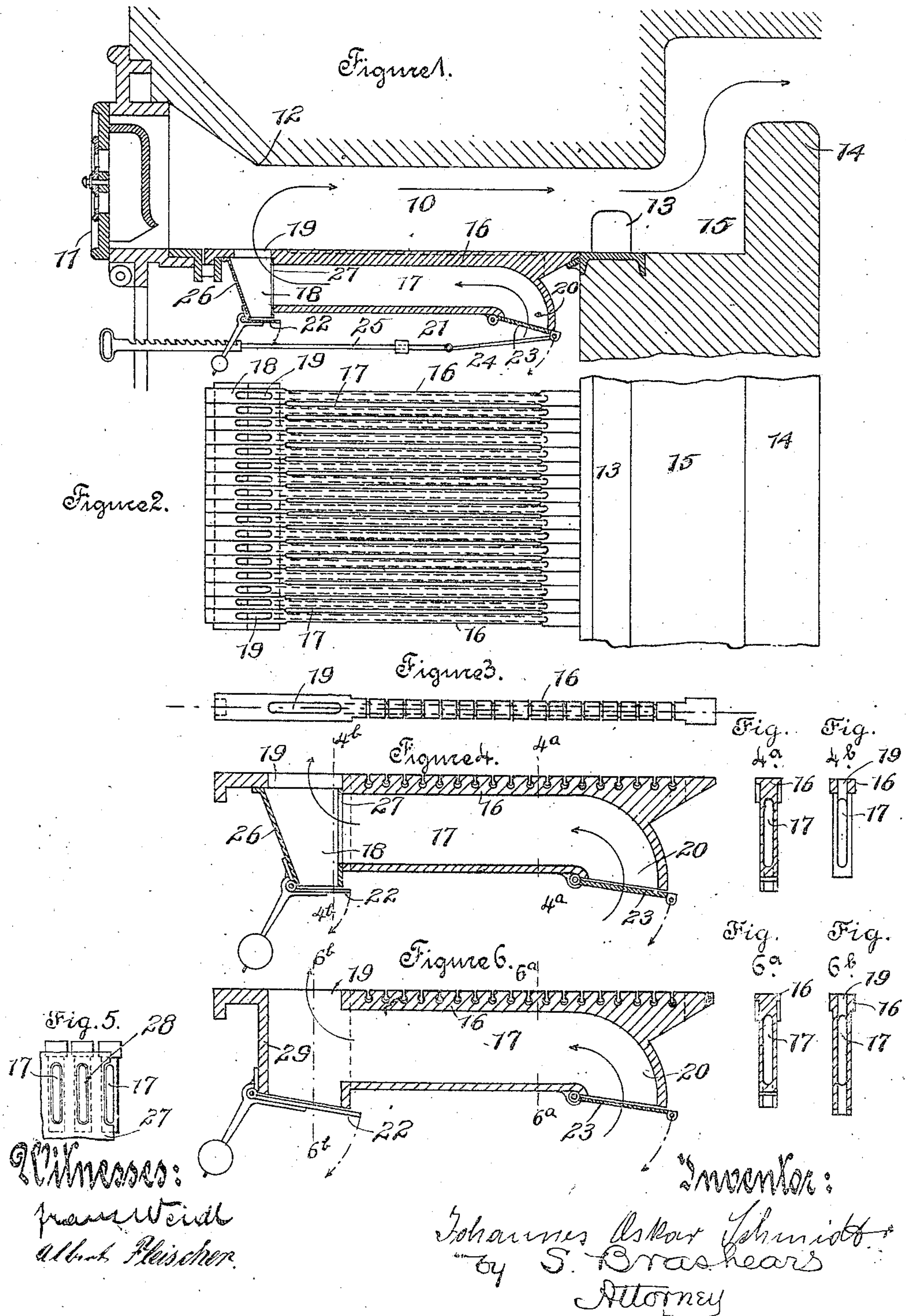


No. 886,546.

PATENTED MAY 5, 1908.

J. O. SCHMIDT.  
AIR FEEDING GRATE FOR FURNACES.

APPLICATION FILED DEC. 22, 1905.





# UNITED STATES PATENT OFFICE.

JOHANNES OSKAR SCHMIDT, OF MÖNCHSMALDE, NEAR BAUTZEN, GERMANY.

## AIR-FEEDING GRATE FOR FURNACES.

No. 886,546.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed December 22, 1905. Serial No. 293,044.

*To all whom it may concern:*

Be it known that I, JOHANNES OSKAR SCHMIDT, a subject of the King of Saxony, residing at Mönchsmalde, near Bautzen, Saxony, Germany, have invented certain new and useful Improvements in Air-Feeding Grates for Furnaces, of which the following is a specification.

This invention relates to that class of grates for furnaces known as air-feeding grates and the object of the invention is to provide an improved grate of this class wherein simplicity of construction is attained and thorough and complete combustion is effected with economical consumption of fuel.

With this object in view the invention consists in the improved construction arrangement and combination of parts hereinafter fully described and afterwards specifically claimed.

