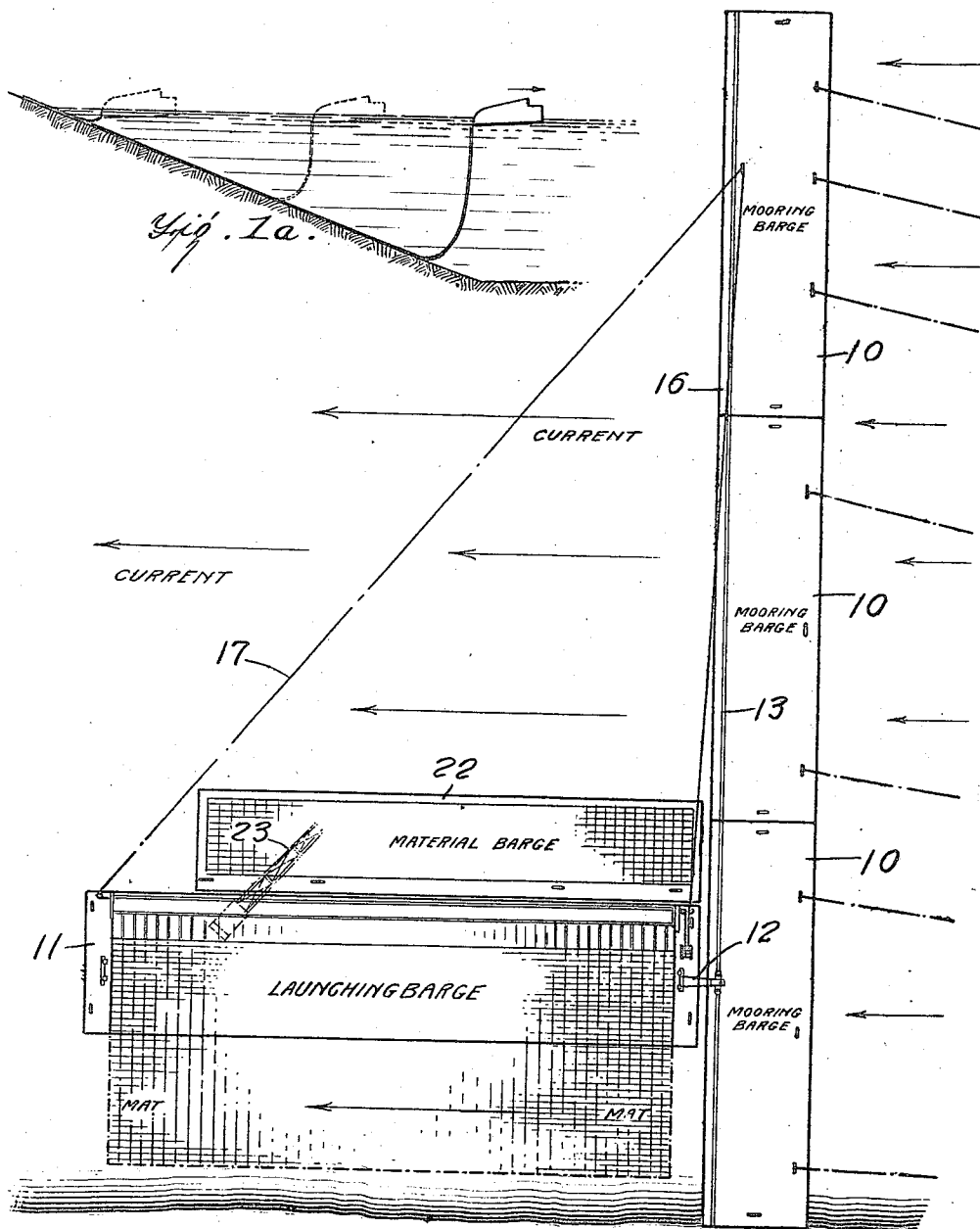


1,229,152.

D. McD. SHEARER.
APPARATUS FOR LAUNCHING REVETMENT MATS.
APPLICATION FILED OCT. 6, 1915.

Patented June 5, 1917.
5 SHEETS—SHEET 1.



