This invention relates to interlocking fire bricks for furnaces.
The object of the invention is the production of interlocking fire bricks for a furnace, which can be easily assembled and easily separated from each other.
The second object of the invention is the production of interlocking fire bricks which can be easily positioned in a square, rectangular, polygonal or other shaped furnace, and easily detached from the furnace.
The third object of the invention is the production of interlocking fire bricks, which can be positioned to form a fire box with round, square, rectangular, polygonal, pear shaped or other forms of walls.
The fourth object of the invention is the production of interlocking fire bricks for a furnace with an oil burner.
The fifth object of the invention is the production of interlocking fire bricks for a furnace with an oil burner in which the flame can be directed to consume the products of combustion with great efficiency.
The sixth object of the invention is the production of interlocking fire bricks for a furnace, that can be quickly assembled and thereby reduce the time required to build the combustion chamber of the furnace. In this application different forms of furnaces are shown with the improved fire bricks, for the purpose of exemplifying some of the various ways in which the improved fire bricks may be positioned therein.
In the accompanying drawings Fig. 1 represents an elevation of a cylindrical boiler partly in section, with the interlocking fire bricks of the furnace of the boiler partly in full lines and partly in vertical section exemplifying the invention; Fig. 2 shows an enlarged section of Fig. 1 on the line 2, 2 with portions in full lines; Fig. 3 is a section of Fig. 2 on the line 3, 3; Fig. 4 indicates an elevation of a plurality of the interlocking fire bricks of the furnace of the boiler positioned in one plane and partly in section; Fig. 5 represents a right hand side view of one of the running bricks indicated in Fig. 4; Fig. 6 shows a top view of Fig. 5; Fig. 7 indicates a front view of one of the cap bricks shown in Fig. 4; Fig. 8 is a right hand side view of Fig. 7; Fig. 9 shows a top view of Fig. 7; Fig. 10 represents a top view of a cap brick with a modification; Fig. 11 is a top view of a cap brick with a further modification; Fig. 12 shows a horizontal section of a rectangular furnace with a top view of the fire bricks partly in section and the spacer brick in section; Fig. 13 indicates a horizontal section of a rectangular furnace with a top view of a pear shaped furnace of interlocking bricks partly in section and its spacer bricks also in section; Fig. 14 represents a section of Fig. 13 on the line 14, 14; Fig. 15 shows a section of Fig. 13 on the line 15, 15; Fig. 16 represents a front view of the key brick shown in Fig. 2 comprising a pair of members; Fig. 17 is a right hand side view of Fig. 16; Fig. 18 shows a front view of the key brick comprising one member; Fig. 19 is a right hand side view of Fig. 18; Fig. 20 represents a front view of the key brick indicated in Fig. 18 somewhat modified; Fig. 21 shows a left hand view of Fig. 20; Fig. 22 shows a front of a key brick similar to Fig. 16 and somewhat modified; Fig. 23 is a top view of a running brick with a modification; Fig. 24 is a top of a running brick with a further modification; Fig. 25 shows an elevation of another modification of a running brick; Fig. 26 indicates a top view of Fig. 25; Fig. 27 is an elevation of a running brick similar to Fig. 25 with a modification; Fig. 28 shows a top view of Fig. 27 and Fig. 29 is a view similar to Fig. 28 with a further modification.
Referring to Figs. 1 to 11 inclusive and Figs. 16 and 17, a side elevation partly in vertical section of a boiler is indicated in its entirety by the numeral 20. The wall 21 of the boiler is indicated with the furnace opening 22, and bears on the foundation plate 23. The latter with the wall 21 form the furnace 24.
The fire bricks in the furnace 24 comprise what I term the running bricks R, the cap bricks C, and the key brick K. A spacer brick is indicated at S.
The running bricks R are supported upon the foundation plate 23 and each comprises the upper member 25 and the lower offset member 26. The members 25 and 26 have the parallel side walls 28. The top face of the member 25 is shown at 29 with the tapered groove 30, and the bottom face is shown at 31 having the hood shaped seat 32. The member 25 is shown with the cylindrical shaped nose end wall 34, coaxial with the hood shaped seat 32, and the opposite end wall having the concave seat 35 with the curved ends 36 spaced from a plane extending through the axial center of the circle forming the seat 35, said plane being at right angles to the walls 28.
The lower member 26 is indicated having the flat bottom face 39 and the top face 40. The member 26 is set off from the upper member 25.
and has projecting therefrom the dowel pin 42. The lower member 26 has indicated therewith the cylindrical shaped nose end wall 45 coaxial with the dowel pin 42, and the opposite end wall having the concaved seat 46 with the curved end 47. The ends 47 are spaced from a plane extending through the axial center of the circle forming the seat 46, said plane being at right angles to the walls 28. The running bricks R in this instance are disposed to constitute a partial annulus, and interlock with one another. The nose end walls 34 of the upper members 25 lock with the concaved seats 35 of the adjacent upper members. The nose end wall 45 of each lower member 26 locks with the concaved seat 46 of the adjacent member 26. The dowel pin 42 of each lower member 26 locks with the seat 32 of its adjacent upper member 25.

