

No. 629,896.

Patented Aug. 1, 1899.

S. F. EVANS.  
TILE ARCH CONSTRUCTION.

(Application filed May 2, 1898.)

(No Model.)

3 Sheets—Sheet 1.

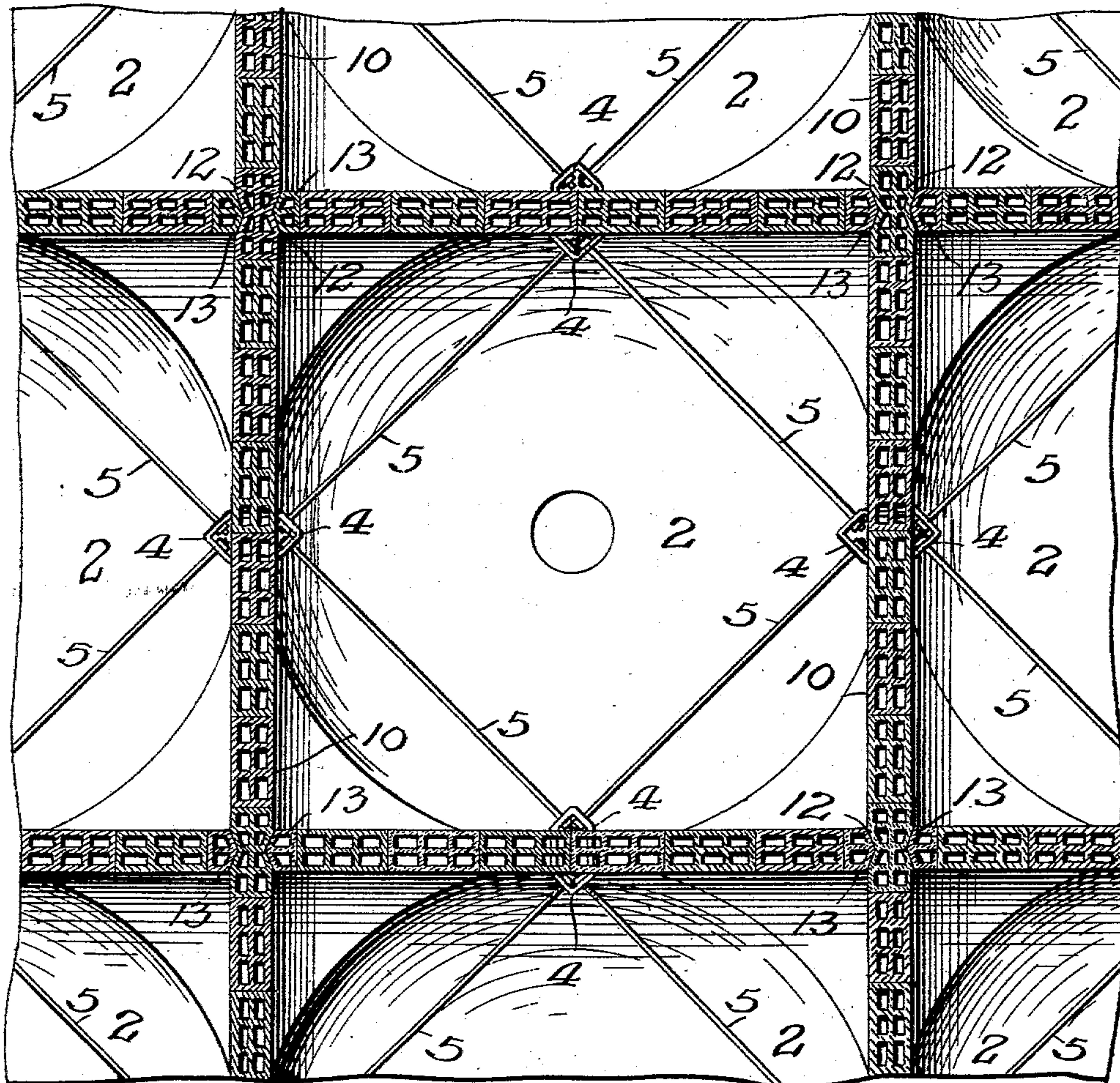


Fig. 1.

