(No Model.)

2 Sheets—Sheet 1.

J. J. & T. F. MELDRUM.

STEAM GENERATOR.

No. 422,816. Patented Mar. 4, 1890

FIG. 1.

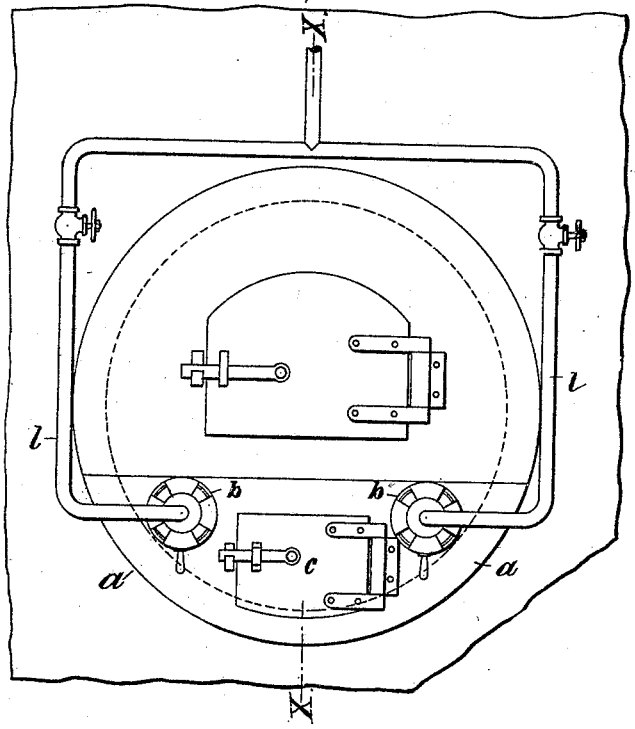
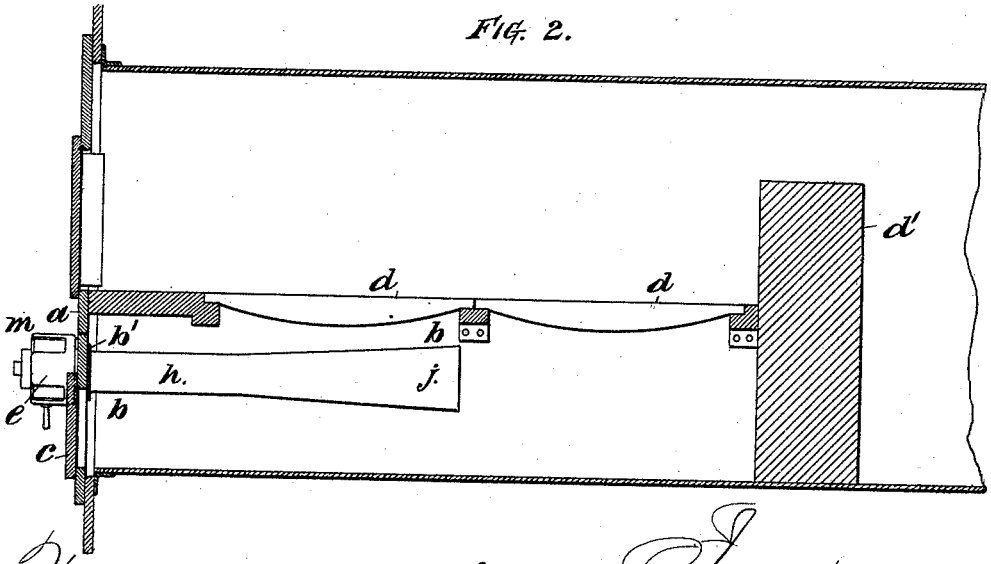


FIG. 2.



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Percy B. Hills

Inventors:
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Attorney.

(No Model.) 2 Sheets—Sheet 2.

J. J. & T. F. MELDRUM.

STEAM GENERATOR

No. 422,816. Patented Mar. 4, 1890.

FIG. 3.

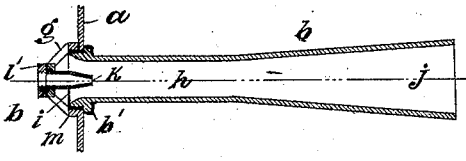


FIG. 4.

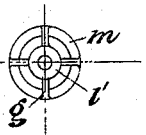


FIG. 5.

