

Nov. 1, 1938.

A. H. STEWART

2,135,118

TILE MOUNTING STRUCTURE

Filed April 18, 1936

2 Sheets-Sheet 1

Fig. 1.

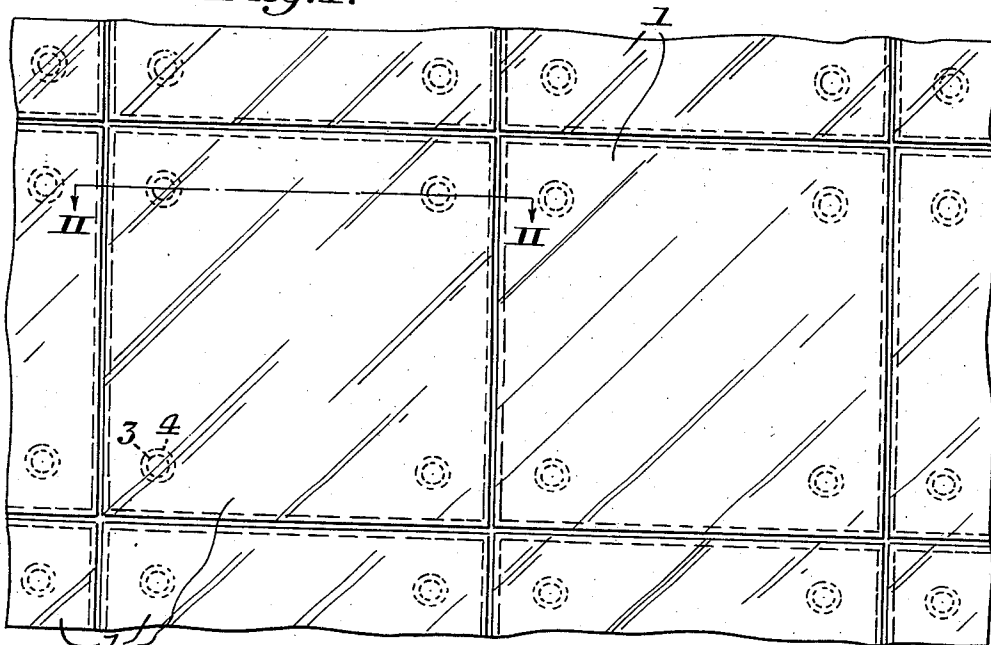


Fig. 2.

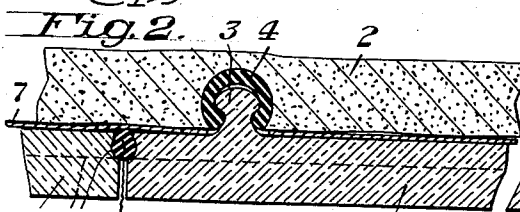


Fig. 2a.

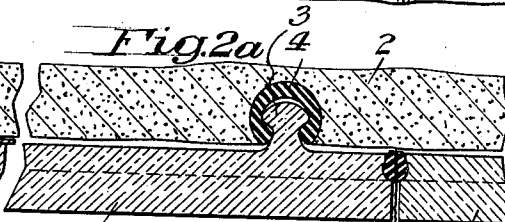


Fig. 3.

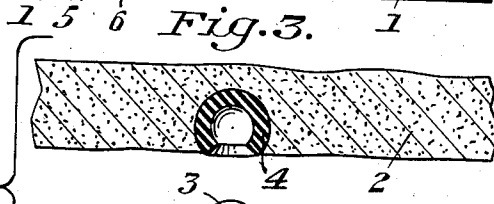


Fig. 4.

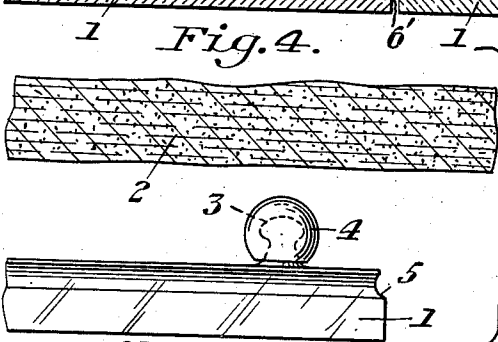


Fig. 15.

