Upon the tube is placed a presser *f* held down by a weighted lever *g* whose fulcrum is at *m*. To the end of this lever other levers are to be attached connecting with a damper in the chimney of the furnace which heats the generator, the attachment being such that the damper shall close as the presser rises and vice versa, or the presser block may be attached to other apparatus for controlling the quantity of air passing through a furnace. Now by looking at the cross section of the tube shown in the drawings it will be perceived, that when steam is introduced it will have a tendency to change such section and approach it to the cylindrical, for when truly cylindrical its capacity would be greatest, and it will also be perceived that if the weight upon the presser be constant this change will be gradual; the presser rising as the steam pressure in the interior of the tube increases. If the

tube were merely flexible and not elastic it is clear that the shape of the end plugs would be material, that is that they should on no account have a circular section, but if the tube be made of highly elastic material then the end plugs may be cylindrical as an increase of pressure could then swell or bulge out a tube already cylindrical into a cylinder of greater diameter thereby lifting the presser. The tube is confined between the bed plate and presser and the former is stationary, the whole change of shape will therefore act upon the presser and cause it to rise or fall.

Now our apparatus does not produce an effect different from other known contrivances and its value lies in the simplicity of its construction, its cheapness and in the fact that its action upon a damper or other draft controller is gradual, opening and closing it by degrees without sudden changes and this without the aid of any contrivance for varying the weight on the presser as it rises or descends. The presser plate may be connected to ash pit doors, to the throttle valve of a blower engine or to any known contrivance for regulating the draft of furnaces or to a damper and we contemplate using it for such purposes and also employing its vibrations to indicate the pressure of steam. A piece of ordinary india rubber hose answers every purpose for the tube and an inspection of the drawings will show that no peculiar nicety of workmanship is required for the production of a useful apparatus. We are aware also of the facts, that elastic diaphragms properly connected have been used as damper regulators; that an elastic metallic vessel of peculiar formation has been employed for the same purpose, and also that a bent highly elastic metallic tube has been and now is used as a steam gage, but in that instance the pressure does not alter the cross section of the tube but the degree of curvature in the length of the tube. And we also know that it has been proposed to employ a coil of tube as a gasket for a stuffing box packing, such a tube being distended by fluid pressure. We therefore lay no claim to any such contrivances but

We do claim as of our own invention—

A flexible, or flexible and elastic, tube closed at both ends and in connection with a steam generator, in combination with a presser block and a bed plate, constructed as a whole substantially in the manner specified and applied to regulate the quantity of air delivered to a furnace or as a pressure indicator.

In testimony whereof we have hereunto subscribed our names on this second day of May, A. D. 1857.

JAMES HOW.
CHAS. W. COPELAND.

In presence of—
WILLIAM PORTER,
WM. HENRY WALLACE.