WITNESSES:

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E. L. Quella

Fig. 1.

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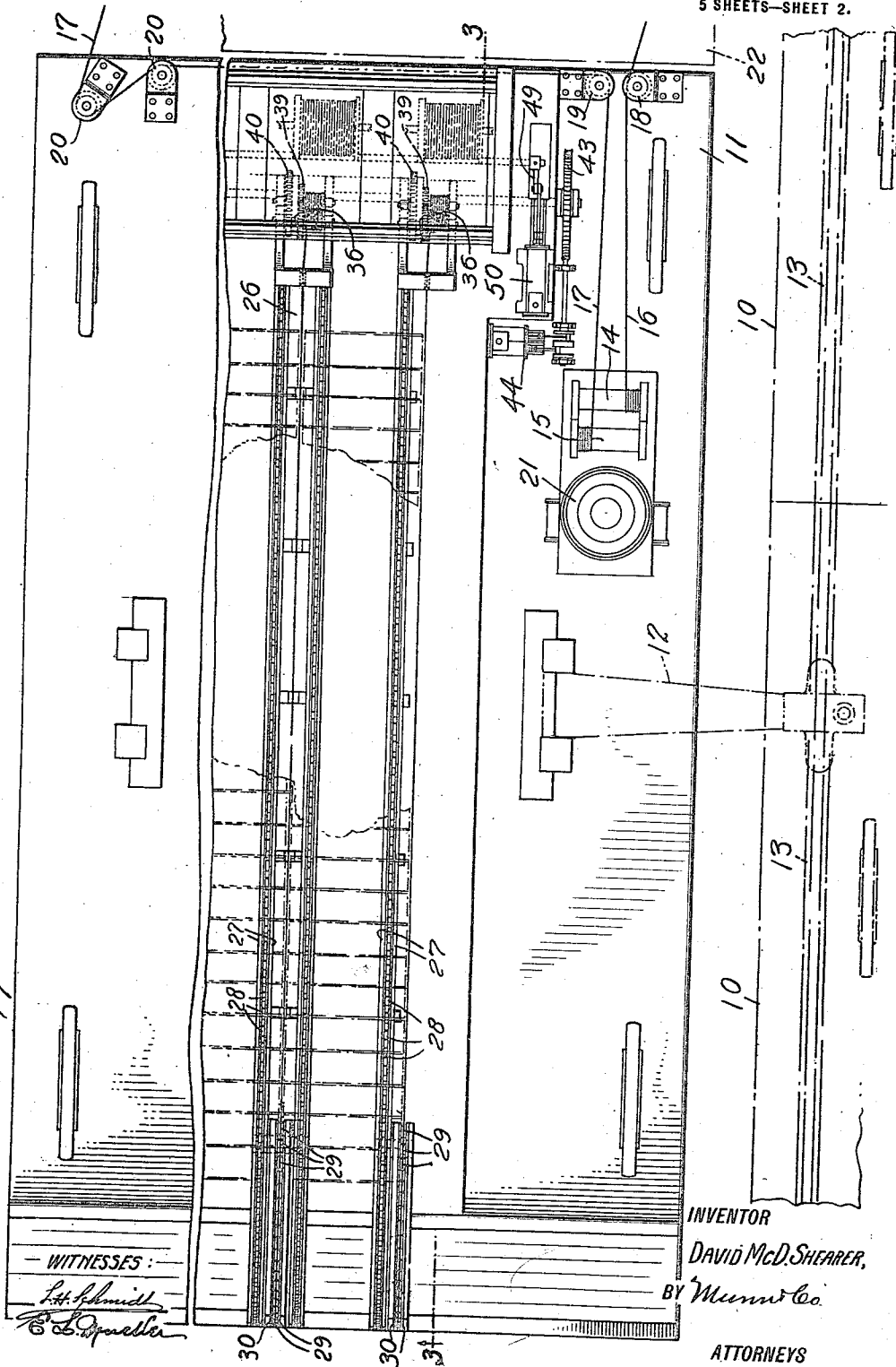


Fig. 2.

