

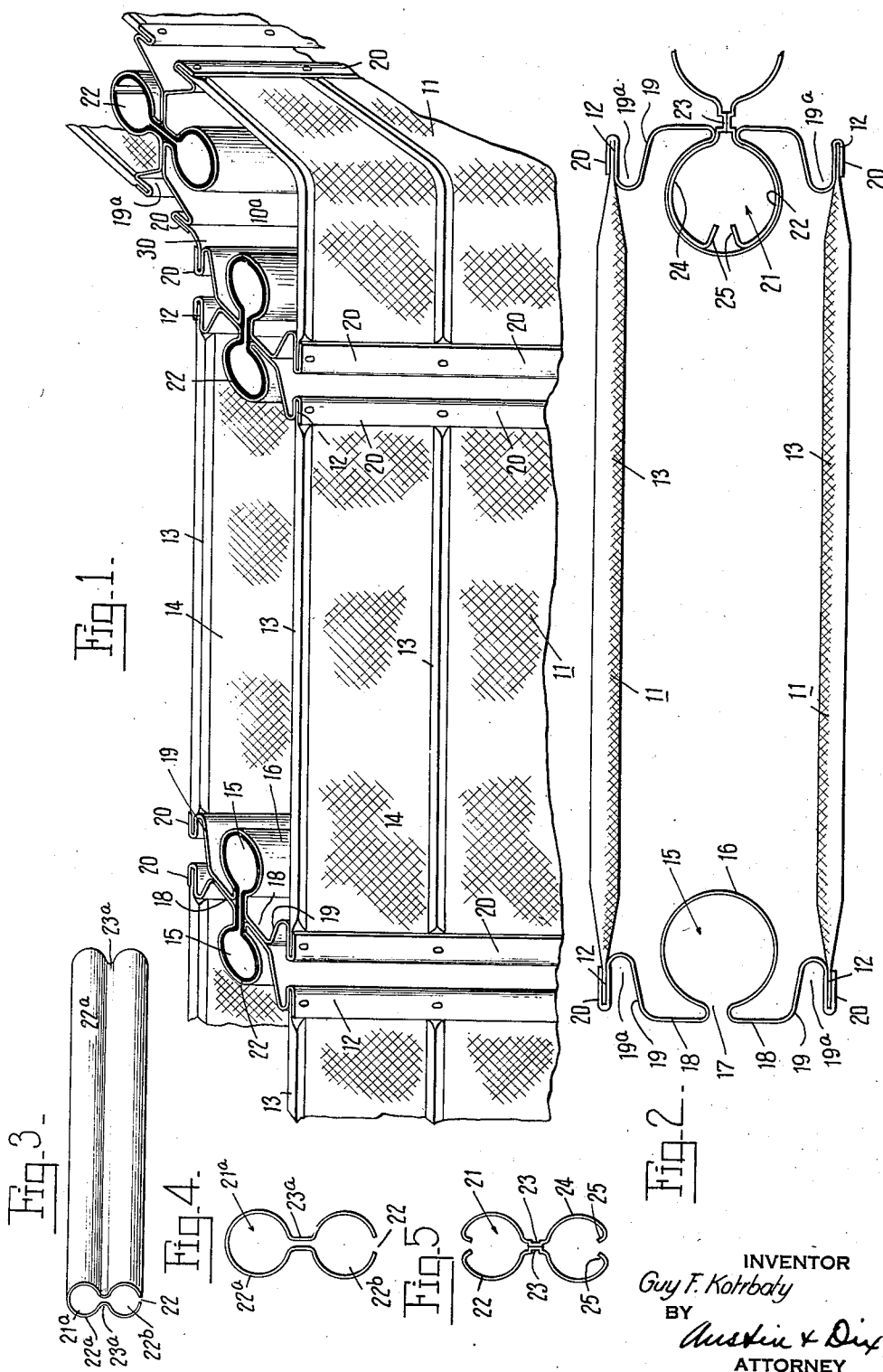
March 26, 1935.

