

March 7, 1967

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3,307,302

SYSTEM OF CONSTRUCTION OF TERRACES WITH DRAINAGE MEANS

Filed July 31, 1963

5 Sheets-Sheet 1

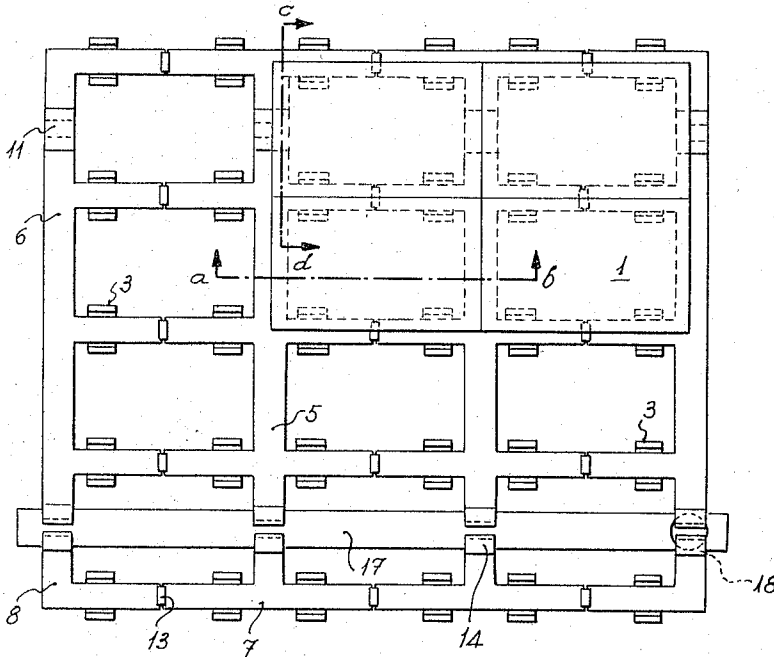


Fig. 1

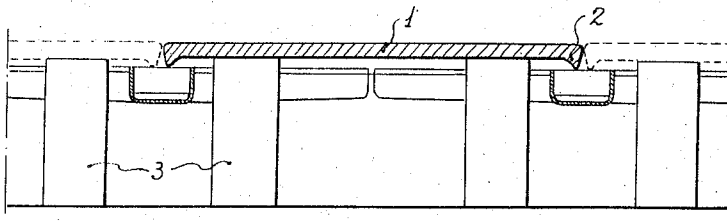


Fig. 2

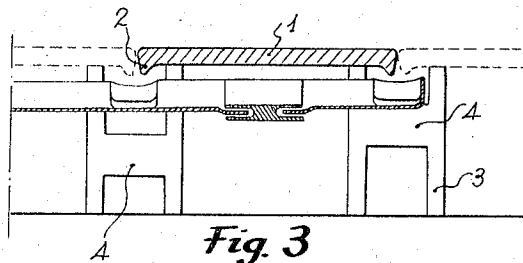


Fig. 3

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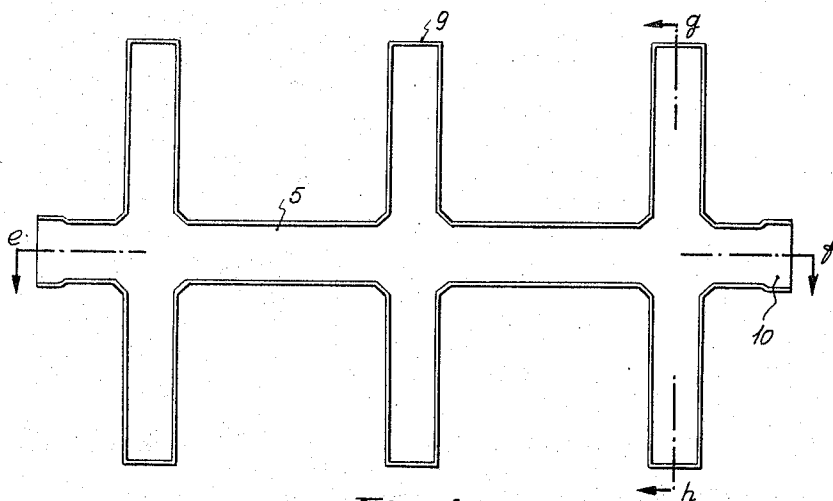


