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J. MacDONALD ET AL

2,012,171

COMBUSTION CHAMBER

Filed Nov. 26, 1934

Fig. 1.

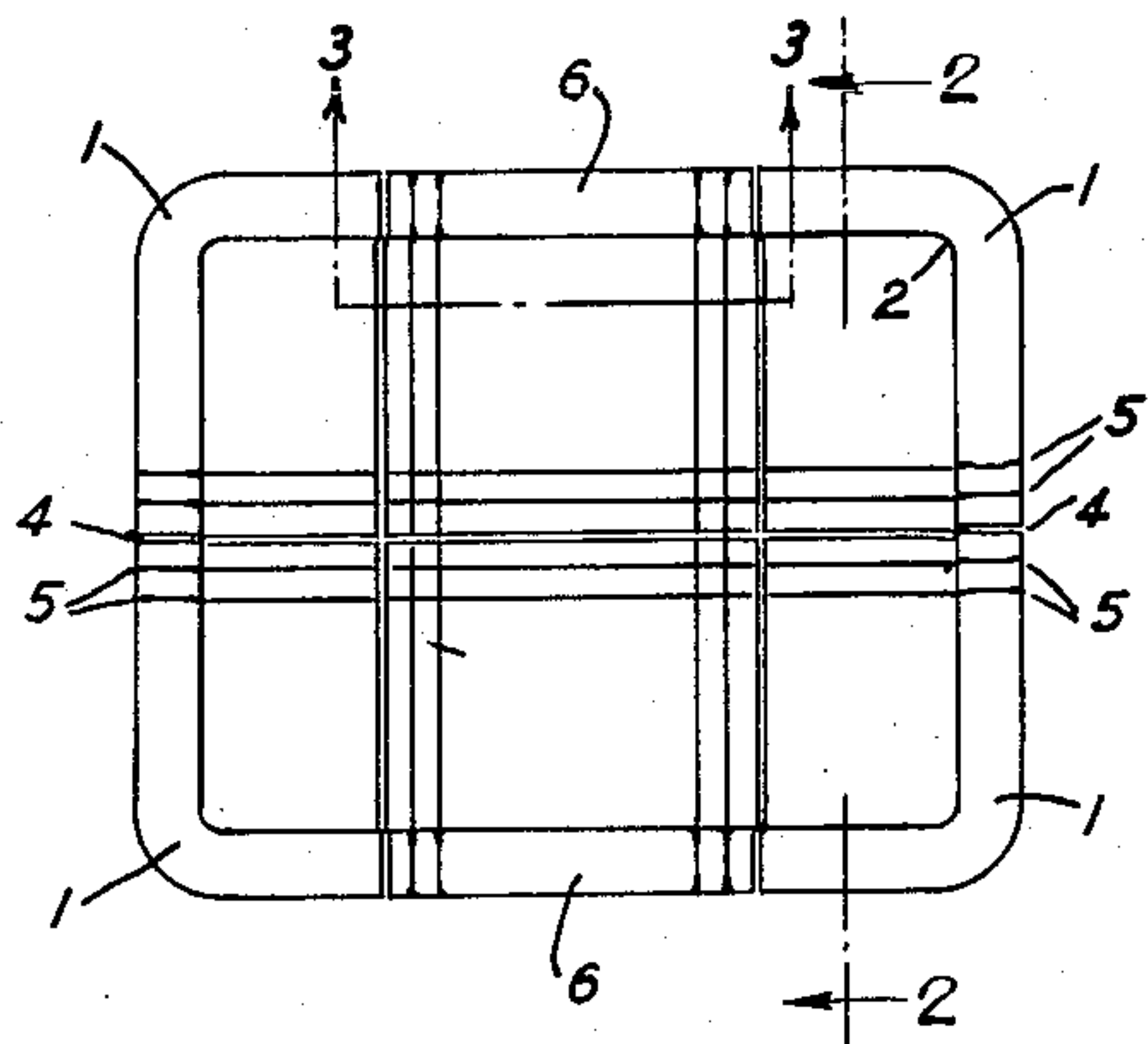


Fig. 2.

