June 29, 1965 I. A. ABERNETHY 3,192,097

CERAMIC WALL TILE ASSEMBLY

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Fig. 1

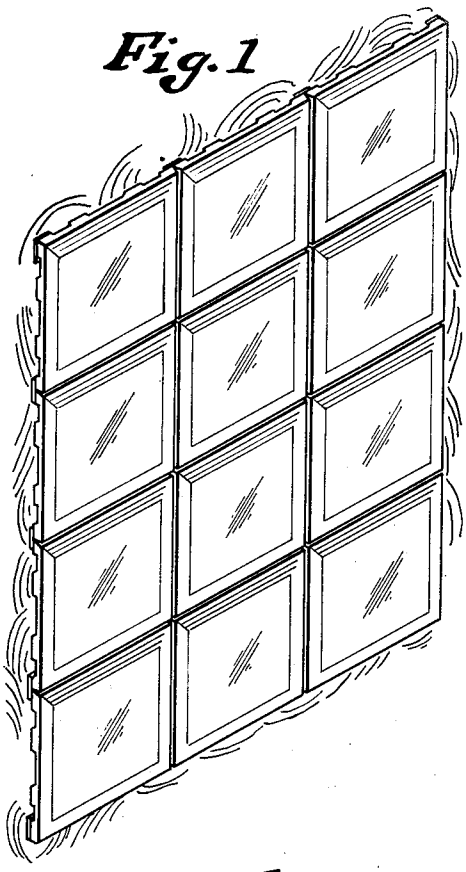


Fig. 3

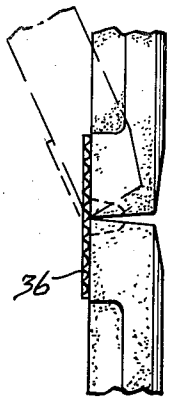


Fig. 2

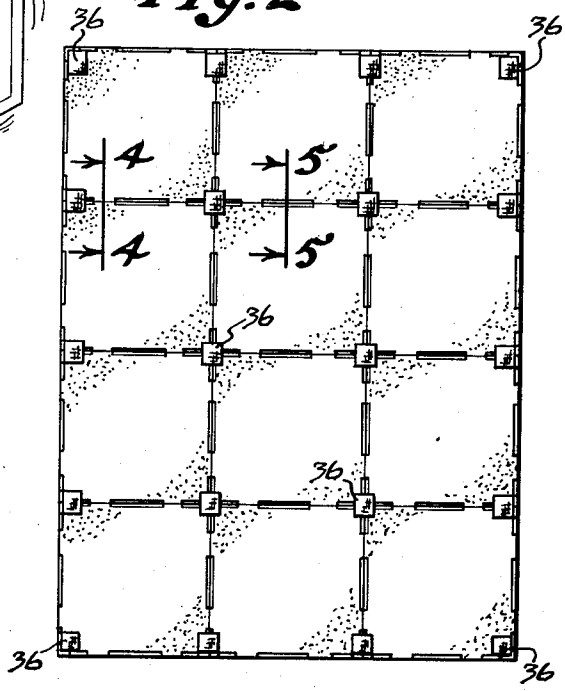


Fig. 5

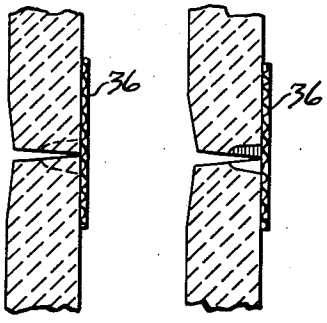


Fig. 4

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CERAMIC WALL TILE ASSEMBLY

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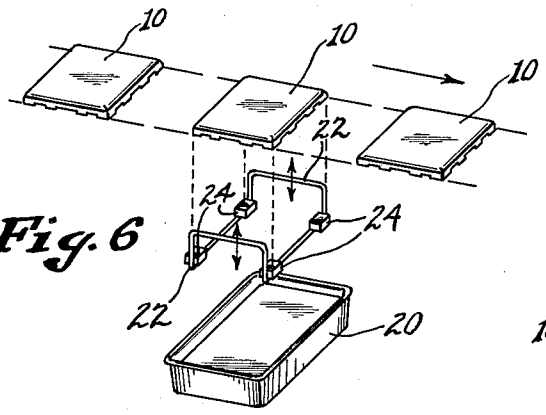