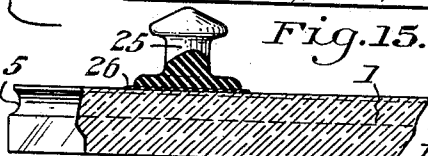


Fig. 16.

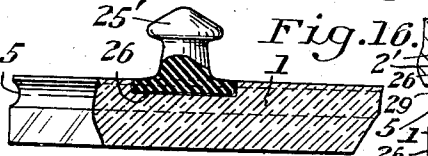


Fig. 17.

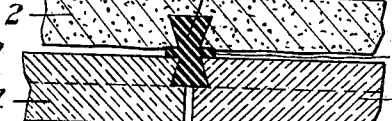
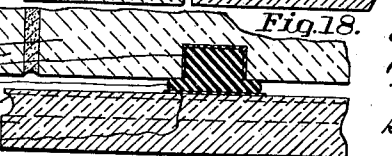


Fig. 18.



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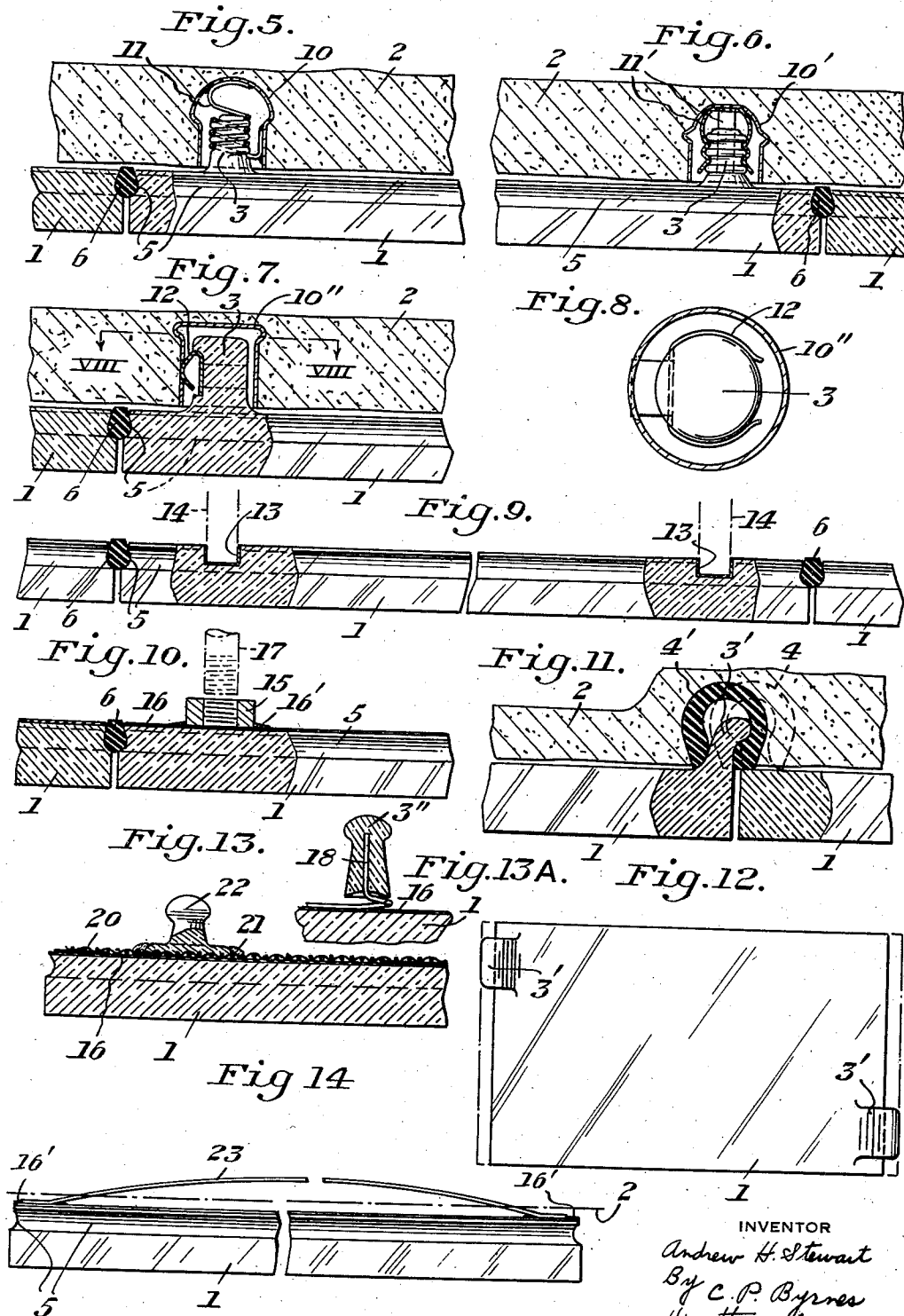
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,135,118

