(No Model.)

G. M. GITHENS.

DRAFT REGULATOR.

No. 270,302. Patented Jan. 9, 1883.

Fig. 1.

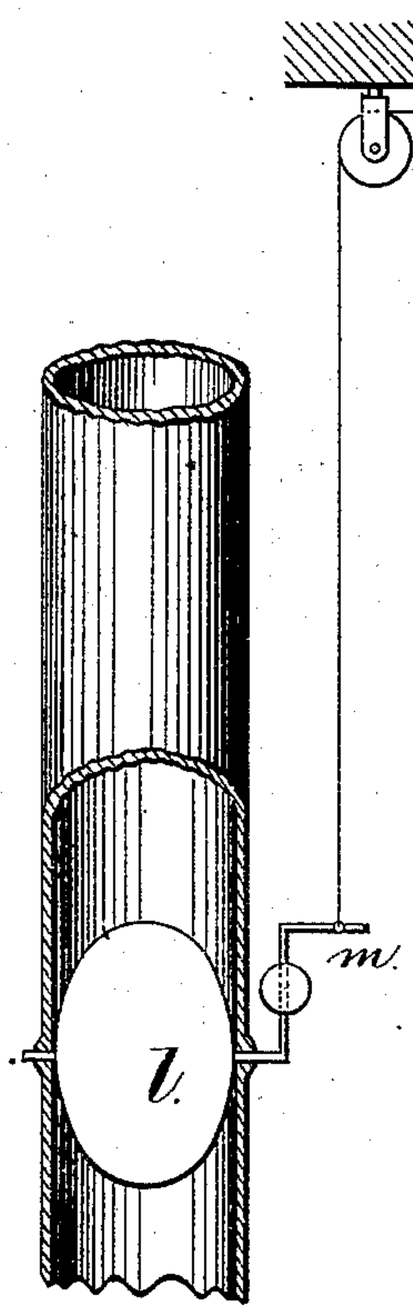
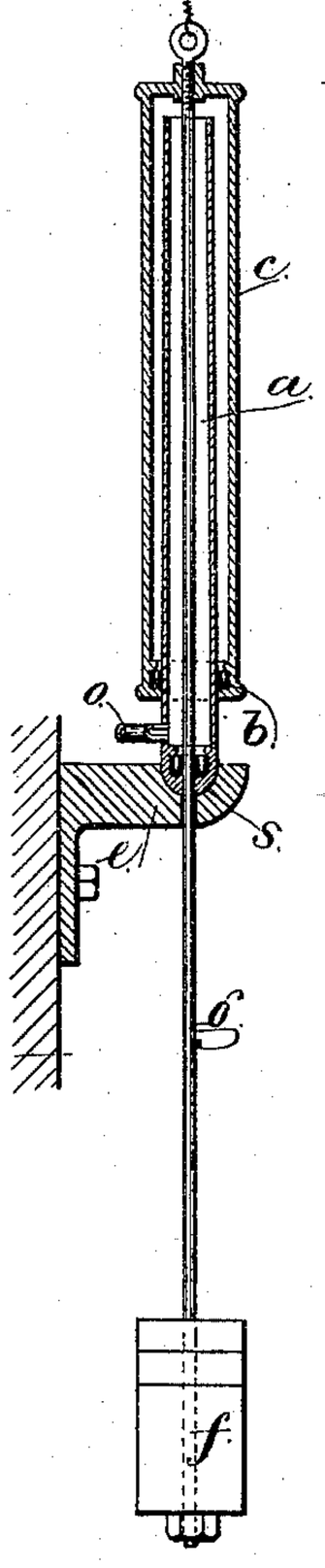
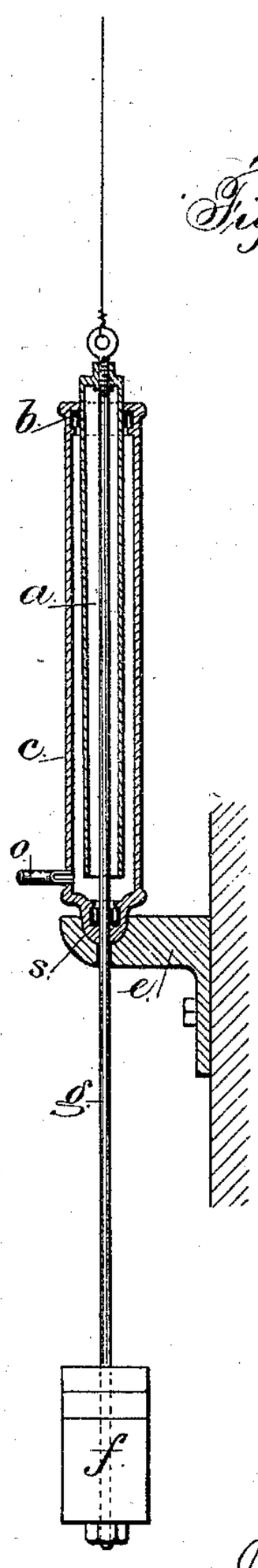


Fig. 2.





Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE M. GITHENS, OF BROOKLYN, NEW YORK.

DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 270,302, dated January 9, 1883.

Application filed May 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. GITHENS, of Brooklyn, E. D., in the county of Kings and State of New York, have invented an Improvement in Damper-Regulators, of which the following is a specification.

Figure 1 is a vertical section. Fig. 2 is a vertical section of a modification.

Damper-regulators have been made of two cylinders, one sliding within the other, and in which there is water that is exposed to the pressure of steam in a boiler by a pipe connecting such cylinder to the steam or water space of the boiler. The moving cylinder is connected with a damper in the flue, so that the pressure will move the damper and regulate the draft of the fire. In these regulators it is usual to set the parts so that with a given pressure the damper will close, and difficulty has been experienced in constructing these regulators so that the damper will not close too suddenly. Various devices have been made to effect this object; but there are more or less difficulties in adapting the same to the various conditions of use.

I make use of a tapering cylinder as the means for actuating my damper, such cylinder having an elastic packing that accommodates itself to the tapering surface, so that the area upon which the pressure acts is larger when the movement of the damper commences, and such area lessens as the movement progresses. Thereby the damper cannot be fully moved until the pressure has increased sufficiently to equal on the smaller area the force exerted on the larger area in commencing the movement of such damper. The cylinder *a* is tapering and passes through the flexible cup-leather packing *b* within the cylinder *c*, and the pressure acts to move the cylinder *a* endwise within the cylinder *b*.

In the section Fig. 1 the parts are shown in such a position that the cylinder *a* is supported at one end by the bracket *e*, and the cylinder *c* is forced upwardly and slides over the cylinder *a*. In the section Fig. 2 the parts are transposed in position, and the cylinder *c* is supported by the bracket or other convenient device, and the cylinder *a* is moved upwardly within such cylinder *c*. In either instance I make use of a weight, *f*, and a rod, *g*, connecting the same to the moving part, such rod passing down through a packing or gland in the stationary part, so that the weight serves to keep the parts vertical and form a resistance to the pressure of the steam. This rod may be loaded with movable weights, so that the same steam-damper can be employed with different boilers carrying different pressures. Under all circumstances the weight is to be sufficient to prevent the parts moving until the minimum presssure in the boiler is attained at which it is desired to commence to close the damper, and the taper of the cylinder *a* is to be such that when the end movement has been given sufficient to close the damper *l* by the wire and lever connections *m*, (illustrated in the drawings,) or by any other convenient means, the pressure must have accumulated to the maximum force, so as to exert on the smaller area of the tapering cylinder the necessary power to operate such damper. In the intermediate positions the damper will close the flue more or less, according to the pressure in the boiler.

I have found that with a movement of about twenty inches the cylinder *a* may be about two inches in diameter at the larger end and about one inch and seven-eighths at the smaller end. This will give the required differences in area and cause the damper to be moved gradually, and at the same time the cup-leather will easily accommodate itself to the taper. The taper may be uniform from end to end, or it may be more rapid in one portion than in another, or the taper portion may be made of two or more parallel portions united by tapering surfaces.

The connection for the pipe *o* to the boiler should be flexible, so as to allow of any slight movement that may be necessary to allow the parts to remain vertical, and I prefer and use a semi-globular bearing, *s*, for the regulator where it rests upon the bracket or support, so as to allow the parts to turn in assuming and maintaining a vertical position.

In some instances the damper may be operated by a piston in a parallel cylinder, the piston-rod being tapering and producing the difference in the area for pressure by passing through a contracting cup-leather; or the same conditions will exist and the same results be

effected if the piston is provided with an expansive cup-leather and the cylinder containing the same is tapering.

I claim as my invention—

1. The combination, in a damper-regulator, of the cylinders *a* and *c* and connections to the damper, and elastic packing, the cylinder *a* being of a tapering form, for the purposes substantially as set forth.

2. The combination, with the tapering cylinder *a*, of the cylinder *c*, packing *b*, weight *f*, and rod *g*, and connection to the damper, substantially as set forth.

3. The combination, with the cylinders *a c* and packing, of the rod *g*, weight *f*, and the globular segmental bearing for the regulator and the connection to the damper, substantially as set forth.

4. The combination, in a damper-regulator, of a stationary and a moving part and an expansive cup-leather packing, the portion with which such packing comes into contact being tapering, so that the area upon which the pressure acts will be varied as the parts move, substantially as set forth.

Signed by me this 15th day of May, A. D. 1882.

GEO. M. GITHENS.

Witnesses:
GEO. T. PINCKNEY,
WILLIAM G. MOTT.