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(54) Grate bar with protection element of ceramic material or equivalent material of high heat and wear resistance.

(57) The grate bar according to the invention is used particularly in the grates of incineration furnaces, which are normally formed with a bed consisting of rows of grate bars supported by two frames driven with reciprocating motion to feed the fuel along the grates.

The grate bars are subject to considerable erosion due to their rubbing against each other and against the overlying material to be burned, and are also obviously exposed to the flames so that they are subject to rapid oxidation and wear.

To reduce said wear and oxidation phenomena, the grate bar according to the invention consists of a lower element with a load-bearing function, constructed of steel or cast iron without particular heat or abrasion resistance characteristics, and an upper element formed of ceramic material or another equivalent material.

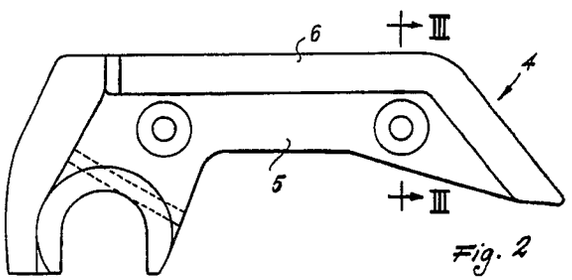

Fig. 2

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GRATE BAR WITH PROTECTION ELEMENT OF CERAMIC MATERIAL OR EQUIVALENT MATERIAL OF HIGH HEAT AND WEAR RESISTANCE

This industrial invention patent relates to a a grate bar for furnaces, particularly but not exclusively for the incineration of solid urban refuse and/or equivalent materials.

Incineration furnaces for solid urban refuse are provided in particular with a grated combustion section which automatically feeds and burns the refuse.

The most widespread type of grate is the reciprocating type, and is conventionally composed of a fixed frame and a mobile frame which is driven with reciprocating motion by suitable means. The purpose of the mobile frame is to support rows of grate bars which form a bed for the refuse or other material.

As is well known, the rows of grate bars are arranged in cascade and are alternately connected to the fixed frame and to the mobile frame so as to feed the fuel and then discharge it in the form of ash.

The grate bars are currently constructed from cast iron of high temperature resistance and are subject to considerable erosion due to their rubbing against each other and against the overlying material, in addition to being obviously exposed to the flame so that they are also subject to rapid oxidation.

The main object of the present invention is to provide a grate bar for furnaces which is formed in such a manner as to have a considerable life, with consequent reduction in the furnace operating costs, in addition to determining a reduction in construction costs compared with the costs of the current version completely of cast iron. In this latter respect, in spite of cooling by the combustion air, the body of a cast iron grate bar reaches a relatively high temperature because of the high conductivity of cast iron. The result is that cast iron of special characteristics has to be used to simultaneously obtain load-bearing capacity and resistance to abrasion at high operating temperatures.

These and further objects of the invention will be apparent to the expert of the art from the description and claims given hereinafter.

The grate bar according to the invention is characterised by consisting of a lower element with a load-bearing function, constructed of steel or cast iron without particular heat or abrasion resistance characteristics, and an upper element which is in direct contact with the combustible material and is formed of ceramic material or another equivalent material.

The grate bar according to the invention, to be associated with a conventional furnace grate, is illustrated by way of non-limited example in the figures of the single accompanying drawing, in which:

Figure 1 is a schematic view of furnace grate comprising the grate bars of the invention;

Figure 2 is a side view of a grate bar; and

Figure 3 is a section on the line II-II of Figure 2.

In said figures, the reference numeral 1 indicates overall a grate comprising grate bars.

The grate 1 comprises conventionally a fixed frame 2a and mobile frame 2b driven with relative reciprocating motion in the direction of the arrows F and F′ and provided with parallel cross-members 3 on which rows of grate bars constructed in accordance with the invention rest in cascade. The feed direction of the fuel is indicated by the arrow G.

With particular reference to Figure 2, each grate bar 4 consists of a lower load-bearing element 5 of cast iron or steel without particular heat and/or abrasion resistance characteristics, and an upper element 6 constructed of ceramic material of high heat and wear resistance or of another equivalent material.

In consideration of the different physical characteristics of the constituent materials of the two elements, and in particular their coefficient of expansion and fragility, the connection between said two elements must be made in a manner which is resistant to force and in particular so that the upper fragile element does not undergo damage.

This problem is advantageously solved, as shown in Figure 3, by constructing the lower element 5 in two halves 5′ and 5″, each with a profile such that they grip the upper element 6, this latter being in the form of a cupel with two side grooves of dovetail shape.

The two halves 5′ and 5″ of the lower element are held together by two stay bolts 7 with elastic elements 8 such as spring washers therebetween, to compensate the difference in expansion between the upper (ceramic) element 6 and the lower (cast iron) element 5, without overstressing.

It is apparent from the aforegoing that with the proposed two-element construction the upper element of ceramic or equivalent material screens and isolates the lower load-bearing element from the heat, so that it can be constructed of normal low-cost cast iron.

Claims

1. A furnace grate bar, characterised by con-

sisting of a lower element (5) with a load-bearing function, constructed of steel or cast iron without particular heat or abrasion resistance qualities, and an upper element (6) with the function of forming the bed for the fuel and constructed of ceramic material or another equivalent material.

2. A grate bar as claimed in claim 1, characterised in that said two elements are connected together by elastic means (7, 8) arranged to compensate the difference in expansion between the upper and lower element, so as not to produce overstressing.

