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(54) **Prefabricated element assembly for making barrier arrangements in rivers and the like.**

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PATENT ABSTRACTS OF JAPAN vol. 8, no. 280 (M-347)(1717) 21 December 1984 & JP-A-59 150 810 (SUMITOMO KINZOKU KOGYO K.K.) 29 August 1984

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Description

BACKGROUND OF THE INVENTION

The present invention relates to a prefabricated element assembly, for making barrier arrangements to be used in water courses and specifically in rivers.

As is known (e.g. from GB 2025494), along the torrential path of a water course, in particular if the latter extends on a water bed which can be easily eroded, there are conventionally provided suitable fabricated elements.

These fabricated elements are built through the overall bed of torrents under "excavation conditions", that is under those conditions in which, during water spates, the solid materials forming the bed are quickly removed.

These fabricated elements substantially operate to reduce the water stream flow rate or speed, and, accordingly, to reduce the eroding power of the water stream itself.

Also known is that conventional fabricated elements used for the above indicated applications comprise a plurality of cross barrier elements, which are conventionally called "weirs".

Each weir, by reducing the speed of the upstream water, favours a deposit of the transported solid material, which accumulates behind the weirs.

These weirs, in actual practice, transform the altimetrical profile of the water bed into a plurality of subsequent steps and portions of small slope.

In this connection it should be pointed out that these conventional weirs are usually made of a stone material walling, the stones of which are restrained by mortar or by dry restraining methods, or by using cement concrete (either reinforced or not) or mixed constructions of wood and stones.

Accordingly, the installation of the mentioned weirs is comparatively complex, mainly with respect to the making of the hollow provided in the profile of the top margin or "crest" thereof.

The thus made fabricated elements, moreover, are not adapted to provide a suitable mechanical strength, mainly against great stresses.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing a prefabricated element assembly which allows to greatly simplify the making method of the mentioned weirs as conventionally used in water course beds.

Within the scope of the above mentioned aim, a main object of the present invention is to provide a prefabricated element assembly, for making barriers for application in water courses, in particular in rivers, which provides fabricated elements which are very reliable construction-wise.

Another object of the present invention is to provide a prefabricated element assembly, for making barriers for application in water courses, which can be used in a very flexible way.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a prefabricated element assembly, for making barriers to be used in river beds and the like, characterized in that said element assembly comprises a plurality of box caissons each having a substantially parallelepipedal shape, of box-caissons having a rectangular trapezium profile, of square plates and of rectangular plates including a projection along one of the longer sides thereof, the mentioned box caissons and the rectangular plates being adapted to be joined to one another and superimposed onto one another forming the weir, the mentioned square plates being adapted to be joined to one another forming the sill, and the elements being furthermore adapted to be mutually restrained by beams, rods or other mechanical restraining elements.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the prefabricated element assembly according to the present invention, will become more apparent from the following detailed disclosure of a preferred, though not exclusive, embodiment thereof, which is illustrated, by way of an indicative but not limitative example, in the figures of the accompanying drawings, where:

Figures 1, 2 and 3 are perspective views respectively showing three types of box caissons having a parallelepipedal shape, and different size;

Figure 4 illustrates a box caisson having a trapezoidal profile;

Figures 5 and 6 respectively show a flat plate and a plate with a projection;

Figure 7 is a top plan view showing a barrier made by using the above mentioned elements; and

Figures 8 and 9 are respectively a longitudinal cross-sectional view and a cross-sectional view of the barrier.

DESCRIPTION OF THE PREFEREED EMBODIMENT

With reference to the figures of the accompanying drawings, the prefabricated element assembly for making barriers to be applied in river

beds according to the present invention, comprises a box caisson 1 including a reinforced concrete box like construction, having a substantially parallelepipedal shape.

More specifically, this box caisson has unit height and depth and a double width, and is provided on its small walls with a plurality of gaps 2.

With the above mentioned first box caisson, a second box caisson 3 cooperates, which has a unit size and is open through one of its walls, there being moreover provided a third cooperating box caisson 4 closed through its four walls and having a suitably greater depth.

The subject prefabricated element assembly further comprises another box-like construction 5, also having unit depth and height and a double width.

This box-like construction, in particular, is open on one of the small sides thereof, where the two longitudinal walls 5′ thereof are suitably slanted.

With the above mentioned box-like constructions or box caissons, cooperate moreover a square plate 6 and a rectangular plate 7, or cover plate, which is provided with a projection 7′ on one of its larger walls.

