

Dec. 24, 1940.

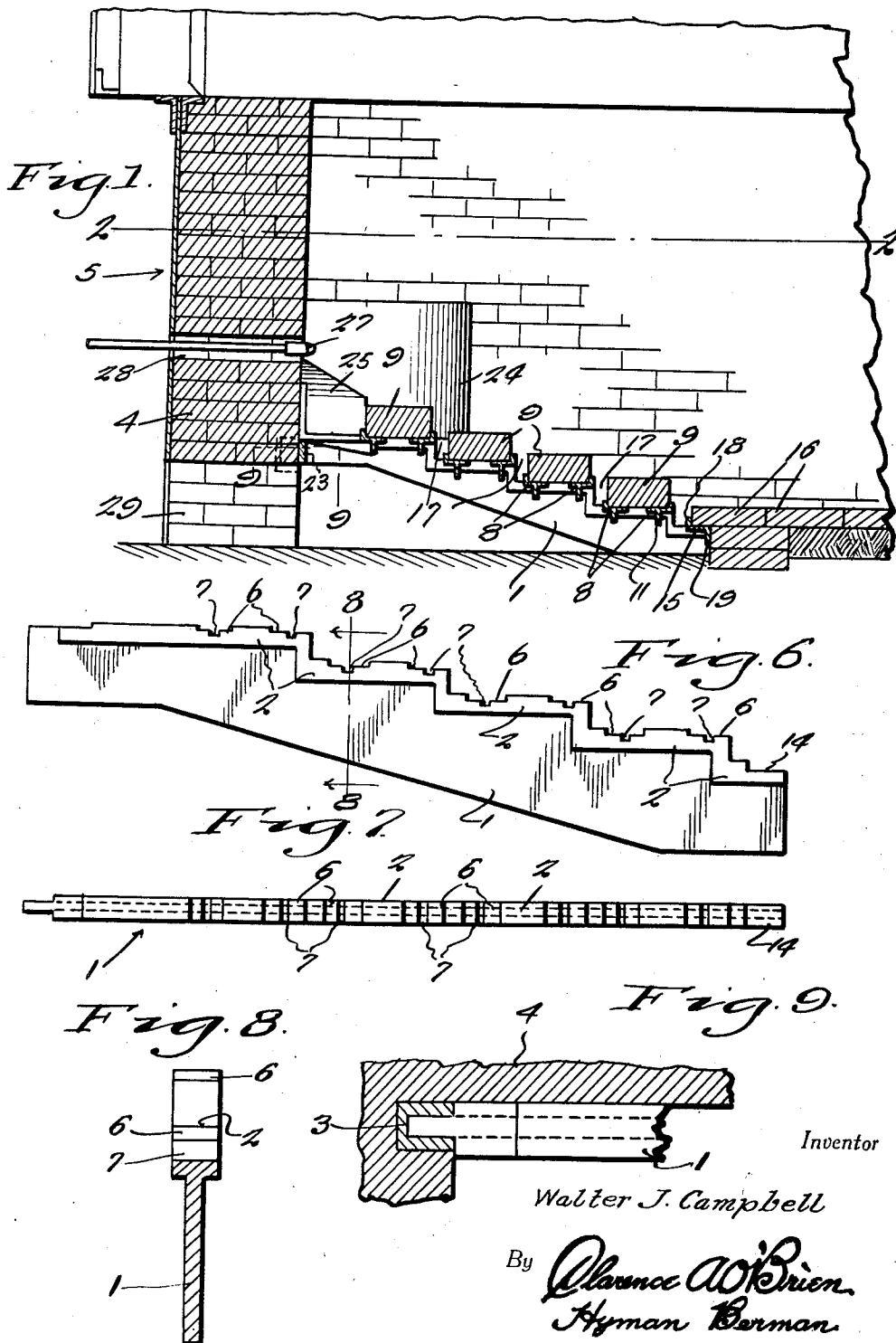
W. J. CAMPBELL

2,226,048

FURNACE

Filed Jan. 26, 1940

3 Sheets-Sheet 1



Dec. 24, 1940.