3. A grate bar as claimed in claim 2, characterised in that the lower element (5) consists of two halves (5′, 5″) each with a profile such as to clamp the upper element (6), the two halves of the lower element being held together by said elastic means.

4. A grate bar as claimed in claim 3, characterised in that said means consist of stay bolts (7) and elastic elements (8), which are advantageously spring washers or the like. All substantially as described, illustrated, claimed and for the objects specified.

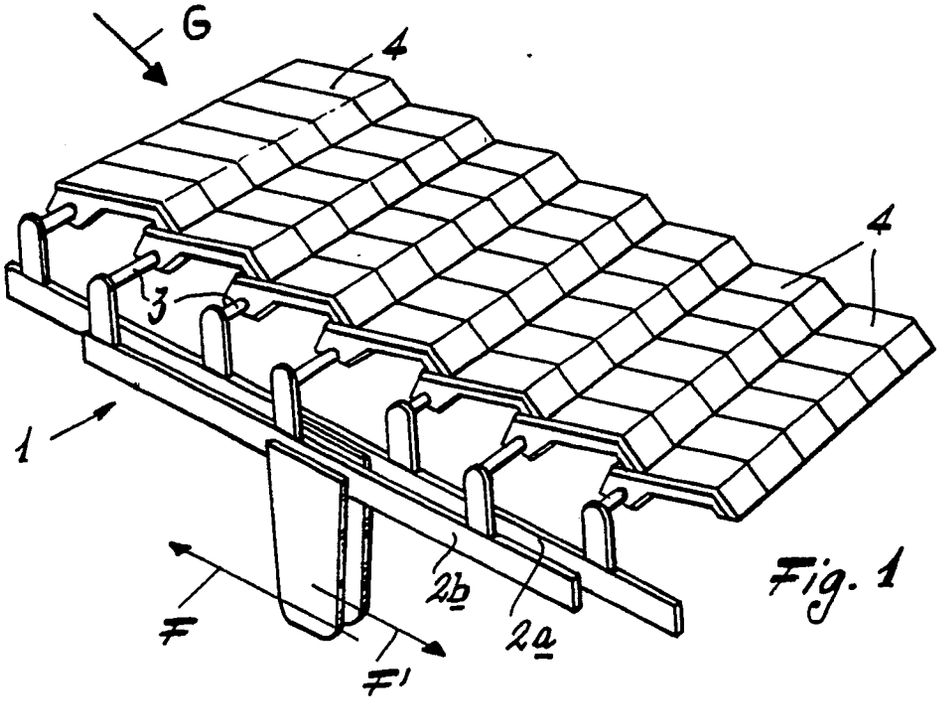

Fig. 1

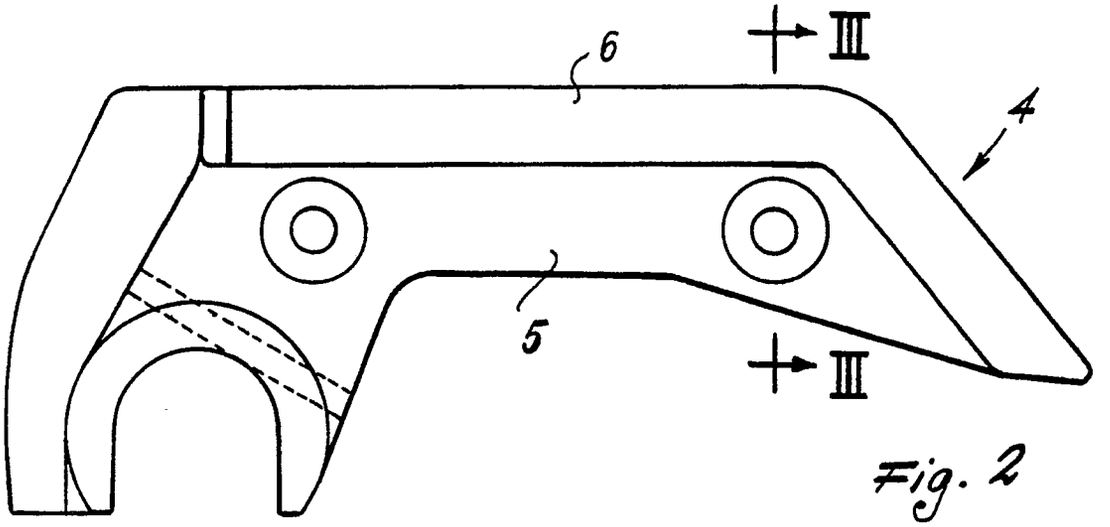

Fig. 2

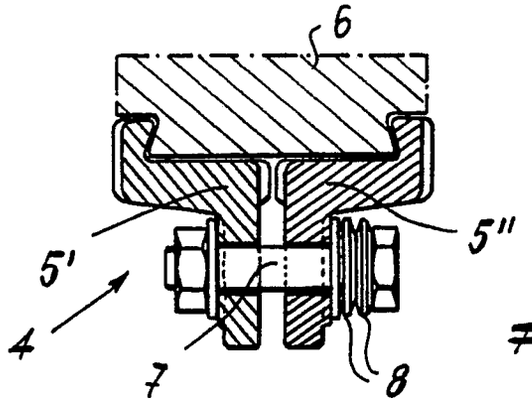

Fig. 3