(No Model.)

T. BAILEY.

FIREPROOF FLOOR STRUCTURE.

No. 534,189. Patented Feb. 12, 1895.

Fig. 1.

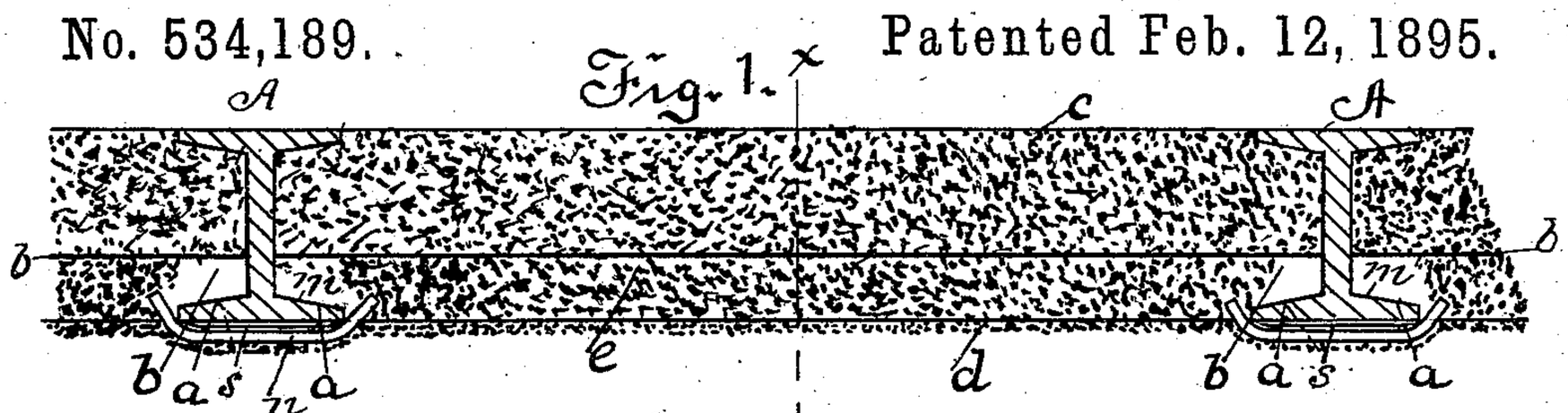


Fig 10.

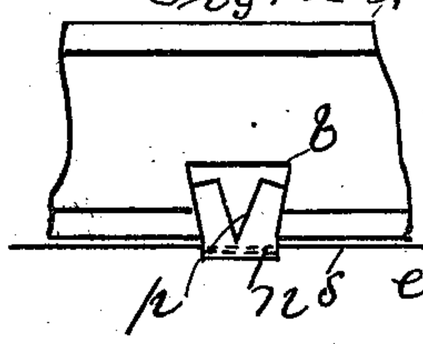


Fig 2.

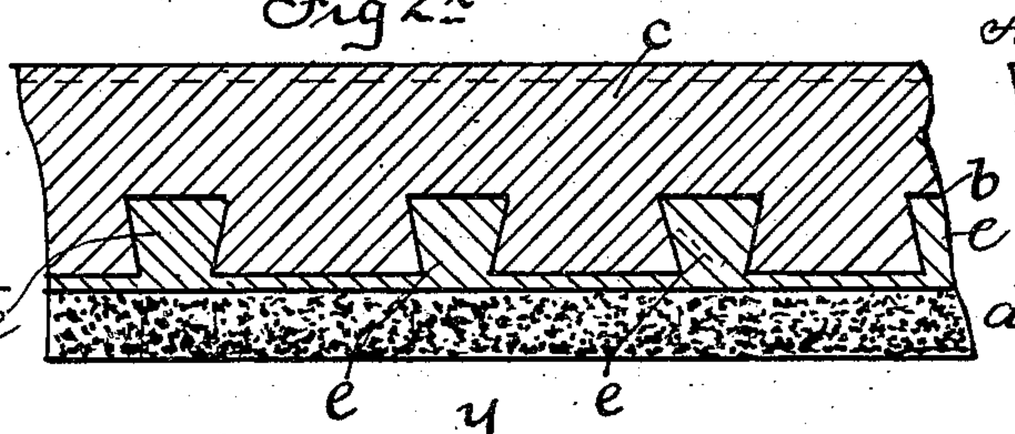


Fig 11.

