

D. C. KELLEEM.  
 Damper-Regulator for Furnaces.

No. 214,507.

Patented April 22, 1879.

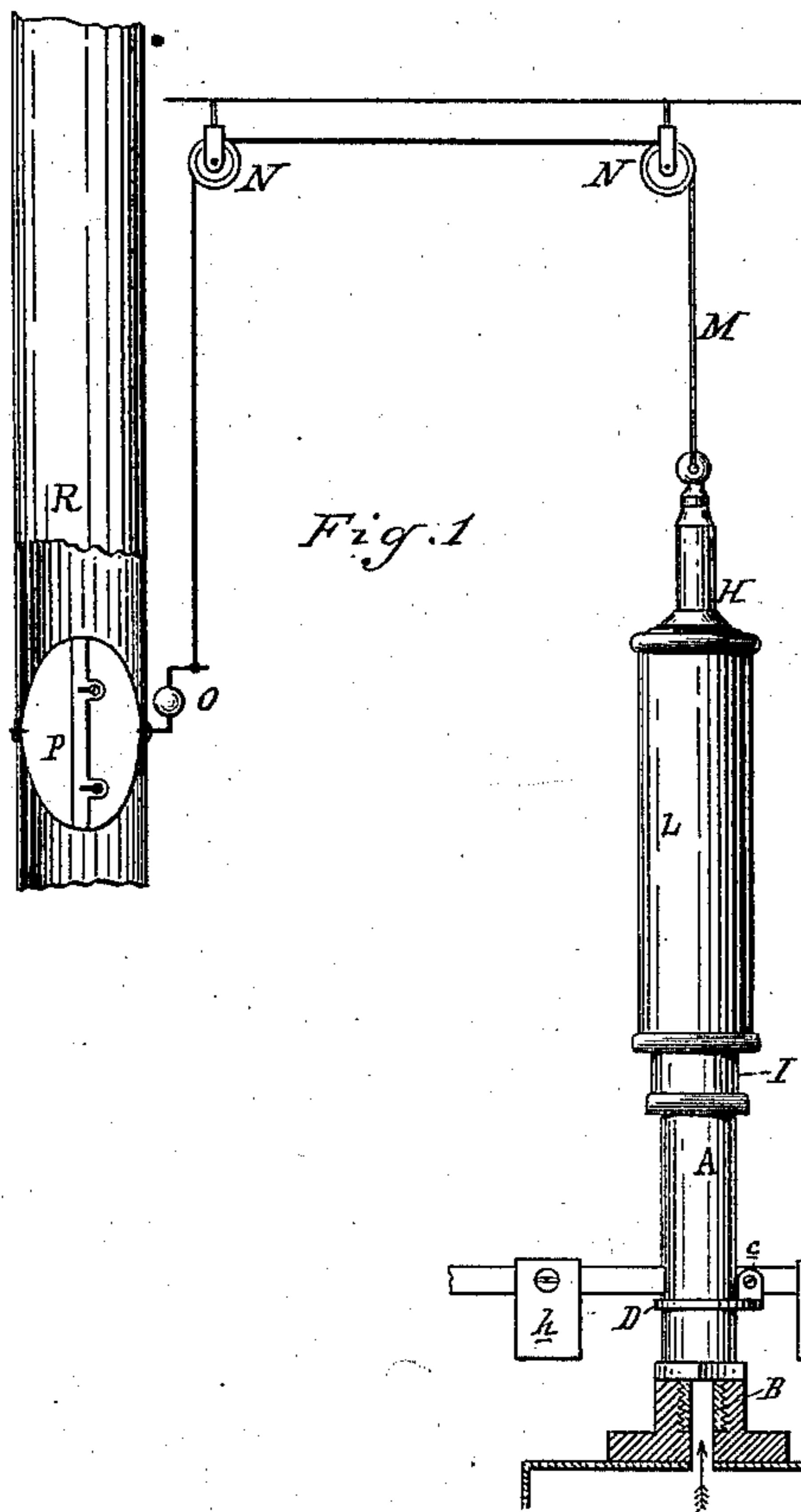


Fig. 1

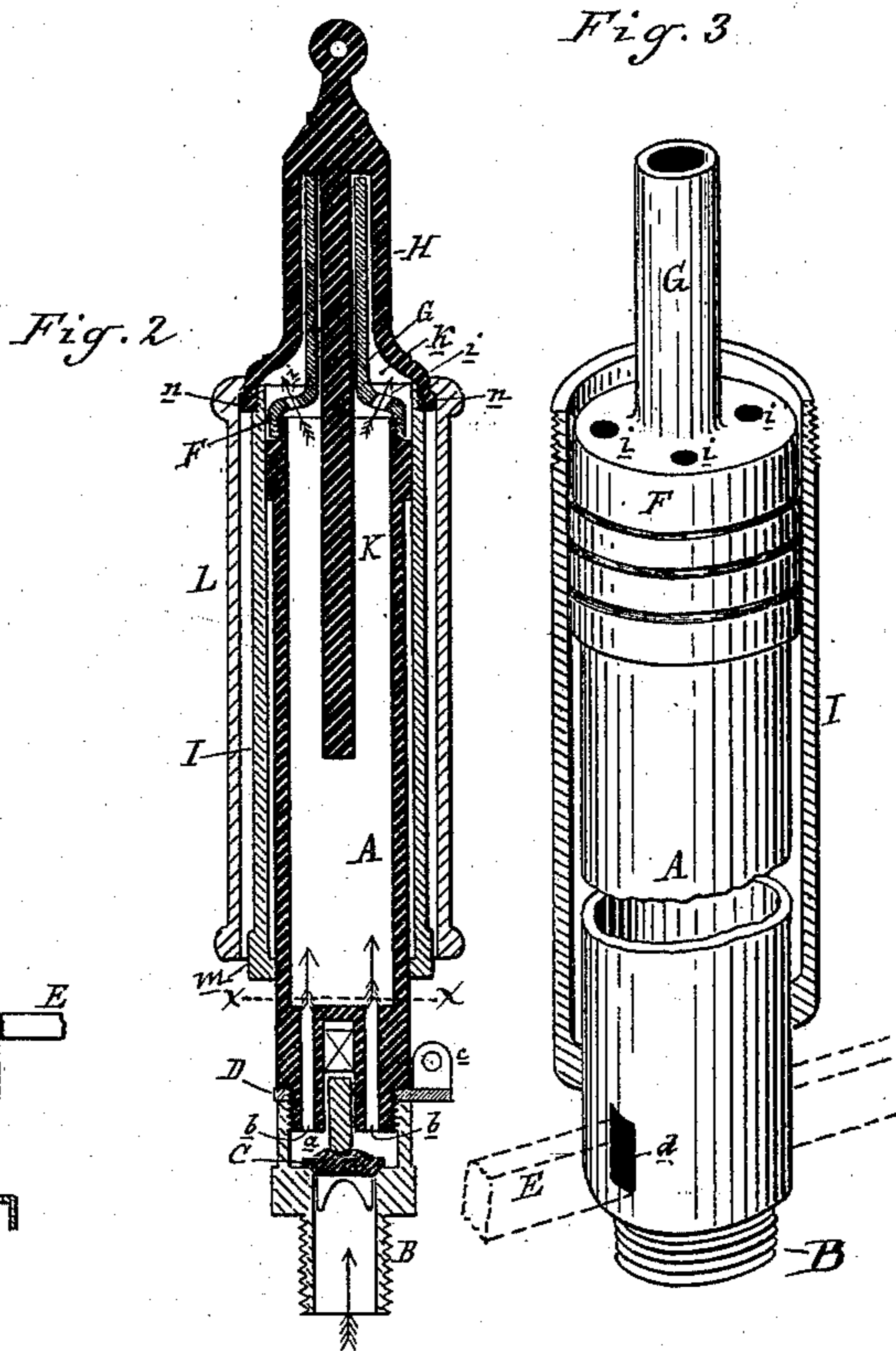


Fig. 2

Fig. 3

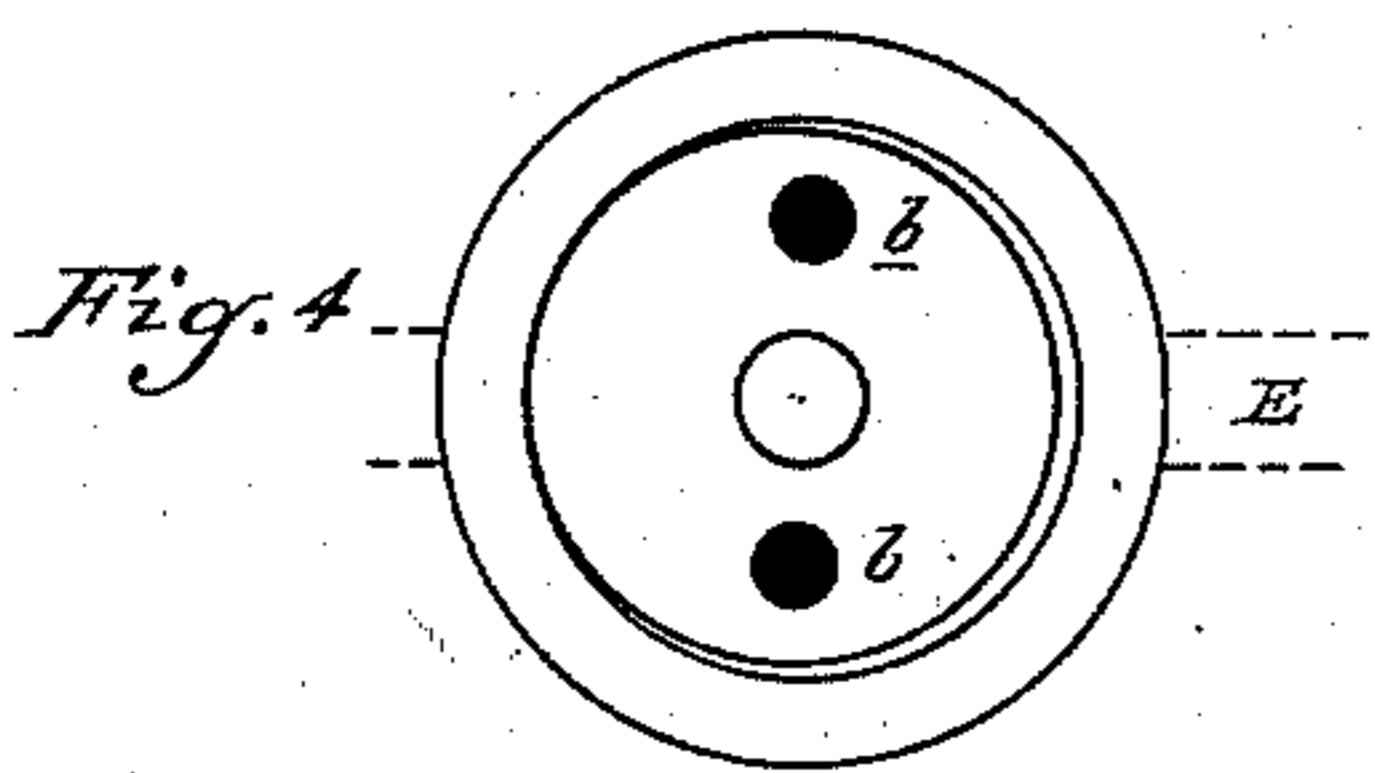


Fig. 4

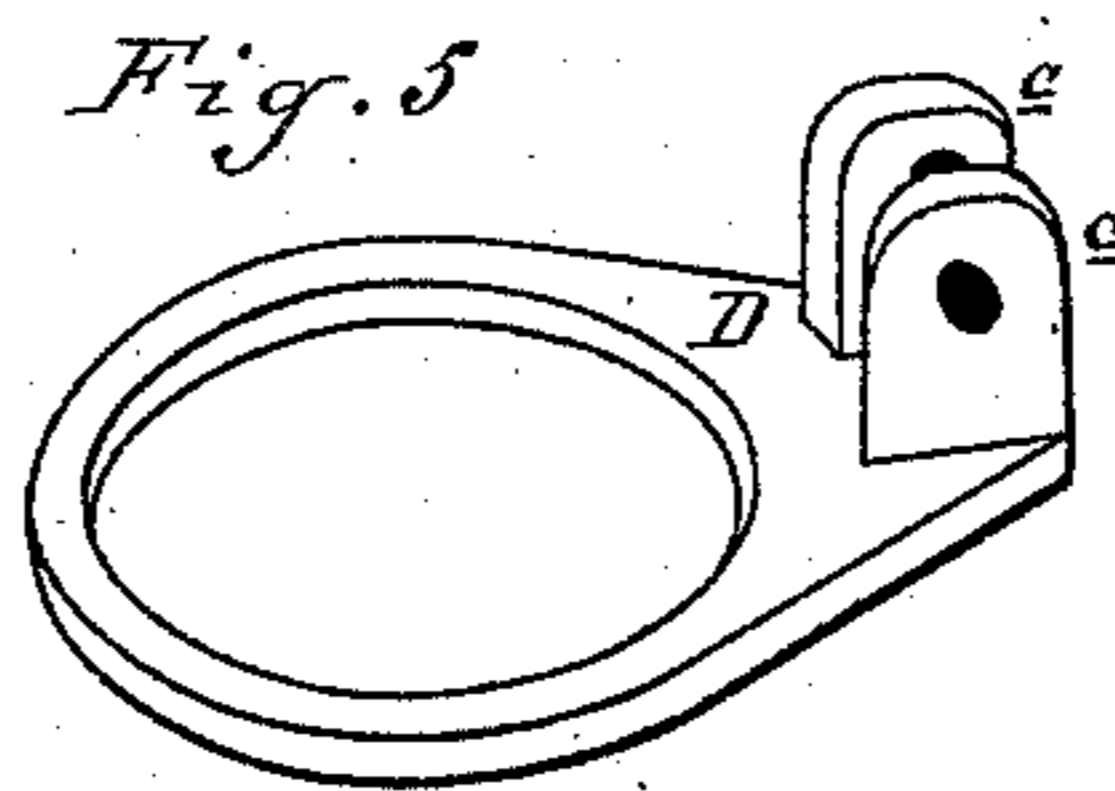


Fig. 5

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# UNITED STATES PATENT OFFICE.

DANIEL C. KELLEM, OF DETROIT, MICHIGAN.

## IMPROVEMENT IN DAMPER-REGULATORS FOR FURNACES.

Specification forming part of Letters Patent No. **214,507**, dated April 22, 1879; application filed December 27, 1878.

*To all whom it may concern:*

Be it known that I, DANIEL C. KELLEM, of Detroit, Wayne county, Michigan, have invented an Improvement in Damper-Regulators for Furnaces, of which the following is a specification.

The nature of my invention relates to certain new and useful improvements in the construction of devices for regulating the dampers of boiler-furnaces by means of the steam-pressure in the boilers, and is more especially designed to be an improvement upon a device for a similar purpose as patented to me May 1, 1877, Patent No. 190,336.

In the drawings, Figure 1 is an elevation, showing my device as applied to the damper-valve in a smoke-stack. Fig. 2 is a vertical central section. Fig. 3 is a sectional perspective of the hollow piston and cylinder. Fig. 4 is a cross-section on the line *x x* in Fig. 2. Fig. 5 is a detached perspective view of the ring to which are attached the ears which form the fulcrum of the lever.