In this connection it should be pointed out that the square plate is provided, on two opposite sides thereof, with annular ridges 8, which are adapted to house anchoring rods 9.

The rectangular plate 7, in turn, is provided, at the edge portion thereof, with a plurality of throughgoing holes 10 which are adapted to house a respective end portion of cross-restraining rods.

In operation, by arranging the above mentioned box caissons adjoining one another and superimposed onto one another with a longitutidinal gap, it is possible to make the foundation 11 and to perform the elevation 12 of the weir indicated at 13.

In particular, the hollow formation of the weir, indicated at 14, is laterally delimited by the trapezoidal box caissons 5.

At the top of the box caissons defining the bottom line of the hollow, moreover, there are restrained, by means of rods passing through the holes 10, the rectangular plates or cover plates 7.

The latter, in operation, will provide a better stability for the construction, and, moreover, will favour the flowing of the water.

Downstream of the mentioned weirs there is provided a sill element 15, which is suitably slanted, and which is obtained by joining and mutually restraining a plurality of plates 6.

At the end of the mentioned sill, there is provided a cross beam 16, made of box caissons, followed by two or more rows of plates 6, equal to the above indicated plates, but not restrained.

In this connection it should be moreover added that after installation, the mentioned box caissons will be filled by ciment mortar, concrete or the like.

From the above disclosure and the figures of the accompanying drawings, it should be apparent that the present invention fully achieves the intended aim and objects.

While the invention has been disclosed and illustrated with reference to a preferred embodiment thereof, it should be apparent that the disclosed embodiment is susceptible to several modifications and variations, all of which will come within the spirit and scope of the appended claims.

Claims

1. A prefabricated element assembly, for making barrier arrangements to be used in river beds and the like, characterized in that said element assembly comprises a plurality of box caissons (1, 3, 4) each having a substantially parallelepipedal shape, of box caissons (5) having a rectangular trapezium profile, of square plates (6) and of rectangular cover plates (7) including a projection (7') along one of the longer sides thereof, the mentioned box caissons (1, 3, 4, 5) and the cover plates (7) being adapted to be joined to one another and superimposed onto one another forming the weir (13), the mentioned square plates (6) being adapted to be joined to one another forming the sill (15) and the elements (1, 3, 4, 5, 6, 7) being furthermore adapted to be mutually restrained by beams, rods or other mechaniccal restraining elements.

2. A prefabricated element assembly according to claim 1, characterized in that said box caissons (1, 3, 4) comprise a box-like reinforced concrete construction, and that one of said box caissons (1) has unit height and depth and a double width, and being provided with a plurality of gaps (2) on the small walls thereof.

3. A prefabricated element assembly according to the preceding claims, characterized in that said assembly further comprises a further box caisson (3) having unit size and open through one of the walls thereof, as well as yet another box-caisson (4) closed on the four walls thereof and having a larger depth.

4. A prefabricated element assembly according to the preceding claims, characterized in that said assembly further comprises another box caisson (5) also having unit depth and height and a double width, said further box caisson (5) being open on one of the small sides thereof where the two longitudinal walls (5') of said further construction are suitably slanted.

5. A prefabricated element assembly according to claim 1, characterized in that said square plate (6) is provided, on two opposite sides thereof, with a plurality of annular ridges (8) adapted to house anchoring rods (9) and that said rectangular plate (7), in turn, is provided, near an edge thereof, with a plurality of throughgoing holes (10) adapted to house a respective end portion of cross restraining rods.

6. A prefabricated element assembly according to one or more of the preceding claims, characterized in that said box caissons (1) provided with said longitudinal gaps are adapted to be arranged adjoining one another and superimposed onto one another so as to provide the foundation (11) and elevation (12) of the weir (13), the hollow portion (14) of which is laterally defined by the trapezoidal shape box caissons (5).

7. A prefabricated element assembly according to one or more of the preceding claims, characterized in that said rectangular plates (7) being used as cover plates, are affixed by means of rods passing through related holes (10), at the top portions of the box caissons defining the bottom line of said hollow portion (14) and that the sill (15), provided downstream of the weir (13), is made by adjoining and mutually restraining, by rods, a plurality of said flat plates (6).

8. A prefabricated element assembly according to one or more of the preceding claims, characterized in that said box caissons are adapted to be mutually engaged so as to provide a cross beam (16) followed by two or more rows of plates equal to the mentioned plates (6) but not restrained.