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5 SHEETS--SHEET 3.



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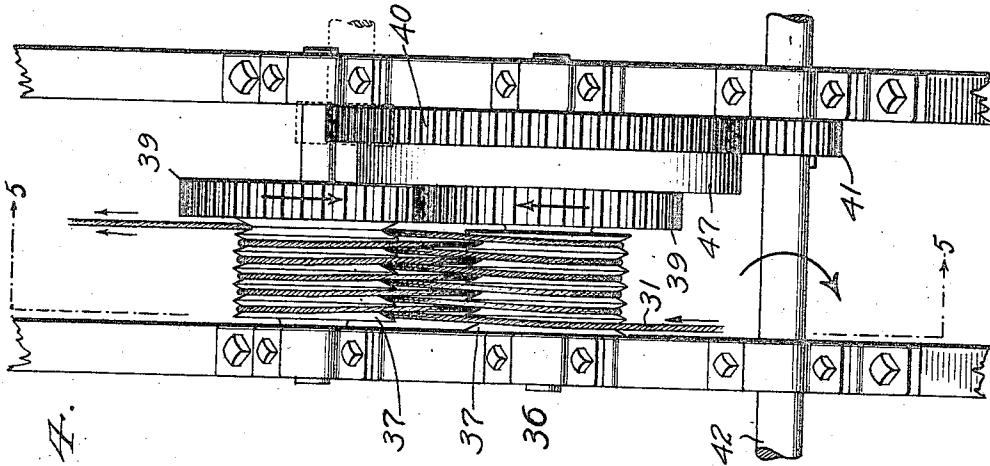
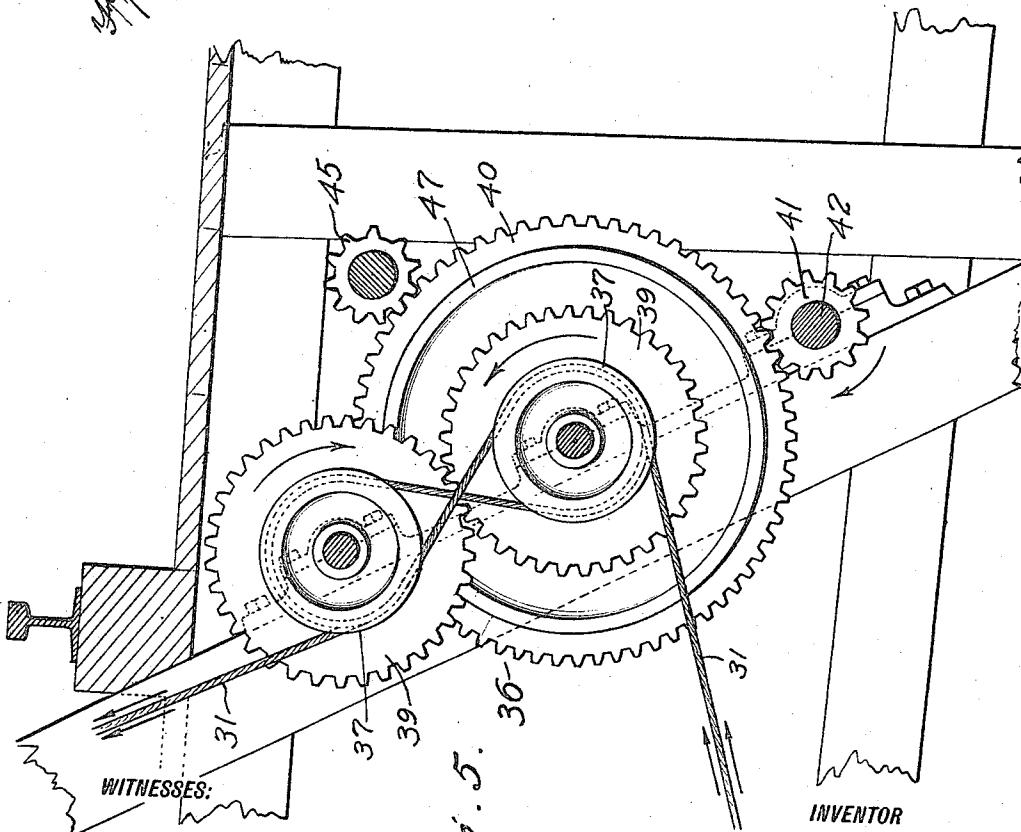


Fig. 4.



