Jan. 15, 1957 C. B. MONK ET AL 2,777,184

DEVICE FOR MAKING STRUCTURAL CLAY TILE PANELS

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Fig. 1

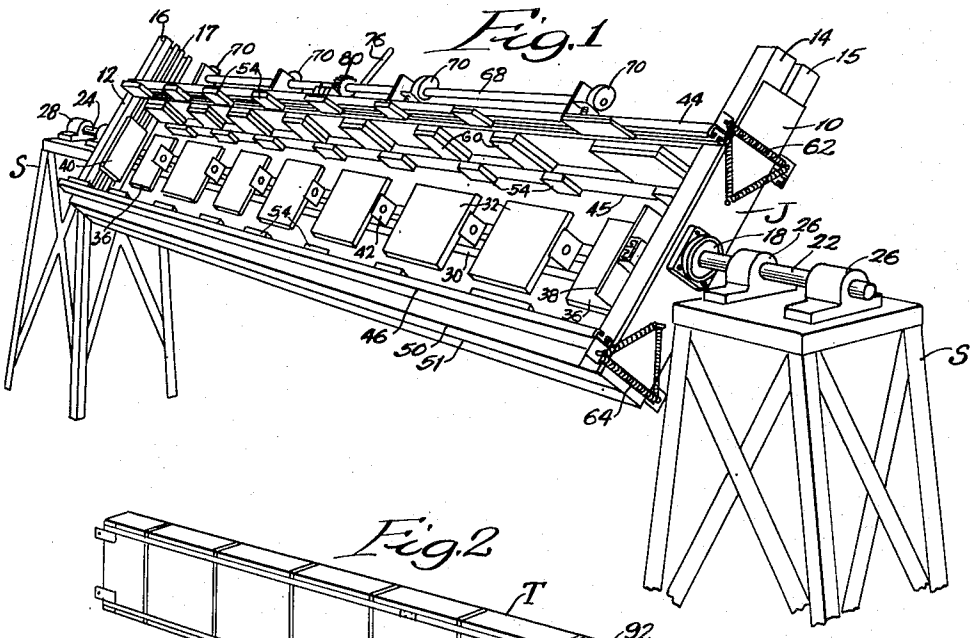


Fig. 2

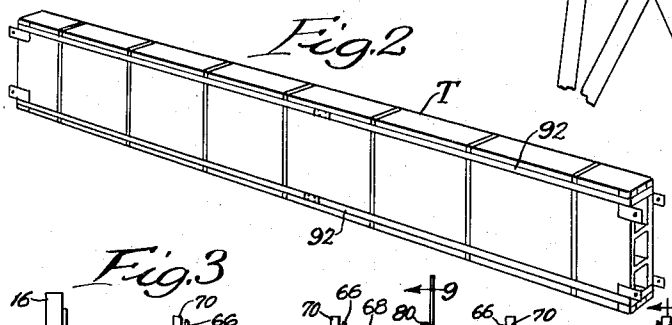


Fig. 3

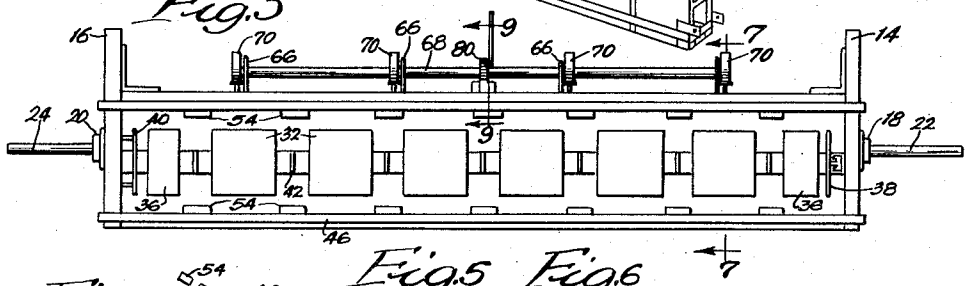


Fig. 4

