Dec. 24, 1940. G. F. DOYLE 2,225,983

REFRACTORY ANCHOR

Filed Aug. 22, 1938

Fig. 1.

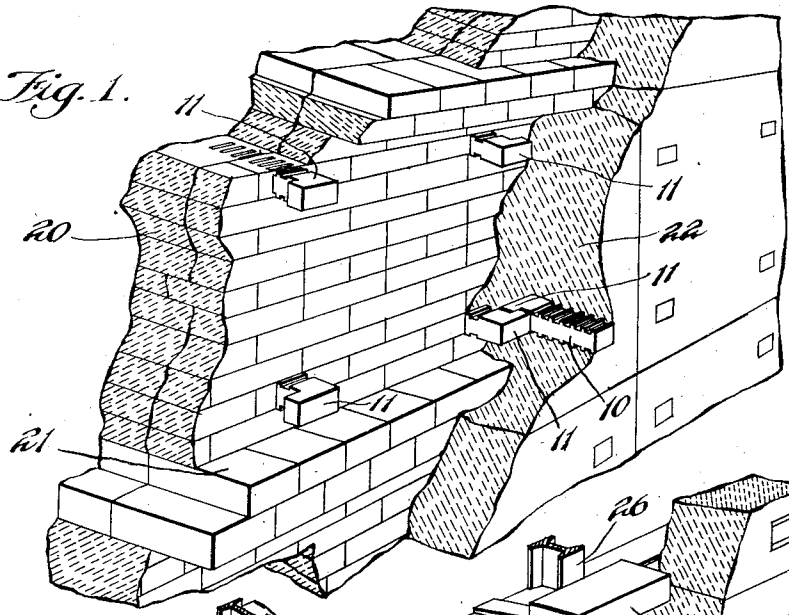


Fig. 2.

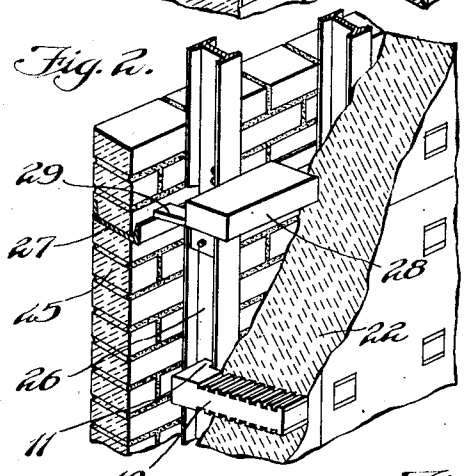


Fig. 3.

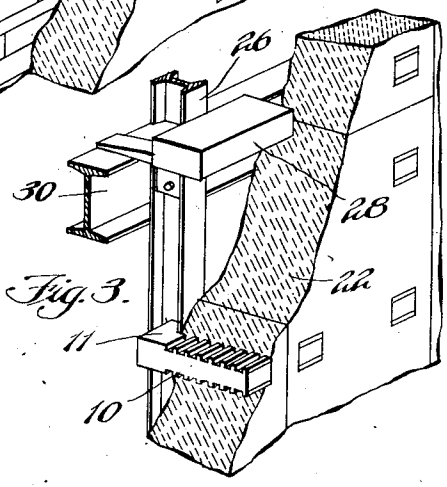


Fig. 5.

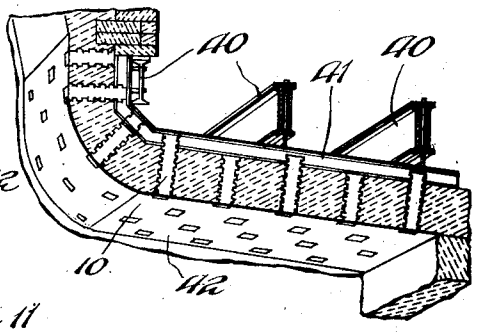


Fig. 4.

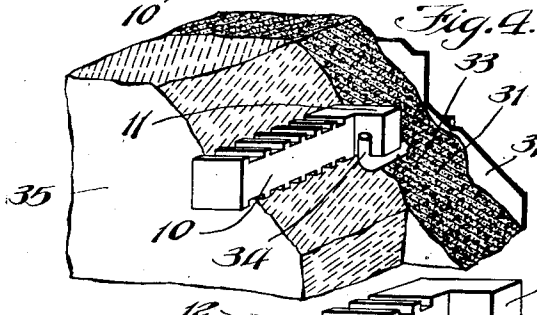
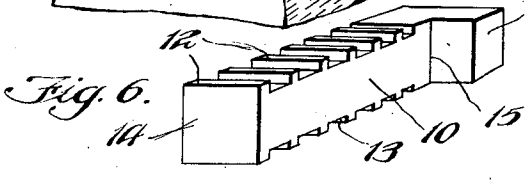


Fig. 6.