TILE-MOUNTING STRUCTURE

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Application April 18, 1936, Serial No. 75,154

18 Claims. (Cl. 72—19)

This invention relates to improvements in attaching tile and other surface covering elements to a building construction, and more particularly, to attaching structure which will permit the surface covering elements to expand and/or contract independently of the structure upon which they are mounted.

Although it has been customary to mount tiling by employing cementitious or plastic holding materials, metal structures for mounting tiling without the use of cement are known. The metal structures have not been commercially successful, however, possibly due to the fact that they are more expensive, require tedious work in mounting, and are not satisfactory when mounted.

Previous to the present invention, neither of the above-mentioned mounting methods have been entirely satisfactory and this is particularly true when certain types of surface elements or tile are to be employed. I have particular reference to artificial tile constructions such as may be inexpensively and readily formed into beautiful designs, but which may have a brittle hardness and/or have a different coefficient of expansion and/or contraction than the structure to which they are to be attached. That is, glass and other vitreous, plastic, and/or ceramic materials when mounted in accordance with the previously known methods, become cracked, chipped and/or loosened by reason of the stresses and/or strains to which they are subjected. These stresses may be compressive, tensile and/or shear. They are especially acute when the temperature conditions of a room, for example, change from hot to cold, or vice versa. Glass tile is more subject to breakage than the ceramic tile, thus more difficulty is encountered in finding a really satisfactory method of mounting it.

I have also found that after a period of time, where the tiling has been set in cement or some similar material, that the exposed portions of the material begin to deteriorate and the bond is lost between adjacent tile and between the tile and the cementitious backing. As a result, the tile will become loose and drop off. In such cases, it is then difficult to properly remount one or two tile without remounting the entire surface.

Frequently, also, the owner of a building wishes to change the design after a period of time, and considerable difficulty arises in tearing out the old and replacing the new tile.

In view of the above considerations, it has been an object of my invention to provide an im-

proved method for attaching tile and similar surface covering elements to building constructions.

Another object has been the provision of an improved tile attaching structure of a type that permits quick attachment and/or detachment of the tile.

Another object has been to provide an improved attaching or mounting structure for tile that permits the tile to expand and contract independently of the building surface to which it is attached.

A further object has been to securely but flexibly attach tile and other surface covering elements.

A still further object has been the provision of a method of mounting tile whereby it is insulated from the surface upon which it is mounted and from adjacent tiling.

These and many other objects of my invention will appear to those skilled in the art from the description thereof taken in view of the drawings and the claims. I have shown certain preferred forms of my invention for the purpose of illustration, in which—

Figure 1 is a reduced plan view of a fragment of a tile structure constructed and attached in accordance with the principles of my invention;

Figure 2 is a cross-sectional view taken along the line II—II of Figure 1;

Figure 2a is a showing similar to Fig. 2 omitting the insulating material.