G. F. KOTRBATY

1,995,477

COMPOSITE BUILDING MEMBER

Original Filed Jan. 16, 1931 2 Sheets-Sheet 1



INVENTOR
Guy F. Kotrbaty
BY
Austin & Dix
ATTORNEY

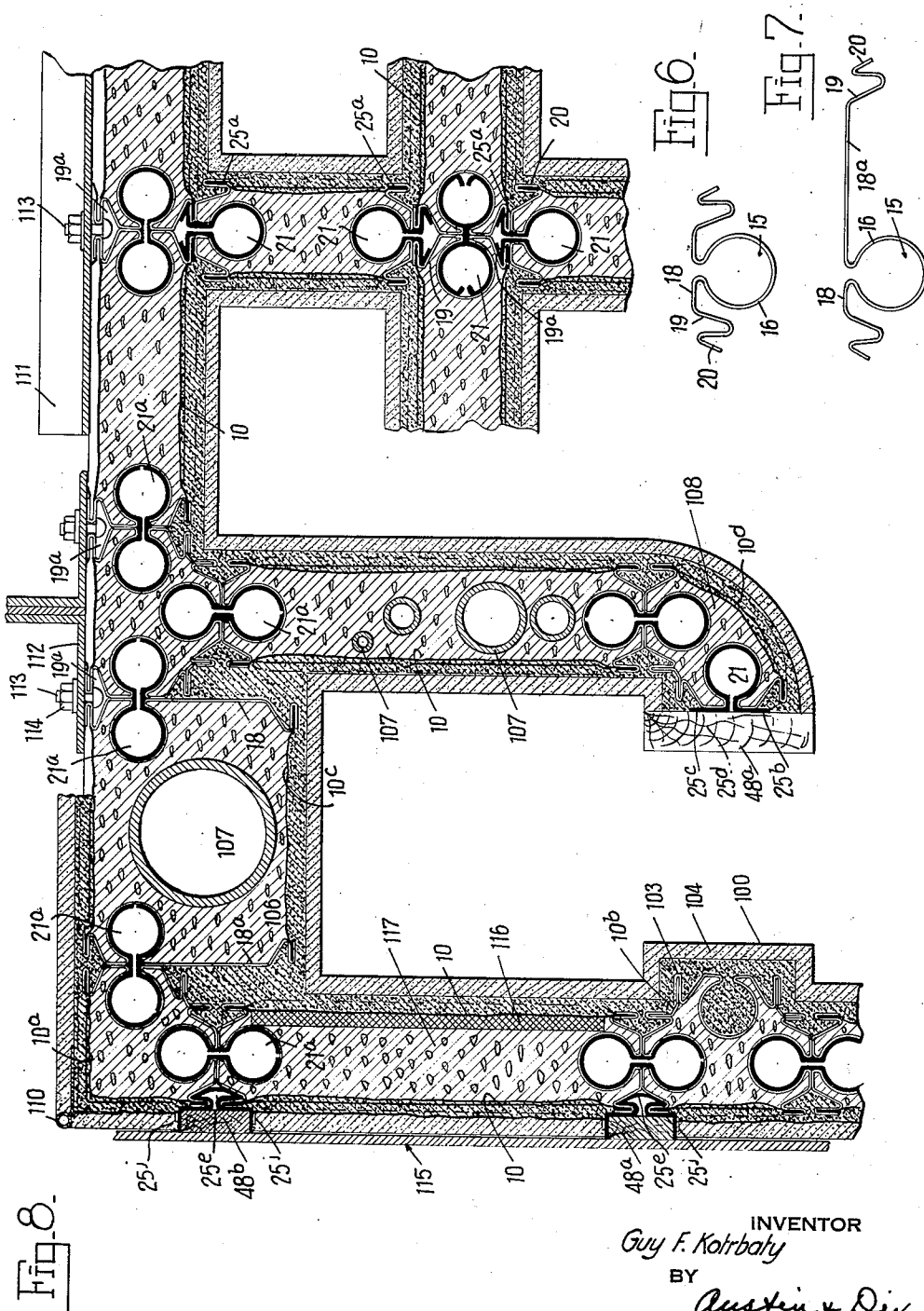
March 26, 1935.

