G. H. MAYNARD.

SMOKE PREVENTER.

APPLICATION FILED JULY 25, 1912.

1,067,826.

Patented July 22, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

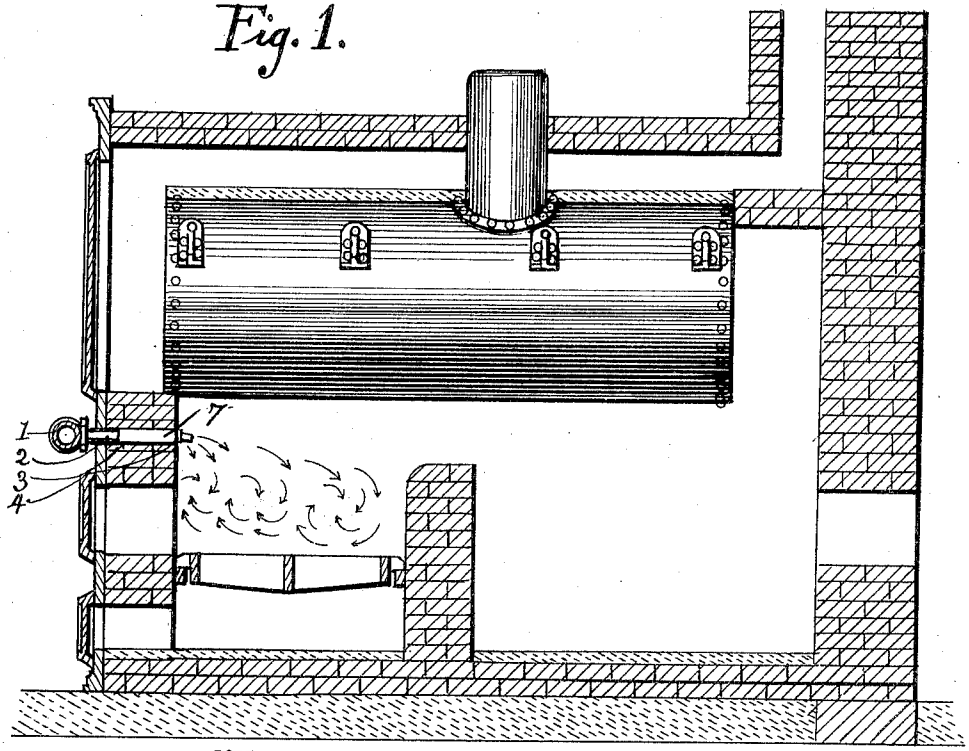
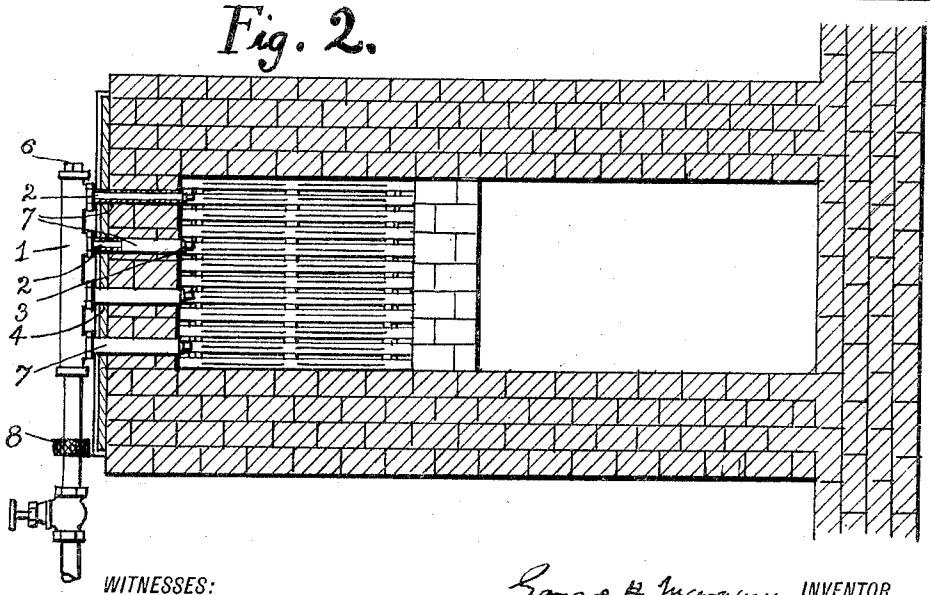