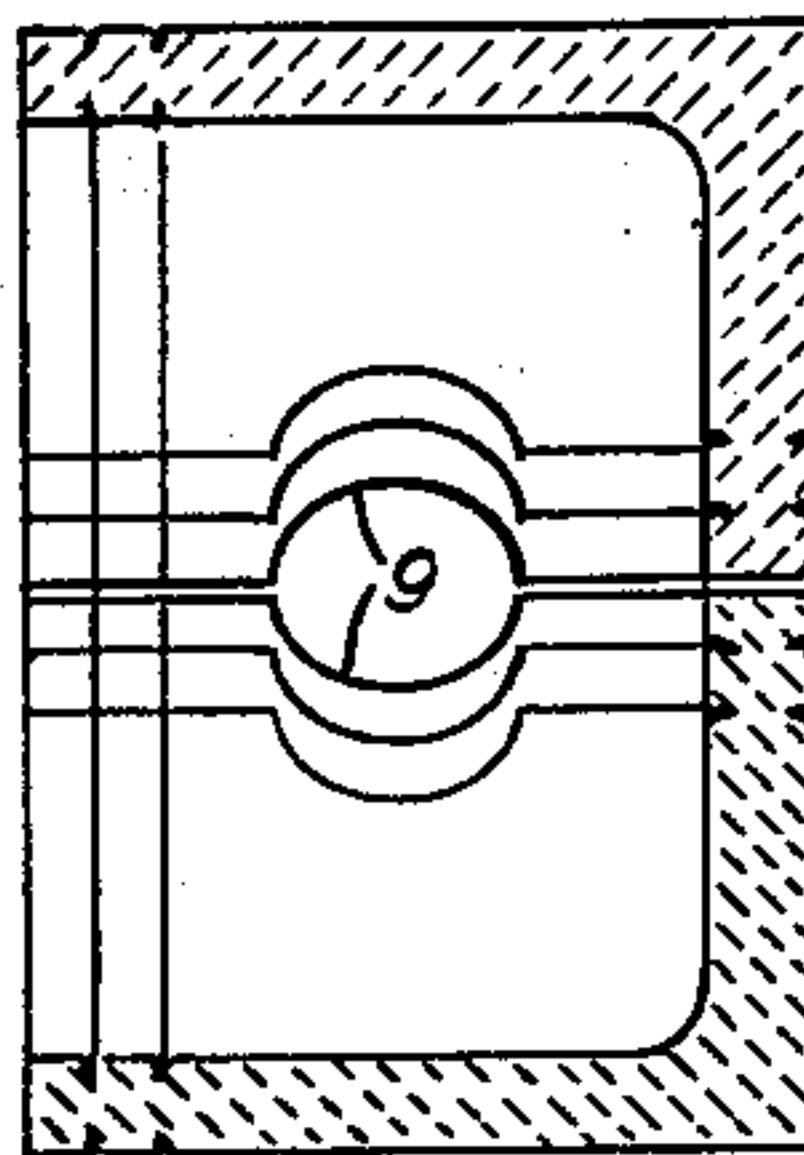


Fig. 3.

