T. H. KANE.

BUILDING CONSTRUCTION.

APPLICATION FILED DEC. 30, 1920.

1,433,826. Patented Oct. 31, 1922.

3 SHEETS—SHEET 1.

Fig. 1.

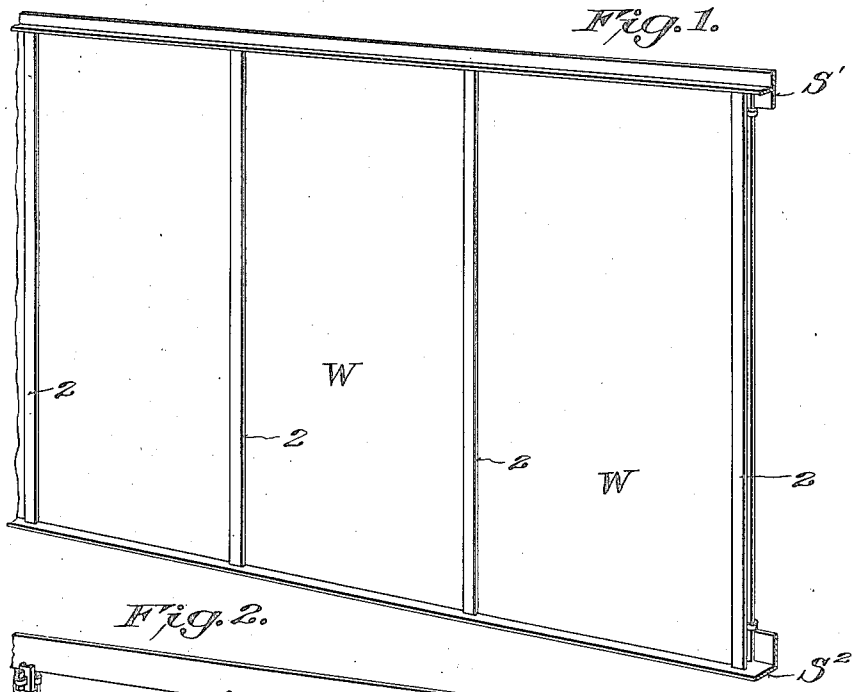
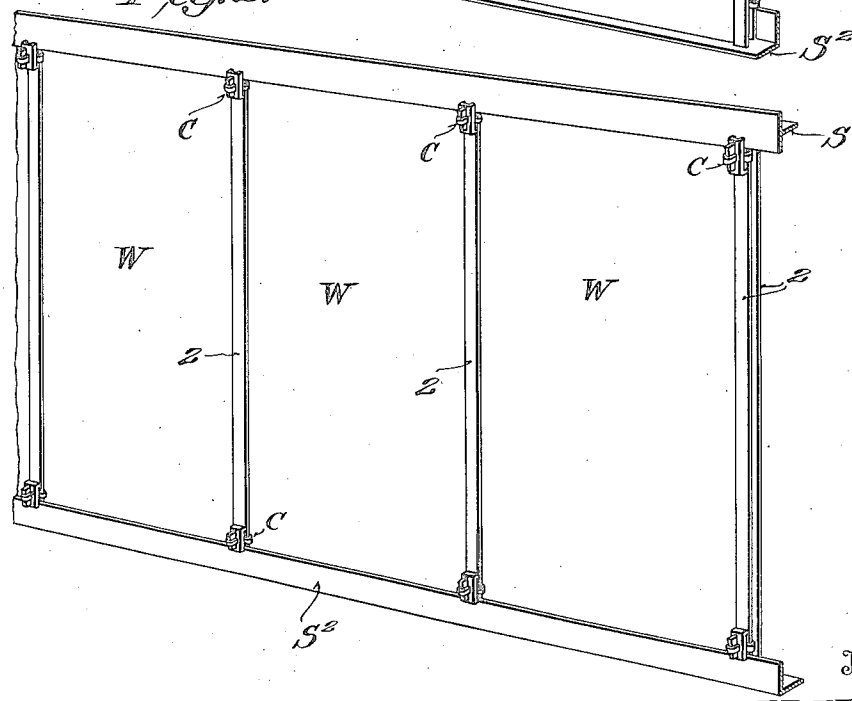


Fig. 2.