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Fig. 5.

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5 SHEETS—SHEET 5.

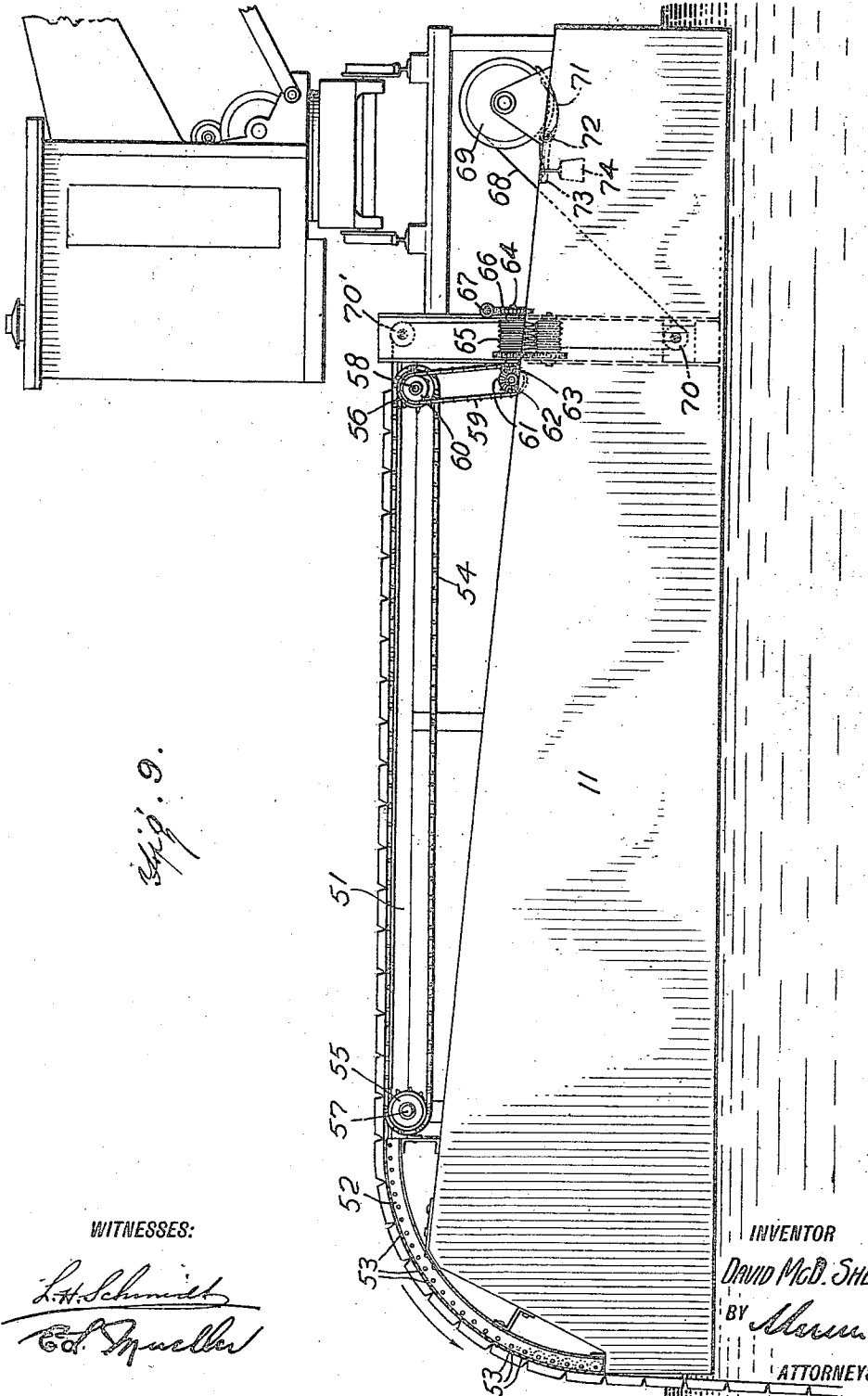


Fig. 9.