Fig. 6

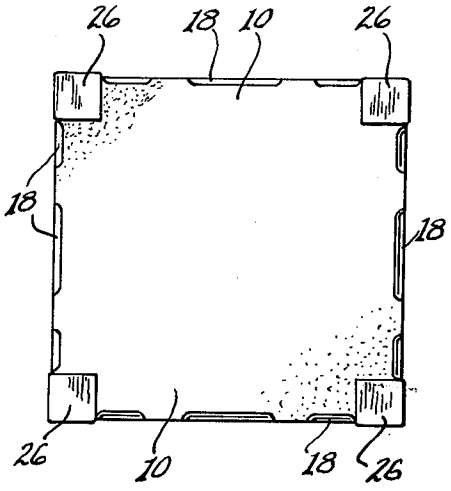


Fig. 7

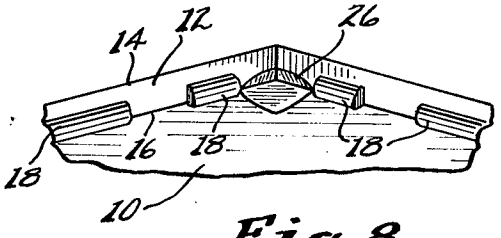


Fig. 8

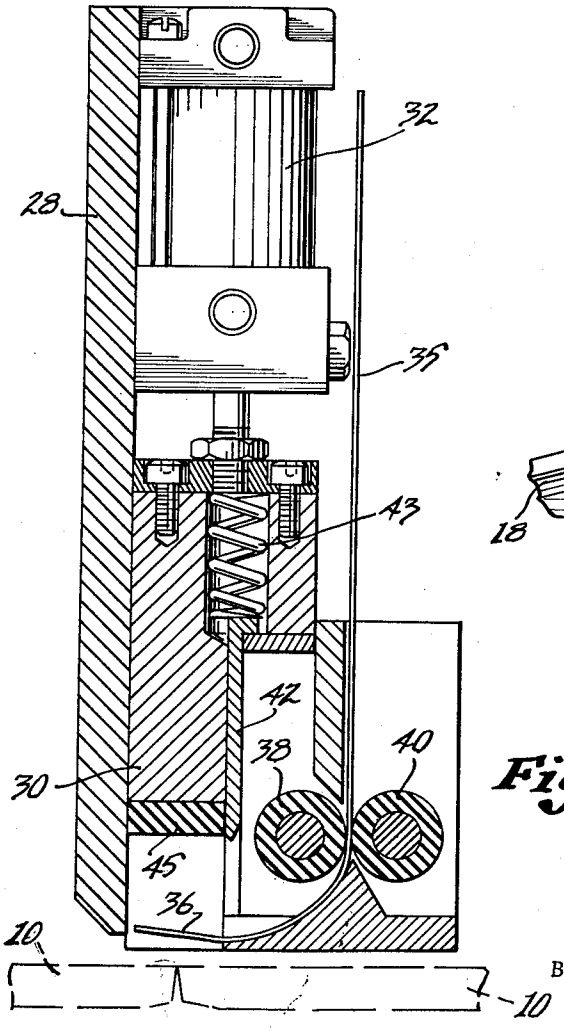


Fig. 9

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CERAMIC WALL TILE ASSEMBLY

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Fig. 10

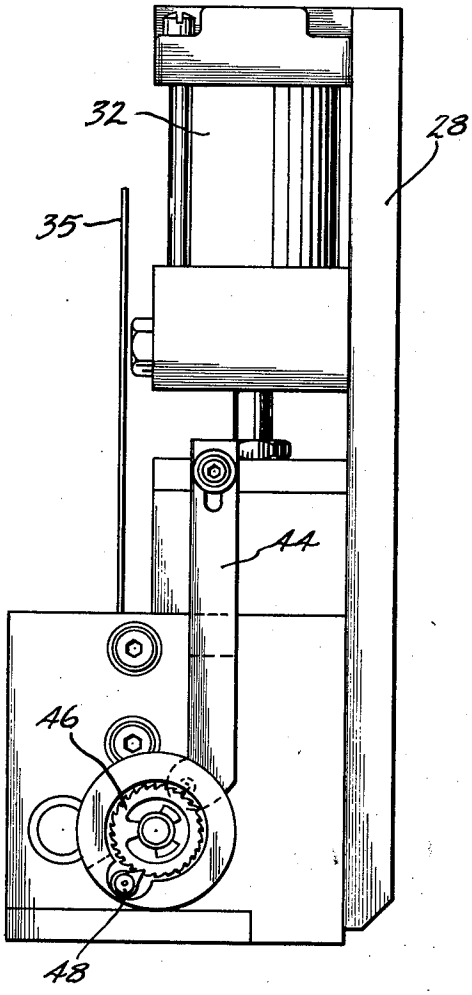
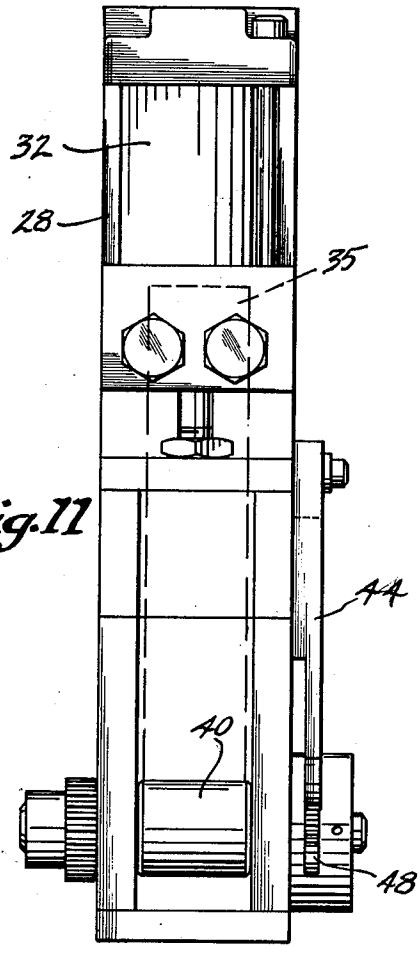


Fig. 11



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3,192,097

CERAMIC WALL TILE ASSEMBLY

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Filed June 3, 1960, Ser. No. 33,664
2 Claims. (Cl. 161—38)

The present invention relates to ceramic wall tile assemblies and particularly to sheets of wall tile assembled at the factory with uniform spacing between the individual ceramic tiles.

In the installation or setting of ceramic tiles, one of the most time-consuming tasks is the positioning and spacing of individual tiles so that the grout line between adjacent tiles is substantially uniform over the entire tiled surface. Unless the grout line is substantially uniform between adjacent tiles the whole appearance of the tiled surface may be spoiled, and to locate tiles so that each tile is uniformly spaced from the adjacent tile is a demanding and laborious task. Heretofore, this task has been performed largely by hand by skilled artisans so that the cost of tile surfaces has become excessive.

Numerous efforts have been made to provide sheets uniformly spaced tile so that areas of ceramic tile could be installed as a unit and the grout line would be more uniform than the usual hand-installation of individual tile. Similarly, by installing large area assemblies of ceramic tile, the installation time and cost could be substantially reduced.