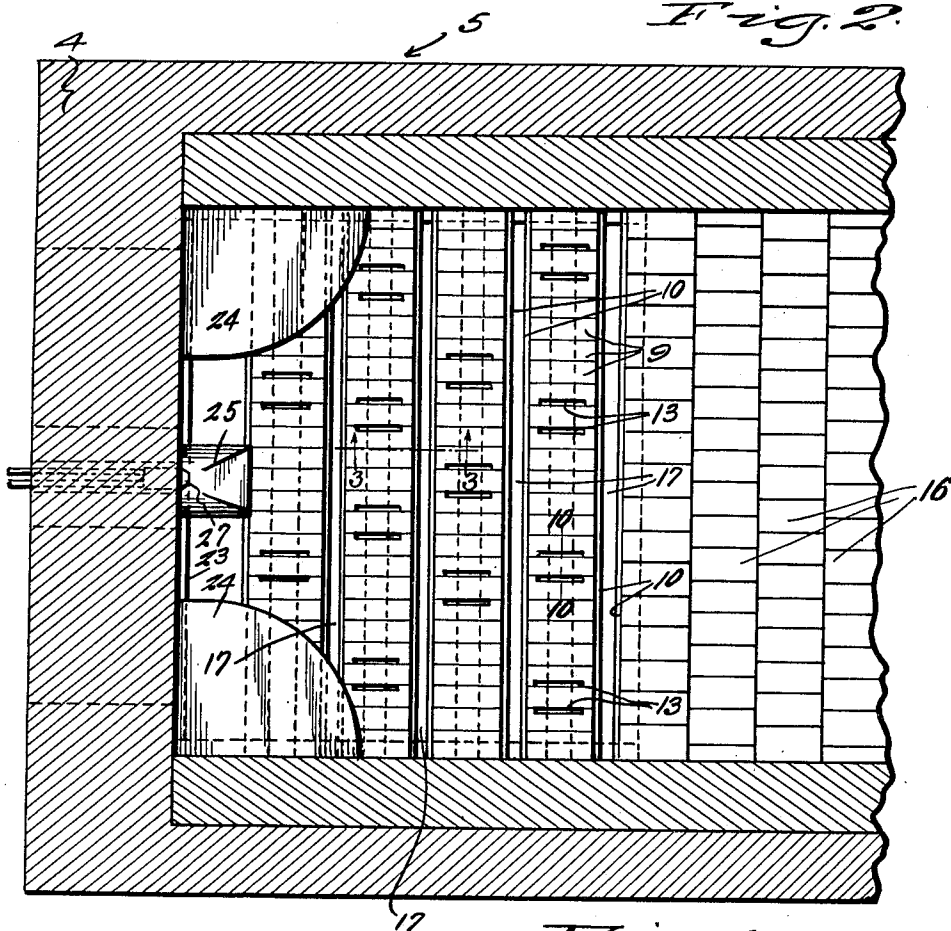
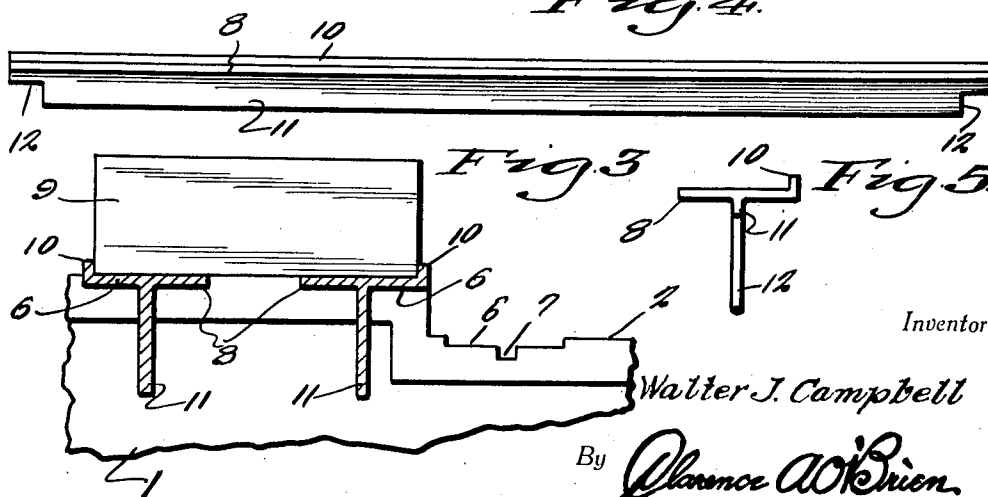
W. J. CAMPBELL