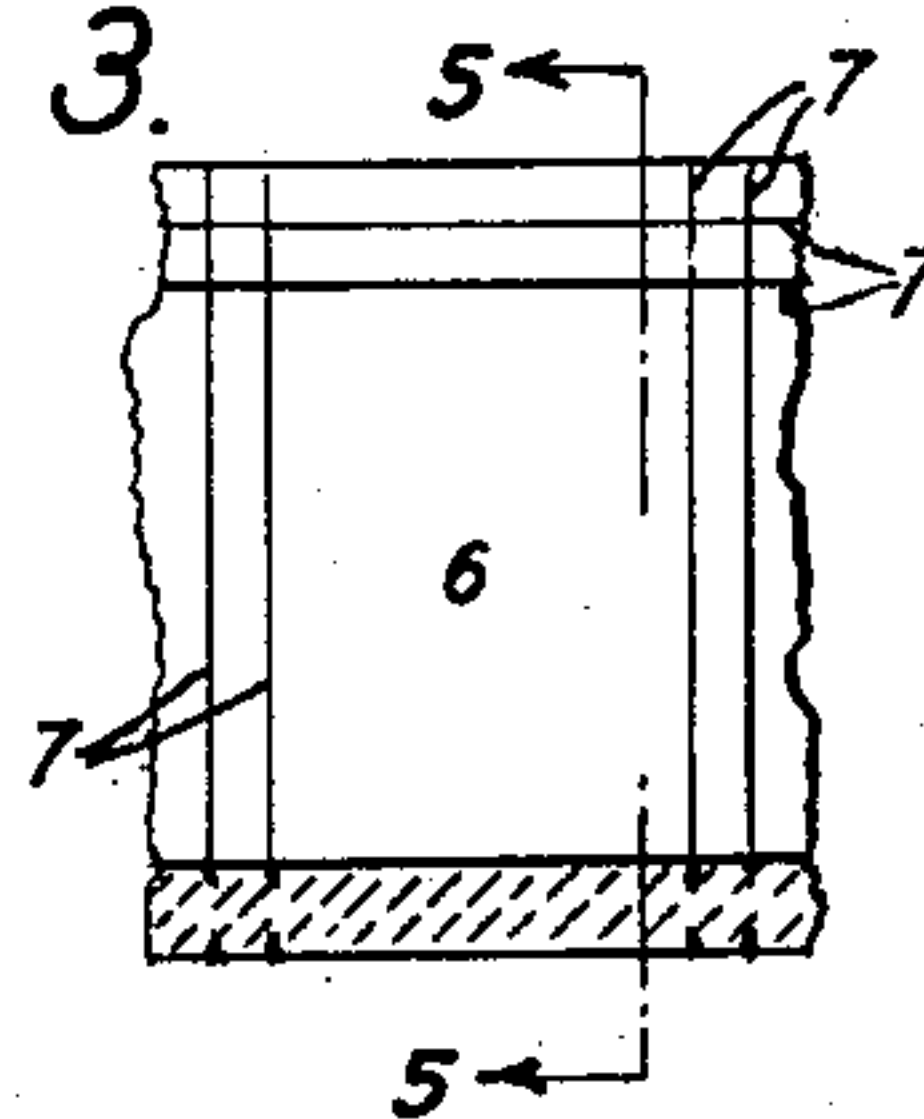


Fig. 4.