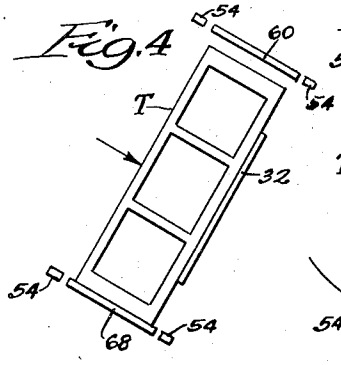


Fig. 5

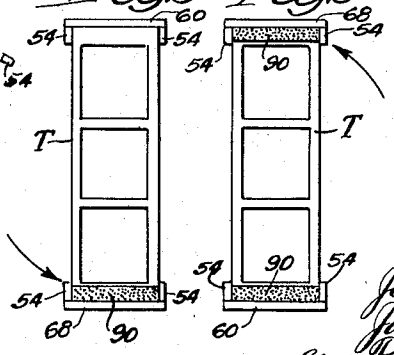


Fig. 6

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Fig. 7

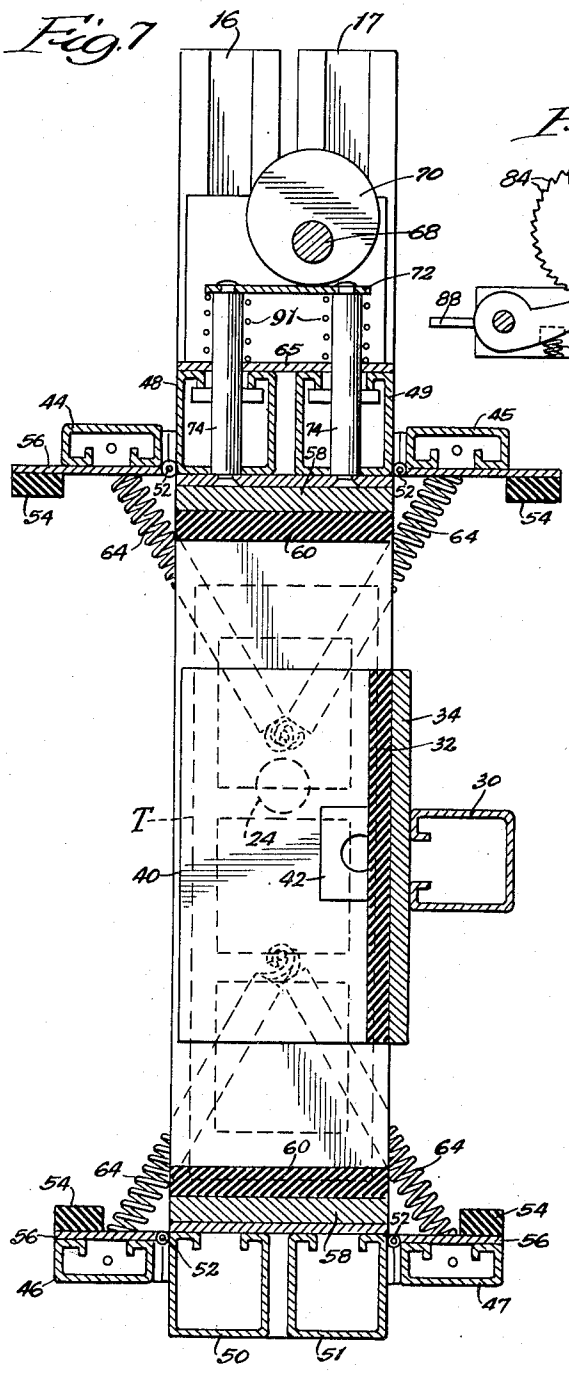


Fig. 9

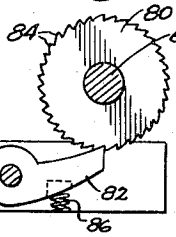
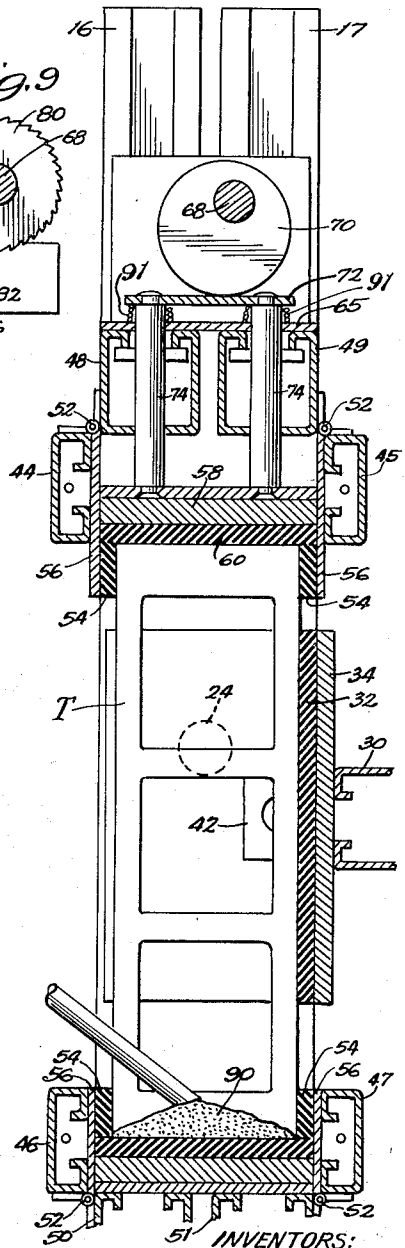