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UNITED STATES PATENT OFFICE.

DAVID McDOUGALD SHEARER, OF VICKSBURG, MISSISSIPPI.

APPARATUS FOR LAUNCHING REVETMENT-MATS.

1,229,152.

Specification of Letters Patent.

Patented June 5, 1917.

Application filed October 6, 1915. Serial No. 54,461.

To all whom it may concern:

Be it known that I, DAVID McD. SHEARER, a citizen of the United States, and a resident of Vicksburg, in the county of Warren and State of Mississippi, have made certain new and useful Improvements in Apparatus for Launching Revetment-Mats, of which the following is a specification.

This invention is an improvement in apparatus for launching and laying revetment mats, and is particularly adapted for use in connection with my copending application, bearing Serial No. 879,644.

Briefly stated, the invention consists in providing a plurality of mooring barges, preferably arranged across the current of a stream or river, and having connected thereto a launching barge or barges each carrying a mechanism of novel construction adapted to feed the revetment mats therefrom. This launching barge is arranged as nearly parallel to the shore line as possible, and at substantially right angles to the mooring barges, and has associated therewith a material barge loaded with a series of relatively small superimposed unit mats, which are adapted to be transferred to the launching barge by a suitable crane mechanism carried by the latter, and fabricated into the final structure of mat.

An object of the invention is to provide a mat barge having a plurality of inclined ways consisting of a series of rollers adapted to support a mat and guide the same, the delivery end of said ways terminating in a downwardly curved launching frame, from which the mat passes into the water. But it is to be understood that conveyer chains, cables, or belts may be substituted for or used in connection with said rollers, as circumstances may warrant, to facilitate launching of the mat from the ways.

Another object is to provide a series of supply drums on the launching barge upon each of which is wound a cable adapted to pass between and to be secured to adjacent rows of concrete slabs or blocks constituting the mat, and be fed from said drums by suitable means including a power controlled friction device adapted to prevent the too rapid launching of said mat, which would otherwise result from the heavy drag or pull occasioned by the weight of that portion of the mat already launched.

A further object is the provision of a

suitable means preferably carried by the launching barge and connected to one of the mooring barges for moving the former outwardly toward the channel of the river as the mat is being paid off into the water, a bar also being associated with said barges and engaged by said means for guiding the launching barge during said outward movement.

The inventive idea involved is capable of receiving a variety of mechanical expressions, some of which, for the purpose of illustrating the invention, are shown in the accompanying drawings, but it is to be expressly understood that said drawings are used merely to facilitate the description of the invention as a whole, and not to define the limits thereof, reference being had to the appended claims for this purpose.

In the drawings:—

Figure 1 is a diagrammatical illustration of the entire apparatus showing the relative positions of the different barges in a body of water when a mat is being launched.

Fig. 1^a is a diagrammatic elevation of the launching or mat barge showing the manner in which the mat is laid.

Fig. 2 is a fragmentary top plan view of the mat or launching barge.

Fig. 3 is a vertical transverse section of said barge on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged edge elevation of the friction device employed in connection with the other mechanism for launching the mats.

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 3 of one embodiment for supporting and guiding the mat on the launching barge.

Fig. 7 is a similar view showing another modification, and

Fig. 8 is a view showing a still further modification.

Fig. 9 is a side elevation of another form of mechanism for launching the mat.

Referring more particularly to the drawings, the numeral 10 indicates a series of mooring barges, which are preferably arranged end to end, and cross the current of the river, said barges being anchored or moored in any preferred manner.

A launching barge, generally indicated by 11, is associated with said mooring barges, and arranged at substantially right

angles thereto and parallel to the shore line. A traveler 12 is carried by the end of the launching barge 11 adjacent the mooring barges, and is adapted to engage a single track 13 carried by the latter barges for the purpose of guiding said launching barge when the same is moved outwardly toward the channel of the river as the mat is being delivered therefrom. It is to be understood that two or more of these launching barges may be employed in which case they are arranged end to end.

