

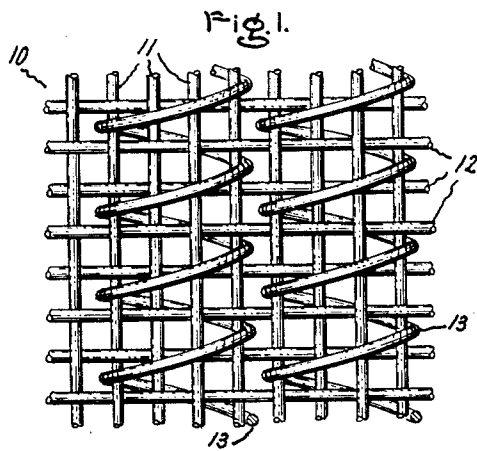
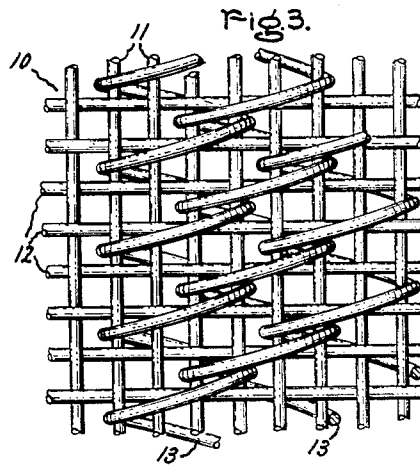
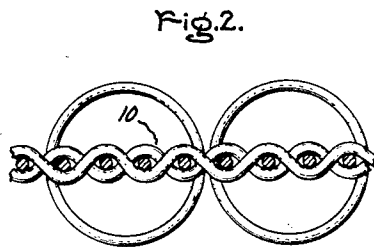
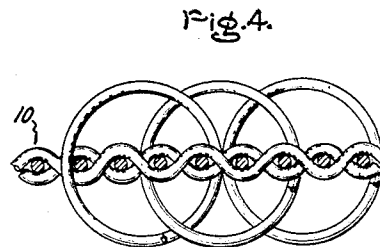
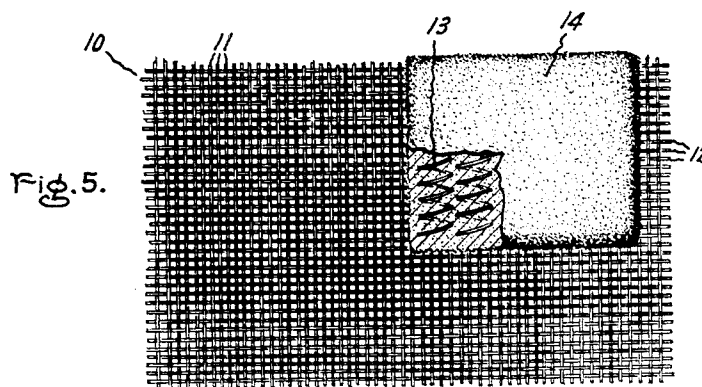
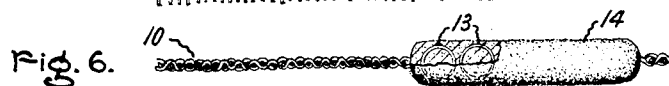
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2,867,112

WIRE MESH SUPPORTED REFRACTORY

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1

2,867,112

WIRE MESH SUPPORTED REFRACTORY

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1 Claim. (Cl. 72—50)

This invention relates to heat and flame resistant thin-wall structural bodies. It is particularly concerned with improved refractory bodies comprising a support structure upon which a heat-resistant coating is carried and which may be fabricated to produce such structures as, for example, a combustor in a gas turbine power plant.

An object of this invention is to provide a light-weight refractory body having high strength.

A further object of this invention is the provision of non-planar, thin-wall, strong, light-weight, refractory bodies.

Another object of this invention is the provision of an internally supported refractory material in which the supporting structure is completely protected by the refractory material.

Another object of this invention is the provision of a refractory material comprising a sheet-like formable support upon both sides of which is bonded a refractory coating, whereby the support is completely protected from corrosion and heat.

The invention is applicable to the construction of combustion liners for combustion chambers and many other similar uses. As disclosed in the Navias Patent 2,564,497, assigned to the same assignee as the present invention, such liners have been previously made by bonding a coating of refractory material to a sheet metal support. This refractory coating is anchored to the sheet metal by means of a plurality of tabs struck from and extending from the sheet metal, formed by punching perforations in the sheet metal by means of a punch which leaves one side of each punching attached to the main body of sheet metal. These tabs are bent out of the plane of the sheet metal and extend a substantial distance therefrom. The refractory material is applied to the sheet metal and by virtue of its engagement after fusion with the holes left in the sheet metal by the punching operation and with the laterally disposed tab surfaces, is anchored securely in place.