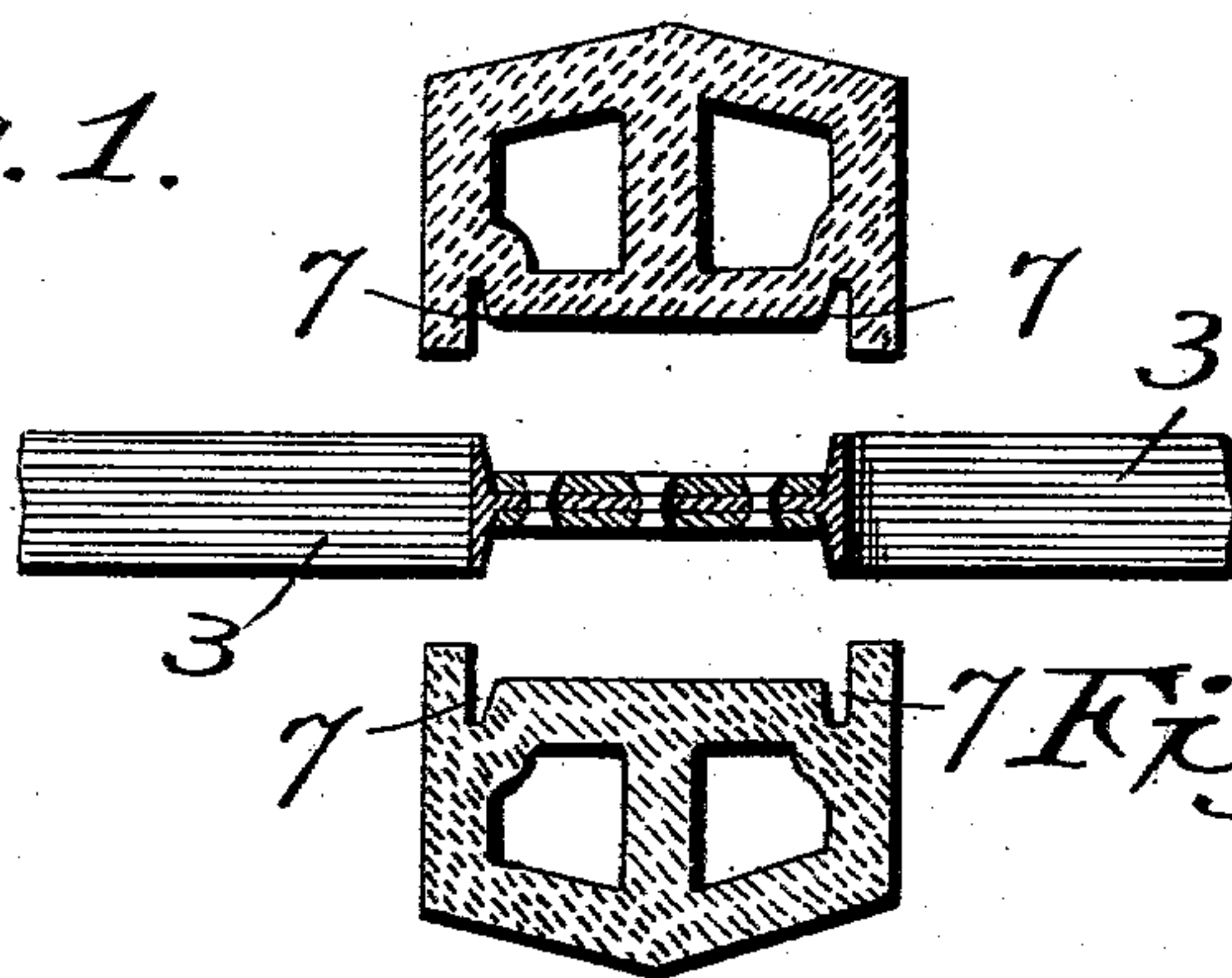


Fig. 3.

Witnesses;

C. E. Van Dorn  
Richard Paul

Inventor;

Scott F. Evans,

By

Paul Hawley  
his attorneys



No. 629,896.

Patented Aug. 1, 1899.

S. F. EVANS.  
TILE ARCH CONSTRUCTION.

(Application filed May 2, 1898.)

(No Model.)