Inventor

Thomas H. Kane,

WITNESSES:-

By

Attorney

T. H. KANE.

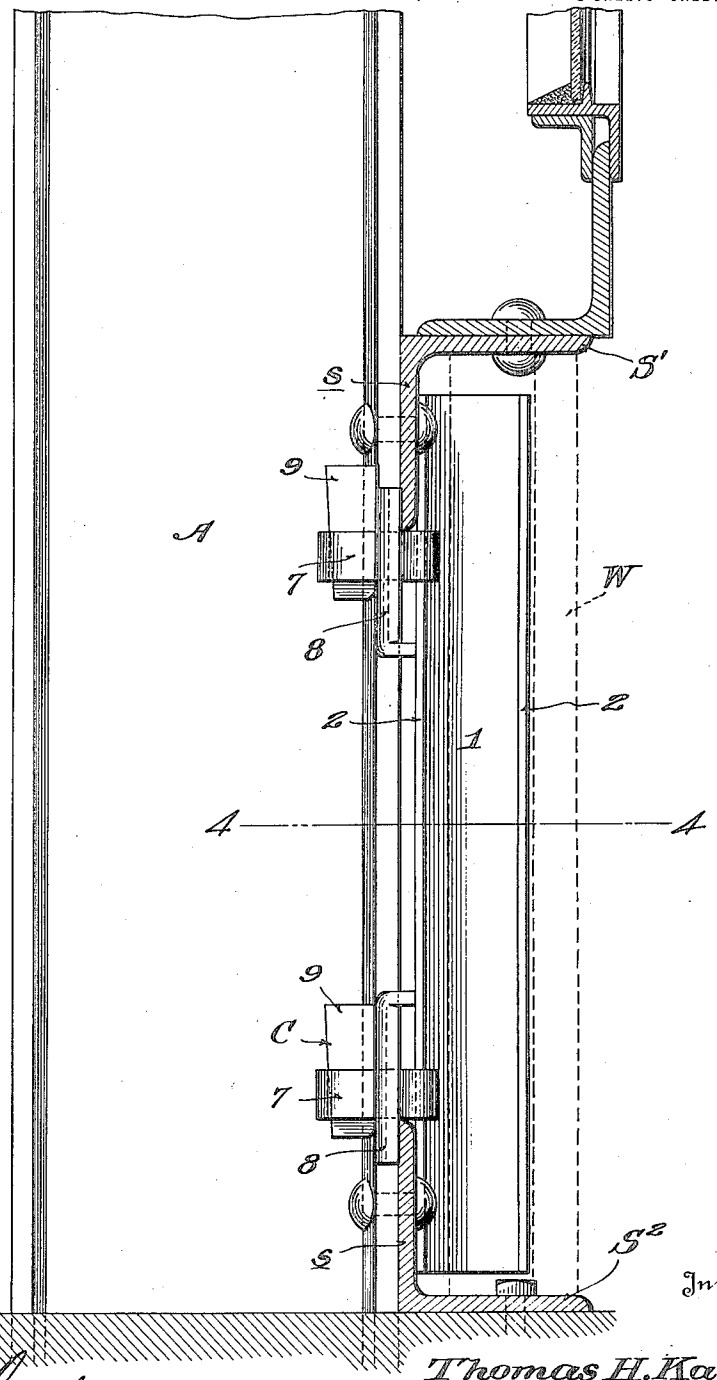
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3 SHEETS—SHEET 2.

Fig. 3.



Inventor

Thomas H. Kane,

By

Attorney

WITNESSES:—

Emory L. Groff

M. A. Jones

T. H. KANE.

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3 SHEETS—SHEET 3.

Fig. 4.

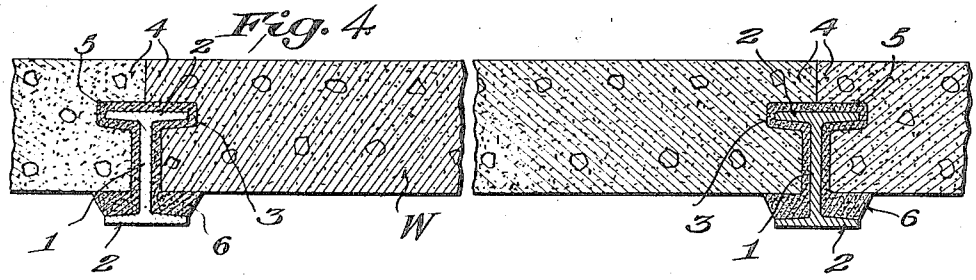


Fig. 5.

