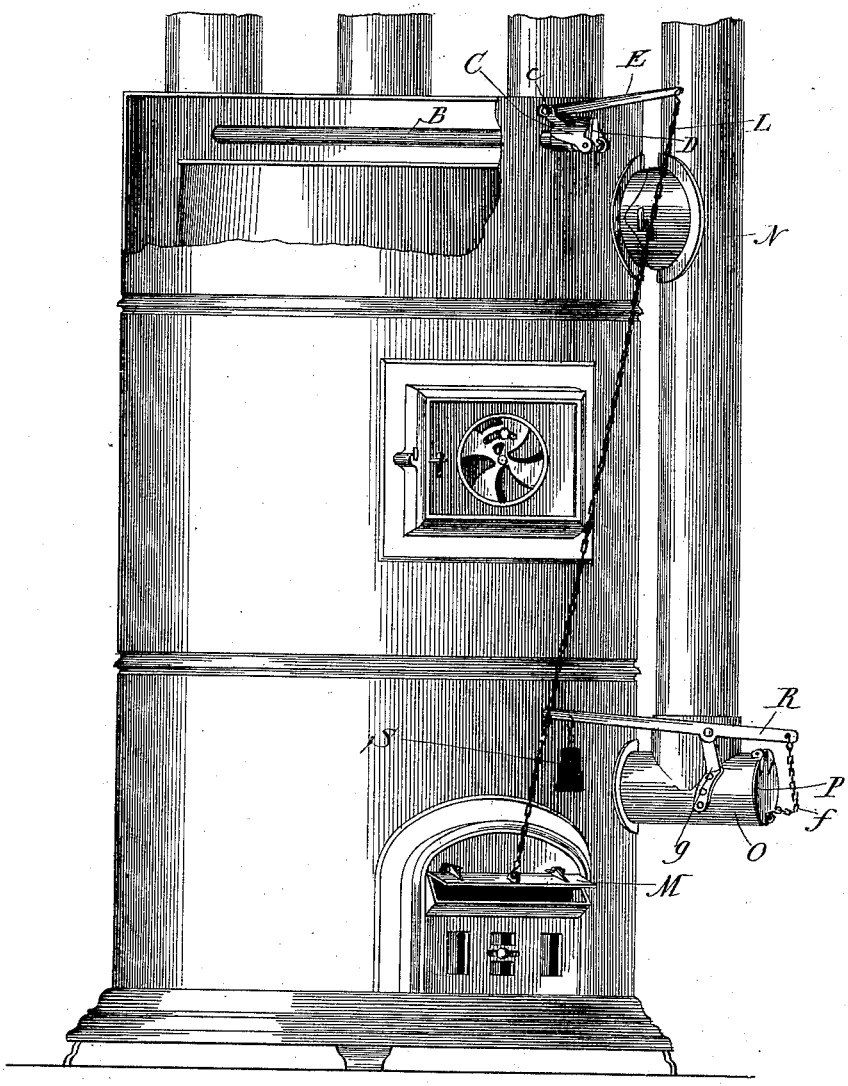
(No Model.) 2 Sheets—Sheet 1.

J. R. BARKER.

DRAFT REGULATOR FOR HOT AIR FURNACES.

No. 344,559. Patented June 29, 1886.

Fig. 1.



Witnesses:
Frank L. Blanchard
Howard Hallock

Inventor:
John R. Barker
By Wm. H. Lo[illegible] & Co.
Attorneys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

J. R. BARKER.

DRAFT REGULATOR FOR HOT AIR FURNACES.

No. 344,559. Patented June 29, 1886.

Fig. 2.