Fig. 8



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DEVICE FOR MAKING STRUCTURAL CLAY TILE PANELS

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Application November 8, 1952, Serial No. 319,486

1 Claim. (Cl. 25—1)

This invention relates to a device to be used in the manufacture of tile panels. More particularly it relates to a device to be used in the manufacture of structural clay tile panels of the type described in the copending application, Serial No. 234,225, which is owned in common with the subject application.

The many advantages of a structural clay tile panel have been described in great detail in the aforementioned copending application. A few of the primary advantages are: such a panel will again enable the structural clay products industry to regain a portion of the interior partition wall market which it has lost and to compete with substitute products which are generally less expensive because of their size advantage and can, therefore, be placed into walls relatively faster and cheaper; such a tile panel greatly reduces the over-all costs of a wall as well as the time required to construct a wall without sacrificing any of the desired characteristics inherent in structural clay products; such tile panels can be banded together to obtain the beneficial characteristics inherent in pre-stressing.

This invention contemplates a device for making the structural clay tile panels upon a commercial basis. To that end, it consists primarily of a jig and framing which is so constructed that it can support, retain and align a plurality of individual tile units in a common plane. While the tile units are so supported and aligned, novel means have been provided to retain the quick acting cement which is introduced between the ends of the tile units. The assembly of the tile units may also be pre-stressed while it is in the device contemplated by our invention. The method of assembling such a structural clay tile panel has been more fully described in the above-mentioned copending application.

It is, therefore, a general object of this invention to provide a device to manufacture structural clay tile panels upon a commercial basis.

Another object of this invention is the provision of a device to manufacture structural clay tile panels composed of relatively simple structural components designed to operate with a minimum of effort and technique, to obviate the use of highly skilled workers and elaborate and expensive equipment.

Another object of this invention is to provide a device which is so constructed that it can receive a number of clay tile units in a common plane.

Still another object of this invention is the provision of framework to retain and align the tile units.

Yet another object of this invention is the provision of novel means to retain fast setting cement which is introduced between the ends of the tile units.

Still another object of this invention is to provide tensioning means to permit the device to be rotated while the tile units are in the jig.

Yet another object of this invention is to provide stop means to facilitate placement of the tile units into the jig.

Other objects and various features of this invention

will hereinafter be pointed out or will become apparent to those skilled in the art and can be best understood with reference to the following description taken in conjunction with the accompanying drawings showing a preferred form of our invention, wherein:

Figure 1 is a perspective view of our new device to make structural clay tile panels.

Figure 2 is a perspective view of a panel contemplated manufactured by the use of our new device.

Figure 3 is a top plan view of our new device for making structural clay tile panels.

Figure 4 is a schematic end view showing a tile unit in position after it has been placed in our new device.

Figure 5 is a schematic end view showing a tile unit after rapid setting cement has been introduced adjacent a portion of one end of a tile unit.

Figure 6 is a schematic end view showing a tile unit after rapid setting cement has been introduced adjacent a portion of the other end of the unit (of Figure 5) after it has been rotated 180° on its axis.

Figure 7 is a cross-sectional view taken on line 7—7 of Figure 3 showing a tile unit in the jig with the clamping bars open.

Figure 8 is a cross-sectional view taken on line 7—7 of Figure 3 showing a tile unit in the jig with the clamping bars in a closed position.

Figure 9 is a cross-sectional view taken on line 9—9 of Figure 3 showing the escapement mechanism of the tensioning means.

Referring to the drawings, the device for manufacturing structural clay tile panels is best shown in Figure 1 of the drawings. It consists primarily of a jig J and a support S for the jig which support can be of any desired form or material so long as it has sufficient strength to carry the jig J when it is fully loaded with tile units T. The support S must also be high enough so as to permit rotation of the jig.

The jig J is comprised of two terminal plates 10 and 12 which are firmly secured to channel bars 14 and 15 and 16 and 17 by any method well known in the art. Bearing supports 18 and 20 are secured in the center of the terminal plates 10 and 12 and receive shafts 22 and 24. The shafts in turn are supported by one or more journal bearings 26 and 28 secured to the support S. Thus the jig J is rotatably supported upon the shafts 22 and 24.

