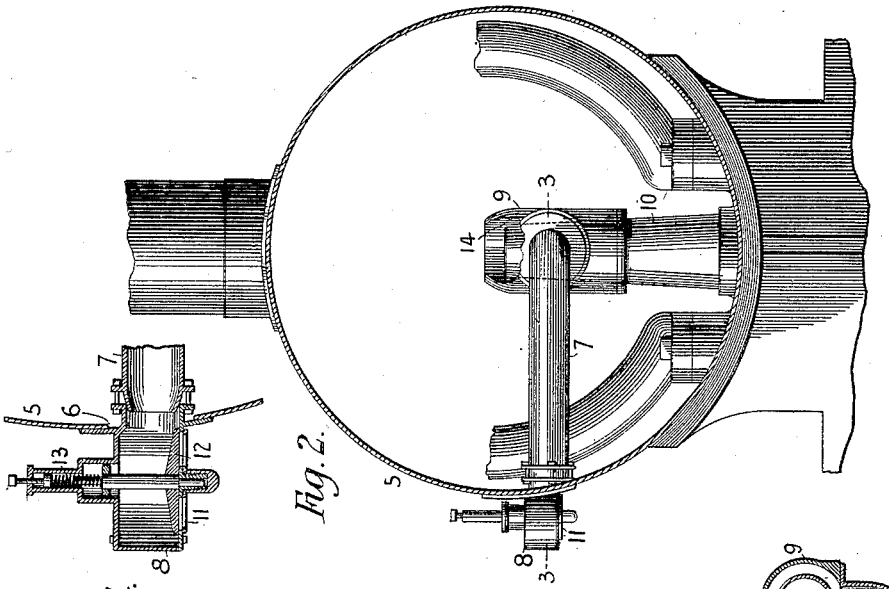
No. 676,959. Patented June 25, 1901.

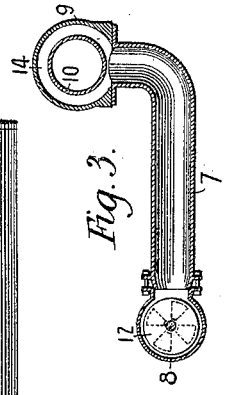
J. MILTON.

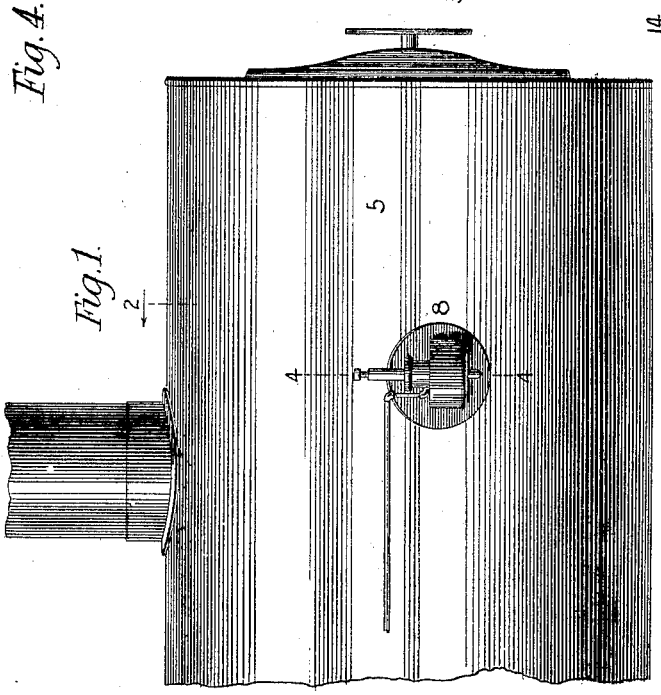
STEAM BOILER FURNACE.

(Application filed Oct. 11, 1900.)

(No Model.)







WITNESSES

S. E. Zimmerman

Arthur Browning.

INVENTOR

John Milton

By W. W. Dudley & Co

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN MILTON, OF WASHINGTON, DISTRICT OF COLUMBIA.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 676,959, dated June 25, 1901.

Application filed October 11, 1900. Serial No. 32,756. (No model.)

To all whom it may concern:

Be it known that I, JOHN MILTON, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Steam-Boiler Furnaces; and I do 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 the figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in the exhaust-regulating appliances which form the subjects-matter of Letters Patent numbered 590,846 and 631,528, issued to me September 28, 1897, and August 22, 1899, respectively, and of my application for patent, filed January 10, 1900, Serial No. 984.

My present invention contemplates the provision of means by which the air to counteract the effects of the exhaust is admitted immediately upon the creation of the exhaust, the means consisting of a special air passage or conduit interposed between the valve-controlled air-inlet and a chamber surrounding the exhaust-pipe, whereby the necessity existing in my former constructions of rarefying the entire body of air in the smoke-box or extension-front to effect the opening of the valve is entirely obviated, and many advantages additional to those possessed by the former appliances are obtained by reason of the fact that the employment of the new construction enables a considerable enlargement of the exhaust-nozzle.