Fig. 4

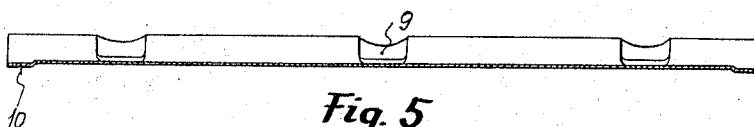


Fig. 5



Fig. 6

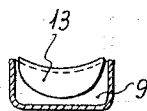


Fig. 7



Fig. 8

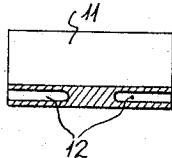


Fig. 9a



Fig. 9b

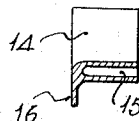


Fig. 10a

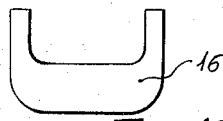


Fig. 10b

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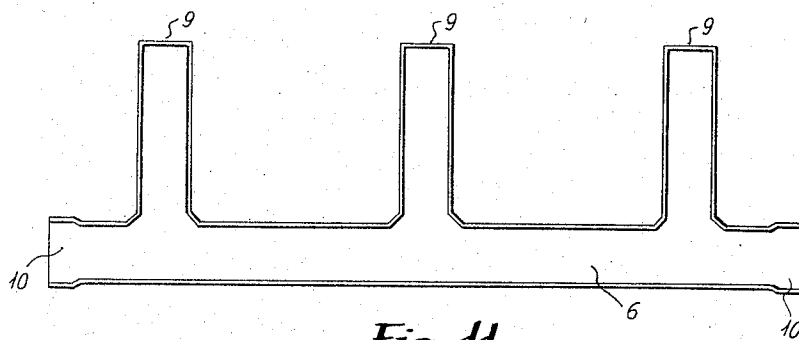


Fig. 11

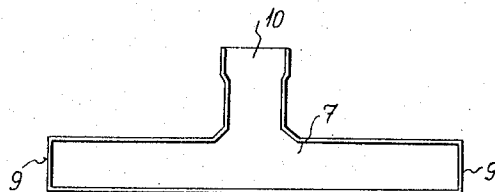


Fig. 12

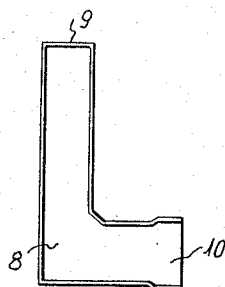


Fig. 13

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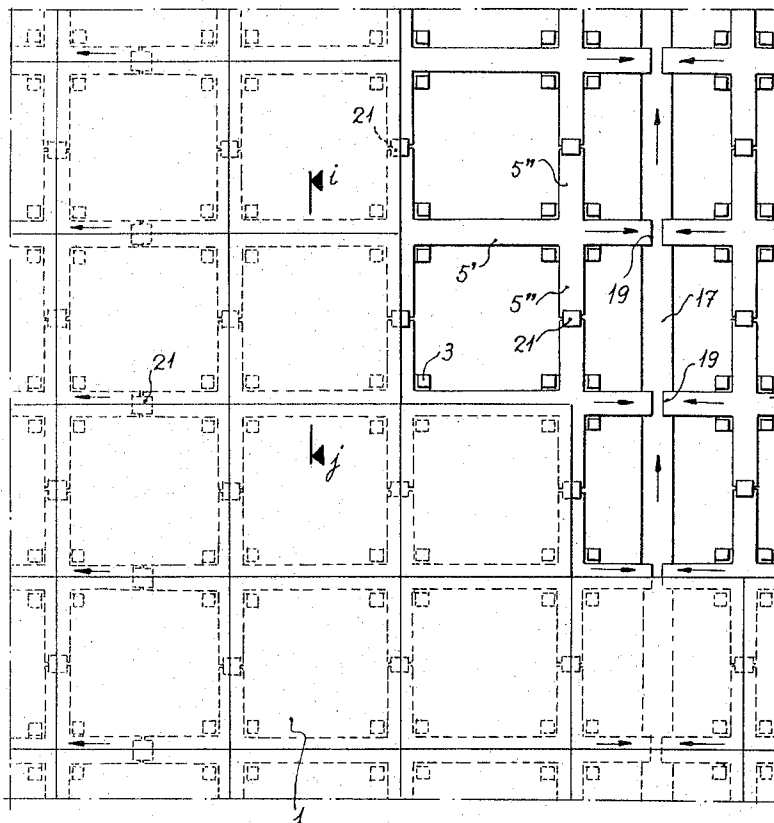