G. F. KOTRBATY

1,995,477

COMPOSITE BUILDING MEMBER

Original Filed Jan. 16, 1931 2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

1,995,477

COMPOSITE BUILDING MEMBER

Guy F. Kotrbaty, Laurelton, N. Y., assignor to
Ferrocon Corporation, New York, N. Y., a cor-
poration of Delaware

Original application January 16, 1931, Serial No.
509,237. Divided and this application July 23,
1934, Serial No. 736,488

7 Claims. (Cl. 72-48)

This invention relates to improvements in composite structural members adapted for use in self-supporting building construction units of the type disclosed and claimed in my allowed application Ser. No. 509,237, filed Jan. 16, 1931, for Building construction and allowed Nov. 3, 1933, now matured into U. S. Patent No. 1,968,045 of July 31, 1934, of which this application is a division.

The present application is directed to improved composite stud, joist and beam members and the component parts thereof, the details of which construction members will be set forth more in detail in the accompanying specification, reference being had to the drawings, in which like numerals refer to similar parts throughout the several views, and in which

Fig. 1 is an elevation, partly in section, of a assembly of self-supporting, open-ended building elements including the composite structural members of the present invention;

Fig. 2 is a top plan view of a self-supporting building unit member, the stud sections, being shown in section;

Fig. 3 is a perspective view of a key member forming a component part of the composite structural members of the present invention;

Fig. 4 is a cross-section of the structure shown in Fig. 3;

Fig. 5 is a cross-section of a modified key member;

Fig. 6 is a cross-section of the grid keyways shown, partly in elevation, in Fig. 1;

Fig. 7 is a cross-section of a modified form of keyway adapted for pilasters and the like, and

Fig. 8 is a top plan view of a portion of a wall section, showing the composite structural members of the present invention with associated structural building members and features.

Referring now to the drawings, the improvements of the present invention are shown in connection with the improved construction member shown in Figures 2 and 3, and designated generally by the numeral 10, comprises a pair of opposed wall members 11 of sheet metal, which may be solid or of any suitable foraminous metallic construction secured together, in spaced relation, by end members 15.

These wall members may be provided with a plurality of stiffening members 13, which as shown are indicated as integral horizontal stiffening ribs. However, it will of course be appreciated that the stiffening members may be vertically disposed or they may comprise associated members such as stiffening rods or bat-

tens, which may be secured to either or both sides of the members as by soldering, brazing, or welding, and such members may be opposed on either side of the members 11 and 12 to provide an increased stiffening effect. If desired, foraminous metal of the expanded metal lath type may be used, and a desirable stiffening imparted thereto by weaving or otherwise associating stiffening wires therethrough in any desired manner.

The sections 14 disposed between the stiffening members 13 may be of solid metal as above indicated, or may comprise expanded lath portions, or perforated sections.

As indicated above, the side members are connected together by means of combination end sections and keyways, designated generally as 15. These members usually comprise a central cylindrical portion 16 having an aperture 17 and oppositely disposed flanges 18, which flanges are continued at 19 to form re-entrant sections, which, in turn, are reversely bent to form clip members 20 adapted to be secured in locking engagement with the ends 12 of members 11. The members 10 may be varied in depth to form pilaster sections or the like by varying one or more of the sections 18 of members 15, as indicated at 18a in Fig. 7. The side members and keyways may be crimped together, or they may be bonded as by soldering, brazing, or integrally joined as by welding.

Referring more particularly to Figs. 2 and 5, the construction members may be abutted together to form a desired construction, and secured to each other by means of key members 21 disposed therein. These key members may comprise a pair of opposed duplex semi-cylindrical sections 22 abutted at mid-point 23, and provided with open ends 24, which may have re-entrant flanges 25, if desired. The members 22 are so constructed as to provide a snug fit in the keyways 15, and preferably should be sufficiently large to completely fill the keyways. By this means the wall members are metallically joined together, and a complete joint is formed between the two sides of the abutted members, to make a composite structural member.

Where desired, the members 22 may comprise a pair of opposed cylindrical members 26 and 27, one of which has an open portion 28, the whole being formed of a single piece of metal bent or otherwise configured to the desired shape to give the necessary resiliency to the key members. The key members may be rolled to shape in suitable rolling machines, the sections being suit-

ably contoured to permit easy fabrication and insertion in the keyways. It will also be appreciated that the rounded corners provided throughout permit large savings in die maintenance, as well as preventing strains in the keys due to sharp angles in the stressed portions.

Where it is desired to form a corner connecting member of any configuration, the keyways are abutted in a desired fashion, and suitable clip members 30 are secured between a pair of opposed members 20, and a section 11a is conformed as desired, and in turn secured between the other clip portions of the keyways to form a corner grid member designated generally as 10a.

