L. D. WEST.

FUEL SAVER AND SMOKE CONSUMER.

APPLICATION FILED NOV. 15, 1916.

1,247,761. Patented Nov. 27, 1917.

2 SHEETS—SHEET 1.

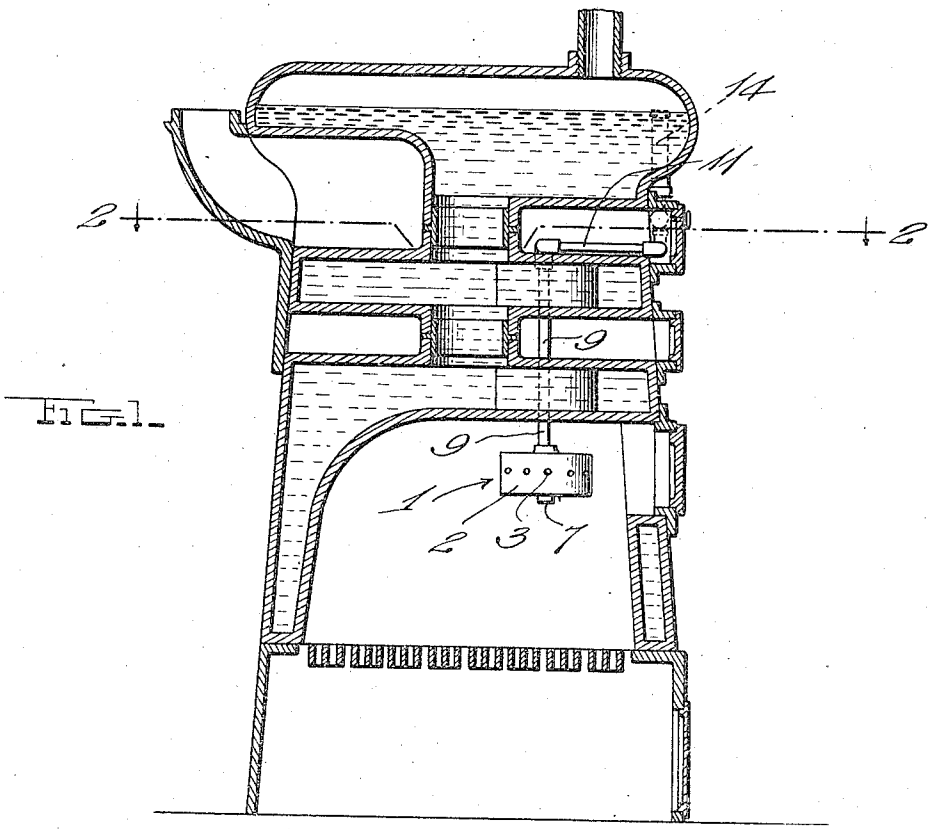


FIG. 1.

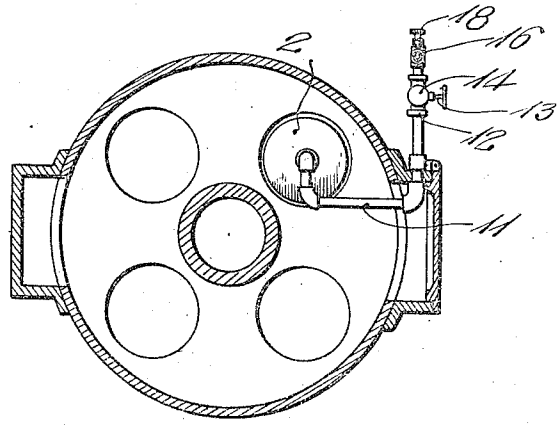


FIG. 2.

Witness

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2 SHEETS—SHEET 2.

FIG. 3.

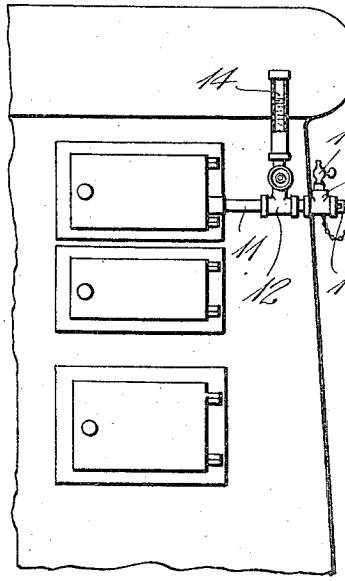
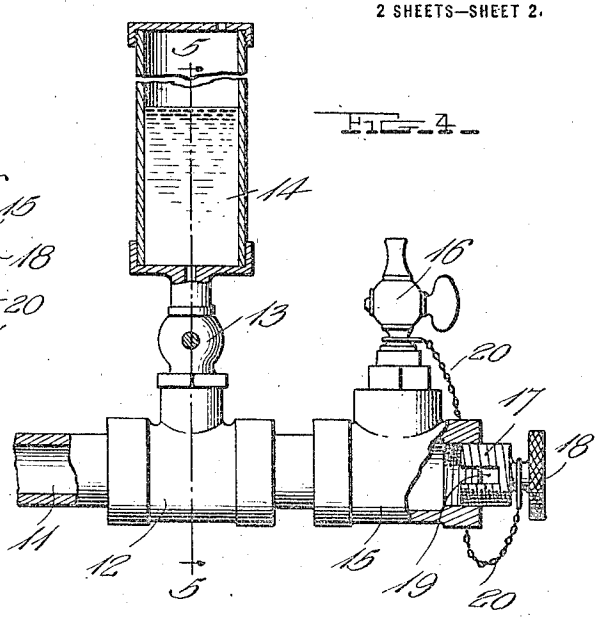


