

Nov. 10, 1942.

K. TEUBER

2,301,592

REVTMENT CONSTRUCTION FOR EMBANKMENTS

Filed Aug. 15, 1939

2 Sheets-Sheet 1

Fig. 1

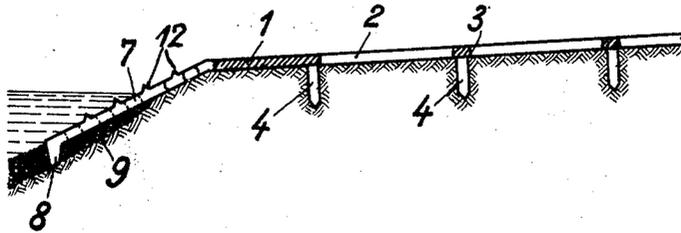
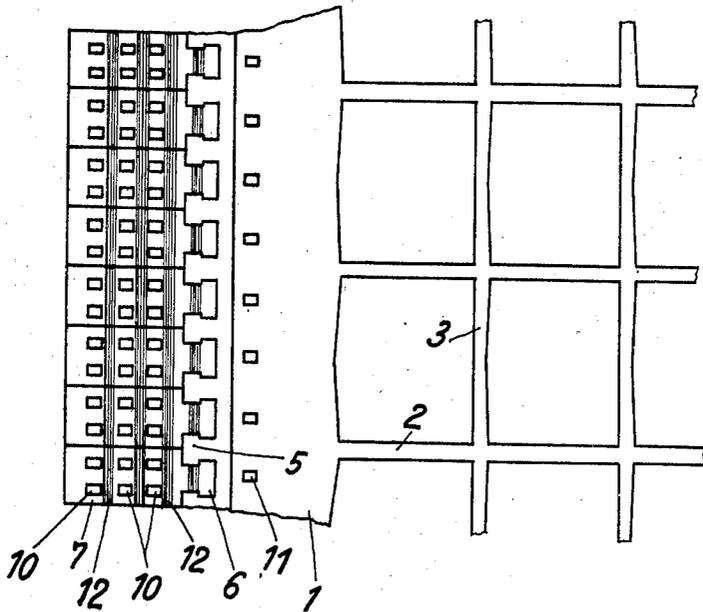