3 Sheets—Sheet 2.

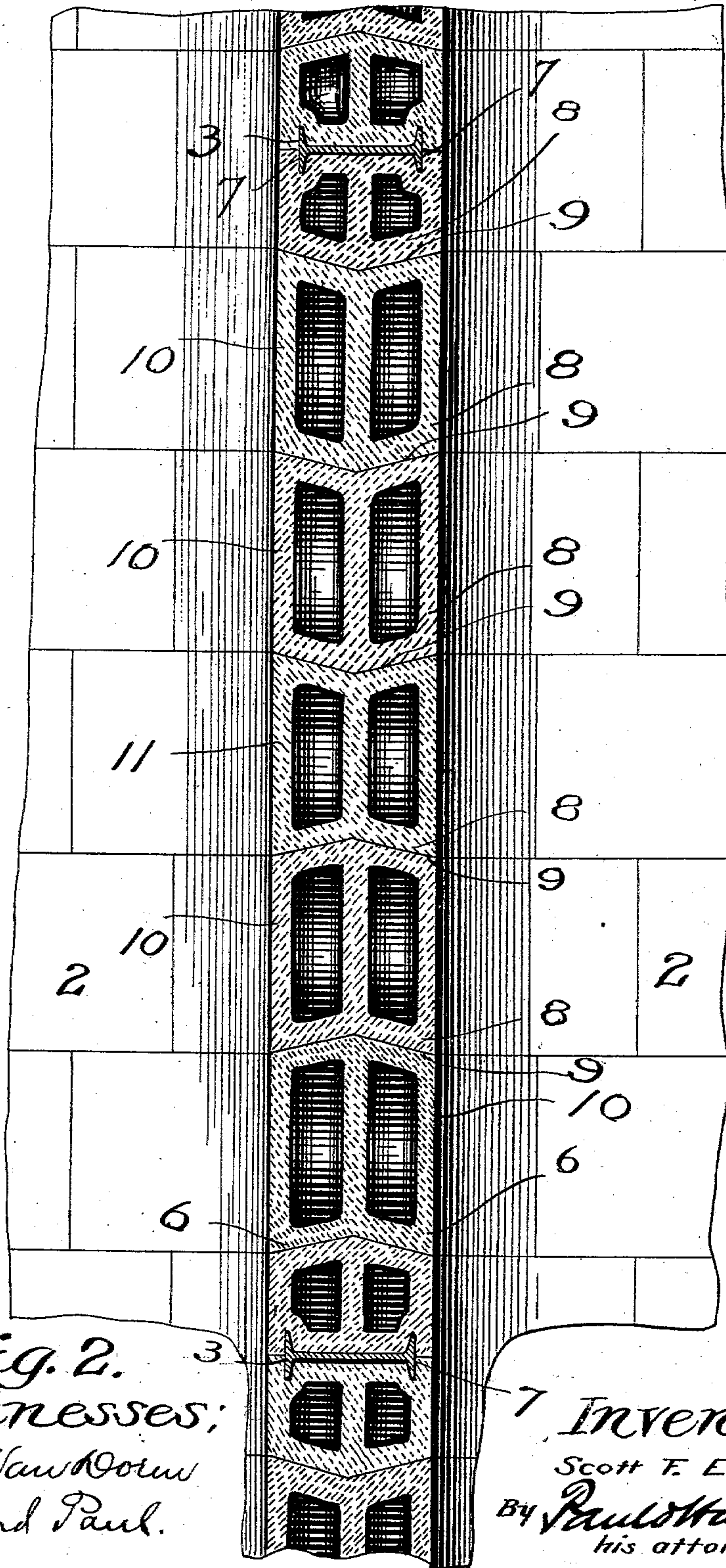


Fig. 2.  
Witnesses;  
C. E. Vawter  
Richard Paul.

Inventor;  
Scott F. Evans.  
By Paul Hawley  
his attorneys.



No. 629,896.