An apparatus is employed for controlling said outward movement and includes independent drums 14 and 15 or power capstans upon which are mounted cables 16 and 17, respectively. The cable 16 extends directly to the outer end of the outermost mooring barge, and is secured thereto, the same passing over a pulley 18 provided on the launching barge 11. The cable 17 likewise passes over a pulley 19 adjacent pulley 18 and then extends along the edge of the launching barge to pulleys 20, after which said cable is extended to the outermost mooring barge where the same is secured thereto.

By operating a power unit generally illustrated at 21, the cables 16 and 17 may be wound upon their respective drums, and the barge moved outward into the river as the mat is being delivered therefrom and held parallel to the current.

A material barge 22 is secured to the outer longitudinal side of the launching barge and is adapted to have superimposed sections of the mats loaded or cast thereon. These unit sections of the mat are adapted to be transferred from the material barge to the launching barge and there joined into the structure of the mat as the laying of the mat progresses, and for this purpose there is provided a traveling crane generally indicated by 23, and mounted on tracks 24 extending longitudinally of the launching barge along the edge adjacent the material barge.

The launching barge 11 may be of any preferred construction and has mounted above its upper deck the supports 25 of the launching ways 27 which are inclined transversely of the barge and have their lowermost portions adjacent the delivery edge thereof, as best illustrated in Fig. 3. In the modification shown in Fig. 6 these ways include angle irons 27 between which are journaled rollers 28 for supporting the adjacent portions of the mat. These ways preferably extend over the downwardly curved edge of the barge, as shown in Fig. 2. The gunwale of the barge 11 along the delivery edge thereof has mounted thereon a plurality of arcuate sheave supporting frames 32, there being two ways 26 for each frame. Each of these frames has journaled therein a plurality of sheaves 29 the bearing sur-

faces of which have the same radius as that of the rollers 28 mounted on the curved extremity of the ways.

In the embodiment shown in Fig. 7 the arcuate frame 27' consists of a pair of angle irons in which is journaled a stub shaft upon the ends of which are mounted rollers 28' which form the ways, a sheave 29' being mounted between said angle irons. In the further embodiment illustrated in Fig. 8 the supporting and guiding means consists of a single roller 28'' having an annular groove 29'' intermediate its ends and adapted to receive the cable 31, said roller being journaled in the frame 27''. These sheaves extend only from the upper terminus of the frames to the lowermost portions thereof where the mat enters the water. They are also arranged as closely together as possible so that the effect of a perfect curve may be secured as nearly as consistent.

As the mat travels down the inclined ways 25 the same passes upon the rollers and sheaves of the frames 32 and is guided from thence off into the water, as shown in Fig. 3. It is to be understood that before that portion of the mat on the inclined ways is launched, the free edges of the constituent units of the fabrication in said portion of mat are tied to the cables 31 thus forming a continuous structure of mat. The barge 11 may be provided with a ballast tank 33 in order to counteract the weight of the mat as the same is being placed in very deep water.

Means are provided in connection with each of the cables 31 to prevent the rapid launching of the mat from the barge which would be occasioned by the drag or pull exerted by that portion of said mat, which has already been launched. For this purpose each of the cables 31 is originally wound upon a separate drum 34 which may be the original commercial reels on which the cable or strand has been purchased, journaled in the framework of the barge 11, as shown in Fig. 3, said cable leading from said drum over a pulley 35, also journaled in the framework of the barge, and from thence, following the direction of the arrows, to the friction device generally indicated by 36 and best illustrated in Figs. 4 and 5. This friction device includes a pair of grooved friction sheaves 37 over which the cable 31 is adapted to pass back and forth several times, as shown in Fig. 4 in order to secure the required amount of frictional resistance. The cable then follows the direction of the arrows in Fig. 4 and passes upwardly to the inclined ways and thence over a pulley 38 and between said ways. Journaled and keyed upon the same shaft with the sheaves 37 are the gear wheels 39 which form a portion of a train of gearing for operating said sheaves in

