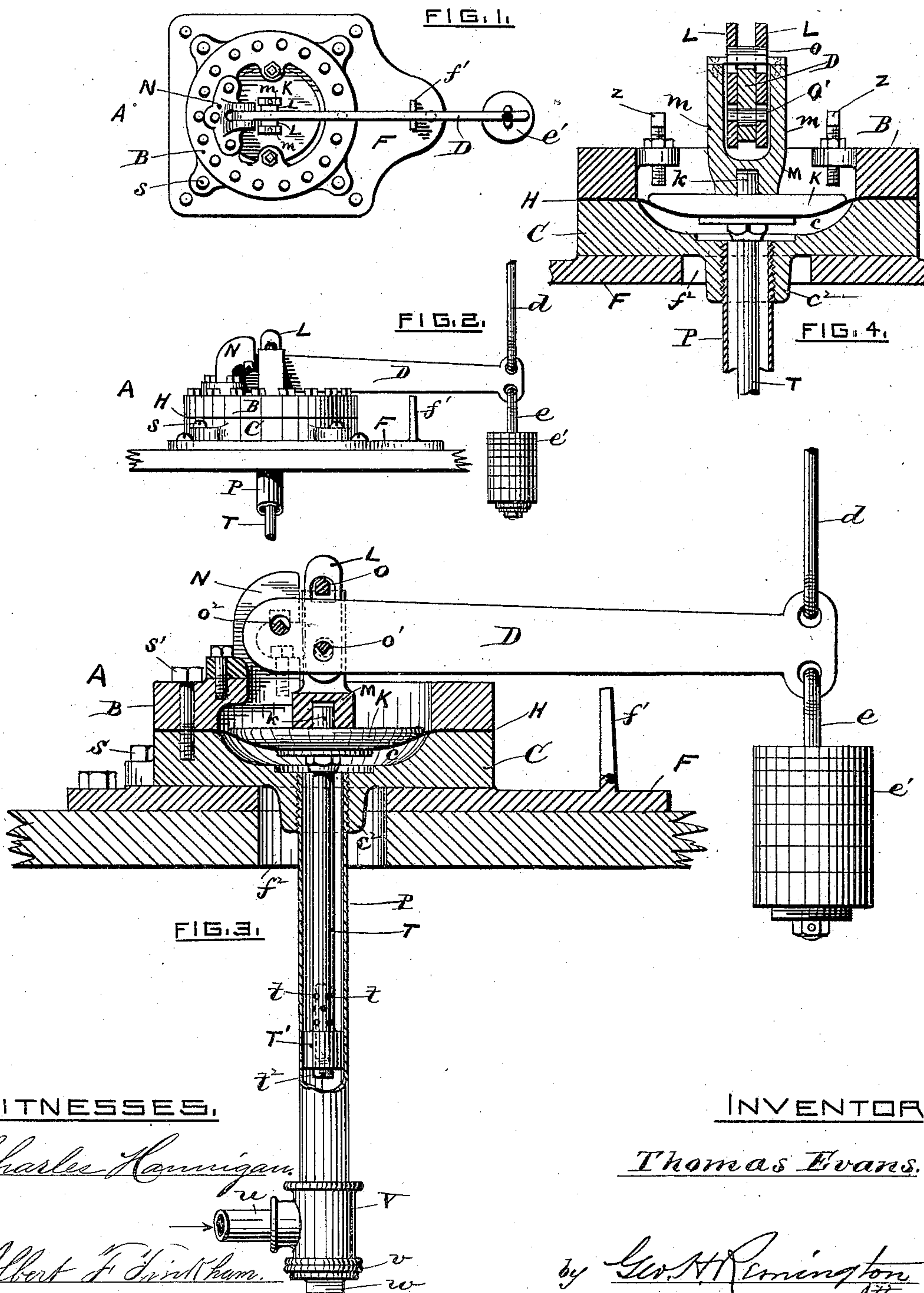


(No Model.)

T. EVANS.
DAMPER REGULATOR.

No. 310,569.

Patented Jan. 13, 1885.



WITNESSES,

Charles Hannigan

Albert F. Fishburn

INVENTOR

Thomas Evans.

by *Geo. H. Remington*
Atty.

UNITED STATES PATENT OFFICE.

THOMAS EVANS, OF PROVIDENCE, RHODE ISLAND.

DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 310,569, dated January 13, 1885.

Application filed July 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS EVANS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Damper-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to steam damper-regulators adapted to automatically control by means of steam-pressure the position of the damper in the flue leading from the furnace to the chimney; and it consists, essentially, of a piston working in a tube having a small area, and mounted on a rod provided with orifices through which water can escape, and means for adjusting its flow, said rod being connected with a head or disk and diaphragm of large area.

My invention further consists in the peculiar manner of connecting the weight-lever with the diaphragm and piston, whereby the latter, in its tube, is adapted to move and guide said diaphragm in a true plane, all as will be more fully hereinafter set forth.

The object of my invention is to connect the diaphragm with the weight-lever, whereby the area of the diaphragm acted upon by the water-pressure will be the same at any point or position within its limit of motion.

Heretofore, so far as I am aware, such damper-diaphragms have been unprovided with means for guiding and steadying them; consequently they frequently became impaired or were rendered inoperative, owing to their angular or cramped position, and also necessitating new diaphragms.

