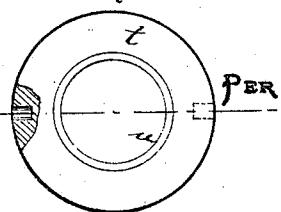
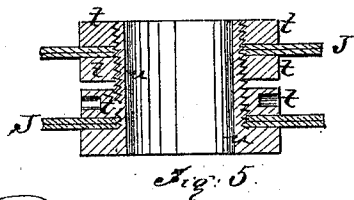
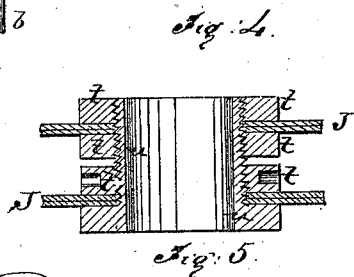
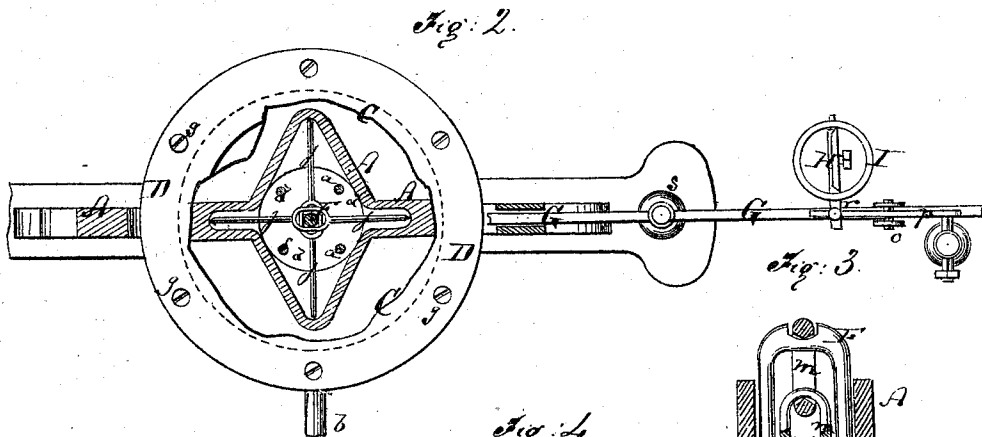
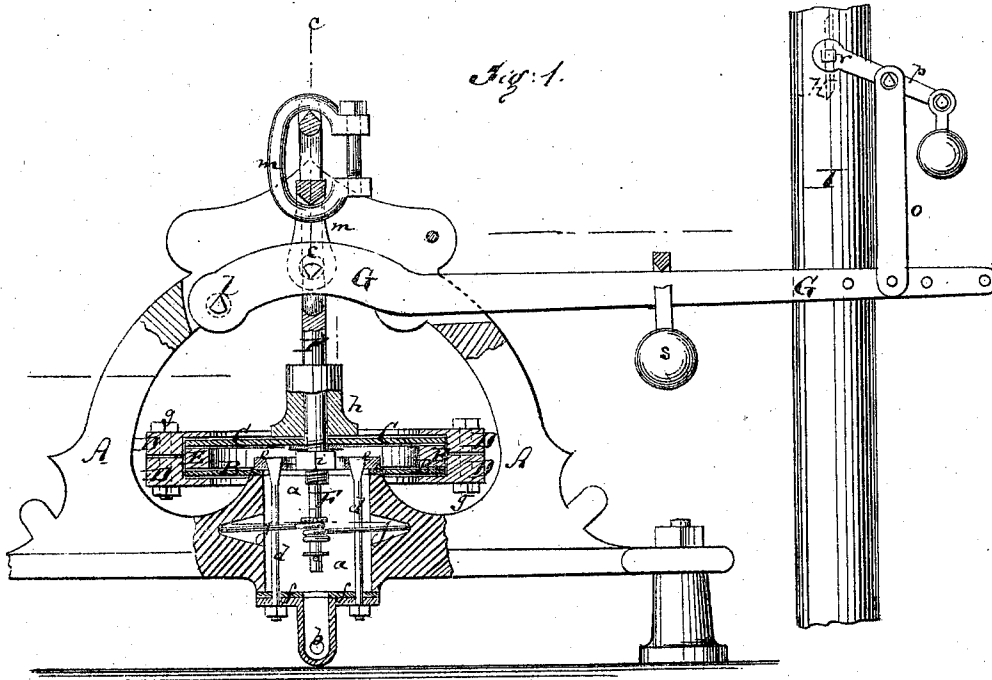


J. WOODRUFF.
Draught-Regulator.

No. 128,836.

Patented July 9, 1872.