Referring now to Fig. 8, there is shown a partial plan view of a floor layout in which the method of forming interior partitions and pilasters, as well as interior members such as staircases and the like is shown. The walls generally are formed of the usual wall grid members 10 abutted together in the usual manner by the expansible keys 21 or 21a described more in detail hereinabove.

Where it is desired to form a cased opening or other decorative member of the pilaster type against a wall, as indicated generally at 100, it will be sufficient to use a three-way connecting grid 10b, the angularly disposed keyway and ties adjacent being filled with any suitable embedding plastic and configured as desired, as shown at 103. Over this plastic surface is applied the usual outer plastic coating 104.

The pilaster grids 10c are formed in substantially the same manner as the wall grids, the ends of the structures being provided with oversized lateral end channels 18a. The members so formed, it will be seen, provide an internal space 106 which is particularly adapted for the reception of pipe stacks, plumbing fixtures, electric wiring conduits and the like, indicated generally by the numeral 107. As will be referred to more in detail hereinafter, this flexibility of construction permits the introduction and manipulation of various services, such as plumbing, wiring, etc., with a minimum of trouble, and without requiring added building features, which feature is characteristic of the grid members generally when it is desired to so use them, the various inserts being made to conform to the requisite dimensions.

Partition walls, as previously described, may be formed by providing three-way keyway members 10b, and abutting suitable grids 10 thereagainst, the whole being keyed by the usual keys 21 or 21a.

Where it is desired to form a round corner, the grids 10d may be made up as shown at 108, wall grid portion 109 of any suitable curvature being disposed between adjacent keyways. By suitably juxtaposing four members of the type of 10d, it will be possible to make a pillar or column having a maximum of structural strength while embodying a minimum amount of structural material, a superficial coat of plastic for decorative purposes being necessary, although if such a pillar or column is intended for supporting heavy floor loads or the like, in addition to subserving its ornamental function, the keyway and space members may be filled with concrete or other suitable embedment.

To protect the plastic coatings at square corners, there may be used a metallic corner bead 110 integral with the corner section of member

10a, or separately formed therefrom and secured thereto by means of wire ties, brazing, soldering, or welding, the finished coat of plastic being finished flushed with the edges of the members which is thus adapted to serve as a plasterer's guide, as well as to prevent the corners from all mechanical injury.

As noted hereinbefore, internal partitions and the like may be readily formed by utilizing clip members 25a associated with keys 21 for insertion into channels 19a formed by the flanges 19 and clip portions 20. The partition wall grids are fitted in place in the usual manner and keyed in the manner herein described.

It will thus be seen that in order to provide any desired number of partition walls at any particular place, it will merely be necessary to vary or appropriately design the wall grid members to present channel members 19a at any desired place. The channels 19a thus permit the association of auxiliary structures and the elaboration of internal construction without involving any general change in the structure, also without involving any ripping out or cutting of the grid members themselves. Where it is desired to provide fire-escapes, or stair risers 111, or connections to other steel structures, such as H-column 112, headed bolts 113 may be slipped into the channels 19a and the auxiliary structures above referred to bolted in place by means of nuts 114 screwed on bolts 113.

To provide a support for ornamental timbering, clapping, sheathing, or roofing, etc., and shingle strips designated by the numeral 115, it will suffice to insert members 25e, as shown in Fig. 8.

To provide suitable support for doors and lintels and the like, a retaining member 48a, as shown more particularly in Fig. 8, may be secured to a key member having lateral clip portions 25d.

Referring now to Figs. 3 and 4, there is shown a modified key member 21a comprising two cylindrical sections 22a and 22b, the latter being opened as indicated at 22c, and the members being integrally joined by resilient webs 23a. These members are formed in one piece from suitable gauge metal, such as copper bearing steel or other material, the configuration being such as to permit the several parts to expand into close contact with the sections 16 of the keyway with which they may be associated. While the key members have been shown as comprising two opposed resilient cylindrical sections, it will be understood that any desired number of key members may be associated together in any angular relation. Thus it will be possible to form a four-way key member in which the sections are at right angles to each other, or clip members may be substituted for any of the key sections.