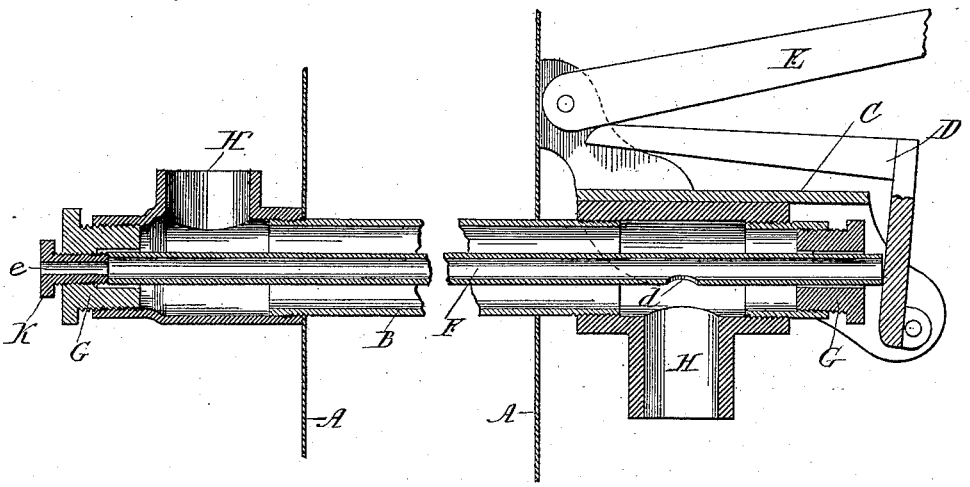


Fig. 3.

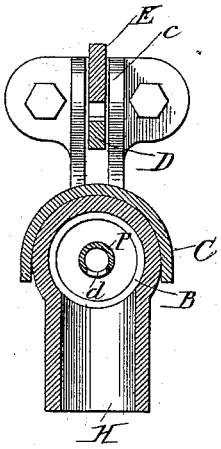
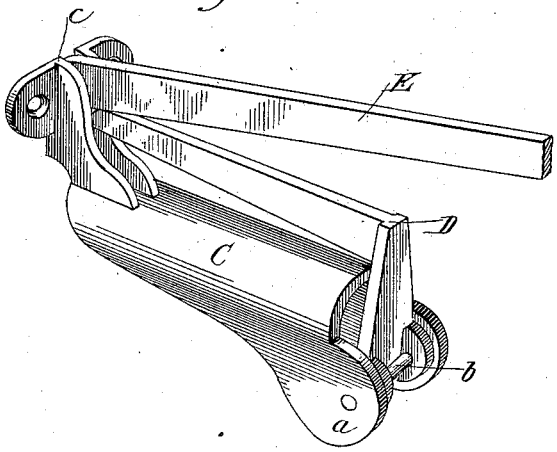


Fig. 4.



Witnesses:
Frank S. Blanchard
Howard Wallock.

Inventor:
John R. Barker
By Wm. A. Toby & Co.
Attorneys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHN R. BARKER, OF CHICAGO, ILLINOIS.

DRAFT-REGULATOR FOR HOT-AIR FURNACES.

SPECIFICATION forming part of Letters Patent No. 344,559, dated June 29, 1886.

Application filed September 1, 1885. Serial No. 175,898. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. BARKER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Draft-Regulators for Hot-Air Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention is an improved furnace-governor.

The object of the invention is to provide automatic means for regulating the heat in furnaces; and to the accomplishment of that end the invention consists of certain novel devices and combinations of devices, as will be described and claimed.

Reference will be made to the accompanying drawings, in which Figure 1 is a view of a furnace with the invention applied; Fig. 2, a longitudinal section through the governor; Fig. 3, a cross-section thereof, and Fig. 4 a detail perspective of parts.

Like letters refer to like parts in each view.

A represents a furnace of any suitable construction. Through the walls of furnace A there is passed a pipe, B, which protrudes out beyond said walls at both ends, and which is so situated as to occupy a position within the hot-air chamber of the furnace.

Pipe B is formed of any suitable material which will expand under the action of heat, the object of which will be explained.

Mounted upon one end of pipe B outside of the furnace is a casting, C, preferably semicircular in shape, to adapt it to fit snugly around the pipe. At one end casting C is formed with lugs or ears *a*, in which a rod, *b*, has bearings. Mounted loosely upon rod *b* is a lever, D, which extends vertically a certain distance and then continues horizontally the length of casting C, the free end of such lever occupying a position directly beneath the inner end of a lever, E, mounted between suitable ears, *c*, formed at that end of casting C, such ears being provided with suitable extensions, through which bolts or screws are passed to secure the device to the furnace-wall.