I have illustrated the invention in the accompanying drawing in which

Figure 1 is a sectional view on a vertical plane passing longitudinally through one of the grate bars of a furnace equipped with my invention, parts being broken away. Fig. 2 is a plan view of my improved grate, the channels through the grate-bars being shown in dotted lines. Fig. 3 is a plan view, on an enlarged scale of a single grate bar. Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 3. Figs. 4<sup>a</sup> and 4<sup>b</sup> are, respectively, transverse vertical sectional views on the lines 4<sup>a</sup>—4<sup>a</sup> and 4<sup>b</sup>—4<sup>b</sup> of Fig. 4. Fig. 5 is a front elevation of part of the perforated plate at the front end of the grate bars. Fig. 6 is a vertical, longitudinal, sectional view of a modified form of my improved grate bar, and Figs. 6<sup>a</sup> and 6<sup>b</sup> are, respectively, transverse vertical sectional views on the lines 6<sup>a</sup>—6<sup>a</sup>, and 6<sup>b</sup>—6<sup>b</sup> of Fig. 6.

Referring specifically to the drawing 10 indicates the fire box or combustion chamber of a furnace which for the purposes of my invention has a door of any suitable construction as at 11, the height of the fire-box being reduced by depressing its cover as at 12. There is also a transverse fire bridge 13 near the rear end, beyond and to the rear of which, and between it and a second and higher fire bridge 14 is formed a secondary combustion chamber 15 from which leads a suitable exit.

My improved grate bars, indicated at 16,

are supported upon any suitable transverse support at front or rear. These grate-bars are provided with longitudinal passages as at 17 which at their forward ends terminate in a transverse chamber 18 communicating, through openings 19 in the top of the grate-bars, with the fire-box, and through openings 20 in the bottoms of the grate-bars, near their rear ends, the channels 17 communicate with the ash pit 21.

The bottom of the transverse chamber 18 is automatically closed by means of a weighted valve 22, which may be opened, by any suitable means, for cleaning the chamber, or for permitting of the passage of air directly through the chamber into the fire-box at the front of the grate. The openings 20 are provided with a transverse valve 23 connected by a link 24 with an operating bar 25 whereby there may be admitted to the passages 17 any suitable quantity of air required for proper combustion.

The chamber 18 in the construction shown in Figs. 1 to 4 is provided with a separate front wall plate 26 and a rear wall plate 27 suitably secured in position, the latter having openings 28, Fig. 5, registering with the front ends of the passages 17, but in the construction of Fig. 6, this front wall indicated at 29, is part of the grate bar itself and the rear wall 27 is omitted.

In operation, air, partly warmed in its passage through the ash-pit 21, passes through openings 20 into and through the passages 17 of the grate bars, and out of said channels through the chamber 18 and openings 19 into the fire box, through which it passes, over the live coals, being confined in its passage closely to said coals by the depressed cover of the fire-box. At the rear of the fire box, mixed with the products of combustion and partially consumed, the air and combustion gases pass over the fire bridge 13, into the secondary combustion chamber 15, where further combustion takes place, the final waste-products passing over the fire-bridge 14 to the exit, their passage being indicated by arrows in Figs. 1, 4 and 6. In its passage through the passages 17 of the grate bars, the air is thoroughly heated and created substantially into a hot air-blast before admission into the fire-box, thus greatly facilitating the combustion of the fuel and gases with an obvious economy of fuel. The grate bars are separated from each other, as is usual, thus ad-



mitting the usual supply through the separating spaces to the bottom of the fuel resting on the bars. The passage of air through the passages may be entirely cut off by closing valve 23.

What I claim as new is:—

1. In a furnace comprising an ash-pit, a fire-box, an interposed grate, and a transverse chamber at the front of the grate, air-feeding grate bars having longitudinal passages opening near their rear ends into the ash-pit and near their front ends into the transverse chamber which also communicates with the ash-pit, each grate-bar also having a vertical opening near its front end affording communication between the transverse chamber and the fire-box, substantially as described.

2. In a furnace comprising an ash-pit a fire-box, an interposed grate, a transverse chamber at the front end of the grate, air-feeding grate bars having longitudinal passages opening near their rear ends into the ash-pit, and near their front ends into the transverse chamber which also communicates with the ash-pit, each grate bar also having a vertical opening near its front end affording communication between the transverse chamber and the fire-box, in combination with a single valve for closing all of the rear openings, and an automatically closing

valve for closing the bottom of the transverse chamber, substantially as described.

3. In a furnace grate, grate bars each of which comprises a rear portion of full width whereby when they are placed side by side in the grate there is no space between these portions, a middle portion extending from the rear portion nearly to the front of the bar, such middle portion being of reduced width so that the usual spaces are left between the bars, and a forward portion of full width but of less depth than the rear or middle portion thus forming a transverse chamber below them and in front of the middle portions, the middle portions having longitudinal passages through them communicating at the rear with the ash-pit and at the front with the chamber below the front portions, and said front portions having vertical openings communicating between said chamber and the fire-box, the chamber being suitably inclosed and provided with a valved bottom opening, substantially as described.

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

JOHANNES OSKAR SCHMIDT.

Witnesses:

PAUL E. SCHILLING,  
OTTO TÖGT.