2 Sheets—Sheet 1.

W. E. KELLY.
Damper-Regulator.

No. 217,879. Patented July 29, 1879.

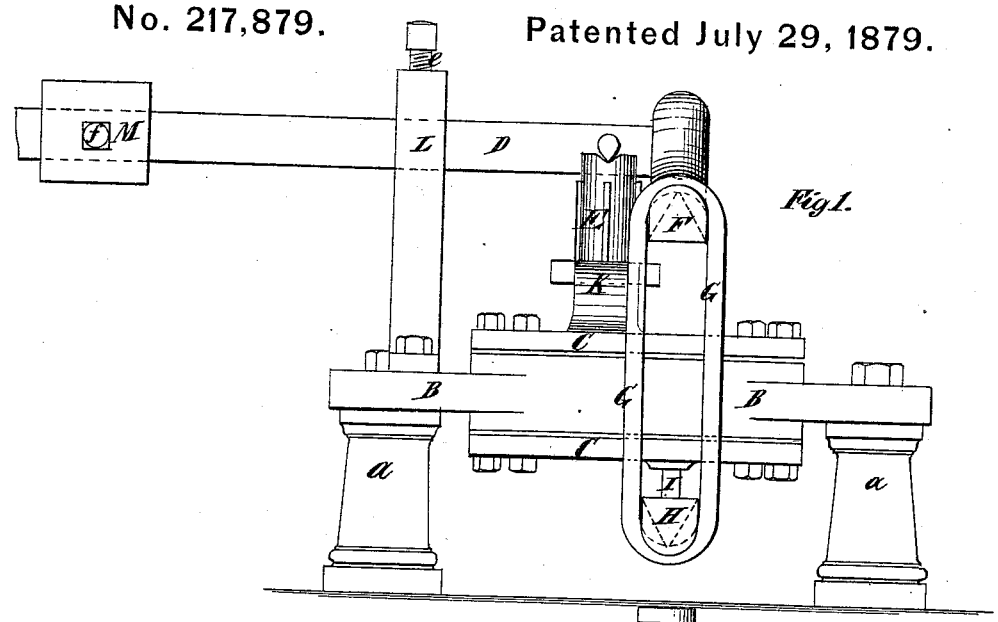

Fig 1.

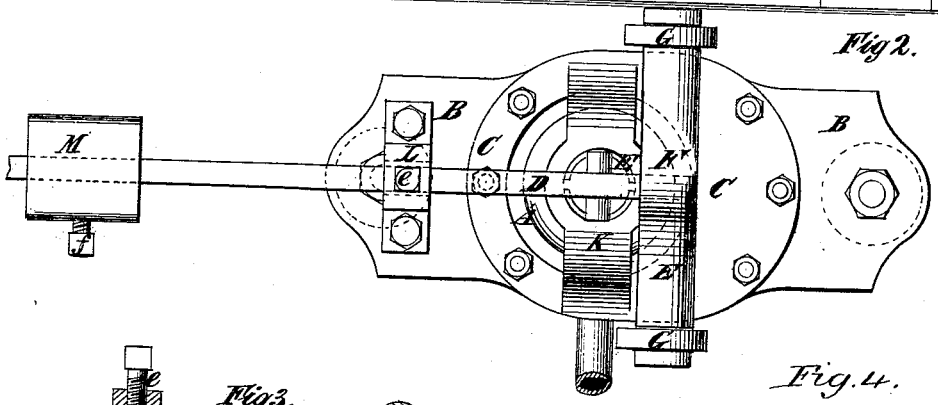

Fig 2.

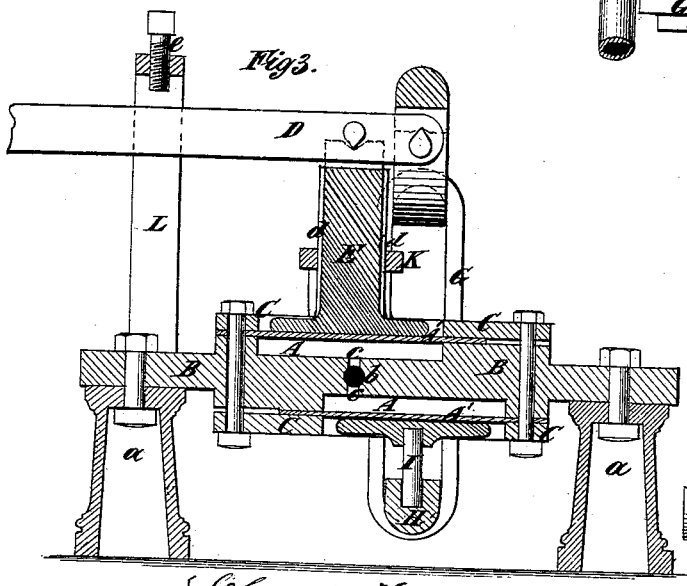

Fig 3.