Figures 3 and 4 are fragmental cross-sections taken along a line similar to Figure 2, but show tiling unmounted and ways of mounting it;

Figures 5 to 7, inclusive, are fragmental cross-sections showing various forms of my invention;

Figure 8 is a section on the line VIII—VIII of Figure 7;

Figures 9 to 11, inclusive, are fragmental cross-sections showing other forms of my invention;

Figure 12 is a reduced plan of a tile employed in the construction of Figure 11;

Figures 13 to 17, inclusive, are fragmental cross-sectional views, illustrating still other forms of my invention; and

Figure 18 is a cross-section through a tiling mounted upon a ceramic or brick veneer or surface.

Although the principles of my invention are applicable to various forms of surface covering or facing elements, such as are generally employed to provide a pleasing interior finish for the wall, ceiling and/or floor portions of a building, yet they are particularly applicable and valuable in application in connection with vitre-

ous tiling. When I speak of "tile" or "tiling", not otherwise limited in the specification and claims, I include ceramic, vitreous, plaster board, composition, and other suitable types. I also have reference broadly to surface covering or facing elements.

Particular difficulty was had in attaching or mounting glass tiling, because of its relative brittleness and the fact that it has a high coefficient of expansion and contraction which is considerably different from that of the building surfaces to which it is to be attached, and thus, because it is extremely sensitive to changes of temperature.

In carrying out the principles of my invention, I employ a flexible mounting for the tile and preferably insulate each tile from the building surface to which it is attached, as well as from adjacent tile. As a result of the above considerations, it will appear that each tile is free to expand and contract independently of adjacent tile as well as independently of the portion of the building to which it is attached. Breakage has been reduced to a minimum, maintenance and installation costs lowered, and each individual tile can be quickly detached with respect to adjacent tiles and with respect to the building construction.

In some specific embodiments of my invention shown for the purpose of illustration, I provide mount elements attachable or attached to the back face of a tile and have also provided detachable, cooperatively-connected mount elements or inserts that are adapted to be set in a thickness of cementitious material. When I refer to "cementitious" materials in the specification and claims, I include such materials as cement, mortar, plaster, bitumen, etc., which may be employed to join objects by adhesion and which, although plastic or viscous, will set or harden. It will appear that in Figure 18, I have shown a ceramic or brick veneer building surface having slots or hollowed-out portions for receiving mount elements 28 of a tile. It should also be understood that any other suitable type of material may be employed in this connection and that the application of the invention is in no sense limited to any specific type of material or building construction.

In Figure 1, I have shown a section of a portion of tiling that has been mounted in accordance with the principles of my invention and which comprises a plurality of tile 1. As seen particularly from the section of Figure 2, each tile is provided with a plurality of juts, male elements or knobs 3 that extend outwardly from a face or planar surface thereof and that are detachably engaged by female socket-like or insert elements 4. As seen in Figure 3, the insert member 4 may be first mounted in a thickness of cementitious material 2, or as seen in Figure 4, may be held on the knob 3 and mounted in position by pressing the tile, and thus, the associated knob 3 and the detachably connected insert element 4 into a thickness of wet cement or plastic cementitious material 2.

In Figures 1 to 7, inclusive, as well as Figures 11 and 12, I have formed the jut or male elements 3 integrally with the tile, and have provided the necessary resiliency of attachment by employing a rubber-like or flexible material for the insert or socket members 4. The compression lips of a socket member such as 4 are provided by shaping the socket member in such a manner that its throat or lip portions have less

spacing or diameter than the main body portion. Although the male or jut elements 3, such as shown in Figures 1 to 7, inclusive, are preferably formed by employing a partible mold in shaping the tile of which they are an integral part, yet the lug or jut members 3' of Figures 11 and 12 are so formed that they may be readily withdrawn from a tile mold without employing partible sections.

In the embodiments of Figures 5 and 6, I have shown modified forms of socket-like insert elements 10 and 10' which are adapted to be embedded within the cementitious material 2 and which are provided with suitable spring-like clamp members 11 and 11', respectively.

