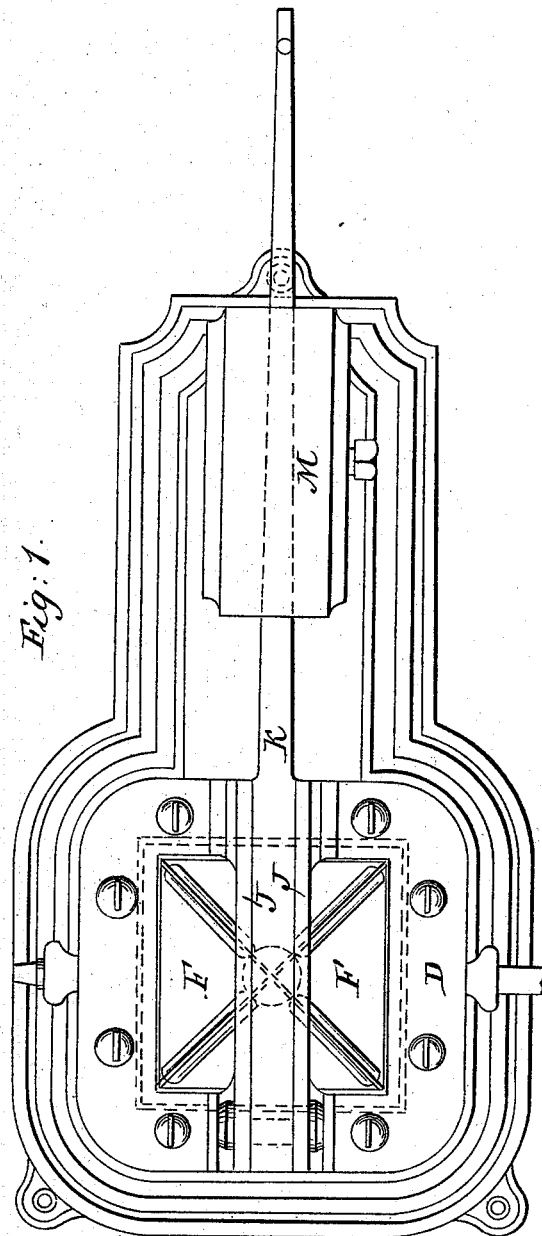


J. H. MURRILL.
Damper Regulator.

2 Sheets—Sheet 1.

No. 107,948.

Patented Oct. 4, 1870.



Witnesses.
Lewis R. Keizer.
J. H. Painter.

Inventor.
James H. Murrill

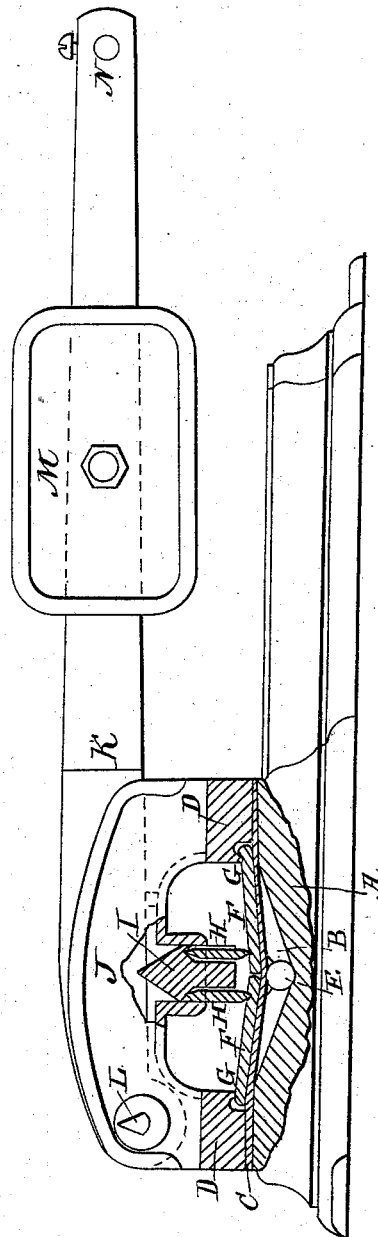
J. H. MURRILL.
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Fig. 2.



