

No. 629,489.

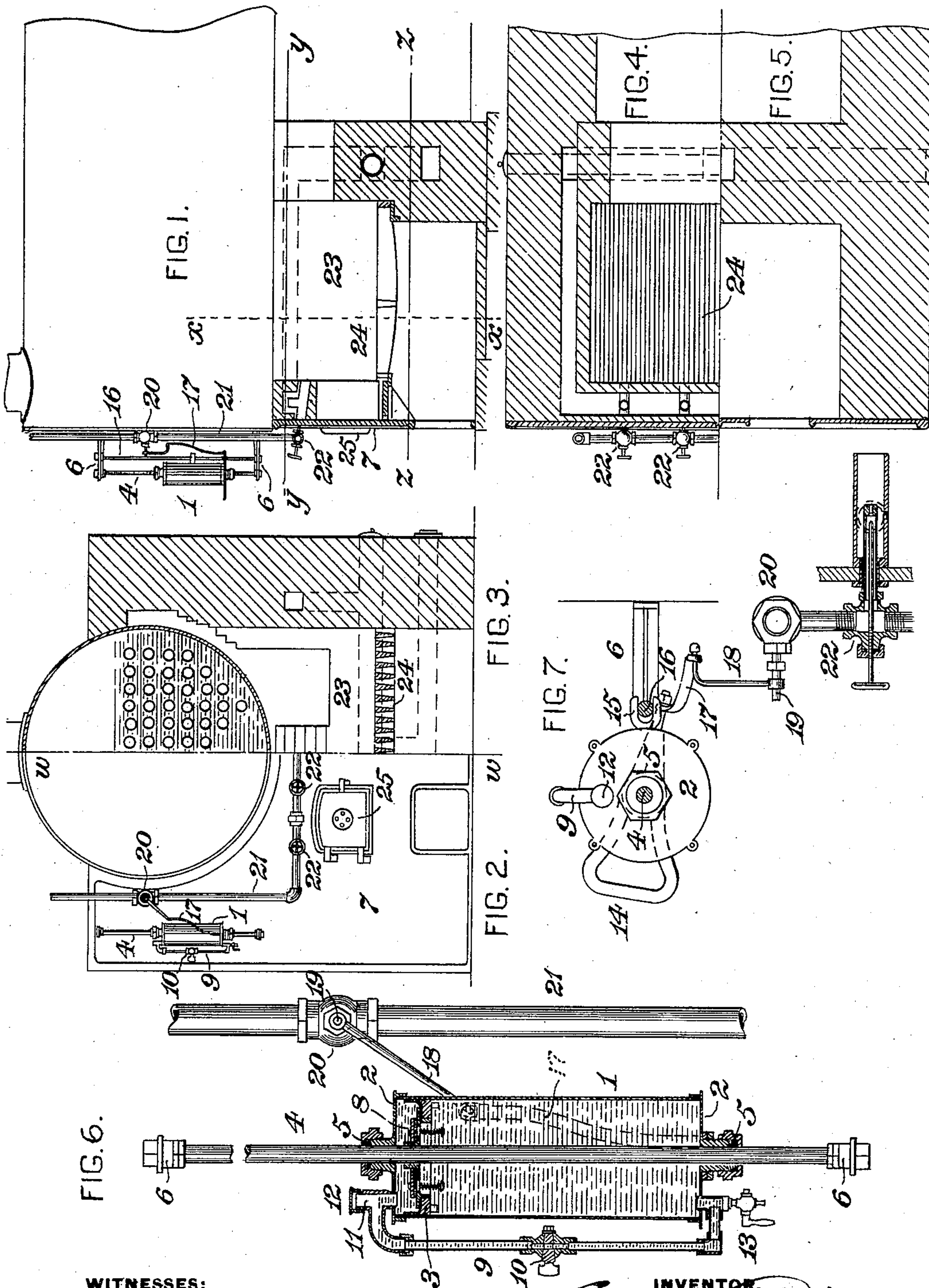
Patented July 25, 1899.

C. E. BRINEY.

VALVE REGULATOR FOR SMOKE CONSUMERS.

(Application filed May 23, 1899.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## VALVE-REGULATOR FOR SMOKE-CONSUMERS.

SPECIFICATION forming part of Letters Patent No. 629,489, dated July 25, 1899.

Application filed May 23, 1899. Serial No. 717,965. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. BRINEY, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Valve-Regulators for Smoke-Consumers, of which improvement the following is a specification.

My invention relates to means for automatically regulating the admission of steam and heated air above the grate-bars of a furnace during and immediately succeeding the periods in which fuel is supplied thereto in order that the delivery of steam and air to the furnace shall be effected in proper relation to the supply and combustion of the fuel.

The object of my invention is to provide a mechanism of such character which shall be readily applicable and effectively operative in connection with smoke-consuming furnaces of various constructions heretofore employed and which may be installed and maintained at comparatively slight cost and without liability to breakage or derangement of its parts in service.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical longitudinal section at the line *ww* of Fig. 2 through a steam-boiler furnace, illustrating the application of my invention in connection therewith; Fig. 2, a view in elevation of one-half of the fire-front thereof; Fig. 3, a transverse section at the line *xx* of Fig. 1; Figs. 4 and 5, half horizontal sections at the lines *yy* and *zz*, respectively, of Fig. 1; Fig. 6, a vertical central section, on an enlarged scale, through a valve-regulator embodying my invention; and Fig. 7, a plan or top view of the same.

