

Oct. 7, 1941.

M. A. HOFFT ET AL

2,257,956

FURNACE GRATE

Filed March 17, 1939

2 Sheets-Sheet 1

Fig. 1.

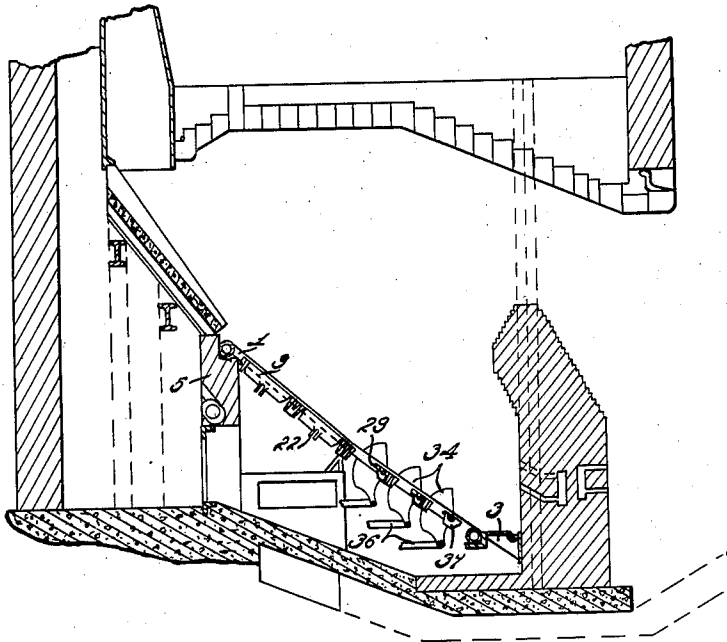
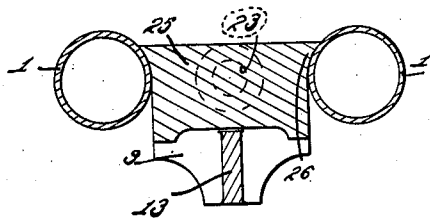


Fig. 4.



INVENTOR.
Maurice A. Hofft and
BY *Nick T. Puckett,*
Hood & Hahn
ATTORNEYS.

Oct. 7, 1941.

M. A. HOFFT ET AL

2,257,956

FURNACE GRATE

Filed March 17, 1939

2 Sheets-Sheet 2

Fig. 2.

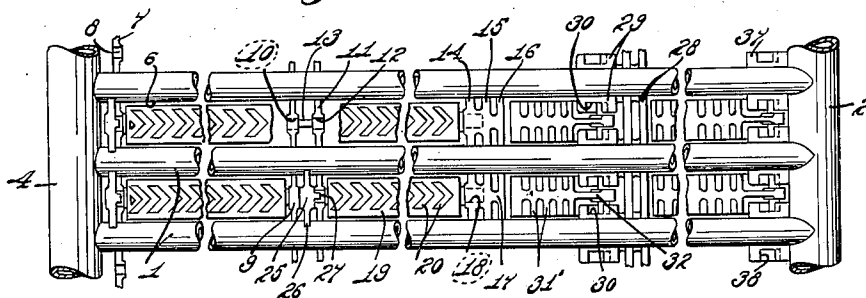


Fig. 5.

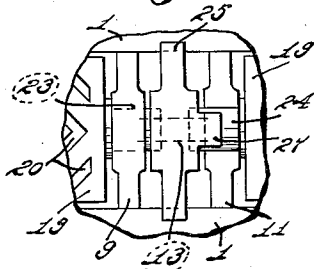


Fig. 6.

