(No Model.)

P. M. BRUNER.

ILLUMINATING TILE AND METHOD OF CONSTRUCTING SAME.

No. 517,156. Patented Mar. 27, 1894.

Fig. 1.

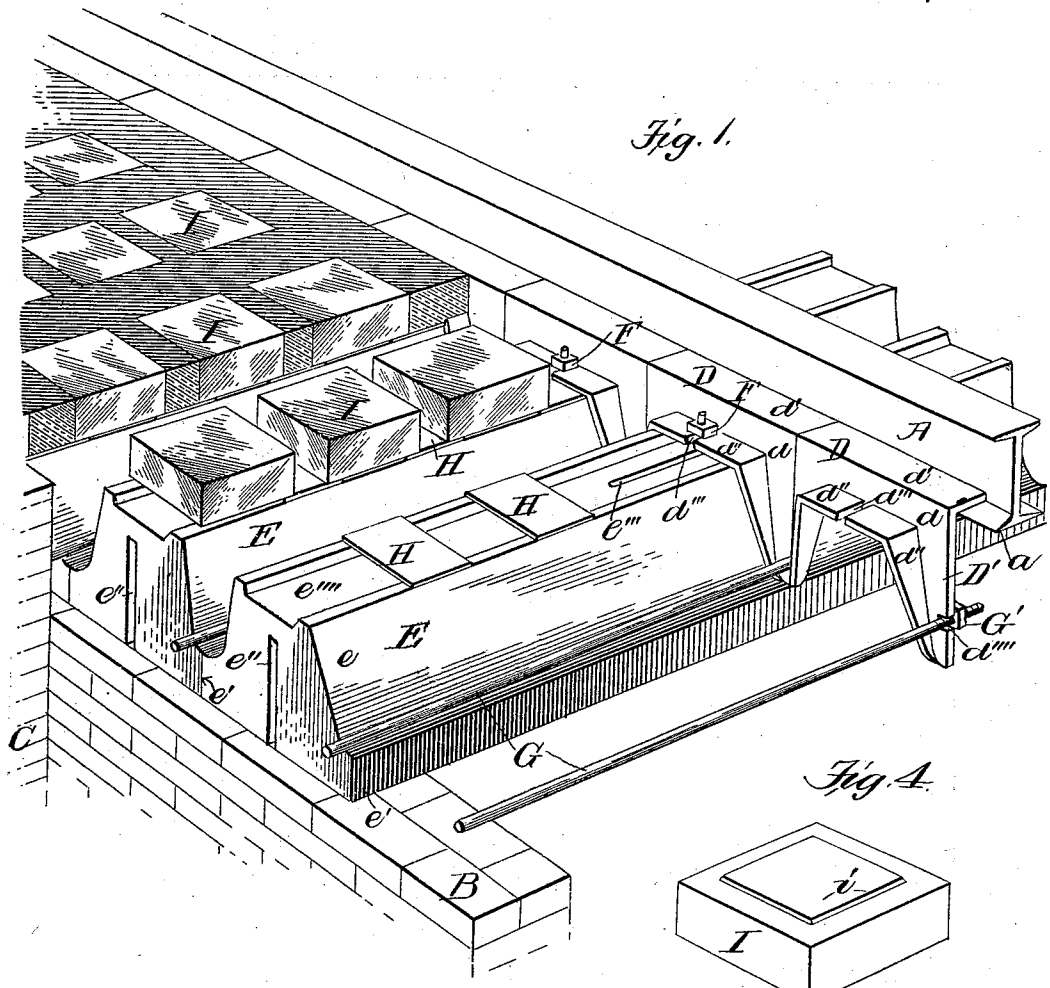
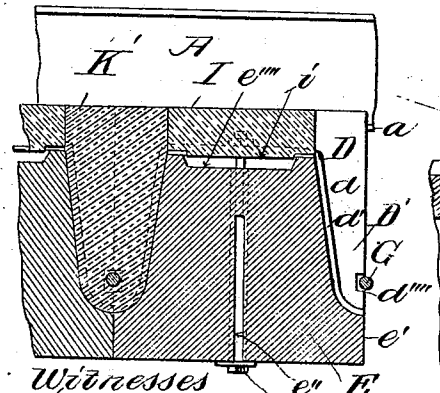


Fig. 4.

