

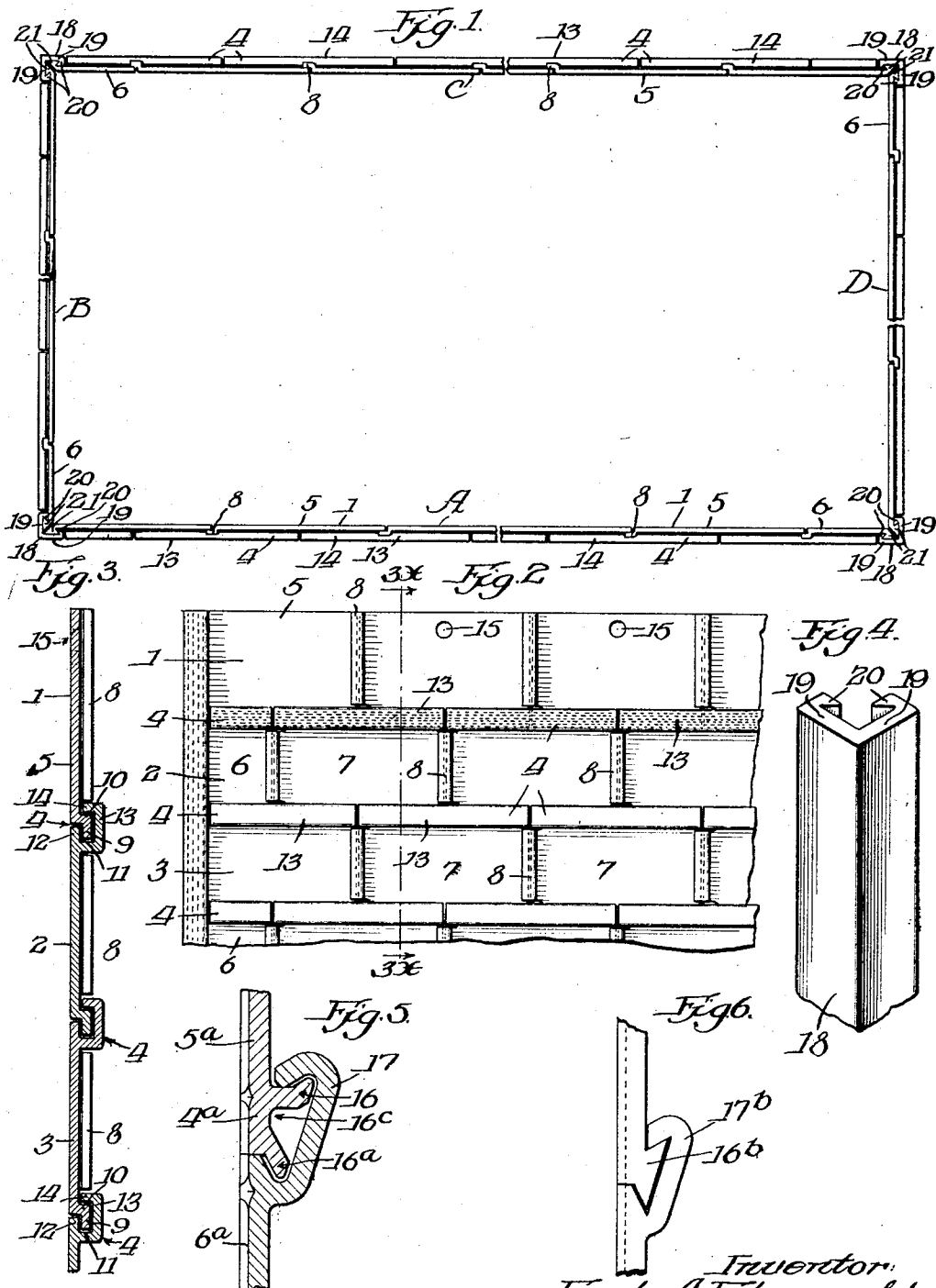
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F. A. FAHRENWALD

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MULTIPLE UNIT FIRE RESISTING INCLOSURE

Filed Sept. 29, 1930



Witness:

R. B. Davison.

Inventor:  
Frank A. Fahrenwald.

By: Wilkinson, Husley, Bepko & Knight,  
Attys.

## UNITED STATES PATENT OFFICE

FRANK A. FAHRENWALD, OF CHICAGO, ILLINOIS

## MULTIPLE UNIT FIRE RESISTING INCLOSURE

Application filed September 29, 1930. Serial No. 485,280.