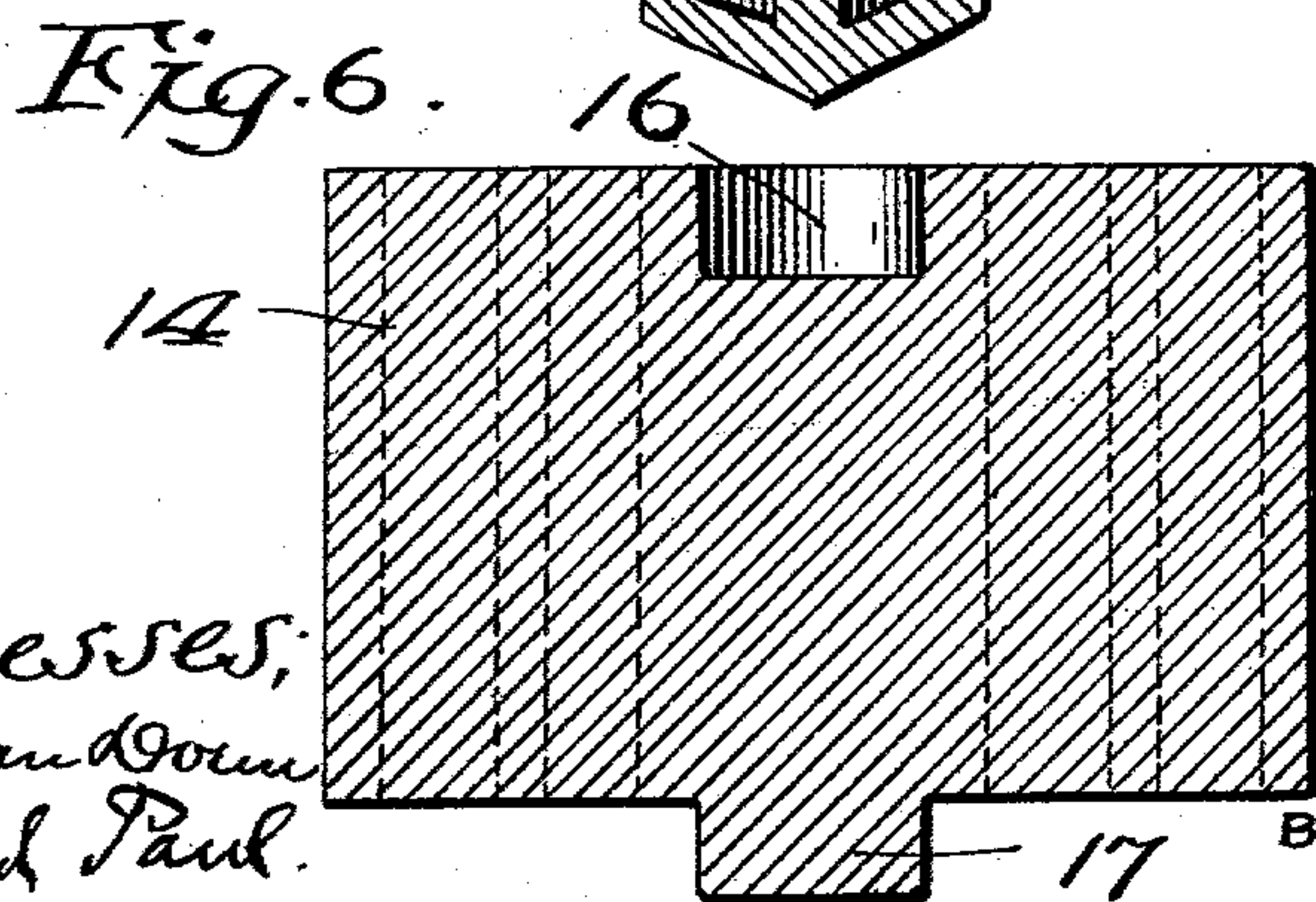
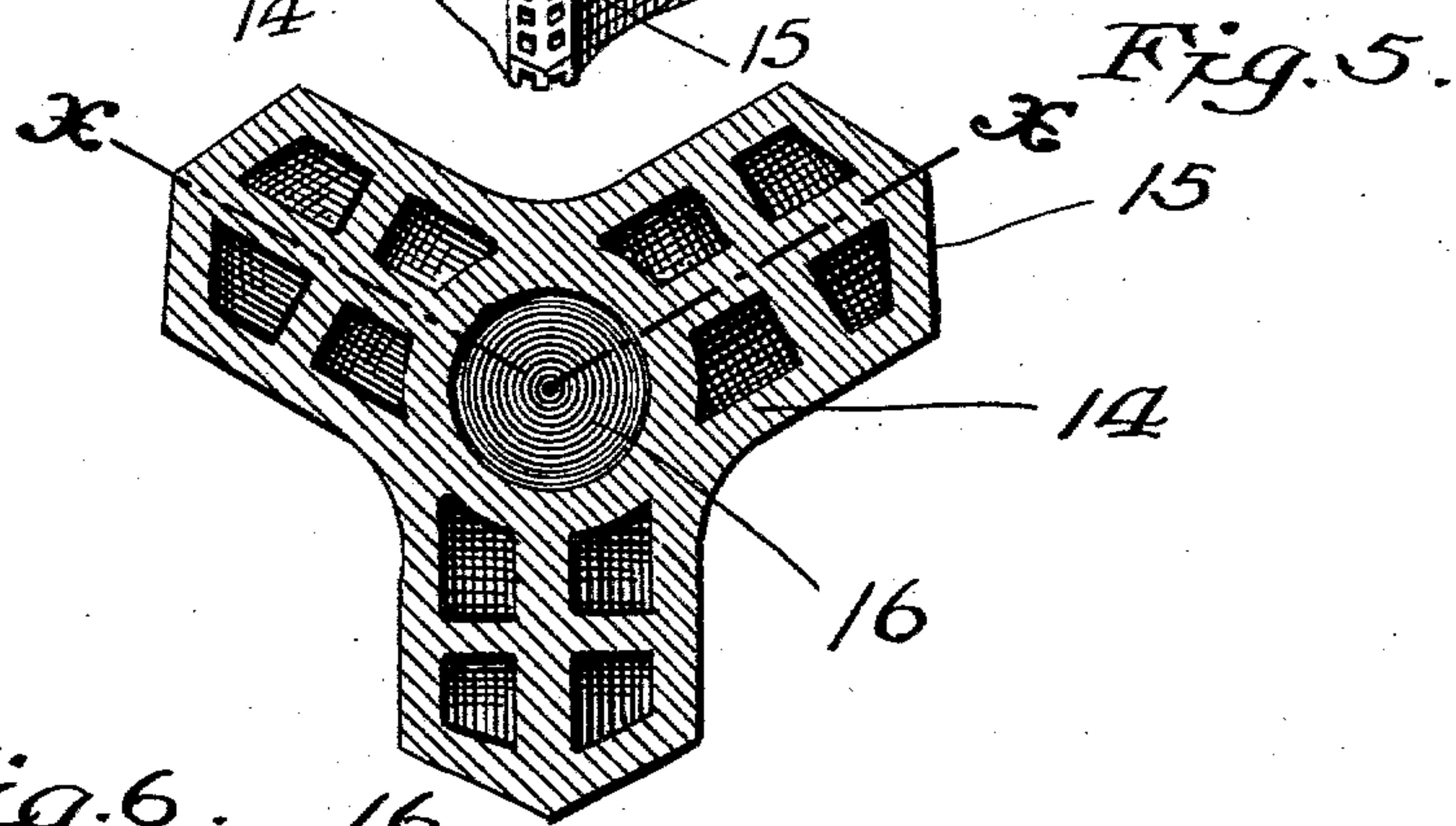