Patentansprüche

1. Eine Zusammensetzung vorgefertigter Teile zur Herstellung von Sperranordnungen, die in Flußbetten und dergleichen verwendet werden, dadurch gekennzeichnet, daß diese Zusammensetzung von Teilen eine Vielzahl von Kistencaissons (1, 3, 4) umfaßt, jeder eine im wesentlichen parallelepipedale Gestalt besitzend, von Kistencaissons (5), ein rechtwinkliges Trapezprofil besitzend, von viereckigen Platten (6) und von rechtwinkligen Deckplatten (7), einschließend einen Uberhang (7') entlang einer der längeren Seiten davon, die erwähnten Kistencaissons (1, 3, 4, 5) und die Deckplatten (7) angepaßt, miteinander verbunden zu werden und übereinandergelegt zu werden, das Wehr (13) bildend, die erwähnten viereckigen Platten (6) angepaßt, miteinander verbunden zu werden die Sohle (15) bildend und die Teile (1, 3, 4, 5, 6, 7), weiterhin angepaßt, wechselseitig durch Balken, Stangen oder andere mechanische Halteteile gehalten zu werden.

2. Eine Zusammensetzung vorgefertigter Teile gemäß Anspruch 1, dadurch gekennzeichnet, daß diese Kistencaissons (1, 3, 4) eine kistenähnliche Stahlbetonkonstruktion umfassen, und daß einer dieser Kistencaissons (1) Einheitshöhe und -tiefe und doppelte Weite besitzt und mit einer Vielzahl von Öffnungen (2) an seinen kleinen Wänden bereitgestellt ist.

3. Eine Zusammensetzung vorgefertigter Teile gemäß den vorstehenden Ansprüchen, dadurch gekennzeichnet, daß diese Zusammensetzung weiterhin einen weiteren Kistencaisson (3) umfaßt, Einheitsgröße besitzend und offen durch eine der Wände davon, ebenso wie noch einen anderen Kistencaisson (4), geschlossen auf den vier Wänden davon und eine größere Tiefe besitzend.

4. Eine Zusammensetzung vorgefertigter Teile gemäß den vorstehenden Ansprüchen, dadurch gekennzeichnet, daß diese Zusammensetzung weiterhin einen weiteren Kistencaisson (5) umfaßt, ebenso Einheitstiefe und -höhe und doppelte Weite besitzend, dieser weitere Kistencaisson (5) ist offen an einer der Schmalseiten davon, wo die beiden longitudinalen Wände (5') dieser weiteren Konstruktion geeignet geneigt sind.

5. Eine Zusammensetzung vorgefertigter Teile gemäß Anspruch 1, dadurch gekennzeichnet, daß diese viereckige Platte (6) an zwei gegenüberliegenden Seiten davon mit einer Vielzahl von ringförmigen Rippen (8) bereitgestellt ist, angepaßt, Verankerungsbolzen (9) aufzunehmen, und daß diese rechtwinklige Platte (7) ihrerseits, nahe einer Kante davon, mit einer Vielzahl von durchgehenden Löchern (10) bereitgestellt ist, angepaßt, ein jeweiliges Endteil von Kreuzhaltebolzen aufzunehmen.

6. Eine Zusammensetzung vorgefertigter Teile gemäß einem oder mehreren der vorstehenden Ansprüche, dadurch gekennzeichnet, daß diese Kistencaissons (1), bereitgestellt mit diesen longitudinalen Öffnungen, angepaßt sind, benachbart zueinander angebracht zu werden und aufeinander geschichtet zu werden, um so das Fundament (11) und die Höhe (12) des

Wehrs (13) bereitzustellen, dessen Hohlteil (14) durch die Kistencaissons mit Trapezgestalt lateral festgelegt ist.

7. Eine Zusammensetzung vorgefertigter Teile gemäß einem oder mehreren der vorstehenden Ansprüche, dadurch gekennzeichnet, daß diese rechtwinkligen Platten (7), gebraucht als Deckplatten, mit Hilfe von Bolzen befestigt sind, hindurchgehend durch entsprechende Löcher (10) an den Oberteilen der Kistencaissons, die Grundlinie dieses Hohlteils (14) festlegend, und daR die Sohle (15), unterhalb des Wehrs (13) bereitgestellt, durch Aneinandergrenzen und wechselseitigem Halten, durch Bolzen, einer Vielzahl dieser Flachplatten (6) hergestellt ist.

