No. 792,302. PATENTED JUNE 13, 1905.

H. N. WILSON.

CELLULAR STEEL FIREPROOF BUILDING CONSTRUCTION.

APPLICATION FILED AUG. 18, 1904.

Fig. 2.

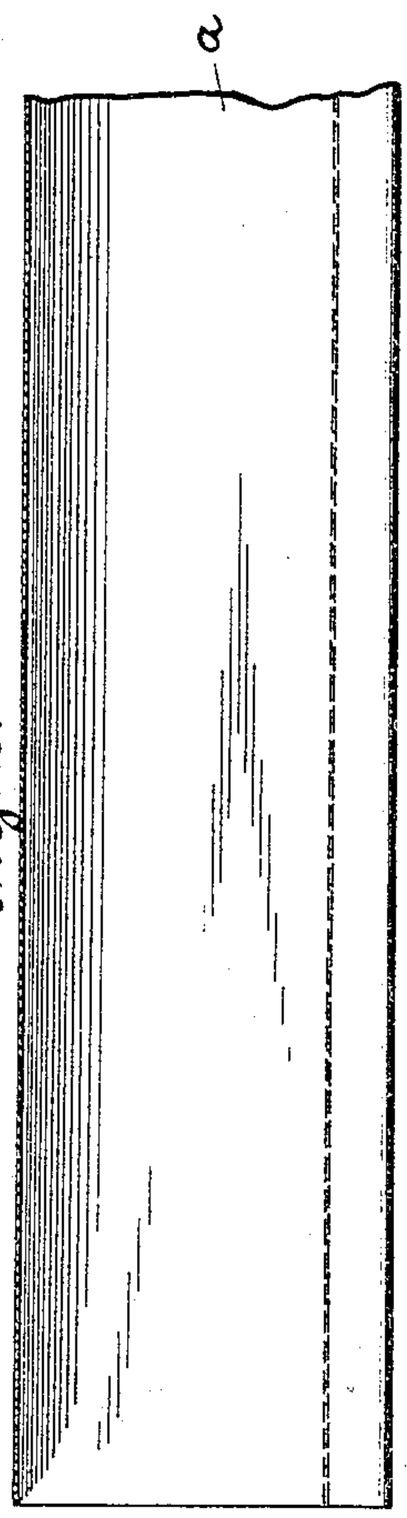


Fig. 4.

