July 8, 1930. E. O. HOWLE 1,769,996

GRATE BAR CONSTRUCTION

Filed March 2, 1927

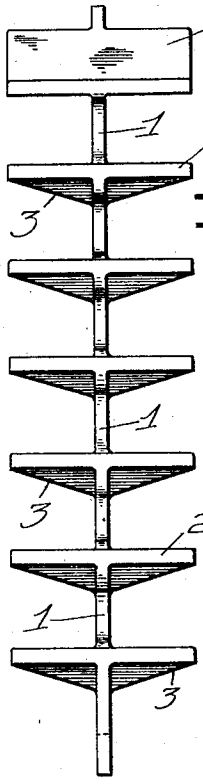


FIG. 1.

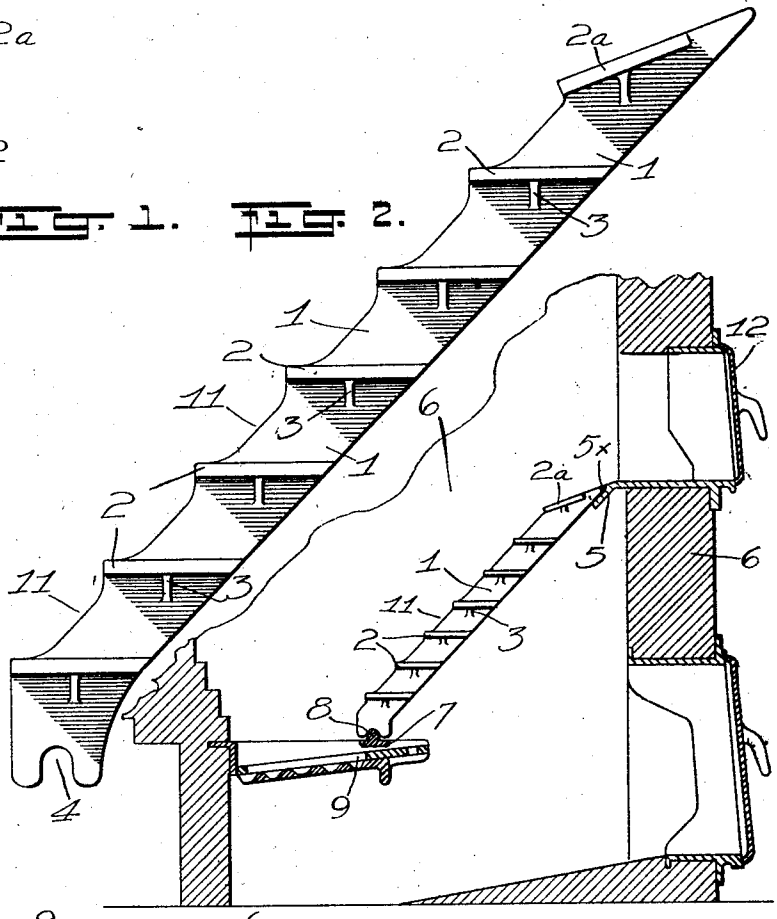


FIG. 2.

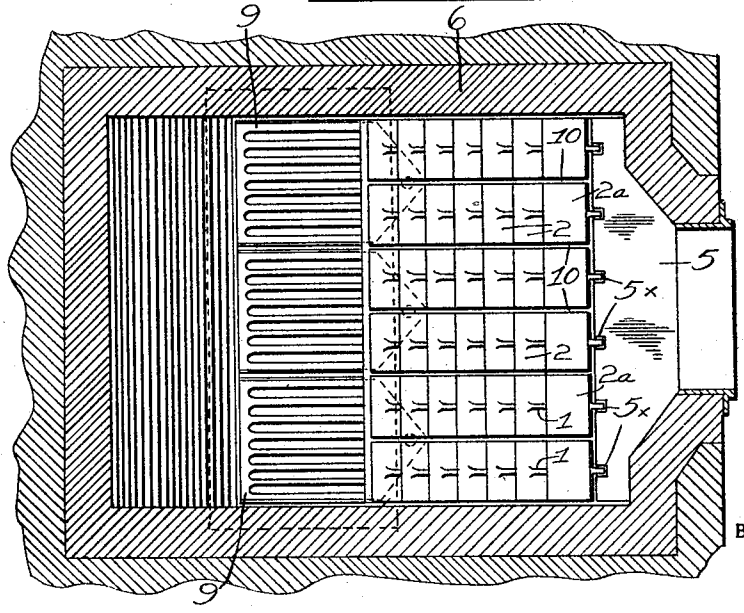


FIG. 3.

FIG. 4.

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GRATE-BAR CONSTRUCTION

Application filed March 2, 1927. Serial No. 172,096.