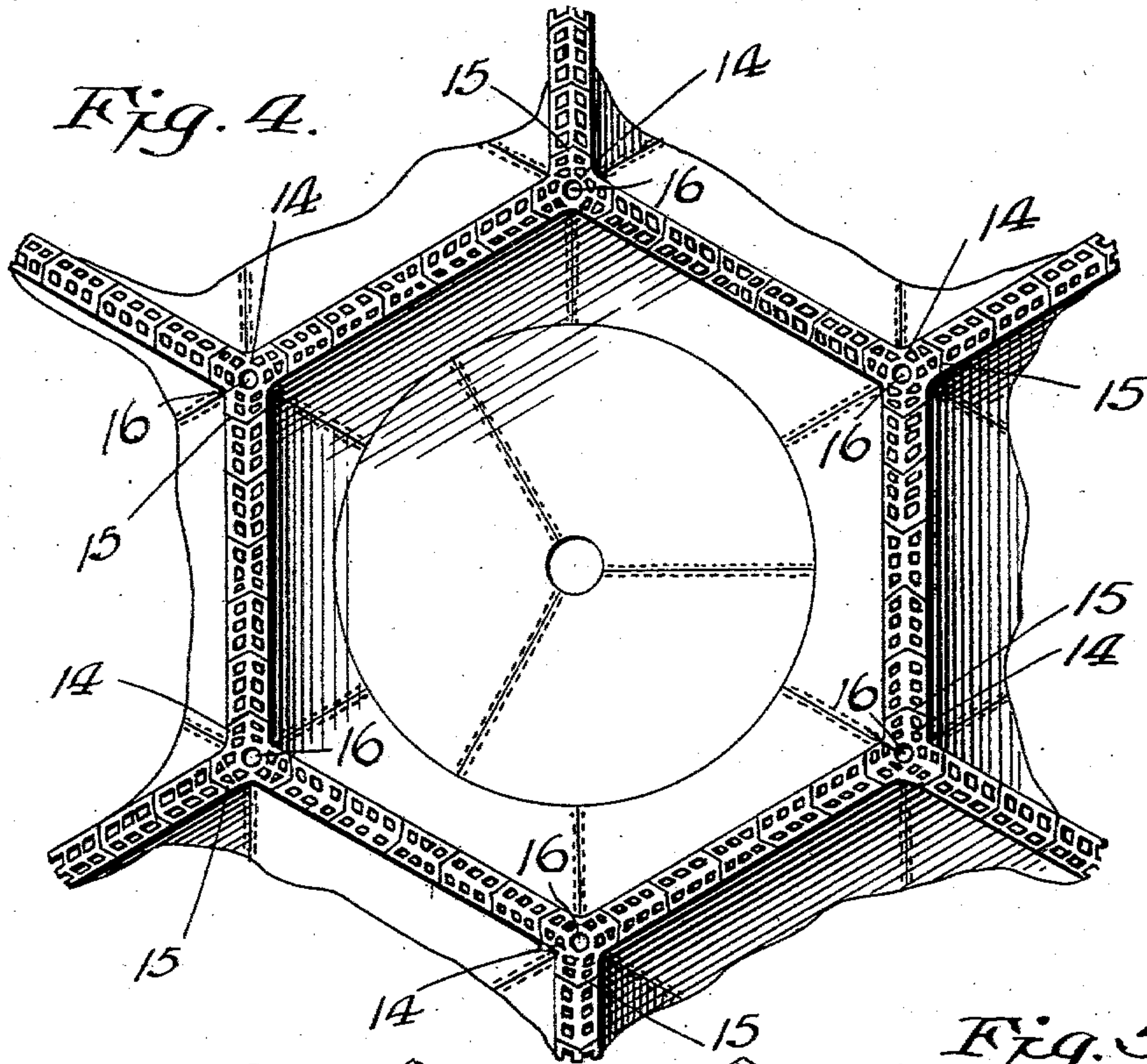
Patented Aug. 1, 1899.