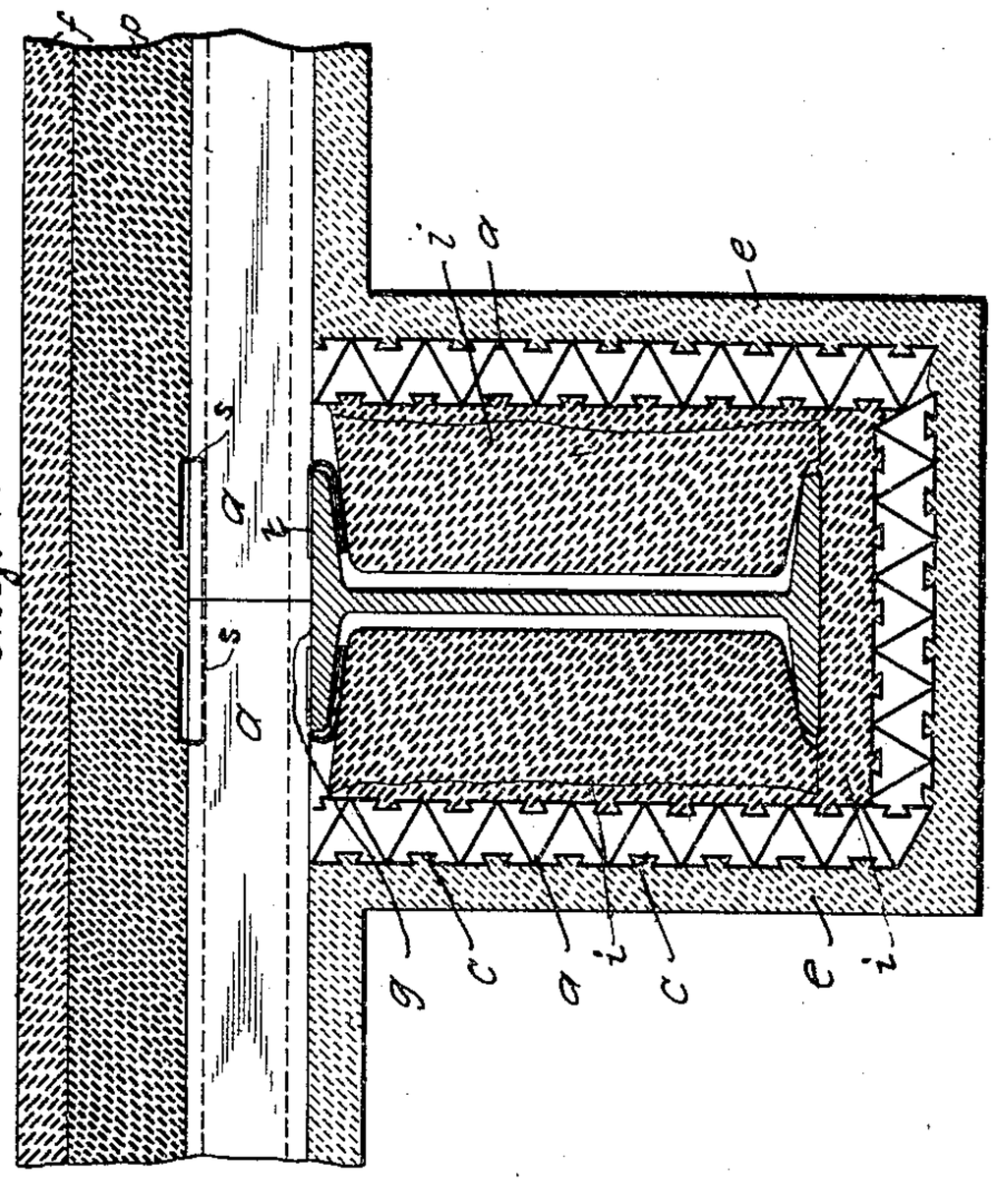


Fig. 1.

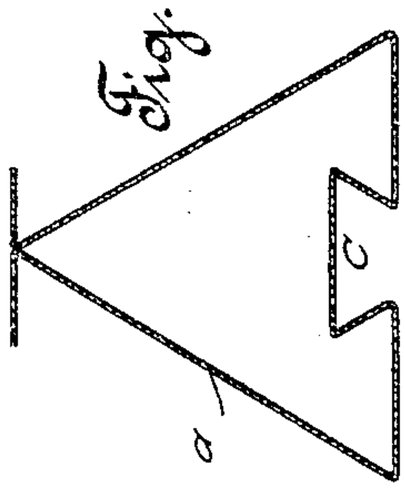
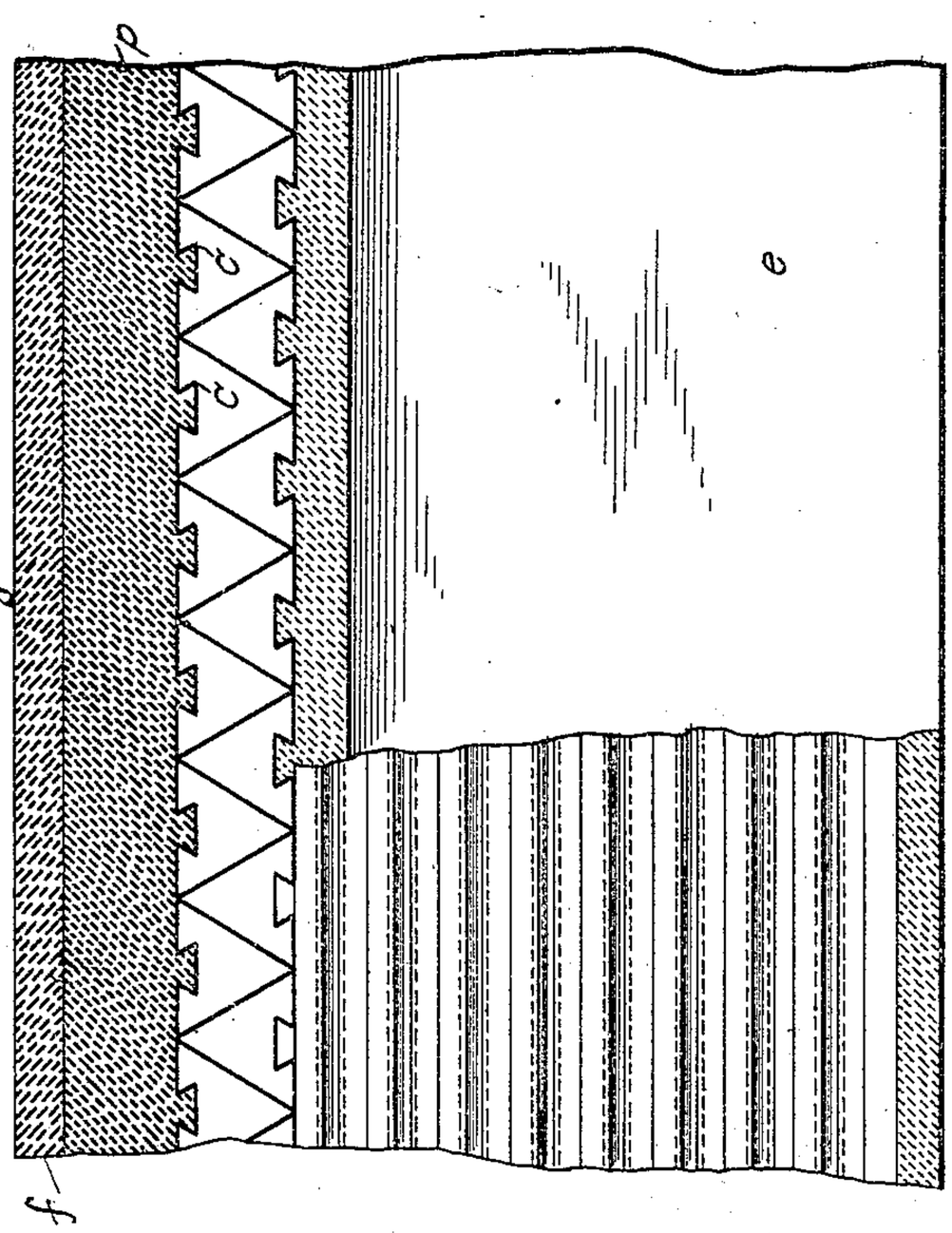