8. Eine Zusammensetzung vorgefertigter Teile gemäß einem oder mehreren der vorstehenden Ansprüche, dadurch gekennzeichnet, daß diese Kistencaissons angepaßt sind, wechselseitig verbunden zu werden, um so einen Querträger (16) zu bilden, gefolgt von zwei oder mehr Reihen von Platten, gleich den erwähnten Platten (6), aber nicht gehalten.

Revendications

1. Un assemblage d'éléments préfabriqués, pour réaliser des arrangements de barrières pour l'utilisation dans les lits des rivières et similaires, caractérisé en ce que ledit assemblage d'éléments comprend une multiplicité de caissons-boîte (1, 3, 4) ayant chacun une forme substantiellement de parallélipipède, de caissons-boîte (5) ayant un profil à trapèze rectangulaire, de plaques carrées (6) et de plaques rectangulaires de recouvrement (7) incluant un talon (7') le long de l'un de leurs côtés majeurs, les caissons-boîte (1, 3, 4, 5) et les plaques de recouvrement (7) mentionnés étant adaptés à être couplés entre eux et être superposés en formant le déversoir (13), les plaques mentionnées carrées (6) étant adaptées à être coupées l'une à l'autre en formant le seuil (15) et les éléments (1, 3, 4, 5, 6, 7) étant en plus adaptés à être mutuellement serrés avec des poutres, des barres ou d'autres éléments de serrage mécaniques.

2. Un assemblage d'éléments préfabriqués selon la Revendication 1, caractérisé en ce que lesdits caissons-boîte (1, 3, 4) comprennent une construction en forme de boîte en béton renforcé, et en ce que un desdits caissons-boîte (1) a une hauteur et une profondeur unitaires et une double largeur, et étant pourvu d'une multiplicité d'ouvertures (2) sur ses parois mineures.

3. Un assemblage d'éléments préfabriqués selon les Revendications précédentes, caractérisé en ce que ledit assemblage comprend en plus un ultérieur caisson-boîte (3) ayant une dimension unitaire et ouvert au travers de l'une de ses parois, en dehors d'encore un autre caisson-boîte (4) fermé sur ses quatre parois et ayant une profondeur majeure.

4. Un assemblage d'éléments préfabriqués selon les Revendications précédentes, caractérisé en ce que ledit assemblage comprend en plus un autre caisson-boîte (5), de même ayant une profondeur et une hauteur unitaires et une largeur double, ledit ultérieur caisson-boîte (5) étant ouvert sur l'un de ses côtés mineurs où les deux parois longitudinales (5') de ladite ultérieure construction sont convenablement inclinées.

5. Un assemblage d'éléments préfabriqués selon la Revendication 1, caractérisé en ce que ladite plaque carrée (6) est pourvue, sur deux côtés opposés, d'une multiplicité d'arêtes annulaires (8) adaptées à accueillir des barres d'ancrement (9), et en ce que ladite plaque rectangulaire (7) est pourvue, à son tour, près d'un bord de celle-ci, d'une multiplicité de trous de passage (10) adaptés à loger des parties terminales respectives de barres transversales de serrage.

6. Un assemblage d'éléments préfabriqués selon l'une ou plusieurs des Revendications précédentes, caractérisé en ce que lesdits caissons-boîte (1) pourvus desdites ouvertures longitudinales sont adaptés à être arrangés avoisinants les uns les autres et superposés de manière à donner le fondement (11) et l'élévation (12) du déversoir (13), la partie creuse (14) duquel est définie latéralement par les caissons-boîte (5) en forme trapézoïdale.

7. Un assemblage d'éléments préfabriqués selon l'une ou plusieurs des Revendications précédentes, caractérisé en ce que lesdites plaques rectangulaires (7) étant employées comme plaques de recouvrement sont coupées au moyen de barres passant au travers de trous (10) rélatifs, auprès des parties supérieures des caissons-boîte définant la file de base de ladite partie creuse (14), et en ce que le seuil (15), prévu en aval du déversoir (13), est fait en rapprochant et serrant mutuellement, au moyen de barres, une multiplicité desdites pla-

ques plates (6).

8. Un assemblage d'éléments préfabriqués selon l'une ou plusieurs des Revendications précédentes, caractérisé en ce que lesdits caissons-boîte sont adaptés à être mutuellement enclenchés, de manière à donner une poutre transversale (16) suivie par deux ou plusieurs files de plaques égales aux plaques (6) mentionnées, mais pas serrées.