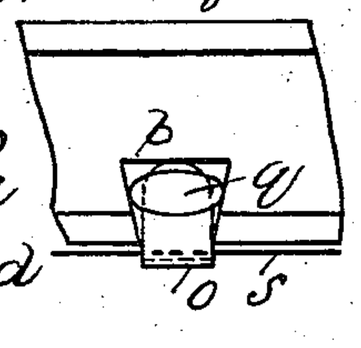


Fig. 3.

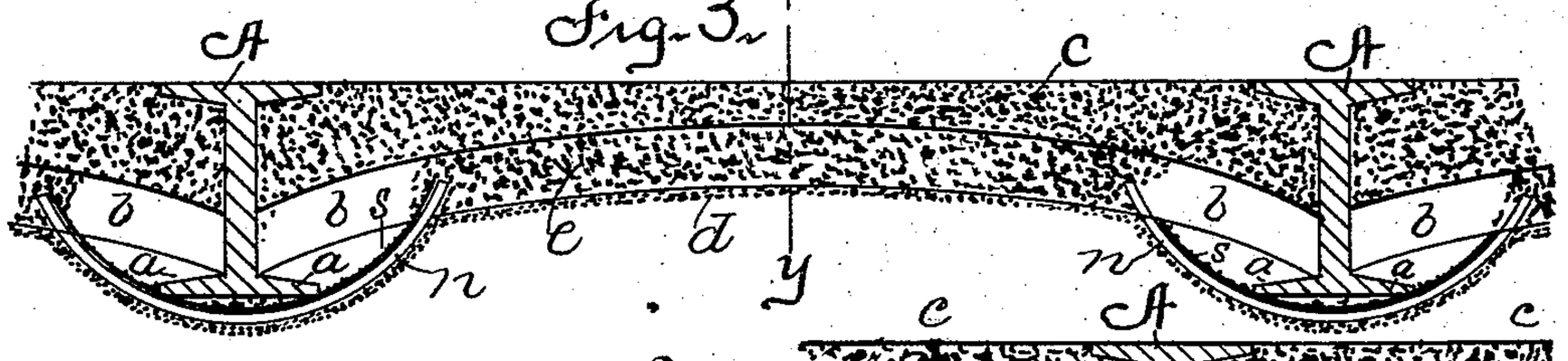


Fig 7

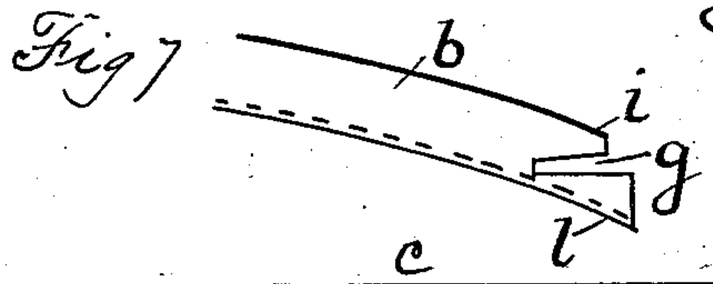


Fig 6.

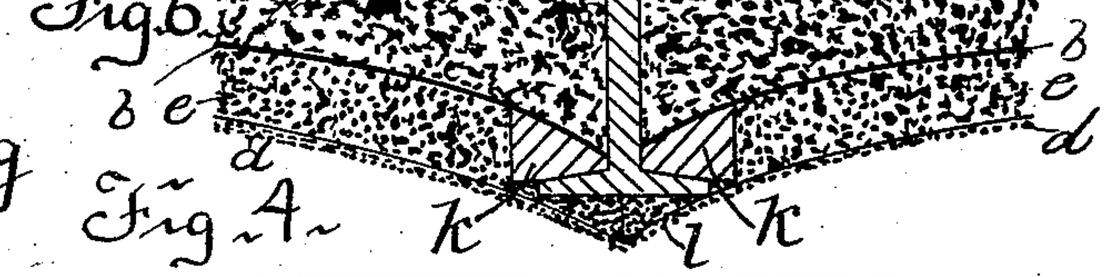


Fig. 4.