Fig. 3.



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No. 792,302. Patented June 13, 1905.

UNITED STATES PATENT OFFICE.

HENRY NEILL WILSON, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR TO THE NATIONAL CELLULAR STEEL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CELLULAR STEEL FIREPROOF BUILDING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 792,302, dated June 13, 1905.

Application filed August 18, 1904. Serial No. 221,177.

To all whom it may concern:

Be it known that I, HENRY NEILL WILSON, a citizen of the United States, residing in Pittsfield, Berkshire county, Massachusetts, have made certain new and useful Improvements in Cellular Steel Fireproof Building Construction, of which the following is a specification.

This invention relates to sheet-steel arranged in cellular form for use in constructing fireproof buildings.

The object of my invention is to provide a lighter and stronger cellular steel fireproof floor, deck, beam, column, wall, partition, or roof than has heretofore been known or used.

For ordinary work I prefer to use sheet-steel pressed into triangular cells—that is, there are three or more walls to each unit or integral section. These walls or sides are therefore fixed at an angle of one hundred and twenty degrees with respect to each other. Each side of a cell is equal to every other side, and the angles of adjacent cells are in continuous and supporting contact. I prefer to make the blocks of a size weighing about five pounds per square foot. The surfaces intended for the top and bottom are channeled, the channel preferably being one-half of an inch wide at the top, three-fourths of an inch wide at the bottom, and one-half of an inch deep. In other words, the top and bottom surfaces are imperforate and provided with a dovetail or key-lock channel. A sheet of steel of sufficient size is formed into multiples of this unit triangular cell and the dovetailed groove is present in the exposed surface of each unit. The angles of adjacent cells are in continuous contact for the purpose of increasing the strength and rigidity. Metal floor-beams are preferably employed and the cellular steel structure is laid on top of these beams and secured with iron clips to the flanges of the beams and the cellular structure is tied together at the joints or meeting-points above the beams, iron ties or straps of metal being employed for this purpose. Metal beams and columns are inclosed or covered with this cellular steel structure. The space between the cellular steel and the beam or column is filled with blocks of cement. The cellular steel structure secures these cement blocks in position, forming air-chambers outside the cement and protecting the cement and the iron or metal column from fire or heat. In the construction of floors, concrete or cement is applied directly to the cellular steel, rammed down, and troweled to a hard finished surface, upon which is laid any finished floor desired. Plastering is applied directly to the under side and exposed surfaces of this cellular steelwork, and with the depth of key-lock grooves above specified the plastering should be three-fourths of an inch thick. In constructing partitions the arrangement is the same as in the flooring last described. The channels may run either horizontally or perpendicular, as desired.

The accompanying drawings illustrate my invention.