Secured to the channel bars 15 and 17 midway between their ends but slightly off-center is the main carrying frame 30 which can be made of any rigid material such as metal or wood. Mounted in predetermined spaces upon said frame 30 are a plurality of flexible tile supports 32 preferably made of rubber. The tile supports 32 are usually backed by plate 34 (see Figure 7) to give the supports 32 rigidity. The tile supports 32 are somewhat smaller than the size of standard tile, the purpose for which will be explained and become clear hereinafter. It is to be noted that the supports 36 at either end of the frame 30 are half the size of the supports 32. The reason for this is that we prefer to place one-half a tile at each end. By cutting a tile unit in half with a masonry cutter, we are insured of a flat and smooth surface on both ends of the tile panel when the cut surfaces are faced out.

We have shown the main carrying frame 30 in the form of a channel bar because we have found that parts may be more readily moved thereon to accommodate variation in sizes of the tile which may occur from time to time. Obviously, we do not mean to have our invention limited to a main carrying frame 30 made from channel bars, nor do we mean to have our invention limited to channel bars 14, 15, 16 and 17 to which the terminal plates 10 and 12 of the jig are attached. Similarly, a full

sized tile support 32 may be used in lieu of the two one-half sized tile supports 36.

At each end of the main carrying frame 30 are plates 38 and 40 to act as tile stops and to insure perpendicularity of the terminal tile units while the panel is being constructed. Of course, these tile stops can be made adjustable to insure that the determined length of the panels are constant and to assist in discharging the completely formed panel from the jig.

Stops 42, such as small plates, may also be attached to the main carrying frame 30 between each of the tile supports 32. These stops 42 serve the dual purpose of helping to positioned the tile units upon the frame 30 and in acting as a spacer element between the ends of the tile units so that quick setting cement may be introduced therebetween as will be explained hereinafter.

Two pairs of oppositely disposed clamping bars 44, 45, 46 and 47 are movably secured at their terminal ends to the channel bars 14, 15, 16 and 17 respectively.

The clamping bars 44, 45, 46 and 47 are connected to the side frames 48, 49, 50 and 51 respectively by hinges 52 (see Figure 7). Attached to each of the clamping bars 44, 45, 46 and 47 are a plurality of flexible pads 54 such as sponge rubber. To give the pads rigidity, we prefer to adhere them to a rigid material 56, such as wood or metal. These pads are spaced intermittently upon the clamping bars 44, 45, 46 and 47 so that they are positioned between the tile supports 32, as best shown in Figure 3 of the drawings.

A plurality of rigid plates 58, such as wood or metal, are mounted on the carrying frame 30 adjacent the frames 48, 49, 50 and 51 to give rigidity to the flexible pads 60 which are adhered thereto. The plates 58 adjacent the frames 48 and 49 are movable relative to said frames 48 and 49. The pads 60 are intermittently spaced so that they are positioned between the tile supports 32 and are contiguous with the pads 54 when the clamping bars 44, 45, 46 and 47 are in closed position and form a resilient U upon which the ends of the tile units rest, as will be explained hereinafter.

The clamping bars 44, 45, 46 and 47 are actuated by triangulated springs 62 and 64, which are attached to one end of each of the clamping bars 44, 45, 46 and 47 and to the terminal plate 10 of the jig as best shown in Figure 1. Figure 7 shows how the forces of springs 62 and 64 hold the clamping bars 44, 45, 46 and 47 in an open position. When the clamping bars are in a closed position, as shown in Figure 8, the springs operate to keep these bars in a closed position because the resultant forces of the springs were changed when the bars were shifted 90°.

Our device also contemplates placing the tile units under slight compression so that the jig can be rotated during the manufacture of the structural clay tile units. The tensioning means employs the familiar principle of a cam.

A common plate 65 is directly mounted atop and to the frames 48 and 49 to which a number of clamps 66 are secured. The clamps 66 are constructed to receive a shaft 68 which carries a plurality of cams 70 preferably adjacent the clamps 66, which ride upon bearing plates 72 to which studs 74 are attached. The studs 74 in turn pass through the plate 65, side frames 48 and 49 and terminate in the rigid plate 58 to which the pads 60 are secured.