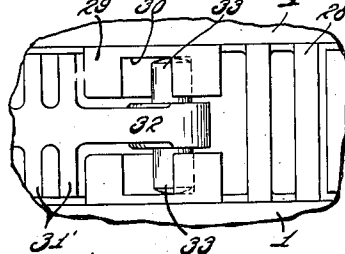
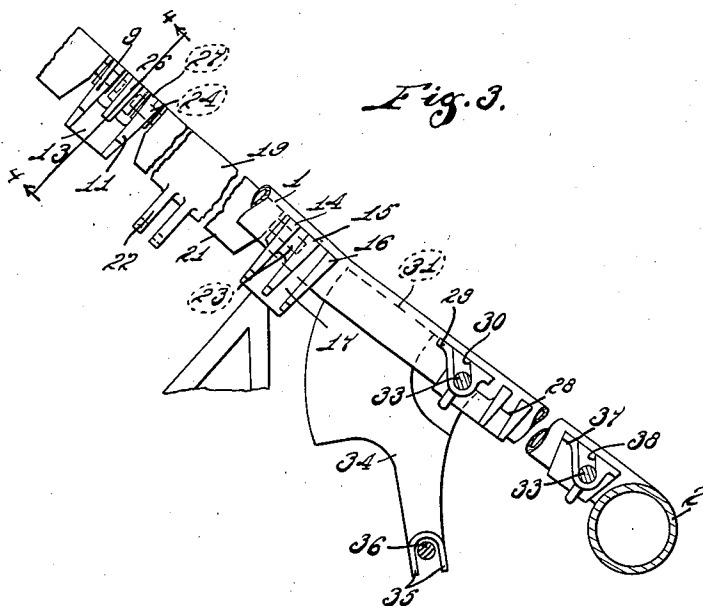


Fig. 3.



INVENTOR.
Maurice A. Hofft and
Nick T. Puckett,
BY
Hood & Blum
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,257,956

FURNACE GRATE

Maurice A. Hofft and Nick T. Puckett,
Indianapolis, Ind.

Application March 17, 1939, Serial No. 262,391

4 Claims. (Cl. 122—376)

The present invention relates to improvements in furnaces and particularly to the grates of furnaces of that type adapted for burning such fuels as refuse, waste, rubbish, garbage, and like material. The invention is particularly adapted for burning material having a high moisture content.

One of the objects of the invention is to provide a grate which will include water-cooled tubular grate bar supporting members and suitable grate bars supported thereby in such a manner that the grate bars may be moved for the purpose of breaking up the fuel bed, when desired.

Another object of the invention is to provide water-cooled supporting members carrying grate bars which may be readily replaced in event of damage and which will be substantially held against displacement.

For the purpose of disclosing the invention, an embodiment thereof is illustrated in the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of a furnace having embodied therein the improved form of grate;

Fig. 2 is a partial plan view of a grate bar embodying the invention;

Fig. 3 is a partial side elevation thereof, certain parts being broken away for fuller illustration;

Fig. 4 is a detailed sectional view on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged plan of a portion of the grate showing more particularly the trunnion support; and

Fig. 6 is an enlarged detail plan showing more fully a second form of trunnion support.

In the embodiment of the invention illustrated, a plurality of water-cooled tubes 1 is provided, which tubes are arranged side by side and extend from front to back of the furnace. These tubes, at their lower ends are connected together by a header 2 which may be supported from a suitable bracket 3 extending forwardly from the bridge wall of the furnace. The tubes, at their upper ends, are connected to a similar header 4 resting upon a supporting wall 5 in the furnace and these tubes are preferably inclined at an angle from their top end to their bottom end of approximately 42°.

The tubes extend, as before stated, longitudinally from the front to the rear of the furnace and are suitably spaced apart to provide between them, grate-receiving spaces 6. At the upper end between the pair of grate-receiving spaces,

is arranged transversely extending supporting bars 7 which are preferably welded to the walls of the tubes. These transversely extending supporting webs have formed in their upper surfaces trunnion sockets 8. At spaced intervals throughout the length of the upper portion of the tubes, additional trunnion sockets are provided, and as each of these is the same, the description of only one is necessary. A cooperating trunnion socket, for the trunnion socket of the character shown at 8 comprises a transverse web 9 welded to the walls of the tubes and disposed between the tubes, and these webs have center openings 10 therein. A component web 11, similar to web 7, is associated with the web 9 and this has an open topped trunnion socket 12. This web is likewise welded to the walls of the tube, being disposed between a pair of tubes and the webs 9 and 11 are connected together by a longitudinally extending center web 13. As a matter of fact, a complete structure in the form of a casting is formed by the webs 9 and 11 and their connecting web 13, the whole structure being welded between the adjacent tubes 1. There may be as many of these grate supporting webs as desirable, depending upon the length of the grate to be used in the furnace.

