

(No Model.)

2 Sheets—Sheet 1.

T. A. LEE.  
FIREPROOF PARTITION.

No. 501,622.

Patented July 18, 1893.

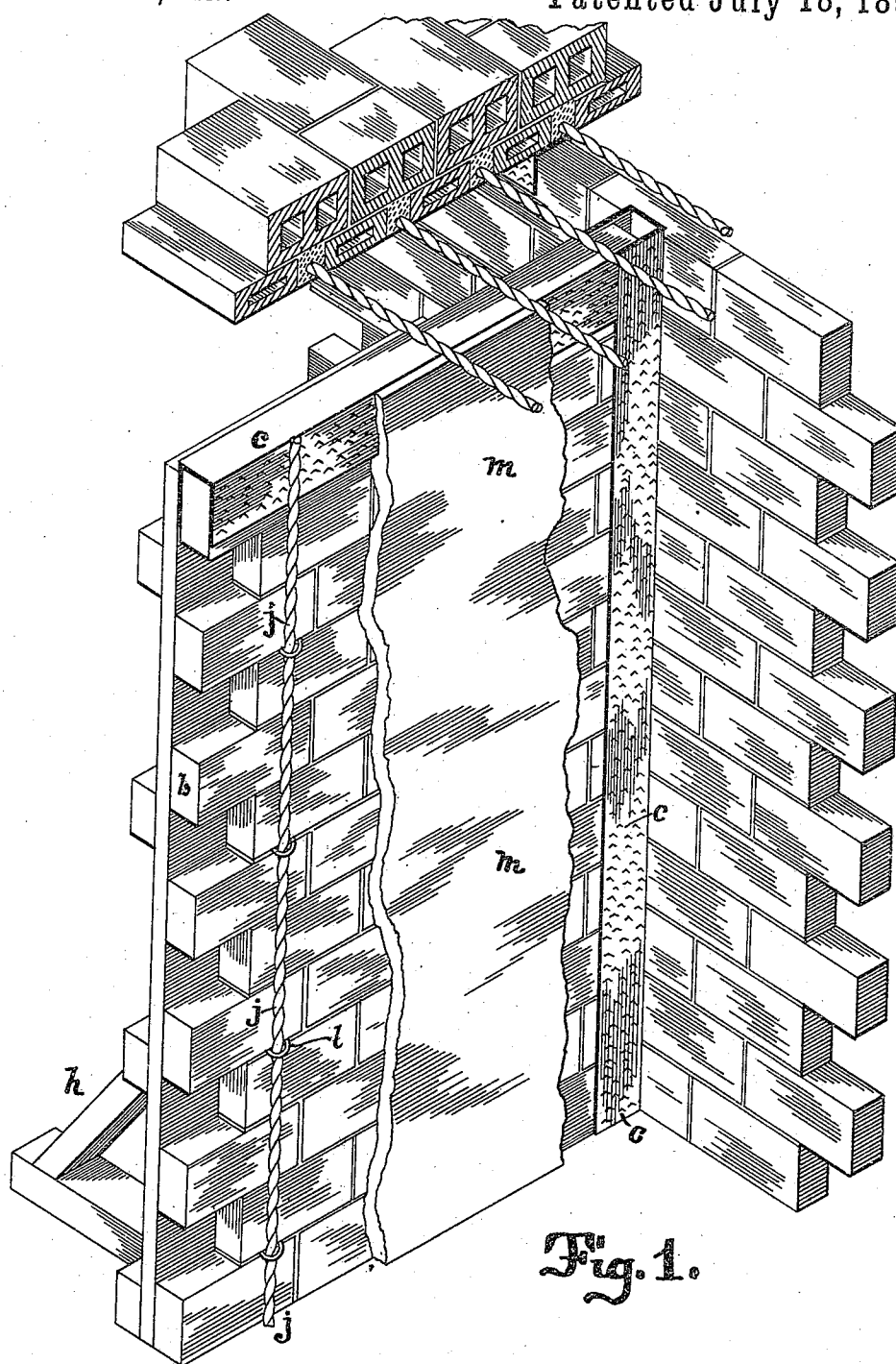


Fig. 1.

Witnesses.