Fig. 2.



Witnesses
F. R. Cornwall
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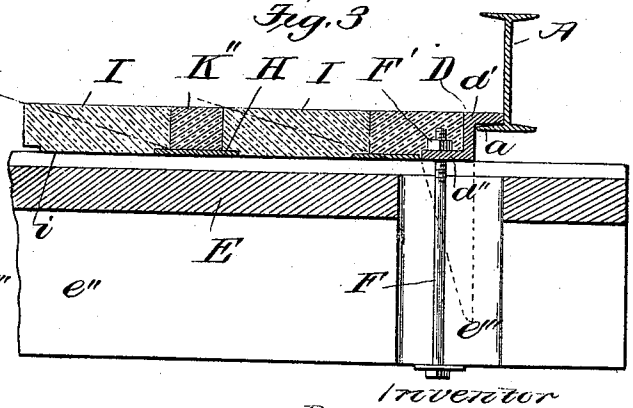
Fig. 3.



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UNITED STATES PATENT OFFICE.

PRESTON M. BRUNER, OF ST. LOUIS, MISSOURI.

ILLUMINATING-TILE AND METHOD OF CONSTRUCTING SAME.

SPECIFICATION forming part of Letters Patent No. 517,156, dated March 27, 1894.

Application filed May 5, 1893. Serial No. 473,115. (No specimens.)

To all whom it may concern:

Be it known that I, PRESTON M. BRUNER, a citizen of the United States, residing in the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Illuminating-Tiles and Methods of Constructing the Same, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which not only show the features of improvement in the finished article, but also illustrate the method of constructing the same.

My invention relates to the construction of monolithic concrete floor or pavement surfaces, and has for its object a form of construction in the finished article, adapting it, more particularly, to be used as an illuminating pavement, such as is generally found spanning the area between the area wall and the building,—that portion of the sidewalk surrounding public buildings in which glass lenses are inserted for the transmission of light to the area and basement.

My invention comprises the feature of embedding the glass lenses immediately in the body of the concrete, while in the course of construction, thereby necessarily involving means for supporting the lenses in position while the pavement is building. In the means employed for this purpose, as herein described, are included features of novelty which I claim as part of my invention, as improvements in the art.

Other features of my invention reside in the means I employ for securing and supporting the "building" edge of my pavement; in the method and means for forming a substructure on which to "lay" the concrete; in the means for supporting this substructure; in the means provided for the easy removal of this substructure without disturbing or mutilating the constructed pavement; in the means for supporting the glass lenses and spacing them apart, while the pavement is building; and in the means for anchoring the pavement proper to the support by which it is anchored to the building.

The details of construction, enumerated above, in which are embodied the novel features of improvement which I claim as my invention, are applicable generally to pavements which are supported at their edges only.

There are features of improvement which are specially applicable to illuminating pavements or floors, as will appear from the following specification, which involve principles essential to the effective use of an illuminating tile or pavement, and which, as far as I am at present advised, are broadly new in the construction of a pavement of this character.

I am aware that pavements of the character herein shown and described, have been previously constructed of monolithic concrete; that various means have been adopted to strengthen the same; that glass lenses, for illuminating tiles or floors, have been embedded in the concrete itself, supported, in some instances, by skeleton iron frames on which the concrete is "laid," in others, independently supported in place while the pavement is building and eventually by the concrete itself. In these features I claim nothing new, broadly, but do claim features of improvement whereby, in the construction, the article can be more cheaply and economically produced, and in the finished article, it is better, safer, and more nearly approaches the desired results in the use of the same.

In the accompanying drawings, in which like symbols of reference denote like parts where they occur in the different views: Figure 1 is a perspective view of a portion of an illuminating pavement over an area alongside a building, while in the course of construction, and is illustrative of the various details of my method of construction in its various steps of progression, illustrating, at the same time, the details of improvement in the pavement itself. Fig. 2 is a sectional view, taken parallel to the building, transversely to the supporting rib of concrete extending from the area wall to the building. Fig. 3 is a view, similar to Fig. 2, but taken through the middle of the substructure supporting wood-strips; and Fig. 4 is a perspective view of the under side of one of the glass lenses preferably used by me.

