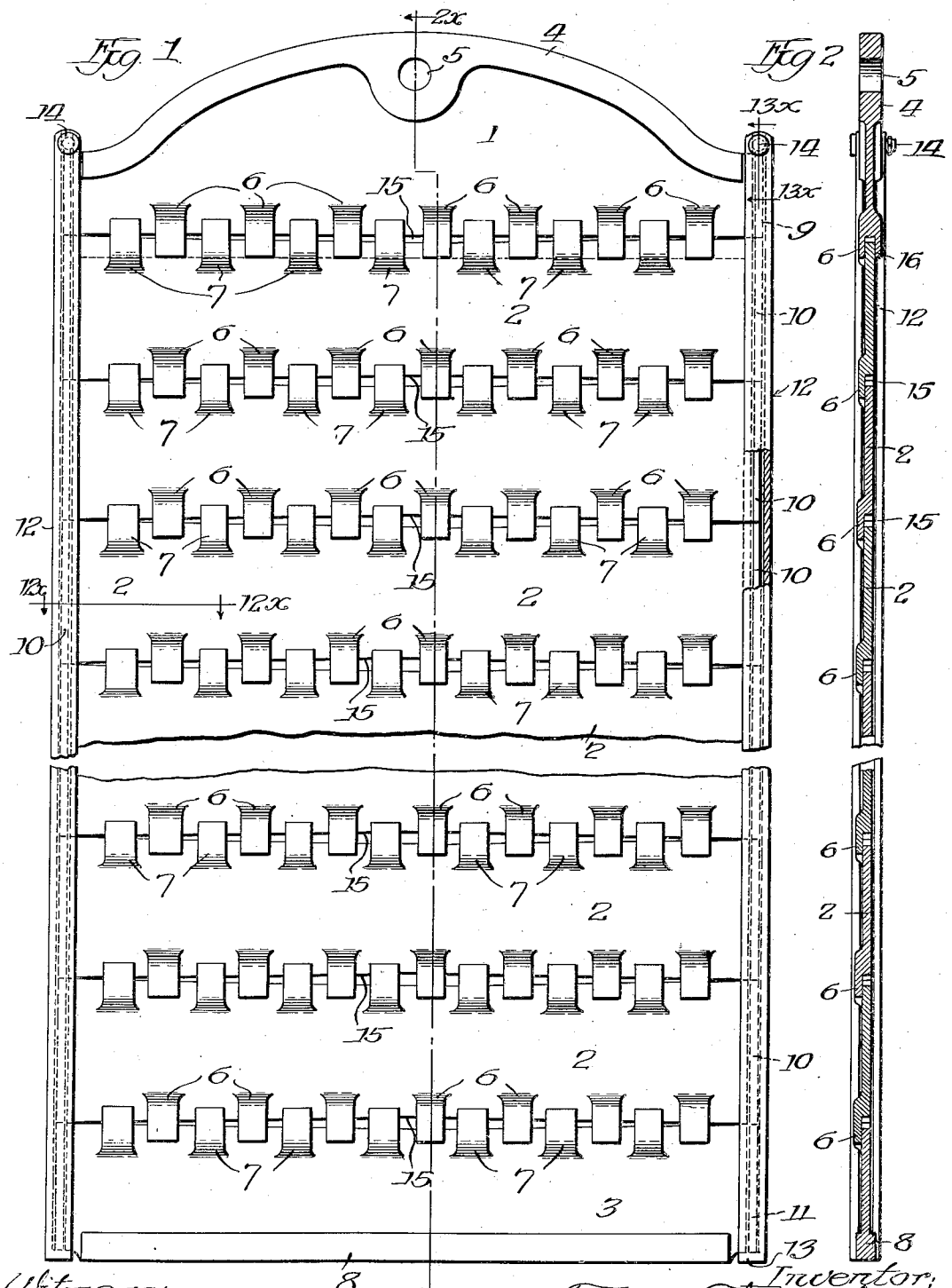
May 24, 1927. 1,629,689

F. A. FAHRENWALD

HEAT RESISTING DAMPER AND THE LIKE

Filed April 21, 1926 2 Sheets-Sheet 1



Witness:

Inventor:
Frank A. Fahrenwald,
By Wilkinson, Huxley, Byron & Knight
Attys.

