

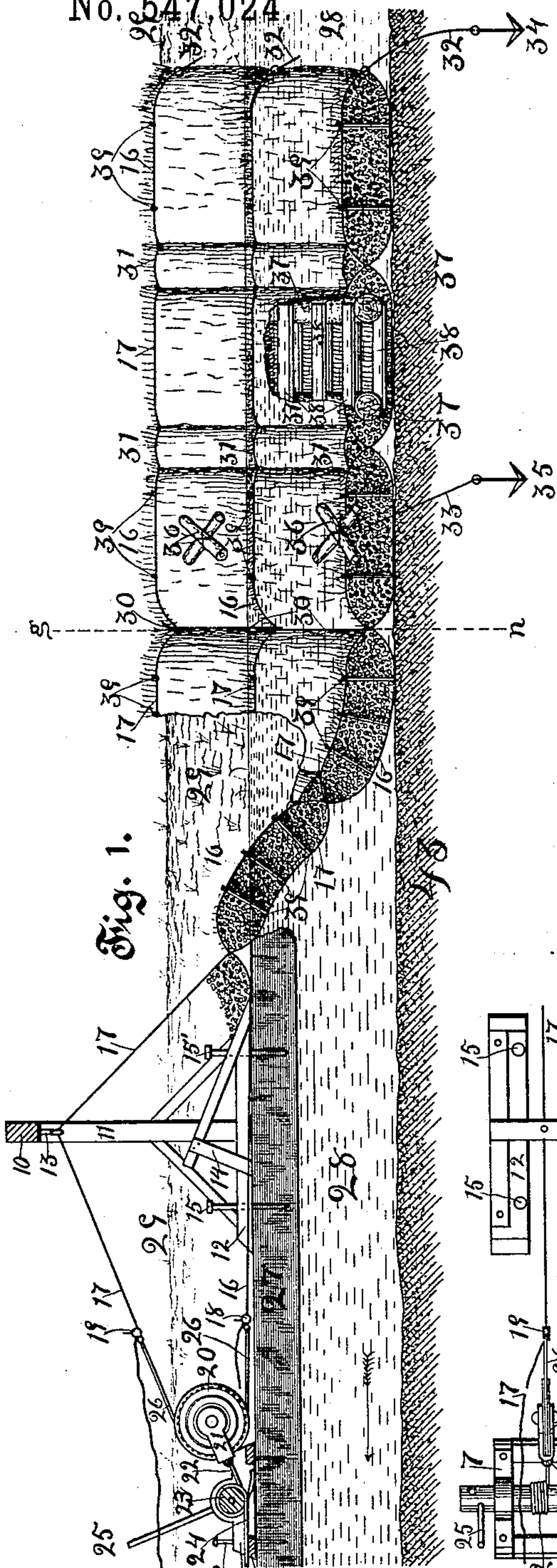
(No Model.)

2 Sheets—Sheet 1.

D. NEALE.
SHORE OR BANK PROTECTOR AND APPARATUS FOR CONSTRUCTING AND
PLACING SAME.

No. 547,024

Patented Oct. 1, 1895.



