

May 26, 1925.

1,538,905

LE G. PARISH
REFRACTORY STRUCTURE

Filed Aug. 12, 1921

2 Sheets-Sheet 1

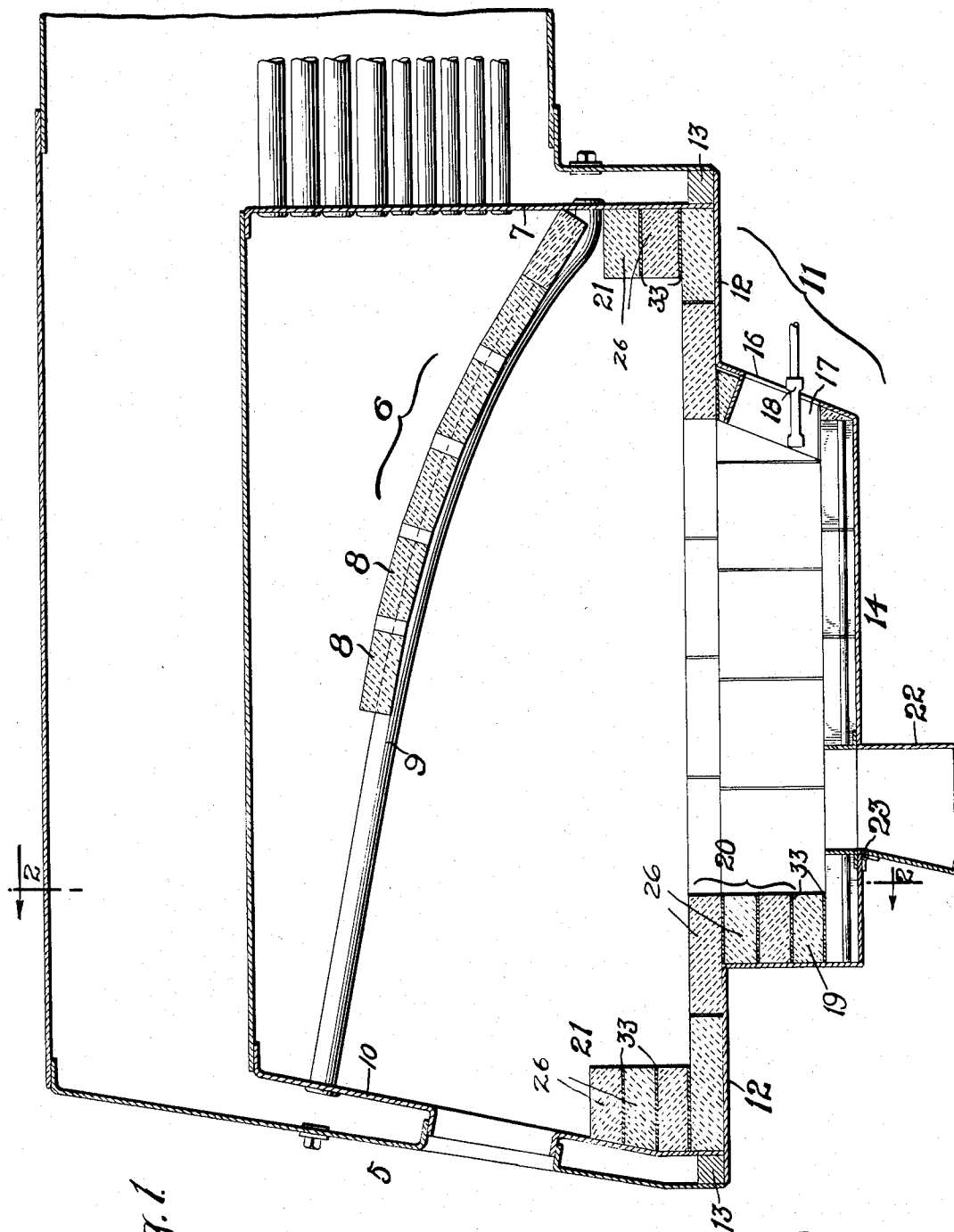


Fig. 1.

