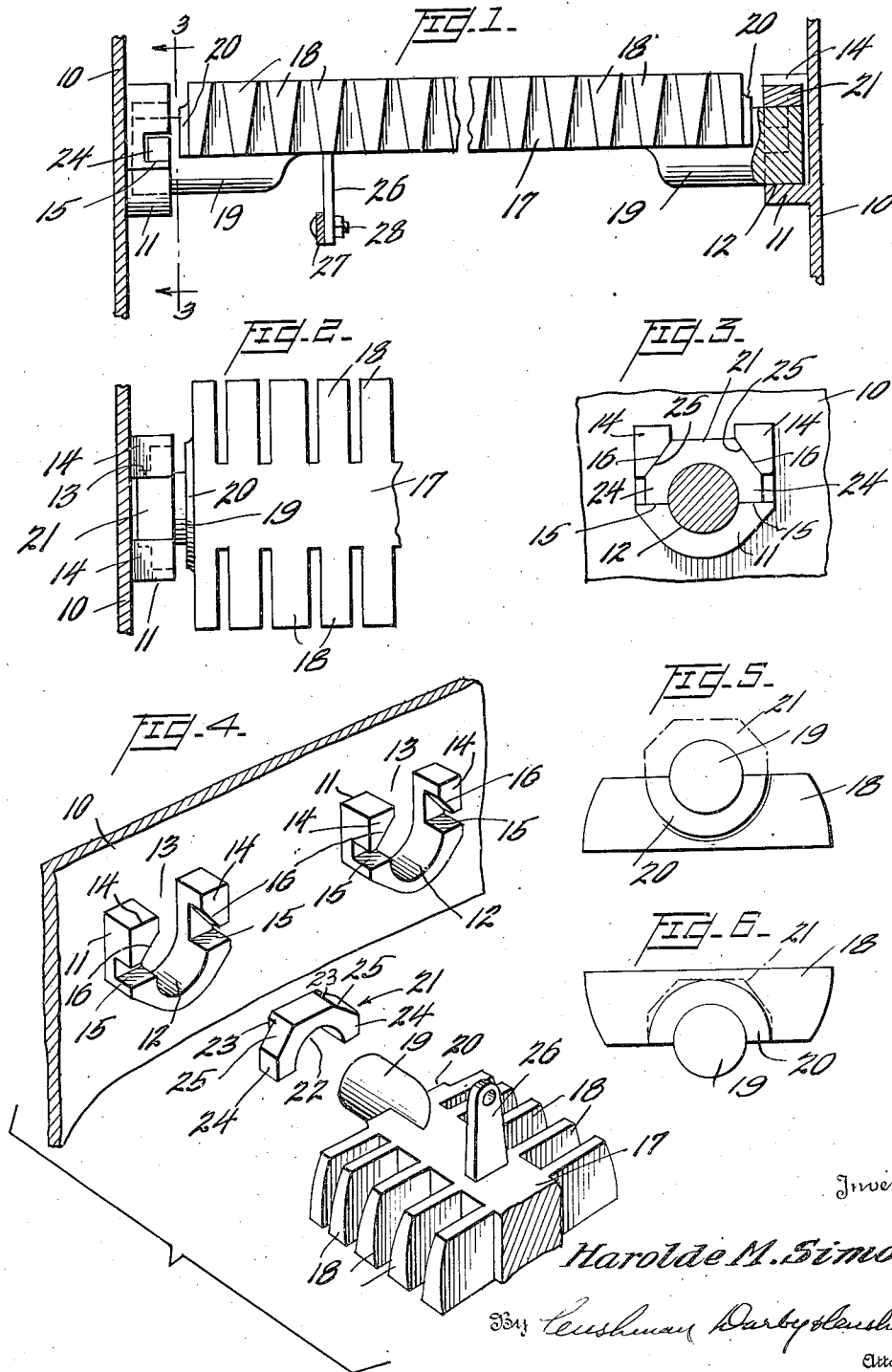


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GRATE FASTENING

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GRATE FASTENING

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The present invention relates to grate fastening means of the revolving grate type used with boilers, furnaces, fire boxes, and other combustible units.

An important object of the invention is to provide simple, efficient and economical means for locking the grate bars and their bearings or supports in proper horizontal and vertical positions.

A further object consists in providing releasable retaining means for positively securing or locking a grate bar in its operative position so that the grate bar may be readily installed or removed.

Another object consists in revolvably and releasably mounting the grate bar on a suitable support, and in which the grate bar is insertable in the support in a reverse or upside-down position and is rotated to its operative position. A retainer block movable longitudinally into and out of the support is arranged to maintain the grate bar in its operative position. The grate bar is provided with stop means movable in the path of the retainer block when the grate bar is rotated to its operative position for the purpose of preventing withdrawal of the retainer block from the support. Movement of the grate bar to carry the stop means away from the retainer block permits the withdrawal of the retainer block from the support so that the grate bar may also be removed therefrom.