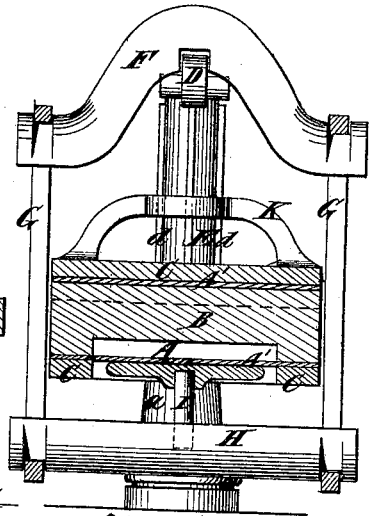

Fig 4.

Witnesses: Chandler Hall, Thomas E. Birch

Inventor Wm E. Kelly by his attorney. Edwin H. Brown

2 Sheets—Sheet 2.

W. E. KELLY.

Damper-Regulator.

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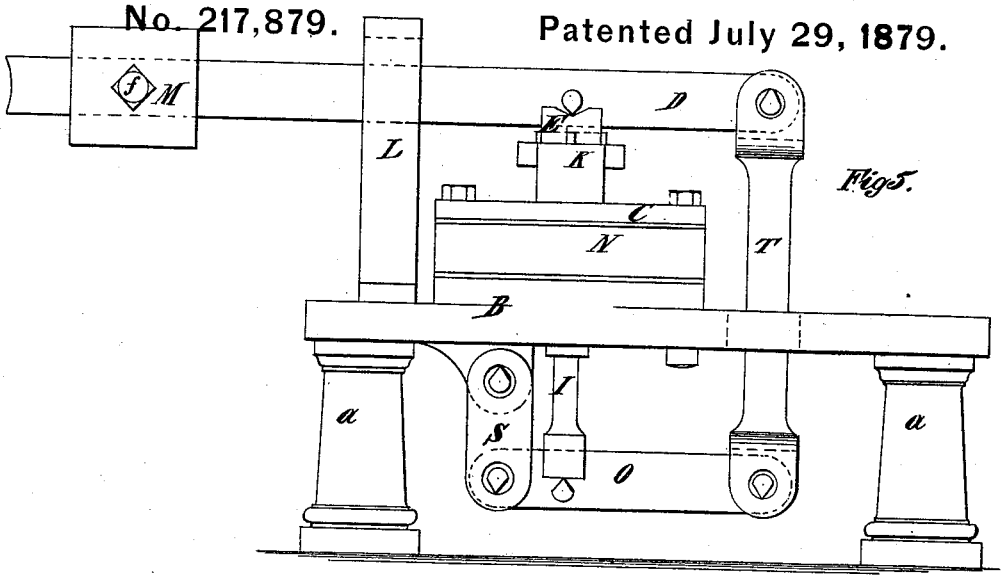


Fig 5.

Fig 6.