FIG. 4.



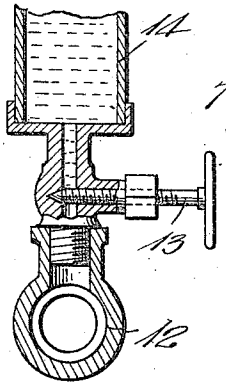
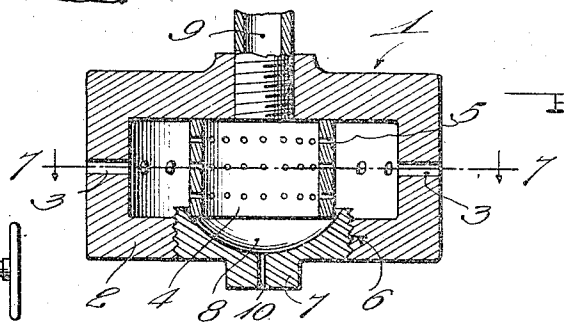


FIG. 5.

FIG. 6.



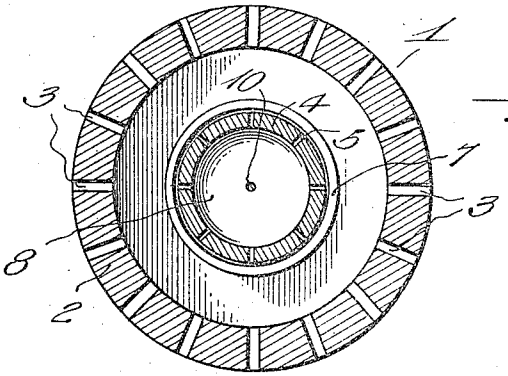


FIG. 7.

Witness

C. [illegible]

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UNITED STATES PATENT OFFICE.

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FUEL-SAVER AND SMOKE-CONSUMER.

1,247,761. Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed November 15, 1916. Serial No. 131,416.

To all whom it may concern:

Be it known that I, LEONIDAS D. WEST, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Fuel-Savers and Smoke-Consumers; 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.

My invention relates to that class of devices designed for furnishing hot air to the flues and combustion chambers of stoves, furnaces and boilers for permitting smoke and other waste products to be consumed by combustion in said chambers, thus not only preventing excessive smoking and formation of soot, but economizing in fuel by compelling the otherwise waste gases to perform part of the work required of the fire.

I have found that the best results are obtained by choking down or retarding the incoming air in the heating device in order that it may not pass therethrough, without being first heated and expanded to the maximum amount.

It is therefore the object of the present invention to provide a simple and inexpensive device for producing the above named result in a novel manner. To this end I employ, in brief, a perforated outer chamber, an inner perforated chamber, and means for supplying more or less air to the latter.

A further object is to form the perforations of the inner chamber of a size to cause the air to be retarded, heated and expanded by said inner chamber before it is discharged into the outer chamber, and to form the perforations of said outer chamber of a size to further trap the air to cause it to be superheated and further expanded in which condition it is discharged into the combustion chamber in a number of jets so as to permit immediate and thorough mixing with the gases therein.

Yet another object is to secure the inner chamber or retarder in the outer in a manner to permit it to be replaced by others having perforations of larger or smaller size according to the strength of draft in the flue.

With the foregoing general objects in view, the invention resides in certain novel features of construction and in unique combinations of parts to be hereinafter fully described and claimed, the descriptive matter being supplemented by the accompanying drawings which constitute a part of this application and in which:

Figure 1 is a vertical sectional view of a horizontal section boiler showing the application of the invention;

Fig. 2 is a horizontal sectional view on the plane of the line 2—2 of Fig. 1;

Fig. 3 is a front elevation of a part of the furnace shown in Figs. 1 and 2 and illustrating the arrangement of parts on the exterior thereof;

Fig. 4 is an elevation of the parts last referred to, portions being broken away and in section;

Fig. 5 is a vertical transverse section on the plane of the line 5—5 of Fig. 4;

Fig. 6 is an enlarged vertical section of the invention and a portion of the air supply pipe;

Fig. 7 is a horizontal section on the plane of the line 7—7 of Fig. 6.

