No. 789,496. PATENTED MAY 9, 1905.

J. D. JAMES.

FURNACE.

APPLICATION FILED AUG. 3, 1904.

Fig. 1.

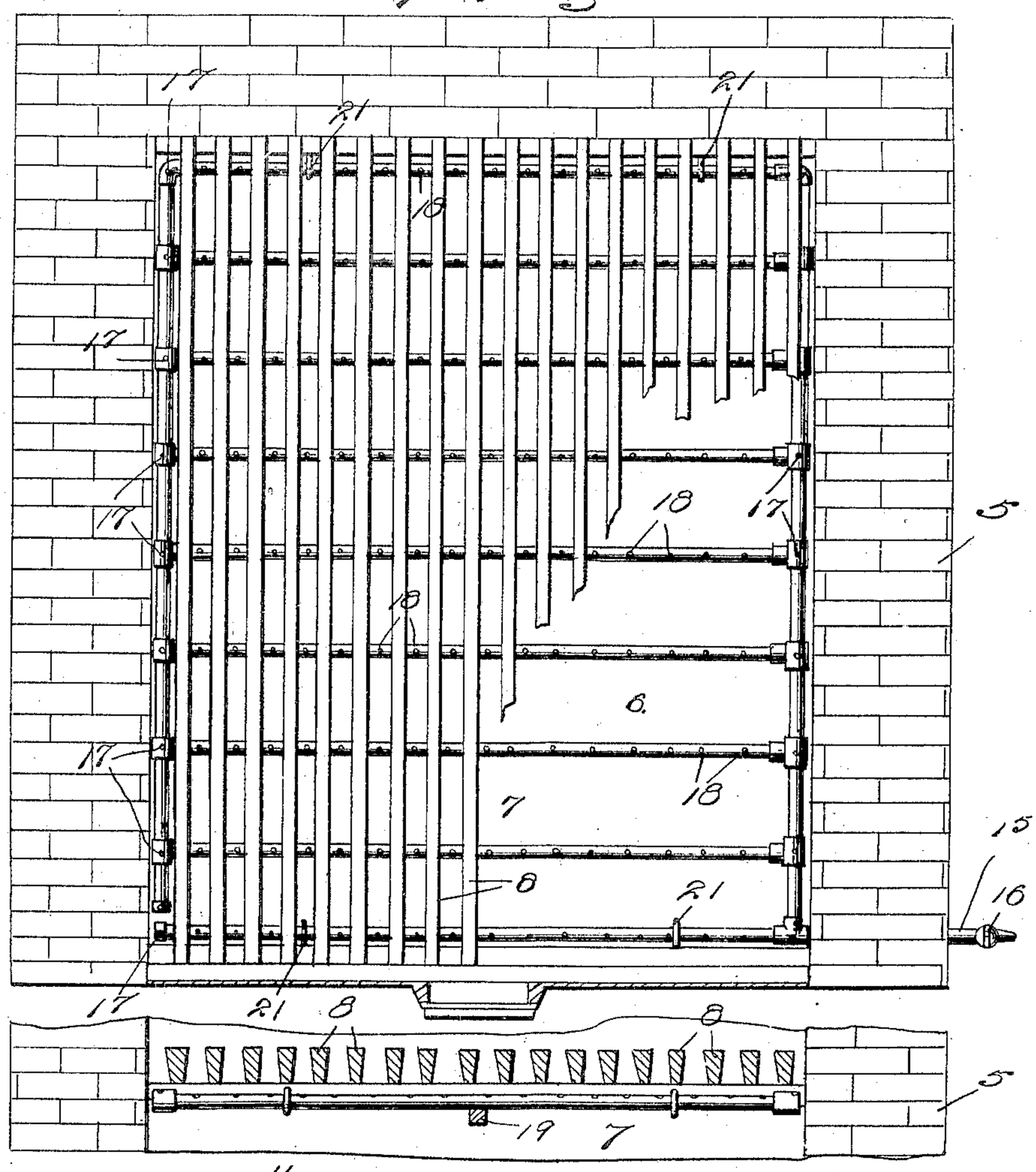

Fig. 2.