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

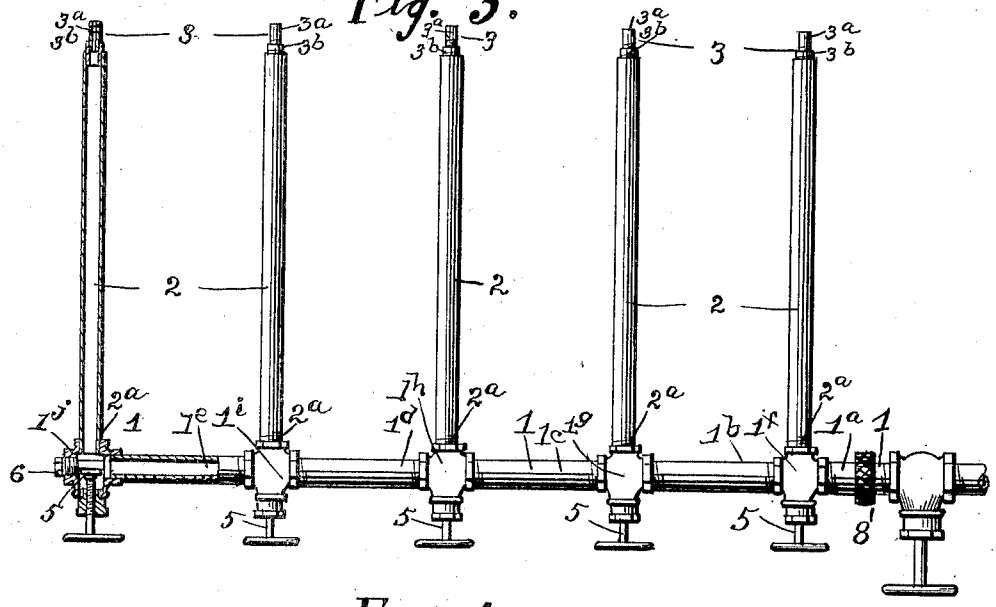


Fig. 4.

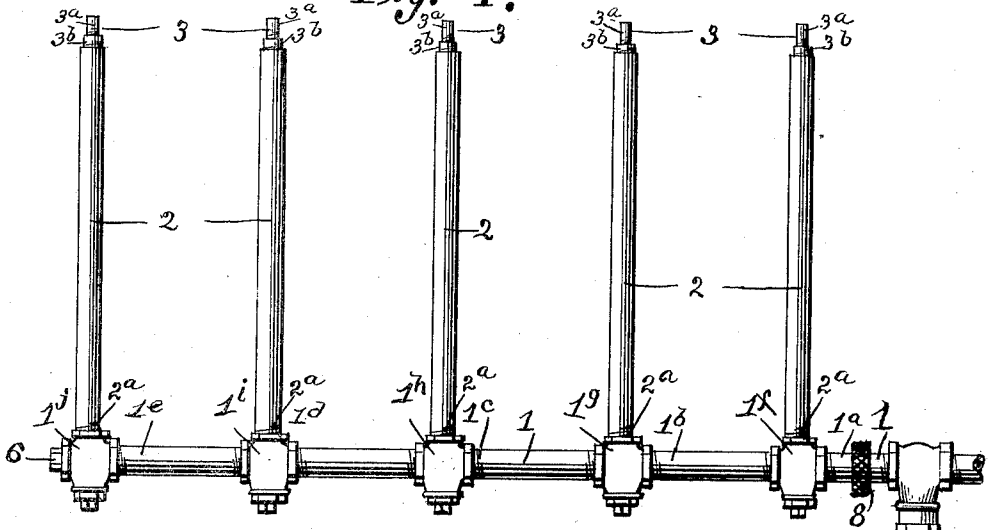
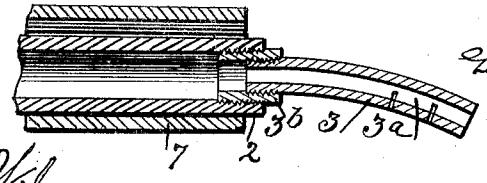


Fig. 5.