As shown in Fig. 8, the key members may be provided with integral clip sections 25a, which are adapted to fit into the sockets formed by the portions 19 of abutting composite construction members. This construction is particularly adapted for partition walls and other like structures.

Where it is desired to build a wall jutting out from a previously built wooden support or joist 48a, the key members are provided with flanges 25b apertured as indicated at 25c, the whole being secured to the joist or other supporting members by means of nails or screws 25d, as shown in Figure 8.

Referring again to Fig. 8, there is shown the method of securing furring strips 48b. Clip mem-

bers 25e are similar in construction to members 25a, but continuous in configuration, are provided with angular pieces 25f configured to the member 48b and provided further at their ends with dogs 25g adapted to be driven into the supporting member. If desired, the dogs may be dispensed with and nails or screws 25h used in their stead. This construction permits the utilization of clapboarding or wood substitutes, asbestos sheets, and similar constructions as inside or outside facings for completed buildings or interior rooms. In the case of soundproofing rooms and auditoria to prevent undesirable acoustical effects, a sheeting of celotex or other fibrous sound and heat insulating material may be used.

It will now be appreciated that there has been provided improved composite stud, stanchion, joist, beam and like structural members comprising abutted web members locked by key members. The web or stanchion members may be provided with lateral or edge structures adapted to secure panel members in spaced relation to form self-supporting open-ended building units. In addition, the edges may be recessed to provide means for securing a variety of associated building structures or elements to composite stud or stanchion members hereinabove described.

What is claimed is:

1. A three-part construction member comprising a pair of opposed and abutted metallic sections, each having web portions with aligned longitudinal cylindrical keyways severally formed therein, substantially cylindrical spring gripping key members in the said keyways having substantially uniform surface contact therewith and joining the said sections together with their webs in abutting contact whereby to form a substantially I-beam stud.

2. A three-part construction member comprising a pair of opposed and abutted metallic relatively thin sections having substantially centrally located, aligned longitudinal cylindrical keyways severally formed therein, and being provided with lateral structural flange members joined thereto by web portions, the web portions being in abutting contact, and common locking means for the abutted metallic sections comprising spring gripping key members in the said keyways and joining the said sections together with their webs in abutting contact whereby to form a substantially I-beam stud.

3. An improved composite building construction comprising a pair of abutted beam members having mutually coacting web sections provided with central portions having keying slots, means inserted in said slots interlocking the abutted beam members, and spaced flanges at the sides

of the several beam members forming auxiliary keying channels, the said abutted beam members forming substantially I-beam studs.

4. An improved composite building construction comprising a pair of abutted beam members having juxtaposed web sections provided with central portions having keying slots, means inserted in said slots interlocking the juxtaposed beam members; spaced flanges at the sides of the beam members forming auxiliary keying channels; the interlocking means in the said slots comprising keys having expansible cylindrical lateral portions fitting in opposed keyways in the web sections locking them together and forming a composite structural unit therewith, the assembly forming a substantially I-beam stud.

5. An integral construction member including a relatively thin metallic section having a substantially centrally located longitudinally slotted cylindrical keyway formed therein and provided with lateral flanges, the said flanges being adapted to serve as auxiliary keyways and being further adapted to receive and secure side wall members, and web portions joining the said centrally located keyway and the said lateral flanges.

6. A composite construction member comprising relatively thin, abutted continuous metallic sections, each section having a substantially centrally located longitudinal cylindrical slotted keyway severally formed therein and provided with lateral flanges joined thereto by web portions, the web portions being in abutting contact, the said flanges being spaced in aligned relationship forming auxiliary keyways, and key means cooperating therewith, the said flanges being further adapted to receive and secure side wall members, said substantially centrally located abutted and aligned keyways being provided with common locking means comprising spring-gripping keys of double cylindrical cross-section inserted in and substantially coextensive with the keyways whereby to form substantially I-beam studs.

7. A composite construction member comprising relatively thin, abutted continuous metallic sections, each section having a substantially centrally located longitudinal cylindrical slotted keyway severally formed therein and provided with lateral flanges joined thereto by web portions, the web portions being in abutting contact, the said flanges being spaced in aligned relationship forming auxiliary keyways, and key means cooperating therewith, the said flanges being further adapted to receive and secure side wall members, these said abutted and aligned keyways being provided with common locking means, whereby to form composite stud and common members.

GUY F. KOTRBATY.