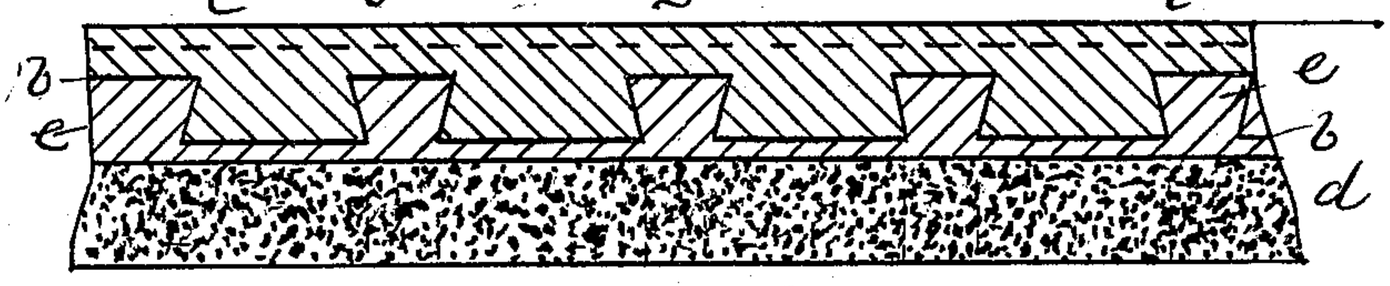
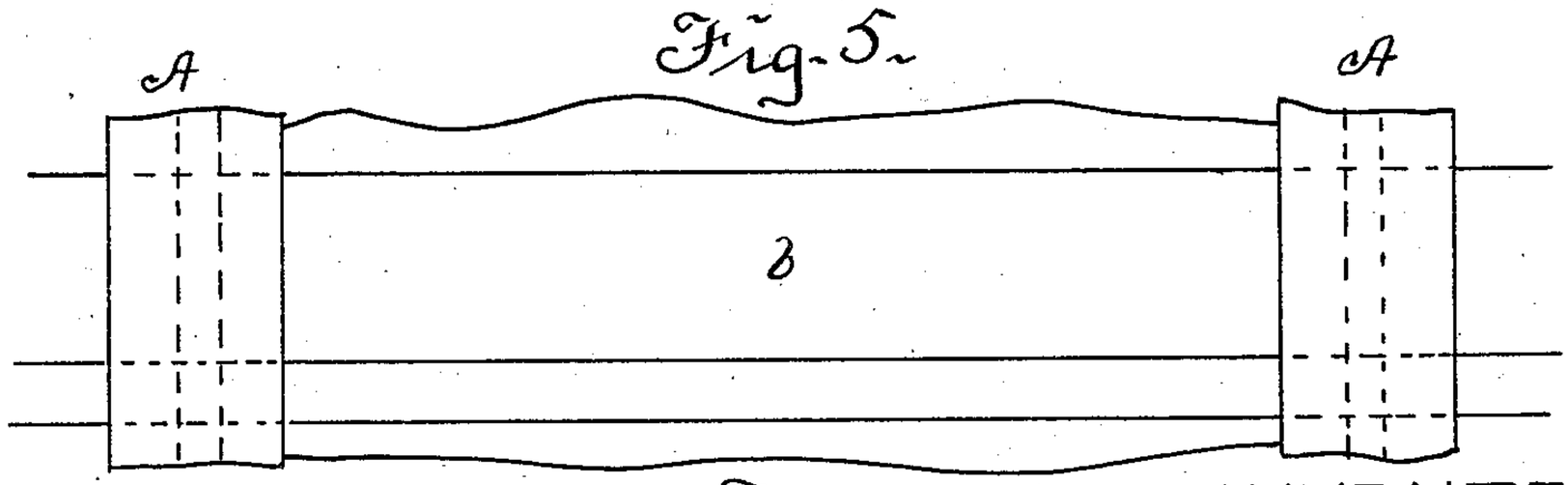


Fig. 5.



WITNESSES.

O. J. Morgan

E. H. Morgan.

Fig 8

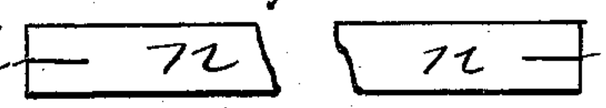
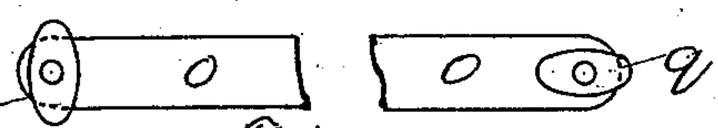


Fig 9



INVENTOR.

Thos Bailey

By A. D. Thayer

Atty

UNITED STATES PATENT OFFICE.

THOMAS BAILEY, OF NEW YORK, N. Y.

FIREPROOF FLOOR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 534,189, dated February 12, 1895.