Witnesses:

Chas. Nida.
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UNITED STATES PATENT OFFICE.

JOSEPH WOODRUFF, OF RAHWAY, NEW JERSEY.

IMPROVEMENT IN DRAUGHT-REGULATORS.

Specification forming part of Letters Patent No. 128,836, dated July 9, 1872.

Specification describing a new and Improved Draught-Regulator, invented by JOSEPH WOODRUFF, of Rahway, in the county of Union and State of New Jersey.

Figure 1 represents a side view, partly in section, of my improved draught-regulator. Fig. 2 is a top view, partly in section, of the same. Fig. 3 is a detail vertical section on the line *c c*, Fig. 1; Fig. 4, a vertical central section; and Fig. 5, a detail top view of a modification in the construction of the diaphragm-holder.

Similar letters of reference indicate corresponding parts.

This invention relates to a new apparatus for regulating the draught of the furnace in accordance with the steam-pressure of a boiler, so that the furnace-heat will be automatically reduced whenever the pressure exceeds a given degree, and augmented when the pressure comes below a desired point. The invention consists in a new arrangement of flexible diaphragms, properly packed and connected with a vertical stem, which, when adjusted up and down by the action of steam on the diaphragm, will cause the vibrations of a weighted lever, and the consequent automatic adjustment of the damper which is connected with the lever.

A in the drawing represents the fixed frame of my improved apparatus, provided with a vertical cylindrical chamber, *a*, into which the steam-pipe *b* is conducted. To the top of this chamber *a* is securely fastened, by a series of vertical bolts, *d d*, an annular metal plate, *e*, which serves to clamp the inner edge of an annular flexible diaphragm, B. The bolts *d* pass through the plate *e*, and also through the bottom plate *f* of the chamber *a*, as shown, and can be drawn sufficiently tight to firmly clamp the inner edge of the diaphragm B. C is an upper flexible diaphragm, as large in external diameter as B. Both diaphragms are at their outer edges confined between two recessed rings, D D, by an interposed ring, E. Bolts *g g*, passing through the thick outer parts of the rings D D, draw them together, and crowd the same against the diaphragms B C, which bear, respectively, against the opposite sides of the ring E, as shown. F is an upright stem fitted centrally through the diaphragm C, and terminating at its upper end in an eye, as shown in Fig. 3. Directly above

the diaphragm C the stem is embraced by a sleeve, *h*, which rests on C, while a washer and nut, *i*, beneath the diaphragm, clamp the same tightly against the sleeve *h*. The lower part of the stem F passes loosely through eyes of radiating rods *j j*, whose outer ends fit into cavities in the sides of the chamber *a a*, shown, or which are otherwise applied to guide them. G is a lever pivoted at *l* to the frame A, and suspended, by links *m m*, from the upper part of the eye into which the stem F terminates. The outer end of the lever G is, by a rod, *o*, connected with a weighted crank, *p*, of the arbor *r*, upon which the damper H in the smoke-flue I is secured. A weight, *s*, is also applied adjustably to the lever G, as shown. By means of this weight the apparatus can be set to a greater or less degree of pressure. Whenever the pressure is sufficient to expand the space between the diaphragms the lever will be swung up, to more or less shut the damper. The arrangement of diaphragm and stem as herein shown is very advantageous, inasmuch as it allows a comparatively long stroke. When a still longer stroke is desired I may use a suitable number of diaphragms, J J, clasped between rings *t t*, which are secured to a central tube, *u*, as indicated in Figs. 4 and 5.

The applying the connecting-rod *o* to the crank of the damper, between the weight thereon and the arbor, causes such weight to ease the damper on its bearings, using the pivot on *o* as its fulcrum, so that the damper will be turned with less difficulty than if not so balanced. The lever G, when graduated and provided with an adjustable weight at the end or middle, can at any time be used to weigh or measure the steam-pressure of the boiler, such weight or measurement being ascertained by adding to the absolute result the weight of the damper and attachments that bear on the lever.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The plate *e*, bolts *d d*, and plate *f*, arranged in combination with each other for the purpose of fastening the inner edge of the annular diaphragm B, as set forth.

2. The recessed rings D D and interposed ring E, applied as outer fastenings for the diaphragms B C, as specified.

3. The central stem F, firmly clamped to the upper diaphragm C, as set forth.

4. The guide-pins *jj*, arranged within the chamber *a*, to steady the lower part of the stem F, as set forth.

5. The weighted lever G, combined with the vertical stem F and with the weighted crank *p* of the damper-arbor *r*, as and for the purpose herein shown and described.

6. The damper hung on a crank-arbor whose crank has a weight at the outer end, and is connected with the operating lever between the weight and arbor, to be balanced, as set forth.

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Witnesses:

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