Witnesses
J. C. Lutz
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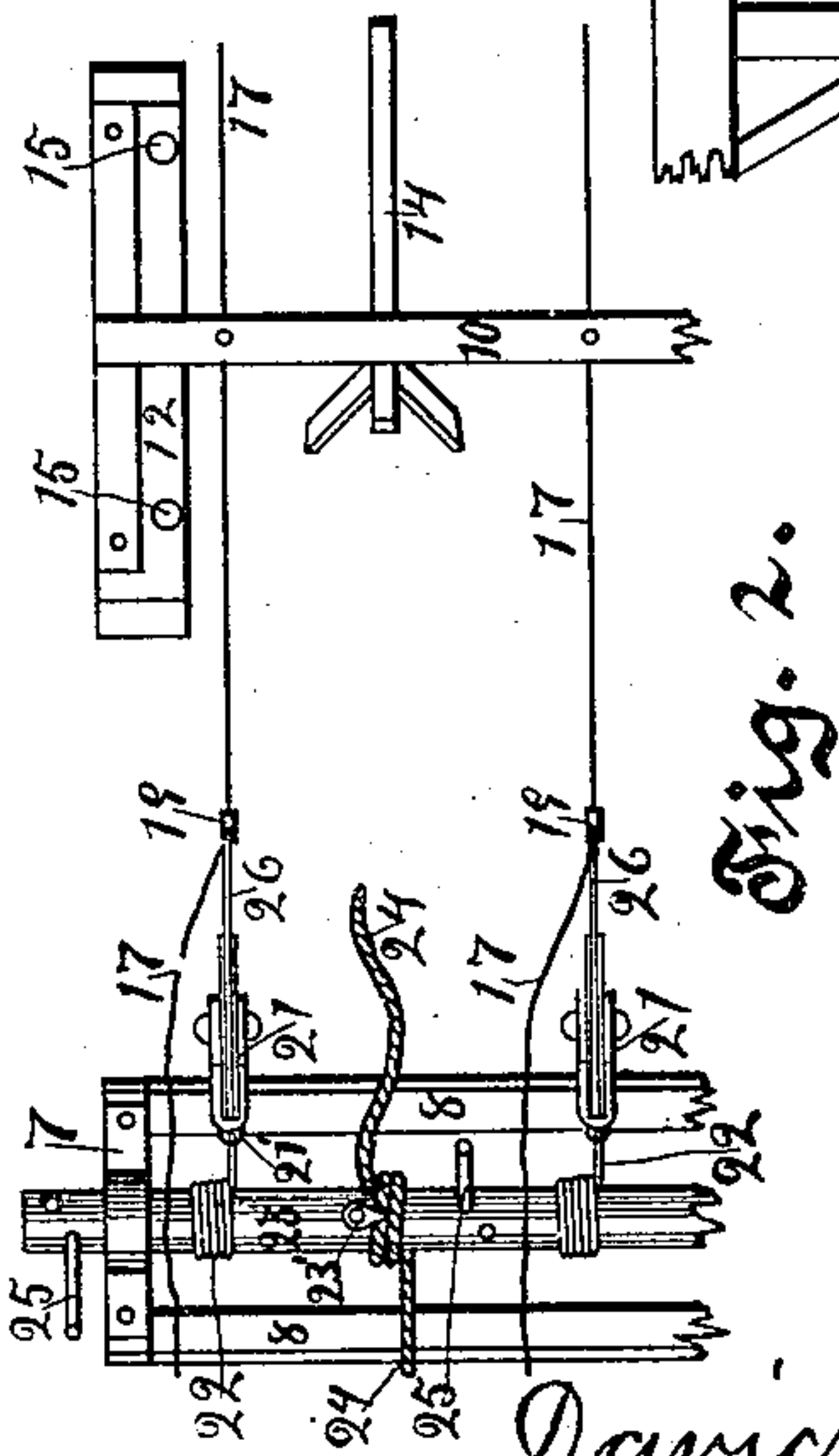
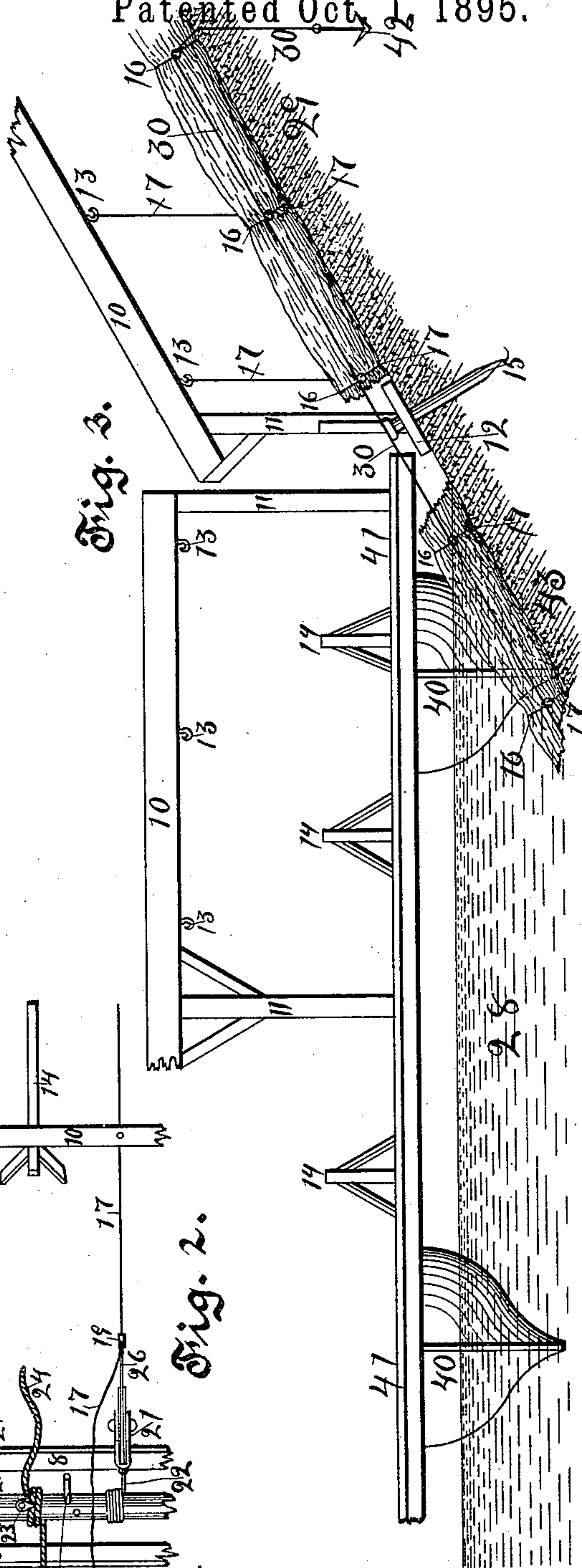