Fig. 2



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2 Sheets-Sheet 2

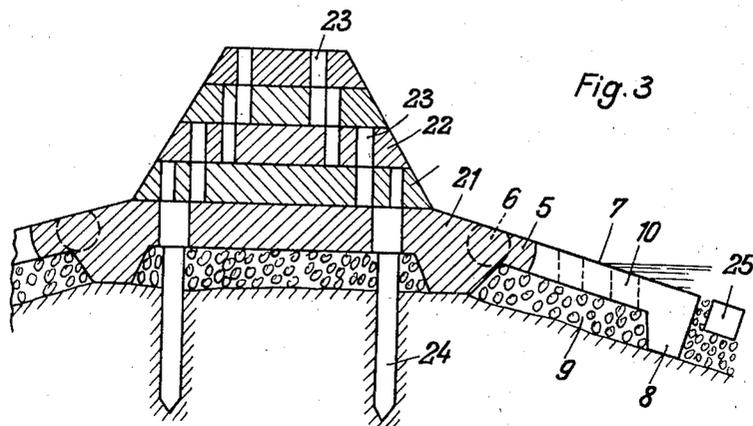


Fig. 3

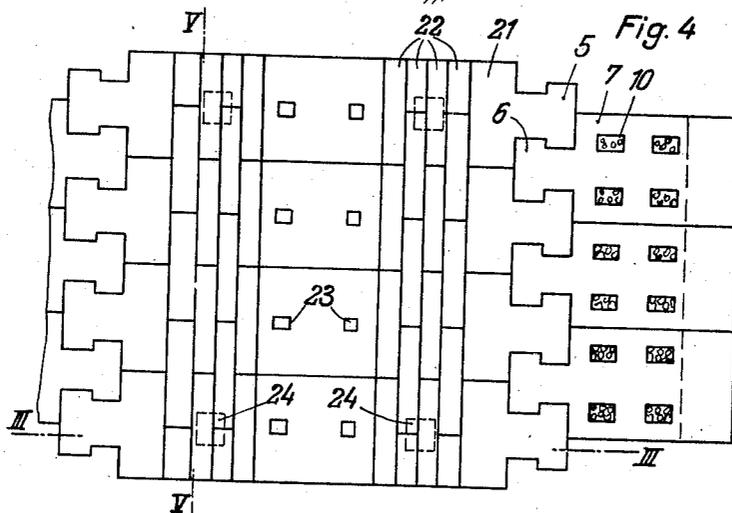


Fig. 4

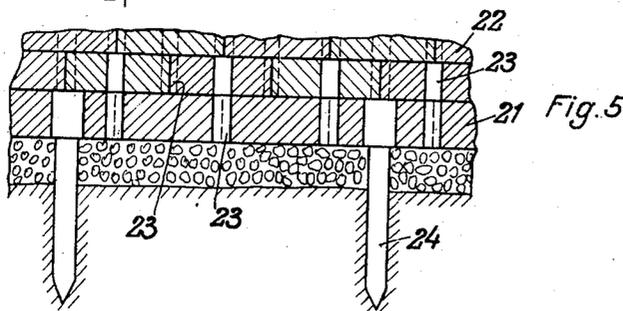


Fig. 5

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UNITED STATES PATENT OFFICE

2,301,592

REVETMENT CONSTRUCTION FOR EMBANKMENTS

Karl Teuber, Hanau-K.-on-the-Main, Germany;
vested in the Alien Property Custodian

Application August 15, 1939, Serial No. 290,253
In Germany August 16, 1938

3 Claims. (Cl. 61—37)

The usual revetments for embankments are composed of willow brushwood fascines with rubble reinforcement, and, if necessary, joined by dry quarry stone masonry perpendicular to the face of the embankment. The durability was, however, owing to the ravages of decay, wave wash, drift of ice and frost out of proportion to the expense, and, moreover, these revetments for embankments were not at all equal to the requirements of traffic, as for instance, when loading or unloading barges. Solid revetments for embankments on the other hand involve extraordinary great expense, which is only justified in a small fraction of all cases.

The invention relates to revetments for the protection of embankments and consists in, that an articulated slab covering, composed of concrete, or a similar material is joined by flexibly coupling-up the slab units or layers to a layer of the elevated parts of the embankment. The division into single, flexibly united slabs, secures elasticity against underwash by strong currents, or other slopings of the ground, as also otherwise, against raisings through frost, and therefore generally, a prevention of possible damage caused by inflexibility of revetments, and thereby such a revetment will fundamentally have a much longer lifetime, and furthermore, should single slabs be damaged by extraordinary force, they may be easily replaced.

The flexible joining of the slabs consists advantageously of hammer-like, and alternately interlocking extensions of the slabs and the elevated embankment revetment. This will mean an absolute weatherproof connection, free from metallic articulations, of sufficient flexibility.

Valuable adjuncts of the slabs consist in the lower flanges with which they are provided, for clinching to the ground or broken stone behind same, as well as slab perforations, to enable the filling-up of the rear at any time. Furthermore valuable are the ledges on the surface of the slabs, parallel to the embankment, for the purpose of walking on same, even when slopes drop off heavily.

The revetment carrying the slabs or layers has the special advantage, that it is composed of a layer of concrete, or similar material, and running like a support along the embankment, with landwards directed extension in a rib- or lattice-work. In this manner the flanged slab is securely anchored in order to hold the articulation slab. Piles which are preferably formed integral with the flanged slab and the ribs or

lattice work secure the whole safely into the ground.

The drawings depict the method of construction of the invention:

5 Fig. 1 shows a cross section of an embankment revetment,

Fig. 2 is a view on same from above,

Fig. 3 is a cross section substantially on the line III—III of Fig. 4,

10 Fig. 4 is a plan view of a groin,

Fig. 5 is a longitudinal section of same taken substantially on the line V—V of Fig. 4.

The embankment above the water level is covered by a flanged slab 1, which according to conditions and distances may be singly run through, or may also be interrupted by flexure joints, and from which extends a lattice work 2, 3 landwards further along. On all essential intersections of the slab and the lattice work, piles 4 are provided integral with these parts within the ground. The whole is suitably rammed or cast at its proper place in casings, or directly placed in cavities dug in the ground, in case of need by forming in reinforcement irons. The lattice work 2, 3 suitably extends so far as appreciable high water levels are to be mastered.

