

J. R. FORTUNE & H. S. WELLS.
GRATE STRUCTURE.
APPLICATION FILED JULY 12, 1910.

981,408.

Patented Jan. 10, 1911.

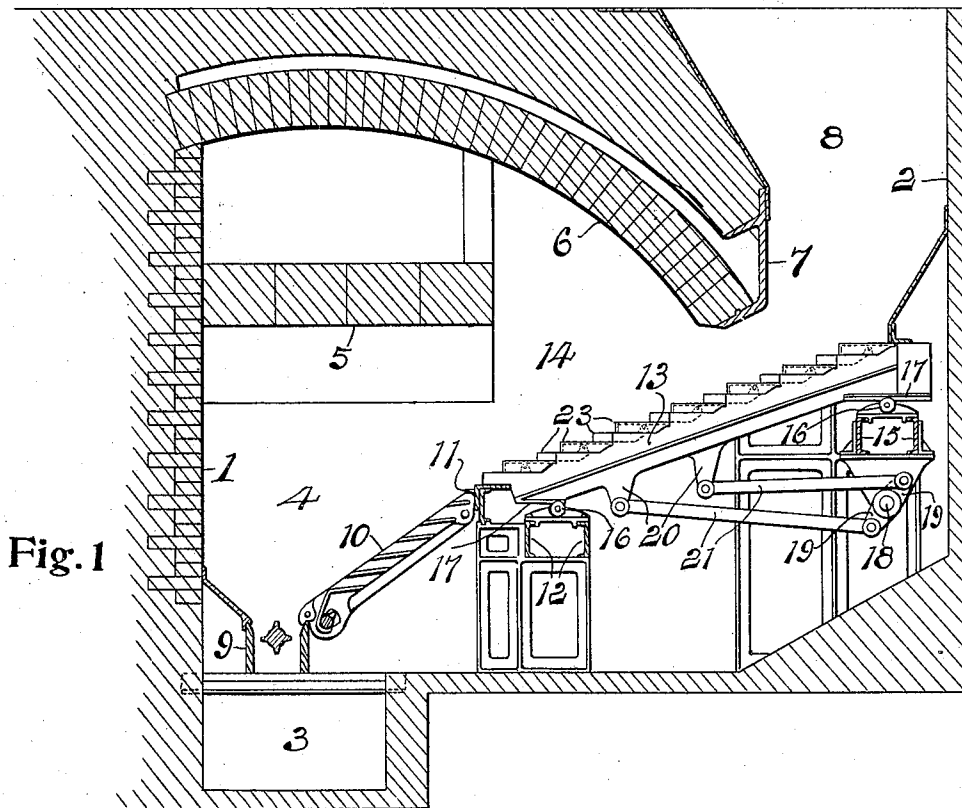


Fig. 1

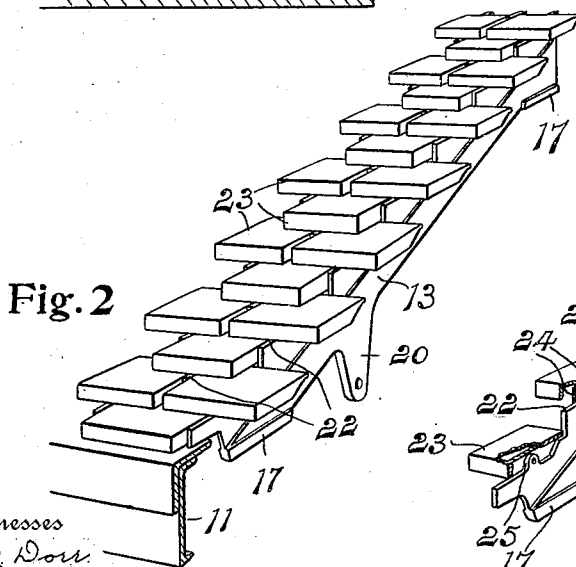


Fig. 2

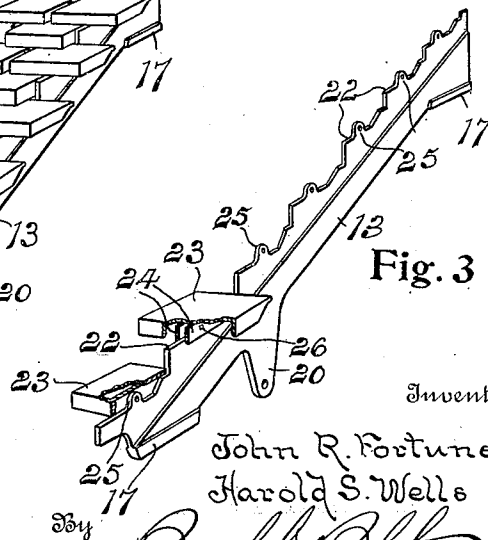


Fig. 3

Witnesses
A. M. Dow
A. M. Shannon.

Inventors

John R. Fortune
Harold S. Wells

By

Bartholomew

Attorneys

UNITED STATES PATENT OFFICE.

JOHN R. FORTUNE AND HAROLD S. WELLS, OF DETROIT, MICHIGAN, ASSIGNORS TO
MURPHY IRON WORKS, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

GRATE STRUCTURE.

981,408.

Specification of Letters Patent.

Patented Jan. 10, 1911.

Original application filed October 27, 1909, Serial No. 524,981. Divided and this application filed July 12, 1910. Serial No. 571,589.

To all whom it may concern:

Be it known that we, JOHN R. FORTUNE and HAROLD S. WELLS, citizens of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Grate Structures, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in grate structures for furnaces and the like and its object is to provide a structure comprising a plurality of independently movable bars having overlapping members attached thereto for feeding the material to be burned, downward over the structure at a slow speed and in a manner to distribute the same evenly over the entire surface of the grate structure, said members forming the structure being so made as to be cheap to manufacture and so that the exposed parts which are liable to be burned out may be replaced without the necessity for removing the entire member or bar.