Fig. 14

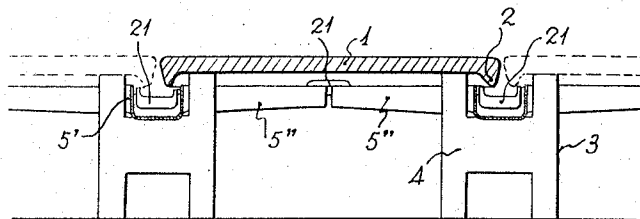


Fig. 15

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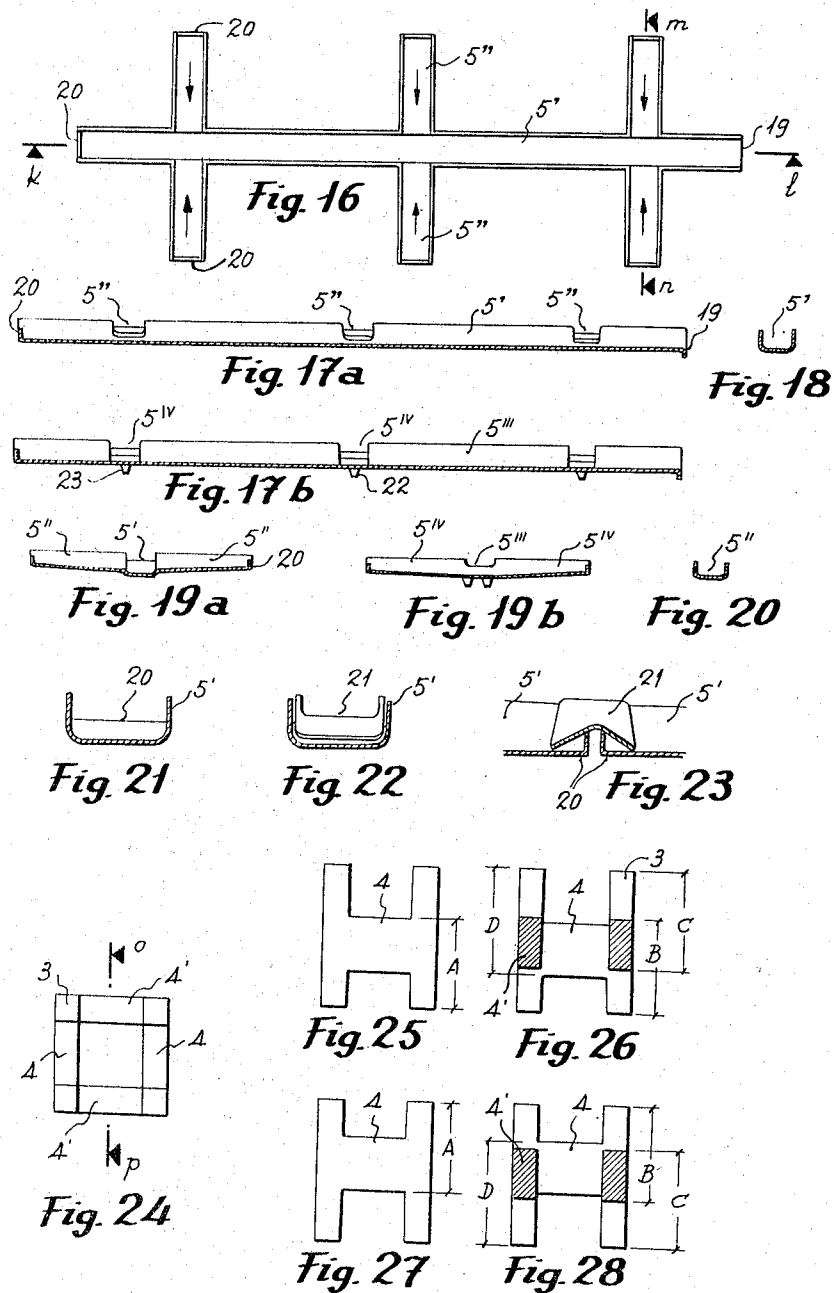
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SYSTEM OF CONSTRUCTION OF TERRACES WITH DRAINAGE MEANS