unison to cause the cable to be gradually fed from the drums 34. The large gearing wheel 40 is also associated with the smaller gears 39, and said gear 40 is in turn driven by a small gear 41 detachably keyed upon the drive shaft 42. This drive shaft is operated by a gear 43 mounted upon one end thereof and driven by a suitable source of power 44 mounted upon the barge. It is to be understood that this shaft 42 extends the entire length of the barge so that the same will operate all of the devices 36 simultaneously. If desired, these devices may be operated separately by throwing the small gear 41 out of mesh with the large gear 40, whereupon a small gear 45, shown in Fig. 3, may be thrown into mesh with the gear 40 and operated by a detachable hand-wheel 46. In this manner each of the devices 36 may be individually actuated and, when not in use the hand-wheel may be dismounted.

Interposed between one of the gears 39 and gear 40 is a brake flange 47 over which is passed a brake band 48, the latter being in conjunction with another band also mounted over a similar brake flange formed upon the drum or reel 34. Means are provided for adjusting the tension of this brake band against the flanges, and consists of a crank shaft 49 connected to said brake band and operated by a steam cylinder 50 carried by the barge 11. This crank shaft is so mounted that the greater braking power may be exerted on the flange 47 and the lesser amount on the flange of the reel or drum. It is to be understood that an average amount of braking power is applied to these flanges at all times so that the cable 31 will not be unwound from its respective drum too rapidly. This mechanism, including the brake band 48, operated by the power unit 50, is preferably used merely as an emergency check whenever desired and as a means by which the drum 34 and the mechanism illustrated in Figs. 4 and 5 may be operated against frictional restraint.

From the foregoing description it will be seen that the operation of laying a revetment mat consists in first arranging the different barges as illustrated in Fig. 1, with the launching barge close to the shore. A layer of concrete slabs or concrete mat units of construction is then transferred from the carrier material barge by the crane 23 to the inclined ways 26, where the different slabs or unit sections of mat are joined to the cables 31. The mechanism for drawing the barge outwardly toward the channel of the river and which includes the cables 16 and 17 is then operated, whereupon the portion of the mat upon the launching barge will gradually be fed therefrom, on operation, at the same time, of power unit 44

which completely controls the launching of the mat from the ways.

As the mat is being launched the cable feeding and friction device 36 causes the cables to be slowly unwound from the drums 34. When the section of the mat being laid is of sufficient length, the cables 31 may be severed. The entire apparatus is then shifted to another position down stream a distance substantially equal to the width of the mat, it being preferably located so that the adjacent edge of the next succeeding section to be laid will overlap that of the preceding one. During the entire process of laying the mat, the weight of the suspended portion is entirely supported by the cables 31 which pass over the different sheaves 29 mounted in frames 32, which fact avoids injury to that portion of said mat on the launching ways.

In the construction shown in Fig. 9 the barge 11 has a flat superstructure 51 in contradistinction to the inclined supports 25 as shown in Fig. 3. The delivery edge of the barge is provided with arcuate sheave supporting frames 52 similar in construction to the frames 32, and said frames 52 have mounted therein sheaves 53. The rollers 28 employed in the embodiment shown in Fig. 3 are replaced, in Fig. 9, by an endless conveyer chain 54 mounted upon sprockets 55 and 56 carried by the shafts 57 and 58, respectively, which extend longitudinally of the barge. These conveyer chains 54 are arranged at intervals along the barge and support and convey the mat to the delivery end of said barge. The shafts 57 and 58 are operated by means of a drive chain 59 mounted upon a sprocket wheel 60 carried by said shaft 58 and also a similar sprocket wheel 61 associated with the bevel gear 62. Another bevel gear 63 meshes with the gear 62 and is geared by a shaft 64 which extends through the friction brake device 65 which is similar in construction to the brake device 36 shown in Figs. 4 and 5. This shaft 64 has mounted thereon a gear wheel 66 which meshes with a worm shaft 67 connected to the source of power 44 shown in Fig. 2 of the drawing. It will thus be seen that the operation of the shaft 67 will drive the conveyer chains 54 to launch the mat from the barge and also pay any cable 68 at the same rate of speed.