Fig. 3.

Fig. 2.



David Neale Inventor
By his Attorney J. M. Vaughan

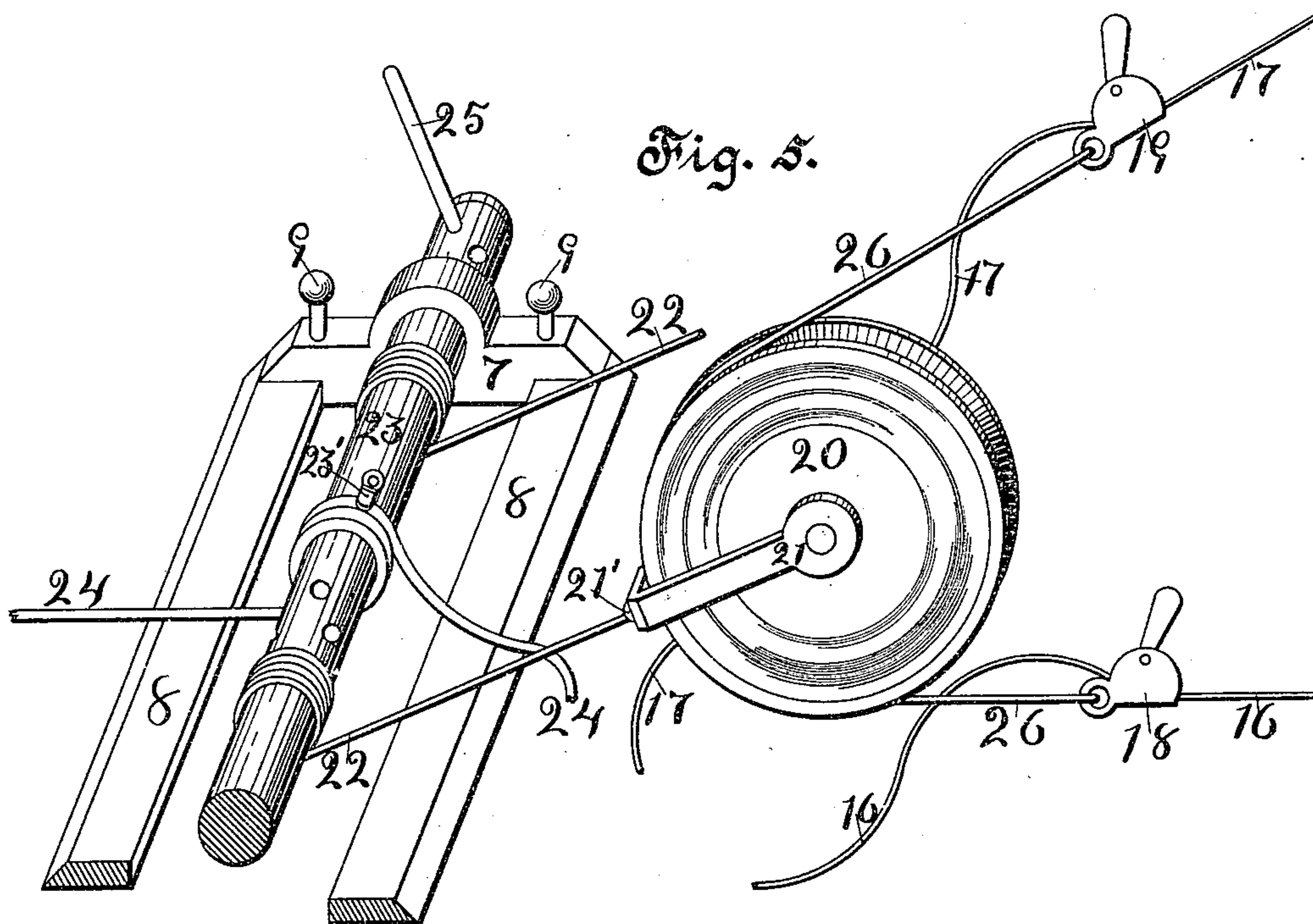