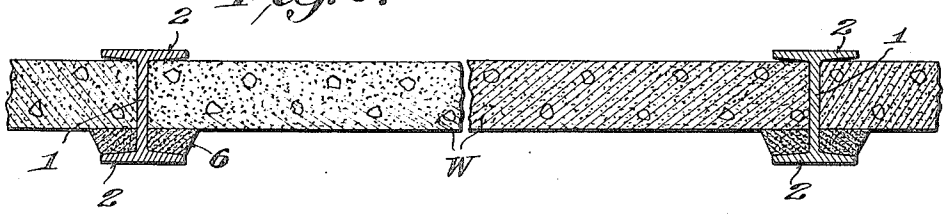


Fig. 6.

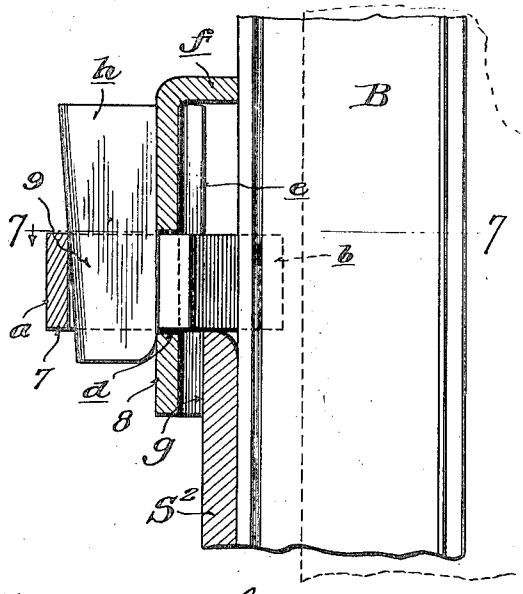


Fig. 7.

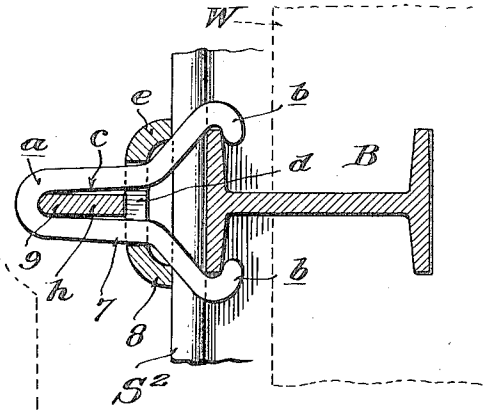
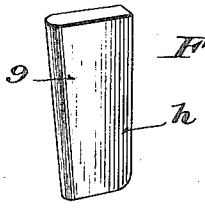


Fig. 8.



Inventor

Thomas H. Kane,

By

Attorney

Witnesses:-

Emory L. Groff

M. A. Jones

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UNITED STATES PATENT OFFICE.

THOMAS H. KANE, OF YOUNGSTOWN, OHIO, ASSIGNOR TO THE TRUSCON STEEL COMPANY, OF YOUNGSTOWN, OHIO, A CORPORATION OF OHIO.

BUILDING CONSTRUCTION.

Application filed December 30, 1920. Serial No. 434,044.

To all whom it may concern:

Be it known that I, THOMAS H. KANE, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Building Construction, of which the following is a specification.

This invention relates to fireproof building construction, and more particularly to an improved means for erecting walls or partitions without the necessity of laying brick or building concrete forms during the construction of the building.

A primary object is to provide a novel wall supporting framework attachable by suitable fastenings to usual steel structural units of the building, and which framework may be set up without the use of rivets or other expansive means of fastening or anchoring. Also, a principal object of the invention is to utilize this framework as a support for previously formed units or sections of wall material, such as pre-cast concrete slabs, which may be made of any size and shape convenient for the purpose at or away from the building site; thereby enabling the builder to close in the open areas of his building without skilled labor and with a minimum of expense and time.