Lewis Searing  
Frank E. Shepard

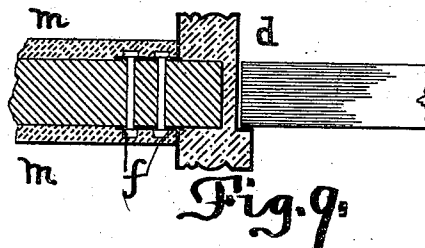
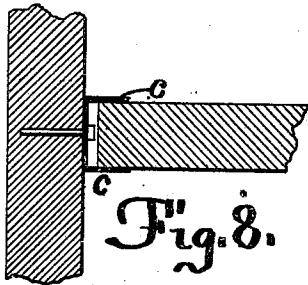
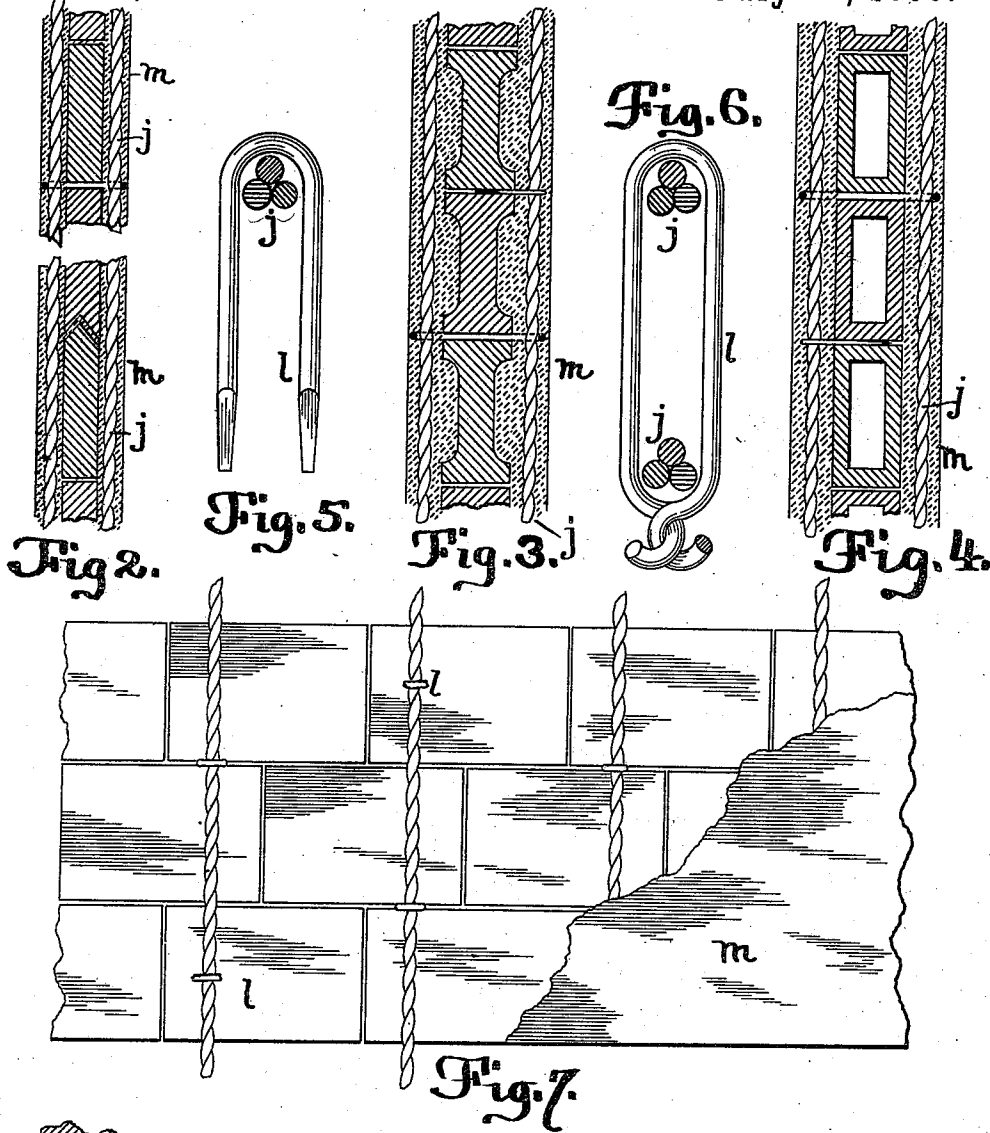
Inventor.