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LeGrand Parish
By his Attorneys
Dymestrett & Lechner

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2 Sheets-Sheet 2

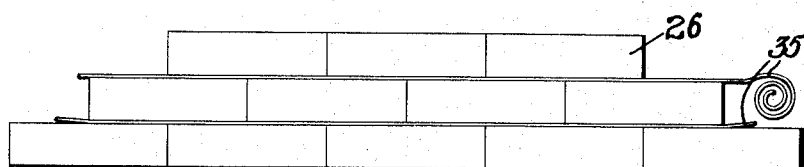
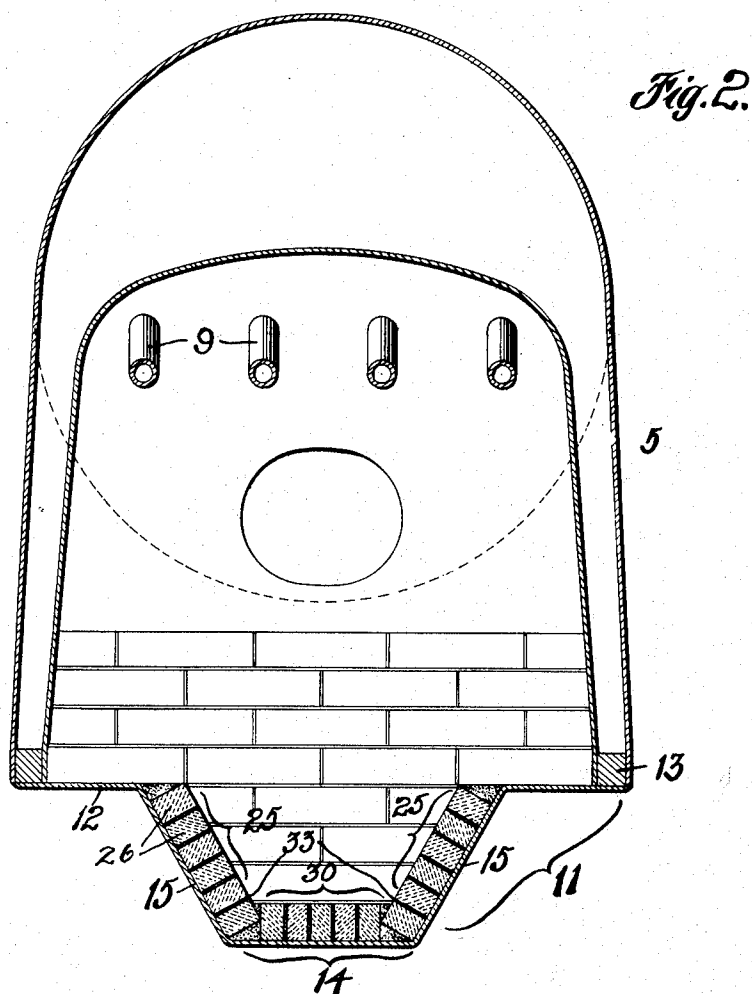


Fig. 3.

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Patented May 26, 1925.

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UNITED STATES PATENT OFFICE.

LE GRAND PARISH, OF MOUNTAINVIEW, NEW JERSEY.

REFRACTORY STRUCTURE.

Application filed August 12, 1921. Serial No. 491,700.

To all whom it may concern:

Be it known that I, LE GRAND PARISH, a citizen of the United States, residing at Mountainview, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Refractory Structures, of which the following is a specification.

My invention relates to refractory structures and bonding, and is especially concerned with uniting the refractory pieces, brick, or blocks of which such structures are composed. I aim to make the union or connection between adjacent pieces secure and durable in itself, and unaffected by the wasting away of the structure as a whole with prolonged service. I also aim to make the assembling of the component pieces of the structure easy and expeditious,—easier, indeed, than when bonded with ordinary refractory mortar or cement. The invention is especially adapted and advantageous for the construction of fire pans or flash pans and other refractory structures of oil burning locomotive boiler furnaces; and I have hereinafter described embodiments of the invention thus applied which are the best embodiments at present known to me.

How the advantages above mentioned and others may be realized through my invention will appear from the description hereinafter.

In the drawings, Fig. 1 shows a vertical longitudinal section through the fire box and fire pan or flash pan of an oil fired locomotive boiler, illustrating the construction of the fire pan walls in accordance with my invention.

Fig. 2 shows a cross section through the fire box and fire pan, taken as indicated by the line 2—2 in Fig. 1.

Fig. 3 is a side elevation or a plan illustrating the preferred way of applying my improved bonding material.