A represents an I-beam which is a fixture secured to the building proper, as is usual in practice, the essential feature of which being the extending lip *a*.

B represents the area wall, on the top of which is supported the "sidewalk" edge of the illuminating pavement; and C, the inner edge of the street pavement, or of the sidewalk proper, as the case may be, the surface of which is generally flush with the surface of the pavement next to the building.

D indicates bracket hangers by which the inner or "building" ends of the substructure strips indicated by E are supported (see Figs. 2 and 3).

F and F′ represent, respectively, the bolts and nuts for securing the bracket hangers D to the strips E.

G and G′ represent, respectively, long tie rods embedded, when the pavement is completed, in the, what I will call, main ribs of the pavement, and the nut, or corresponding head portion, on one end of the rods G, for anchoring the brackets D to the pavement.

H represents strips or plates of tin, or similar material, used to place between the blocks or lenses of glass represented by I, to space them apart, as well as to form the bottom of what will constitute a mold for the concrete between the consecutive lenses in the same tier, as hereinafter described.

K represents the concrete of the pavement as a whole; K′, the main ribs of the same, which extend from the area wall B to the building, and K″ the short transverse ribs between consecutive lenses I in one tier or row from area wall to building.

It is obvious that the I-beam A might be dispensed with in instances when a ledge or shoulder is formed in the masonry work of the building for supporting the inner edge of the pavement, except in instances, as will appear from the following description, where it is desirable that there should be no obstruction to the free passage of the light transmitted through the pavement, extending below the lower "building" edge of the pavement.

As shown in Fig. 1, the mold or building strips E are formed of a cross-section shown more fully in Fig. 2, the essential features of which are the inclined sides *e*, preferably with lip-like projections *e′* along each lower edge, so that, when placed in consecutive order alongside each other, in the manner shown in Fig. 1, to form a supporting structure on which to "lay" the pavement, there will be left a substantially V-shaped opening or trench, with a rounded bottom, into which the concrete of the pavement will run, forming the main ribs K′. The strips E are formed with the slot *e″* extending, along their entire length, to a convenient depth from approximately the middle of their under side; and, at or near one end, with the elongated bolt holes *e‴* for the reception of the bolts F. The upper surface of these strips E is grooved out, as at *e⁗*, so as to form a raised rib along either side edge of the strips on which are supported the glass lenses I, the groove *e⁗* being formed to accommodate the relative raised portion *i* formed on the under side of the lenses, as shown in Fig. 4. By this means, an easy and convenient alignment of the lenses I is effected when placed on the strips E.

Between the lenses I, when placed, preparatory to the pavement being "laid," are placed the thin strips or sheets of metal H, which are of a length just sufficient to span the upper surface of the strips E, and of a width dependent on how far apart it is desired to space the lenses. The functional feature of these strips, while effective to space the lenses apart, is to act as the bottom of the mold between the lenses and prevent the concrete from going into the groove *e⁗*, and, thereby, when the pavement is completed, limiting the depth of the ribs between lenses in the same row from area wall to building, as shown in the sectional view of the pavement in Figs. 1 and 3.

The bracket hangers D are formed, essentially, with a web portion *d*, which is substantially vertically placed when in use, and two oppositely extending lips or flanges *d′* and *d″* at substantially right angles to the plane of the web portion *d*—one, *d′*, along the upper edge of the web portion *d* and the other along the inner edge of two leg portions D′, formed by adapting the web portion of the bracket piece, as a whole, to straddle the strips E. In this manner these lips *d″* are inclined at an angle to the vertical side edges of the piece as a whole, corresponding to the inclined sides of the strips E, forming, when several are placed in consecutive order, against each other, as shown in Fig. 1, substantially a V-shaped stirrup for the support of the "building" end of the main ribs K′. The lips *d″* are made to extend horizontally along the under edge of the web *d*, corresponding to the upper surface of the strips E, when the parts are secured together, as hereinafter described, leaving an intermediate space or slot *d‴* for the reception of the bolt F for securing the strips E to the bracket hangers D, as will hereinafter appear. The vertical distance from the supporting lip *d′* and the horizontal portion of the lips *d″* is decided by the thickness of the glass lenses I which are, of course, in the finished pavement flush with the surface of the pavement, which is preferably flush with the supporting lip *d′*, as shown in Fig. 1. The horizontal portions of the lips *d″* are useful not only as means for securing and supporting the building end of the strips E, but, as shown, also act as a support for that edge of the pavement when completed.

