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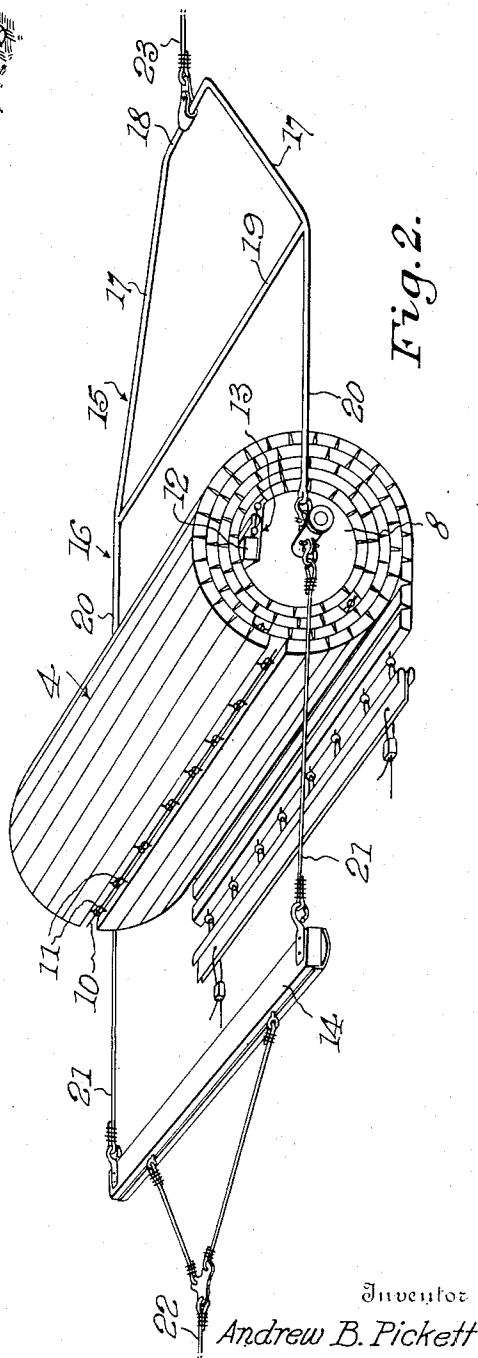
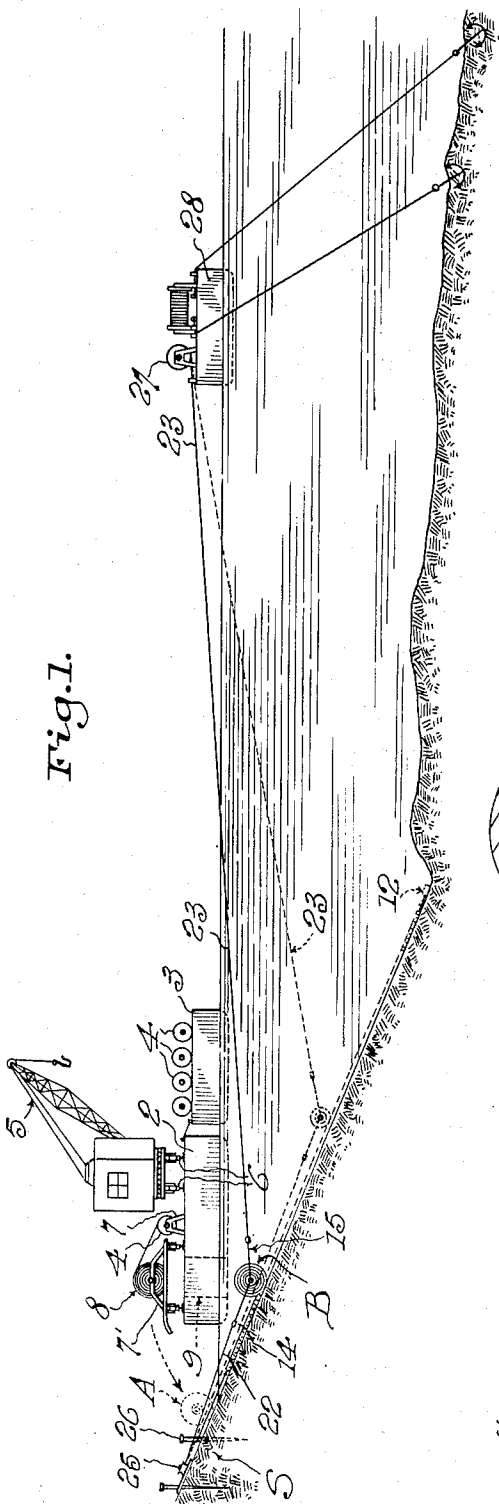
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2,570,271