S. F. EVANS.  
TILE ARCH CONSTRUCTION.

(Application filed May 2, 1898.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses;  
C. E. Vandoren  
Richard Paul.

Inventor;

Scott F. Evans.

By *Paul Hawley*  
his attorneys.



# UNITED STATES PATENT OFFICE.

SCOTT F. EVANS, OF MINNEAPOLIS, MINNESOTA.

## TILE-ARCH CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 629,896, dated August 1, 1899.

Application filed May 2, 1898. Serial No. 679,413. (No model.)

*To all whom it may concern:*

Be it known that I, SCOTT F. EVANS, of the city of Minneapolis, county of Hennepin, and State of Minnesota, have invented certain new and useful Improvements in Tile-Arch Construction, of which the following is a specification.

My invention relates to the construction of partition-walls, arches, or floors, the object being to provide an improved form of block or tile which when built into a wall will form a vertical or horizontal double arch, thus rendering the wall capable of resisting great lateral pressure, and therefore particularly adapted for use in the construction of grain-bins, where, owing to the fact that one bin may be filled with grain and the adjoining bin entirely empty, a very heavy lateral pressure is exerted upon the bin-walls, causing them to bulge out or be overthrown unless constructed in a very heavy and substantial manner.

A further object is to provide a very strong and durable construction for grain-elevator and other storage bins and also one that will be fireproof.