Application filed March 19, 1894. Serial No. 504,152. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BAILEY, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Fireproof Floor Structures, of which the following is a specification.

My invention relates to fire proof floor constructions in which the filling between the beams is supported on the lower flanges of the beams, and it consists of dovetail ribbed and grooved metallic sheets whereof the webs of the bottoms of the grooves are flat, for the support of the fire proof material between the floor beams and resting at the ends on the lower flanges of the beams, with plaster coating of the under side, and said plates when straight adapted for positive resistance to end thrusts to prevent lateral movement of the beams, the plaster being secured by anchorage in the dovetail grooves and largely reinforcing the power of the sheets both for supporting weight and resisting end thrusts, whereby I provide cheaper and stronger filling between the beams and such as may be more readily used.

My invention also comprises a simple contrivance for suspending protective coverings for the under sides of the beams from the supporting sheets of the filling material between the beams, all as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1, is a transverse section of the floor beams, and of the intermediate filling as I construct it. Fig. 2, is a section on line *x*—*x* Fig. 1. Fig. 3, is a transverse section of the floor beams and the intermediate filling with the ribbed and grooved sheets in arched form. Fig. 4, is a section of Fig. 3 on line *y*—*y*. Fig. 5, is a plan view of a section of the skeleton floor. Fig. 6, is a detail in section showing a modified arrangement for protecting the under sides of the beam. Fig. 7, is a detail showing the shape of the ends of the sheets for the way of protecting the under sides of the beams as in Fig. 6. Fig. 8, is a plan view of one form of bar employed for suspending the lathing strips under the floor beams. Fig. 9, is a plan view of another form of suspending bar for the same purpose. Fig. 10, is a detail showing a side view of part of a floor beam, section of part of a ribbed and grooved sheet, and end view of the lathing strip supporting bar of Fig. 8 placed in position, and Fig. 11, is a view similar to that of Fig. 10, showing the lathing strip of Fig. 9 in position.

A represents a couple of metal floor beams between which the fire proof filling is to be placed.

b represents thin sheets of metal which are dovetail ribbed and grooved lengthwise, with flat webs of the bottoms of the grooves and placed between the beams with the ends resting on the lower flanges *a*, of the beams.

c represents filling of plaster, cement, or other approved fire proof material, and *d* represents a plaster coating of the lower surface of the plates secured by the anchors *e*, pressed into the dovetail grooves of the under side of the sheets.

The metal sheets will be first crimped in the usual manner of crimping, and then they will be placed in position loosely side by side with the ends resting on the flanges *a*, and with the edges touching each other, and will then be covered above with any kind of cheap non-combustible filling material shoveled in and lightly tamped and finished with a smooth top finish of mortar. The under coating should be a good quality of plaster adapted to set hard and smooth and have strength to hold securely. Sheets of thin, light, and inexpensive character thus crimped afford ample strength for strong floors, the strength largely depending upon the depth of the crimps which may be more or less according to circumstances.

The crimped sheets will generally be flat as in Figs. 1 and 2, but they may be arched as in Figs. 3, 4 and 6 for greater strength for supporting the filling above with less depth of the crimps. When flat as in Figs. 1 and 2, the ends of the sheets resting on the flange *a*, will be recessed and beveled as at *m*, to let the lower surface down flush with the lower surface of the beams, the recesses being produced in such a way that the flat bearing webs of the bottoms of the grooves are preserved, and the ends are made to abut against the webs of the beams for stays to prevent lateral movement of the beams and thus also serve the purpose of the tie rods heretofore used but now unnecessary, and may be dis-

pensed with. When the sheets are arched the ends of the flat webs of the bottoms of the grooves have bearing their full width on the flanges of the beams, affording more substantial foot rests than the ends of ordinary corrugated sheets.

For protecting the under sides of the beams I provide supporting bars *n* or *o*, for holding lathing sheets under said beams, said bars being adapted to have the ends secured in dovetail grooves of the sheets *b*, by expanding the split ends *p* of bars *n*, or by means of buttons *q* pivoted on the ends of bars *o*, which when ranging lengthwise of the grooves will enter them and when entered and turned crosswise of the bars and the grooves, and the plaster *d*, is applied, will be effectually secured therein.