APPARATUS AND PROCESS FOR LAUNCHING REVETMENTS

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2 Sheets-Sheet 1



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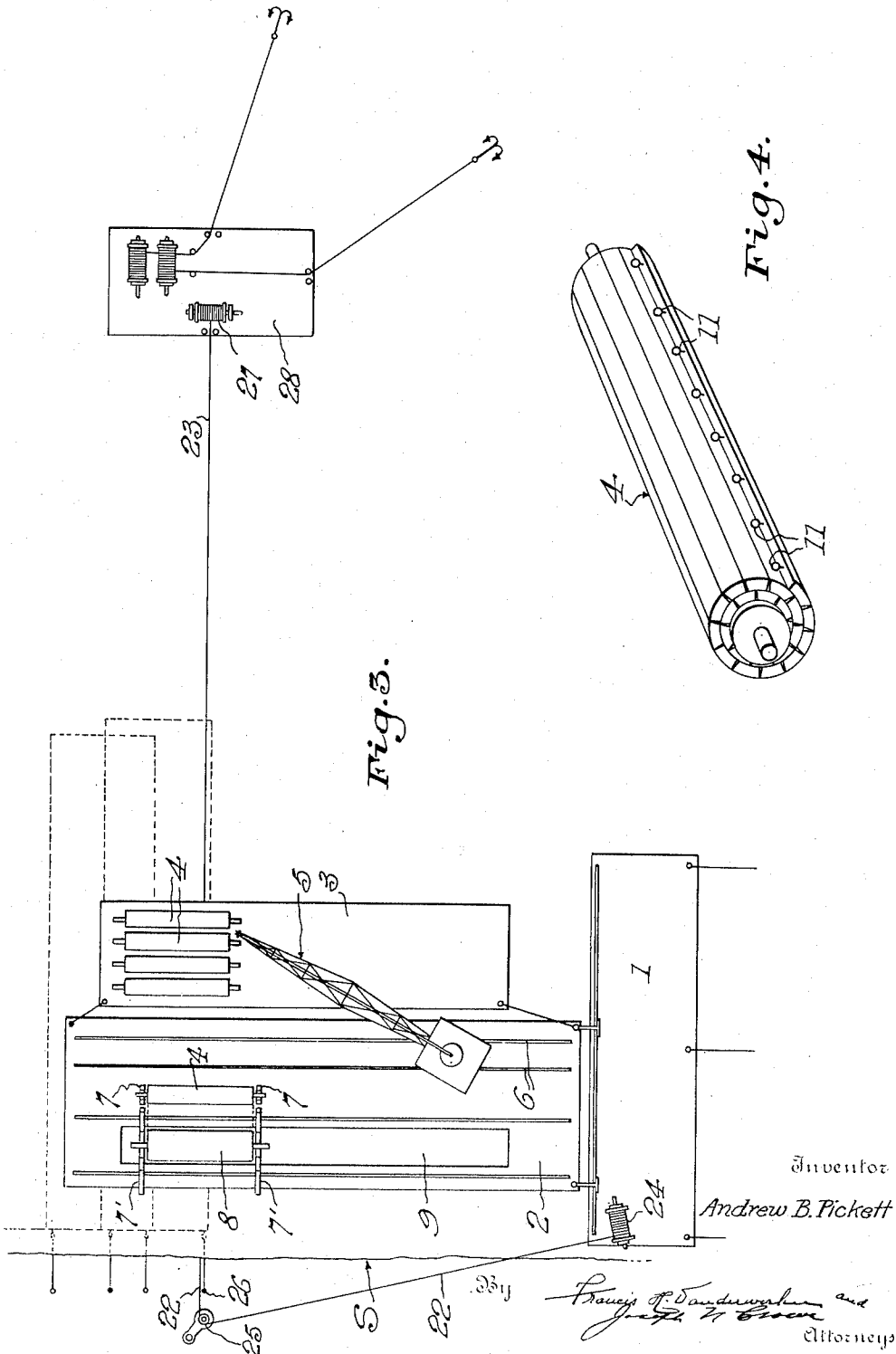
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,570,271

APPARATUS AND PROCESS FOR LAUNCHING
REVTMENTSAndrew B. Pickett, United States Army,
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4 Claims. (Cl. 61—38)

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amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of any royalty thereon.

This invention relates to an apparatus for launching revetment mats over an area on a subaqueous river bank; more particularly it is directed to an apparatus of this character for laying roll-type revetment mats.

One of the objects of the invention is to provide a mooring barge having a mat launching or placing barge associated therewith, with a mat carrying barge associated with the mat launching barge and an anchor barge including means for unrolling the revetment mats down the slope of a river bank or the like.