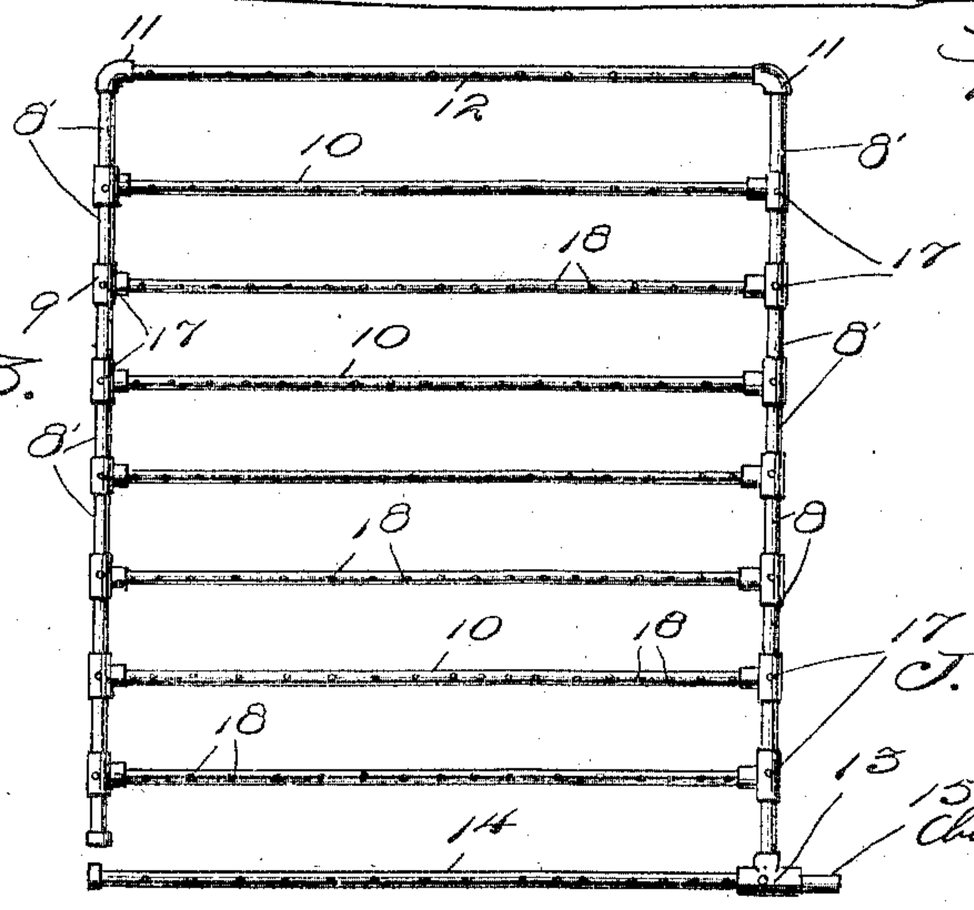

Fig. 3.

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No. 789,496. Patented May 9, 1905.

UNITED STATES PATENT OFFICE.

JOHN D. JAMES, OF PULASKI, VIRGINIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 789,496, dated May 9, 1905.

Application filed August 3, 1904. Serial No. 219,370.

To all whom it may concern:

Be it known that I, JOHN D. JAMES, a citizen of the United States, residing at Pulaski, in the county of Pulaski, State of Virginia, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to furnaces, and has specific reference to means for preventing the formation of the hard vitreous clinkers which accumulate upon the grate-bars and serve not only to lower the efficiency of the furnace, but also to soon destroy the grate-bars themselves, the object of the invention being to provide a cheap and simple apparatus or means for injecting tiny streams or sprays of water upwardly between the grate-bars and continuously of the lengths of the latter, so that the clinkers that tend to form on the grate-bars are maintained in a spongy frangible state, which permits them to be raked down after the manner of ordinary ash.

Further objects of the invention are to provide means for disintegrating the clinkers that form upon the fire-box lining or wall and to permit of the use of a grate or fuel that cannot be otherwise used because of the excessive clinker-forming properties of the fuel. By the use of the present invention, therefore, the clinkers are disintegrated, the grate-bars are saved, the fire-box lining has a longer life, the labor of removing clinkers is practically eliminated, and the moist condition in which the ash falls into the ash-pit prevents that dust which is ordinarily present in a furnace-room.

Other objects and advantages of the invention will be understood from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a horizontal section through a furnace just above the grate-bars, which latter are partly broken away and are shown in top plan. Fig. 2 is a transverse section on line 2 2 of Fig. 1. Fig. 3 is a plan view of the water-piping or grille.