This procedure is most satisfactory when only one side of the support sheet is to be coated. If it is desired to coat both sides of the sheet, the additional tabs which extend from the other side of the sheet remove sufficient metal from the base sheet that its strength and rigidity have a tendency to be reduced. This invention provides a substantially planar supporting sheet which may be shaped and refractory material bonded and anchored to both of its sides.

A better understanding of my invention may be had by reference to the accompanying drawing in which

Fig. 1 is a fragmentary plan view of the elements of one embodiment of the refractory support;

Fig. 2 is an end view of Fig. 1;

Fig. 3 is a fragmentary plan view of the elements of a modified refractory support;

Fig. 4 is an end view of Fig. 3;

Fig. 5 is a plan view of the embodiment of the support shown in Fig. 1 with parts broken away or omitted to

2

show how refractory material is related to the support elements; and

Fig. 6 is an end view of Fig. 5 with parts broken away or omitted.

Referring to Figs. 1 and 2, the illustrated support structure comprises a substantially planar screen or mesh-like integral structure 10 composed of two groups of filamentary elements 11 and 12. Each of the first group of elements 11 is spaced from and substantially parallel to each other and is disposed at an angle of substantially 90° to and is intertwined between the elements 12 of the other or second group which are likewise parallel to and spaced from each other. It is to be noted that these groups of elements may be disposed to each other at angles other than 90°. A plurality of helical filamentary elements 13 are intertwined or interwoven through the screen-like structure 10, the axis of each of the helical elements being parallel to the axes of the others and to elements 11 and lying in the plane of structure 10. As illustrated in Fig. 1, the pitch of each of the helical elements 13 is such that each element 13 passes between each pair of elements 12, and the helical diameter of each element 13 is such that a plurality of elements 11 are encompassed thereby. As further illustrated in Figs. 1 and 2, the helical diameter of elements 13 is so selected that a predetermined given number of elements 11 will just fit within the helix, and elements 13 are so arranged with respect to elements 11 that all elements 11 are encompassed by elements 13, but no element 11 is encompassed by more than one helical element 13.

The substantially planar screen-like structure 10 with the helical support elements 13 may be then shaped to any convenient non-planar configuration and any suitable pulverulent or granular refractory material 14 may then be applied. The refractory 14 is compacted upon and through the network of support elements 11, 12 and 13 and extends a substantial distance from both sides of element 10, as illustrated in Figs. 5 and 6, and completely covers elements 13. This composite structure is then fired at a suitable temperature and the refractory is thereby bonded and fused to produce a monolithic, internally supported integral body. One such suitable refractory is fused MgO bonded to the support by means of a glass fired on at 1000° C. It is obvious, however, that many refractory materials might be so bonded to the support structure. Therefore, I do not wish to limit the invention to any particular refractory coating. The filamentary elements 11, 12 and 13 may be made of any suitable, strong material, for example, metal wire.

Figs. 3 and 4 illustrate a modification of the support structure shown in the other figures. The structural elements in this modification are identical in every respect to those shown in Figs. 1, 2, 5 and 6 except that helical elements 13 are spaced closer together or overlap so that every element 11 is now encompassed by two helical elements 13 and, further, the helical elements 13 are intertwined or interlaced with each other, as may be seen by inspection of Fig. 3.

It is obvious that further modifications are possible by varying the spacing of the helical elements to each other and by varying their pitch; however, it is not deemed either necessary or practical to illustrate every possible dimensional permutation and combination of the structural elements.

While the various figures of the drawing illustrate a supported refractory having a substantially planar configuration, it is readily apparent that the internal support elements 11, 12 and 13 may be formed into a great many different geometrical shapes and, after coating and firing, produce correspondingly shaped monolithic, internally

supported refractory thin-walled bodies. By way of example, such shapes as would immediately occur to one skilled in the art include hollow cylindrical bodies, hollow pyramidal bodies, conical bodies, prismatic tubular bodies and others too numerous to list. In view of this, no attempt has been made to illustrate any such specific configuration.

With the foregoing in mind, it is my intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention as defined by the following claim.

What I claim as new and desire to secure by Letters Patent of the United States is:

A thin wall heat, flame and corrosion resistant structure comprising in combination, a first and second group of substantially parallel filamentary metal wire elements, the said wire elements of the first group being interwoven with the wire elements of the second group and defining a flexible integral planar reticulated mesh, a plurality of helical metal wire support elements intertwined through the interstices of said mesh parallel to each other and to one of said groups of wire elements, each support element having its axis within the spatial limits of said mesh, each support element on two of its opposite sides longitudinally of its axis being intertwined in overlapped relation with adjacent support elements therealong and defining aligned spaces therebetween in the overlaps formed thereby, a plurality of said wide ele-

ments of said one group continuously threaded through said aligned spaces of the overlaps of each of said two opposite sides of each of said support elements, the wire elements defining the two opposite sides of said plurality of said wire elements being spaced apart substantially the width of said aligned spaces, and a compacted refractory metal fused and bonded to said mesh and support elements completely covering and embedding said elements and producing a substantially monolithic, internally supported, thin wall integral body.

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