However, many of these prior art efforts have not been wholly successful either because the cost of producing the sheets of tile was too high, or because the inherent structure of the sheets prevented complete and proper adhesion of the tiles to the wall or other surface.

Further, since ceramic tile is rather brittle, individual tiles are sometimes cracked or chipped during handling or installation and with tiles heretofore available it has been difficult and expensive to replace a cracked or broken tile in a sheet.

Because the tiles are brittle individual tiles in sheets frequently have edges chipped or broken in shipment. According to the present invention, the tile edges and corners are protected against such breakage.

One of the objects of the present invention is to provide a back-mounted tile assembly in which the individual ceramic tiles are accurately and uniformly positioned with respect to each other so that the uniform grout line will exist.

Another object of the present invention is to provide a back-mounted ceramic tile assembly which may be applied to a wall or other surface as a unit and in which the tiles are secured directly to the wall or other surface.

Another object of the present invention is to provide a back-mounted ceramic tile assembly in which individual tiles may be quickly and easily replaced.

Another object is to provide a ceramic tile assembly in which edge chipping of individual tiles is substantially reduced.

Another object is to provide a back-mounted ceramic tile assembly in which outlining of the individual panel assemblies is substantially eliminated.

A further object is to provide a method of producing back-mounted tile assemblies.

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These and other objects and advantages reside in certain novel features of construction, arrangement and combination of parts, and in steps and processes, as will hereinafter be more fully set forth and pointed out in the appended claims.