My invention relates to improvements in grate bar constructions, especially those grate bars used in incinerators and refuse furnaces, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of the invention is to provide a grate bar of the step grate type which is not subject to the warping and burning of the step bar grate of the ordinary type.

A further object is to provide a grate bar construction in which there is a greater radiating surface and in which expansion is provided for, thereby obviating the danger of buckling or warping.

A further object is to provide a grate bar construction of the step grate type which is so arranged that air spaces are provided between the upper surface of the grate and the burning mass which it supports, thus further tending to keep the grate in a cooled condition and preventing its burning.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a front view of a grate bar in its normal inclined position,

Figure 2 is a side view of the bar shown in Figure 1,

Figure 3 is a diagrammatic view showing the position of the bar in an incinerator, and

Figure 4 is a horizontal section through an incinerator, showing the arrangement of a plurality of bars.

In carrying out my invention, I make use of a series of bars, such as that shown in the drawings. These bars, as will be noted, consist of a central supporting portion or stringer 1 and integral steps 2 which project laterally on either side of the stringer, the steps and central stringer being reinforced by integral brace members 3 which serve to prevent warping of the steps and central stringer. As will be seen from Figure 2, the steps are parallel and when the bar is in its normal position they are horizontal. Near the top of the grate bar is a step 2^a which is inclined so as to permit the material fed into the furnace to slide downwardly on the grate bar. This construction permits the upper ends of the bars to be positioned relatively close to the furnace wall, avoids the use of the usual apron to overlap the upper ends of the bars, and permits a grate bar to be readily removed or replaced through the fire door of the furnace. The bottom portion of the bar is projected downwardly and is provided with a recess 4.

In Figure 3 I have shown how the bar rests at its upper end on any suitable supporting member, such as the plate 5 carried by the wall 6 of the incinerator. At the bottom, the grate bars are supported on a transverse rod or plate 7, having an upstanding rounded portion 8 arranged to be received in the recess 4. It will be observed that there is an auxiliary grate portion 9 below the step grate. This auxiliary portion, however, is ordinary and forms no part of the present invention.

In Figure 4 I have shown how the bars of the step grate are arranged. The upper end of the stringer is designed to rest in a recess 5^x in the supporting member 5. The bars are spaced slightly apart, as shown at 10, and the bars at the side are also spaced slightly from the wall 6 of the incinerator or furnace.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. In the ordinary step grate construction, the steps are generally loosely carried on side stringers and expand when subjected to heat and warp out of shape or crack and buckle up.

The integral construction of the present step grate, in which the steps extend from the front to the rear of the grate bar, gives increased radiating surface and thus tends to keep the grate cool. It provides space for the admission of air between the steps into the body of the burning mass upon the grate. It will be noted that between the front edges of the successive steps the front edge of the stringer is cut away, as shown at 11. This tends to provide an air space between

the burning mass and the bar itself which tends to further cool the grate.

In Figure 4, it will be seen that room is provided for the lateral expansion of the steps so that the grate bars are not buckled as they might be where such free expansion is not provided for. Longitudinal expansion of the bar is also provided for, and to this end the upper supporting member 5 is notched so as to hold the grate in position but to permit such expansion.

In Figure 3, in which I have shown a diagrammatic view of the incinerator, the matter is deposited on the grate either through the door 12 or it may be deposited from above through an upper opening, not shown. The uppermost step 2^a tends to guide the material on the inclined series of steps of which the grate bars are formed, and the air, as stated, passes between the steps into the body of the burning mass.

I claim:

1. A grate bar comprising a central stringer, a series of spaced-apart integral side extensions carried by the stringer to constitute steps and extending from the front to the rear of said central stringer, said stringer being cut away between the side extensions for forming recesses, and integral brace members for reinforcing the side extensions and the central stringer, a pair of said integral side extensions being inclined in the direction of the other of said side extensions and the other of said side extensions being arranged in parallelism.

2. A grate bar adapted to be supported in an inclined position comprising a central stringer, a series of spaced-apart integral side extensions carried by the stringer to constitute steps, said stringer being cut away between the side extensions for forming recesses to provide draft passages between the stringer and the material being burned, reinforcing webs formed integrally with the side extensions and the central stringer, the stringer being formed with an upper end portion of rectangular configuration in cross section, the lower end of said central stringer being provided with a recess, means substantially conforming to the shape of said last named recess for supporting the lower end of said stringer, and means having a guiding recess for holding the upper end of the stringer against rotation but with capacity for longitudinal sliding movement.

3. A grate bar construction comprising a central stringer, a series of side extensions formed integrally with the stringer and constituting a series of steps across which the material fed into the furnace moves downwardly toward the lower end of the said grate bar, the lower end of said central stringer being supported against longitudinal downward movement, supporting means for the upper end of the bar having guiding recess in which the upper end of the stringer is held against rotational and lateral movements but with capacity for longitudinal sliding movement to compensate for longitudinal expansion thereof.

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