(No Model.)

G. W. GALBRAITH & J. TAYLOR.

FIRE DOOR FOR DOWNDRAFT FURNACES.

No. 498,258. Patented May 30, 1893.

Fig. 1.

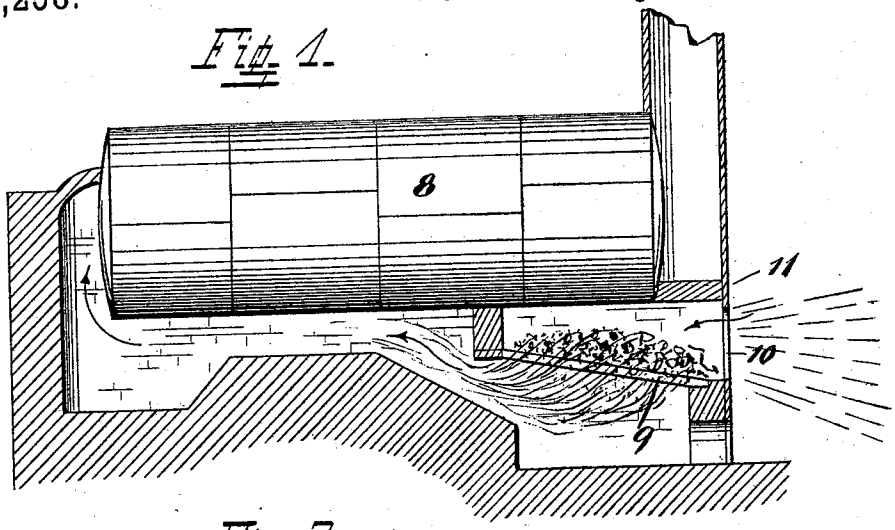


Fig. 2.

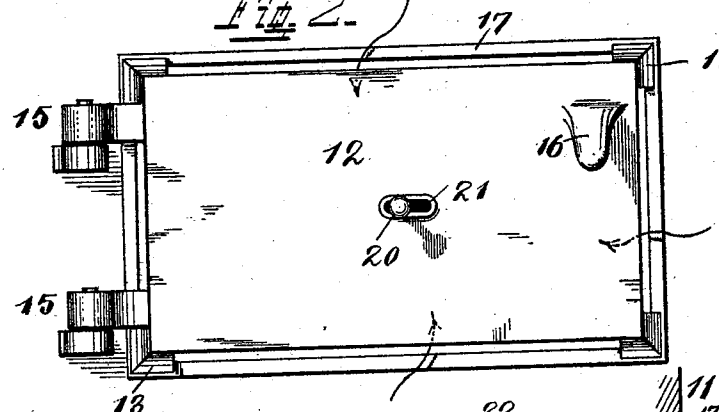


Fig. 3.

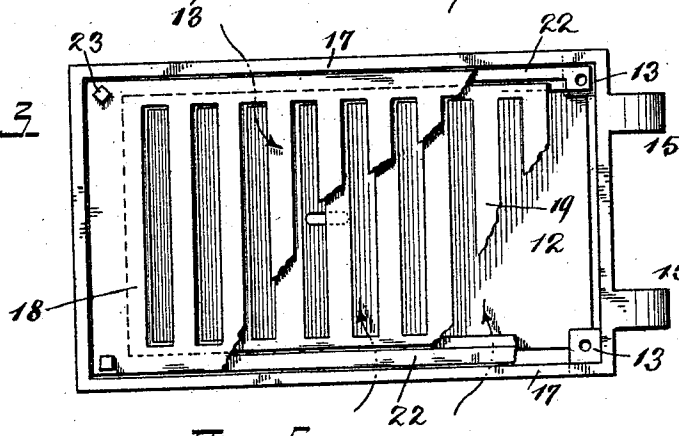


Fig. 4.

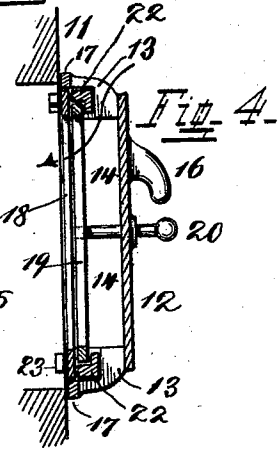
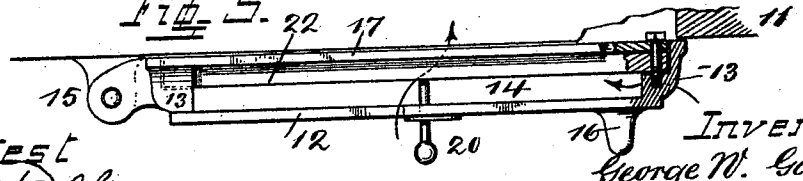


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE W. GALBRAITH AND JAMES TAYLOR, OF CINCINNATI, OHIO.

FIRE-DOOR FOR DOWNDRAFT-FURNACES.

SPECIFICATION forming part of Letters Patent No. 498,258, dated May 30, 1893.

Application filed February 21, 1893. Serial No. 463,216. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. GALBRAITH and JAMES TAYLOR, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Fire-Door for Down-draft-Furnaces; and we 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 constitutes an adjunct to boiler-furnaces and particularly to the so-called down-draft furnaces. In these latter the air and draft, instead of passing through the grate from below and up, pass in above the grate and through it in a downward direction. The advantages of such furnaces are considered extensive steam-generating power, economy in fuel and perfect combustion which makes them practically smokeless.