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SMOKE-PREVENTER.

1,067,826. Specification of Letters Patent. Patented July 22, 1913.

Application filed July 25, 1912. Serial No. 711,607.

To all whom it may concern:

Be it known that I, GEORGE H. MAYNARD, a citizen of the United States, residing at Brooklyn, in the city of New York, county of Kings, and State of New York, have invented a certain new and useful Smoke-Preventer, of which the following is a specification.

This invention relates to a smoke preventive for furnaces, and more particularly to means whereby the combustible elements in the gaseous products of combustion may be consumed by the fire in the furnace without the aid of any chemical substances, and without recourse to expensive mechanical apparatus, for developing air currents, counter currents, &c., or the more usual mode of constructing the settings of furnaces, by the construction or reconstruction, of the same to provide bridge walls, arches, flues, and like devices to serve as dampers or checks to the draft, and which frequently result in decreasing the efficiency of the furnace without materially decreasing the volume of smoke that escapes through the chimney.

My invention has for its object primarily to provide means whereby steam may be employed in such a manner as to produce an eddy in the draft, whereby the smoke is caused to revolve rapidly in the space above the grates and below the boiler until the combustible elements are consumed by the heat of the fire, and which would otherwise escape through the chimney immediately by the direct force of the draft.

A further object is to create the eddy above described by such means as will not reduce the heat of the fire as is the case where air currents are employed for a like purpose. This is accomplished by the use of steam which is always at a high temperature, and therefore while its force is such as to impart the desired motion to the air in the furnace and the particles of smoke rising from the fire that still the temperature is not appreciably reduced.

My invention is illustrated in the accompanying drawings and will be more fully described in the appended claims forming a part of this specification.

In the accompanying drawings Figure 1, is a vertical longitudinal section of a furnace showing a boiler in position and my invention applied thereto ready for use; Fig. 2, is a sectional plan of the furnace, showing the relative position of the invention to the grate and other parts of the furnace; Fig. 3, is a plan view of the invention, partly in section shown independently of the furnace; Fig. 4, is a view similar to that shown in Fig. 3, representing a modified form of the invention; Fig. 5 is an enlarged detail view showing the construction of the nozzles employed for discharging the steam in the proper form into the furnace.

The invention may be applied to any furnace but it may be manufactured and sold with a furnace originally equipped with the apparatus.

In the application of my invention I employ primarily a steam pipe 1, having branch pipes 2, said branch pipes terminating in the nozzles 3. Openings are provided in the front of the furnace, 4, and through the wall through which the branch pipes are projected, the branch pipes being of such a length that the nozzles extend beyond the inner surface of the wall of the furnace. In cases where the invention is applied to furnaces now in use the openings in the front of the furnace must be bored, but in the furnaces manufactured especially for use in conjunction with this invention the front of the boiler is constructed so as to admit of the insertion of the branch pipes.

In the application and use of my invention I prefer to make the steam pipe 1 in sections 1^a, 1^b, 1^c, 1^d, 1^e, and to connect them with joints, 1^f, 1^g, 1^h, 1^i, 1^j, and to make the branch pipes separately and secure them in the joints by means of screw threaded joints as at 2^a. The ends of the sections of the pipe 1^a, 1^b, &c., I also prefer to secure in the joints 1^d, 1^e, &c., by means of screw threaded joints, but I do not wish to limit myself to this form of construction and may in practice braze or weld the parts together.

In each of the joints 1^f, 1^g, &c., I have shown valves 5, adapted to be adjusted by means of a screw threaded shaft whereby the size of the passage for the steam may be regulated. The pipe 1, is connected by a screw threaded joint with a steam pipe leading from the boiler, and the opposite end is

closed by a plug preferably a screw threaded plug 6, inserted in the joint 1^j.

By the construction shown in my preferred form, Fig. 3, it is possible to adjust the apparatus to suit any furnace, by merely removing the last section and adding another joint, or joints. It is also possible to employ the apparatus in conjunction with a train of furnaces, of any number by connecting one series to another, by a pipe section of the required length.

