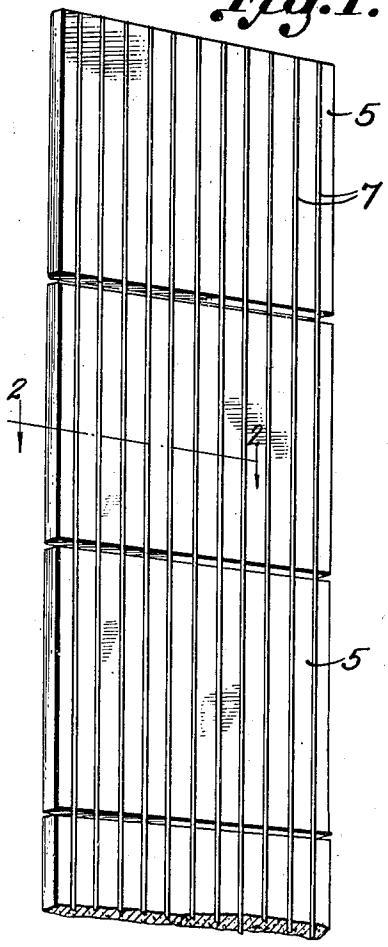
Dec. 9, 1941. W. SCHMOHL 2,265,614

TILE

Filed July 24, 1939

Fig. 1.



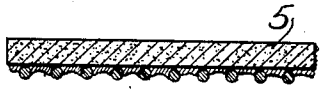


Fig. 2

Fig. 3.

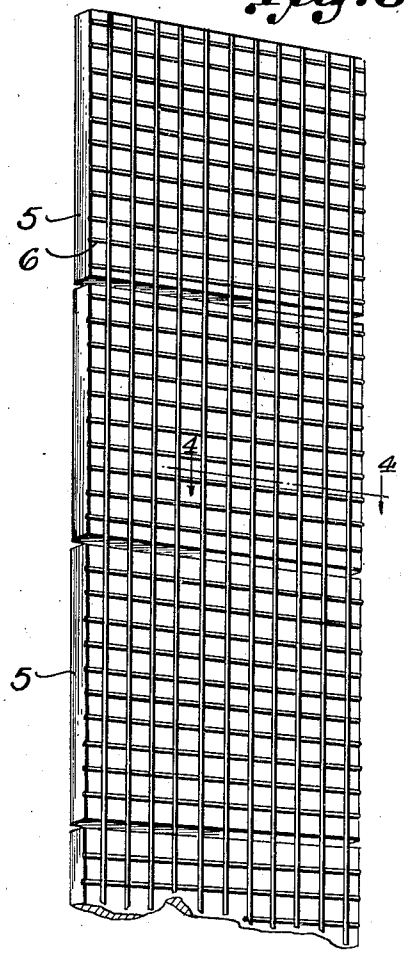


Fig. 4.

Inventor:
Walter Schmohl
By
Richards & Geier
ATTORNEYS

Patented Dec. 9, 1941

2,265,614

UNITED STATES PATENT OFFICE

2,265,614

TILE

Walter Schmohl, Stuttgart, Germany

Application July 24, 1939, Serial No. 286,239
In Germany July 1, 1936

3 Claims. (Cl. 72—22)

The present invention relates to a new and marketable form of wall or floor tile or tiling.

This new form which may suitably be described as a tile strip, consists, according to the invention, of several tiles arranged in a row and suitably connected at the back by a pliable or flexible connection. Such a tile unit, consisting of an interconnected row of tiles, can be used in the same manner as carpets or linoleum for covering wall or floor spaces.

The known ceramic slabs or tiles have to be formed into wall or floor coverings by experienced craftsmen, with the use of mortar, at the place where they are used. Moreover much experience is required for perfect tiling, since in the course of time the ceramic slabs swell, as a result of accumulated moisture, and consequently increase in size, a fact which leads, often years afterwards, to warping of the tiled surface, or at least to the loosening of individual tiles.

The swelling of the tiles, which depends upon many indeterminate factors, causes damage in cases where the tiles are laid by the means hitherto used, (that is with mortar which at first sets comparatively quickly and soon becomes hard), on account of the absolute rigidity of the cement, and in spite of the fact that the increase in size of each individual tile is insignificant. This is because considerable forces arise which are multiplied in a number of adjoining tiles and cause the tiles to burst off.

It is among the objects of the present invention to eliminate these forces arising from the swelling of the tiles by the use, for laying the tiles, of a cement which retains a certain plasticity after setting and hardening. Naturally however, considerable precautions must be taken to prevent the freshly applied tiles from slipping down or falling off.