By reason of the peculiar design above mentioned, the air passes in through the openings through which the fuel is supplied and which openings in other furnaces are usually closed by fire doors, which latter have to be omitted however in the class of furnaces here in consideration, otherwise the down draft which is the primary advantage of them could not be obtained. While these furnaces are a practical success as far as their operation is concerned, their attendance is connected with great hardships to the firemen by reason of the intense heat which is emitted through the feed-openings, which in these furnaces have to be left open, to admit the draft. To overcome this objectionable feature we provide a door which practically closes the draft-opening as far as emission and radiation of heat are concerned, but is located some distance away from the furnace-front to create a space through which the air, necessary to produce the draft, enters. With such a door we combine a register whereby the amount of air to be admitted may be regulated, which regulation is not now possible by reason of the fixed size of the opening.

To this end our invention consists in the provision of such a door for this class of furnaces, in the combination with such a door of a register, whereby the draft is regulated, and in the general and specific features of the construction, all of which will appear more fully hereinafter.

In the following specification is found a full description of our invention, the same being particularly pointed out in the claims at the end thereof and its construction illustrated in the accompanying drawings, in which—

Figure 1. shows in a sectional elevation a diagrammatic view of a down-draft furnace. Fig. 2. is a front view of our improved fire-door. Fig. 3. is a rear view of the same, parts of it broken away. Fig. 4. is a vertical section and Fig. 5. is a top view of the same.

8. shows a boiler, provided with one of these so-called down-draft furnaces.

9, is the grate, and 10, is the fuel-supply and draft-opening in the furnace front 11, through which the air passes which is necessary for the maintenance of the fire and the draft. The latter travels in the direction of the arrows shown in Fig. 1, and after having passed through the grate, continues on through the back part of the furnace and through flues in the boiler to the smoke stack in the well-known way.

12, is our fire-door, provided with projections 13, toward the boiler-front whereby it is kept from completely closing the draft-opening and produces between it and the boiler front a space 14, through which the air is admitted.

15, are hinges by which the door is held in place and 16, is a knob whereby it is opened to admit the supply of fuel. For purposes of stability, projections 13 are connected by a frame 17, which also serves to hold the stationary plate 18, of the register in place. Behind this plate is the adjustable register proper, designated by 19, and provided with vertical slots in the same manner as plate 18. The slots in these two plates are of equal width and when the furnace is in full operation, they register with each other and admit a full supply of air. When the draft is to be decreased or shut off, register 19 is moved in a way that part, or all of its surface between its slots comes opposite the slots of plate 18, whereby their open area is decreased or wholly shut off as the case may require it.

For such adjustment register 19 is provided with a handle 20, which reaches through slot 21 in fire-door 12. For its proper guidance, ways 22, are provided which rest on the inside of projections 13, and on which ways the register moves during its adjustment. It is held in position on these ways by plate 18, while the whole, that is all parts of the register, are held in place and secured to the fire-door by means of screws 23, which pass through plate 18, through the ends of the ways 22, and are tapped into the inner ends of projections 13.

While a draft-opening closed in the manner shown and which admits all the air necessary, overcomes the objectionable features of such furnaces, the register added thereto, is an immense advantage over the old style open-draft doors, devoid of any means of regulation. It enables economizing in fuel and permits the draft to be reduced whenever less steam is needed and for which reason such door is adaptable to any furnace where regulation of the draft through the fire-door is desirable.

Another advantage incidentally connected with our fire-door consists of the fact that the air, while passing through between the hot register becomes pre-heated and more readily adapted to enter upon the process of combustion thereby increasing the economy of fuel.

Having described our invention, we claim as new—

1. A fire-door for down-draft furnaces, of a size to close the fuel-supply-opening in order to prevent radiation of heat therefrom, combined with a register connected to it and to that side of it next to the furnace-front, for the purpose of regulating the amount of air passing through the draft-opening, the connection between the two being such as to produce a space between them whereby air is admitted to the register.

2. A fire-door for down-draft furnaces, of a size to close the fuel-supply-opening, to prevent radiation of heat therefrom, combined with projections 13, extending from the inside of the door toward the furnace-front in order to produce a space between them for the admission of air, and a register secured to these projections and next to the furnace-front whereby the air, passing through the draft-opening, may be regulated.

3. A fire-door for down-draft furnaces for the purpose of preventing radiation from the fuel-supply-opening and at the same time admitting the requisite amount of air to it, combined with projections 13, to keep the door away from the boiler-front, ways 22, secured to these projections, a register guided and supported on these ways and means to keep the register in position thereon.

4. A fire-door for down-draft furnaces for the purpose of preventing radiation of heat from the fuel-supply-opening and at the same time admitting the requisite amount of air to the latter, combined with projections 13, extending from the fire-door toward the boiler-front, a frame 17, secured to these projections, ways 22, on these projections, a register 19, guided and supported on these ways and a plate 18, forming a part of the register and serving as a means to keep the same in position on the fire-door.

5. A fire-door for down-draft furnaces for the purpose of preventing radiation of heat from the fuel-supply-opening and at the same time admitting the requisite amount of air to the latter, combined with projections 13, united by a frame 17, ways 22, and two register plates 18 and 19, all secured to the fire-door by screws passing through them and tapped into projections 13.

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

GEORGE W. GALBRAITH.
JAMES TAYLOR.

Witnesses:
R. B. PULLAN, Jr.,
C. SPENGEL.