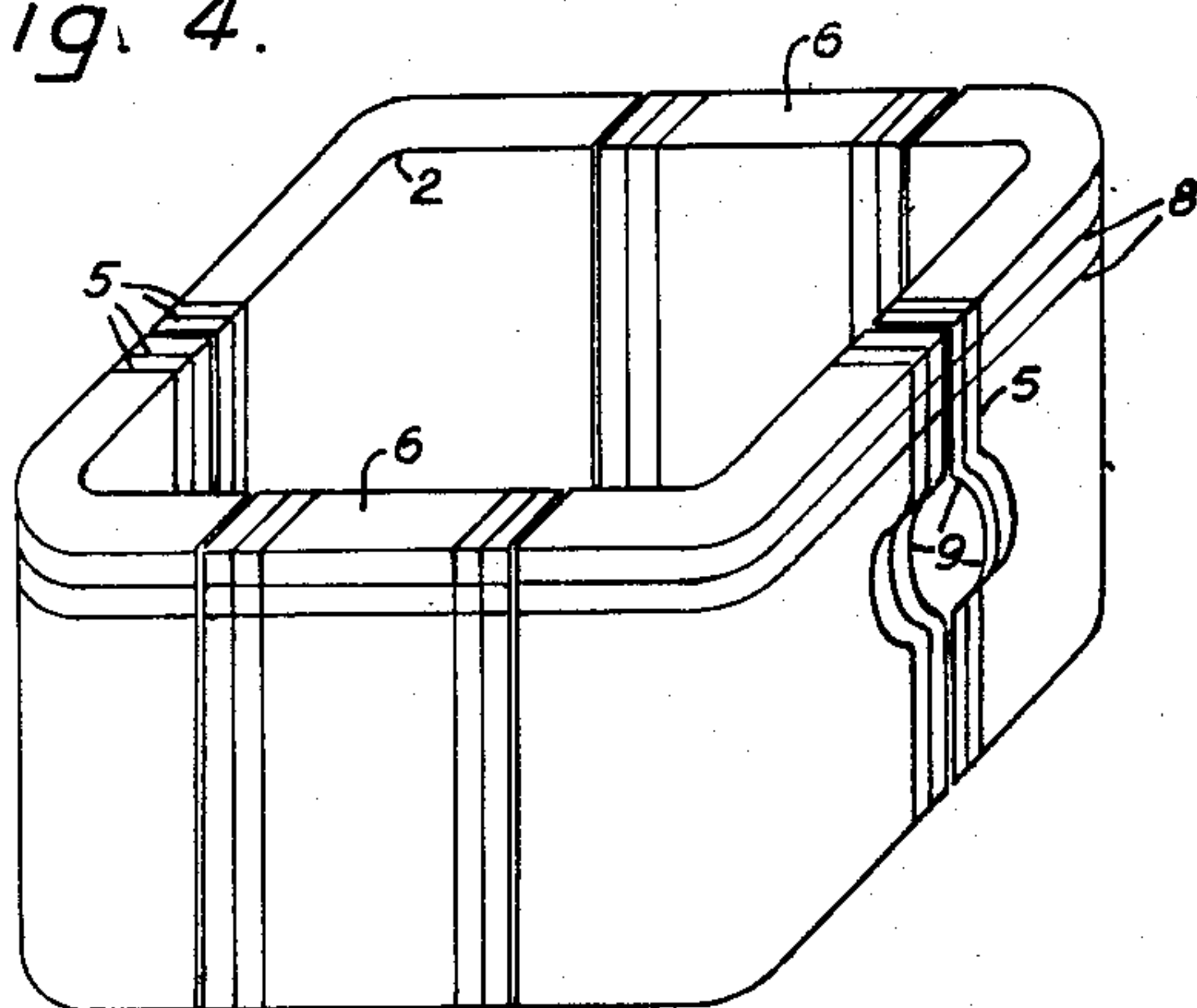


Fig. 5.

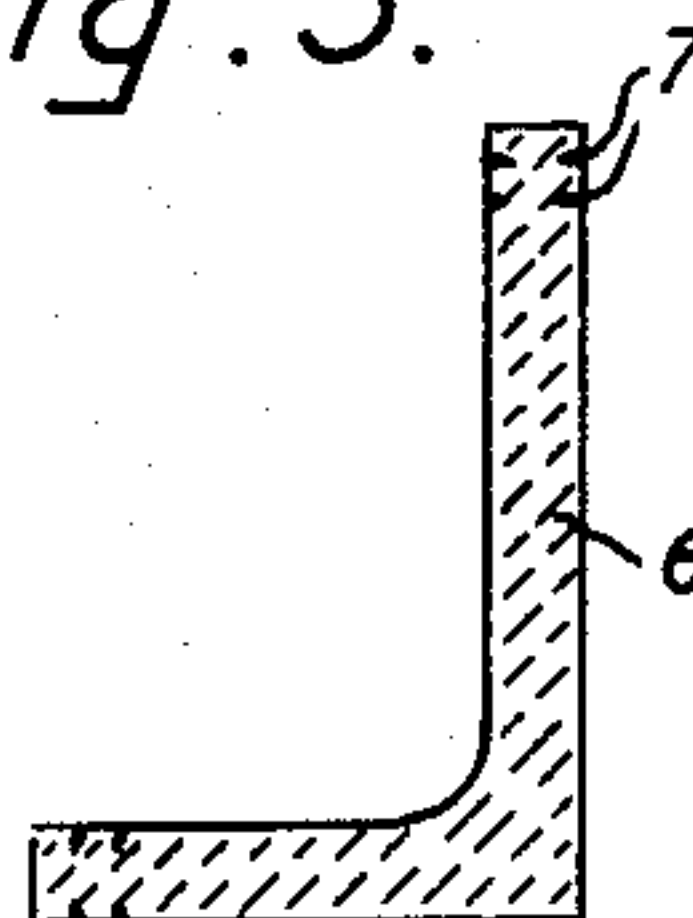


Fig. 6.