Fig. 4 illustrates a modified form of my invention, the valves are omitted. This form of the invention is less expensive than the form shown in Fig. 3, and may be almost as satisfactory in many cases, as the steam pressure may be regulated by a valve provided in the supply pipe between the boiler and the first branch pipe of the series in the injector. In this way the flow of steam through all of the branch pipes is controlled simultaneously.

When it is desired to clean the branch pipes or the nozzles the valves may be removed from their seats, in the preferred form of my invention and a wire or other instrument inserted in the pipes whereby they may be cleaned. To clean the branch pipes and nozzles in the modified form shown in Fig. 4, the hood or cap may be removed from the cross joints and access to the interior of the branch pipes be thereby afforded.

The nozzles 3, are made of metal, preferably brass or copper, and have a tubular opening 3^a, therethrough, extending from one end to the other. One end of the nozzle is threaded on the outer periphery and is seated in a screw-threaded bearing provided in the end of a tubular section of a little larger diameter, 3^b, and the part 3^b, is provided with a screw thread upon its outer periphery on the end opposite from the one in which the nozzle 3, is seated, and this screw threaded end of said section 3^b, is seated in the end of the branch pipe 2, the inner end of the said branch pipe being threaded to admit the section 3^b. The wall of the nozzle 3, is slotted on its under side to admit of the discharge of steam through the under side of the nozzle, and the end of the nozzle is open and curved slightly downward. By this arrangement of the nozzles and the slots in the under side thereof, the steam when forced through the pipe 1, and the branch pipes 2, and the nozzles 3, is distributed over the fire and the grate of the furnace as shown by arrows in the drawing, in a whirling movement which is from the front and upper part of the fire box downward upon the fire and against the bridge wall of the furnace. This whirling movement causes the particles of combustible matter carried upwardly by the draft to be precipitated upon the incinerated mass of fuel upon the grate, and the process is repeated until every particle of combustible matter is consumed, but without in any degree abating the heat or preventing it from rising to the boiler.

To provide for removing the injector from the furnace for making repairs or other purposes, I provide a sleeve 7, which is embedded in the wall of the furnace at suitable intervals so as to admit the branch pipes of the injector, whereby the injector may be readily removed without disturbing the wall of the furnace. I also provide a union joint 8, between the cut-off valve and the injector whereby the injector may be disconnected from the supply pipe and removed from the furnace without the necessity of unscrewing the joints of the pipes or the injector.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:

1. In a smoke preventer for boiler furnaces, the combination with a steam pipe, a furnace chamber, and a series of sleeves fixed in a wall of said furnace chamber, of a feed pipe coupled detachably to said steam pipe, a series of branch pipes attached to the feed pipe and passing loosely through the sleeves, and a series of nozzles coupled to said branch pipes, said nozzles being curved downwardly into the furnace chamber and each nozzle being provided with an outlet opening in the end and with transverse outlet slots in the under surface thereof so as to distribute the jets of steam both lengthwise and crosswise of the furnace chamber.

2. In a smoke preventer for boiler furnaces, the combination with a furnace chamber, and a pipe for supplying steam thereto, of branch pipes attached to said pipe and and extending through a wall of said chamber, and nozzles attached to the branch pipes and curved downwardly therefrom into the furnace chamber, each nozzle having an open delivery end and provided in the under side thereof with transverse outlet slots, so as to distribute the steam both longitudinally and crosswise of the furnace chamber.

3. A steam feeding attachment for boiler furnaces, embodying a main pipe, a series of branch pipes attached thereto, a series of curved tubular nozzles each having an open delivery end and provided in the under side thereof with transverse outlet slots, and nipples for coupling the nozzles individually to the branch pipes, said nozzles extending forwardly and downwardly from the branch pipes.

4. A steam feeding attachment for boiler furnaces embodying a main pipe composed of tubular sections and members uniting

said sections, a removable closure at one end of said pipe, a coupling at the other end of said pipe, a series of branch pipes attached to said members of the main pipe, and a series of nozzles coupled to the ends of the branch pipes, each nozzle being curved longitudinally and provided with an outlet at the free end and with transverse outlet slots positioned in the under side of the nozzle and rearwardly of said outlet at the end.

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