This invention relates to a metal wall built up of a plurality of articulated units assembled by horizontal telescoping movement or plurality of such walls making an inclosure having the capacity of retaining self sustention and form in the presence of high temperatures such as are developed in the heat treatment of objects in the industries. The influence of high temperatures upon metal structures sets up stresses of such varying orders, as well as directions in different parts of the structure, that it is impracticable to use rigid walls or walls of very large single piece dimensions in the construction; and a serious problem is presented in the designing of the constituent parts of the structure to enable them to enter into an assembly which will render the structure self sustaining when in use.

The present invention meets the problem stated, and provides a construction of heat resisting walls or closures built up of inter-related unit members sufficient in number to divide up the wall areas and at the same time to retain assembly of the constituent members while leaving them free to expand and contract in response to localized temperatures. The invention also provides for the erection of structures of many different dimensions but of constituent units of substantially uniform design. It also affords novel structural details of unit parts and assembling members which render more convenient and effective the assembly of the parts in the building of structures therefrom.

In the accompanying drawings—

Figure 1 is a plan view of a rectangular closure built up of parts in accordance with the present invention.

Figure 2 is a side elevation of a portion of one of the walls, extending to a corner, shown in Figure 1.

Figure 3 is a detail view showing in vertical section means for establishing articulation between horizontal marginal portions of adjacent structural units.

Figure 4 is a detail view showing in perspective a portion of a corner unit used for interlocking the vertical margins of two meeting walls; and

Figures 5 and 6 are detail views showing modified constructions of meeting marginal portions of unit members whereby they are adapted to interlock and enter into intersustaining relation one to the other, both when a wall is standing under compression or columnar support and when standing under suspension.

In Figure 1, A, B, C and D represent four walls of a rectangular inclosure, each of which walls is built up of a number of horizontal courses of unit members, such, for instance, as the courses 1, 2, 3, etc. shown in Figure 2, which courses are connected together by long meeting horizontal margins through means of specially constructed articulations 4 having the peculiarity of rendering the courses mutually intersustaining at least when the wall is supported by suspension, and preferably also when the wall is in columnar or compressional support. Each horizontal course 1, 2, 3, etc. is in turn subdivided vertically into units such as indicated at 5, 6, and 7, which in turn are made to meet in the joints 8 which may be of any desired construction, and which are shown in Figure 1 by way of illustration as being of lap-tongue construction.

The articulations 4 may be of various constructions so long as they involve a pair of upper bearing surfaces and a pair of lower bearing surfaces spaced vertically and adapted to afford vertical inter-sustention between the units, in addition to inter-engagement that resists relative tipping movement between the units in a horizontal direction that is transverse to the plane of the wall which the units compose. One such articulation is shown in Figure 3, where tongue 9, offset from the unit member 5 and thereby providing a supporting shoulder 10, is made to enter the groove 11 between flanges 12 and 13 while flange 13 carries a lip 14 engaging above the shoulder 10, so that the articulation indicated generally by the reference character 4 provides a lap joint which is flexible within limits but adapted to resist collapsing of the two members which it unites even when the upper member is resting by gravity upon the lower member; which will sustain the upper member upon

the lower member when resting as a column or by gravity; and which will prevent the upper member being lifted away from the lower member when the members are sustained by suspension, as, for instance, when sustaining the wall by suitable means introduced through openings shown at 15 in Figure 2.

Another form of articulation, indicated generally at 4a, is shown in Figure 5 and consists of a dove-tail tongue 16, 16a offset laterally from the plane of the member 5a, with its salient portions 16, 16a separated by a recess 16c for considerations having to do with the use of foundry methods in production; also with said salient portions 16, 16a spaced apart vertically and aligned at an angle to the plane of the member 5a, and an undercut groove member 17 formed upon the upper margin of the unit member 6a, offset from the plane of said member 6a, and assuming the same angular position as the dove-tail member 16, 16a. This construction provides upper and lower bearings affording vertical sustentation, respectively, one of which is effective when the composite wall is under suspension, and the other of which acts when it is sustained from below, and both of which act to limit flexure of the wall or buckling in a horizontal direction transverse to the plane of the wall. The construction shown in Figure 5 is one which can be conveniently made by casting and which, when cast, can be conveniently finished by instrumentalities available for that purpose.

In Figure 6 is shown a somewhat different design of the angularly disposed dove-tail articulation, wherein the tongue 16b is of truncated triangular form and the groove member 17b is similar to the groove member 17 in Figure 5.