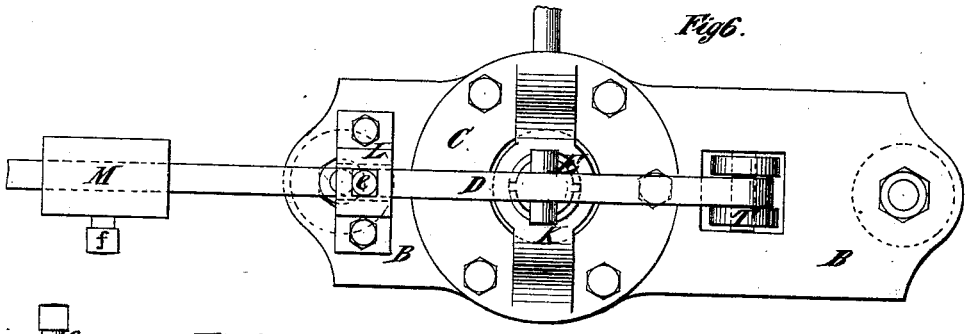
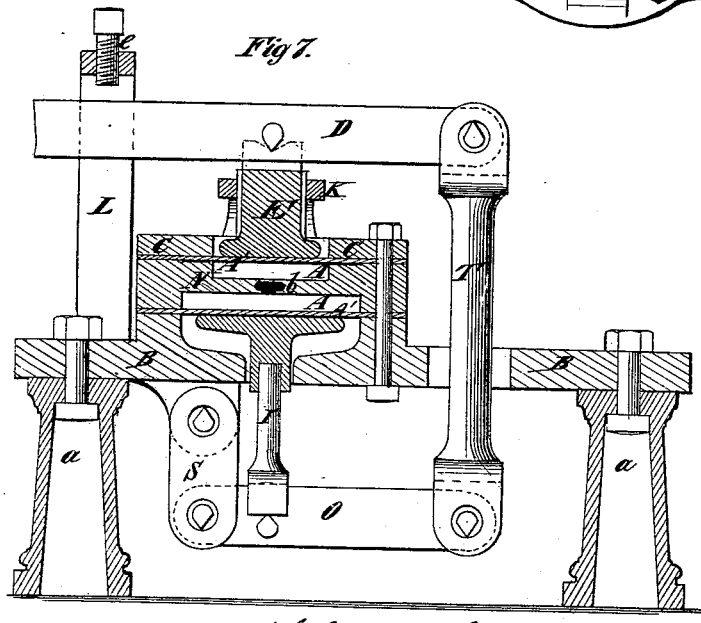


Fig 7.



Witnesses: Chandler Hall. Thomas E. Birch.

Inventor: Wm E. Kelly by his Attorney Edwin H Brown

UNITED STATES PATENT OFFICE.

WILLIAM E. KELLY, OF NEW BRUNSWICK, NEW JERSEY.

IMPROVEMENT IN DAMPER-REGULATORS.

Specification forming part of Letters Patent No. **217,879**, dated July 29, 1879; application filed February 27, 1879.

To all whom it may concern:

Be it known that I, WILLIAM E. KELLY, of New Brunswick, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Damper-Regulators, of which the following is a specification.

My invention consists, principally, in the combination, for use with a steam-generator and a damper therefor, of a lever adapted to be connected with such damper and two motors acting in different directions on such lever, and arranged on opposite sides of an intermediate partition or platform eccentrically to each other, whereby I produce a simple and compact apparatus, wherein each motor is operated independently of the other, so as to impart a double movement to the said lever.

The invention also consists in various combinations of parts and devices, hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side view of an apparatus embodying my invention. Fig. 2 represents a plan thereof. Fig. 3 represents a central longitudinal section of the same. Fig. 4 represents a transverse section thereof. Fig. 5 represents a side view of an apparatus of slightly modified form embodying my invention. Fig. 6 is a plan thereof. Fig. 7 is a central longitudinal section thereof.

Similar letters of reference designate corresponding parts in all the figures.

Referring first to Figs. 1, 2, 3, and 4, A A′ designate two motors, shown as consisting of circular chambers A, arranged eccentrically on opposite sides of a platform, B, and furnished with diaphragms A′, of metal, leather, canvas, and india-rubber or other flexible material, secured in place by clamping-rings C.

The platform B may be erected on legs *a*, and the clamping-rings may be elongated, so as to be ellipsoidal, in order that each shall overlap the chamber to which the other is fitted, and both may be secured in place by the same bolts passing through them and the platform.

Both the chambers A communicate with, so as to receive steam from, a steam-generator, in this instance, by a single port or passage, *b*, in the platform B and branch ports or passages *c* leading therefrom.

It is obvious, however, that entirely separate passages might be employed in lieu of those described, and the chambers excluded from each other.

D designates a lever, shown as connected directly to the upper or nearer diaphragm A′ by means of a pin or bar, E, and to the lower or most distant diaphragm A′ by means of a yoke, F, pivoted to it, and extending transversely across the upper diaphragm, in conjunction with links G, extending from its ends to the ends of another yoke or cross-bar, H, connected, by a pin or bar, I, to said lower diaphragm, said links straddling the latter.