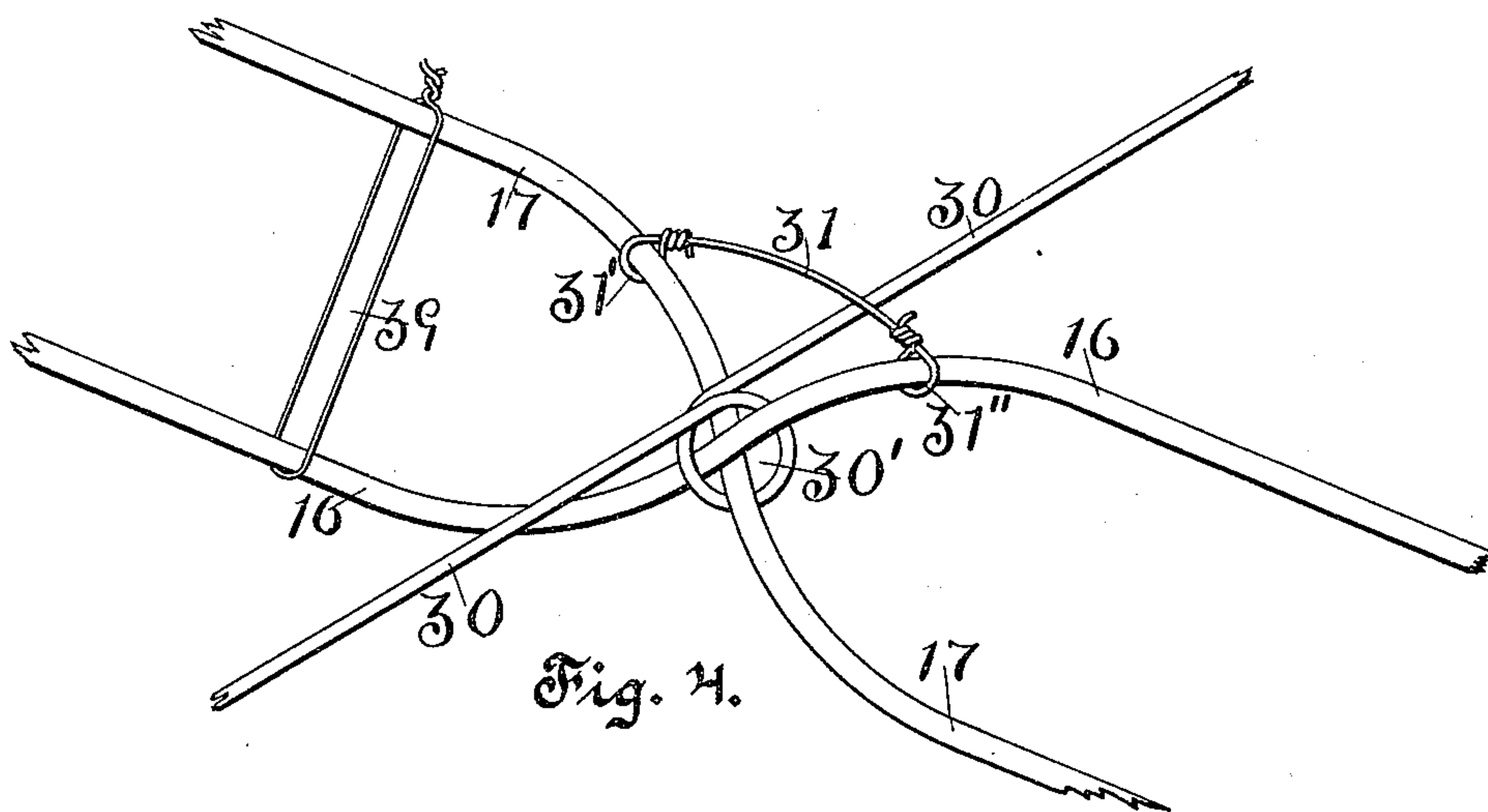
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UNITED STATES PATENT OFFICE.