A third type of trunnion casting is provided which is adapted to be located further down the length of the tubes. This casting comprises a plurality of transversely extending webs 14, 15 and 16, connected by a center web 17 and provided on its upper edge with a trunnion socket 18. The above trunnion castings are for the purpose of receiving and supporting grate bars. The particular type of grate bar illustrated as being supported by these webs comprises a bar 19 having grate openings 20 in the top surface thereof and provided with downwardly extending side flanges 21 to which are attached rocking lugs 22. The ends of these grate bars are provided with pivot pins 23 and 24 and when the bars are assembled in position, one of the pivot pins, 23, is preferably socketed in a trunnion opening 18, while the top pin is dropped down into a trunnion socket 12. By this arrangement, the grate bar may readily be assembled in position. After the pin 24 has been dropped into a trunnion socket 12, and it will be noted that where the pinions more or less abut, there is a space between the webs 9 and 11. This space is preferably closed by a cross bar 25 having reduced projections 26 which bar drops between the water cooling tubes and is provided with a lip 27 overlapping the trunnion socket 12.

At the lower end of the grate, there are preferably arranged pusher bars of the type illustrated and to accommodate these pusher bars, a type of casting is welded to the adjacent faces of the water tubes. One type of casting comprises the cross bars 28 and the inwardly projecting lugs 29 which have on their upper faces trunnion sockets 30. The structure comprising the lugs 29 and the cross bars 28 preferably comprise one casting which is welded to the opposite faces of the pairs of water tubes and comprises a support for a pusher grate 31 having the upper grate bar portion thereof provided with spaced apart fingers 31'. The lower or front end of this pusher bar has a restricted neck 32 provided with transversely extending pins 33 adapted to socket in the trunnion sockets 30. These hollow pusher fingers extend downwardly, being provided with downwardly projecting arms 34 having bifurcated fingers 35 adapted to receive rocker rods 36. There may be as many of these pusher fingers supporting castings as desired, dependent, of course, upon the length of the grate.

At the lower end and adjacent the headers 2, there are provided internally extending lugs 37 having on their top surfaces trunnion sockets 38 to receive the trunnion pins 33 of the bottom-most pusher fingers. The only difference between these supporting castings and the ones above is that the transverse filler cross bars 28 are dispensed with. It is to be observed that the transverse cross bars provide filler grates for the space between the top edge of one pusher finger and the trunnion edge of the next adjacent pusher finger.

It is obvious that the grate bars 20 may be rocked by suitable rocking mechanism manipulating the projections 22 and that the pusher bars 31 are rocked longitudinally of the grate for the purpose of feeding the fuel forward toward the lower end.

It is obvious that the tubes 1 may be set at any desired angle and may have different portions thereof set at any desired angle throughout their length. To accomplish this, these tubes may be bent either in a continuous curve or by short curves at different points to obtain different angular inclinations of the tubes.

We claim as our invention:

1. A furnace grate comprising in combination,

a plurality of water tubes arranged in spaced side by side relation, grate bar sections disposed between adjacent pairs of tubes, a portion of said sections having trunnion pins at their opposite ends, and transversely extending supports for said sections welded to the opposed faces of tube pairs and extending between the tubes, said supports having trunnion recesses therein for the reception of the trunnion pins of the grate bar sections.

2. A furnace grate comprising in combination, a plurality of water tubes arranged in spaced side by side relation, grate bar sections disposed between adjacent pairs of tubes, a portion of said sections having trunnion pins at their opposite ends and transversely extending supports for said sections welded to the opposite faces of the tubes and extending between the tubes, certain of said supports having trunnion pin recesses in the side faces thereof and other of said supports having trunnion recesses in the top faces thereof for the reception of the trunnion pins on said grate bar sections.

3. A furnace grate comprising in combination, a plurality of water tubes arranged side by side in spaced relation, pairs of grate bar supports each having a trunnion socket therein and welded to adjacent water tubes, and grate bars having oppositely disposed trunnions resting in the trunnion sockets of the grate bar supports and between the water tubes.

4. A furnace for burning refuse fuels and having a front wall and a bridge wall, including a grate comprising a hearth, downwardly inclined and extending from the intake end of the furnace toward the rear, a plurality of water tubes disposed side by side in spaced relation and extending from front to rear of the furnace and having their upper ends supported above the surface of said hearth and their lower ends supported adjacent the bridge wall and grate bars mounted between said tubes beyond the hearth, said grate bars having openings therein permitting the inlet of air beneath the fuel bed, the top surface of said grate bars being below the top surface of the tubes and the fuel being slidably supported on the top surface of the tubes and leaving a space between the bottom surface of the fuel and the top surface of the grate bars.

MAURICE A. HOFFT.
NICK T. PUCKETT.