Cables 68, similar to the cables 31, are also employed and are mounted upon supply drums 69 from which the same are passed around the pulleys 70 and from thence to the brake devices 65 which prevent the rapid launching of the mat from the barge, said cables 68 passing over a pulley 70' and being arranged to the mat as previously described. In addition to the brake devices 65, there is shown in Fig. 9 another brake device associated with the drum 69 and including a

shoe 71 pivoted at 72 and having an arm 73 extending on the other side of said pivot to which is connected a weight 74 which causes a frictional engagement of the shoe 71 against the drum 69 and thereby prevents the cable from unwinding too rapidly from said drum, thus furnishing the initial restraint necessary to insure proper functioning of the cable controlling mechanism 65 in developing the required degree of friction with cable 68.

I claim:—

1. An apparatus for laying revetment mats comprising a plurality of mooring barges, a launching barge connected thereto, a material barge associated with said launching barge, means for transferring the mats from the material barge to said launching barge, means for controlling delivery of said mat from said launching barge, and means for moving said launching barge longitudinally of said mooring barges as the mat is being launched.

2. An apparatus for laying revetment mats comprising a plurality of mooring barges, a launching barge connected thereto, a material barge associated with said launching barge, means for transferring the mats from the material barge to said launching barge, means for controlling delivery of said mat from said launching barge, means for moving said launching barge longitudinally of said mooring barges, as the mat is being launched, and means for guiding said launching barge during its longitudinal movement.

3. An apparatus for laying revetment mats, comprising a plurality of mooring barges arranged transversely of the current or stream, a launching barge movable longitudinally of said mooring barges and in substantially parallel relation to the shore line, and means for launching the unit mats from said launching barge.

4. An apparatus for laying revetment mats, comprising a plurality of mooring barges arranged transversely of the current or stream, a launching barge movable longitudinally of said mooring barges and in substantially parallel relation to the shore line, means for launching the unit mats from said launching barge, and means including flexible members connecting said launching barge with one of said mooring barges for moving the former outwardly from the shore as the laying of the mat progresses.

5. An apparatus for laying revetment mats, comprising a plurality of mooring barges arranged transversely of the current or stream, a launching barge movable longitudinally of said mooring barges and in

substantially parallel relation to the shore line, means for launching the unit mats from said launching barge, and a material barge from which the unit mats are transferred to said launching barge.

6. A launching barge for revetment mats comprising launching ways terminating at the delivery ends in downwardly curved inclines, sheave supporting frames associated with said curved portions, sheaves mounted in said frames in close proximity to each other, cable carrying devices mounted in said barge, launching cables carried by said devices and to which the mats are to be secured at opposite sides, mechanism for moving the barge to feed the mat therefrom, a friction device associated with each of said cable carrying devices and including friction sheaves over which said cable passes, and an adjustable brake band for controlling the speed with which the cable is fed from said devices.

7. In an apparatus for laying revetment mats, a barge having transversely extending inclined ways, and sheaves between the ways, a cable carrying drum mounted on the barge, guides between the drum and the inclined ways, a launching cable to which mats are to be secured at opposite sides, said cable passing from the drum over the guides between the way and over the sheaves, and means for feeding the cable from the drum.

8. In an apparatus for laying revetment mats, a barge having transversely extending roller ways and sheaves between the rollers, a cable carrying drum mounted on the barge, a friction device on the barge adjacent the drum, a launching cable to which mats are to be secured at opposite sides, said cable passing from the drum to the friction device and from said friction device over the sheaves between the ways, and means for operating the friction device to feed the cable and mats from the barge.

9. In an apparatus for laying revetment mats, a barge having transversely extending ways, sheaves between the ways, a cable carrying drum mounted on the barge, a pair of friction sheaves geared together, a launching cable leading from the drum, over and around the friction sheaves and from said sheaves to and over the sheaves between the said ways and to which mats are to be secured at opposite sides, and means for operating the friction sheaves to feed the cable from the drum.

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