In the drawings above briefly described, the numeral 1 designates the improved smoke consuming and fuel saving device as a whole, said device including a short one-piece casing 2 of cylindrical shape closed at both of its ends and having in its circular wall a horizontal circumferentially extending row of comparatively large perforations 3.

An inner casing 4 is provided within the casing 1, said inner casing being preferably in the form of a short length of pipe formed with a plurality of comparatively small perforations 5. The casing 4 is inserted into the casing 2 through a circular opening 6 in one end of the latter and a screw plug 7 is then threaded in said opening, said plug having in its inner end a concave socket 8 which increases in size toward its open end, said socket receiving one end of the cylindrical casing 4 whereby the latter is accurately centered and is clamped in contact with the other end of the casing 2, the axis of the casing 4 being then in line with an air supply pipe 9 by means of which the device is supported in the combustion chamber of a furnace, or stove, said pipe necessarily varying in length according to the different applications of the invention. A small passage or bore 10 pref-

erably leads from the socket 8 through the outer end of the plug 7 for a purpose to appear.

For furnaces of the well known horizontal section type shown in Figs. 1 to 3, one of the improved smoke consumers and fuel savers is in most cases adequate, although more can well be employed if necessary. In this application of the device the pipe 9 rises through certain of the flue openings in the boiler sections as shown in Figs. 1 and 2 and is suitably connected to a horizontal pipe line 11 which by preference leads through the frame of one of the usual clean out doors as depicted in Fig. 2.

The pipe line 11 carries at its outer end a T 12 which supports a needle valve 13, said valve in turn carrying a tubular receptacle 14 which may contain water or oil to be supplied to the combustion chamber of the furnace through the device 1. If water is employed it is of course converted into steam in the casings 2 and 4 and this steam serves to effectively clean the perforations in the outer casing of any soot, carbon or the like which may have deposited therein. There is no danger, however, of the perforations of the casing 4 becoming clogged since said casing is effectively protected by the outer casing 2. When oil is fed into the furnace by filling the receptacle 14 with such oil, it will be obvious that said oil will vaporize in the device 1 and will thus be expelled from the latter in the form of gas to burn in the combustion chamber of the furnace together with the air taken in through the device and the otherwise wasted gases which are consumed with said air.

Spaced outwardly from the T 12 and in communication therewith is another T 15 carrying a pet cock 16. A screw plug 17 is threaded into the outer end of the T 15 and is preferably provided with a milled head 18 for adjusting it so as to permit more or less air to enter the pipe line 11 through a slot 19 formed longitudinally of the plug 17. By preference, a chain or the like 20 will be connected with the plug 17 and anchored to the pet cock 16 to prevent loss of the former.

After the dampers of the furnace have been properly set, the plug 17 is adjusted after first closing the pet cock 16 so as to permit the required amount of air to enter the device to cause a hot and steady fire in the combustion chamber. At night, however, when the fire is to be checked, the plug 17 is screwed inwardly to close its slot 19 and the pet cock 16 is opened, thus insuring that only a limited amount of air be fed to the furnace.

Whether the air enters through the slot 19, the pet cock 16, or both, it will be choked down or retarded within the inner casing 4 and will thus be heated and expanded, it being then expelled through the fine perforations 5 into the outer casing 2. In this casing, the air is superheated and further expanded and is finally expelled into the combustion chamber through the comparatively large perforations 3 in jets, whereby it effectively and immediately mingles with the otherwise waste gases in the combustion chamber to form a readily combustible mixture. This mixture in burning not only increases the efficiency of the boiler but at the same time prevents excessive smoking and the formation of deposits of soot.

From the foregoing, taken in connection with the accompanying drawings, it will be obvious that although the invention is of extremely simple and inexpensive nature, it effectively accomplishes the objects set forth and will be a highly efficient device. For these reasons, the construction shown constitutes the preferred form of the improved smoke consumer and fuel saver but it is to be understood that within the scope of the invention as claimed, numerous changes may be made without sacrificing the principal advantages.

I claim:

A smoke consumer and fuel saver comprising a one-piece casing of cylindrical shape with integral ends provided respectively with a central air inlet opening and a central plug-receiving opening, said casing having air discharge perforations, an air retarder in the form of a short length of pipe positioned in said casing coaxially therewith and having one end seated against the casing and surrounding said air inlet opening, and a screw plug threaded in said plug-receiving opening and having in its inner end a concave socket receiving the other end of said retarder to center the latter, said retarder having perforations of less size than those of the casing to cause the slow expulsion of a restricted amount of air from said retarder into the casing.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LEONIDAS D. WEST.

Witnesses:
J. A. GRIESBAUER,
L. O. HILTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."