Feb. 15, 1944. W. C. HENSEL 2,341,777

INSULATING BLOCK

Filed April 13, 1942

Fig. 1.

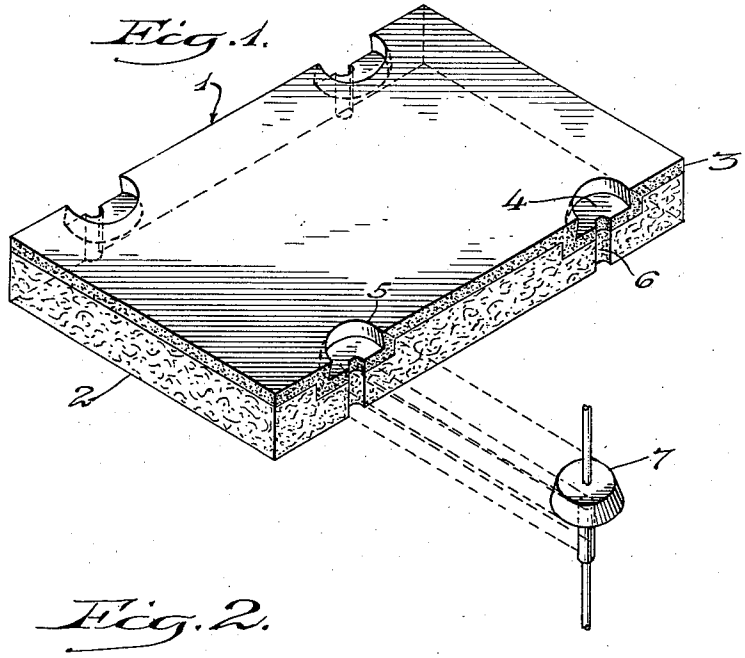


Fig. 2.

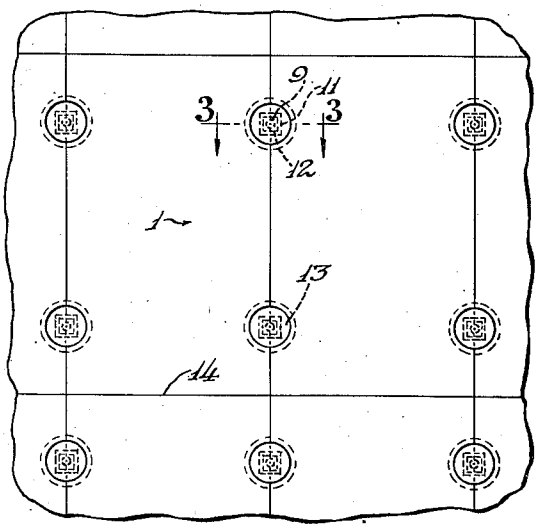
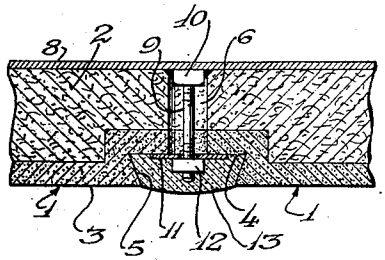


Fig. 3.



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INSULATING BLOCK

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4 Claims. (Cl. 72—101)

This invention relates to an improved form of insulating block which is especially adapted for use in flue gas ducts and the like.

The features of this invention provide an insulating block having means incorporated therein for facilitating its fastening to the walls of ducts or other equipment, the insulation of which is desired. Also, by employing this invention an insulating lining is provided for ducts and the like which presents a substantially continuous and durable surface to the hot gases.

Heretofore, insulating blocks have been secured to supporting framework or walls by bolts or other suitable means which extended beyond the surface of the block. After the fastenings were in place, plastic material was used to cover the fastening means and prevent their overheating. However, when employed in hot gas ducts and the like this plastic material, due to the extreme temperature conditions to which it was subjected, had a tendency to loosen and fall away from the wall thus leaving the fastening means exposed to excessive heat. This overheating of the fastening means would cause it to fail, leaving the insulating blocks unsupported and eventually make necessary the shutting down of the heater or other equipment. The present invention provides means for preventing the filling material from loosening and becoming displaced from the recesses. This is accomplished by providing the individual blocks with recesses so that the filling material upon setting is keyed into the wall and permanently held in position. The entire insulating wall will, therefore, present a substantially uniform and lasting surface to the flue gases.

Although the illustrations and examples presented herein are directed toward refractory surfaced insulating blocks it is entirely within the scope of the invention to adapt its principles to other types of insulating block.

In order to make the features and advantages of the invention more apparent and clearly understood, reference is made to the accompanying diagrammatic drawing and description thereof.

Fig. 1 illustrates in a perspective view, a preferred type of insulating block which includes the features of the invention and further illustrates one method for forming the recesses therein.

Fig. 2 shows a portion of a flue gas duct to which has been applied insulating blocks embodying the features of the invention.

Fig. 3 is a sectional view of the same flue gas duct as shown in Fig. 2 taken from a plane indicated by line 3—3 in Fig. 2.