Figure 1 is a cross-section of a unitary part of the cellular steel structure. Fig. 2 is a side view of the same, the dovetail groove being indicated by the dotted line. Fig. 3 is a cross-section of a ceiling and floor with the cellular fireproof steel supporting both. Fig. 4 shows a girder or floor beam with the cellular steel structure resting upon it to form a support for the floor. The girder is inclosed by the cellular structure and the space between the girder and cellular structure is filled with blocks of cement, while plastering is supported upon the exterior of the cellular steel structure by means of the grooves.

In Fig. 1, *a* is a sheet of steel. I prefer No. 28 galvanized sheet-steel for ordinary uses, formed by hydraulic pressure into the triangular cell shape shown. The three walls are arranged at an angle of one hundred and twenty degrees with respect to each other. The cell is equilateral, and a sheet of steel is formed into a series of these cells, the angles of adjacent cells being in continuous permanent contact from end to end. The exposed surface—that is, the top or bottom surface of each unit—is channeled, as at *c*. I prefer to make this channel one-half of an inch wide at the opening, three-fourths of an inch wide at the bottom, and one-half of an inch deep. The

sheet-steel must be imperforate, and I channel it as described with a dovetail or key-lock channel to receive and hold cement or plaster or any plastic material with which it is to be coated. As shown in Fig. 4, two series of channeled sheets are arranged end to end, the junction being above the girder *g*. I provide clips or straps of iron or steel, like *s*, which I pass through slots in the cellular steel and bend back, as shown, to prevent displacement of the cellular structure at the point of junction. I also provide straps of iron or sheet metal *t*, and by passing one end of such strap through a slot in the steel cell and the other end around the flange of the girder I tie the two parts together, as shown in Figs. 3 and 4. The cellular steel structure is preferably laid upon the top of girders, like *g*. Upon this is preferably laid a concrete foundation, consisting of one part Portland cement, two parts of sand, and five parts of cinders or fine broken stone. This coating is shown at *p*. Upon this Portland cement concrete the finished floor is laid. I prefer to make this of one part Portland cement and one part sand. This is shown at *f*. Girders or columns are inclosed by the cellular steel structure *a*, Fig. 4, which for this purpose is of reduced dimensions as compared with that used to support the floors. Blocks of concrete, preferably consisting of one part Portland cement, two parts sand, and four parts slag or cinders, (shown at *i*,) are molded and placed between the girder *g* and the cellular steel *a*. The blocks *i* are given form or outline to fill the space between the girder and the cellular steel structure, and the steel structure is tied in position by metal straps *s*. The plaster *e* is applied to the exposed cellular steel structure *a* and is held in position by reason of the dovetail groove *c*.

I am aware of the United States Letters Patent No. 596,010, dated December 21, 1897, to E. F. Baude, but do not claim anything therein shown or described. The imperforate sheet metal employed by me is free from the tendency to yielding or flexure due to imposed weight which is incident to the use of a perforated and therefore weakened material.

What I claim, and desire to secure by Letters Patent, is—

1. The combination in a fireproof structure of a substantially imperforate sheet of metal bent or folded into two or more triangular forms, each angle lying in contact with an adjacent similar angle, a key-lock groove in the exposed surface of each triangular section and a coat of cement uniting the key-lock grooves of adjacent sections.

2. An elementary component in a fireproof structure consisting of a substantially imperforate sheet of metal bent or folded at angles of one hundred and twenty degrees to present a series of substantially equal surfaces, each angle lying in contact with an adjacent angle in the same sheet and a key-lock groove in each unitary part.

3. A new article of manufacture constituting an element for use in a fireproof building or structure consisting of a substantially imperforate sheet of steel having three or more substantially equal surfaces lying at angles of one hundred and twenty degrees with respect to each other, said angles being in supporting contact, and a key-lock or dovetail aperture in the exposed surface thereof.

4. An elementary component in a fireproof structure consisting of a substantially imperforate sheet of metal bent or folded in triangular form, each angle lying in contact with an adjacent similar angle and a key-lock groove in the exposed surface of each triangular section.

5. A girder inclosed with a substantially imperforate cellular steel structure *a*, combined with molded blocks of cement between the girder and steel structure and a plaster coating for said structure maintained by dovetail grooves in the exterior surface thereof.

6. A girder inclosed with a substantially imperforate cellular steel structure composed of a series of triangular cells, having key-lock grooves in the exposed surfaces, adjacent angles thereof lying in close contact, combined with a plastic cement coating for said steel structure.

HENRY NEILL WILSON.

Witnesses:
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