Another object of the invention is to provide means on the mat launching barge whereby roll-up unit sections of revetment mats may be unrolled and then rerolled on a large drum, with the unit sections being joined together while being rerolled on the drum.

In carrying out the invention, a plurality of unit revetment mat sections are rolled up either on a core or without a core and taken by a material barge to a site of sinking operations where the rolled-up mat sections are removed from the material barge by a derrick and placed on a launching barge. The mat sections are then rerolled on a substantially large drum, the unit sections being joined together by threading small cables through exposed loops thereon until a revetment mat of a predetermined length is formed. The drum with the revetment mat rolled thereon is removed from the launching barge and rolled down the slope of a river bank, whereby the revetment mat is unrolled and laid on the bank for protecting the river bank against erosion, after which the drum is recovered and the operation again repeated.

With the above and other objects and advantages in view the invention consists of certain features of construction and operation of parts which will hereinafter be described and shown in the accompanying drawings in which:

Figure 1 is a vertical sectional view through an embankment and showing the launching apparatus embodying the invention floating in the water near the shore, with a roll-type revetment mat illustrated as being rolled down the slope of the embankment;

Figure 2 is an enlarged perspective view of a complete revetment mat rolled up on a core with means for unrolling the revetment mat down the embankment and for retrieving the core;

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Figure 3 is a top plan view of Figure 1; and

Figure 4 is a perspective view of a unit section for forming a complete revetment mat of a predetermined length.

Referring more specifically to the drawings, a mooring barge 1 is provided which is arranged at right angles to a shore line S Fig. 1 and having connected thereto a mat placing or launching barge 2 and a material or mat carrying barge 3 adjacent to the outer longitudinal side of the launching barge. Both the launching barge 2 and material barge 3 are parallel to the shore S and at right angles to the mooring barge. The material barge 3 is adapted to have a series of reinforced rolled-up type of flexible unit mat sections 4 loaded thereon, which are adapted to be transferred to the launching barge 2 by means of a traveling crane or derrick 5 mounted on tracks 6 extending longitudinally of the launching barge 2 along the edge adjacent to the material barge.

The launching barge 2 is provided with stands 7 and 7' with a large mat rerolling drum 8 rotatably mounted on the stand 7', which drum 8 extends longitudinally of the launching barge on one end thereof. A longitudinally extending well 9 is also provided in the launching barge for a purpose which will hereinafter appear.

The revetment mat sections 4 are unrolled from the stand 7 and rolled up on the large drum 8, with the unit sections being joined together by threading small cables 10 through the exposed loops 11 on the ends of the unit sections thus forming a revetment mat of a predetermined length. Before the first unit section is rolled up on the drum 8 on the stand 7' on the launching barge 2, heavy anchor weights 12 are attached to the starting end thereof, which weights 12 fit into a longitudinally extending recess 13 formed on the drum. With the revetment mat rolled around the drum 8 the anchor weights 12 are held in the recess 13 of the drum.

After sufficient unit sections are joined together to form a complete revetment mat of desired length the rolled-up mat and drum 8 are removed from the stand 7' by the derrick 5 and placed on the river bank as shown by the dotted lines at A or may be placed in the water through the well 9 in the launching barge 2 as shown at B. A rear spreader bar 14 and a frame structure 15 are connected to the drum 8, said frame structure 15 including an inclosed portion 16 having side bars 17, a front member 18 and a rear cross bar 19, with arms 20 extending rearwardly from the ends of the cross bar 19 and connected to the ends of the axle of the drum 8. The rear spreader bar

14 may be connected to the axle of the drum by cables 21 or any other suitable means and has a rehaul cable 22 attached to it, while one end of a pulling cable 23 is attached to the front member 18 of the frame structure. The rehaul cable 22 leads from a power winch 24 on the mooring barge to a pulley block 25 on the shore and from there to the rear spreader bar 14.

Before the revetment mat is unrolled, the anchor cables attached to the head of the mat are fastened to anchors 26 on shore, after which it is pulled down the slope of the river bank by means of the pulling cable 23 leading to a power winch 27 mounted on an anchor barge 28 in mid-stream. After the mat has been unrolled down the slope of the river bank and the drum 8 has been released, the drum is pulled back up the slope of the river bank over the revetment mat just laid, by means of the rehaul cable 22 attached at one end to the rear spreader bar 14 and leading to the power winch 24 on the mooring barge 1. The drum 8 is then picked up at the water's edge by the derrick 5 on the mooring barge 1 and is placed on the stand 7' for forming another complete revetment mat from unit mat sections. If desired under some conditions the revetment mat may be unrolled by gravity down the slope of the river bank without the use of the anchor barge 28.