There are formed, in the outside edge of the leg members D′ of the bracket hangers, notches *d⁗* for the reception of the rods G and for supporting that end of the same while the pavement is in course of construction.

I will now describe the method of procedure in making use of the appliances I have already described in building a pavement of the character illustrated, which description will, at the same time, set forth the essential

features of improvement in the finished pavement itself.

It will be understood that the I-beam A is a fixture in the building and that the area wall B and the street, or other, pavement C, have already been constructed, the desired relative surface levels of the pavement C and of the pavement K (to be constructed) having been predetermined. The height of the area wall is determined, as will appear later, by the vertical thickness of the strips E, and the relative height of the lip *a*, or corresponding support, by the thickness of the glass lenses I. One of the bracket hangers D is loosely secured to one of the strips E by one of the bolts F and nuts F'. The lip *d'* of the bracket D is placed on the supporting lip *a*, the other end of the strip E resting on the area wall B, and the strip E adjusted longitudinally (the elongated bolt holes *e'''* permitting this), so as to leave the proper space between its end on the area wall and the pavement C to afford a supporting rest, on the area wall, for that edge of the finished pavement K, as is evidently necessary. The nuts F are then screwed tight. A sufficient number to cover the desired space of the strips E and supporting brackets D are placed thus in successive order against each other, as shown in Fig. 1. The rods G are then passed through the recesses *d''''* therefore in the brackets D, the area wall ends being supported in proper position by blocking up, or in any desirable manner. The lenses I are then placed in position on the strips E, with the spacing plates H therebetween. The concrete K is then poured or "laid," filling in the intermediate spaces between the lenses and the trenches between consecutive strips E and the space at the ends of the strips E, between them and the pavement C. It is evident that it is not necessary, while perhaps advisable, to build the pavement C before the pavement K is constructed. The pavement C might evidently be replaced by a mold board performing the same function of defining that edge of the pavement K. After the pavement K has hardened or "set," sufficiently, so as to be self-supporting, the strips E are removed. This is done by first loosening and removing the bolts F and then compressing the lower side of the strips E, the slot *e''* permitting this, when the strips are easily removed. And, subsequently, the sheets or strips of metal H are removed. It is evident that the nuts F' are embedded in the concrete, and that they are necessarily left in position when the strips E are removed.

As illustrated, particularly in Fig. 2, the rods G are embedded in the lower portion of the main ribs K' and act to compensate for any tensile strain that the main ribs K' may be subjected to, strengthening the same. The use of the nuts G', or corresponding head portion, on the rods G, is to prevent any accidental displacement, in the finished pavement, of the supporting bracket hangers D, binding, as they do, the brackets D to the body of the pavement K.

While the method, as herein outlined, is much more convenient and simple than any heretofore employed, it is very much cheaper. The strips can be adapted, by the bolt slots *e'''*, to span any ordinary area distance and can be used over and over again. Their use also obviates any preparatory, more or less expensive, substructure for supporting the mold structure for the pavement. This is true of any pavement, whether it be illuminating or otherwise, in instances where it is necessary to span an area or space where the pavement has only edge support. But the more important features of improvement, consequent in such a form of construction, exist in its adaptation to an illuminating pavement, and in the consequent inherent features of utility. These features are fully illustrated in Figs. 2 and 3.

In monolithic concrete structures of this character, a certain depth or thickness, of parts at least, is necessary for strength. In my improved form of construction, I dispose this thickness in the parallel ribs K', which extend from area wall to building, and place the lenses in the comparatively shallow or thin spaces between the strengthening ribs, making the cross ribs K'', at most, not deeper or thicker than the lenses themselves, thus, as is evidenced by the broken lines in Fig. 3, permitting the transmission of all the light that the thickness of the lenses would permit. It has been heretofore thought necessary to reinforce a pavement of this character by a framing of relatively thicker or deeper dimensions. This I dispense with, and, by the use of the virtually double L-shaped bracket supports, support the "building" edge of my pavement on a support above the lower surface of that part of the pavement in which the lenses are set, thereby obviating any obstruction to the transmission of the light, at that edge of the pavement, into the cellar or basement under the building.

