July 8, 1969 J. R. SALTON 3,453,793

HEAT-RESISTANT WALL

Filed Jan. 5, 1968 Sheet 1 of 2

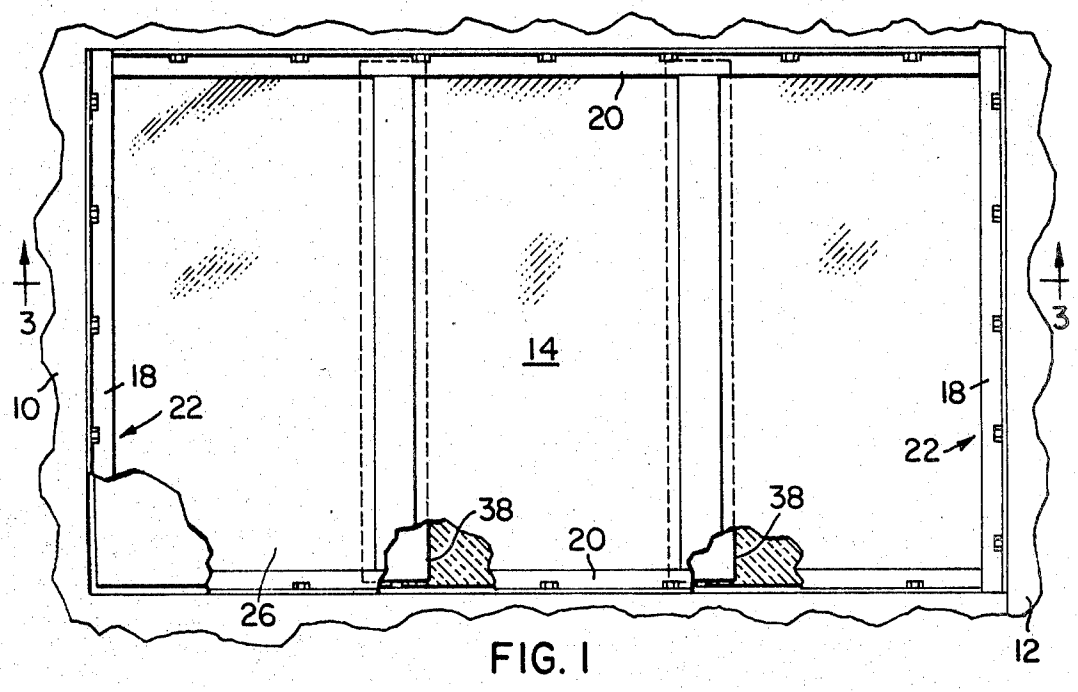


FIG. 1

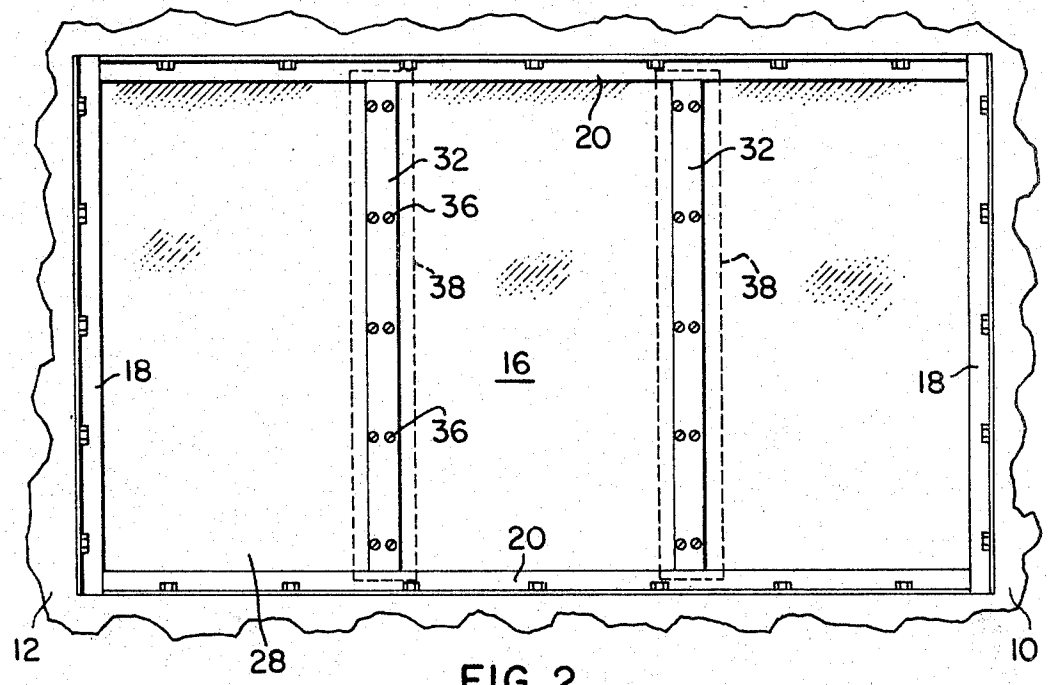


FIG. 2

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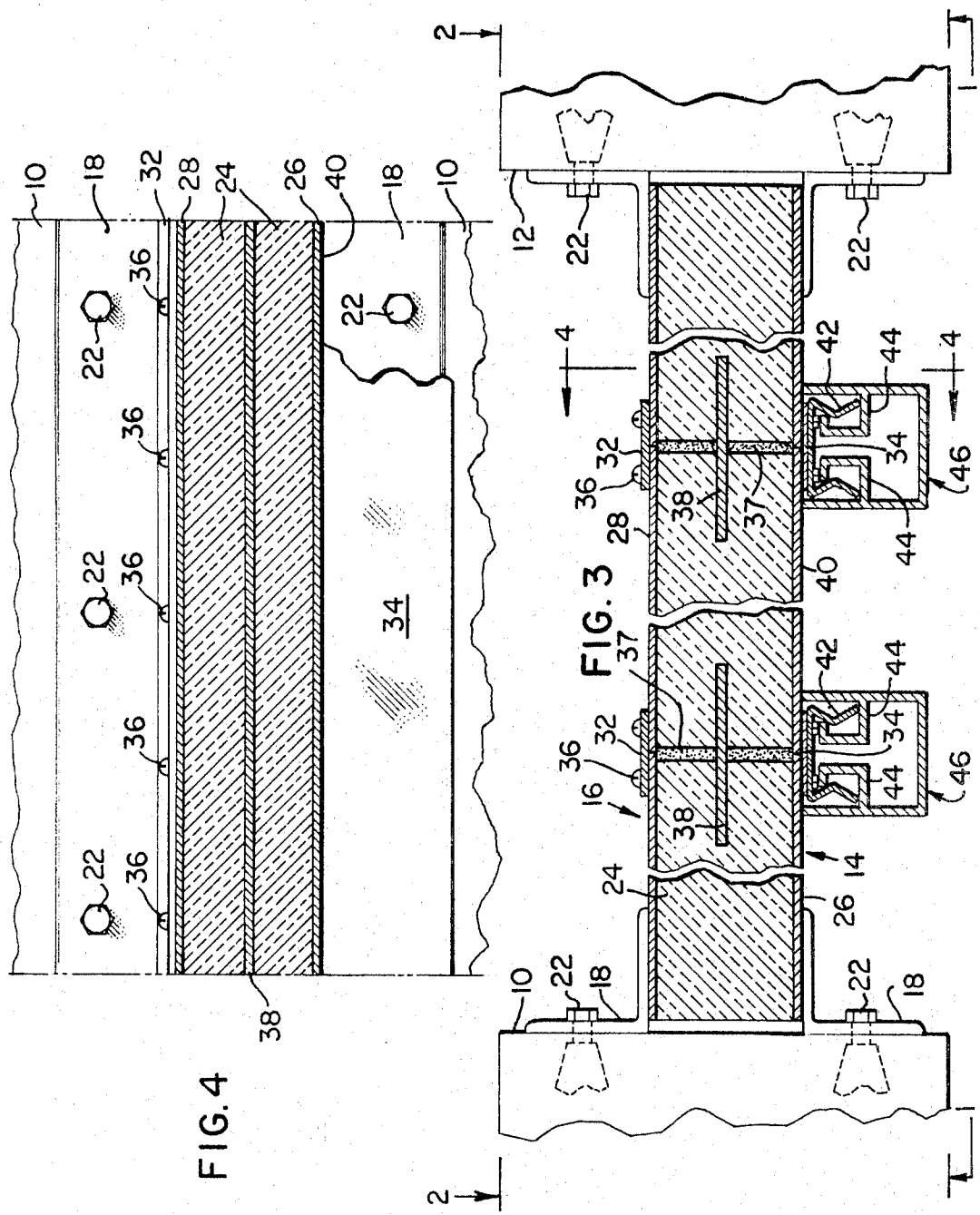


FIG. 3

FIG. 4

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HEAT-RESISTANT WALL

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U.S. Cl. 52—461 1 Claim

ABSTRACT OF THE DISCLOSURE

A heat-resistant wall, or panel, for preventing the spread of fire, and comprising a refractory core enclosed between two steel sheets and provided with an interior buckle-resisting reinforcement.