In Fig. 2 the revetment mat is shown being unrolled down the slope of the river bank in different positions coming to rest finally at the bottom of the slope of the river bank, with the heavy weights 12 on the bottom end of the revetment mat serving as anchors to hold down the lower end of the mat, thus preventing the river current from turning back the end of the mat.

After one mat is unrolled, the entire operation is repeated, with each succeeding mat overlapping the mat previously laid. The mats will be unrolled from the water's edge down the slope of the river bank and the work will progress upstream as each mat is laid until a completed revetment covering the desired area is completed.

The mats may be lapped over each other any amount to take care of a severe or light attack of the water against the river bank. By this method of laying the mats, a laminated type of construction is provided and a series of slip joints is also provided between the mats to take care of settlements in the graded bank and still provide proper protection.

Wherever the term "launching cable" is used in the appended claims the term refers to the cable system comprising the rehaul cable 22 and the pull cable 23. The term "yoke" refers to the composite structure on which the roll-type mat and core is mounted for laying. The yoke is the structure performing the function of interconnecting rehaul cable 22 and pull cable 23.

It will thus be seen that there is herein provided a novel and efficient form of apparatus for launching revetment mats which is well adapted for the purpose intended. Even though there has been herein shown certain features of construction and operation of parts, it is nevertheless to be understood that various changes may be made therein without departing from the spirit or scope of the claims.

Having thus described my invention, what I claim as new and wish to secure by Letters Patent is:

1. A method of protecting river banks against erosion which comprises anchoring a series of

revetment mats at contiguous anchoring stations, positioning succeeding mats in edge-overlapping relation relative to one another for unrolling down a river bank to be protected, each mat being rolled into a roll or coil having an exposed head end and a foot end enclosed in the roll, the head end of each mat being anchored at the respective anchoring stations, unrolling the succeeding mats while controlling the unrolling so that each mat as unrolled definitely follows a predetermined path, so that adjacent edges of the succeeding mats overlap, whereby when unrolled, one mat will lap over the adjacent mat along adjacent edges until a complete revetment is formed, the resulting revetment construction thus being provided with a series of overlapping edges forming a series of slip joints for taking care of settlements in the sloped river bank and at the same time providing proper protection to the bank, the unrolling of each mat being controlled by applying continuously to each mat oppositely directed straight line pulls from a source remote from the anchoring station for the mat, the straight line unrolling pull exceeding in force the oppositely directed pull, the said straight line pulls however cooperating to control and to maintain the mats definitely in the predetermined path during unrolling thereof, and automatically anchoring the foot end of each mat in laid position responsively to complete unrolling of the mat with attendant release of the foot end of the mat.

2. An apparatus for laying roll-type revetment mats comprising a power driven shore drum receiving a length of rehaul cable, a power driven off-shore drum receiving a length of pull cable and positioned beyond the most remote off-shore point to be revetted, the said cables moving responsively to rotation of said drums, a yoke connected at opposite ends to the cables, a core rotatably connected to said yoke adapted to receive a roll-type revetment mat, the said core having a density substantially greater than the density of water, the said cables exerting oppositely directed straight line pulls on the yoke when operated by the drums, and shore anchoring means adapted to receive and retain one end of a roll-type revetment mat, the said core being recessed to receive an anchor weight for a free end of a mat wrapped on the core.

3. An apparatus for laying roll-type revetment mats comprising a power driven reversible shore drum adapted to receive a length of launching cable, a power driven reversible off shore drum adapted to receive a length of launching cable and positioned beyond the most remote off-shore point to be revetted, a launching cable operably interconnecting the said drums, the said launching cable moving responsively to rotating of said drums, a yoke including diametrically oppositely extending connecting means mounted on said launching cable, a core rotatably connected at its axis to said yoke adapted to receive a roll-type revetment mat, the said core having a density substantially greater than that of water, and shore anchoring means adapted to receive and retain one end of a roll-type revetment mat wrapped on the core.

4. An apparatus for laying roll-type revetment mats, comprising a power driven shore drum, a power driven off-shore drum, a cable system connecting the drums, a rotatable core for a rolled-up revetment mat axially connected in the cable system, the core having a density substantially greater than the density of water,

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and a yoke mounted on the cable and having diametrically oppositely extending connecting parts, one of the parts being connected to a rehaul portion of the cable system, the opposite connecting part of the yoke being connected to a pull portion of the cable system, the rehaul cable portion being connected to the shore drum, the pull cable portion being connected to the off-shore drum, operation of the drums in one direction paying out the rehaul cable and taking in the pull cable, the said drums exerting an oppositely directed straight line pull on the yoke through the said cable system, the said operation of the drums rotating the core in a predetermined straight line course away from the shore drum, reversal of rotation of the drums retracting the rehaul cable and paying out the pull cable for retracting the core along the said straight line course.

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