Thomas A. Lee  
by Gilbert M. Plympton  
Att'y

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# UNITED STATES PATENT OFFICE.

THOMAS A. LEE, OF KANSAS CITY, MISSOURI.

## FIREPROOF PARTITION.

SPECIFICATION forming part of Letters Patent No. 501,622, dated July 18, 1893.

Application filed April 26, 1892. Serial No. 430,758. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. LEE, of Kansas City, Missouri, have invented certain new and useful Improvements in the Construction of Fireproof Partitions, of which the following is a description, reference being taken to the accompanying drawings, which form part of this specification.

My invention relates to the construction of interior walls and partitions, for dividing rooms, closets, and the like; and is particularly adapted to fire proof buildings.

The purpose of the invention is to give strength and stiffness to the wall and to the blocks which form it; and thereby to produce a simpler and more durable construction with a substantial saving of care, skilled labor, and space necessary for its formation, and consequent increased economy.

To these ends my invention consists of and is embodied in the partitioned construction and its several features, constructed, arranged, combined, and used, substantially as hereinafter described, illustrated, and claimed.

It has heretofore been customary in fire proof buildings to erect partitions and interior walls of hollow material, usually hollow burnt clay tiles about four inches in thickness, though often three or five inches in thickness, plastered on both sides. The thickness of a four inch tile partition is therefore when finished nearly six inches. Such thickness is found necessary with such formation to give the requisite transverse strength. The tiles are laid up in suitable mortar, breaking joints. When the mortar has somewhat hardened, the walls become stiff enough to receive the plastering upon the sides. Great care and nicety in laying the tiles, in order that the wall may be plumb, true, and straight, is necessary, and skilled mechanics with lines and plumb rules must be employed. Even then much trouble is often experienced in obtaining perfect work. Where doors, windows, and other openings in the walls, occur, it has been customary to erect wooden studs or forms with longitudinal strips of wood up and down the backs thereof. Around these strips and against the studs or forms, the hollow tiles are laid and anchored with suitable hooks or clasps. Where a partition is to join the exterior walls, strips of wood are attached

to the wall and the tiles secured thereto. After the plastering has been finished, the studs serve as the attachment for, and are enveloped by the finished moldings of wood into which the doors and windows are fitted. With such construction the jars from the slamming of doors and other causes often loosen the studs from the tiling and the consequent movement between the two causes cracks in the plastering and between the tiles. This is because it is practically impossible to make a durable junction or union between the wood studs, the tiles, and the plastering. Moreover, the necessary thickness of such partitions causes considerable loss in space, a factor which in building upon expensive ground materially increases the expense of a given area of free floor surface. In my improved construction, I reduce the thickness of the partition walls about two thirds and entirely do away with wooden studs, strips, and moldings.

A wall constructed under my improvements possesses the following distinctive features: First, I use plates or blocks for the interior of the wall preferably of the ordinary porous fire proof clay tiling about an inch thick by ten inches wide by sixteen inches long and without hollows. Blocks or tiles of other dimension and construction may of course be used. Some modifications in tiling are shown in the drawings and will be hereinafter described. Secondly, I use channel plates of sheet iron or steel attached to the adjoining walls and ceilings to receive and firmly hold the ends of the tiles that form the body of the partition wall. The thickness of these channel plates may be about one sixteenth of an inch and the flanges of the channel, which extend back over the wall blocks for about three inches are perforated or roughened to more securely hold the plastering. Thirdly, where door and window openings occur I place metal frames provided with channels similar to those just described. The surfaces of these frames where they project outside of the plastering are given the form of ornamental moldings and may be painted and finished in the usual manner like vault door frames and similar metal surfaces. The sides of the channels upon such frames may be pinned together occasionally through the til-

ing to more securely hold the latter in place. As greater strength is required in these frames than in the wall channels, they are preferably made of one eighth of an inch steel. Where hinges are to be attached they should be suitably reinforced and provided with means for such attachment. Fourthly, I use tension rods of rough surface laid in the plastering on each side of the wall and held in position to the tiles by staples or binders of small wire. Fifthly, I preferably use plaster of paris or quick setting cement for laying the wall blocks or tiling. Sixthly, for the scratch coat of plastering, I use some mortar composition that becomes thoroughly hard when set and dry, such as acme cement plaster, adamant plaster, silicon wall plaster, or lime mortar tempered with cement, or plaster of paris, or other composition that hardens to a high degree. With such a construction great saving of space is effected and the tension rods at each side of the wall, in conjunction with the strong plastering and tiles to which they are firmly bound, give ample tensile and compressive strength to resist lateral stresses and shocks.