The present invention, therefore, has the advantages above pointed out which result in a material economy of time and labor, and is particularly advantageous in the building of curtain walls and the like particularly between the window sills and floor of the building as it eliminates the necessity of laying brick or building concrete forms on the job.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which

Figure 1 is a perspective view of one side of a portion of a wall constructed in accordance with the present invention.

Figure 2 is a perspective view similar to Figure 1 showing the opposite side of the construction shown in Figure 1.

Figure 3 is a detail side elevation, partly in section, of a unit of construction of the type proposed by the present invention.

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a view similar to Figure 4 showing a modified type of slab.

Figure 6 is a detail side elevation, partly in section, of a type of clip that may be advantageously employed.

Figure 7 is a cross sectional view on the line 7—7 of Figure 6.

Figure 8 is a detail perspective view of the wedging clamp used as a part of the clip.

Similar reference numerals correspond to similar parts throughout the several figures of the drawings.

As pointed out, the distinctive feature of the present invention is that of a novel wall-forming structure filling the open spaces or areas between the structural members of the building and clamped to such members by clamping or fastening devices without the use of bolts, rivets or equivalent expedients ordinarily employed in building construction, and which require the drilling or punching of holes in the members or parts to be united. This wall-forming structure in itself, comprises framing elements or members preferably made of standard structural shapes such as flanged beams or bars of I-form, channel form or L form which contribute to the structural strength of the building, while at the same time being utilized as supports or keying elements to which are attached, by keying or otherwise, previously formed units or sections of wall material, and preferably in carrying forward the invention, the previously formed units or sections of wall material consists of pre-cast or molded concrete slabs which complete the wall structure. Therefore, the invention as a wall-forming structure, is necessarily applicable for use in any open spaces or areas between oppositely arranged structural members of the building where it is desired to build in or form a wall or partition and in fastening the framing ele-

ments to the structural members, this is accomplished by the use of a novel and simple type of clamp which may be readily applied by unskilled labor, thus permitting the erection of the complete wall-forming structure with facility and dispatch and at a minimum expense.

The invention is necessarily susceptible of a wide application, and therefore there will necessarily be minor variations in the practice or method of setting up the same during or after the erection of the main structure of the building. However, all of the essentials of the invention are exemplified by the example shown in the accompanying drawings and referring to such example or embodiment, there is shown one of the upright columns designated A of the main building structure to which are riveted in the usual manner the upper and lower sill angles S^1 and S^2. These sill angles or sill members are horizontally arranged in the usual manner and the space or area therebetween is filled by the curtain wall, and the present invention provides a way of making this curtain wall in a substantial and economical manner It is, therefore, proposed by the present invention, to have as the body part of the wall-forming structure a metallic framework occupying the space or area between the sills S^1 and S^2 and adapted to be securely fastened to the vertical flanges *s* of the sills by means of simple and strong clamps or clamping devices which are designated in the drawings generally by the reference letter C. The use of clamps or fastening devices C for the purpose of attaching the metal framework to the sill members entirely obviates the necessity of boring or drilling holes and the usual riveting operation thus permitting comparatively unskilled workmen to set up the framework wherever desired and then attaching or fastening to the framework the previously formed units or sections of wall material. The details of the clamp or fastening device shown in the drawings will be hereinafter more particularly referred to, but as to the metal framework of the wall-forming structure, it will, of course, be understood that this may be made in any suitable way and of any suitable element or elements but preferably a sufficient number of properly spaced structural shapes are employed for that part of the invention, and these pieces or sections of structural shapes are designated in the drawings by the numeral 1 and are preferably of I-beam form. It has been pointed out that when the filler framework is made up of flanged shapes, the latter function as key elements. When of the I-beam form, the same present the offset flanges 2 at opposite sides thereof which may be conveniently utilized as a point of engagement for the clamps C, as well as providing an effective key to cooperate with and hold wall-forming units W in place. These wall-forming units as already stated, are preferably pre-cast concrete slabs whose opposite edge portions are provided with the flange-receiving slots 3, and may be of any desired size and thickness according to the character of the building operation under construction. As shown in Figure 3 for instance, the wall-forming units W may be of sufficient thickness to provide the key facing edges 4 cooperating to provide a flush joint on the outside of the building, to thereby conceal and protect the framing and stud elements, or as shown in Figure 4, the said wall forming units may be relatively thin, and simply rest between the flanges of the I-bars 1 as shown. In the case of the slotted edge type of unit shown in Figure 3 it is desirable to use an elastic cement indicated at 5 between the units and the I-bars to make a tight and waterproof joint, and also at the inside face of the slabs it is proposed to fill the space left between the inner flanges of the I-bar and the inside face of the unit with a mortar or equivalent filling 6 which will seal the inner side of the joint between the key elements and the units.