In the modification of Figure 5, the knob or jut 3 is threaded to be received by a thread-shaped flexible metal clamp element 11, and in the embodiment of Figure 6, the knob or jut 3 is provided with a plurality of circumferential annuluses upon which a pair of corrugated, outwardly extending flexible metal members 11' are detachably clamped. To mount the tile in the embodiment of Figure 5, the insert 10 may first be screwed on the knob and then pressed into place in the cementitious material 2 and the material allowed to harden, after which the knobs 3 of the tile can be forced within the spring-like threaded portions 11 of the element 10. The same method may be used in the embodiment of Figure 6; the socket element 10' may, however, be first set in the cementitious material 2 and the male element 3 then pushed into a locked or clamped position within the element 11'.

In both embodiments, the socket element 10 may be first set in the material 2, the clamp portion 11 or 11' forced or screwed on the knob 3, and then, the clamp portion 11 or 11' may be coated with a suitable cement and moved into position within the socket 10 or 10'. However, when the size and shape of tile permit, one set of mount elements 3, 10, 11 is sufficient to attach the tile; the set is then preferably centrally located. In such a case, the tile 1 may, at any time, be readily screwed into and out of the socket 10.

In Figure 7, the knob 3 is cut out or slotted adjacent one side thereof, in order to receive a removable key or spring-like metal clamp element 12. The socket 10'' is also slotted out adjacent the slotted out portion of the knob 3 to receive a shoulder of the clamp element 12. In mounting the tile, the clamp element or key 12 is first clamped in position on the knob 3, and the knob is then moved into position within the socket member 10'' and turned until the shoulder of the key snaps into the slot in the socket.

In Figure 9, I have shown tile formed with one or more indentations or holes within which a suitable length or a jut mount element 14 is positioned and to which it is secured by some suitable adhesive, solder or cement 13. Another variation is shown in Figure 10. There, each tile 1 is covered on its back face with a suitable metal coating 16. This coating 16 is preferably provided by a procedure such as set forth in my copending application Serial No. 9,121, filed March 2, 1935. In this manner a reflective surface may be provided which will be visible from the front face of a transparent glass tile. This gives a very pleasing effect. The metal coating 16 will be physically adherent to the glass and will serve to protect it from actual contact with the cementitious material 2 upon which it is

mounted, and to also hide the mount elements by which the tile is secured or attached to the cementitious material 2. I also contemplate manufacturing glass tile of various shades and may employ an opaque glass where it is desired to completely hide the mount elements. However, an opalescent or a translucent type of tile may be employed in this connection. From the above, it will be apparent that it is preferable to provide a reflective metal backing when it is desired to use a clear or transparent type of tile.

In the embodiment of Figure 10, a mount element or boss 15 is inwardly threaded to receive a second threaded mount element 17. The element 15 is preferably secured to the metal backing 16 by solder or sprayed metal 16'. For the reasons pointed out above, it will appear that a surface type of mount element 15 is preferable when it is necessary to provide a clear glass tile having a reflective surface.

In the embodiment of Figures 11 and 12, opposite corners of the tile 1 are provided with mounting lugs or juts 3' which project backwardly from the plane of the back face or surface of the tile and also project outwardly beyond the plane of an adjacent edge of the tile. If the socket elements 4' are first set in the cementitious material 2, it will appear to those skilled in the art that each tile 1 may be mounted by first placing one of its lugs 3' in one of the flexible rubber-like inserts 4' and then moving it against the resiliency of such insert into position substantially parallel with the cementitious backing surface 2. This is not only a simple method of removably mounting the tile, but, as previously pointed out, enables the connecting or mount elements 3' to be formed integrally with the tile without providing partible molds.

In Figure 13, the tile 1 is first coated with a physically adherent metal coating 16 such as mentioned in the description of Figure 10, then a wire mesh 20 is mounted on the coating 16 by spraying additional metal on the wire and the coating. This provides a flexible type of backing for the glass tile 1 and since it is physically adherent to the tile, strengthens it to an astonishing degree and prevents it from shattering even when broken by a hammer or some other heavy object. The mount element or knob 22 may be secured to the flexible wire netting 20 by solder 21 or additional sprayed metal.