DAVID NEALE, OF FORT CALHOUN, NEBRASKA.

SHORE OR BANK PROTECTOR AND APPARATUS FOR CONSTRUCTING AND PLACING SAME.

SPECIFICATION forming part of Letters Patent No. 547,024, dated October 1, 1895.

Application filed February 7, 1895. Serial No. 537,654. (No model.)

To all whom it may concern:

Be it known that I, DAVID NEALE, a citizen of the United States, residing at Fort Calhoun, in the county of Washington and State of Nebraska, have invented a new and useful Shore or Bank Protector and Apparatus for Constructing and Placing the Same, of which the following is a specification.

My invention relates to a continuous fabric or mattress for the protection of shores or banks and apparatus for constructing and placing the same, the objects being to dispense with the bulkhead usually used to start such facings on river banks, to dispense with the use of stone where these are not easily attainable, to economize in the use of brush, and to provide at minimum cost a facing of the greatest strength and durability, with other important features more fully set forth hereinafter, and illustrated by the accompanying drawings, in which—

Figure 1 is a sectional view parallel with the shore or stream, showing the apparatus supported on the ice with section of facing as made, deposited, and anchored beneath the water and upon the bank. Fig. 2 is a plan of a part of the portable apparatus or machine for weaving the facing. Fig. 3 shows a section of the facing and bank on the broken line *g n*, looking down stream, also shows the arrangement of a catamaran to carry the weaving apparatus when there is no ice. Fig. 4 is a perspective detail of the arrangement of the warp-cables, quilting and binding wires, and lateral anchoring-cables with the woof or filling removed; and Fig. 5 is a perspective detail of the machine for managing the free ends or coils of warp-cables.

Similar numerals refer to similar parts throughout the several views.

When the facing is to be used to protect the bank of a stream, I begin at the upstream end, and instead of building a large bulkhead to anchor and protect this end of the facing, I start by constructing on the bank 29, above the water 28, and either on the ice 27 or on an anchored catamaran 40 41 the end of the facing of the required width and at the required point on the stream. When sufficient length is made to reach down to the required depth, the anchor-cables 32 are attached one to the

end of each double warp line or cable, consisting of the cables 16 and 17. These anchor-cables are cut to about equal lengths, and an anchor 34 attached to the free end of each and driven into the bank 29 and bed of stream 43 to the desired depth after removing the ice from under the part over the water. (See Fig. 1.) The anchor used to retain this facing is the one patented to me April 10, 1894, No. 517,880, being adaptable for this purpose and may be driven so far as to give absolute security; but other forms of anchors might be used. In this manner a permanently anchored start is obtained and the construction and lateral anchoring proceeded with as follows: a series of longitudinal cables or warp-lines arranged in pairs 16 and 17, the pairs a required distance apart to secure the woof or filling—which is usually brush, but may be poles, bagasse, reeds, long hay, or straw, or other fibrous material placed between the upper and lower warp-lines in limited installments, say sufficient to add four to ten feet to the length of facing. Then the warp-lines are reversed in position, bringing the lines that were above below and those that were below above, and then placing another installment of filling, and so on, each pair of warp-lines forming a longitudinal series of links embracing a series of laterally-extending installments of filling, the warp-lines in each pair crossing at the ends of the links or junction of the separate installments of filling. Each installment, as soon as the warp-lines are crossed to retain it, is, if of width necessary to require it, quilted with wire 39, passed through vertically and embracing the warp-lines 16 17, which secures it in the form of a flat, pointed, or sharp-edged mattress extending laterally across the facing and up and down the bank. At the joinings of these mattresses where the warp-lines cross there is thus formed chinks or crevices, extending through and across the facing. These I close by forming a batten of filling material laid in the chink on top of the warp-lines and bound in place by the wire 31 spanning the chink, each end attached to opposite warp-lines, as shown in Figs. 1 and 4.