At the ends of the partial annulus is interposed the key brick K, for details see Figs. 16 and 17. The key brick K in this instance comprises the upper member 50 and the lower offset member 51. Both of the members 50 and 51 are indicated with the inner curved walls 53 and the outer curved walls 54, which are respectively continuations of the side walls 26 of the running bricks R. The upper member 50 of the key brick K has the cylindrical shaped nose end wall 55 and the opposite end wall having the concaved seat 56 with curved ends 57 similar to 47 spaced from the center of the circle forming the seat 56. The upper member 50 of the key brick is indicated with the top face 60, and the bottom face 61 having the hood shaped seat 62 and the tongue 63 somewhat less in length than the width of the said member 50. The lower member 51 of the key brick K is indicated with the bottom face 66 which bears on the foundation plate 23 of the furnace 24. The top face of the member 51 is indicated at 67 with the dowel pin 68. From the face 67 extends the tapered groove 69 which locks with the tongue 63. The lower member 51 is indicated with the cylindrical shaped nose end wall 70, which is laterally set off from the member 50, and the opposite end wall having the concaved seat 72 with curved ends 73 similar to 57. In the members 50 and 51 of the key brick K is indicated the opening 75 with the tapered portion 80 of the adjacent to the adjoining faces of the members.

Between the outer face of the key brick K and the wall 21 is positioned the spacer brick S having the opening 78, the curved walls 79 and 80 and the end faces 81. The spacer brick is shown of one member, but may be made of several members.

The cap bricks C of the furnace are positioned upon the running bricks R for a portion of the annulus thereof, as indicated in Figs. 1 and 2 of the drawings. Each cap brick C comprises in this instance, the parallel side walls 85, having the cylindrical shaped nose end wall 86 and the opposite end wall having the concaved seat 87 with the curved ends 88 spaced from a plane extending through the axial center of the circle forming the concaved seat 87, said plane being at right angles to the walls 85. The flat top face of the cap brick is shown at 89 and the bottom face at 90, which latter has projecting therefrom the tapered tongue 92 of a length somewhat less than the width of the brick. The tongues 92 engage the grooves 93 of the adjacent running bricks R, and the end wall 86 of one cap brick is seated in the concaved seat 87 of the next adjacent cap brick.

The annular space 95 between the wall 21 of the furnace 24 and the outer faces of the running brick R, and the key brick K and the end faces 61 of the portion 93 of the key brick S is preferably filled with sand 96. The top face of the sand and top faces of the running brick R are covered with fire clay 98, see Figs. 1, 2 and 3.

The discharge nozzle 100 of an oil burner extends through the opening 22 of the wall 21 of the furnace 24, the opening 103 of the running brick S and the opening 75, of the key brick K. Fire clay 101 is packed in the annular space between the nozzle 100 and the tapered portion 76 of the opening of the key brick K.