I have shown the pin or bar E, which forms the stem of the upper diaphragm A′ and connects it to the lever D, as provided with wings *d* and fitting in a guide or bridge piece, K, whereby it is kept from tilting.

The lever D is preferably connected to the pin or bar E and yoke F by means of knife-edge bearings, so as to admit of its easy operation.

It will be understood that upon the accumulation of a certain pressure of steam in the steam-generator and its transmission to the chambers A the diaphragm A′ will be distended in different directions, and will, by acting on the lever D in different directions at the points of their connection with it, impart to it a double motion while operating entirely independently of each other.

One diaphragm forms a movable fulcrum for the lever, and the other acts on one of its arms.

The lever D, in this example of my invention, constitutes the means for operating on the damper of the steam-generator, so as to open or close it to increase or decrease the draft to the furnace of the generator and regulate the pressure of steam in the latter, and such lever may be connected with the damper in any suitable manner. Preferably I employ in connection with this lever D a guide, L, to prevent it from swinging sidewise, and when I do so I may advantageously furnish such guide with an adjustable stop, such as a screw, *e*, for limiting the upward motion of the lever.

A weight, M, capable of being adjusted into different positions on the lever and of being secured in place by a set-screw, *f*, serves to return the diaphragms A′ to their normal posi-

tions upon a reduction of pressure within the chambers A.

In Figs. 5, 6, and 7, two chambers, A, are fitted with diaphragms A′, and arranged one concentrically above the other. Both are shown as above the platform B; but a partition, N, is arranged between them.

The lower diaphragm is connected to a lever, O, pivoted at one end to a link or links, S, suspended from the platform B, and connected at the other by a link, T, with a lever, D, which is connected to the upper diaphragm, as in the above-described example of my invention, and constitutes the means for operating the damper of the steam-generator. In this example one diaphragm forms a movable fulcrum for the lever D, and the other acts upon one of its arms, as in the other example of my invention; but here the upper diaphragm needs to be of less active area than the lower, in order to act properly in conjunction with it.

It will be seen that by my invention I produce a simple, exceedingly compact, and effective apparatus, whereby the pressure of steam in a generator may be regulated through the damper.

It is obvious that my invention is not confined to regulating pressure of steam in a generator, but that it may be employed for regulating pressure of gases or liquids in various ways—for instance, by subjecting the motors to the influence of the gases or liquids whose pressure is to be regulated, and causing said motors to act upon the throttle-valve of an engine.

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

1. The combination, for use with a steam-generator and a damper therefor, of a lever adapted to be connected with such damper, and two motors acting in different directions on said lever, and arranged on opposite sides of an intermediate partition or platform eccentrically to each other, substantially as specified.

2. The combination, for use with a steam-generator and a damper therefor, of a lever adapted to be connected with said damper, two motors arranged on opposite sides of an intermediate partition or platform, a link or links extending transversely across said motors, connecting said lever with the most distant motor, and a pin or bar connecting said lever with the other of said motors, substantially as specified, whereby I produce a very compact and efficient apparatus for operating a damper.

3. The combination, for use with a steam-generator and a damper therefor, of a lever adapted to be connected with said damper, two motors arranged on opposite sides of an intermediate partition or platform, a link or links extending transversely across said motor, connecting said lever with the most distant motor, a pin or bar connecting said lever with the other of said motors, a guide for said lever, and an adjustable stop for limiting the motion of said lever, substantially as specified.

4. The combination, for use with a steam-generator and a damper therefor, of a lever adapted to be connected with the damper, two motors arranged on opposite sides of an intermediate partition or platform, a link or links extending transversely across said motors, connecting said lever with the most distant of said motors, a pin or bar connecting said lever with the other of said motors, and a weight applied to said lever, substantially as specified.

5. The combination, for use with a steam-generator and a damper therefor, of a lever, D, two motors, consisting of chambers A and diaphragms A′, arranged on opposite sides of an intermediate supporting-platform, B, yoke H, links G, and yoke F, connecting the lower of said diaphragms with said lever D, and means for connecting the upper diaphragm with said lever, substantially as specified.

WILLIAM E. KELLY.

Witnesses:

EDWIN H. BROWN,

THOMAS E. BIRCH.