2,226,048

FURNACE

Filed Jan. 26, 1940

3 Sheets-Sheet 2



Inventor

Walter J. Campbell

By

Clarence A. O'Brien
Hyman Berman

Attorneys

Dec. 24, 1940.

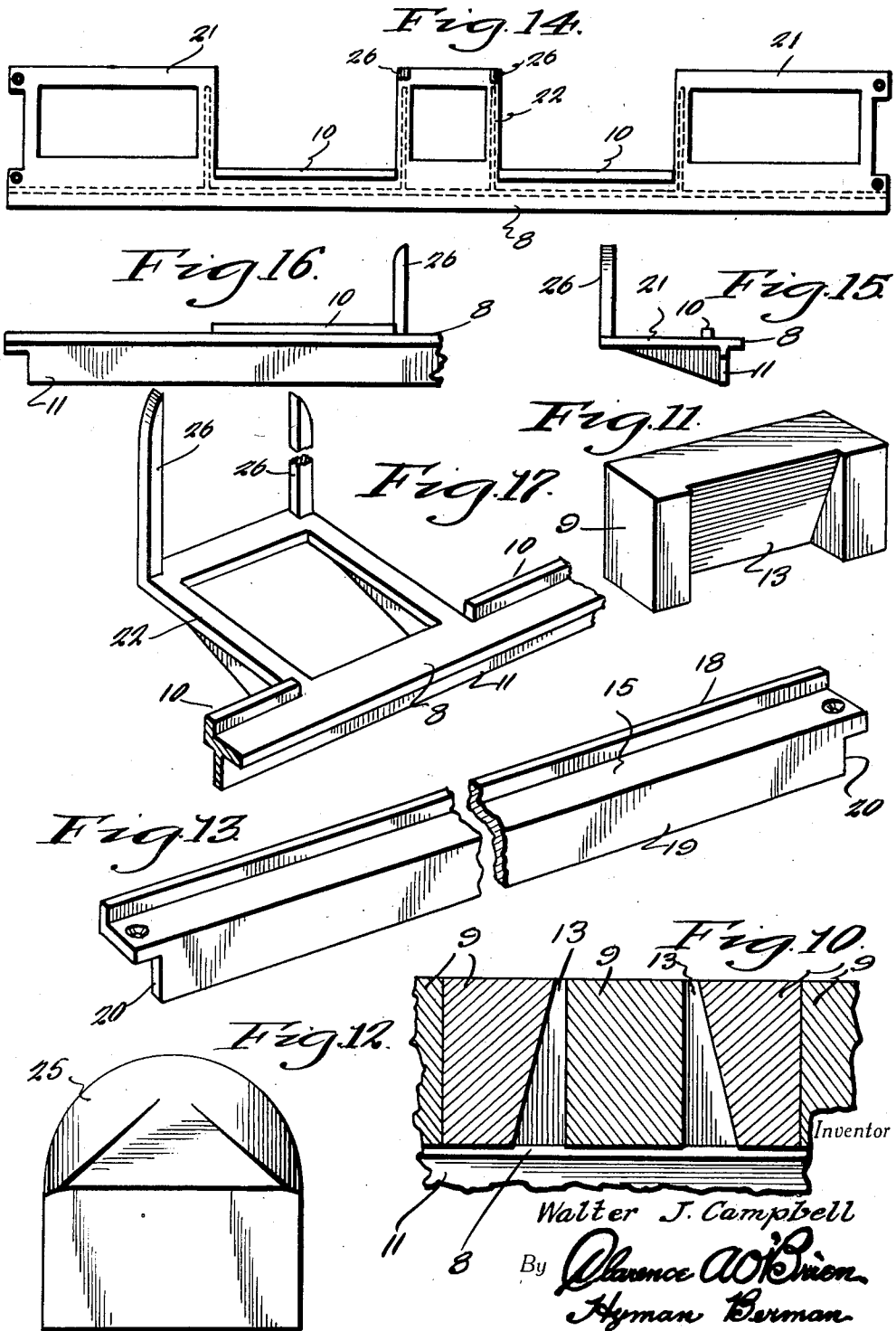
W. J. CAMPBELL

2,226,048

FURNACE

Filed Jan. 26, 1940

3 Sheets-Sheet 3



Walter J. Campbell

By Clarence A. O'Brien
Hyman Berman

Attorneys

UNITED STATES PATENT OFFICE

2,226,048

FURNACE

Walter J. Campbell, Providence, R. I.

Application January 26, 1940, Serial No. 315,838

2 Claims. (Cl. 158—1)

This invention pertains to new and useful improvements in furnaces particularly of the liquid, gaseous or dust burning type and has for one of its important objects to provide, in a manner as hereinafter set forth, a novel construction and arrangement for feeding air whereby the efficiency of the furnace will be materially increased.

Another very important object of the invention is to provide a furnace of the aforementioned character embodying a plurality of stepped air feeding slots or openings, together with novel means for supporting the elements defining said slots or openings.

Still another very important object of the invention is to provide, in a furnace of the type including a drip block and wing tiers, a novel structure for supporting said drip block and wing tiers.

Other objects of the invention are to provide a furnace of the character described which will be comparatively simple in construction, strong, durable, reliable and which may be manufactured and installed at low cost.

All of the foregoing and still further objects and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:

Figure 1 is a view in vertical longitudinal section through an embodiment of the invention.

Figure 2 is a view in horizontal section, taken substantially on the line 2—2 of Fig. 1.

Figure 3 is a fragmentary view in vertical longitudinal section, taken substantially on the line 3—3 of Fig. 2.