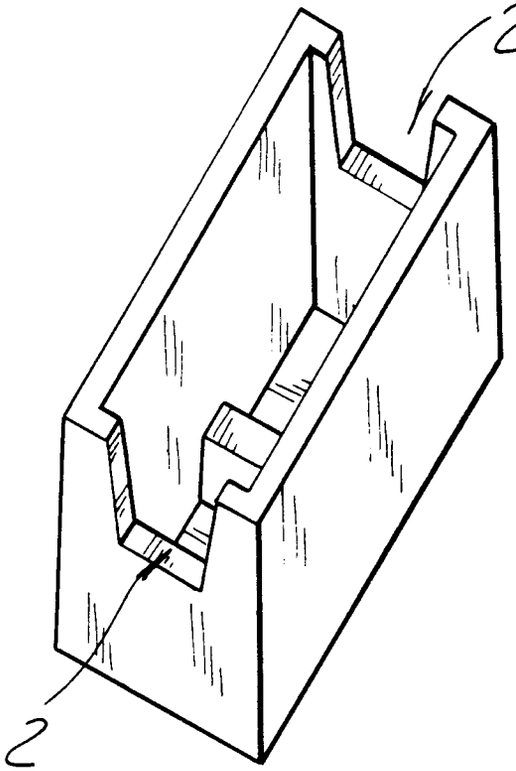


FIG. 1

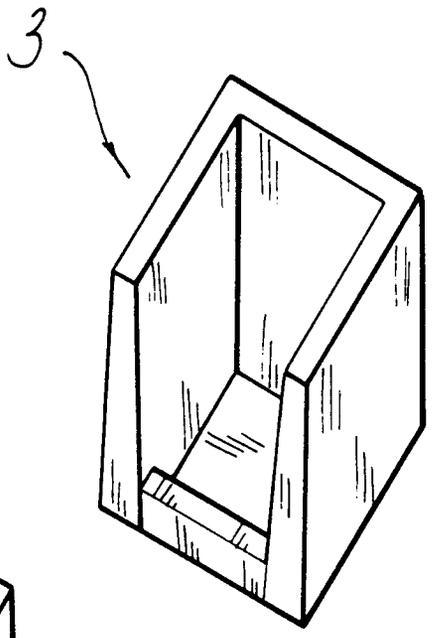


FIG. 2