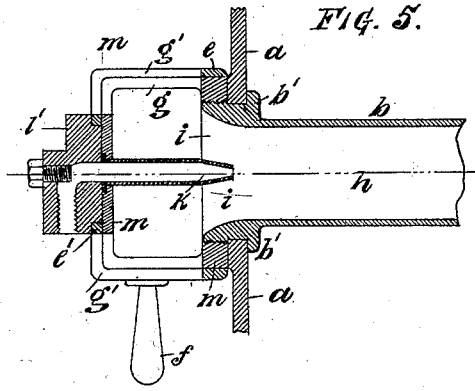


FIG. 6.

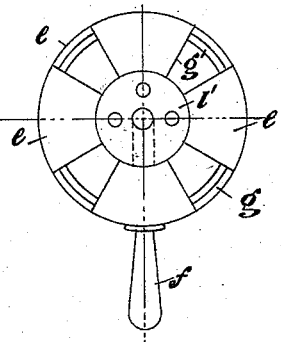


FIG. 7.

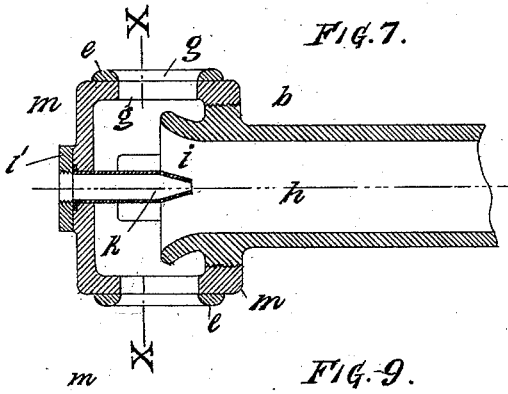


FIG. 8.

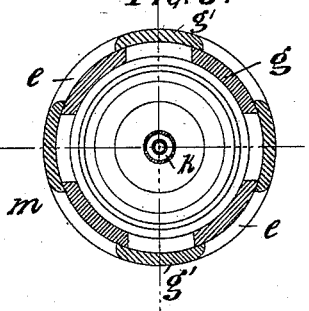


FIG. 9.

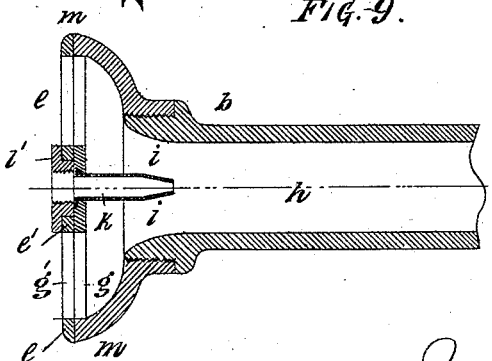
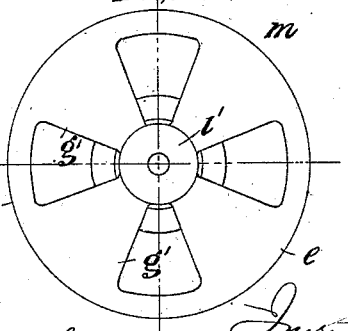


FIG. 10.



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UNITED STATES PATENT OFFICE.

JAMES JONES MELDRUM AND THOMAS FREDERICK MELDRUM, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 422,816, dated March 4, 1890.

Application filed December 3, 1889. Serial No. 332,455. (No model.) Patented in England June 5, 1889, No. 9,336.

To all whom it may concern:

Be it known that we, JAMES JONES MELDRUM and THOMAS FREDERICK MELDRUM, subjects of the Queen of Great Britain and Ireland, residing at Manchester, in the county of Lancaster, England, have invented new and useful Improvements in or Connected with Steam-Generators and other Analogous Furnaces, (for which we have obtained patent in Great Britain, No. 9,336, dated June 5, 1889,) of which the following is a specification.

This invention has mainly for its object the utilization of fuel to the best advantage, with special reference to small and poor fuel, such as coke-dust or breeze, coal-dust, ash-pit refuse, and the like.

The types of steam-generator furnaces to which the invention principally relates are those of the Cornish, Lancashire, and marine types, in which the fires are contained in tubes or flues within the shell of the boiler.

According to this invention the ash-pit of a steam-generator is closed with a plate or front analogous to the furnace-front, and which may be provided with a door giving access to the ash-pit. Air for combustion is supplied under pressure by means of one or more "steam-jet" blowers, fixed to the ash-pit front plate in such a manner that the major portion of the blowers lies within the ash-pit, the inlet portion of the blowers projecting in front of the boiler only a few inches. If small fuel is used, the grate-bars are put close enough together to prevent any fuel falling through, the pressure in the ash-pit above the atmospheric pressure being sufficient to give very active combustion with the bars almost touching each other. A secondary supply of air may be admitted, if desired, through perforations in the dead-plate or through a hollow bridge.