In the modification shown in Fig. 10 the cap brick is indicated as having the parallel side walls 85, the nose end wall with the curved corrugations 87, and the concaved opposite end wall having the concaved corrugations 108.

In Fig. 11 the modified cap brick is again shown having the parallel side walls 85, with the nose end wall having the pointed corrugations 109, and the concaved opposite end wall having the pointed corrugations 110.

Attention is called to the fact that the running brick R, the cap brick C and the key brick K, and also the various modifications of the said bricks to be described can be positioned in various different angular positions, by reason of the jointure between the cylindrical shaped nose end wall as 34 with the concaved seat as 35 of the adjacent brick. By this disposition of the ends of the bricks, one can be brought relatively to the other, and the bricks in the walls can be easily assembled or separated from each other.

Referring to Fig. 12 the furnace is shown rectangular in cross section having the front wall 111, the parallel rear wall 112 and the parallel side walls 113. The running fire bricks R are in part parallel to the walls 111 and 112 and in part parallel to the walls 113.

The cap bricks C are in part parallel to the wall 112 and in part parallel to the walls 113. The key brick K5 is shown parallel to the wall 111, and the spacer brick is indicated at S1. It will be noted that the corners of the bricks of the furnace are inclined as indicated at 114.

The discharge nozzle of the oil burner is again indicated at 100. The sand is again shown at 96 and the fire clay at 98.

Referring to Figs. 13, 14 and 15, the walls of the rectangular furnace are again indicated at 111, 112 and 113. The fire bricks in this modification are located in pear shaped position and comprise the running bricks R, the cap bricks C1, the key brick K5 and the spacer brick S1. The discharge nozzle of the oil burner is again shown at 100. The sand is again indicated at 96 and the fire clay at 98. The cap bricks in this modification are each shown with the lower portion 116 having the tongue 117 similar to 92, which engages its coacting tapered groove in its accompanying running brick. The end walls 117a of the cap brick C1 are parallel to each other to be adapted to suit fire boxes of different curvatures. The end walls of this modification of cap bricks may interlock with each other at their portions 116. At the upper portion of each of the cap bricks C1 is formed the inwardly curved deflecting hood 118 and the outwardly extending horizontal flange 119.

Between the walls of the furnace and the outer faces of the walls of the running brick R and the outer faces of the portions 116 of 75
the cap bricks is located the sand 96, and on top of the sand and the upper faces of the running bricks and flanges 119, is spread the fire clay 98. In this modification, the running bricks joining the key brick are inclined in position as shown at 120.

Referring to Figs. 18 and 19 the key brick comprises the single member K1 consisting of the upper portion 121 and the lower off-set portion 122. Both of said portions have the outer curved walls 123 similar to 54 and an inner curved wall similar to 53. The opening 75 with its tapered portion 76 is indicated in the key brick K1. The cylindrical shaped nose end wall is again indicated at 55 for the portion 121 and the opposite end wall is again indicated having the concaved seat 56. The bottom face of the portion 121 is indicated at 61 with the hood shaped seat 62. The top face 67 of the portion 122 is again indicated with the dowel pin 68. The lower portion 122 is shown with the cylindrical shaped nose end wall 70, and the opposite end wall having the concaved seat 72.

Referring to Figs. 20 and 21 the modified key brick is indicated in its entirety at K2 with the cylindrical shaped nose end wall 123, but without any off-set, and the opposite end wall having the concaved seat 126 with the curved ends 127 similar to 57. Curved side walls are indicated at 128 and 129.

The opening in the brick is again indicated at 75 with the tapered portion 76.

Referring to Fig. 22 the key brick is designated in its entirety at K3 and comprises the upper member 130, and the lower off-set member 131. The upper member 130 is indicated with the cylindrical shaped nose end wall 55, the opposite end wall with the concaved seat 56. The bottom face of the member 130 is indicated at 61 with the hood shaped seat 62. The top face of the member 131 is indicated at 67 with the dowel pin 68. The opening is indicated at 75 with the tapered portion 76 at the adjacent faces of the members of the brick. Between the faces 61 and 67 is shown the fire clay 133.

