F. P. WEAVER & E. L. CHEYNEY.

Automatic Governor for Furnace.

No. 219,421. **Patented Sept. 9, 1879.**

Fig. 1.

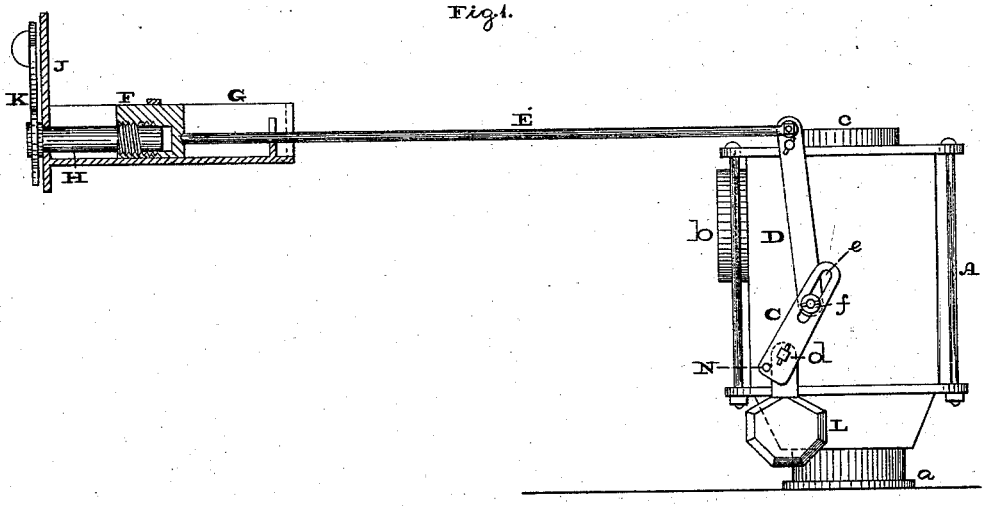


Fig. 2.

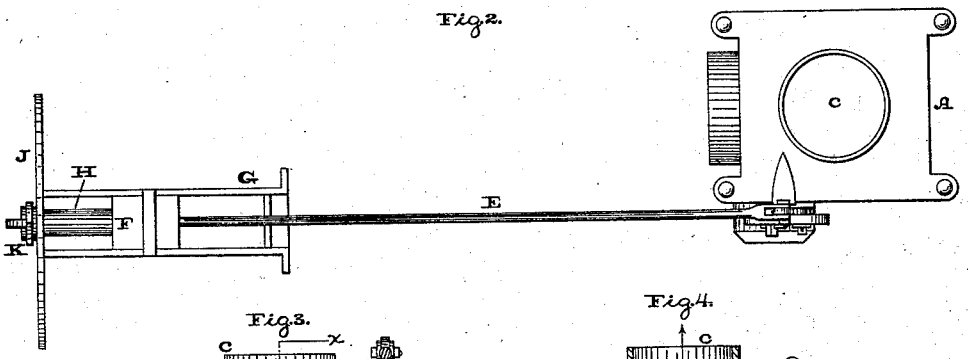


Fig. 3.

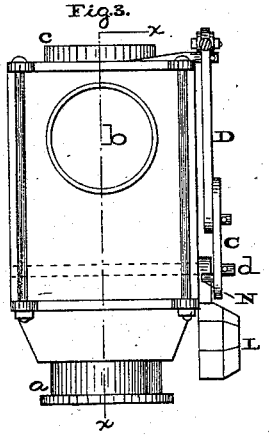


Fig. 4.

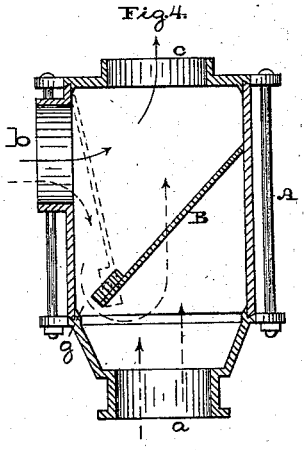
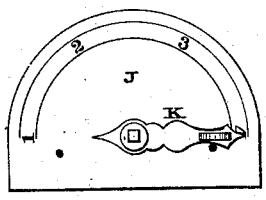


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK P. WEAVER AND EDWARD L. CHEYNEY, OF PHILADELPHIA, PA.

IMPROVEMENT IN AUTOMATIC GOVERNORS FOR FURNACES.

Specification forming part of Letters Patent No. **219,421**, dated September 9, 1879; application filed June 28, 1879.

To all whom it may concern:

Be it known that we, FRANK P. WEAVER and EDWARD L. CHEYNEY, both of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Automatic Governors for Hot-Air Furnaces, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a side elevation of the governor embodying our invention. Fig. 2 is a top or plan view thereof. Fig. 3 is a side elevation of a portion thereof. Fig. 4 is a vertical section of the same in line *x x*. Fig. 5 is a face view of the dial employed.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to automatic governors for furnaces which are operated by the expansion and contraction of a metal rod, and provided with devices for regulating its action and for indicating the degree of such adjustment.