INVENTOR:
George F. Doyle
BY Kent W. Wounell
ATTORNEY.

Patented Dec. 24, 1940

2,225,983

UNITED STATES PATENT OFFICE

2,225,983

REFRACTORY ANCHOR

George F. Doyle, Chicago, Ill.

Application August 22, 1938, Serial No. 226,121

6 Claims. (Cl. 72—101)

This invention relates in general to furnace linings and more particularly to a new and novel means for supporting and anchoring a plastic monolithic in a furnace or to anchor any plastic wall to a suitable support.

An important object of the invention is in the provision of an anchor composed of plastic refractory material having substantially the same co-efficient of expansion as the plastic lining of a furnace to which it is applied, or the other plastic material in which it is embedded.

A further object of the invention is in the provision of a plastic pre-fired anchor having a specific form and construction which adapts it to interlock with similar anchors and also to engage supporting walls and structures such as I-beams and angle irons, and for suspending linings from arches or walls.

A further object of the invention is in the provision of a plastic pre-fired anchor having lateral corrugations and a projecting head at one end strengthened to prevent cracking, at the angular portion of the head.

Other objects of the invention will appear hereinafter, the accompanying drawing illustrating the preferred construction and application of the invention.

In the drawing,

Fig. 1 is a perspective of a brick wall and a plastic lining united by anchors embedded both in the wall and in the lining and interlocked;

Fig. 2 is a fragmentary perspective showing the anchor as used in connection with a brick encased air cooled wall;

Fig. 3 is a fragmentary perspective illustrating the anchor as used in connection with a steel encased or air cooled wall;

Fig. 4 is a fragmentary perspective illustrating the anchor as used in connection with a metal cased bolt;

Fig. 5 is a fragmentary perspective illustrating the anchor as used in connection with a suspension type of installation for a water tube boiler; and

Fig. 6 is a perspective of anchor of the preferred form and structure.

Unless anchors of this type are simple in form and structure it is difficult to make a universal application of them. For example, if the anchors are formed with recesses which fit over an I-beam it is difficult to repair any portion of a wall without breaking out a much larger portion or cutting the I-beam in removing and applying the anchors. Even in the formation of a simple anchor with a projecting or L-head it is found that in prefiring the anchor itself, the head may be weakened by a crack at the angle joining the head or hook to the shank or extremity of the anchor.

These objections are overcome in the present invention by providing an anchor of an extremely simple shape consisting only of a straight corrugated shank with an L-head or hook at one end which is strengthened or enlarged at the angle by making it of full section. An anchor of this shape may be inter-engaged with similar anchors in adjacent wall sections, it may be hooked into engagement with beams, angle irons, or even with bent rods, and if dimensioned as intended it may be built into ordinary brick walls without any loss of time in patching and fitting bricks around it.

Referring now more particularly to the drawing, an anchor constructed in accordance with this invention is shown in Fig. 6 and comprises an L-shaped block of pre-fired plastic material substantially rectangular in cross section having a shank 10 of suitable length to extend into and through a wall, an angular head 11 at one end extending at right angles to the shank and forming a head or hook which may be engaged with a corresponding head or hook of a similar anchor placed oppositely in an adjacent wall, or engaging any suitable support.

On opposite sides of the shank are ribs 12 formed by grooves 13 between them, the ribs and grooves both being preferably rectangular in cross section, and the extremity 14 of the shank being the full size of the block.

The grooves forming the ribs in the anchor terminate at a distance from the angle 15 of the head so that neither the head or the connection of the head with the shank are reduced or weakened at the angle of the anchor, which ordinarily receives the greatest stress.

The dimensions of the block are such, particularly in heighth, that they correspond to the thickness or heighth of the bricks usually employed in building walls for furnaces and the like, so that the anchors may be inserted and built directly in a brick wall 20 as shown in Fig. 1, with the head 11 of each anchor projecting therefrom. In forming a vertical furnace lining for a brick wall of this kind a supporting ledge 21 is commonly provided for supporting a lining 22 of plastic material and as the plastic lining is applied other anchors are built into the plastic lining with their heads 11 in interlocking engagement with the heads of the anchors projecting from the brick wall. In the brick wall the anchors are secured in place by the cement or mortar by

which the bricks are secured together, engaging in the grooves 13 of the anchors and in the plastic lining the material in its plastic state similarly engages with the ribs and grooves of the anchors built therein.