My invention is herein exemplified as applied in connection with a steam-boiler furnace and steam and air feeding accessories of the construction set forth in Letters Patent of the United States No. 609,225, for improvement in smoke-consuming devices, granted and issued to me under date of August 16, 1898. It is not, however, limited in application to that or any other specific construction of air and steam furnace-feeding devices, and as these do not in and of themselves constitute any part of my present invention they will not be herein described further than is

necessary to explain their relation in operation to the mechanism of my present invention.

In the practice of my invention I provide a cylinder 1, which is closed at its ends by heads 2 2 and is fitted to slide freely in a vertical plane upon a piston 3, which is secured to a piston-rod 4, passing through stuffing-boxes 5 in the cylinder-heads and connected at its ends to arms or brackets 6, which are supported in any convenient relation to a furnace 22, preferably, as shown, by being secured to the fire-front 7 thereof. An upwardly-opening valve 8 (one or more) is fitted to work on and control an opening in the piston 3, and a release or by-pass pipe 9, in which is fitted a regulating cock or valve 10, leads from one end of the cylinder to the other, on the outside thereof. A supply-passage 11, having a removable cap or cover 12, leads into the upper end of the cylinder 1, and a discharge-cock 13 controls a passage leading from the lower end of the cylinder to the atmosphere.

The cylinder 1 is provided at or near its lower end with a handle 14, by which it may be raised or lowered as desired, and its circumferential movement about the axial line of the piston-rod is prevented by a recessed lug 15, fixed upon its outer surface and fitting a guide-rod 16, secured to the supporting-brackets 6 of the piston-rod. An operating-arm 17 is secured to the cylinder and projects therefrom in proper direction to be pivotally connected to an arm 18, secured upon the stem 19 of a steam-supply valve located in a casing 20 and controlling a pipe 21, through which steam is admitted to a plurality of air-injecting devices 22, which are herein shown as being of the construction set forth in Letters Patent No. 609,225 aforesaid, by which devices steam and air are delivered into the furnace 23 above the grate-bars 24 and fire-doors 25 thereof.

In the operation of a valve-regulating mechanism embodying my invention the piston-rod, piston, and cylinder are adjusted in proper operative relation, and the operating-arm 17 is coupled to the stem of the steam-supply valve, the arms 17 and 18 being so set that the supply-valves shall be fully open when the cylinder 1 is at or near the upper limit of



its range of traverse and closed to such extent as will admit the volume of steam, which is proper during the intervals between firing, when the cylinder is at the lower limit of its range of traverse. The cylinder 1 and by-pass pipe 9 are then filled with an incompressible liquid, as oil or water, and the regulating-cock 10 opened to a greater or less degree as desired. When either of the fire-  
 5 doors is opened to fire the furnace, the cylinder 1 is raised by its handle 14 to the upper limit of its range of traverse, the valve 8 in the piston 3 opening automatically and permitting all the liquid in the cylinder to pass  
 15 to the space above the piston as the cylinder is raised. When the cylinder is released, it gradually drops by its gravity and that of the contained liquid to its lowest position, coincidently and correspondingly closing the connected supply-valve, the period of the closing movement thereof being dependent upon and proportionate to the degree of closure of the regulating-valve 10, which controls the flow  
 20 of fluid from the upper to the lower side of the piston—that is to say, the more fully said valve is closed the longer will be the period during which the supply-valve is moved from its maximum to its minimum degree of opening, and vice versa. The adjustment of the  
 25 regulating-valve is effected by the fireman in accordance with the manner of firing and the character of the fuel employed.

The essential feature of structural novelty which distinguishes my invention from prior  
 35 constructions designed or adapted to effect the gradual and regulated closure of a steam-supply valve consists in the employment of a cylinder moving relatively to a fixed piston, by which means the weight of the cylinder  
 40 and the liquid contained therein is utilized as a motor and the special independent weights and their connections, which have been here-

tofore provided and which were necessary to that end in prior constructions, are dispensed with. The apparatus is not only thereby correspondingly simplified and reduced in cost, but is also of such character that power sufficient for actuating any desired number of valves may be afforded by correspondingly proportioning the volume of the cylinder. 45 50

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

1. In a valve-regulator for smoke-consumers, the combination, substantially as set forth, of a steam-supply valve, a piston-rod supported vertically adjacent to said supply-valve, a piston fixed upon said piston-rod, an upwardly-opening valve controlling an opening in the piston, a cylinder fitted to traverse on said piston and rod, a by-pass pipe connecting the opposite ends of the cylinder, a valve controlling said by-pass pipe, and an arm connected to the cylinder and to the steam-supply valve. 55 60

2. In a valve-regulator for smoke-consumers, the combination, substantially as set forth, of a steam-supply valve, supporting-brackets fixed to a fire-front adjacent to said supply-valve, a piston-rod and a guide-rod, each connected at its opposite ends to said brackets, a piston fixed upon said piston-rod, an upwardly-opening valve controlling an opening in the piston, a cylinder fitted to traverse on said piston and rod and having an external lug engaging the guide-rod, a by-pass pipe connecting the opposite ends of the cylinder, a valve controlling said by-pass pipe, an arm connected to the cylinder, and an arm connected to the supply-valve and coupled directly to the arm on the cylinder. 65 70 75

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Witnesses:

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