A further object is to provide a construction in which the overlapping parts of the several members may move slightly upon said members to prevent the parts from binding, and to provide certain other new and useful features in the construction and arrangement of parts all as hereinafter more fully described reference being had to the accompanying drawing, in which—

Figure 1 is a transverse vertical section through a furnace structure showing a grate structure embodying the invention in operative position therein; Fig. 2 is a perspective detail of a portion of the grate structure; and Fig. 3 is a perspective detail of one of the bars forming the grate structure with its pusher blocks removed and broken away to show the construction.

The grate structure embodying the invention is shown in Fig. 1 as embodied in a refuse burning furnace, but it is obvious that such a grate structure could be used in other forms of furnaces or analogous structures and we do not wish to limit ourselves to any particular form of furnace structure.

The refuse burning furnace illustrated in the drawing is the subject matter of an application for patent filed by us on October 27, 1909, Serial No. 524,981 and this appli-

cation is filed in conformity with a requirement for division in that application.

In the drawing 1, and 2 are the side walls of a furnace and 3 an ash pit at the bottom of a fire chamber 4 from which springs a fire arch 5 curved longitudinally of the fire chamber and extending laterally from the wall 1. Over the arch 5 at a distance above the same is a second arch 6 which springs from the side wall 1 across to a suitable arch plate 7 forming one side of a hopper 8, the opposite side of said hopper being formed by the wall 2. Within the fire chamber 4 is supported a grate bearer 9 upon which the lower ends of inclined grate bars 10 are supported, the upper ends of said bars resting against a suitable channel iron 11 extending across the furnace at the open side of this fire chamber 4.

A supporting structure formed of channel bars 12 forms a support for the lower ends of a series of reciprocable bars 13 which together form the grate structure embodying this invention, said bars extending in an inclined position across the drying or coking chamber 14 located between the open side of the fire chamber and the lower end of the hopper. The upper ends of said reciprocable bars 13 are supported by channel bars 15 located near the wall 2 beneath the open lower end of the hopper. The bars are all supported at their ends upon rollers 16 engaging horizontally disposed ribs 17 upon the ends of the bars so that said bars may be easily reciprocated longitudinally in an approximately horizontal plane.

Supported in suitable bearing brackets on the lower side of the channel bars 15, is a rock shaft 18 and upwardly and downwardly extending arms 19 on said shaft are pivotally connected to downwardly extending lugs 20 on said bars by connecting rods 21. By the turning of the shaft 18, every alternate bar 13 is moved forward as the intermediate bars are moved in an opposite direction.

The upper edge of each bar 13 is notched or stepped to form a series of seats 22 for a series of pusher blocks 23, each bar with its blocks resembling stairs, the blocks resembling the stair treads. Each pusher block is detachably attached to its bar by being formed on its lower side with parallel spaced ribs 24 to embrace ears 25 formed integral

with the bar and extending upward from each step or seat portion 22 thereof. Pins 26 passing through the ribs 24 and ears 25 detachably secure the blocks in place.

5 The blocks on each bar 13 are each of a length to fit loosely between the two adjacent bars, and the transversely alined blocks on the alternate bars together form ledges or shelves extending the length of the furnace. The blocks of each row or ledge being all carried by said bars which are moved simultaneously in the same direction, each ledge or shelf is therefore moved forward and back as a whole. The bars are so made and the blocks attached thereto in such relative positions that the rows of blocks carried by one set of bars each lie between the adjacent rows of blocks carried by the other set of bars, and thus each row or ledge is moved forward as the row or ledge next above and the row or ledge next below are moved inward. The blocks are of such a width that the rows overlap and thus the material upon the structure is prevented from dropping through. The sliding of one row of blocks upon another gradually feeds the material from the lower end of the hopper downward and deposits it upon the upper ends of the inclined grate bars, at the same time spreading and mixing the same as it passes downward. The material to be burned is thus spread out in a comparatively thin layer over the entire surface of the structure and is stirred as it is fed downward by the reciprocation of the bars. The rapidity with which the material will be fed from the hopper may be accurately regulated by the speed at which the rock shaft is operated.

40 Having thus fully described our invention what we claim is:—

1. In a structure of the character described, the combination of a series of parallel spaced bars, a series of spaced members forming pushers attached to each of said

bars and having a limited movement thereon, the members of each bar sliding freely within the spaces between the members on the adjacent bars, and means for reciprocating said bars.

2. In a structure of the character described, the combination of a series of parallel spaced and inclined bars each formed with a series of spaced seats, a series of spaced pusher blocks on each bar engaging said seats, the blocks on each bar sliding freely within the spaces between the blocks on adjacent bars, means for pivotally and detachably securing each of said blocks to its bar, and means for reciprocating said bars.

3. In a structure of the character described, the combination of a series of parallel spaced and inclined bars each formed with a stepped upper edge forming seats, a series of blocks detachably and movably engaging said seats on each bar and of a length to fit between the adjacent bars at each side thereof and arranged to slide freely within the spaces between the blocks on said adjacent bars, and means for moving each bar and its adjacent bars in opposite directions.

4. In a grate structure, the combination of a series of parallel spaced and inclined bars each formed with a plurality of ears having openings, a series of blocks on each bar spaced apart and arranged to overlap and move between the blocks on adjacent bars, ears engaging said blocks and the openings in said ears to detachably secure said blocks to said bars and permit of a limited movement of the blocks upon the bars, and means for reciprocating the bars.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN R. FORTUNE.
HAROLD S. WELLS.

Witnesses:

LEWIS E. FLANDERS,
OTTO F. BARTHEL.