In the annexed drawings, which serve to illustrate the invention, Figure 1 is an elevation showing the front of one furnace of a Lancashire or Cornish boiler provided with the improvements according to the invention. Fig. 2 is a longitudinal vertical section of the furnace at the line X X, Fig. 1. Fig. 3 illustrates in longitudinal section one form of steam-jet blower, and Fig. 4 is an end view of the inlet end thereof. Fig. 5 is a longitudinal section of the inlet end of the blower, similar to Figs. 3 and 4, but provided with a valve for regulating the admission of air thereto; and Fig. 6 is an end view of the same. Fig. 7 is a longitudinal section of the inlet end of a blower, being a modified form of regulating-valve from that shown in Figs. 5 and 6; and Fig. 8 is a cross-section of the same at X X, Fig. 7. Fig. 9 shows in longitudinal section the inlet end of another form of blower having a regulating-valve, and Fig. 10 is an end view thereof.

In all the figures the same letters of reference are used to denote the same or similar parts.

With reference, in the first instance, to Figs. 1 and 2, *a* is the ash-pit front plate of a steam-generator provided with the door *c* for obtaining access to said ash-pit, the said front being bolted or otherwise suitably fixed in position. *b* are steam-jet blowers, one being fixed on each side of the front plate *a* and lying in or projecting principally into the ash-pit below the fire-bars, (designated *d*,) and the inlets thereof being provided with valves *e*, hereinafter described with reference to Figs. 5 and 6. Steam is introduced to the blowers by the pipes *l*, and as it issues from the nozzle thereof into the body draws in air and forces it into the ash-pit under pressure, rendering the combustion independent of the chimney draft.

As regards the construction of the steam-jet blowers *b*, Figs. 3 and 4 show the simplest form that we use, its essential elements being a single steam-nozzle *k*, a combining-cylinder *h*, a coned inlet *i*, and diverging outlet-tube *j*. These four essentials are found also in the three other forms of blower shown in Figs. 5 to 10. *l'* is a flange to which the steam-supply pipe is connected. The nozzle *k* in all cases may be central, as shown, or annular, and may be provided with a conical spindle for varying the area of the outlet. In Figs. 3 and 4 the nozzle *k* is connected to the rest of the blower by means of the arms *g* of the head *m*. Four arms are shown, but any other convenient number may be employed.

In Figs. 3 and 5 the means or mode of attachment of the blowers to the plate *a*, clos-

ing the ash-pit of a steam-generator, is illustrated. It consists of a collar b' formed on the neck, which fits in the aperture for it in the plate a, and the ring of the head m of the blower which screws into the said neck, the plate a coming between these two parts.

With reference to Figs. 1, 5, and 6, e is a cap-valve mounted over the head m of the blower, and the sides and part of the end of which consist of alternate bars g' and apertures corresponding with the apertures and bars g of the head m. The cap is held in position by the ring e' of the valve, which works in a recess in the steam-flange or connecting-plate l', as shown in Fig. 5. f is a handle formed on or connected to one of the bars g' of the valve e and by which it is operated. Similar means may be provided in the valves shown in Figs. 7 to 10.

The sleeve and disk valves illustrated in Figs. 7 to 10 are substantially of the same construction as but differ in form from that set forth with reference to Figs. 1, 5, and 6. This will be clear on reference to the views and by the letters of reference or like corresponding parts used thereon.

Having now described the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a steam-generator furnace, the combination of the ash-pit front plate a, and the combining-cylinder h, having the coned inlet i and diverging outlet j, and provided with the collar b', resting against the inside of the front plate, the head m, having separated bars g, and a ring secured to the projecting neck of the cylinder and abutting the front plate, so that the latter is clamped between the ring on the head and the collar on the cylinder, a flange l', located on the head outside the separated bars g and to which the steam-pipes l are attached, and the nozzle k, secured to the head behind the flange l', and extending through the head into the coned inlet end of the combining-cylinder, substantially as described.

2. In a steam-generator furnace, a plate a by which the ash-pit of said furnace is closed, and a steam-jet blower b of the type or types shown and described connected to said plate at its head by a collar b' on the neck of the blower, and a ring on the head m thereof, the plate a being between said collar and ring, and the air-inlet or head of the blower being disposed outside the plate a, and the mixing tube or portion and diverging outlet being disposed within the ash-pit, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES JONES MELDRUM.
THOMAS FREDERICK MELDRUM.

Witnesses:
THOMAS COLLINGS,
THOMAS COOPER.
Both of 25 *Cathedral Yard, Manchester.*