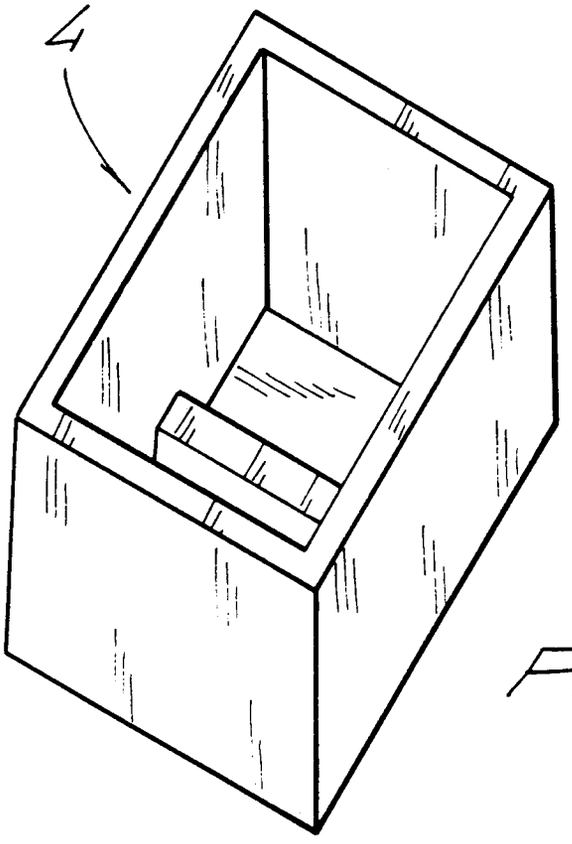


FIG. 3

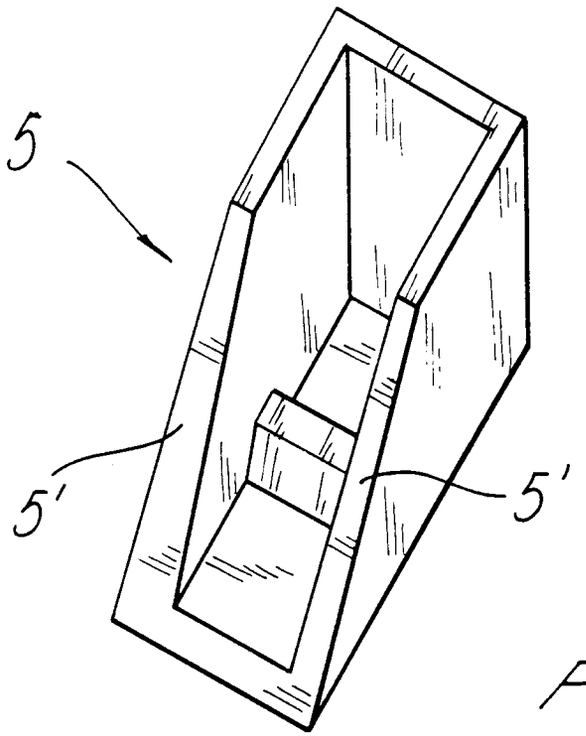


FIG. 4

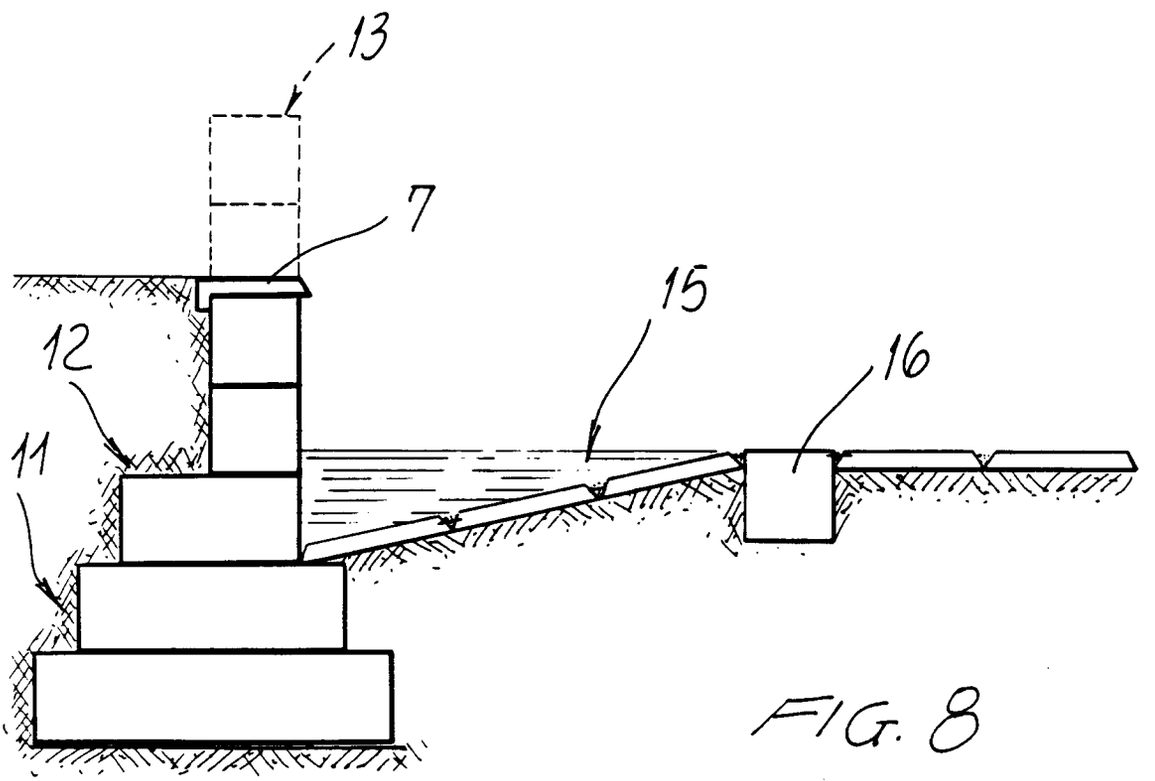