The nature of said invention consists in the improvements hereinafter particularly set forth, and pointed out in the claims.

Referring to the drawings, A represents a box or chamber, which is provided with a collar, *a*, at bottom for entrance of fresh air, a collar, *b*, at one side or face for attachment to the pipe leading from the combustion-chamber, and a collar, *c*, at top for communication with the exit-flue or chimney.

B represents the damper, whose axis or axial shaft *d* is at the bottom thereof, so that the upper end of the damper is adapted to swing toward and from the collar *b*. The axis *d* is mounted on the sides of the box A, and one end projects outside of the box, and has secured to it a lever, C, whose upper end is slotted, as at *e*, and loosely connected to another lever, D, by means of a screw or pin, *f*, which, fixed to said lever D, enters the slot *e* of the lever C. The upper end of the lever D is pivoted to the box A at or near the top thereof, and has pivoted to it a tube or rod, E, which is located within the hot-air chamber of the furnace, and formed of metal of highly-expansible nature.

F represents a movable nut, which is mounted on a box or guide, G, suitably supported on a part of the furnace, and one end of the tube or rod E is adapted to abut against said nut without being necessarily secured to it. To the nut is fitted, by a threaded connection, a rod, H, one end of which is passed through a dial, J, or other support, and has fixed to it an index, K, which serves to rotate the rod H. Suspended from and fixed to the projecting end of the shaft or axis *d* of the damper is a compensating-weight, L, whose upper end is adapted to bear against a pin, N, on the lower end of the lever C. The axis or shaft *d* of the damper B is set back from the adjacent wall of the box A, so as to leave a space, *g*, between said wall and the lower end of the damper, as seen in Fig. 4, whereby, when the damper is completely closed, as shown by the dotted lines in said figure, the space *g*, remaining open, provides a small passage for the products of combustion. Furthermore, soot and other matters deposited in the box A or against the damper will be directed to the space *g*, and thus escape to and through the collar *a*, whereby the box and damper are readily cleared of said matters. The normal position of the damper is shown in Fig. 4.

The nut F is set by means of the threaded rod H, the rotation whereof by the index K causes the nut to move toward or from the end of the rod, thus increasing the degree of pressure thereon, and regulating the extent of expansion and contraction of the operating end of the rod, and adjusting the play of the damper B.

The heat of the hot-air chamber of the furnace causes the expansion of the rod E, and the compound levers D C are operated thereby, whereby the damper closes toward the collar *b*, and a quantity of fresh air is admitted at the collar *a* into the box A, and thence to the flue or chimney through the collar *c*, the draft being checked. Should for any reason the heat further increase, the rod E will expand to a greater extent, and a larger volume of fresh air will be admitted to the flue or chimney, thus further checking or retarding the fire.

Should there be a decrease of heat in the hot-air chamber of the furnace, due to the low state of the fire, the rod E contracts and allows the lever D and connected lever C to op-

erate in such manner that the damper is opened from the collar *b* and closed toward the opposite wall of the box A, thus opening the damper and decreasing the entrance of fresh air to the chimney and causing the fire to burn with little or no retarding action of such air. The return motion of the damper B to its normal position is assisted by the action of the weight L.

Should the damper be closed to its full extent, the space between the bottom of the damper and adjacent wall of the box provides a sufficient outlet for the products of combustion.

The dial J will have characters or graduations marked thereon for setting the nut F by means of the index J relatively to the nature of the weather, character of the fire, size of the furnace, &c.

The damper B possesses a large sweep and operates without abruptness in its movements.

We are aware that it is not new to regulate the action of a damper-governing rod by applying screw-pressure to the non-operating end thereof, so as to vary the degree of elongation and contraction of the operating end thereof under the effect of changes of temperature, and therefore we do not broadly claim the same; nor do we claim, broadly, an indicator applied to show the degree of such compression, that also being old; but

What we do claim is—

1. In combination with damper B, levers C D, and rod E, the compressing-block F, said rod being arranged within the furnace, so as to be expanded by the heat thereof, such expansion operating to close the damper, and said block being forced against the end of said rod and there held by an adjusting device.

2. In combination with a guide-frame, G, having a dial-face, J, an expansible rod, E, a recessed screw-threaded block, F, said block being separate from said rod, working in said frame against the end of said rod E, and a threaded rod, H, bearing index K, whereby block F may be forced inward or drawn outward at will.

3. In combination with expansible rod E and levers C D, the casing A and damper B, said damper being pivoted at one end in said casing, and arranged so as to leave a small draft-passage, *g*, even when said damper is closed.

4. The damper B, pivoted to the box A, and having its axis set back, leaving the space *g* between said axis and the adjacent wall of the box, substantially as and for the purpose set forth.

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