The presence of plaster of Paris in the mortar hitherto used for laying tiles always presented a danger. The precautionary measures and other extra work required in the hitherto used tile-laying processes, which, particularly in old buildings, consisted in removing the plaster of Paris cement and subsequent replastering and practically always in painting and papering, resulted in a large amount of dirt and gave rise to considerable costs which, including the wages of the workmen, amounted to many times the cost of the tiles. Moreover the tiled surface is never watertight, and water penetrating through the spaces between the tiles results in considerable damage to the structure. The hollow spaces which must of a necessity remain behind tiles laid in mortar, according to the hitherto used processes, in addition to the breaks in the mortar between the tiles resulting from swelling (possibility of the nesting of vermin), and the moisture absorbing properties of the mortar, destroy the hygienic qualities which a tiled surface is supposed to possess.

According to the present invention, the above disadvantages are removed by the use of a cement which retains a certain amount of plasticity after hardening or setting, but which is watertight. Moreover several tiles are connected in a row, by means of a backing or back wall secured to the backs thereof which bridges over the joints between the tiles; and furthermore the backs of the tiles are provided with projections, ridges or the like, the surfaces of which lie substantially in one plane and which are preferably narrower than the depressions lying between them.

The invention will appear more clearly from the following description, when taken in connection with the accompanying drawing showing, by way of example, preferred embodiments of the inventive idea.

In the drawing:

Figure 1 is a perspective view of a tile strip;

Figure 2 is a section along the line **2—2** of Figure 1;

Figure 3 is a perspective view of a tile strip provided with a mesh;

Figure 4 is a section along the line **4—4** of Figure 3.

The corrugations of the backs of the tiles **5** may well be formed by the non-rigid backing which connects the individual tiles and which consists preferably of a coarse mesh web **6** (Fig. 3), of jute for example, or of parallel cords **7** (Fig. 1).

If the corrugations on the back of the tiles **5** are formed by the material of the backing this results in the advantage that the tiles are secured against swelling when they are laid, since the cords **7** or the threads of the coarse meshed web **6** are correspondingly non rigid even when they are saturated with the cement, which remains to some extent plastic. They also serve as a resilient buffer, when any displacement arises in the tiles, between the rigid surface of application on the one hand and the rigid back of the tiles on the other.

The laying of a tile strip, consisting preferably of five pliably interconnected individual tiles **5**, directly on to the mortar, for example on to plaster of Paris cement, is considerably facili-

tated by a suitable cement or adhesive. A suitable cement for the purpose is found to be one which contains water but which, after drying and setting, is water-tight and water-repelling, for example, a water-containing bitumen emulsion.

The tiles are protected from slipping on the surface of application, which is previously coated with water-containing adhesive, by the numerous projections on the back of the tiles.

The lowest layer of the bitumen emulsion, when applied to the dry surface of application, sets comparatively quickly as a result of withdrawal of moisture by the surface of application, and thus attains a considerable power of adhesion. The projections on the backs of the tiles are forced into this strongly adhesive layer when the tiles are applied, with the result that the upper layers of the bitumen emulsion which are still in a pasty condition are forced aside and that the tiles adhere firmly to the surface of application. However, the displacement of the tile strip within certain limits is still possible in order to fit it into the correct position.

When the backs of the tiles are concavely profiled, this immediate adhesion is increased, because the water-containing cement which has penetrated into the depressions of the tile, disappears as a result of the withdrawal of moisture, so that a vacuum arises in the cup like spaces and consequently the individual tiles are forced against the airtight surface of application by natural air pressure.

This firm initial adhesion of the projections, ridges or the like of the tiles prevents any slipping of the individual tiles and consequently of the whole tile strip. Such slipping was unavoidable with the adhesives formerly used and could only be prevented by taking special precautionary measures.

The pasty bitumen emulsion which, as a result of capillary action, holds the walls of the projections on to the back of the tiles, hardens gradually at first as moisture is withdrawn and thus ensures a secure adhesion of the complete strip.

If the pliably interconnected tiles have honeycombed rear surfaces or if the entire pliable backing or back wall consists of a coarse mesh web which, when glued to the back of the tiles, forms numerous hollows with transverse dividing projections, then the tile strip cemented with bitumen emulsion can be heated almost to the melting point of the bitumen without the tiles being loosened, because the transverse projections prevent the softened bitumen from flowing down, whilst firm adhesion to the surface of application is maintained by the thin bitumen layers below the projections.

