A. N. JETTE.

ROOF CONSTRUCTION FOR REVERBERATORY FURNACES.

APPLICATION FILED AUG. 31, 1920.

1,416,716. Patented May 23, 1922.

Fig. 1.

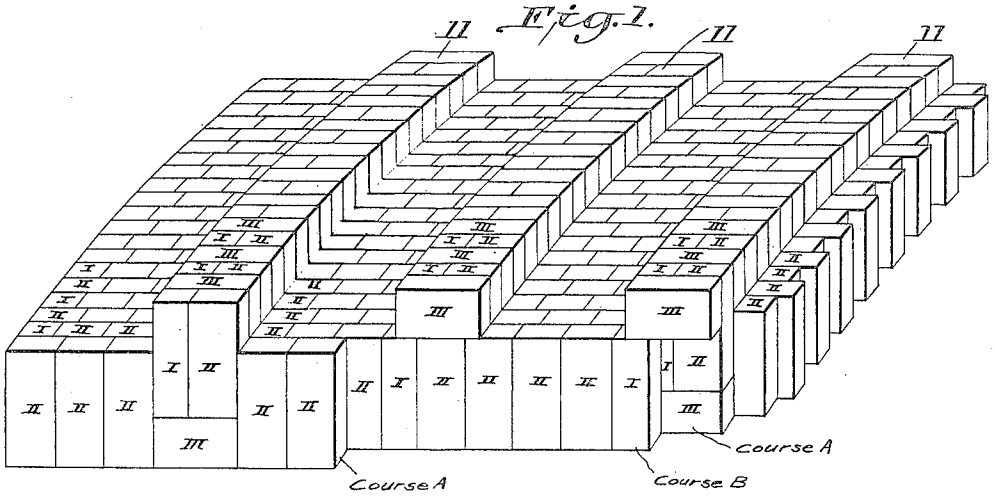


Fig. 2.

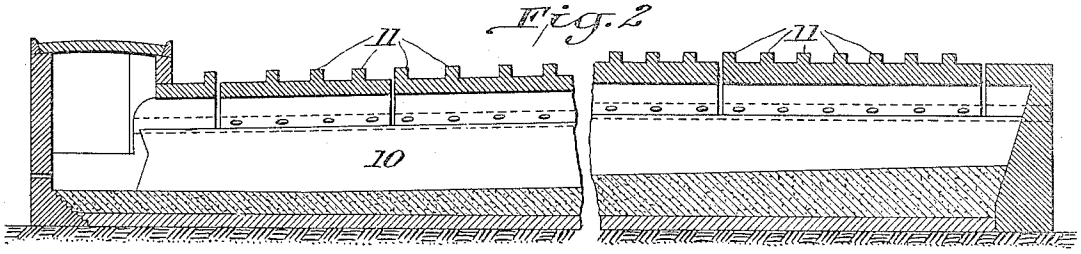
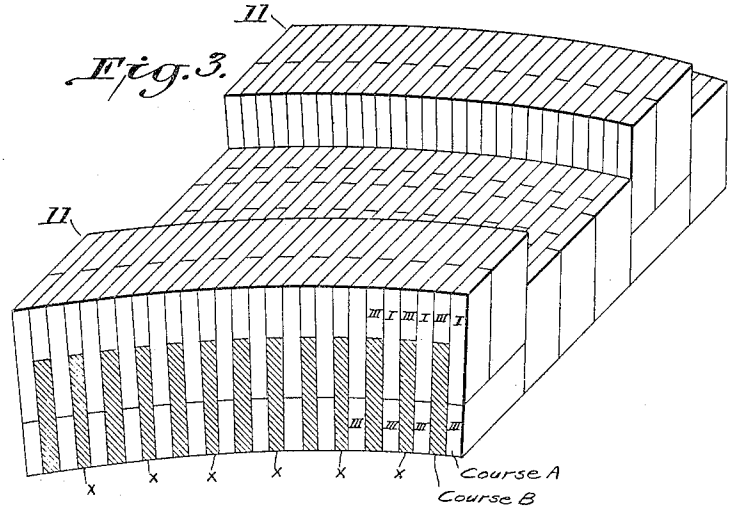


Fig. 3.