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SYSTEM OF CONSTRUCTION OF TERRACES WITH DRAINAGE MEANS

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279,748; Feb. 21, 1963, 285,333

9 Claims. (Cl. 52-11)

This invention relates to the construction of substantially flat terraces and, more particularly, to a novel readily assembled and disassembled prefabricated terrace construction.

Terraces constructed in accordance with the present invention have the advantage that the flooring is substantially horizontal with all slopes being eliminated. Furthermore, the terrace is not affected by expansion or contraction of the building structure, and thus is not susceptible to cracking. It may be assembled and disassembled with great rapidity, and can be either totally or partially dismantled, and even re-assembled in another building. Thus, it is also easy to check any point of its surface, as well as to substitute parts which may need replacement or repair. A further feature is that the downspouts may be situated at any part of the terrace floor. The necessity for waterproofing materials is eliminated, with the resultant advantage of there being no longer any dependence on the state of preservation of the materials of the terrace.

The foregoing objectives obtained by the present invention have also been the attempted objectives of the prior art in the constructions of various types of terraces. However, all of the prior art solutions present disadvantageous drawbacks with respect to attainment of their objectives, and not the least of these drawbacks is the complication in construction.

Spanish Patent No. 251,087, issued to the present applicant, proposed a quite satisfactory solution, but the present invention presents important innovations with respect to that patent.

The improvements referred to affect the whole organization and arrangement of the elements, and permit a maximum simplicity in the drainage system. These and other characteristics and advantages will be better appreciated in the description which is given in what follows with reference to the attached drawings, in which there are represented, simply and schematically, and only by way of nonlimitative examples, some preferable forms of implementation, susceptible to all those modifications of detail which do not imply a substantial alteration in the inventive characteristics proper, which, as such, are subsequently claimed.

In the said drawings:

FIGURE 1 represents a plan view of a terrace in accordance with the patent, in which there has been eliminated a large number of the tiles or slabs to make more clearly visible other details of the complex.

FIGURE 2 is the section indicated by *a-b* in FIGURE 1.

FIGURE 3 is the section *c-d* of the same FIGURE 1.

FIGURE 4 is a detailed plan view of a water drainage pipe or gutter system.

FIGURE 5 shows the section of the same water drainage system through *e-f*, as is indicated in FIGURE 4.

FIGURE 6 is the section through *g-h* of the same FIGURE 4.

FIGURE 7 is the section of one of the branches of the drain pipe system, permitting there to be seen in elevation the bent which covers what would be a passage for the water in the event of the bent being lacking.

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FIGURE 8 is an axial section of the bent which has just been mentioned.

FIG. 9a is a longitudinal section, and FIG. 9b is an end elevation view, of one of the connection pieces of the drainage system.

FIG. 10a is a longitudinal section, and FIG. 10b is an end elevation view, of one of the finishing pieces forming spillways for the drainage system.