Further object comprehends the provision of a support for the grate bar and the retainer block. The support has spaced recesses, constituting seats for receiving complementary lugs on the retainer block, the walls of the seats and the sides of the complementary lugs being inclined so that when the parts are set up, the grate bar is firmly secured to the support and is prevented from moving vertically or jumping up when a clinker or the like is caught between two successive grates.

Other objects and advantages of the invention will become apparent from the following description when taken in conjunction with the accompanying claims and drawings.

Referring to the drawings in which is shown a preferred embodiment of the invention:

Figure 1 is a sectional view of a furnace showing my improved grate bar mounted thereon.

Figure 2 is a detailed plan view of one end of Figure 1.

Figure 3 is a sectional view taken substantially along the line 3—3 of Figure 1.

Figure 4 is a detailed perspective view of the side of the furnace showing the grate bar in its

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inverted, or upside-down position, and the retainer block prior to the assembling of the parts.

Figure 5 is a detailed diagrammatic view showing the grate bar in its inverted position relative to the support, and

Figure 6 is a view similar to Figure 5, showing the grate bar rotated to its operative position.

Referring to the drawings in which like numerals indicate like parts in the several views, 10 designates the spaced sides of a furnace or ash pit wall. A support 11 (Fig. 4) is suitably fastened to or integrally formed on the inner wall of each of the sides 10 and is preferably provided with a semicircular bearing surface 12 in the lower portion thereof and has a vertical opening or recess 13 extending centrally between the upper side arms 14 of the support. Each of the arms 14 is formed with a similarly shaped recess 15 having the upper wall thereof inclined as at 16, for a purpose which will subsequently be described. A grate bar 17 is provided with laterally projecting space fingers or teeth 18 and has extending from each end thereof a trunnion 19 which preferably is of a cylindrical shape and of such size as to be inserted into the support 11 through the opening 13 so as to rest on the curve bearing surface 12. Each end finger 18 of the grate bar has extending outwardly therefrom a curve projection 20 adjacent the trunnion 19 (Fig. 5) that constitutes a stop means, the function of which will later be described. A retainer block or member 21 is formed with a central semicircular bearing surface 22 of substantially the same diameter as the trunnion 19 and with a centrally disposed vertical lug 23 arranged to fit within the opening 13 between the arms 14 of the support 11. The retainer block 21 also has the spaced side lugs 24 provided with inclined sides 25 arranged to snugly fit within the recesses 15 and engage the sides 16 when the parts are set up. The bottom of each of the grate bars adjacent one side thereof has a depending arm 26 to which is suitably connected the grate linkage 27 (Fig. 1), such as by the pin 28 for simultaneously rocking the grates.

As shown in Figure 4, the grate bar 17 is in its inverted or upside down position so as to be initially mounted on the support 11 by inserting the trunnion 19 into the opening 13 so that the trunnion will engage the bearing surface 12. The retainer block 21 is now slidably mounted on the trunnion 19 and moved longitudinally into the support so that the vertical lug 23 fits within and closes the opening 13 above the trunnion 19 and the side lugs 24 snugly engaged their

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complementary recesses or seats 15 and the inclined sides 25 contact with the inclined sides 16 (Fig. 3). The grate bar 17 is then rotated through an angle of 180° to its operative horizontal position (Fig. 2) and during this movement the stop means 20 is moved in the path or in front of the retainer block 21 so as to prevent the withdrawal of the retainer block from the support 11. The parts are now firmly locked in their assembled or operative position. The trunnions 19 are of such length that the stop means 20 is spaced from the adjacent wall of the support 11 but not sufficiently to permit the withdrawal of the retainer block 20. When it is desired to remove the grate bar 17 from the support the grate linkage is disconnected from the arm 26 and the grate bar 17 rotated from its normal or operative position, through an angle of 180° to the position shown in Figure 5. This will result in the curve stop projection 20 being moved from in front of the retainer block 21 so as to allow the lateral withdrawal of the block 21 from the support and the subsequent removal of the trunnion 19 through the opening 13.

The trunnion 19 may be vertically offset relative to the grate bar 17 and extends outwardly from the adjacent end fingers 18 so that when the grate is in its normal operative position substantially half the diameter of the trunnion 19 is below the lower surface of the grate bar. Any number of grate bars may be disposed transversely of the side walls 10 of the furnace so as to be removably mounted in suitable space supports 11 carried between the side walls, and these grate bars may be operatively connected for simultaneous movement through suitable linkage connected to the depending arm 26.