May 24, 1927. 1,629,689

F. A. FAHRENWALD

HEAT RESISTING DAMPER AND THE LIKE

Filed April 21, 1926 2 Sheets-Sheet 2

Fig. 3

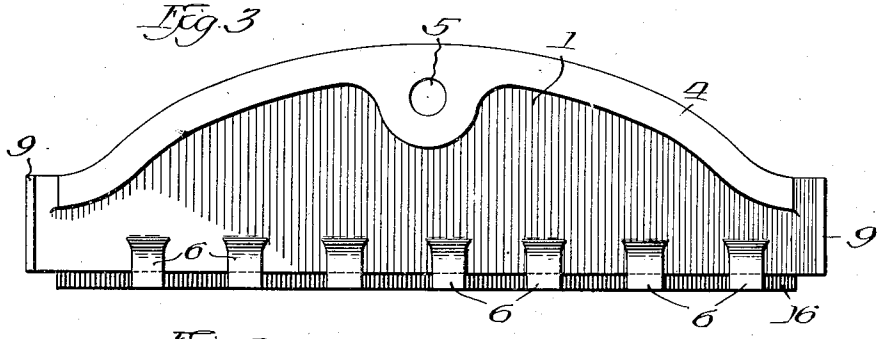


Fig. 5

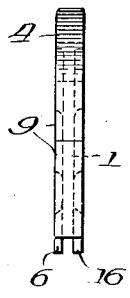


Fig. 4

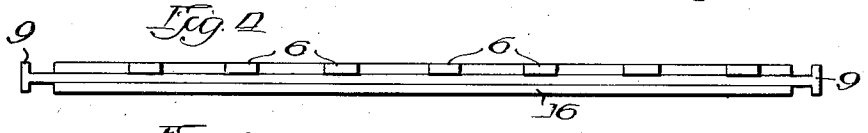


Fig. 6

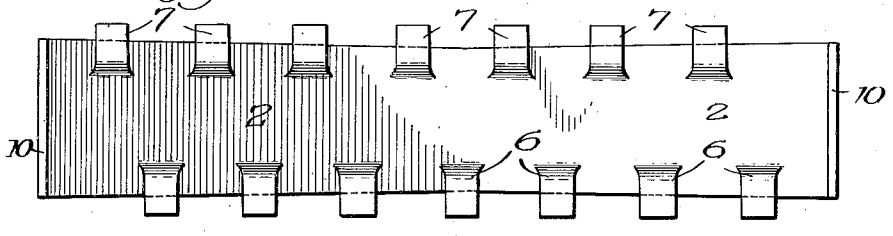


Fig. 8

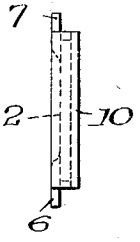


Fig. 7



Fig. 9

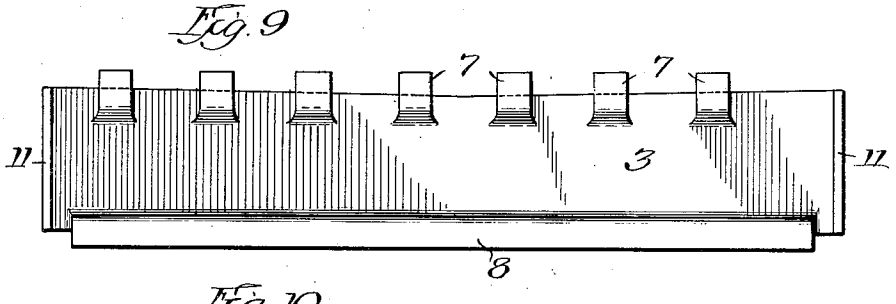


Fig. 11

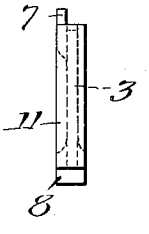


Fig. 10

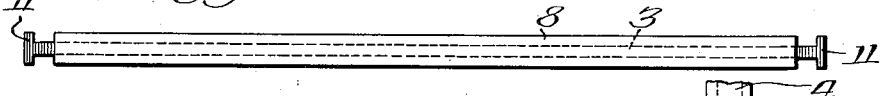
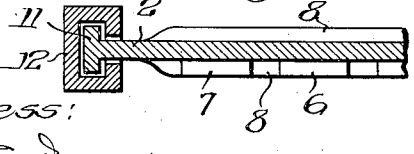


Fig. 12



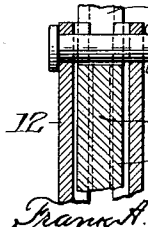


Fig. 13

Witness:

Inventor;

Frank A. Fahrenwald,

By Wilkinson Huxley Byron & Knight

Attys.