FIGURES 11, 12 and 13 are plan views of three other catchment pieces of analogous function to that illustrated in FIGURE 4, which, as will be appreciated from FIGURE 1, complete with water catchment or drainage complex.

FIGURE 14 is a plan view of a terrace, modified with respect to the details illustrated in previous figures, but always within the scope of the invention. Here also part of the floor tiles have been eliminated in order that there may be more clearly appreciated the internal organization of the supports and drainage elements.

FIGURE 15 is a section in accordance with *i-j* of FIGURE 14.

FIGURE 16 is a plan view of the fundamental water catchment piece of FIG. 14.

FIGURE 17a is a section in accordance with *k-l* of FIGURE 16.

FIGURE 17b is a possible modification, represented in a section analogous to FIGURE 17a, of the water catchment piece.

FIGURE 18 is a transversal section of the central channel of the water catchment piece, in accordance with the conception of FIGURE 17a.

FIGURE 19a is a section in accordance with *m-n* of FIGURE 16.

FIGURE 19b is the same type of section, in accordance with the modification of FIGURE 17b.

FIGURE 20 is a transversal section of one of the branches of the water catchment piece.

FIGURE 21 is a transversal section of the central channel of the piece illustrated in FIGURE 16, looking towards the upper end of the said piece.

FIGURE 22 is a section identical with that represented in the previous figure, with the covering piece in place.

FIGURE 23 represents, in longitudinal section, the ends of the two water catchment pieces, with their covering element in place.

FIGURE 24 is a plan view of a supporting element, in accordance with FIGURES 14 and 15.

FIGURE 25 is a lateral view of the same supporting element.

FIGURE 26 is a section in accordance with *o-p* of FIGURE 24.

FIGURE 27 is a lateral view of the same supporting element shown in FIGURES 14, 15 and 25, in an inverted position with respect to this latter figure.

FIGURE 28 is the same section *o-p* of FIGURE 26, in an inverted position with respect to the latter.

In accordance with all the foregoing, with particular reference to FIGURES 1 to 13, the tiles or slabs 1 which constitute the terrace have a flat upper face, and the whole of their under surface is shaped like a condensation gutter 2.

Some H-pieces 3 rest on the beams of the roof of the building, and upon these in turn are supported the tiles 1 in the manner described in what follows.

The intermediate or horizontal arm or branch 4 of each H block 3 is displaced with respect to the middle zone of the vertical branches or arms of the said H-pieces.

These parts 4 are destined for the support of the water catchment pieces. These water catchment pieces, 5, 6, 7, 8, should obviously be arranged with an adequate slope so that the water may flow towards the gutters, or the

gutter, or catchment pieces which feed into the drain pipes.

By siting the pieces 3 in such a manner that in the points up-stream part 4 is high, and in the points down-stream the same part is low, we succeed in giving the pieces supported on the said parts 4 the slope desired, as a function of the eccentricity of 4 and of the separation between the supports 3. The intermediate supports are filled with mortar to give each part 4 the appropriate intermediate height, such as may be seen to the left of FIGURE 3.

The pieces 1 rest upon the upper ends of the pieces 3, and since all of them are of the same height, the terrace is horizontal.

The joints between the pieces 1 are thus effected precisely on the catchment pieces 5, 6, 7, 8, as may be clearly appreciated in FIGURES 1, 2 and 3. Thus, because of the shape in gutter 2, the water flows easily through the joints between the pieces 1, and falls into the said catchment pieces.

These pieces are conceived with the necessary dispositions for the perfect formation of a rectangularly reticulated grid. Thus, in plan, these pieces may have the form of a simple angle 8, as in FIG. 13, a simple T 7 as in FIG. 12, a main channel 6 having plural lateral extensions on one side, as in FIG. 11, or a main channel 5 having plural lateral extensions on both sides, and aligned with each other, as in FIG. 4.

The ends of some arms of the above-mentioned catchment pieces are closed by a baffle the upper edge of which has a concave curvature 9. Other ends have, in their bottom and side walls, an expansion 10 to facilitate the reception of the joining pieces 11 or the spillway pieces 14.