In the drawings which form a part of this specification, A represents a hollow cylindrical piston, terminating at its lower end in a threaded pipe, B, by means of which the device is screwed into the dome, safety-valve, or steam-space of a steam-generator. This pipe B affords communication between the interior of the boiler and the chamber *a* in the bottom or lower end of the steam-cylinder piston A. Above the chamber *a* this piston is solid for a short distance, as shown in Fig. 2, except the small ports *b*, which allow the steam to pass from the chamber *a* into the hollow piston proper. A valve, C, is seated in the chamber *a*, to cut off or admit a flow of steam through the pipe B, the stem of said valve having a vertical throw or play in a correspondingly-shaped hole drilled into the solid part of the piston between the ports *b*. Sleeved on said solid part of the hollow piston is a ring, D, to which are secured the ears *e*, in which is fulcrumed the lever E, which passes through the slot *d* above the end of the valve-stem. Adjustably secured upon this lever are the weights *h*. To the upper end of this hollow piston there is secured the cap F, terminating in the tube G.

The cap is provided with a number of small ports or openings, *i*, which allow the steam to

pass into the chamber *k*, which is formed by the cap H, which screws onto the top of the cylinder I, which incloses said hollow piston, the said piston and cylinder being so arranged as to be steam-tight except through the ports hereinbefore mentioned. From the top of the cap I there is suspended a guide-rod, K, which passes down through the tube-extension G of the cap F.

L is an outer cylinder, inclosing the cylinder I, and sufficiently large to leave a dead-air space between the two cylinders for the purpose of preventing a too rapid condensation of steam, as would be the case if the cylinder I were not thus inclosed. This outer cylinder has an inwardly-projecting flange at top, and rests upon the outward-projecting flange *n* of the cap H, and the lower end of this cylinder rests against the outwardly-projecting flange *m* around the bottom of the cylinder I.

In practice, the pressure of steam in the boiler being required to be kept at a uniform height, the weights on the lever are so balanced that an excess of such pressure, acting upon the valve in the chamber *a*, will cause its stem to raise the longer arm of the lever, allowing the steam to pass into the hollow piston through the ports *b*, and out of the same, through the ports *i*, into the chamber *k*, exerting its pressure upon the cap H, thereby raising the cylinder I, with its outer cylinder, L, and slacking upon the chain M, which passes over the pulleys N to the crank-shaft O of the damper P in the smoke-stack R. The greater the pressure of steam the higher within its limit will the cylinders be forced up until the damper is entirely closed, thereby checking the fire in the furnace until the steam is reduced to the proper pressure. When this is attained the weight of the cylinders will overcome the friction between the hollow piston and the cylinder I, and fall to their original position, allowing the lever to depress the valve-stem and close the opening through the tube B, the damper opening gradually as the cylinders fall. The steam left in the cylinder I will gradually condense, and the water of condensation will pass out between the bottom of the cylinder and the piston by its own gravity. Although described as acting upon

the damper in a smoke-flue, it may be employed with suitable connections to act upon the door in the ash-pit of the furnace to keep the pressure of steam within the given limit.

What I claim as my invention is—

1. In a damper-regulating device, and in combination therewith and with a pipe communicating with a steam-generator, and provided with a valve and hollow piston, A, having ports *b*, affording communication for the steam to pass into the hollow piston A, the movement of said valve being controlled by the weighted lever E, substantially as described.

2. In combination with a damper-regulating device, the hollow piston A, into which steam is admitted, as described, and with the cylinder I and cap H, chamber *k*, the ports *i*, through which steam is admitted from the hollow piston into the chamber *k*, substantially as and for the purposes set forth.

3. In combination with a damper-regulating

device, the cap H of the cylinder I, the guide-rod K, passing through the tube-extension G of the cap F of the hollow piston A, as described.

4. In a damper-regulating device, the outer cylinder, L, in combination with the cylinder I and its cap H, and with the hollow piston A, substantially as and for the purposes set forth.

5. A damper-regulating device consisting of the hollow piston A, pipe B, chamber *a*, enclosing a valve, C, the ports *b*, the ring D, provided with lugs or ears *c*, the lever E, fulcrumed thereto, the cap F, tubular extension G, cylinder I, chamber *k*, ports *i*, guide-rod K, and incasing-cylinder L, the parts being constructed, arranged, and operating substantially as described.

DANIEL C. KELLEM.

In presence of—

CHAS. J. HUNT,  
H. S. SPRAGUE.