My invention aims still further to overcome the unsteady and irregular action of the diaphragm when in use under pressure. This I am enabled to do by means of the perforated piston-rod and its adjusting-screw, before alluded to.

In the accompanying sheet of drawings, Figure 1 represents, in reduced scale, a top

view of the device embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal central section, enlarged; and Fig. 4 is a partial transverse section.

The following is a detailed description of my invention, including the manner of its operation:

F in the drawings represents the base or plate adapted to be secured to a shelf or other suitable support.

C is a circular plate having the cavity or depression c and downwardly-projecting hub c^2 . This plate is secured to the top of the base F by screws or bolts s . An annular ring, B, is secured to the top of said plate C by bolts s' . This joint also serves to clamp the diaphragm H in position. (See Fig. 3.) Secured to and above said diaphragm is the disk K, having a short central stem, k , projecting from its upper surface. A forked holder, M, is adapted to loosely receive said stem and rest upon the disk. The sides $m m$ of the holder extend upwardly, and are united at the top by the knife-edge tie o .

B is the weighted lever, fulcrumed at o^2 to the casting or projection N of the ring B. Said lever is provided with the knife-edge piece o' , located above the center of the disk and projecting from each side of the lever, for the purpose of connecting with the short links L. The outer end of the long arm of the lever is adapted to connect with a rod, d , the latter in turn being connected with the damper, as is common.

Secured to the hub c^2 is the pipe or tube P, which extends downwardly and terminates in the T V. A piston, T', is loosely fitted within said tube and secured to the rod T, the lower end of said rod being hollow and provided with perforations t above the piston, and further provided with a screw, t^2 , or other suitable device for adjusting and controlling the admission of water within the tube over the piston, a removable plug, w , rendering the screw t^2 accessible for the purpose. The upper end of the piston-rod is secured to the disk K, as fully shown. It is evident that as the lever D, which is fulcrumed at o^2 , is connected by means of links L, bearings $o o'$, and holder M, any pressure acting against the under side of the diaphragm H will be transmitted

through the disk K and said holder to the bearing o, &c.

The following is the manner of operating my invention: In this, as in most other steam-dampers, a small steam-pipe leads from the boiler above the water-line to the regulator. In my invention such steam-pipe *u* terminates in the T V at the end of the tube P. Having approximately weighted the lever to correspond to the steam-pressure in the boiler, I now allow the steam (condensed) to enter the pipe *u*, and thence through the rod T into the pipe P and chamber *c*, completely filling the space. If, now, the lever is unsteady or vibrating rapidly, as it might be in case the boiler is furnishing steam for an engine, I remove the plug *w* and turn the screw *t*² to partially close the opening into the rod T, thereby retarding the passage of water therein and resulting in a steadier movement of the lever. At the same time the piston serves to guide the disk *k*, so that as the latter changes its position it will move true and vertical and present a uniform diaphragm area to be acted upon by the water. If, now, from any cause the pressure in the boiler should be lowered a pound or so, such decrease will be gradually followed by a proportionate falling of the weight *e'*, and the consequent opening of the damper, until the recovery of the pressure, which, reacting upon the diaphragm, returns the damper to its normal position. The adjustable stops *z* of the ring B serve to limit the lift of the disk *k*, and prevent undue pressure or tension upon the diaphragm. A stop, *f'*, which may also be adjustable of the base F, serves to support the lever D when not in use or before the requisite pressure is obtained in the boiler. If at any time the pipe *u* should burst or otherwise allow the pressure therein to be suddenly lowered, such accident would not react seriously upon the damper-regulator, as the contracted opening through the rod and screw *t*² serves to prevent the free escape of the water contained in the tube above the piston.

I am of course aware that damper-regula-

tors provided with a diaphragm and disk and its corresponding chamber, *c*, have been used before, the water in such cases being admitted direct to the chamber, and I also am aware of the existence of Funck's patent, No. 258,639, showing a stand-pipe, &c., in combination with a damper-regulator, and therefore do not claim such construction, broadly; but

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

1. In a damper-regulator having a recessed base, a diaphragm with its disk, and means for connecting the same with the weight-lever, the combination therewith of the tube P, secured to said base, provided with a piston secured to the rod T, working in said tube, and means, substantially as described, for admitting and adjusting the flow of water or other liquid within the tube.

2. The combination, in a damper-regulator provided with a depending tube inclosing a piston and rod attached to the diaphragm, of the lever D, fulcrumed and connected by means of links L and holder M, substantially as shown and described, whereby the disk *k* is adapted to move in a vertical line.

3. In a damper-regulator provided with the tube P and perforated rod T, the loosely-fitting piston T', having an adjusting-screw, *t*², whereby the water or other liquid is contracted in its passage to and from the diaphragm-chamber, substantially as shown, and for the purpose set forth.

4. The damper-regulator herein described, consisting of the base F; chambered plate C, annular ring B, provided with stops *z* and fulcrum-support N, in combination with the diaphragm H, disk K, holder M, and lever D, mounted as shown, and means, as described, for admitting water under the diaphragm into the chamber *c*, as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS EVANS.

Witnesses:

GEO. H. REMINGTON,
CHARLES HANNIGAN.