Inventor

Archie Noel Jette

By Byrnes Townsend & Brickenstein

Attorneys

UNITED STATES PATENT OFFICE.

ARCHIE NOEL JETTE, OF ANACONDA, MONTANA.

ROOF CONSTRUCTION FOR REVERBERATORY FURNACES.

1,416,716. Specification of Letters Patent. Patented May 23, 1922.

Application filed August 31, 1920. Serial No. 407,141.

To all whom it may concern:

Be it known that I, ARCHIE NOEL JETTE, a citizen of the United States, residing at Anaconda, in the county of Deer Lodge and State of Montana, have invented certain new and useful Improvements in Roof Constructions for Reverberatory Furnaces, of which the following is a specification.

This invention relates to metallurgical furnaces of the reverberatory type and more particularly to roof construction thereof.

In reverberatory furnaces constructed with the simple arched roof, the roof is only as strong as its weakest point. When a portion of the roof becomes thin or burned out, a settling is the inevitable result and operations must be stopped and the roof must be rebuilt. This means a complete shut down for a considerable length of time.

Many attempts have been made during the last twenty years to evolve roof constructions of longer life and ribs have been provided, in particular, for that purpose but these attempts have met with little success.

The object of the present invention is a roof construction embodying ribs which afford a reliable support for the arched roof, prevent caving in when a portion is burned through and admit of local repairs.

For a full understanding of the invention, reference is had to the accompanying drawings in which—

Fig. 1 is a perspective view of a roof construction embodying the invention.

Fig. 2 is a longitudinal section through a furnace, embodying the invention; and

Fig. 3 is another perspective view representing a transverse section through the structure shown in Fig. 1.

As indicated in Fig. 2, the roof of the furnace 10 has a relatively large number of transverse ribs 11. These ribs are of such height and width that considering them as structurally independent of the body of the roof, they are capable not only to form stable structures but also to act as suspension elements for carrying weight. In fact these ribs are primarily designed to carry the weight of the roof after the latter has deteriorated, due to the various influences at work, to such an extent that it would, at least in part, cease to be self-supporting.

This being the broader aspect of the invention, the more specific feature relates to the problem of so interconnecting the ribs and the body of the roof that they form one unitary homogeneous structure such that should at least portions of the roof become very thin or burned out, the cohesion between the material at or around the damaged regions and the adjacent ribs is sufficient to prevent caving in or collapse.

The refractory material from which the roof is built is in the form of bricks as usual.

While there is, of course, some latitude in the arrangement of the bricks to form a solid cohesive structure, I have found that the arrangement represented in Figs. 1 and 3 is very satisfactory and for this reason I consider it at present as the preferred embodiment of the invention.

The roof structure may be built up from three sizes of brick which may for instance have the following dimensions:

Brick I =3 x 6 x 20.
Brick II =3 x 9 x 20.
Brick III=3 x 9 x 15.

The brick II is the principal form used and the forms I and III are used in regular turns to bring about that overlapping and intergripping relation which is necessary to produce a solid mechanically homogeneous structure.

As seen in Figs. 1 and 3, course A is composed of bricks of form II intermediate the ribs. Within the width of the ribs course A includes at the bottom, brick III and above it bricks I and II.

Course B is composed of bricks II alternating adjacent the ribs with brick I and the space allotted for the rib is completely taken up by brick III. Course B also starts with brick I.

By this arrangement the bricks forming the body of the roof are made to overlap, the bricks forming the ribs are made to overlap and the body and the ribs are in intimate intergripping engagement. After the application of the usual binder the combined roof and rib construction is for all practical purposes a single integral structure in which each component part i. e. each brick or fraction thereof is firmly held to the adjacent part and the sections intermediate the ribs are securely bound to the ribs. Thus, if one layer after another should be removed upwardly from the lower surface of the body of the roof, the stability of the structure would not be critically affected. The significance of this feature is that substantially the whole body of the roof may be gradually disinte-

grated or eaten away under the effects of the high temperatures in the furnace without incurring a collapse or partial collapse of the roof structure.