In the drawings, Figure 1 is a view of a section of partition wall at its junction with another wall or partition. Fig. 2 is a section of a thin partition. Fig. 3 is a similar cross section showing flanged tiles for better plastering surface. Fig. 4 is a cross section showing the use of hollow tiling for walls of greater strength and thickness. Figs. 5 and 6 illustrate respectively my staples and binding links for securing the tension rods. Fig. 7 is a side view of a piece of wall with the plastering torn away to show my tension rods. Fig. 8 is a horizontal cross section of a junction between the wall and partition or between two partitions. Fig. 9 is a similar section of wall and door frame.

Like letters of reference in the several views indicate like parts.

In executing a piece of work under my improvements I begin, after the exterior walls, floors, and ceilings, are in place by setting in position the channels *c*, Figs. 1 and 8, against the inside of the exterior walls and ceiling and firmly attach them with spikes or screws. I then carefully place in position the door or other frames as required, care being taken to get them in proper line with the channel flanges upon the walls and ceiling. In Fig. 9 is shown a cross section of one of these frames *d*. This is preferably of one eighth inch steel plate, conforming to the ornamental moldings required, hollow, and provided with flanges *e* as shown, for embracing the tiling, to which they may be secured at suitable intervals by pins or bolts *f*. These frames are provided at the necessary points with hangers or means for attaching doors, sliding sashes, and the like. After being set in position the frames are temporarily braced in the usual way. I then set up in position a vertical form of scaffolding

as indicated at *h* in Fig. 1, the face of which is brought flush with the surface of one of the flanges of the channels upon the walls, ceilings, and door frames. This temporary form of scaffolding may be of any desired construction which is sufficiently firm, and it serves in conjunction with the channels the double function of a guide by which to lay the tiling and a support while the cement between the tiling is hardening.

In laying the blocks or tiles in position, I begin at the floor in one of the channels attached to the exterior walls. I place mortar upon the bottom edge and one end of a block and shove it into the channel. The one broad side of the block rests against the scaffolding and insures the proper position of the block. Another block is then spread with mortar on bottom and end and placed against the projecting end of the first block, the scaffolding forming a guide and rest for the side of the block. Other blocks are set in like manner till a point near the door frame is reached. A block is then spread with mortar upon end and bottom and shoved into the channel in the door frame, as far as it can go, mortar being thrown in around the end of the block to fill up the space within the frame and secure the block firmly in position. Other blocks are then set to complete the course, care being taken to place any odd sizes of blocks needed to fill in the course well away from the door frame. The course is then continued on the other side of the door frame in like manner into the channel attached to the opposite wall. Successive courses are then laid up breaking joints in the usual manner, the top course being shoved up into the channel attached to the ceiling. After the blocks are all laid in and the interior of the partition wall completed, tension rods *j* are placed upon the exposed side of the wall, running from floor to ceiling and about a foot apart. These tension rods are preferably of several steel wires twisted together to give cement engaging surface and are secured to the wall by means of staples or binding wires *l*, as shown in Fig. 7, the attaching devices being shown in detail in Figs. 5 and 6. When porous clay tile blocks are used I may drive the staples directly into the face of the block; but when dense clay blocks or other hard materials are used, I employ the small wire binders which extend through the mortar joints and are hooked down on the other side around other tension rods upon such side after the plastering upon the first side has been hardened and the scaffolding removed. When the tension rods are all secured in position upon the first or face side of the wall, the tiles are thoroughly wetted that the plastering may become more securely cemented to the tiles, and the scratch coating of plastering laid on, completely enveloping the tension rods and presenting a plane rough surface for the finishing or putty coat of plastering. The tension

rods, having a rough cement engaging surface, are securely held in the plastering and when the plastering has hardened the wall becomes stiff and rigid. Temporary braces of ordinary construction are then placed against the plastered side of the wall, to insure its stiffness while the opposite side is being plastered, and the scaffolding taken away. Tension rods are then placed upon the exposed tiling, against which the scaffolding was placed, and secured in position by staples or by the wire binders above referred to. The plastering is then spread upon this side of the wall and after it has hardened all braces and forms are removed. The wall is then ready for its finishing coat of plaster. The scratch coat of plaster covers the flanges upon the channels and readily adheres thereto on account of the perforations or roughened surfaces with which they are provided. At the door or window openings it extends to the shoulder where the ornamental molding begins, as shown in Fig. 9, the plastering being indicated at *m*.