On its waterwards directed edge, the flanged slab 1 passes over in hammer-like extensions 5 with rounded off cross sections of the hammer-head-like parts, and between these parts interlocked hammerhead-like parts 6 of articulation slabs 7 are singly hung in, and form the slope within the range of the water level. These link-like, up and down swinging articulation slabs 7, are provided on their lower edges parallel to the embankment with ledges 8 protruding downwards for retaining the ground or rubble 9 below or other stone ballast. Perforations 10 in the slabs 7 will enable at any time the additional filling behind of ballast to make up for any sinkings. Similar perforations 11 are also provided in the flanged slab 1 for the same purpose.

Upper ledges 12 extend on the slabs 7 parallel to the embankment in order to facilitate walking on same. Also these slabs may contain iron reinforcements of the usual kind.

According to Figs. 3 and 5 finishing slabs 21 are resting on the head of the sea groin covered with rubble 9, said slabs being subdivided transversely. Every third slab 21 is fastened into the ground of the groin by means of reinforced piles 24. On the finishing slabs 21 rest additional transversely subdivided finishing slabs 22, in which reinforced dowels 23 are fastened, which interlock in the openings of the side flanges of

the slabs 22 below or 21 respectively. The dowels consequently interlock into the joints of the slabs below and in this manner they are preventing a sliding movement, against each other, of the slabs below. As longitudinal connection of the slab units with each other also iron rods may be provided, which are suitably carried through the dowels 23. The joints between the slabs 21 or 22 respectively may be filled in by cement mortar or laid-in asphalt, or similar material.

The covering slabs 21 are provided with hammerhead-like extensions 5 with rounded-off cross-section, and in these interlockhammerhead-like extensions 6 of flexible up and down swinging articulation slabs 7, which on their lower edges, parallel to the embankment are again provided with ledges 8 protruding downwards for retaining the rubble 9 underneath same. On the lower edge of the articulation slabs 7, which is situated below the lowest level of the water, is arranged the usual stone mounting 25. In the embodiment shown in Figs. 3 to 5 inclusive slabs 21 and 7 may be assembled as follows: first, one slab 21 is staked in place; then two oppositely disposed slabs 7 are placed in position, the extensions 6 being slipped endwise into the corresponding recesses in the slab 7; the next slab 21 may then be placed in position against the first slab 21, the other extensions 6 of the two slabs 7 fitting endwise into the corresponding recesses in the second slab 21, and so on.

Such groins are arranged in the usual manner perpendicular to the embankment dikes.

A particular advantage of the distribution of the covering slabs 21, 22 into short pieces is, that the production of the revetment is not influenced by the flood entering meanwhile. The concrete structures are completely made on a work place which is secure against inundations; they are only transferred to the groins during ebb tide when they have completely hardened.

I claim:

1. Embankment revetment for dikes, groins and the like, comprising an upper layer on the

elevated embankment parts, said layer along one side having a plurality of T-slots, a plurality of extension slabs having T-extensions to fit said T-slots, said T-slots and said T-extensions being constructed to comprise independent hinges between said upper layer and said extension slabs, by virtue of which any extension slab may be swung up or down without affecting any other extension slab, and means for anchoring said upper layer in place.

2. Embankment revetment for dikes, groins and the like comprising an upper layer on the elevated embankment parts, said layer along one side having a plurality of T-slots, a plurality of extension slabs having T-extensions to fit said T-slots, said T-slots and said T-extensions being constructed to comprise independent hinges between said upper layer and said extension slabs, by virtue of which any extension slab may be swung up or down without affecting any other extension slab, and means for anchoring said upper layer in place, said hinge connections being such that when the extension slabs are in their operative positions they will be independently interlocked with said upper layer.

3. Embankment revetment for dikes, groins and the like, comprising an upper layer on the elevated embankment parts, said layer along one side having a plurality of T-slots, a plurality of extension slabs having T-extensions to fit said T-slots, said T-slots and said T-extensions being constructed to comprise independent hinges between said upper layer and said extension slabs, by virtue of which any extension slab may be swung up or down without affecting any other extension slab, and means for anchoring said upper layer in place, said upper layer comprising a plurality of rectangular slabs laid side by side and having hammer-like end extensions, those of one rectangular slab cooperating with those of adjacent rectangular slabs to provide the aforesaid T-slots.

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