In connection with the general thickness of the said wall-forming units W, it will be observed that the portion thereof resting within the fishing space or channel of the stud element is of less depth than the channel to provide adequate clearance for the hooks or claws of the clamps C which hold the same to the permanent structural elements of the building (see Figure 6). After the clamps are made secure, the exposed part of the channel may conveniently be filled or pointed up with mortar or the like as indicated at 6 in Figure 3.

Referring now more particularly to the clamps, it will, of course, be understood that the type of device employed for this purpose will necessarily vary to a certain degree according to the specific type or cross-section of framing element employed, but in the case of the employment of the I-bar type of stud shown in the drawing, a clamp of the type shown in Figures 5 to 7 inclusive may be advantageously used. In any event, the clamp includes in its organization certain essential elements, namely, a clip element 7, a clamping member 8 for engaging with a structural member of the building, and a suitable adjustable locking device 9 for binding the several parts together, and also securely locking the frame element to the structural member. In the embodiment shown, for example, the frame engaging or clip member of the clamp may consist of the substantially U-shaped body *a* having the hook shaped ends *b* for engaging with

the flanges 2 of the frame while the loop portion *c* thereof projects through an opening *d* in a fulcrum element *e* having the fulcrum foot *f* for engaging with the upright beam or column B of the building and the clamping foot *g* for binding against the upstanding flange of the lower sill angle S^2 when the wedge *h* or equivalent locking device is forced through the loop *c* of the member *a*.

In assembling the wall structure in with the form of the invention shown, one of the I-bars or frame elements may be placed in position, and the ends thereof securely clamped to the structural members of the building, then one of the wall forming units may be placed in position either after the manner shown in Figure 3 or that shown in Figure 4, whereupon the next frame element may be engaged with the opposite edge of the unit while the opposite ends thereof are in turn rigidly clamped or secured to the structural members in the manner already described. This operation may be repeated as often as desired to completely fill in the space to be covered by the wall, partition or the like. And, it will of course be understood that in erecting the said wall, the elastic cement 5 may be flowed into the channels or grooves at the edges of the slabs to surround the I-beams, as shown in Figure 3 for example, and after the entire wall is assembled and tied or anchored to the structural members of the building, the inner exposed channels of the flanges of the keys may be filled in or pointed up with mortar to improve the weatherproof character of the inner side of the joint.

I claim:

1. A building construction including the combination with the spaced horizontal structural members of the building, of a wall forming structure arranged between said members and consisting of alternately arranged relatively wide wall forming units and relatively narrow strip-like filler elements, and means engaging with said filler elements and with the structural members of the building to anchor the wall forming structure thereto.

2. A building construction including the combination with the spaced horizontal structural members of the building, of a wall forming structure arranged between said members and consisting of alternately arranged slabs of pre-cast material and metal frame bars, and a clamping device engaging with said frame bars and with the structural members of the building to anchor the wall forming structure thereto.

3. A building construction comprising in combination with its structural members, a filler framework composed of a plurality of lengths of structural shapes, clamping devices for fastening each of said lengths to structural members of the building, and pre-formed wall-forming units having a supporting engagement with said lengths.

4. A building construction comprising in combination with the structural sill members defining the space for a curtain wall, a plurality of flanged bars extending between the sill members, individual clamps for securing each bar to said sill members, and wall-forming units having supporting engagement with said bars.

5. A building construction including the combination with the structural members of the building, of a wall-forming structure clamped between said structural members with an elastic filler interposed therebetween.

6. A building construction comprising in combination with its structural members, a filler framework arranged between and clamped to said members, a wall slab interposed between the elements of the filler framework and an elastic material between the wall slab and the filler framework.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

THOMAS H. KANE.

Witnesses:
H. E. WHITE,
FRANK H. SMITH.