Figs. 2, 3 and 4 show modifications of tilings used in my wall construction, the walls being finished ready to receive the putty coat of plaster. In the upper part of Fig. 2 are shown tiles of solid rectangular form; in the lower part, the tiles are shown provided with V-shaped upper and lower edges, which I find somewhat better than the rectangular form and of extremely simple construction. In Fig. 3 the tiles are shown provided with flanges upon their edges to better engage the plastering. This necessitates a slightly thicker construction of wall. Fig. 4 shows hollow tiling adapted for walls of considerable strength and greater thickness.

In setting wall blocks or tile work under my improvements skilled mechanics are not necessary as the temporary vertical forms serve as a guide. The mortar required upon the edge and end of the tile being of small quantity and preferably of a composition that hardens quickly, such as plaster of paris is readily applied by dipping the tiles into it, and therefore any building laborer of average intelligence can rapidly set the tiles without fear of error. After the tiling and tension rods are in place the plastering can be spread in the usual manner. In this way I reduce the expense of labor to a minimum, and the tension rods preferably of comparatively small wire, do not materially add to the expense of material. Indeed by their use much less tiling is required and a saving of cost of this material thereby accomplished. I prefer to use porous terra cotta tiles, but I do not confine myself to this material, for tiles of clay, or plates or blocks of other materials such as paper, straw, fibrous brick, plaster board, plaster of paris and others, may be used.

The tiles may be made with presses and dies in the well known manner and are pref-

erably scored, scratched, fluted, or grooved, in the process of manufacture, that the plastering may more readily cling to their surfaces.

When pressure is brought against one side of my wall the tension rods on that side materially add to the compressive strength of the plastering, while those upon the other side, firmly embedded within the plastering, give the necessary tensile strength required to resist the pressure. The principles involved are similar to those of a beam, the materials upon one side being put in compression, and on the other in tension, when the beam is loaded. The plastering about the tension rods, by preventing the rods from buckling, materially increases their compressive strength, so that the layer of plastering in conjunction with the rods, which form part of it, gives far greater compressive strength than could possibly be obtained by mere plastering or cement.

It must not be understood that the staples or wire binders perform any important function in the finished wall. They are only intended to hold the rods in place during the process of construction. After the plaster has hardened, that, and not the staples, forms the bond which rigidly secures the rods to the face of the wall.

I have now set forth my invention as embodied in several forms, and I therefore claim and desire to secure by these Letters Patent the following:

1. A partition or other wall having an interior of tiling and layers of mortar or other cement with tension rods embedded therein for reinforcing the said mortar or cement, whereby the cement and tension rods form tension and compression members of the structure separated but rigidly united by the said tiling, substantially as, and for the purposes, set forth.

2. A partition or other wall having an interior of tiling with tension rods laid upon each face thereof and secured thereto, substantially as, and for the purposes, set forth.

3. A partition or like wall of tiling provided with channels secured to the ceiling and adjacent walls and embracing the said tiling, and rods secured to the said tiling upon each face of the said wall, substantially as, and for the purposes, set forth.

4. A partition or like wall of tiling, a coat of plastering upon each face thereof, tension rods embedded in the said plastering, and channels at the junction of the said wall with ceiling, adjacent walls, or doors and other frames, embracing the said tiling and embedded in the said plastering, substantially as, and for the purposes, set forth.

5. A partition or other wall consisting of an interior portion of tiling and coats of mortar or other cement laid upon each face thereof, and channels secured to the adjacent walls or ceiling and embracing the said interior por-

tion and covered by the said mortar or cement, whereby the interior portion may be supported in the process of formation by the said channels and whereby the said coats of mortar  
5 or cement form tension and compression members of the structure separated but rigidly united by a web of tiling, and secured to the adjacent wall or ceiling by the said channels,

substantially as, and for the purposes, set forth. 10

In testimony whereof I have hereunto set my hand this 11th day of April, 1892.

THOMAS A. LEE.

Witnesses:

CHAS. M. BEAM,  
HAROLD B. MANN.