In Figure 13a, a flexible rod or metal piece 18 is soldered or secured to the back of the tile 1 by sprayed metal 16. This wire-like element 18 is preferably given a spring twist adjacent the tile and the mount element or knob 3'' of rubber-like, ceramic or vitreous material is formed on its extending end. The twist provides the necessary flexibility to the attaching structure and the knob 3'' may thus be set directly in the cementitious material 2.

In the embodiment of Figure 14, the tile is provided with a length of flexible wire or strap metal 23 which is secured to the tile at opposite edges thereof by a coating of metal sprayed thereon. This length 23 is positioned in the cementitious material and holds the tile in spaced relationship with respect to the material in the manner indicated. Thus, there is a certain amount of resiliency in the length of strap metal between the points where it is secured to the tile 1 and the points where it is secured to the cementitious material 2. The specific types shown in Figures 13a and 14 are employed where quick detachability is not essential, although the

employment of a rubber insert element 4 (see Figure 2) will make the type of Figure 13a readily detachable.

In Figures 15 and 16, I employ rubber-like knobs or mount elements 25 suitably secured to the tile by an adhesive or cement 26. In the embodiment of Figure 15, the knob fits on the back surface of the tile 1 and in the embodiment of Figure 16 the knob fits within a depression.

In Figure 17, I have shown a form of mount element 27 which has somewhat of a double keystone shape. More specifically it comprises two keystone-like portions which converge inwardly adjacent the center of the element and which are provided with an outwardly extending annulus 28, which serves to space the tiling 1 from the backing 2. One keystone-like portion is adapted to fit within an inwardly diverging opening in the backing 2 and the other keystone-like portion is adapted to cooperate with complementary edge walls of adjacent tile 1. That is, each tile has an inwardly diverging slot or groove extending along the edges thereof adjacent the back surface or face thereof. It will thus appear that the element 27 by reason of its shape and complementary supporting action, holds the tile 1 in position and spaces it with respect to adjacent tile without the employment of additional mount elements. The elements 27 may be individually formed or integrally formed and spaced along a length of bead-like material which has a keystone shape and in effect constitutes half of the element shown in the figure.

In Figure 18, I have shown a brick veneer 2' having a depression formed therein for holding a flexible mount element 29 which may be secured thereto and also to the tile by a suitable adhesive or cement 26. The holes or depressions in the brick may be formed immediately after the brick has left the pug mill, or, if desired, after each individual brick has been severed from the length fed from the mill. The tile may, if desired, be metal coated. No insulation is necessarily required between the tile and the brick surfaces even when the elements 3, 4 of the embodiments of Figure 2 are employed in place of the element 28 and the tile 1 placed in actual abutment with the brick surface 2'. Various other expedients will appear to those skilled in the art. For example, I find that it is advantageous, before the brick leaves the plant, to mount the tile on the face or end of the brick which is to be exposed when the brick is mounted in a building construction. In other words, the brick and its facing are shipped as a complete unit and then the brick may be mounted in the usual manner at the job. Thus, additional labor for mounting the tile at the job is unnecessary. Of course, the tiling will be mounted in accordance with the principles of my invention in order that it will be free to expand and contract independently of the brick upon which it is mounted.

From the foregoing, it will appear that I have provided various forms of flexible mount elements for attaching tiling to a suitable portion of a building, and that any expedients employing the broad ideas of flexibly, or flexibly and detachably securing tiling to a building surface will fall within the scope of my invention. I also preferably provide a band or bead of flexible fibrous or rubber-like composition material 6 (see, for example, Figure 2), which is mounted in grooves or slots 5 cut around the edges of the tile adjacent the back face thereof. In this man-

ner, each tile is mounted so that it does not come into actual physical contact with adjacent tile. The beading also serves a further function of aiding in holding the tile in a mounted relationship, and of eliminating the employment of any cementitious material between tiling. It is preferably located adjacent the back face of the tile to prevent any cementitious material used in the backing 2 from working between adjacent tiles.