Figure 4 is a detail view in side elevation of one of the transverse T beams.

Figure 5 is a detail view in end elevation of one of the T beams.

Figure 6 is a detail view in side elevation of one of the stepped side bars on which the T beams are mounted.

Figure 7 is a top plan view of one of the side bars.

Figure 8 is a cross sectional view through one of the side bars, taken substantially on the line 8—8 of Fig. 6.

Figure 9 is a fragmentary view in horizontal section, taken substantially on the line 9—9 of Fig. 1.

Figure 10 is a fragmentary view in cross section

and on an enlarged scale, taken substantially on the line 10—10 of Fig. 2.

Figure 11 is a detail view in perspective of one of the bricks having a draft passage therein.

Figure 12 is a view in front elevation of the drip block.

Figure 13 is a perspective view of the furnace floor engaging beam.

Figure 14 is a top plan view of the supporting structure for the drip block and wing tiers.

Figure 15 is a view in end elevation of the drip block and tier supporting structure.

Figure 16 is a view in front elevation of one end portion of the drip block and tier supporting structure.

Figure 17 is a perspective view of the intermediate portion of the drip block and tier supporting structure.

Referring now to the drawings in detail, it will be seen that the embodiment of the invention which has been illustrated comprises a pair of duplicate side bars 1 of suitable metal, said side bars being substantially T-shaped in cross section, as shown to advantage in Fig. 8 of the drawings. The side bars 1 are stepped, as at 2, and said side bars are mounted at an inclination. The upper end portions of the side bars 1 are mounted in suitable sockets 3 (see Fig. 9) which are provided therefor in the front walls 4 of a furnace designated by numeral 5.