The backing connecting the individual tiles, particularly when it also forms the projections on the back of the tiles, for example, when it consists of coarse mesh web or of parallel cords, is secured to the tiles in the following manner. Several tiles are laid in a row in such a manner that by an interposed distance piece or the like a small space remains between each tile and the backs of the tiles are coated with a cement which, after setting and hardening, is watertight and airtight, for example a water-containing bitumen emulsion, hot bitumen, waterglass or the like. Whilst the layer of cement is still soft and adhesive, the coarse mesh web or the parallel cords are pressed into the cement to about half their thickness, with the result that they are saturated by the cement and after hardening and setting of the same become airtight and watertight. Any superfluous cement is if necessary removed, e. g. by scraping. Tile strips made in this manner may be used immediately after hardening or setting of the cement, or alternatively they may be packed for storage or for consignment to the place of use.

The cords or chains and/or threads of the backing or web which bridge over the space between the adjacent tiles allow of considerable displacement between the adjoining tiles in a direction parallel to the dividing space, particularly in using a cement remaining plastic to a certain degree.

When a tile strip of this kind is to be applied to a wall or floor, according to the invention, the surface of application, that is the wall or floor, is coated with a layer of bitumen emulsion or other water-containing cement which after hardening and setting becomes water-repelling and/or water tight, and then the back surface of the tile strip is pressed into the layer of cement on the wall or floor.

Any swelling of the tiles in the course of months or years after laying is rendered innocuous by the cement which retains a certain plasticity even after drying and hardening, and furthermore by the plastic filling of the intermediate spaces, which allows expansion.

The thin layer of adhesive, which is chiefly responsible for the firm adhesion of the tile strip according to the invention, is remarkably durable even when subject to relatively high temperatures. The firm adhesion of the wall or floor covering according to the present invention is to be traced to the fact that two elements which are connected by means of a comparatively thin colloidal layer, such as for example, carpenter's glue, adhere together much better than two elements connected by means of a thick colloidal layer of the same adhesive.

According to the invention, the tiles are joined in only one row so that each row is entirely independent of the laterally adjoining row. Consequently any thrust which arises can work itself out only in the longitudinal direction since there exists no direct connection with the tiles on either side of the row.

Important advantages of the tile strip according to the invention are its cheapness, the possibility of self laying, the watertight qualities of the tiled surface formed according to the invention, and the fact that the formation of harmful hollow spaces, and loosening of the tiles are rendered impossible. Moreover the watertight and airtight setting of the tiled strip prevents the nesting of vermin, a function which may be aided by the addition of a suitable vermin exterminator to the bitumen emulsion.

A further advantage is that in kitchens, the cheaper woodwork may be used, since it can be protected by the tiled strips according to the invention and the tiled strips are easily fixed thereto. The use of the tiled strips of the invention as a gastight and washable wall and ceiling covering in air raid shelters is advantageous, because the hitherto known tiling by means of cement offered only an apparent insulation against gas and water, just as the hygienic qualities of tiled surfaces set in cement are also only apparent.

Dividing walls and cupboard linings can be formed by cementing the tiled strips according to the invention back to back with an interposed layer of wire gauze or the like.

What I claim is:

1. A tile strip, comprising a plurality of adjoining tiles consisting of baked ceramic plates, said tiles being situated one next to the other and extending in a closely spaced single row, a backing attached to the backs of the tiles and extending over the entire row of the tiles and spacing them in said closely spaced relationship, and cementing means attaching said backing to said tiles, whereby said tiles are pliably interconnected at the back, said backing being saturated with said cement.

2. A tile strip, comprising a plurality of adjoining tiles situated one next to the other and extending in a closely spaced single row, a plurality of parallel cords attached to the backs of the tiles and extending over the entire row of the tiles, said cords spacing the tiles in said closely spaced relationship and constituting projections the surfaces of which lie substantially in one plane, the cords being separated from each other by spaces which are wider than the surfaces of the cords, and cementing means attaching said cords to the backs of said tiles, whereby said tiles are pliably interconnected at the back.

3. A tile strip, comprising a plurality of adjoining tiles situated one next to the other and extending in a closely spaced single row, a web attached to the backs of the tiles and comprising parallel threads extending over the entire row of the tiles, said threads spacing the tiles in said closely spaced relationship and constituting projections, the surfaces of which lie substantially in one plane, and being separated from each other by spaces which are wider than the surfaces of the threads, and cementing means attaching said web to the backs of said tiles, whereby said tiles are pliably interconnected at the back, said web being saturated with said cement.

WALTER SCHMOHL.