Figure 4 shows a desirable means, but not the only means that may be employed, for uniting meeting vertical margins of two walls in developing an inclosure such as shown in Figure 1. This consists of a channel member 18 having divergent walls 19 terminating in gripping lugs 20 which are adapted to interengage with undercut ribs 21 on the margins of the unit members which meet at a corner, as shown in Figure 1. From the foregoing, it will be seen that the present invention contemplates two multiple unit walls, angularly related as meeting confines of an inclosure, with the units of each wall grouped in a plurality of horizontal panels and meeting in vertical lines of articulation; with the several panels united by horizontal telescoping action against vertical separation; and with these units which are at the ends of the several horizontal panels of one wall interlocked with the meeting end units of the horizontal panels of an angularly related wall, so that while the walls are definitely fixed in their relations as confines and each horizon-

tal series of units is, notwithstanding, interlocked against vertical separation and restriction against tipping or buckling in a horizontal direction perpendicular to the plane of the wall, only the end units of the horizontal panels are held to the corners of the meeting walls, and all the intermediate units of the horizontal panels are left free, notwithstanding the corners of the inclosure may be held in desirably close assembly to effect a substantial structure.

The structure that is herein described will avoid substantially all the distortion of walls by inequality of temperature developed at different localities in a wall, and the wall will retain its integrity and the exactness of form even when subjected to very high temperatures.

The nature of the unit members and the constructions of which they are articulated afford a wide range of availability of such members with respect to dimensions of structure to be erected, and particularly structures having dimensions too large to admit of making their walls of single or relatively large pieces.

I claim:

1. A fire resisting wall, comprising a series of superposed horizontal panels having at their meeting horizontal margins, articulations which render the panels vertically inter-sustaining while leaving them free for relative expansion and contraction; each panel being subdivided transversely into a plurality of unit members and said articulations comprising upper and lower interengaging pairs of surfaces which, in addition to transmitting vertical sustentation, limit tipping and buckling in a horizontal direction perpendicular to the plane of the wall.

2. A fire resisting wall, comprising a series of superposed horizontal panels having at their meeting horizontal margins, articulations which render the panels intersustaining while leaving them free for relative expansion and contraction; each panel being subdivided transversely into a plurality of unit members; an articulation consisting in tongue and groove joints laterally offset from the plane of the panels on one side thereof.

3. A fire resisting wall, comprising a series of superposed horizontal panels having at their meeting horizontal margins, articulations which render the panels intersustaining while leaving them free for relative expansion and contraction; each panel being subdivided transversely into a plurality of unit members; an articulation consisting in tongue and groove joints laterally offset from the plane of the panels; providing vertically spaced pairs of vertically sustaining bearing surfaces and vertically spaced pairs of interlocking surfaces resistant to horizontal buckling.

4. A structure as described in claim 3, in

which the tongues and grooves are essentially dove-tailed in section with the salients of the dovetail spaced vertically, and said dovetail providing upper and lower pairs of vertically sustaining bearing surfaces and upper and lower pairs of interlocking surfaces sustaining the joint against buckling in a horizontal direction perpendicular to the plane of the wall.

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10 5. A structure as described in claim 3, in which the tongues and grooves are essentially dove-tailed in section and disposed at an angle to the plane of the panels and also at an angle to a plane perpendicular to the wall, whereby said tongues provide vertically spaced pairs of surfaces affording vertical sustention and resistance to horizontal buckling.

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20 6. Fire resisting walls related as confines of an inclosure, meeting at an angle and provided with interlocking corner members tying the walls together; at least one of said walls consisting of a series of telescopically united, vertically inseparable panels, each of which panels is made up of a plurality of units meeting in substantially vertical lines; the corner members of the structure tying to the meeting wall only the end units of the panels, and the intermediate units of the panels being free to contract under temperature changes independently of said end units.

25  
30 Signed at Chicago, Illinois, this 24th day of September, 1930.

35 FRANK A. FAHRENWALD.

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**CERTIFICATE OF CORRECTION.**

**Patent No. 1,840,942.**

**Granted January 12, 1932, to**

**FRANK A. FAHRENWALD.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 66, for the misspelled word "nothwithstanding" read notwithstanding; page 3, line 15, claim 5, after "tongues" insert the words and grooves; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of April, A. D. 1932.

(Seal)

**M. J. Moore,**  
Acting Commissioner of Patents.