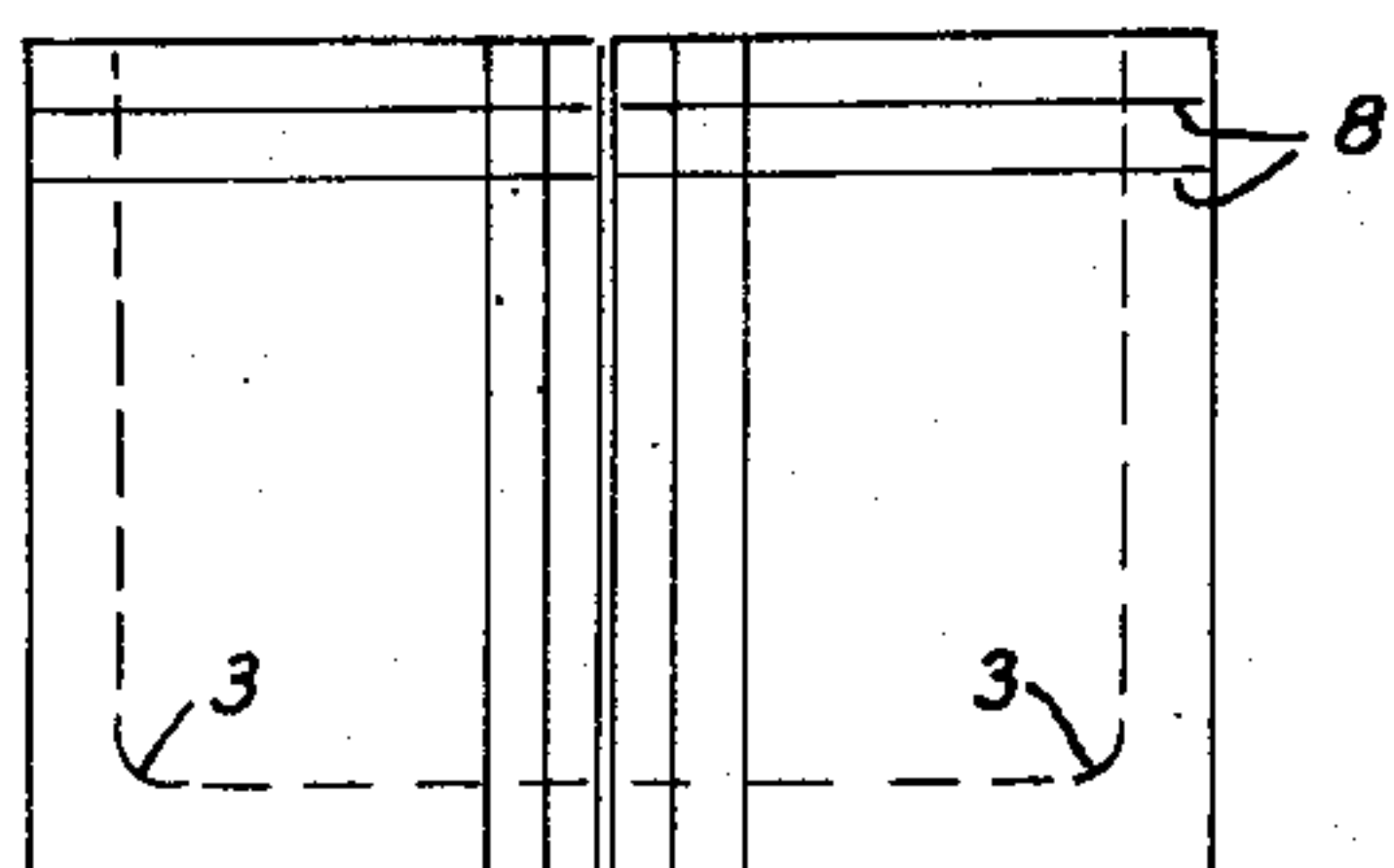
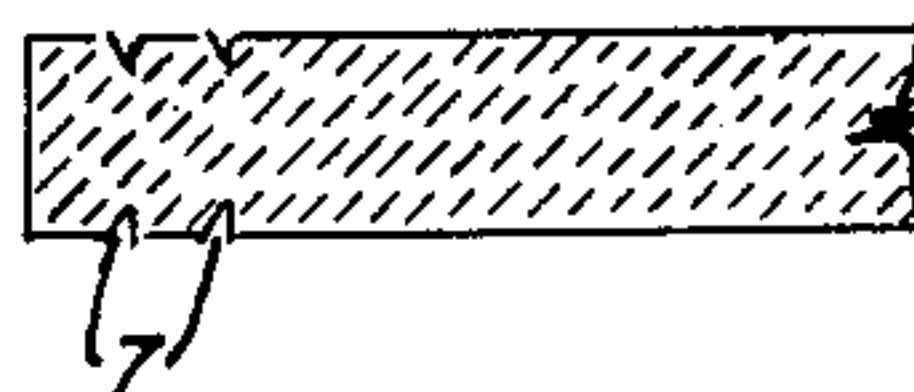