It will be understood that casting C although mounted upon pipe B is independent thereof, and further, that the vertical branch of lever D occupies a position directly in front of one end of said pipe.

Situated within pipe B is a second pipe, F, resting at each end in passages formed in plugs G, screwed into the ends of pipe B, such passages being sufficiently large to allow of a free movement of pipes B and F independent of each other.

At that end of pipe B upon which casting C is mounted an air-inlet, H, is provided, and at the opposite end an air-outlet, H'.

Pipe F is provided with an opening, *d*, directly above inlet H, the air admitted therethrough being allowed to escape through a passage, *e*, formed in a regulating screw or plug, K, to be referred to. By the arrangements of parts last above described, it will be understood that while pipe B is so exposed to the action of the heat that it will expand or contract, as the case may be, pipe F will always be subjected to a cool-air current which will prevent any variation therein.

In Fig. 2 I have shown the parts in the positions they will occupy when the pipe B not being acted upon by any great heat will be contracted. As therein shown, one end of pipe F protrudes out beyond its supporting-plug, and contacts with the vertical arm of lever D, thereby forcing the horizontal arm of such lever upwardly and through its medium or elevating-lever E, the opposite end of said pipe resting against the plug at the opposite end. Now, as the heat in the furnace gradually increases, the pipe B will expand, and the support or brace formed for the pipe F being gradually withdrawn, when, as this takes place, the weight of lever D will force the pipe F in the same direction, the horizontal arm of such lever being thereby lowered and the support removed from lever E, which will likewise be lowered. To the outer free end of lever E there is fastened one end of a chain, L, which at its lower end is secured to a draft-door, M, as clearly shown in Fig. 1. From the representation made in that figure it will be seen when the lever E is at its highest point (which, as described, is when pipe B is contracted) it will draw the door M open, creating a draft in the furnace. When the lever is lowered by the expansion of pipe B, the door is gradually closed and the draft shut off.

N represents the smoke-stack, which is continued downwardly and communicates with a branch pipe, O, which opens into the outer air. The end of branch O is, however, closed by a hinged cover, P, secured to which is a chain, *f*, the opposite end of which is attached to one end of a lever, R, pivoted in a support, *g*, mounted upon said branch O. The opposite end of lever R is attached to the chain L, as is clearly shown in Fig. 1, and is provided, preferably, with a weight, S.

By the arrangement of parts as described it will be seen that when the lever E occupies the position shown in Fig. 1 that end of lever R which is attached to chain L will be slightly elevated, and the hinged door or cover P closed to prevent the admission of air to branch O. When, however, the tension is removed from chain L, the weight S will act to lower its end of lever R, and thereby gradually open cover P, thus admitting an air-current to branch O, and through it to smoke-stack N, and thus providing additional means for checking the draft. The object of the adjustable screw or plug K is to determine the exact position of pipe F with respect to lever D, and thereby determine the amount of expansion necessary to operate the parts.

I am aware that various devices have been used whereby the dampers of a furnace have been opened and closed automatically through the medium of the expansion or contraction of hot air; but I lay no claim to any such.

I am also aware that an expansible tube or pipe located in the hot-air chamber of a furnace has been used in connection with a solid non-expansible rod located therewithin, the pipe and rod together with suitable levers and other connections serving to operate a damper in a furnace, and I hereby expressly disclaim the use of such expansible pipe when combined with a solid non-expansible rod located therewithin; but

What I claim is—

1. The combination, with a hot-air furnace and with a pipe, B, located in the hot-air chamber thereof, of a pipe, F, located within pipe B, both pipes provided with air inlets and outlets, a draft-door for the furnace, and lever and chain connections between said pipes and door, as set forth.

2. The combination, with a hot-air furnace and a pipe, B, located in the hot-air chamber thereof and provided with suitable air inlet and outlet, of a perforated plug situated in one end of pipe B, a second pipe, F, located within pipe B and provided with an air-inlet, a draft-door for the furnace, and lever and chain connections between said pipes and door, as set forth.

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

JOHN R. BARKER.

Witnesses:

M. J. CLAGETT,

HOWARD HALLOCK.