Referring to the drawing,

FIGURE 1 is a perspective view of the front surface of a back-mounted ceramic tile assembly according to the present invention;

FIGURE 2 is a back view of a back-mounted ceramic tile assembly according to the present invention;

FIGURE 3 is a fragmentary section illustrating how the back-mounted tile assembly of the present invention may be folded;

FIGURE 4 is a fragmentary section taken on line 4—4 of FIGURE 2; and

FIGURE 5 is a fragmentary section taken on line 5—5 of FIGURE 2.

FIGURE 6 is a diagrammatic flow sheet illustrating the coating of the tile corners.

FIGURE 7 is a bottom view of a tile after the corner coating step.

FIGURE 8 is a fragmentary perspective view showing the tile corner after coating.

FIGURE 9 is a vertical section of the tape applicator.

FIGURE 10 is a side elevation of the tape applicator illustrating the tape feed mechanism.

FIGURE 11 is a front elevation of the tape applicator.

The present invention is illustrated as applied to a wall tile assembly preferably employing tile of the type shown in U.S. Letters Patent No. 2,904,990. According to that patent, the individual tiles 10 are formed with precision ground edges 12 which taper outwardly from the front surface 14 to the rear surface 16, thus leaving a generally V-shaped space between abutting tiles. Since the edges 12 are precision ground, the opening between tiles at the front surface will necessarily be of uniform width when the back edges abut.

Preferably, the tiles also have reentrant recesses 18 adjacent the back surface so as to lock the grouting securely in place as illustrated in the drawings. The individual tiles may be 4¼ x 4¼ glazed surface tiles with cushion edges.

In carrying out the present invention the individual tiles are placed with the glazed surface up upon a suitable conveying belt and are fed intermittently past the edge coating mechanism. At the edge or corner coating station a pan or tray 20 filled with a suitable plastic or resin type adhesive is located beneath the tile feeding belt and a plastic applicator 22 having four soft, resilient pads 24 of suitable material such as felt is raised from the tray by suitable means (not shown), and applies the resin to the four corners of the tile 10. Because the pads 24 are soft and resilient, the resin not only coats each corner of the bottom surface of the tile but also extends upward over the side edges of the corner as indicated at 26 in FIGURE 8. Each of the four corners is similarly and simultaneously coated as shown in FIGURE 7.

The adhesive is preferably a so-called "contact" adhesive which, when cured, will adhere only to a surface coated with the same or a similar adhesive. One suitable adhesive is a neoprene-base solvent type contact adhesive.

After the corners of each tile are coated, the adhesive is dried or cured, thus forming a coating on the tile corners which serves not only to provide contact adhesive covered areas for subsequent mounting of the tile in a tile assembly as discussed below, but to protect the tile corners from breakage.

After the corners of the tiles have been coated with resin and the resin cured, the tiles are inverted so that the glazed surface is down and a tile assembly of suitable size, such as three tiles in width and four tiles in length (see FIGURE 1), is assembled. Because of the precision ground edges, this assembly will have accurate dimensions and there will be uniform spacing between the front surfaces of adjacent tiles. The thin resin coating 26 upon the edges prevents cracking, chipping or breaking of the corners of abutting tiles.

The tile sheet is then passed beneath an assembly of tape applicators as illustrated in FIGURES 9, 10 and 11.

Referring first to FIGURE 9, the tape applicator consists of a housing 28 containing a slidable piston 30. Mounted on an upper portion of the housing is a suitable piston or bellows 32 for moving the piston 30 vertically. When pressure is released from the bellows or piston 32, the air cylinder reverses and returns the piston to its normal position.

A tape 35, preferably of flexible material such as cloth, is coated on one surface with a suitable contact type adhesive of the same type as applied to the back corners of the tile, and is fed from a source (not shown) by two feed rollers 38 and 40 to an open space in the bottom of the housing 28 in alignment with the piston 30.

Tiles 10 are fed intermittently beneath the housing 28 and when the joint between adjacent tiles is in alignment with the piston 30, the tiles are stopped and the piston is actuated to move downward. A knife 42 which moves with the piston cuts off a length of tape 36 and the head 45 of the piston then presses the tape 36 against the corners of four adjacent tiles, securing the four of them together. Knife 42 is resiliently backed by spring 43 to provide a lost motion connection between the knife and piston 30.

The piston 30 also carries a pawl 44 which operates a ratchet wheel 46 secured to the drum 38. On the return stroke of the piston, this pawl moves the ratchet wheel and drum 38 through a predetermined distance so that a predetermined length of tape 36 is fed beneath the piston to be ready for the next application. A detent 48 prevents reverse feeding of the ratchet wheel 46 or drum 38.