In fact damaged portions of the roof may be required from time to time since the ribs form a skeleton structure on which the parts inserted are temporarily supported until the mutual supporting action of the newly assembled parts assisted by the binder has become sufficient to make it self-supporting.

The life of the roof may thus be extended indefinitely.

As shown in Fig. 3, in every alternate course B the bricks I and II forming the body of the roof are tapering, the courses thus modified being indicated by the letter X. This arrangement is made, as is obvious, to produce a solid arch structure of fire brick. The tapered bricks are 2½" thick at the bottom and have the normal thickness of 3" at the top.

In this way the body of the roof exposed directly to the high temperatures consists substantially of a solid mass of fire brick.

I claim:

1. An arched roof for a metallurgical furnace having ribs projecting from its upper surface, in which the bricks of alternate courses are similarly disposed and in which the joints of all bricks in one course are overlapped by bricks in the adjacent courses.

2. An arched roof for a metallurgical furnace having ribs projecting from its upper surface in which different sized bricks are so disposed that the joints of all bricks in one course are overlapped by bricks in the adjacent courses.

3. An arched roof for a metallurgical furnace having ribs projecting from its upper surface, in which different sized bricks are used in each course and in which the joints of all bricks in one course are overlapped by bricks in the adjacent courses.

4. An arched roof for a metallurgical furnace having ribs projecting from its upper surface, in which different sized bricks are similarly disposed in alternate courses and in which the joints of all bricks in one course are overlapped by bricks in the adjacent courses.

5. An arched roof for a metallurgical furnace having ribs projecting from its upper surface, in which bricks of three different sizes are similarly disposed in alternate courses in such a way that the joints of all bricks in one course are overlapped by bricks in the adjacent courses.

6. An arched roof for a metallurgical furnace having ribs projecting from its upper surface, in which the bricks of alternate courses are similarly disposed and in which the joints of all bricks in one course are overlapped by bricks in the adjacent courses, the arrangement being such that in alternate courses bricks extend from within the body of the roof upwardly above the surface thereof and that in the remaining courses the spaces between the upwardly projecting bricks are filled each by a single brick.

7. An arched roof for a metallurgical furnace having ribs projecting from its upper surface, in which bricks of three different sizes are similarly disposed in alternate courses in such a way that the joints of all bricks in one course are overlapped by bricks in the adjacent courses, two of the different kinds of bricks having a length equal to the thickness of the body of the roof and a combined width equal to the width of the ribs and the third kind of bricks having a length equal to the width of the ribs and a width equal to the height of the ribs, the arrangement being such that the ribs are formed of two bricks extending from within the body of the roof in alternate courses upwardly above the face thereof, and bricks of the third kind filling the spaces between the projecting parts of said bricks, the spaces below the upwardly extending bricks being taken up by bricks of the third kind.

8. An arched roof for a metallurgical furnace having ribs projecting from its upper surface and composed of three different kinds of bricks similarly disposed in alternate courses so that the joints of all bricks in one course are overlapped by bricks in the adjacent courses, two of the different kinds of bricks having a length equal to the thickness of the body of the roof and a combined width equal to the width of the ribs and the third kind of bricks having a length equal to the width of the ribs and a width equal to the height of the ribs, the arrangement being such that in one set of alternate courses two bricks extend from within the body of the roof upwardly above the surface thereof, the spaces below the said upwardly extending bricks being filled by bricks of the third kind, and that in the second set of alternate courses the spaces between the projecting parts of said upwardly extending bricks are filled by bricks of the third kind and the arrangement being further such that in some of the second set of courses the bricks forming the body of the roof are tapered towards the bottom.

In testimony whereof, I affix my signature.

ARCHIE NOEL JETTE.