Patented May 24, 1927. 1,629,689

UNITED STATES PATENT OFFICE.

FRANK A. FAHRENWALD, OF CHICAGO HEIGHTS, ILLINOIS.

HEAT-RESISTING DAMPER AND THE LIKE.

Application filed April 21, 1926. Serial No. 103,656.

This invention relates to metal structures designed to provide a heat resisting barrier or surface, and particularly to that class of heat resisting surfaces which, for the sake of rendering them proof against distortion and cracking under differential heating of different portions of their areas, or frequent fluctuations in temperature, are made by assembling a plurality of separately formed members which, while sufficient to collectively provide the whole area required, are of such restricted dimensions individually that stresses set up in the members by thermal expansion and contraction, will not exceed a predetermined maximum at which the members will retain their original form indefinitely.

One object of the present invention is to provide a sectional barrier which, while embodying the structural principle above referred to, will have its members assembled in such manner that the barrier may be moved bodily or as a whole, as an incident to the function which it is to perform in service, for instance, such movements as are required in a damper for controlling the flow of gases at high temperature; and to accomplish this in such a manner that while the ends of the members of the barrier are held by extraneous means against displacement from the plane of the barrier, and left free to expand in said plane, they have at intermediate portions of their opposed edges or margins, means integral with the respective members for interlocking them against displacement in either direction perpendicularly to the said plane; and another object of the invention is to so construct the extraneous holding and aligning means for the ends of the barrier members that said means will serve as mountings through which the barrier is guided in its movement as a whole.

Accordingly, the present invention resides in a heat resisting barrier, wall, surface, or the like, comprising a plurality of separately formed plate sections assembled in approximately the same plane, each plate section being provided upon each of the margins through which it meets an adjacent plate section with a lug or lugs extending substantially parallel to the plane of the barrier and overlapping the adjacent section, with the lugs on the respective sections all on the same side of the plane of the barrier so that each plate, while left free for expansion and contraction in the plane of the barrier, will be held against displacement in either direction from the plane of the barrier; and all the plate sections being held in assembly by means of a confining member or members extraneous to or independently of the plate sections which constitute the barrier members and constituting a marginal portion or portions of the structure, and which, while embracing the respective plate sections in a manner to hold them in assembly with freedom of relative expansion and contraction of the sections under changes in temperature, will adapt the assembly of sections to be moved as a unitary structure in such manner as may be required in the service which the structure is to render. While the invention may find a wide variety of uses, it is well illustrated in its application to a flue damper, and, for convenience, the structure will be hereinafter referred to as a damper, with the understanding that the term is to be regarded as one of illustration rather than limitation.

Preferably, there will be at least two confining members related to the group of plate sections in a manner to define the plane of their assembly, for instance, by producing a number of plate sections with a common dimension in one direction, and having the confining members spaced apart by this dimension and interlocked with marginal portions of the sections without confining the latter against expansion and contraction. Preferably, also, the marginal confining members will serve as means for preventing separation of the sections in the longitudinal direction of the confining members, so that the damper may assume a vertical position and be raised or lowered through a connection with an upper section, and the sections will have along their margins which meet in the assembly of the sections, means for interlocking the said margins against relative displacement perpendicularly to the plane of the damper, as described in my copending application aforesaid, thereby resisting tendency of the sections to warp. Further features of the invention reside in details of construction incident to a realization of the features generally stated above, and will be hereinafter particularly described with reference to the preferred embodiment of the invention herein selected for illustration and shown in the accompanying drawings.

In said drawings—

Figures 1 and 2 are, respectively, a face elevation and a vertical transverse section of a damper embodying features of the present invention; the plane of section being indicated by the line 2^x—2^x of Figure 1.