Background

To be eligible for insurance at regular rates, a fire wall must be heat-resistant in the sense that it must prevent the passage therethrough, even when the inner side thereof is exposed to a fire having a temperature of a predetermined order for a period of not less than 90 minutes. This test is conducted by the Underwriters Laboratories and is known as the "1½ hour test." Also, the outer side of the wall which is not exposed to the fire is not yet hot enough to start a fire.

The invention

A decorative, one-piece, or a sectional, wall which can be tailored to close a particular opening and which passes the "1½ Hour Test."

In the drawings:

FIG. 1 is an elevational view of the outer, or atmosphere-exposed side of a wall, or panel, embodying the invention.

FIG. 2 is an elevational view of the inner, or flame-exposed side of the same.

FIG. 3 is an enlarged, horizontal sectional view looking in the direction of line 3—3 on FIG. 1.

FIG. 4 is a sectional view looking in the direction of line 4—4 on FIG. 3.

In the drawings, **10** and **12** designate two building walls which could be the vertical sides of an opening, or could be top and bottom sills of such opening, depending on the particular orientation. It is sufficient that the opening be closed by a panel P of this invention.

The panel, which was used in test described below, has an outer, atmosphere-exposed face **14** and an inner fire-exposed face **16**, and it is mounted with its opposite ends between opposite pairs of angles **18** and **20** which are secured to walls **10** and **12** as at **22**.

The panel is composed of a central core **24** and an outer steel plate **26**, which was not exposed to the fire, and an inner steel plate **28** which, in the test referred to, was exposed to fire. The core **24** is made of asbestos or other high heat resisting refractory material, such as foamed, or non-foamed natural or synthetic ceramics, and is of the desired thickness. For small openings and for openings of an accurately known size, a one-piece panel is feasible. For other installations, the panel can be cut in sections of the same or of different sizes, so as to make various combinations to fit a particular opening. As an illustration, the panel may be formed of three or four sections which are joined together with battens **32** and **34** which are secured in position by screws **36**, or the like. The junctions of the

panel sections are caulked with refractory material as at **37**. Internally, the panel is provided with a spline **38** which intersects the caulking and overlaps the junctions of the panel sections to prevent the passage of fire should the caulking material fail. The splines also reinforce the refractory core. The sides **26** and **28** of the panel and the spline **38**, are made a bit shorter than the opening to be closed so as to provide for expansion. The fit of the ends of the panel between the pairs of angles **18** and **20** is snug enough to prevent the passage of fire or of substantial drafts, but not tight enough to prevent relative movement due to expansion and contraction.

Outer plate **26** is coated with a heat-resistant and decorative material, such as porcelain, or other ceramic material **40**.

In order to cover the junctions of adjacent panels or of panel sections, I provide the battens **34** on outer wall **26** with spring clips **42** which are detachably engageable with arms **44**, which are carried by channels **46**, which overlap said junctions. Channels **46** can be decorative as well as utilitarian.

A panel 48" x 36" x 2$\frac{1}{32}$" constructed as herein disclosed, was tested by the Underwriters Laboratories under the following conditions and with the following results:

Steel sheets **26** and **28** were of 24-gauge, and the outer, atmosphere-exposed sheet **26** was coated with porcelain. The caulking was a standard mineral-asbestos mix and the splines were of 18-gauge.

The inner side **14** of the panel was exposed, for over 90 minutes to a gas flame which generates a temperature of about 1825° F. which was measured by nine suitably distributed thermocouples. In tests of this kind, limiting end point temperatures are reached when the transmission of heat through the panel is enough to raise the temperature to 250° F. above the ambient temperature, or when the temperature of any point rises 30% of the allowable 250° F. rise. In the test to which this panel was subjected, the ambient temperature was 83° F. and therefore, the average limiting temperature would be 333° F. and the individual point limiting temperature would be 408° F. Analysis of the unexposed side of the present panel showed an average temperature of 297° F. and a maximum temperature of 355° F. or well below the corresponding allowable limits. Also, the endurance limit was 98 minutes or in excess of the required 90 minutes.

Immediately after the fire, the exposed side was subjected to a 30 p.s.i. stream of water from a 1⅛ hose at 20 ft. without any penetration.

In the claim, "exposed" refers to the inner, or fire-exposed side **16** and "unexposed" refers to the outer, atmosphere-exposed side **14** of the panel.

What I claim is:

1. A fire resistant panel including a refractory core having grooves therein,

splines in said grooves,

a sheet metal cover for the exposed side of said core,

sheet metal cover for the unexposed side of said core,

said panel being formed of a plurality of sections with their edges abutting,

a refractory caulking material sealing the junctions of said sections,

battens overlapping said junctions and secured to adjacent sections,

channels overlapping the junctions of said sections at their unexposed sides, and

means detachably securing said channels to said bat-

tens, and wherein said splines intersect said caulking material and overlap said junctions.

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