The tensioning means is actuated by a lever 76 attached to the shaft 68. When the lever 76 is pulled forward, it rotates the shaft 68 which in turn rotates the cams 70 to depress the bearing plate 72 to force the studs 74 down until the pad 60 compresses the tile units. When the shaft 68 is rotated a ratchet wheel 80, which is also mounted upon the shaft 68, is also being rotated and is engaged by a pawl 82 which is urged into contact with the teeth 84 on the periphery of the ratchet wheel 80 by means of a spring 86.

After the tensioning means has performed its desired service, the tension can be released by merely using a handle 88 attached to the pawl 82 to disengage the pawl 82 from the teeth 84 of the ratchet wheel 80 and the springs 91 between the bearing plate 72 and the plate 65 urges the bearing plate 72 outward to withdraw the pads 60 from contact with the tile units.

Mode of operation

The jig J is preferably rotated to an angle as shown in Figures 1 and 4, in order to facilitate loading the individual tile units on the jig and to make it less fatiguing on the worker. Of course, the jig J may be placed in any other position without affecting the scope of our invention.

When the jig is in the desired position, the clamping bars 44, 45, 46 and 47 are placed in an open position, as shown in Figures 4 and 7 of the drawings, to permit adequate room for the tile supports 32 to properly receive the individual tile units. The tensioning means is also in an open position. The flat sides of the individual tile units are then placed upon the tile supports 32 in such a manner so that the ends of the tile units extend beyond the edge of the supporting pads and to the stops 42. The tile units at the same time will be supported on their narrow sides by the pads 60 mounted on the frames 50 and 51. Thus, the ends of the tile units will rest approximately in the center of the pads 60.

When all of the tile units have been placed upon and into the jig the tensioning means mounted on the frames 48 and 49 is then compressed so that the tile units are held quite rigidly by the pads 60 mounted upon the frames 48, 49, 50 and 51, and then the bars 44, 45, 46 and 47 are placed in a closed position (see Figures 8 and 5). The pads 54 mounted upon the bars 44, 45, 46 and 47 serve to align the individual tile units when they are in the closed position.

After the tile units have thus been placed under compression and properly aligned, a rapid setting cement 90 is then introduced by any convenient means between the ends of the tile units by merely squirting the rapid setting cement between the ends of the tile units and upon and between the pads 60 and the pads 54 since these pads form a tight joint form when the bars 44, 45, 46 and 47 are in the closed position. To obtain the best results, it has been found that before introducing the rapid setting cement between the tile units, the jig J should be rotated to a vertical position as shown in Figure 5. After a short time, depending upon the setting time of the cement, the jig is rotated 180° (see Figure 6) and the rapid setting cement is then similarly introduced between the opposite ends of the tile units.

While the panel is in the jig, the tile units may be placed under stress by externally banding the tile units with steel bands 92, as shown in the complete structural clay panel in Figure 2, to form a pre-stressed panel. The panels can then be removed by merely returning the clamping bars 44, 45, 46 and 47 to the open position and releasing the tension placed upon the frames 48 and 49.

Although a new structural clay panel possessing many advantages not heretofore obtainable with structural clay products has been created (described in the aforementioned application), nonetheless, much of its value is lost if it is not a competitive item price-wise. Therefore, a prime consideration is to provide equipment to make the panels whch is relatively inexpensive and yet capable of mass production. It is obvious, that our device comprises relatively simple structural components which have been designed to give the greatest service with the least amount of effort and equipment. The novel combination of these components results, for the first time, in a device which can make structural clay partition panels

at a relatively low cost, by efficient means and without requiring complicated and expensive machinery.

The operation of our device in a commercial plant, can, of course, be accomplished by a battery of the devices comprising our invention. The techniques of mass production are also available with our devices and it is contemplated that when such techniques have been further developed that it is possible that much of the movable operation of our units will be accomplished either hydraulically or electrically while still following the teaching of our invention.

While we have shown and described a specific embodiment of our invention it will, of course, be understood that we do not wish to be limited thereto and that by the appended claim we intend to cover all modifications and alternative constructions as fall within the true spirit and scope of our invention.

We claim:

A jig for making tile panels comprising, in combination, a main frame, tile stops at the ends of the main frame, means on the main frame to receive a plurality of tile units in a substantially common plane, stop means

on the main frame to space the tile units and form joint areas therebetween, side frames secured to the main frame on axes parallel to the longitudinal axis of the main frame and perpendicular to the tile stops, a plurality of pads along the side frames oriented to overlap the joints between the tile units, pairs of opposed clamping bars movably connected to the side frames, and a plurality of pads oriented along the clamping bars to overlap the joints between the tiles thereby forming, with the side frame pads, a trough to permit injecting a cementitious material into the joints between the tile units.

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