All the pieces which go to form the whole of the catchment system situated immediately below the gutters 2 are made of a strong, light waterproof material, preferably fireproof, such as, for example, fibre cement.

To fulfill their function of joining elements, the pieces 11 have slots or channels 12. These pieces give continuity to the water catchment pieces in the zones in which they join them.

With the aim of not forming a rigid network, and thus facilitating the assembly and dismantling, the substitution of parts, and the elimination of tensions produced by contractions or expansions, the mutual coupling of another series of arms is effected by placing the baffles 9 butt to butt and situating upon them, in an overlapping manner, the small pieces 13, as may be appreciated in detail in the FIGURES 7 and 8. The concavity on the upper side of these makes it possible to lodge, without difficulties in the zone concerned, the gutters 2.

The ends 10 which are to constitute the water outlet are fitted with pieces 14, provided with a groove, slot, or channel 15 analogous to each one of the two which the joining pieces 11 have, but the pieces 14 terminate in a vertical apron 16 which constitutes the spillway through which the waters fall to the catchment gutter 17, along which they reach the drain pipe 18.

The example illustrated in FIGURES 14 to 16, 17a, 18, 19a and 20 to 28 is, perhaps, more simple in conception.

In FIGURE 14 there is represented a terrace constructed by means of independent square tiles 1, which are supported on some prefabricated elements 3 endowed with four supporting points. These elements 3 replace the H-pieces previously mentioned and, to a certain extent, may be considered as being constituted by the lateral coupling of two of the said H-pieces.

The tiles 1 show in section the same form as those described above. They are supported on four points corresponding to the vertical elements, situated at the crossings of the channels of the water catchment pieces, that is to say at the confluence between the branches 5'' and the central channel 5' of the said pieces. In FIGURE 15 there is shown the arrangement of the covering piece 21 which links two ends of two branches 5'', or of two central channels 5'.

The water catchment pieces are constituted by a central channel 5' and three branches 5'' on each side, which discharge end-to-end with slopes descending towards the main channel 5'. One end of the main channel 5' is closed by means of the flange 20, while the other end 19 remains open, providing the arrangement of a spillway. Likewise the ends of the two branches 5'' are provided with flanges in a similar manner.

Due to the constitution of these catchment pieces, the water descends towards the central channel 5', it being necessary to site this with a slope descending towards the open end 19 which flows into one of the catchment channels 17—the general catchment channels—as is shown in FIGURE 14.

The support and slope are effected by means of the piece 3 represented in FIGURES 24 to 28 in full detail. In these figures there is shown the said piece 3, constituted by four vertical supports joined by cross-pieces 4 and 4'. These cross-pieces are situated at different heights, that is to say at different spacing of their edges with respect to the ends of the supports. Consequently, according as to whether the piece 3 is situated in one or another position, and whether the central channel 5' is supported, in accordance with FIGURE 15, on the edge of one or other of the cross-pieces 4 or 4', the level of support is different, and may be that which corresponds to the elevations A, B, C and D. This possibility of the graduation of the level of the supports makes it possible to give the slope desired to the water catchment piece, shown in plan view in FIGURE 16, but maintaining, however, the support of the tiles 1 at a constant level.

The links between the branches 5'' as well as the links between the ends 20 which correspond, as has already been indicated, to the point of greatest height of the catchment piece, are made by means of the pieces 21, which have a form similar to that of a saddle (analogous to pieces 13), placing them in such a way that they cover the flanges 20 to avoid water being introduced from the joining line between the tiles 1. Consequently, the said pieces 21 determine the joining line of two consecutive slopes.

With reference now to FIGURES 17b and 19b, there may be seen some appendices or lower legs 22, 23 under the crossings of the central channel 5'', with its lateral channels 5''', crossings which are now effected in such a way that the bottoms of 5''' and 5''V remain at the same height. The said appendices 22, 23 serve for the support of the channels on the transversal arms 4, 4' of the supports 3 (FIGURES 24 to 28) without the necessity of those transversal arms having the clearances of different heights previously referred to. Thus, in order to produce adequate slopes with the pieces conceived in accordance with FIGURES 17b and 19b, supports 3 are used in which A, B, C and D have equal mutual values.