Having thus described my invention and its method of application, what I claim, and desire to secure by Letters Patent, is—

1. The method of constructing area-spanning pavements, consisting in hanging from a suitable support one or more bracket-hangers, temporarily attaching to said bracket-hangers a suitable sub-structure, placing the material on the substructure and against and upon the bracket-hangers, and, finally, removing the substructure and leaving the bracket-hangers to support the edge only of the finished pavement, substantially as described.

2. The method of constructing area-spanning pavements, consisting in suspending bracket-hangers from a suitable support, said bracket-hangers being provided with suitable inwardly-projecting flanges which conform to the contour of the under side of the finished pavement, in temporarily attaching to said

bracket-hangers strips forming a substructure, which strips are so formed on their upper faces and sides as to form a mold, corresponding to the inwardly-projecting flanges on the bracket-hangers, in placing the material on this substructure and inwardly-projecting flanges, and finally removing the substructure, leaving the same supported solely by the bracket-hangers, substantially as described.

3. The herein-described method of constructing an illuminating pavement, consisting in supporting a substructure on which to "lay" the pavement and which forms a mold for the same, by bracket hangers which, in the finished pavement, form a part of the pavement and support the edge thereof; placing the lenses and spacing them apart with plates which form a mold bottom for the concrete therebetween; and removing the substructure and the mold plates between the lenses, all substantially in the manner and for the purposes specified.

4. The combination with the removable construction strips, for supporting a concrete pavement while in the course of construction and forming a mold therefor, said strips being formed with inclined sides and a deep longitudinal groove in their lower sides, through the medium of which deep groove the strips are compressed or pinched away from the material, of the detachable bracket-hangers for supporting the ends of the strips and for supporting that edge of the finished pavement, substantially as and for the purposes specified.

5. The combination with bracket-hangers provided with means for mounting the same upon a suitable support, of flanges extending from their inner lower edges, said flanges being so arranged as to receive the substructure into pockets formed by the flanges, and the substructure having its upper face conforming to the arrangement of the flanges and having a longitudinal slot for adjustment through the medium of a securing bolt between the brackets and substructure, substantially as described.

6. The method of constructing an artificial stone illuminating pavement, which consists in arranging the bracket hangers in position, which bracket hangers form a permanent support for the finished pavement, placing in position a substructure which is formed with grooves, corresponding to the ribs of the finished pavement, extending in an outward direction from the building, placing the lenses in position on the crowns formed by the substructure, which crowns in the substructure form the space between the ribs, laying the pavement in the grooves and between the lenses to the top thereof, and finally removing the substructure, substantially as described.

7. The method of constructing an illuminating pavement by the use of a temporary substructure, which consists in laying the pavement on the substructure, forming ribs on its under side during the course of laying, which ribs run toward the building, and in embedding the lenses in the pavement between the ribs, and finally removing the substructure, when the pavement will be supported at its edges by permanently located hangers, which are cut out between the ribs so that the light through the lenses may pass obliquely and unobstructedly into the basement or area to be illuminated, substantially as described.

8. The method of constructing area spanning illuminating pavements, which consists in arranging bracket hangers at the side or sides of the area which hangers are cut away at their lower edges to correspond to the contour of the finished pavement, in building a sectional substructure by arranging beams at right angles to the building, which beams are so shaped on their upper faces as to form ribs on the under side of the pavement, which ribs run toward the building, in supporting on said substructure the lenses, in laying the pavement on the substructure, between the lenses, and to the top thereof, and finally removing the substructure, substantially as described.

9. The combination with an area spanning illuminating pavement which is formed with ribs on its under side running toward the building, the lenses thereof being embedded in the pavement between the ribs, and bracket hangers which support the edge of the finished pavement, said bracket hangers being cut away on their lower edges to correspond with the spaces between the ribs, whereby the rays of light passing through the lenses, may pass obliquely, in the direction of the ribs, beyond the line of the bracket hangers, which bracket hangers are cut away to permit the unobstructed passage of such rays of light, substantially as described.

In testimony whereof I have hereunto affixed my signature, in presence of two witnesses, this 26th day of April, 1893.

PRESTON M. BRUNER.

Witnesses:

A. RAMEL,

HUGH K. WAGNER.