Fig. 7.



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## UNITED STATES PATENT OFFICE

2,012,171

## COMBUSTION CHAMBER

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Application November 26, 1934, Serial No. 754,756

## 8 Claims. (Cl. 158—1)

Our invention relates to a refractory lining for a combustion chamber and more particularly to combustion chambers for oil burners of the gun type.

Due to the fact that the combustion chamber for an oil burner is subjected to extremely high temperatures, relatively sudden changes in temperature and corroding influences, there always exists the problem of repair. It has become important therefore to provide a combustion chamber which will be easy to install and easy of replacement in whole or in part. It has been customary to either build up these chambers in situ of refractory bricks or to mold these chambers in situ of refractory concrete or cement. Such installations are rendered difficult by the cramped working space. Moreover, when such an installation becomes in need of repair in one or more spots, it becomes necessary to either tear down the whole combustion chamber or a considerable portion thereof and replace it, all of which must be done inside the combustion chamber.

The principal object of our invention is to provide a combustion chamber in which these disadvantages will be eliminated. We accomplish this by constructing the chamber of at least four sections, each of which comprises a corner, a part of each of two adjacent side walls and a part of the bottom. Each of these sections is therefore self-supporting whereby the necessity for holding the parts in place during the cementing operation is eliminated.

Our combustion chamber is preferably made of hydraulic setting refractory material.

A further object of our invention is to provide a combustion chamber precast into sections as aforescribed which sections can be adjusted to fit any size of combustion chamber. By reason of this fact, the manufacturer requires molds of only one size to satisfy the requirements of the industry.

Another object of our invention is the provision of a combustion chamber in which the deposition of carbon will be reduced to a minimum. We obtain this advantage by eliminating all sharp corners from the interior of the combustion chamber.

Further objects and advantages of our invention will be apparent from the accompanying drawing in which,

Fig. 1 is a plan view of the combustion chamber with the sections assembled;

Fig. 2 is a vertical section along the line 2—2 of Fig. 1;

Figure 3 is a detail section showing the cen-

tral part of the device along the line 3—3 of Figure 1.

Fig. 4 is a perspective view of the combustion chamber with the sections assembled;

Fig. 5 is a vertical section along the line 5—5 of Fig. 3;

Fig. 6 is an end view of the combustion chamber; and

Fig. 7 is an enlarged detail of a free end of one of the sections.

Referring to the drawing in detail, 1 represents a corner section which includes part of one end wall, part of the adjacent side wall and part of the base. The corners 2 and 3 are arcuate in configuration. By making the corner 3 arcuate, the deposition of carbon is not only reduced, but the point of juncture of the different planes of section 1 is strengthened.

Adjacent the abutting edge 4 of each section 1, and spaced in parallel relation to said abutting edge and to each other, are a series of grooves 5. Each groove extends continuously around the perimeter of the vertical cross section of the member 1. Each groove is of sufficient depth to render easy the breaking off or cutting of the member 1 along the groove. These lines are opposite each other in order to permit a clean, square break of the material. If there were only one groove and an attempt were made to break it, the whole side of the section would break into irregular pieces.