FIG. 8

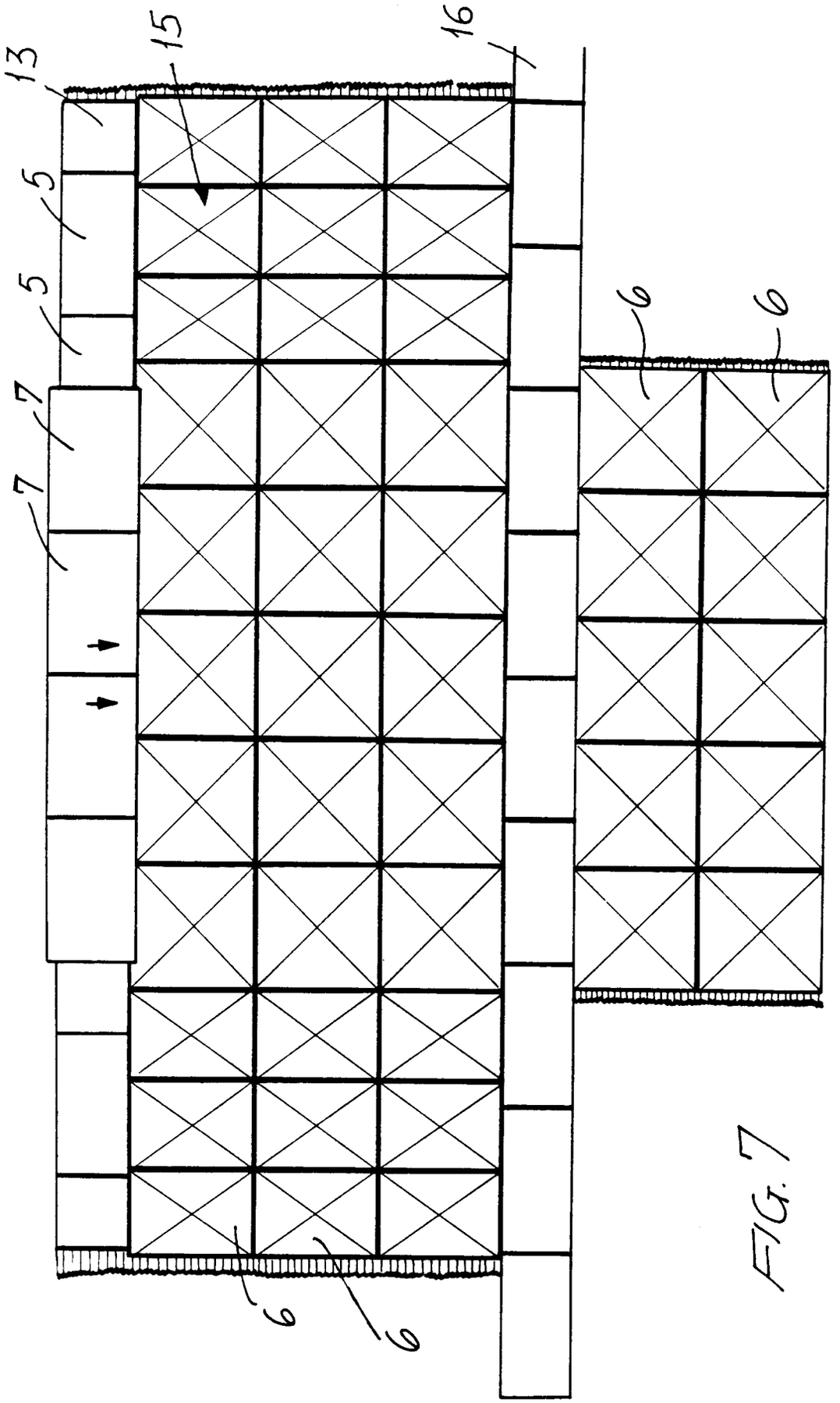


FIG. 7

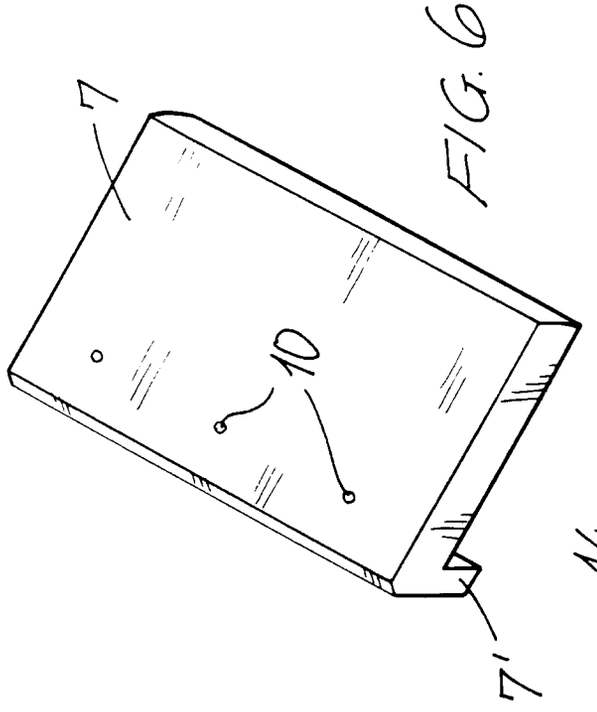