I also contemplate employing an individual, continuous band of rubber or some other suitable material that may be snapped into place in the groove 5 of each tile (see the right section of Figure 2). In this manner a double bead 6' will be provided between adjacent tiles, and the bead may have any suitable shape that will effectively lend itself to the desired functions, that is, adjacent beads preferably have a complementary outline with respect to each other.

From the above description of my invention, it will appear that the socket members such as 4 of Figure 2, are open to the face of the cementitious material 2 of the building construction and are provided with compression lips, past which the knob 3 (see Fig. 3) or the knob 25 (see Fig. 15) is pressed when the tile is to be mounted upon the face of the building. It will thus appear that the socket and knob portions have interlocking portions which detachably hold them in a mounted relationship with respect to each other after the knob has been pressed into position. Due to the flexible mounting of the tile both with respect to the face of the building 2 and with respect to adjacent tile, it is protected against chipping and breaking such as produced by expansion and contraction of the members, and particularly, by uneven expansion and contraction of abutting members. This construction also makes it possible to detachably mount a tile both with respect to adjacent tile and with respect to the face of the building, and to, in effect, seal off the edges of that tile with respect to adjacent tile without the employment of any cementitious material; the flexible or resilient bead, mounted to extend around the edges of the tile, functions in this manner.

Much of the deterioration which occurred in the previous tile structures was due to the fact, previously pointed out, that the portions of cementitious material which were used to secure the edges of the tile, were exposed to the atmosphere and thus subject to the deteriorating effects of various gases and substances in the air. A flexible material such as rubber will last a lifetime and may be readily replaced by merely removing a tile and snapping a new band in position.

Although I contemplate forming the mount elements such as 3 and the bead elements such as 6, in such a manner that they will separate the tiling from the cementitious backing 2 and provide a small insulating or air space therebetween, I also contemplate eliminating these spacing portions and mounting a suitable insulating material 7, such as a bituminous paper, see the left hand section of Figure 2, on the face of the tile and prevent actual physical contact with the facing 2. The metal coating 16 of Figures 10 or 13 may be employed separately or in combination with insulation 7 for this purpose.

While I have described certain illustrated embodiments of my invention, it will be apparent to those skilled in the art that many modifications, changes, substitutions, additions and omissions,

or combinations thereof, may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In an article of manufacture, a ceramic or vitreous tile, a flexible wire mesh secured by physical adherence to a face of said tile, a mount element secured to said wire mesh and adapted to be attached to a portion of a building by a thickness of cementitious material or a suitable support structure.

2. In a construction for attaching tile to a portion of a building, a tile, a flexible metal piece secured to and extending from said tile, and a knob of suitable material mounted on said metal piece, said knob being adapted to be set in a thickness of cementitious material or a suitable support structure for attaching said tile to the building.

3. In a construction for attaching tile to a portion of a building, a mount element of suitable construction, a spring-like element secured to said mount element, a tile, and a jut element secured to said tile, said jut element cooperating with said mount element, said spring-like element holding said jut element in a cooperating relationship with said mount element for flexibly attaching said tile to the building.

4. In a vitreous or ceramic tile, juts extending backwardly from a face thereof and outwardly beyond an adjacent edge thereof, and mount elements adapted to be secured to a portion of a building, said juts having diagonally opposite positions on the face of said tile, said juts cooperatively engaging said mount elements for attaching said tile to the building.

5. In an article of manufacture, a tile, an offset portion extending along at least one edge of said tile, a flexible bead mounted on said offset portion and extending therefrom, so that it will abut the edges of an adjacent tile or bead when tiling is in a mounted relationship, said bead extending along substantially the full length of said edge and spacing said edge with respect to the edge of an adjacent tile, said bead closing off the spacing between said tile and the adjacent tile.

6. In an article of manufacture adapted to be attached to and to cover a portion of a building construction, tiling which comprises a plurality of tiles, a flexible bead mounted to extend around the edges of each tile, each tile being mounted in an edge-to-edge relation with respect to adjacent tile such that said bead prevents the edges of adjacent tile from abutting each other, and means for attaching said tiling to the building construction.