For the purpose of illustration I have shown and described my present improvements in connection with the fluid-actuated valve-controlling means which forms the subject-matter of my application for patent above referred to; but it is to be understood that any other means capable of transmitting motion to the valve by movement of the stoking-door or independently of said door may be employed.

The nature of my present improvements will be readily comprehended, reference being had to the following detailed description and to the accompanying drawings, in which—

Figure 1 is a side elevation of the forward end of a locomotive-engine equipped with my invention. Fig. 2 is a vertical sectional view on line 2 of Fig. 1 viewed in the direction of the arrow. Fig. 3 is a horizontal sectional view on line 3 3 of Fig. 2. Fig. 4 is an enlarged vertical sectional view on line 4 4 of Fig. 1.

Referring to the drawings by numerals, 5 denotes the smoke-box or extension-front, in one side of which is an opening 6, receiving an air-pipe 7, forming communication between a valve-casing 8 and an air-casing 9, surrounding the upper portion of the exhaust-pipe 10. The opening 6 and valve may be located at any point; but I prefer the location shown, for the reason that thus placed the valve is in plain view from the cab and is more readily accessible.

The valve-casing is preferably cylindrical, and the air-inlet is preferably in the lower side thereof, and means is provided to regulate the volume of air admitted, consisting of an apertured plate 11 in contact with the under side of the casing and rotatable to bring its apertures more or less in register with the air-inlet openings to vary the size of the inlets. Any other suitable regulating means may be provided in lieu of that shown.

Where the air-inlet is provided in the lower side of the casing, the valve 12 is vertically movable to control the admission of air. My present improvements are not concerned with any particular means for controlling the valve, though I have in the drawings shown, for the purpose of illustration merely, fluid-pressure means substantially like that forming the subject-matter of my application above referred to, and reference should be had to said application for an understanding of the construction of one valve-controlling means capable of employment in connection with this present invention. The valve is automatically raised from its seat through the action of the exhaust against, preferably, the closing force of a spring 13, coiled around the valve-stem, which spring is preferably provided with means for varying its tension to increase or diminish the resistance of the valve. Should it be deemed advisable to admit air at all times into the smoke-box, the valve or valve-casing may be perforated, or the valve may be prevented from seating by

any suitable device, such as a stop on the valve-stem, which will contact with the casing when the valve has reached a predetermined position.

The air-casing 9 is preferably cylindrical in form and is mounted on the exhaust-pipe 10 to be concentric therewith, whereby there is provided about the exhaust-nozzle an annular air-chamber 14. The casing 9 extends, preferably, above the exhaust-nozzle, whereby upon the creation of the exhaust a partial vacuum is instantly formed in the chamber 14, pipe 7, and valve-casing 8, and as the capacity of these connections is comparatively small there occurs upon the creation of the exhaust the immediate opening of the valve by the outside air-pressure and the admission of the proper volume of air to counteract the effects of the exhaust.

Compared with my former constructions this present appliance effects in operation the opening of the valve practically instantaneously and obviates the necessity before existing of producing a rarefication of the entire body of air in the smoke-box before the unseating of the valve could be effected. In addition to the advantages peculiar to my former constructions my present improvements enable, through increased efficiency of the steam-blower, a material enlargement of the exhaust-nozzle, whereby a further saving in fuel is effected, back pressure on the cylinders is greatly relieved, and a large diminution in sparks is secured. Further, by the admission of the counteracting air through the special passage the effect of the exhaust on the products of combustion is such as to retard the escape of the products from the stack, thus in a measure adding to the efficiency of the appliance in retaining the sparks in the smoke-box and somewhat abating the smoke nuisance.

I claim as my invention—

1. The combination of a casing, an exhaust-pipe therein, a chamber surrounding said pipe at the outlet thereof, an air-conduit leading from the chamber outside of the casing, and an inwardly-opening automatic valve at the receiving end of the conduit.

2. The combination of a casing, an exhaust-pipe therein, an annular chamber surrounding the exhaust-nozzle and extending above the same, an air-pipe leading from the chamber outside of the casing, a valve-casing connected with the outer end of the conduit and provided with an air-inlet, and an inwardly-opening spring-pressed automatic valve at said inlet.

3. The combination of a casing, an exhaust-pipe therein, an annular chamber surrounding the nozzle end of the exhaust-pipe, an air-pipe leading from the chamber outside of the casing, a valve-casing communicating with the air-pipe and having a regulable air-inlet, and an inwardly-opening spring-pressed automatic valve at said inlet.

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

JOHN MILTON.

Witnesses:
W. T. NORTON,
ARTHUR BROWNING.