Figures 3, 4, and 5 are, respectively, a face elevation, a bottom edge view, and a side edge view of the uppermost section shown in Figures 1 and 2.

Figures 6, 7, and 8 are, respectively, a face elevation, a bottom edge view, and a side edge view of one of the intermediate sections of the damper, of which there may be any number necessary to develop the dimension required.

Figures 9, 10, and 11 are, respectively, a face elevation, a bottom edge view, and a side edge view of the lowermost section of the damper.

Figure 12 is a detail view in section on the line 12^x—12^x of Figure 1; and

Figure 13 is a detail view in section on the line 13^x—13^x of Figure 1.

1 represents the uppermost section, 2 the intermediate section, and 3 the lowermost section of a multiple-section heat resisting damper. The uppermost section has a top marginal reinforce 4 which may be perforated as at 5 or otherwise provided with means for attaching a controlling connector through which to impart movements to the damper; and said section is further provided, upon its margin through which it meets an intermediate section 2, with integral interlocking lugs 6 which cross the plane of division between the sections and lap sufficiently on the adjacent or intermediate section to resist movement of the latter in one direction perpendicularly to the plane of the damper. The intermediate sections 2 are provided on their lower meeting margins with integral lugs 6, which may be in all respects similar in construction and function to the similarly indexed lugs on the uppermost section 1. The intermediate section and the lowermost section have on their upper margins, and interspersed with the downwardly presented lugs 6, a plurality of upwardly presented lugs 7 which bridge the joints between each section and the one next above it, and lap upon the latter sufficiently to resist relative movement between the sections in the direction opposite to that in which the lugs 6 act. By mounting the lugs 6 and 7 some on one member and others on the other member, the sections are interlocked in both directions even though the lugs are all on the same side of the barrier, which is an advantage in situations where the heat encountered by the barrier is such as to seriously attack projecting portions of small dimensions. Since all of the joints, whether those between the uppermost and an intermediate section, or between the several intermediate sections, or between an intermediate section and the lowermost section, are provided with mutually interlocking interspersed lugs 6 and 7, it follows that all of the sections are held in the plane of the damper against warping tendencies, paticularly at intermediate areas between the lateral margins of the sections. The lowermost section 3 has a bottom marginal reinforce 8.

All of the sections have lateral reinforced marginal portions preferably developing T-sections, said portions being indicated by 9 in the uppermost section, 10 in the intermediate sections, and 11 in the lowermost section; and the several sections are thereby adapted to enter into interlocking relation with vertical members 12 which constitute marginal portions of the complete damper, and which are designed with such form (in the present instance, with C-section or T-channel), as will adapt them to interlock with the margins 9, 10, and 11 and hold the plate section in assembly. The marginal assembling members 12 have at bottom, arresting stops 13 (in the present instance, walls across the channels of the members), whereby they are adapted to lift the group of plate sections, and at top are provided with transverse pins 14 which prevent separation of the sections when movement is imparted to the damper through the uppermost section. But the grooves of the assembly members 12 and the spacing of the bottom stops 13 and the top pins 14 are such as to allow ample tolerance between the plate sections and the assembly members to permit freedom of expansion and contraction of the plate sections vertically, and even laterally in case the assembly members 12 should be confined in a guide frame or other structure employed for locating the damper.

As shown at 15, the meeting edges of the several plate sections are preferably cambered slightly from the sides toward the middle in order that they may remain in vertical bearing one upon another at their side margins when expanded, and even though the expansion is materially greater in intermediate portions of the area where the gases are hottest than at the sides where either lower temperatures are encountered or greater conducting influences reduce the vertical expansion of the plates. Preferably the top section 1 is provided, and intermediate sections may, if desired, be provided, with a depending flange 16 (Figures 2, 3, and 5) on the face of the section which is opposite to the lugs 6 for the purpose of reinforcing the joint against warping, and with the effect also of closing the space left by the camber 15. The plate sections, as well as the marginal assembling members entering into the construction of the dampers or other barriers, movable walls, or the like,

to which the present invention relates, will preferably be made of metal alloy having the capacity of resisting very high temperatures.