In the event clinkers should be caught between two successive grates 17 and a rocking movement imparted to the grates, the trunnions 19 carried by the supports 11 are prevented from moving vertically or jumping up in the supports due to the fact that the upward force imparted to each trunnion 19 is absorbed through the contact of the inclined sides 25 of the lugs 24 with the inclined sides 16 of the support so as to substantially reduce this force and prevent objectionable strain being transferred to the lugs on the retainer block 21. In other words, the vertical force exerted due to the principle of the inclined plane employed, is broken up into component forces through the inclination of the sides of the block 21 and the inclined walls of the recesses 15 with the result that the effect of this force is greatly reduced, so that the lugs on the block 21 may be kept at a safe minimum as to size without in any way impairing the efficient operation of the parts. This feature is highly desirable both from a manufacturing and design viewpoint.

It is to be understood that the form of the invention shown and described is merely illustrative of a preferred embodiment and that such changes may be made as comes within the purview of one skilled in the art without departing from the spirit of the invention and the scope of the claims.

I claim:

1. In combination with a grate bar, a support for said grate bar, said grate bar being insertable in the support in a reverse position and rotatable to its operative position, and retaining means movable longitudinally into and out of the support for releasably securing the grate bar to the support, said grate bar having stop means mov-

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able in the path of the retaining means when the grate bar is rotated to its operative position to prevent removal of the retaining means from the support.

2. In combination with a grate bar having a trunnion, a stop projecting from said grate bar, a grate bar support having a trunnion seat and recesses constituting lug seats, said grate bar being insertable in the support in a reverse position and rotated to its operative position, and a retaining block having lugs movable longitudinally into and out of engagement with the lug seats on said support to prevent vertical displacement of the block, said grate bar when rotated to its operative position moving said stop in the path of the retaining block to prevent the removal of the latter from the support.

3. In combination with a grate bar having a trunnion, a support for the trunnion, said grate bar being insertable in the support in a reverse position and rotatable to its operative position, said support having spaced recesses constituting lug seats, a retainer block for releasably securing the grate bar to the support, said retainer block having spaced lugs arranged to be moved into and out of said lug seats, said grate bar adjacent the trunnion having outwardly extending stop means movable in the path of the retainer block when the grate bar is rotated to its operative position to prevent removal of the retainer block from the support, said stop means when moved away from the retainer block allowing the latter to be withdrawn from the support.

4. In combination with a grate bar having a trunnion, a stop projecting from said grate bar adjacent the trunnion, a grate bar support having a trunnion seat and a recess at each side of the trunnion seat, and a retainer block movable longitudinally into and out of the support, said block having a central lug and side lugs, said central lug arranged to extend into the support above the trunnion seat and said side lugs arranged to fit into the recesses when the parts are set up, said grate bar when turned to its operative position moving the stop in the path of the retainer block to prevent removal of the latter from the support, said stop when moved away from the retainer block allowing the same to be withdrawn from the support.

5. In combination with a grate bar having a trunnion, a stop projecting from said grate bar adjacent the trunnion, a grate bar support having a trunnion seat, and a recess at each side of the trunnion seat constituting lug seats, each of said lug seats having an inclined upper wall, and a retainer block movable longitudinally into and out of the support, said block having a central lug and side lugs, said central lug arranged to extend into the support above the trunnion seat, and each of said side lugs having inclined upper surfaces arranged to fit in the lug seats and engage the inclined sides thereof when the parts are set up, said grate bar when turned to its operative position moving the stop in the path of the retainer block to prevent the removal of the latter from said support, said stop when moved away from the retainer block allowing the same to be withdrawn from the support.

6. The combination of a grate bar having a trunnion with a portion extended below the surface of said bar, a stop projecting from the end of said bar adjacent said trunnion, a grate bar support having a trunnion seat and a recess constituting a lug seat at each side of said trunnion seat, and a trunnion retaining block engaging said

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trunnion and having lugs to engage the lug seats on said grate bar support to prevent vertical displacement of the block, said grate bar being rotatable in said support to move the stop into and out of the path of said retaining block.

7. A trunnion support for grate bars comprising a fixed member having a trunnion seat and a recess constituting a lug seat at each side of the trunnion seat, a trunnion retaining block longitudinally insertable in said fixed member and having a trunnion engagement seat, and a lug on each side of said trunnion seat to engage a lug seat on said fixed member to prevent vertical displacement of the block.

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8. A trunnion support for grate bars comprising a fixed member having a trunnion seat and a recess on each side of said trunnion seat forming a lug seat, the upper wall of each recess being inclined, a trunnion retaining block movable longitudinally relative to said fixed member and having a trunnion engaging seat and a lug on each side of said trunnion seat for engaging the lug seats on said fixed member, each of said lugs having its upper surfaces inclined to engage the inclined wall of the adjacent recess in order to prevent vertical displacement of the block.

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No references cited.