The locomotive fire box 5 shown in Fig. 1 is of a familiar type. It is provided with the usual sectional fire arch 6 extending rearward and upward from the lower portion of the flue sheet 7, and consisting of fire brick 8 supported on fore and aft water circulation tubes 9 connected between the flue sheet 7 and the rear wall 10 of the fire box. At the bottom of the fire box 5 is a fire pan structure 11 whose general form and construction are also familiar in the art. It may be briefly described as comprising

a metal floor sheet or "shelf" 12 extending inward, from the bottom of the mud ring 13, and a metal trough 14 with sloping sides 15, 15 extending fore and aft within and below the inner edges of the shelf 12. The front end 16 of the trough 14 slopes rather steeply, and has an opening 17 into which projects an oil burner 18, and through which a supply of air for combustion is also admitted. The rear end 19 of the trough 14 is shown as vertical, and its refractory lining 20 serves as a flash wall to arrest or baffle the jet, blast, or stream of fuel and air from the burner 18, mix it up, and throw it forward and upward into the superjacent combustion chamber or furnace proper of the fire box 5. The fire pan structure 11 has a refractory fire brick lining, shown as thickest at and above the rear end 19 of the trough or fire pan proper 14. There are also thick refractory fire brick walls 21 at either end of the combustion chamber in the fire box 5 above the fire pan structure 11, built up from the refractory lining that covers the shelf 12. Near the rear of the fire pan 14 is a clean out hopper 22 for the removal of refuse, dust, ash, etc. from time to time. The rear wall of this hopper 22 is hinged at its upper edge, at 23, so as to swing rearward and upward for this purpose.

The distinctively cross sectioned layers 33 between the courses of refractory pieces 26 in the various walls 20, 21, and 25, and in the floor 30, do not represent the cement or mortar ordinarily used in such refractory structures,—which is, indeed, responsible for the quick deterioration of fire brick in furnaces, owing to the considerable amount of water with which such mortar or cement is mixed. On the contrary, the layers 33 represent interstitial material such, for example, as a good grade of silica sand, preferably relatively dry, which is fusible under the heat to which the refractory structure is subjected in service,—more fusible, if anything, than fire brick,—and is adapted to interfuse or interadhere with the refractory pieces 26, and thus weld together and unite them. I prefer to employ the material 33 in the form of flexible strips, and to interlay these strips with the courses of blocks in assembling the latter to form the refractory structure, in the manner illustrated at 35 in Fig. 3. Such flexible strips 35 may be made by coating flexible webbing

(e. g., manila or other strong paper) on one or both sides with sand or other fusible refractory material, as by dusting the sand on the paper or other webbing after applying an aqueous solution of water glass or some other adhesive agent to the webbing to serve as a glue for sticking the sand to it,—or very much as sand paper is manufactured. The paper web will be destroyed on the first service run or heavy firing of the locomotive, and the sand will remain in the interstices and unite the brick 26. The web and its slight residue of ash will be quite innocuous to the function of the sand.

15. I claim:

1. A refractory structure for fireboxes composed of a plurality of refractory units with preformed units of fusible material between said refractory units.

20 2. A flexible strip for interlaying with refractory pieces in their assembly to form a refractory structure, comprising material fusible and adapted to interadhere with and unite said refractory pieces under the heat to which they are subjected in service.

25 3. A refractory structure comprising courses of refractory blocks interlaid with flexible strips of material fusible and adapted to interadhere with and unite the brick under the heat to which they are subjected in service.

30 4. A refractory structure comprising a plurality of pieces with preformed units of relatively dry material between them, fusible and adapted to interadhere with and unite the pieces under the heat to which the structure is subjected in service.

35 5. A flexible strip for interlaying with refractory pieces in their assembly to form
40 a refractory structure, comprising a flexible

thermally destructible and innocuous web coated with relatively dry material fusible and adapted to interadhere with and unite said refractory pieces under the heat to which they are subjected in service. 45

6. As a new article of manufacture a strip for interlaying with refractory pieces in their assembly to form a refractory structure, comprising material fusible and adapted to interadhere with and unite the said refractory pieces under the heat to which they are subjected in service. 50

7. As a new article of manufacture a strip for interlaying with refractory pieces in their assembly to form a refractory structure, comprising a thermally destructible and innocuous web coated with relatively dry material fusible and adapted to interadhere with and unite said refractory pieces under the heat to which they are subjected in 55 60 service.

8. The improvement in the construction of a refractory structure for a firebox comprising refractory blocks, bonded together, which consists in laying up such blocks with fusible bonding material substantially dry, afterward heating the structure to a temperature exceeding the fusing point of such material. 65

9. The material for the construction of a refractory structure for fireboxes comprising refractory blocks bonded together, which consists in laying up the blocks with a preformed unit layer of fusible bonding material between them, afterward heating the structure to a temperature exceeding the fusing point of such material. 70 75

In testimony whereof I have hereunto signed my name.

LE GRAND PARISH.