The invention consists generally in a wall composed of a single row of, preferably, tile blocks built to form a vertical or horizontal double arch, to the end that the lateral pressure upon either side of the wall caused by the weight of the grain will not produce a bulging or transverse strain upon the wall though one bin may be full and the adjoining bin entirely or partially empty.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a sectional view of a grain-bin embodying my invention. Fig. 2 is an enlarged vertical section of one of the bin-walls. Fig. 3 is a detail of the tile-blocks and strengthening-beams arranged at intervals in the walls. Fig. 4 is a horizontal section of a hexagonal bin, the blocks being laid to form horizontal instead of vertical double arches. Fig. 5 is a plan view of a block at the intersections of the walls. Fig. 6 is a vertical section on the line *xx* of Fig. 5.

In the drawings, 2 2 represent grain-bins, and 3 I-beams, horizontally arranged one upon another at intervals, preferably, of about six feet upon the four sides of the bins. These beams serve to bind the structure firmly together and aid in supporting the tile walls; but I do not confine myself to the use of I-beams in this construction, as various other forms of beams may be used with equally good results. Preferably near the middle of the wall the I-beams are provided with clamps 4, connected by tie-rods 5, extending across the corners of the bins, by means of which the beams in the adjoining walls may be held firmly in position. Between each pair of beams I provide a vertical double arch composed of a single row of blocks, preferably tile or other clay products, the haunches 6 of which bear upon the I-beams and have recesses 7 at one end to receive the flanges thereon. The lower haunch of the arch at its inner end is provided with a wedge-shaped surface 8 to enter a correspondingly-shaped recess 9 in the end of the adjoining voussoir, which in turn at its opposite end has a wedge-shaped surface to enter a V-shaped recess in the next voussoir, and so on until the middle of the arch is reached, where a keystone 11 is provided, having V-shaped recesses in its upper and lower ends to receive the wedge-shaped surfaces of the voussoirs immediately above and below. Above the keystone 11 the construction described is continued until the upper haunch of the arch is reached, which is secured to the I-beam in the manner heretofore described with reference to the lower haunch. The other arches forming the walls of the bin are constructed in a similar manner, there being preferably four voussoirs in each arch in addition to the keystone and haunches, but, if preferred, the beams may be arranged at greater intervals, thus increasing the length of the arches, or the I-beams may be placed closer together should it be desired to construct a bin in which the walls would be subjected to an unusual lateral strain. At the intersection of the walls I provide vertical rows of tiling 12, having preferably square ends and V-shaped recesses in their opposite sides to receive the wedge-shaped surfaces on the ends of the adjoining blocks 13 at the corners of the bins.



In Fig. 4 I have shown a slightly-modified construction, which consists in providing a hexagonal bin, through it may be polygonal in form, the double arches being formed of a single row of blocks, but arranged horizontally instead of vertically between the supporting-beams. At the intersection of the walls I provide triangular blocks 14, having wedge-faced surfaces 15 to interlock with the recessed ends of the blocks in the abutting walls. Near the center of the blocks, in their upper surfaces, are recesses 16 to receive projections 17 upon the under surface of the superimposed blocks when built into a column. A vertical column is thus formed, composed of interlocking blocks, which when joined with the ends of the abutting walls form an extremely rigid and substantial corner for the bin. Instead of tile I may use steel columns at the corners of the bins.

The advantages of this construction lie in the fact that by providing V-shaped recesses and wedge-shaped surfaces in the ends of the voussoirs a double vertical or horizontal arch is formed of a single row of blocks between each pair of supporting-beams, so that great lateral pressure may be exerted upon either side of the wall without bulging it out of perpendicular or overthrowing it entirely, as the resultant of the lateral pressure of the grain, owing to the peculiar shape of the blocks, is directed through the ends of the arch upon the vertical or horizontal supports of the wall rather than transversely to the plane thereof, and as it frequently happens that the wall of a grain-bin may be subjected to great pressure from one side only it is obviously very important to provide a partition-wall capable of resisting any strain to which it may be subjected from either side.