Fig. 23 shows the top view of a modified running brick R1. The upper member of the brick is shown with groove 134 similar to 30, and the lower member of the brick is shown with the groove 135 similar to 42. The upper member of the brick is indicated having cylindrical shaped nose end wall with the curved corrugations 136 and concaved end wall having the curved corrugations 137. The lower off-set member of the brick has formed thereon the cylindrical shaped nose end wall having the curved corrugations 139, and the concaved end wall having the curved corrugations 140. A hood shaped seat 140a is formed in the lower face of the upper member.

Fig. 24 shows a top view of another modification of the running brick R2. The upper member of the running brick is shown with the dowel seat 142 and the lower member of the brick is indicated with the dowel pin 143. The upper member of the brick is indicated having the cylindrical shaped nose wall with the pointed corrugations 144, and the concaved end wall having the pointed corrugations 145. The upper member has formed in its upper face the tapered groove 146 similar to 30. The lower off-set member of the brick has formed therewith the cylindrical shaped nose end wall having the pointed corrugations 148 and the concaved end wall having the pointed corrugations 149.

Referring to Figs. 25 and 26, a running brick R3 is indicated without any off-set. It is shown with the parallel walls 155, the cylindrical shaped nose end wall 156, the opposite end wall having the concaved seat 157, and the top face 158 having the tapered groove 159.

Referring to Figs. 27 and 28 the running brick R4 is again indicated without any off-set. The brick is shown with the parallel walls 163, the cylindrical shaped nose end wall having the curved corrugations 164, the opposite concaved end wall having the curved corrugations 165. The top face of the brick has indicated thereon the tapered groove 166.

Referring to Fig. 29 the running brick R5 is similar to the brick R4 and in this modification the cylindrical shaped nose end wall is indicated with pointed corrugations 170, and the opposite concaved end wall is shown with the pointed corrugations 171.

Attention is called to the fact that the end walls of the key bricks may be provided with corrugations for their end walls as described for the running bricks and the cap bricks.

The key brick may be further modified by making the lower member thicker than the upper member.

The foundation plate 23 of the furnace 24 may be omitted, so that the bricks of the furnace are positioned on the concrete floor upon which the boiler is placed.

It will be noted that the curved ends 36 of the concaved seats 35 and the curved ends 47 of the concaved seats 46, permit the running bricks R to be placed in positions making angles with each other. This is also true of the curved ends of the cap bricks and the curved ends of the concaved seats of the key brick relatively to the running bricks.

Various modifications may be made in the invention and the present exemplification is to be taken as illustrative and not limiting thereof.

Having described my invention I claim:

1. An interlocking running brick of the character described comprising a pair of side walls, a top face and a bottom face for the brick, said top face having a groove, a curved nose end wall for the brick, said top face having an opposite end wall for the brick, a concaved seat for the latter end wall and curved ends for the concaved seat spaced from a plane extending through the central plane of the circle forming the seat, said plane being at right angles to the side walls of the brick.

2. An interlocking running brick of the character described comprising, a pair of side walls, a top face and a bottom face for the brick, said top face having a groove, a curved nose end wall for the brick, corrugations in said end wall, an opposite end wall having a concaved seat and corrugations in said seat.

3. An interlocking running brick of the character described comprising, an upper member and a lower off-set member, side walls, a top face and a bottom face for each of said members, said upper member having a groove in its top face, the bottom face of the upper member having a hood shaped seat, a dowel pin extending from the top face of the lower member, a cylindrical shaped nose end wall for the top member, an opposite end wall for the top member having a concaved seat, a cylindrical shaped nose end wall for the lower member oppositely positioned to the cylindrical end wall having the pointed corrugations 149.
shaped nose end wall of the upper member and an end wall for the lower member having a concaved cylindrical seat oppositely positioned to the end wall of the upper member having a concaved seat.