In another way of protecting the under sides of the beams, more particularly applicable to the arched sheets, I make a notch as *g*, in each end to receive the flange *a*, with a part *l* below extending a little farther than the part above the notch so that these parts *l* will meet below the beam, the sheets being supported on the flanges of the beam by the parts *i* above the notch, and to provide more substantial support of the ends of the plates on the flanges of the beams I insert bearing blocks *k*, between the flanges and the upper webs of the ribs whereby the stress is distributed, and tearing the side webs of the ribs at the angles of the notches is prevented. It will be seen that these dovetail ribbed and grooved sheets afford simple and cheap support for upper layers of fireproof material and at the same time serve the purpose of metal lathing for the under coating of plaster. The upper filling may consist of cheap materials for the most part as broken bricks or stones mixed with cement of any kind.

I am aware that flat dovetail corrugated sheets have been used on the upper sides of wood beams for the support of floors and also on rafters for the support of cement roofing, and I do not claim such application of such sheets my invention being limited to the kind of floor construction in which the filling is located between the beams and where the said plates may—when straight and thus adapted to resist powerful end thrusts—be utilized for stays to prevent lateral movement of the beams. I am also aware that both arched and flat corrugated sheets of the ordinary form not having the dovetail ribs and grooves have been similarly placed on the flanges between the beams as in patents to Hoyt, No. 173,470; Fugman, No. 475,854, and White, No. 511,385, and I do not claim such device, my invention being also limited to sheets having dovetail corrugations for holding the plaster coating both on the upper and the under sides in a way to add largely both to the power of the sheets to resist end thrusts, and to resist stresses tending to break them, besides simplifying the means of attaching the plaster to the under side for being retained thereat, and to utilize the flat bottoms of the ribs for more substantial and reliable bearing on the supporting flanges of the beams. In the forms of corrugations represented in the said patents, the bearings of the sheets on the beam flanges are narrow points of the crowns of the inverted arches of the ribs distant from each other the entire length of the "pitch" of the corrugations which offer but slight resistance to crushing stresses of the weight, while the broad flat seats of the dovetail ribs reinforced with the fillings of cement locked in the dovetail grooves of both sides of the sheet afford ample power for sustaining the greatest weight liable to be imposed, and it is to be specially noted that the cement thus locked in the grooves of both sides of the sheets largely stiffens the sheets against end thrusts for greater power to resist lateral movements of the beams and also increases their power of supporting weight. Therefore it is plain that much lighter sheets with smaller corrugations may be used for given strength. The cement locked in the grooves by their dovetail form unites with the webs of the grooves and forms a solid mass effectually preventing the webs from buckling under stresses, whereas the cement covered sheets of ordinary corrugations have only the weight of the cement to oppose the crowding of the cement out of the grooves in the act of buckling.

I claim—

1. In fire proof floor construction, dovetail ribbed and grooved sheet metal plates having flat webs of the bottoms of the grooves placed between the beams and resting at the ends on the lower flanges of the floor beams, said ends of the sheets being recessed and the lower surfaces of the sheets arranged flush with the lower surfaces of the beams with filling of fire proof material above, and a plaster coating of the under side secured in the dovetail grooves substantially as described.

2. In fire proof floor construction, dovetail ribbed and grooved sheet metal plates placed between the beams and resting at the ends on the lower flanges of the floor beams, with filling of fire proof material above, a plaster coating of the under sides of the sheets, and also under the beams, the part under the beams supported from the sheets substantially as described.

3. In fire proof floor construction, dovetail ribbed and grooved sheet metal plates placed between the beams and resting at the ends on the lower flanges of the floor beams, with filling of fire proof material above, a plaster coating of the under sides of the sheets, and also under the beams, the part under the beams supported from the sheets by the bars having the ends secured in the dovetail grooves of the sheet metal plates substantially as described.

4. In fire proof floor construction the combination of metallic beams having lateral flanges of the lower edges, dovetail ribbed

and grooved metallic sheets to support the filling between the beams, said sheets bearing the full width of the lower ribs on the flanges of the beams, and reinforcing cement filling interlocked in the said dovetail grooves substantially as described.

5. In fire proof floor construction, dovetail ribbed and grooved, sheet metal plates placed between the beams and resting at the ends on the lower flanges of the beams with reinforcing bearing blocks in the grooves of the under side of the sheets and resting on the flanges of the beams, and with filling of fire proof material above the sheets and plaster coating of the under side secured in the dovetail grooves substantially as described.

Signed at New York city, in the county and State of New York, this 21st day of February, A. D. 1894.

THOMAS BAILEY.

Witnesses:
W. J. MORGAN,
S. H. MORGAN.