Referring now to Fig. 1, the block indicated generally by the reference numeral 1, comprises a layer of insulating material 2 upon which is placed a second layer of other desirable material such as the suitable refractory material 3. When desired the block may be made up of but one material throughout. The insulating material 2 may be of any type which upon setting forms a substantially self-supporting slab and of a thickness sufficient to provide the desired amount of insulation. Any type of refractory or semi-refractory material may be used in conjunction with this insulating material, and preferably one which may be applied thereto in plastic state and which is capable of withstanding the temperature conditions to which it may be exposed.

At spaced points, along opposite edges thereof, the refractory material layer 3, in the preferred form of insulating block, should be of an increased thickness to accommodate recesses which are to be formed or cut therein. These recesses are defined by a semi-circular base 4 and a tapered wall 5, the wall 5 of the recess converging from the base 4 to the face of the insulating block so that the cross-sectional area of the recess at the face of said block will be smaller than at points inwardly thereof, the purpose of which will be later explained. Transversely across the edges of the block and extending from the base 4 of each recess to the opposite surface of the block is a slot such as the semi-circular groove 6. This groove is to accommodate bolts or other fastening means by which the block may be secured to walls or structural framework. The recesses in the face of the block, and also the side slots, may be formed when the block is cast in a mold simultaneously therewith, or be cut after the block has hardened. A tool of a shape suitable for cutting these recesses is diagrammatically indicated by numeral 7. This tool may be made up of suitable abrasive materials such as carborundum or it may be a hardened steel cutter.

In order to demonstrate the utility of the invention its application in the construction of an insulated duct lining is illustrated in Figs. 2 and 3. In these figures the individual blocks 1 are set up in horizontal rows against the duct wall 8 in a manner whereby the recesses and side grooves of the adjacent blocks coincide, the resultant composite recesses taking on the outline of a truncated cone. At predetermined points on the wall 8 nuts 10 have been welded or otherwise suitably fastened. These nuts are so located and spaced that they coincide with the matched

grooves 6 in adjacent insulating blocks which are of sufficient width to accommodate them. The nuts 10 are also adapted to receive suitable bolts 9 which extend through the composite grooves 6 of two adjacent blocks to a point intermediate the base 4 of the recesses and the outer or refractory face 3 of the insulating block. A suitable washer 11, which in the case here illustrated, is square but may be of any other desired shape, is placed around the bolt 9 to bear against the bottom of the composite recesses in two adjacent blocks and is held in place by nut 12 on bolt 9. After the nut 12 has been tightened in place a suitable plastic material 13 is placed in the composite recess to cover the fastening means. This plastic material may be of any type desired which upon setting is capable of withstanding the temperature conditions to which it may be subjected The contour of the recess walls 5 give the composite recesses increasing cross-sectional areas as the distance from the block face increases thereby providing a wedge-like interlocking means between the filler 13 and the blocks to obviate any danger of this filling material loosening and becoming displaced. A suitable plastic mortar may be employed between the various blocks as indicated by numeral 14.

Although the various recesses illustrated are shown as semi-circular in cross-section and frusto-conical in longitudinal section it is entirely within the scope of the invention to employ recesses of pyramidal section or other shapes of like effect when desired.

I claim as my invention:

1. An insulating block comprising a layer of insulating material, a layer of hard refractory material secured to the insulating layer and having a portion thereof indented into the latter, a recess in said indented portion extending from the exposed surface of the refractory layer inwardly of the block and having a base within the block adapted to receive fastening means for securing the block to a supporting structure, said recess increasing in cross-sectional area from said exposed surface inwardly to said base.

2. An insulating block comprising a layer of insulating material, a layer of hard refractory material secured to the insulating layer and having a portion thereof indented into the latter, a recess in said indented portion extending from the exposed surface of the refractory layer inwardly of the block and having a base within the block adapted to receive fastening means for securing the block to a supporting structure, said recess increasing in cross-sectional area from said exposed surface inwardly to said base, and an opening of smaller cross-sectional area than said recess extending from the base of the recess through the insulating layer.

3. An insulating block comprising a layer of insulating material, a layer of hard refractory material secured to the insulating layer and having a portion thereof indented into the latter adjacent a side edge of the block, a recess in said indented portion opening to said side edge of the block and extending from the exposed surface of the refractory layer inwardly of the block and having a base within the block adapted to receive fastening means for securing the block to a supporting structure, said recess increasing in cross-sectional area from said exposed surface inwardly to said base.

4. An insulating block comprising a layer of insulating material, a layer of hard refractory material secured to the insulating layer and having a portion thereof indented into the latter adjacent a side edge of the block, a recess in said indented portion opening to said side edge of the block and extending from the exposed surface of the refractory layer inwardly of the block and having a base within the block adapted to receive fastening means for securing the block to a supporting structure, said recess increasing in cross-sectional area from said exposed surface inwardly to said base, and a groove in said side edge of the block of smaller cross-sectional area than said recess and extending from the base of the recess through the insulating layer.

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