The different lengths or heights between 22 and 23 determine, together with the third crossing, not provided with such appendices, the appropriate alignment for the sloping assembly of the central channel 5'''.

What is claimed is:

1. A terrace construction comprising, in combination, a plurality of individual H-shape, vertically elongated, substantially identical blocks resting loosely in longitudinally spaced relation on base means such as substantially parallel support beams; each block being an integral member including a pair of substantially parallel equal length legs interconnected by a substantially horizontal cross bar disposed nearer to one end of the block than to the other end, and spaced substantially from both ends; said blocks being positioned to define, in plan, a series of substantially congruent rectangles; a plurality of substantially congruent rectangular tiles each having a substantially flat upper surface and downwardly and inwardly sloping peripheral edges forming peripheral lips around the lower surface of the tile, each tile resting loosely on the upper ends of four of said blocks and having rectangular dimen-

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sions such as to extend substantially to the vertical plane midway between the legs of the supporting tile; adjacent tiles being in substantial abutment with each other at the lateral edges of their upper surfaces; and a rectangularly reticulated gutter network loosely resting on cross bars of said blocks and including respective branches each extending beneath the abutting edges of adjacent tiles; said gutter network having a drainage slope provided by orienting said blocks so that the blocks at the upper end of said slope have their cross bars nearer the upper ends of their legs, and the blocks at the lower ends of said slope have their cross bars nearer the lower ends of their legs.

2. A terrace construction, as claimed in claim 1, including filler means on the cross bars of blocks intermediate those at the upper end of said slope and those at the lower end of said slope to provide support for said gutter network between the upper end of said slope and the lower end of said slope.

3. A terrace construction, as claimed in claim 1, in which said gutter network comprises a plurality of channel-cross section gutter sections, each section including at least a pair of legs extending perpendicularly to each other whereby said sections may be combined to form said rectangularly reticulated network.

4. A terrace construction, as claimed in claim 3, in which certain of said legs have vertical baffles at their ends, said baffles having a concave upper edge; one end of at least one leg being open and being expanded to receive connection pieces joining gutter sections to each other.

5. A terrace construction, as claimed in claim 4, in which a pair of said sections have their baffled end legs in abutment; and an inverted channel-shaped connecting piece extending over the abutted baffles and having a concave upper edge.

6. A terrace construction, as claimed in claim 4, including connecting pieces joining the open ends of legs of a pair of gutter sections; said last-named connection pieces being of channel-shape cross section and fitting said expanded ends in such a manner that the inner surfaces of said channel-shape cross section of said connecting pieces are substantially flush with the inner surface of the joined sections; each connecting piece having a slot extending inwardly from each end thereof and receiving the expanded ends of the adjacent sections.

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7. A terrace construction, as claimed in claim 4, including terminal members each secured to the open expanded end of a leg of a gutter section; said terminal members each having a channel-shape cross section and having their inner surfaces flush with the inner surfaces of the leg to which they are attached; the channel-shape cross section of said terminal members having a slot extending inwardly from one end face and receiving the expanded portion of the associated leg; the other end of each terminal piece having a downwardly extending flange constituting a spillway for discharge of water.

8. A terrace construction, as claimed in claim 1, in which each H-shape block comprises four vertical legs arranged at respective corners of a rectangle and equal in height, each pair of legs being interconnected by a cross bar so that there are four cross bars; the cross bars being arranged in pairs, each including a pair of substantially parallel cross bars at the same height; one pair of cross bars being disposed in vertically offset relation relative to the other pair of cross bars, whereby to provide appropriate support for said gutter network along said slope by proper orientation of said H-shape block.

9. A terrace construction, as claimed in claim 8, in which the branches of said gutter network are channel shaped in cross section; each branch having projections extending downwardly from its lower surface and spaced longitudinally thereof, said projections being progressively different in height whereby, by engagement with said cross bars, to provide said slope.

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