A further advantage arising from the use of this construction lies in the fact that a tile wall will absorb moisture which otherwise might damage the grain, and in addition will render the structure practically fireproof. I prefer to provide hollow blocks, which when built into a wall will form continuous horizontal or vertical passages between the bins, thus aiding in the ventilation and permitting the rapid escape of the moisture that is absorbed by the blocks.

The construction may be used not only in grain-elevators, but also in other storage-bins where flour, coal, &c., are stored in large quantities.

Obviously the construction may be modified considerably by any one skilled in the art, and I therefore do not confine myself to the specific details herein shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A wall composed of blocks of tile or other clay products, the end blocks having flat surfaces to rest against the supports of the wall, and having also opposite wedge-shaped surfaces to interlock with correspondingly-re-

cessed surfaces in the adjoining blocks, and a key-block having opposite recessed surfaces and forming, with the other blocks, a double arch to resist pressure upon either side of the wall.

2. A wall, composed of a single row of tile blocks or other clay products, said blocks having wedge-shaped and recessed surfaces adapted to interlock one with another, a middle keystone-block and all the blocks together forming a vertical or horizontal double arch to resist a bulging or lateral strain upon either side of the wall, substantially as described.

3. A storage-bin having walls composed of a single row of blocks having opposite recessed and wedge-shaped surfaces forming double arches and vertical columns at the intersections of the walls and adapted to interlock with the blocks at the ends of the abutting walls, substantially as described.

4. A storage-bin having walls composed of a single row of blocks, having opposite recessed and wedge-faced surfaces forming double arches, and vertical columns at the intersections of the walls, said columns being composed of triangular blocks, having wedge-faced surfaces to interlock with the blocks in the abutting walls, and each block having a recess in its surface to receive a projection on the surface of the superimposed block, substantially as described.

5. A wall for grain or other storage bins, comprising a series of beams arranged at intervals one above another, a single row of interlocking tile arranged between the pairs of beams and forming a double arch, whereby the transverse or bulging strain upon the wall arising from lateral pressure is diverted and expended through the ends of said arch upon the vertical or horizontal supports of the wall, substantially as described.

6. A wall, for grain or other storage bins, comprising a series of beams arranged at intervals one above another, and a double arch between each pair of beams, said arch comprising a single vertical row of tiling, the tiles forming the haunches of the arch bearing upon the beams at one end and having wedge-shaped surfaces at their opposite ends to enter V-shaped recesses in the abutting voussoirs, and a keystone having V-shaped recesses in its opposite ends and arranged midway between the pairs of beams.

7. A tile-arch construction for storage-bins, comprising a series of I-beams horizontally arranged at intervals one above another, tie-rods connecting said I-beams, and a single vertical row of tiles between each pair of beams, and having wedge-shaped and recessed surfaces adapted to interlock whereby a vertical or horizontal double arch is formed to resist the lateral or transverse pressure from either side.

8. A wall for grain or other storage bins, comprising a series of beams arranged at intervals one above another, a single row of tiling arranged between the pairs of beams,



the faces of the tiles forming the surfaces of the wall being in substantially parallel planes, the tiles between the pairs of beams being interlocked with one another to form a double arch to resist the bulging or lateral strain upon the wall from either side, substantially as described.

9. A wall for grain or other storage bins, comprising a series of beams horizontally or vertically arranged at intervals, blocks of tile or other clay products arranged between the pairs of beams, said blocks having alternate convex and concave surfaces to permit the surface of one block to be interlocked with the surface of the abutting block, and a middle keystone-block forming with the other blocks a horizontal or vertical double arch between each pair of beams to resist a bulging or lateral pressure from either side of the wall, substantially as described.

10. A storage-bin having walls composed of interlocking blocks forming vertical or hori-

zontal double arches to resist a bulging or lateral strain upon either side of the wall, and vertical columns interlocking with the abutting blocks at the intersections of said walls, substantially as described.

11. A storage-bin, having walls composed of interlocking blocks forming horizontal or vertical double arches to resist a lateral or bulging pressure upon either side of the walls, and vertical columns at the intersections of said walls, said columns being composed of blocks having surfaces to interlock with the adjoining blocks in the abutting walls, substantially as described.

In testimony whereof I have hereunto set my hand, this 22d day of April, 1898, at Minneapolis, Minnesota.

SCOTT F. EVANS.

In presence of—

ELENA F. DARLING,  
RICHARD PAUL.