Referring now to the drawings, there is shown a common type of furnace, including a masonry wall 5, which incloses a fire-box 6 and an ash-pit 7, between which latter are grate-bars 8 of common form and arrangement, these portions of the structure illustrated forming no part of the present invention in themselves.

In installing the present invention a grille of pipe is provided comprising side members, each including a series of nipples 8′, connected by the T's 9, the stems of corresponding opposite T connections having the transverse pipes 10 engaged therein. The endmost nipples at one end of the grille are engaged in L's 11, with which is also engaged a transverse pipe 12, while one end of the endmost nipples at the opposite end of the grille is engaged in the stem of a T 13, with one end of the head of which is engaged a pipe 14, having its free end closed, the free end of the remaining endmost nipple being also closed, as by a cap, as illustrated. With the outer end of the head of the T connection 13 is engaged a supply-pipe 15, having a hand-valve 16 for regulating the flow of water into the grille.

The grille is arranged with the pipes 12, 10, and 14 transversely beneath and spaced slightly below the grate-bars 8, while the nipples, T's, and L's extend in lines longitudinally of the grate-bars and beneath the interspaces between the outermost grate-bars. Each of the T's and L's is provided with a perforation 17 in its upper face arranged to direct a stream of water or a spray upwardly between the outermost grate-bars and the wall of the fire-box, as the case may be, and other perforations 18 are formed in the upper faces of the transverse pipes, so as to direct streams or sprays upwardly between the remaining grate-bars. It will be noted that the grille is so proportioned that the streams or sprays are delivered at short intervals longitudinally of the grate-bars, so as to affect the clinkers continuously of the lengths of the grate-bars, to disintegrate the clinkers, and prevent the vitreous formations upon the bars.

By arranging the pipes 12, 10, and 14 transversely of the grate-bars they do not interfere with proper settlement of the ash into the ash-pit, while the water in the pipes remains at such a low temperature as to insure immediate results. Furthermore, the pipes are not burned.

A supporting-bar 19 is provided beneath the grille and extends longitudinally of the grate-bars and sustains the principal weight of the grille, it being understood that additional supports in the form of hooks 21 may be driven into the masonry and engaged around the outer pipes of the grille.

In the operation of a furnace in which the present invention is installed the entire lower portion of the body of ash on the grate-bars and between the grate-bars is dampened, so that the upper faces of the grate-bars are moistened, but to a lesser degree, of course, than the sides of the grate-bars, against which portions of the streams or sprays are played. Advantage is taken of the rapid absorption of heat units involved in the evaporation of the moisture upon the grate-bars, and it is found in practice that the rapid evaporation of the surface moisture and its conversion into vapor produces a far more rapid reduction of temperature than when the cooling of the grate-bars is effected by a water circulation through them. The temperature is further reduced by reason of the chilling of the lower portion of the body of ash and coke. The present invention not only prevents the formation of clinkers upon and above the grate-bars, but also prevents their formation against the fire-box lining. This method of cooling the grate-bars and disintegrating the clinkers does not effect a loss of heat in the furnace above, for the reason that the aqueous vapor in being decomposed into its constituent gases in the furnace-chamber or fire-box promotes the chemical union and intensifies the heat above, so as to give greater effectiveness to the fuel.

What is claimed is—

1. In a furnace, the combination with grate-bars of means disposed therebelow and constructed and arranged to eject liquid streams or sprays upwardly through the interspaces between all of the grate-bars and at intervals longitudinally thereof.

2. In a furnace, the combination with grate-bars, of means disposed therebelow and constructed and arranged to eject liquid streams or sprays upwardly through all of the interspaces between all of the grate-bars and at so short intervals longitudinally of the bars as to affect the entire lower face of the body of material lying exposed through said interspaces.

3. In a furnace, the combination with grate-bars, of a grille arranged below the grate-bars, said grille comprising pipes perforated in their upper faces at points below the interspaces between the grate-bars, said pipes being arranged at intervals longitudinally of the grate-bars and being connected with a water-supply.

4. In a furnace, the combination with grate-bars, of a grille disposed therebelow and comprising an outer hollow frame and pipes connected thereto and extending transversely of the grate-bars, said pipes having perforations in their upper faces below the interspaces between the grate-bars.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN D. JAMES.

Witnesses:
GEO. H. CHANDLER,
E. W. VAN DYKE.