All but the lowermost of the steps 2 of the side bars 1 have formed therein pairs of spaced recesses 6, said recesses, in turn, being notched, as at 7. Mounted in the recesses 6 of the side bars 1 are transversely extending pairs of beams 8 of suitable metal on which longitudinal bricks 9 are mounted in side abutting engagement. The bricks 9 are retained against longitudinal movement by upstanding flanges 10 on the beams 8. The depending flanges 11 of the substantially T-shaped beams 8 are provided with reduced end portions 12 which engage in the notches 7. The upper faces of the beams 8 are flush with the steps 2. Certain of the bricks 9 have formed therein air passages 13 of the shape shown to advantage in Figs. 10 and 11 of the drawings. The lowermost steps of the side bars 1 have formed therein a single recess 14 for the reception of a metallic beam 15 of the shape shown in Figs. 1 and 13 of the drawings, said beam 15 acting as a stop to prevent creeping of the floor bricks 16 toward the front of the furnace. The construction and arrangement is such that stepped air slots 17 are formed between the rows or courses of bricks. The stop beam 15 comprises upstand-

ing and depending flanges 18 and 19, respectively, on its longitudinal edges. The end portions of the depending flange 19 are recessed, as at 20, to accommodate the side bars 1.

- 5 Referring now to Figs. 14 to 17, inclusive, of the drawings, it will be seen that the first beam 8 on the uppermost steps 2 of the side bars 1 comprises horizontal end frames 21 and an intermediate frame 22. The frames 21 and 22 rest on a bar 10 23 which is provided therefor on the front wall 4 of the furnace 5. The outer ends of the frames 21 are also recessed in and secured to the side bars 1. The frames 21 assist in supporting substantially segmental wing tiers 24 which are 15 mounted in the front corners of the furnace 5 on the uppermost beams 8. Mounted on the frame 22 is a drip block 25 of substantially the shape shown in Figs. 2 and 12 of the drawings. One end of the drip block 25 abuts the front wall 4 of the furnace 5 and is retained between upstanding arms 26 on the frame 22. The reference numeral 27 designates a conventional liquid fuel burner above the drip block 25, said burner extending through opening 28 which is provided therefor in 20 the front wall 4 of the furnace. Draft openings 29 are provided in the lower portion of the furnace front 4.

- It is thought that the operation of the invention will be readily apparent from a consideration of 30 the foregoing, particularly to those skilled in the art to which said invention pertains. Air enters the lower portion of the furnace at the front thereof through the draft openings 29 and flows forwardly, upwardly and then forwardly again 35 through the stepped slots 17, said air also passing upwardly adjacent the front wall 4 on opposite sides of the drip block 25 through the space between said drip block and the wing tiers 24. Some of the air also passes upwardly through the passages 13 in certain of the bricks. The passages 40 13 may be of any desired number and arrangement. The combination and arrangement of the air passages is such that the air will be thoroughly mixed with the fuel from the burner 27 for assur-

ing substantially complete combustion and maximum heating efficiency.

It is believed that the many advantages of a furnace constructed in accordance with the present invention will be readily understood and al- 5 though a preferred embodiment of the device is as illustrated and described, it is to be understood that changes in the details of construction and in the combination and arrangement of parts may be resorted to which will fall within the scope of the 10 invention as claimed.

What is claimed is:

1. A furnace grate structure comprising a pair of stepped, inclined side bars, the steps of said side bars having spaced recesses therein, each 15 recess having a notch therein, pairs of spaced, parallel, transverse beams of substantially T-shaped cross section mounted on the side bars and engaged in the recesses, the depending portions of the T beams having reduced end portions en- 20 gaged in the notches, the upper faces of said T beams being substantially flush with the steps of the side bars, longitudinal bricks extending between the pairs of T beams and resting thereon, said bricks defining spaced, parallel stepped air 25 passages, and upstanding flanges on the T beams engaged with the ends of the bricks, certain of the bricks having vertical air passages formed in one side thereof.

2. A furnace grate structure including a pair of 30 inclined side bars having their upper ends supported on the front wall of a furnace, a pair of spaced, parallel beams mounted transversely on the upper portion of the side bars, bricks mounted longitudinally on said beams and extending there- 35 between, end frames extending horizontally from one of the beams to the front wall of the furnace, wing tiers supported by said beams and said end frames, an intermediate frame on said one beam 40 between the end frames extending to the front wall of the furnace, and a drip block mounted on said intermediate frame.

WALTER J. CAMPBELL.