I claim:

1. A movable heat resisting barrier, comprising a plurality of separately formed plate sections assembled in substantially the same plane, and confining means constituting a marginal portion of the barrier, embracing the respective plate sections and holding them in assembly with freedom of relative expansion and contraction in the plane of the barrier; each plate section being provided on each of its margins through which it meets an adjacent plate section, with a projection lapping upon the adjacent section, and the sections being thereby interlocked against relative displacement in either direction perpendicular to the plane of the barrier.

2. A heat resisting barrier, comprising a plurality of separately formed plate sections assembled approximately in the same plane, and confining means consisting of a plurality of members constituting marginal portions of the barrier, embracing corresponding marginal portions of the plate sections, holding the plate sections in assembly and defining the plane of their assembly; meeting marginal portions of the respective plate sections being provided with interlocking lugs, some of which are on the one and the others upon the other of the meeting portions, whereby the effected interlock is in both directions perpendicular to the plane of the barrier.

3. A heat resisting barrier, comprising a plurality of separately formed plate sections assembled approximately in the same plane, and confining means consisting of a plurality of members constituting marginal portions of the barrier, embracing corresponding marginal portions of the plate sections, holding the plate sections in assembly and defining the plane of their assembly; the plate sections having upon their margins through which they meet one another, means for interlocking them against relative displacement or warping in both directions perpendicular to the plane of the barrier.

4. A heat resisting barrier, comprising a plurality of separately formed plate sections, and a pair of confining members constituting opposite lateral margins of the barrier, embracing and interlocking laterally with the ends of the plate sections, and holding them in the plane of assembly while leaving them free to expand and contract.

5. A heat resisting barrier, comprising a plurality of separately formed plate sections, and a pair of confining members constituting opposite lateral margins of the barrier embracing and interlocking laterally with the plate sections, and holding them in the plane of assembly while leaving them free to expand and contract; said plates sections meeting one another at edges thereof extending from one to the other of said confining members, and carrying adjacent their said meeting edges, and upon each plate section, oppositely presented lugs lapping from each section to the other and resisting warping while permitting expansion and contraction in the plane of the sections.

6. A heat resisting barrier, comprising a plurality of plate sections assembled edge to edge, and a pair of assembling members interlocking laterally with the end portions of the plate sections and holding them in assembly; said assembly members having means engaging the uppermost and lowermost plate sections in directions to resist separation of said sections in the direction of the length of the assembly members.

7. A heat resisting barrier, comprising end sections constructed with reenforcing marginal portions, and intermediate sections, said sections being assembled edge to edge, and lateral assembling members embracing and reenforcing the ends of the sections.

8. In sectional heat resisting barriers, comprising a plurality of plate sections assembled in a plane, an assembling member constructed with a channel in which it receives and by which it interlocks laterally with end portions of the plate sections, said channel being closed at one end and having a removable stop at the other end whereby said sections are prevented from moving endwise in the assembling member.

9. A sectional heat resisting barrier, comprising a plurality of plate sections assembled in a plane and with meeting marginal portions; the marginal portion of each plate section at each line of meeting being provided with a lug or lugs projecting therefrom in the direction of the plane of the barrier and lapping upon the plate section which meets it, the lugs on the two sections at each line of meeting being on the same side of the plane of the barrier.

10. A sectional heat resisting barrier, comprising a plurality of plate sections assembled in a plane and with meeting marginal portions; the marginal portion of each plate section at each line of meeting being provided with a lug or lugs projecting therefrom in the direction of the plane of the barrier and lapping upon the plate section which meets it, the opposed edges of the sections at the respective lines of meeting being spaced apart along the intermediate portions of said edges, thereby affording greater range of expansion in the intermediate portions of the sections without contact of the edges.

11. A sectional heat resisting barrier, comprising a plurality of plate sections assem-

bled in a plane and with meeting marginal portions; the marginal portion of each plate section at each line of meeting being provided with a lug or lugs projecting therefrom in the direction of the plane of the barrier and lapping upon the plate section which meets it, the opposed edges of adjacent sections being in abutment at the ends of the sections but diverging from their ends toward the middle line, thereby leaving space for greater expansion of the intermediate portions of the sections.

Signed at Chicago, Illinois, this 14th day of April, 1926.

FRANK A. FAHRENWALD.