4. An interlocking running brick of the character described, comprising an upper member and a lower offset member, side walls for the members, a top face and a bottom face for each of said members, said upper face having a groove in its top face, the bottom face of the upper member having a hood shaped seat therein, a dowel pin extending from the top face of the lower member, a cylindrical shaped nose end wall for the lower member, an end wall for the top member having a concaved seat, corrugations in said seat, a cylindrical seat end wall for the lower member oppositely positioned to the nose end wall of the upper member, corrugations in the latter end wall and an end wall for the lower member having a concaved cylindrical seat oppositely positioned to the end wall of the upper member having a concaved seat, and corrugations in the latter seat.

5. A cap brick of the character described comprising, a pair of parallel side walls, top and bottom faces for the brick, a cylindrical shaped nose end wall for the cap brick, an oppositely positioned end wall for the brick, a concaved seat for the latter wall, curved ends for the concaved seat spaced from a plane extending through the axis of the circle forming the concaved seat, said plane at right angles to the side walls of the lower member. - AMOS J. PASSINO.

6. A cap brick of the character described comprising, a pair of parallel side walls, a top face and a bottom face for the brick, a cylindrical shaped nose end wall, for the cap brick, corrugations in the face of the nose end wall, an oppositely positioned nose end wall for the brick having a concaved seat, corrugations in said seat and a tongue extending from the bottom face of the brick.

7. A key brick of the character described comprising, side walls, a cylindrical nose end wall for the brick, an opposite end wall for the brick, a concaved seat for the latter end wall and curved ends of the concaved seat spaced from a plane extending through the center of the circle forming the seat.

8. A key brick of the character described comprising, an upper member and a lower offset member, inner and outer walls for the key brick, a cylindrical shaped nose end wall for the upper member, an opposite end wall with a concaved seat for the upper member, a top face and a bottom face for the upper member, a hood shaped seat, a tongue extending from the lower face of the upper member, a top and a bottom face for the lower member, the latter top face having a groove locking with the tongue of the upper member, a cylindrical shaped nose end wall for the lower member, an opposite end wall for the lower member with a concaved seat and a dowel pin extending from the top face of the lower member, said upper and lower members having an opening therethrough at their adjacent faces.

9. A key brick of the character described comprising a single member consisting of an upper portion and a lower offset portion, each of said portions having a top face and a bottom face, a cylindrical shaped nose end wall for the upper portion and an opposite end wall for said upper portion with a concaved seat, a cylindrical shaped nose end wall for the lower portion, an opposite end wall for the lower portion with a concaved seat and a dowel pin extending from the top face of the lower portion.

10. A key brick of the character described comprising an upper member and a lower offset member, a bottom face for the upper member having a hood shaped seat, a top face for the lower member, a dowel pin extending from the latter face, the said members having an opening extending therethrough at their adjacent faces and fire clay positioned between the adjacent faces of the members of the brick.

11. A cap brick of the character described comprising, a lower portion, a tongue extending from the lower portion, an upper member for the cap brick, an inwardly curved deflecting hood integral with the upper portion and an outwardly extending horizontal flange integral with said upper portion.

12. An interlocking running brick of the character described comprising, an upper member and a lower offset member, side walls for the members, a top face and a bottom face for each of said members, said upper member having a groove in its top face, the bottom face of the upper member having a hood shaped seat, a cylindrical shaped nose end wall for the top member coaxial with said hood shaped seat, an opposite end wall for the top member, a concaved seat for the latter wall, curved ends for said concaved seat spaced from a plane extending through the axis of the concaved seat, said plane at right angles to the side walls of said upper member, a dowel pin extending from the top face of the lower member, a cylindrical shaped nose end wall for the lower member oppositely positioned to the cylindrical shaped nose end wall of the upper member, an end wall for the lower member opposite its nose end wall, a concaved cylindrical seat for the latter wall and curved ends for the latter concaved seat, spaced from a plane extending through the axis center of the latter concaved seat, said plane at right angles to the side walls of the lower member.

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