In addition to the tape strips applied to adjacent corners of tiles in the sheet, strips 35 of tape 35 are also applied to the outer corners of the tiles at the outer corners of the sheet as shown in FIGURE 2. This is done so that the sheet as a whole will lie flat against the surface to be tiled.

If necessary, the finished sheet may be baked or otherwise treated so as to cure or vulcanize the adhesive on strips 36.

The individual patches of tape are relatively small and cover only the corners of the back surfaces of the individual tiles. Consequently, substantially the entire back face of each individual tile is exposed. Further, since the tapes are flexible, it is possible, referring to FIGURE 3, to fold the entire assembly along the center line, thus conserving space and placing the tiles in back to back relation where the danger of scratching the glazed surface is minimized.

The finished sheets of tile are now ready for installation and can be secured to the wall or other surface by conventional cements or adhesives. The tape itself is waterproof so that the tile sheet may be soaked in the usual manner; and because of the precision ground edges, adjacent panels can be placed together leaving a grout line which is of the same width as the grout line between individual tiles in the panel. Because of the precision size of the individual tile as well as of the panel as a whole, outlining of individual panels or offset is avoided.

The invention has been described employing precision ground edge tiles but it is apparent that any form of tile may be used. If lugged tile is used, the lugs insure accurate spacing between adjacent tiles. When straight edge tile is used, the tile may be spaced manually or by suitable mechanical means. Whatever type of tile is used, the steps of the process are the same.

From the foregoing, it will be apparent that I have attained the objects of my invention and have provided a new and improved back mounted wall tile assembly and a new and improved method for producing such an assembly. Various modifications can, of course, be made without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. A tile assembly comprising a plurality of ceramic tiles positioned in contacting edge-to-edge relationship, each of said tiles having a back surface, a front surface and edge surfaces, the front surfaces of said tiles positioned within said assembly to face in a common direcion, a thin coating of a cured contact-type adhesive material cured in situ upon the back and edge surfaces of each said tile proximate to the intersection of adjacent edge surfaces of the tile; the remainder of said back and edge surfaces of each tile being substantially uncoated with said contact-type adhesive, said contact-type adhesive coating consisting of an adhesive material which will adhere only to a surface coated with a similar contact-type adhesive material and being of a thickness to permit the adjacent uncoated edge surfaces of adjoining ceramic tiles within the tile assembly to be maintained substantially co-extensive with one another, and a common strip of flexible material connecting each of said ceramic tiles to each adjacent tile solely through the adhesion of said cured contact-type adhesive on the back surfaces of said tiles to said common strip of flexible material, said flexible material being relatively small compared to the total back surface area of any one of said tiles and extending over and adhering to only the portions of the back surfaces of said tiles which are coated with said contact-type adhesive; the flexible material being coated at least on one side with a contact-type adhesive which will adhere only to said contact-type adhesive which is coated and cured on the back and edge surfaces of said tiles.

2. A method of forming an assembly of ceramic tiles positioned in contacting edge-to-edge relationship which includes: providing a plurality of ceramic tiles; applying a thin coating of a curable adhesive material of a contact-type to the corner areas only of the back surface of each of said tiles and to the corner edge areas only of the edge surface of each of said tiles which are adjacent said corner areas so as to leave a substantial portion of said back and edge surfaces of said tiles uncoated with adhesive; said coating being formed to a thickness of permit said tiles to be positioned in said assembly with the uncoated edge surfaces of adjacent tiles substantially co-extensive with one another and from an adhesive material of a contact-type, which, when cured, will adhere only to a surface coated with a similar adhesive, and which is substantially resilient so as to protect the tile corner areas from breaking and chipping when the edges of said tiles are positioned co-extensive with one another; curing said adhesive material, positioning a plurality of said tiles so that the edges of adjacent tiles are substantially co-extensive with one another; and flexibly connecting each of said tiles to each adjacent tile solely by securing to adjacent coated corner areas of the tiles a strip of flexible material coated with an adhesive which will adhere only to the contact-type adhesive on said tile corner areas and which is relatively small compared with the total back surface area of any one of said tiles so as to leave a suf-

ficiently large area of the tiles uncovered to permit said tiles to be effectively secured to a surface to be tiled through adherence of said uncoated and uncovered area of the tiles by means of a cementitious material.

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