Witnesses.
Levi R. Keyser
J. Bainter.

Inventor.
James H. Murrill.

United States Patent Office.

JAMES H. MURRILL, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF
AND LEWIS R. KEIZER, OF SAME PLACE.

Letters Patent No. 107,948, dated October 4, 1870.

IMPROVEMENT IN DAMPER-REGULATORS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, JAMES H. MURRILL, of Baltimore, Maryland, have invented a new and useful Improvement in Damper-Regulators for Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, in which—

Figure 1 is a plan view, and

Figure 2, a side elevation, showing the working parts in section.

Damper-regulators, in which a flexible diaphragm of rubber or other material is used, have long been known, but much difficulty has been experienced in practice from the excessive strain upon the rubber, causing it eventually to give way; and

The nature of my invention consists in effectually protecting the diaphragm by a series of linged flaps, which move in unison with it, receive the strain, and transfer its motion to the lever through suitable connecting-rods, so arranged as to relieve the working parts of friction, and render the apparatus sensitive to slight changes of pressure.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

A, fig. 2, represents a section of the base plate of the machine, having a quadrangular depression, B, in which the diaphragm rests when not in action.

C is the flexible diaphragm, preferably of sheet-rubber, which is firmly clamped to the base plate by a ring, D, having a square opening through it, as shown.

E is an opening, for the admission of steam between the base plate and diaphragm.

F F are four metal flaps, resting upon the diaphragm, and having their outer sides pivoted by knife-edges and V-grooves to the under side of ring D, as shown at G G.

These flaps are, in form, right-angled triangles, their apexes joining in the center, forming a square.

If steam be now admitted through pipe E, under diaphragm C, it will be raised, the central portion having the greatest movement; the flaps F F being pivoted at the same points at which the diaphragm is held, move entirely in unison with it, thus allowing freedom of action without friction or undue strain.

The motion of diaphragm and flaps is communicated to the lever by the use of four short rods H H, pointed at both ends, one end of each rod resting in a conical depression in the apex of its corresponding flap.

The upper ends of the rods center in similar depressions formed in a grooved plug, I, which passes through an opening in the arch J.

The upper portion of this plug has a knife-edge engaging with a corresponding V-groove in the under side of lever K, which is pivoted at L on knife-

edges, and works between jaws or guides in the arch J.

M is a counterweight, which may be adjusted by a set-screw to any position on lever required by the desired pressure.

N is a hole, for the reception of the damper-rod.

The machine being connected with the boiler by a suitable pipe, (preferably attached below the water-line, to avoid contact of steam or hot water with the diaphragm,) and the damper-rod being connected with lever, the operation is thus:

The counterweight is set on lever to the required pressure, say fifty pounds per square inch, and as the steam rises, there is an increasing tendency to raise the diaphragm and flaps in opposition to the action of counterweight M.

On approaching the desired pressure, the resistance is finally overcome, and the lever gradually raised, more or less closing the damper.

As the pressure, and consequent power in sustaining the weight, decreases, the lever gradually falls, and the damper is opened, the rising and falling of lever and weight being in proportion to the pressure of steam.

It will be observed that, as all the working parts are sustained by knife-edges or points, friction is reduced to the minimum, and the sensitiveness and efficiency of the machine increased.

The entire freedom of action, and the absence of all abrasion and wear secured by my peculiar method of protecting the diaphragm, and transferring its motion to lever by anti-friction joints and connections, constitute the chief features of my invention, which I claim secures the desired object more effectually than any similar device yet produced.

It is evident that any number of flaps above three may be employed, instead of four, which number I have adopted as securing the most simple construction and desirable form. I therefore do not limit myself to any particular number or arrangement.

I am aware that damper-regulators have been constructed with flexible diaphragms, protected by metallic backing. I therefore do not broadly claim this as a distinctive feature; but, having fully described my invention,

What I claim, and desire to secure by Letters Patent, is—

1. Pivoting the flaps by knife-edges at or near the vibrating points of the diaphragm, substantially as described.

2. The grooved plug and connecting-rods, for transferring the motion of the diaphragm and flaps to the lever, substantially as described.

JAMES H. MURRILL.

Witnesses:

LEWIS R. KEIZER,
W. PAINTER.