7. In a tiling construction adapted to be attached to a building surface, a plurality of tile positioned in an edge-to-edge relationship with respect to each other, an inwardly widened slot extending along the edges of each of said tiles adjacent the back portions thereof, and a complementary element cooperating with and fitting in the said slots of adjacent tile for holding said tile in position, at least one jut portion on said element for securing said element to the building surface, and means on said element for securely holding adjacent tile in position and for insulating the tiling from the building surface.

8. In an article of manufacture, a tile, a hollow insert adapted to be mounted on a portion of a building with its mouth open thereto, said hollow insert having flexible compression lips, at least one mount element secured to said tile and

extending therefrom, said mount element having a projecting lock portion interlocking with the said lips of said insert when said mount element is pushed into said insert from the face of the building against the force exerted by said compression lips.

a tile, a flexible mount element attached to said member and extending outwardly from a face thereof, said mount element being attached to a back face of said tile and holding said tile in a mounted relationship with respect to said member, said element having portions spacing the back of said tile with respect to said member.

14. In an article of manufacture, a tile, a socket member adapted to be mounted on a portion of a building with its mouth open to a face thereof, at least one mount element secured to said tile and extending therefrom, said socket member having a main body portion and suitable lips, said main body portion having a greater diameter than said lips, said mount element having a lock portion interlocking with the lips of said socket member, at least one of said members having a flexible construction such that said mount element may be pushed into said socket from the face of the building against the force exerted by such flexible construction upon said lips into a cooperative relationship with respect to said main body portion of said socket member.

15. In an article of manufacture adapted to be attached to and to face a portion of a building construction, a tile, juts extending backwardly from a face of said tile and outwardly beyond an adjacent edge thereof, said juts being arranged to cooperatively engage a mounting on the building construction and to attach said tile thereto.

16. In a tile, at least one jut extending from a face thereof, said jut being constructed and arranged to interlock with a portion of a building construction and to detachably position said tile with respect to such building construction.

17. In an article of manufacture, a tile, an element adapted to be mounted on a portion of a building construction, an element attached to said tile, at least one of said elements being of yieldable construction, said elements being arranged to detachably engage each other and to mount the tile on the building construction.

18. In an article of manufacture, a tile, said tile having a depressed portion in the back face thereof, a strong and physically adherent metal coating on the back face of said tile, a jut element adapted to be positioned in said depressed portion and to extend therefrom for mounting the tile in position with respect to a building construction, and means to secure said jut element to said tile.

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9. In an article of manufacture, a tile, a socket member adapted to be mounted on a portion of a building with its mouth open to a face thereof, a knob secured to and extending from said tile adjacent a back face thereof, said socket member and said knob having flexible portions that detachably interlock with each other.

10. In an article of manufacture, a tile for mounting on a face of a building, a socket member adapted to be mounted on the building with its mouth open to the face thereof, said socket member having flexible compression lips, a knob secured to and extending from said tile adjacent a back face thereof, said knob being of resilient material and having a larger diameter than said compression lips, said knob and socket member having interlocking portions that engage when said knob is pressed into said socket from the face of the building against the force exerted by said compression lips, said tile having grooved edge portions, resilient material mounted in said grooved portions and extending around said tile and insulating it with respect to adjacent tile and closing off the spacing therebetween, and a spacer portion on said knob adapted to abut the face of the building and insulate said tile therefrom.

11. In an article of manufacture, a transparent tile, a strong and physically adherent metal coating on a back face of said tile in direct contact therewith, said coating being light-reflective when viewed through said tile from a front face thereof, and a mount element secured to said coating and adapted to be attached to a portion of a building for holding the tile in position.

12. In an article of manufacture, a tile, an offset portion extending along at least one edge of said tile, a flexible bead mounted on said offset portion and extending therefrom in such a manner that it will abut the edges of an adjacent tile or bead when tiling is in a mounted relationship, said offset portion and said bead having a shaped relationship such that said tile will be detachably held in position with respect to an adjacent tile by said bead.

13. In combination, a building wall member,