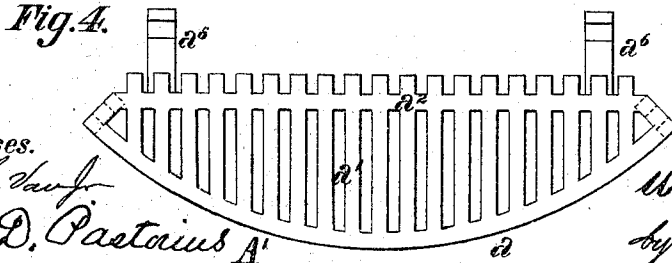
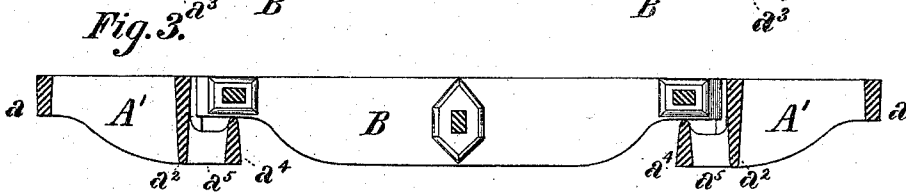
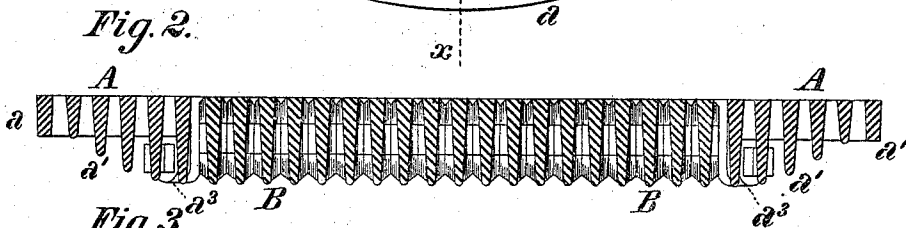
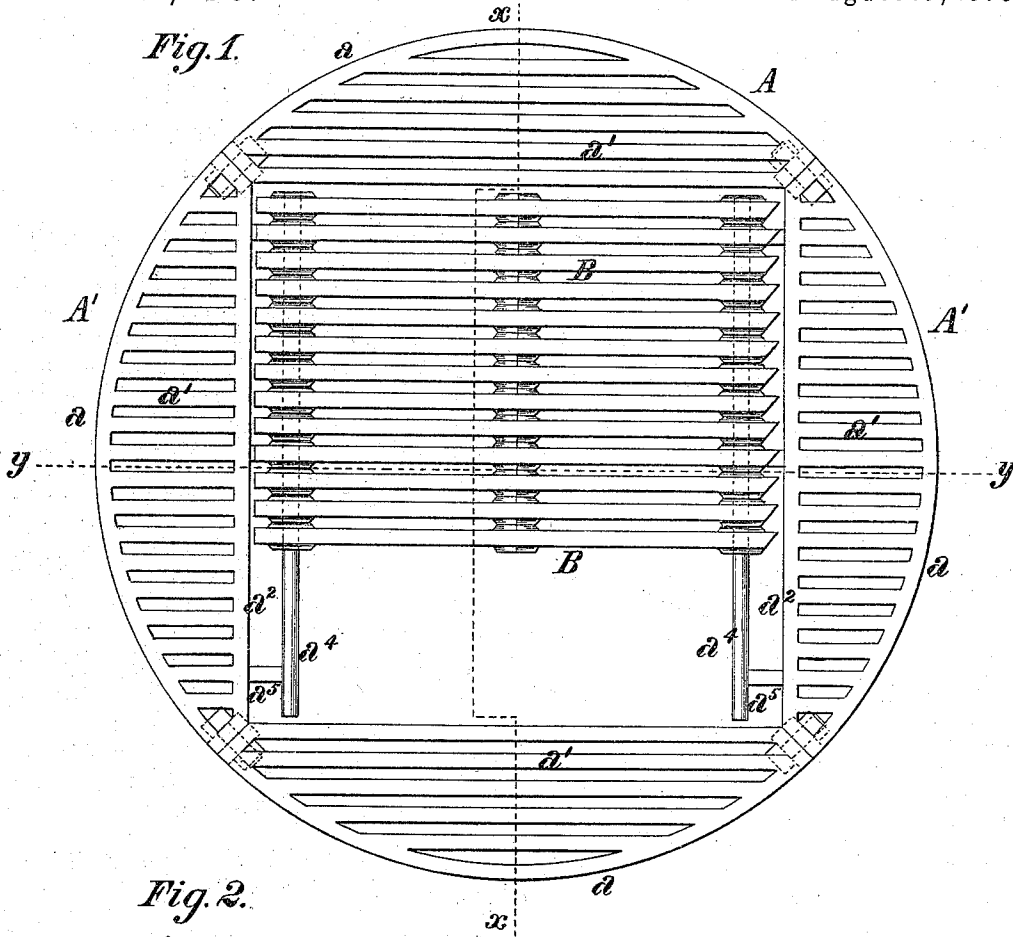


W. B. Le VAN.
Furnace Grates.

No. 141,936.

Patented August 19, 1873.



Witnesses.

A. P. Le Van
Francis D. Pastorius

Inventor.

W. Barnett Le Van
by Erving & Bell
his attys

UNITED STATES PATENT OFFICE

WILLIAM B. LE VAN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN FURNACE-GRATES.