FIG. 6

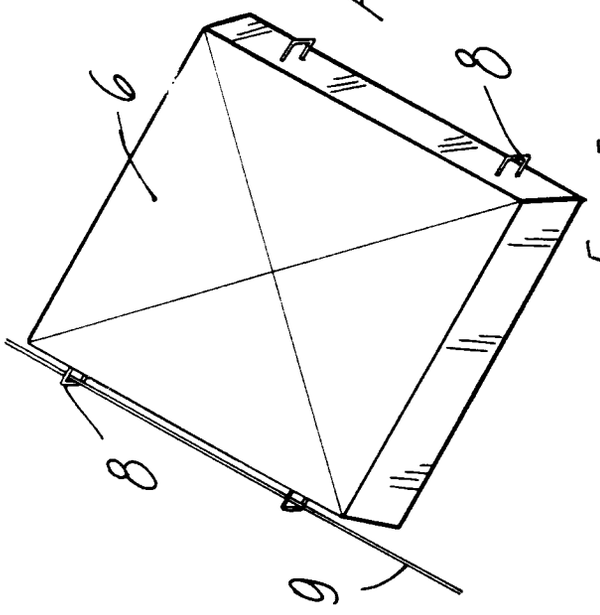


FIG. 5

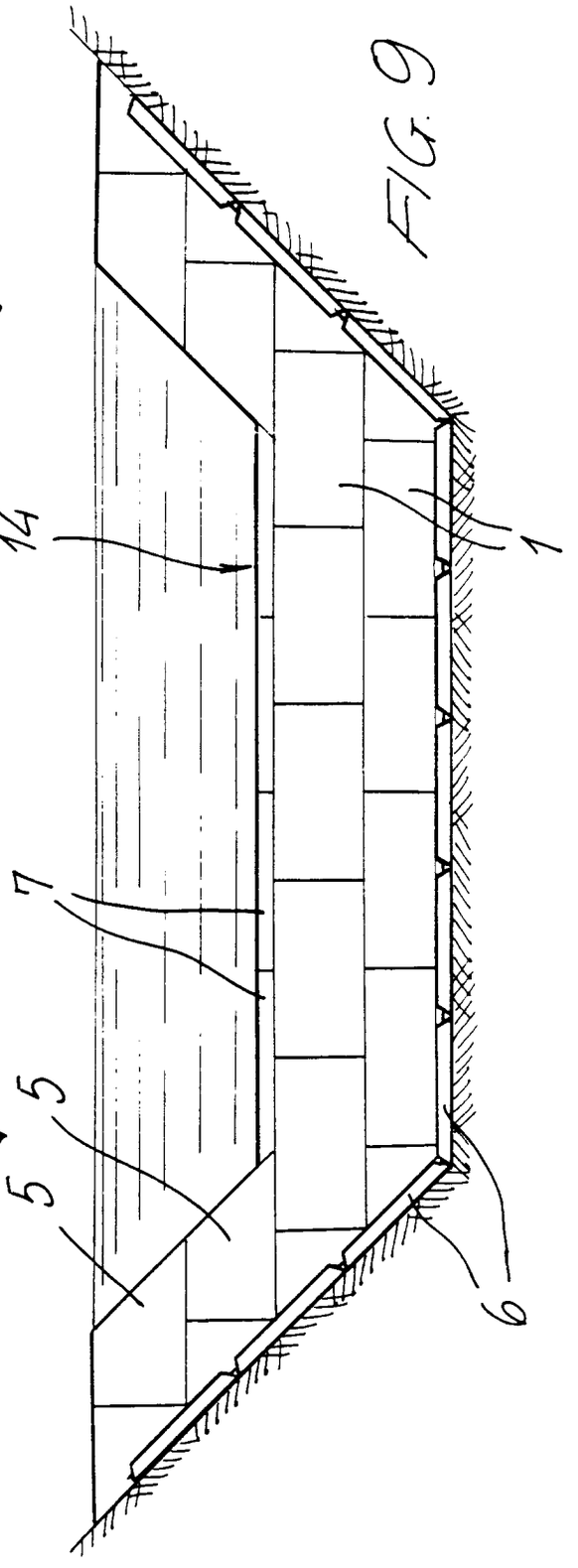


FIG. 9