When this anchor is applied to a brick enclosed wall 25 as shown in Fig. 2, having vertical I-beams 26 supported from channels 27 built into the walls, the heads 11 of the anchors are engaged with the flanges of the I-beams which hold the plastic lining 22 against the wall and a brick ledge 28 carried by a metal supporting bracket 29 attached to each I-beam supports the plastic wall in vertical position.

A similar air cooled wall may be supported upon horizontal I-beams 30 as shown in Fig. 3, the plastic wall or lining 22 being supported by the anchors and ledge 28 against the vertical beams 26 so that the rear side of the plastic wall may be air cooled.

As shown in Fig. 4 a monolithic wall 31 of concrete or the like has an outer metal supporting shell 32 with an anchor bolt 33 extending inwardly from the shell and having a bent head 34 projecting from the inner side of the wall 31. To attach a plastic lining to this structure the head 11 of the anchor is placed in engagement with the head 34 of the bolt and the shank of the anchor is embedded in a plastic lining 35 which holds the lining in engagement with the wall.

In a suspension type of structure for arches, boilers, and the like, a suitable supporting structure composed of I-beams 40 and cross beams 41, are erected for a plastic lining 42 which is cast or molded in place with a number of pre-cast anchors engaging the cross beams 41 and projecting through the lining 42 so that when the lining is set and fired in place the anchors having the same co-efficient of expansion will be contained in the wall, the heads thereof will support the lining in engagement with the beams, either in vertical or suspended position as shown.

Thus an anchor of this improved form and structure may be combined readily with various types of insulation, either brick, steel, concrete or a suspension type of structure without necessity for special refractory anchor shapes. The anchor combines readily with brick-work without change of size and is extremely flexible in that it can be used with any standard steel I-beam or angle iron structure, and to any type of existing hanger for suspended arches or walls.

I claim:

1. In a refractory pre-fired anchor, a shank and a head of rectangular L-shape and substantially the same cross section, the shank only having ribs and grooves at opposite sides spaced from the head and the L-angle thereof, and the section at the junction of the head and shank having the full width and strength of the anchor.

2. In a refractory pre-cast anchor, a shank with an angular head at one end substantially of the same cross section and L-shaped, the opposite sides of the shank having ribs formed by grooves extending parallel to the head and the grooves terminating on the shank at a distance from the angle which the head makes with the shank to maintain the head of full cross section at its joint with the shank.

3. An anchor for an originally plastic furnace lining comprising a shank with opposite ribs adapted to be embedded in the lining and having an angular head projecting at one end of the shank, the projecting portion being smooth, without ribs, and adapted to extend from the lining for hooked engagement with any suitable support for the lining the head and the shank through the ribs having the same cross section.

4. A furnace wall structure comprising an originally plastic lining and refractory anchor means embedded in the lining having grooves forming ribs in opposite sides for engaging the lining, and a head at one end smooth and without grooves forming an angular hook of full uninterrupted cross section adapted to interengage with a support for the lining, the head and the shank being substantially of the same cross section throughout diminished in the shank by the grooves between the ribs.

5. A furnace wall structure comprising a support, an originally plastic lining therefor, and means for connecting and retaining the lining in engagement with the support, said means comprising a plurality of anchors each having a ribbed shank embedded in the plastic lining and having an angular head of full and unribbed cross section projecting therefrom adapted to inter-engage with the support for maintaining the lining in position relating thereto, the head and shank being substantially the same outer cross sectional area throughout diminished in the shank by the grooves between the ribs.

6. A furnace wall structure comprising a support, an originally plastic monolithic refractory lining therefor, and a plurality of pre-cast refractory anchor means, each of substantially L-shape having an angular head at one end projecting from the lining and adapted to inter-engage with said support, the shank of the anchor having ribs parallel with the head and on opposite sides of the shank but the ribs terminating at a distance from the angular connection of the head with the shank and the head and the shank having substantially the same outer cross sectional area throughout except between the ribs of the shank so that the full cross section of the anchor and the strength of the connection of the head with the shank is not impaired.

GEORGE F. DOYLE.