Specification forming part of Letters Patent No. **141,936**, dated August 19, 1873; application filed May 5, 1873.

To all whom it may concern:

Be it known that I, WILLIAM BARNET LE VAN, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification:

My improvements are particularly adaptable to the circular furnaces of steam-boilers of the upright type, but can be applied to furnaces of other descriptions and forms with equal facility. The object my invention is to provide a furnace-grate which can be conveniently transported and put in place, which shall embody the features of economy of construction and durability in use, and which shall afford ready facilities for renewal of burned-out portions; to which ends my improvements consist in combining a skeleton-frame and a series of removable bars supported thereon in such manner as to provide proper air-spaces throughout the entire extent of the grate, as hereinafter more fully set forth.

In the construction of grates for circular furnaces, as practiced heretofore, it has been the custom either to cast the grate in one or more sections or to form it of a series of bars of the different lengths required to fit the furnace. Each of these plans is objectionable from the fact that in the first case a defective or burned-out bar will necessitate the renewal of either the entire grate or of a section thereof, and in the second a large number of separate patterns is required for the different bars, which must be carefully fitted in their respective positions, and as the bars deteriorate more rapidly toward the center of the grate than at its circumference they cannot be renewed without waste, as the portions of the bars toward their ends may be comparatively uninjured while the central portions are burned out.

My improvements provide a grate which is readily portable, and can be quickly put together and placed in position. One or all of the central bars can be removed and replaced without interfering with the portions of the grate adjacent to its periphery, and by the relative arrangement of the skeleton-frame, bars, and bearers the necessary air-spaces are

provided without interfering with the proper support of the bars.

In the accompanying drawings, Figure 1 is a plan or top view of a furnace-grate embodying my improvements, some of the central bars being removed to show the construction more clearly; Fig. 2, a vertical section through the same at the line *xx* of Fig. 1; Fig. 3, a similar section at the line *yy* of Fig. 1; and Fig. 4, a plan or top view of one of the segments of the skeleton-frame, showing certain modifications therein.

In the construction of my improved furnace-grate, I provide a skeleton-frame composed of four segments, *A A' A' A'*, which when united present a circular outline, the diameter of the circle being such as is required to fit properly within the furnace. Each of the segments is composed of a curved rim, *a*, and a series of bars, *a¹*, placed sufficiently far apart to leave proper air-spaces between them, and so arranged that when the segments are united the bars will all extend in the same direction; or, in other words, the bars of the segments *A A* are parallel with the chords of said segments, and those of the segments *A' A'* are perpendicular to their chords. The latter segments are further provided with transverse bars *a²*, which may either unite the bars *a¹* at their inner ends, as shown in Fig. 1, or the latter may project, as shown in Fig. 4. Lugs *a³* are cast upon the ends of the segments, which are united by bolts and nuts or keys. The skeleton-frame then presents a square central space, in which a series of removable bars, *B*, is arranged. The bars *B* are supported upon bearers *a⁴*, united to the segments *A' A'* by ribs *a⁵*; or loose bearing-bars may be employed, if preferred, in which case they would rest on hooks or pockets, *a⁶*, cast on the inner faces of the segments.

In the drawings I have shown the bars *B* united by mortises and tenons, which serve both as spacing-pieces to maintain the bars at a proper distance apart, as well as to prevent their longitudinal and vertical displacement; but it is obvious that any other description of bar may be used without departing from the spirit of my invention.

The bearers *a⁴* are placed at such a distance

from the bars a^2 that they will be immediately beneath the end spacing-pieces of the bars B, thereby avoiding the formation of additional dead spaces.

In order to facilitate the removal of clinkers and ashes, which at times close up the spaces allowed for the expansion of the bars, I form one or both of their ends with a vertical bevel or incline, as shown in Fig. 1, so that when the bars are expanded by heat their inclined faces tend to disintegrate the ashes or clinkers by wedging them against the transverse bars a^2 , and thereby to displace them from the ends of the bars.

It will be seen that only three patterns are required for the construction of my improved grate, instead of one for every two bars, as is the case when the bars are cast separately. The grate can be readily put together inside of a furnace without removing any portion thereof, and the central bars being of uniform length there is no trouble in fitting them to their places. Moreover, the patterns for a grate can easily be used for a larger-sized furnace by simply putting strips upon the periphery of the segments, additional air-spaces being thereby provided. Defective or burned-out bars can be readily replaced without waste, the central portion of the grate being removable without disturbing the ends upon which comparatively little deteriorating effect is ex-

ercised by the fire, and by the manner of supporting the central bars there is no interference with the proper arrangement of the air-spaces between the bars.

I am aware that grates composed of a hopper or frame of solid plates similar in outline to the furnace, and having a central opening in which removable bars are inserted, have been heretofore known; and I do not, therefore, broadly claim the use of removable central grate-bars in connection with other devices for supporting the fuel.

I claim as my invention—

1. In a circular grate for furnaces, the combination of four segments, A A' A' A', each provided with a series of bars and air-spaces, and united by the downwardly-projecting lugs a^2 with the series of removable central bars B, these members being combined so as to provide bearing-surfaces for the fuel and air-spaces to support combustion throughout the whole extent of the grate, as set forth.

2. The combination, with the segments, of bearing-bars so arranged as to provide air-spaces between themselves and the segments, substantially as set forth.

WILLIAM BARNET LE VAN.

Witnesses:

FRANCIS D. PASTORIUS,
EDMUND P. COCHRAN.