In the drawing the grooves are shown on members 1 adjacent the abutting edges of these members on the short sides of the chamber. Similar grooves can be applied adjacent the abutting edges of the long side of the chamber. In practice, however, a greater number of sizes can be embodied in one construction and replacement of worn parts can be rendered simpler and cheaper by providing angular sections 6 for insertion between the sections 1 on the long side of the combustion chamber. Spaced from all the free edges of each section 6 and from each other are parallel grooves 7, identical in nature and purpose with grooves 5. In the drawing, these grooves are shown equi-distantly spaced from each other. It is apparent that by varying the spacing between the grooves on opposite ends of section 6, the number of sizes to which member 6 can be adjusted can be increased. It is to be noted that grooves parallel to the top of each member 6 are provided. Corresponding grooves 8 parallel to the top of each member 1 are also provided whereby the height of the combustion chamber can be adjusted as desired



Each of the short side abutting edges of two of the corner sections 1 is provided with a cut-out portion, preferably in the form of half an ellipse 9, so that when the sides abut an opening is formed. In the embodiment shown, this opening is elliptical. This opening permits the insertion of the burner and the adjustment of it at any desired distance from the bottom of the chamber. The grooves 5 parallel to each of these edges are made parallel to the elliptical surface of each edge so that in the event that it is necessary to cut away part of the edge to make a smaller size chamber, the size of the elliptical opening will not be altered.

While two parallel grooves are shown for each edge of each section of the combustion chamber, it is to be understood that any number of grooves ranging upwardly from one can be employed, depending upon the range of sizes that must be accommodated. Likewise any desired number of angular sections 6 can be employed. When the sections are assembled, after being cut along the grooves to a proper size, if necessary, any remaining grooves are filled in with refractory cement at the same time that the various sections are cemented together. Simultaneously, the elliptical opening is filled with cement after the burner has been adjusted to the desired position.

Having thus described the nature and objects of our invention and illustrated a preferred embodiment of the same, which embodiment is to be taken as illustrative rather than limitative, what we claim as new and desire to secure by Letters Patent is:—

1. A combustion chamber of refractory material comprising at least four precast sections, each section forming an arcuate corner and one end of the combustion chamber and comprising part of two adjacent sides and part of the bottom of the combustion chamber.

2. A combustion chamber of refractory material comprising at least four precast sections, each section forming an arcuate corner and one end of the combustion chamber and comprising part of two adjacent sides and part of the bottom of the combustion chamber and having the interior junction points of converging surfaces rounded.

3. A combustion chamber of refractory material comprising at least four precast sections, each section forming an arcuate corner and one end of the combustion chamber and comprising part of two adjacent sides and part of the bottom of the combustion chamber, each of the abutting edges of two of said sections being cut

away in the form of half an ellipse so that when the two sections are abutted an elliptical opening is formed in the resulting surface.

4. A combustion chamber of refractory material comprising at least four precast sections, each section forming an arcuate corner and one end of the combustion chamber and comprising part of two adjacent sides and part of the bottom of the combustion chamber, each section being provided with at least one groove on each side of each section parallel to and spaced from an abutting edge of the section of sufficient depth to facilitate the separation of the section into two parts along the groove.

5. A combustion chamber of refractory material comprising at least four precast sections, each section forming an arcuate corner and one end of the combustion chamber and comprising part of two adjacent sides and part of the bottom of the combustion chamber, each section being provided with at least one groove on each side of said section, said grooves being opposite to each other in order to permit a clean, square break spaced from and parallel to an abutting edge and at least one groove spaced from and parallel to its top edge, said grooves being of sufficient depth to facilitate the separation of the section into two parts along the groove.

6. A combustion chamber of refractory material comprising four precast corner sections, each of which comprises part of two adjacent sides and part of the bottom of the combustion chamber and at least two precast angular sections, each of which comprises part of the one side and part of the bottom of the combustion chamber.

7. A combustion chamber according to the preceding claim in which each of the sections enumerated is provided with a groove spaced from and parallel to an abutting edge of the section the groove on one side of the material being opposite the groove on the other side of the material in order to permit a clean, square breakage of the material.

8. A combustion chamber according to claim 6 in which each of the sections is provided with a plurality of grooves parallel to the abutting edges of the section and spaced from said edges and from each other and grooves parallel to and opposite to each other and spaced from the upper edge of each section and from each other, each of said grooves being of sufficient depth to permit the separation of the section into two parts along the groove.

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