To prevent lateral rupture of the facing and to anchor the same at the upper edge to

the bank, the cable 30 is secured at one end to the point of crossing of the pair of warp-lines at the lowest edge of facing and is then carried along the crevice between the mattresses and once or more around the crossing of each pair of warp-lines to the upper edge of facing. (See Figs. 1, 3, and 4.) Here the anchor 42 is attached and driven well down into the bank, as shown in Fig. 3. It is not often necessary to place these lateral binding and anchor cables at every crevice, as in some work they may be omitted from spaces of ten to thirty feet. To take the place of stone to sink and retain the facing on the bank in the water the cross 36 is placed on top of the mattress at or near its center, the cable 33 attached to the cross and passed down through the mattress with the anchor 35 at its lower end and driven well down into the bank or bed of the stream. These anchors are driven from the rear edge of platform 41 or from a like position on the ice and are usually driven diagonally backward, as indicated, to avoid slack in the cable 33 as well as reinforce the starting anchors. Openings are left or made through the mattresses through which the anchors are placed and driven.

Where the water is turbid and accretions form readily and filling material is scarce, I economize by constructing the mattress, as shown in Fig. 1, placing centrally therein the framework consisting of the large poles 37 37, connected by a series of cross-slats 38, spiked to the opposite sides, forming a longitudinal cavity through the mattress up and down the facing, which readily fills with the mud, silt, or sand and serves well as an anchor to retain the facing on the bank.

Where filling material has to be transported some distance it is found expedient to use the composite building-mats, patented to me September 25, 1894, No. 526,457, these being placed end to end in each lateral facing-mattress and so as to break joints in each adjoining mattress. As these mats are quilted nearly all of the quilting-wires 39 can be omitted, the other features being carried out in the usual manner.

When the facing is made and deposited from the ice, the edge of the ice is broken off as fast as necessary and either removed or the blocks of ice forced down where they are carried away by the current; but when a catamaran is used it is anchored upstream by a main line and retained against the bank by lateral lines, and as often as is required is slackened downstream to let the facing sink or place the anchors 35.

The beam 10 has the hooks 13 to hold the upper warp-line of each pair up out of the way during the filling of each mattress or section, after which this line is lifted out of the hook and the other line of the pair raised and placed in the hook preparatory to filling the next section, and so on. The beam is sup-

ported just above the heads of the workmen on posts 11, with feet 12 and metal pins 15 to prevent slipping, a section for the bank 29 being made oblique to agree with bank, as shown in Fig. 3. These supports are moved downstream on the bank and ice as the work progresses; but if a floating platform 41 is used the posts 11 may be fixed upon it.

To carry and control the downstream or forward ends of the warp-lines 16 17 they are passed through the clutches or grips 18 and 19, which grips are attached to opposite ends of the line 26, which runs over the grooved pulley 20 and thereby keeps the strain equal on each line when they are lengthened and shortened by changing places from top to bottom. The pulley 20 is journaled between the forks of the U-shaped frame 21, which is connected to the line 22 by a swivel-joint 21', which allows the frame and wheel to turn in a plane agreeing with the axis of the wheel—that is, to be inverted when the warp-lines are changed in position as to top and bottom. The line 22 is attached to and winds on the windlass 23, journaled in a pair of head-blocks 7 7, fixed to opposite ends of the bed-pieces 8 8. The line 24 is larger in diameter than the lines 22 22 and winds on the windlass in an opposite direction to the lines 22, thus drawing in an opposite direction at the same tangent, and after making a few coils on the drum 23 the free end is releasably held by the button 23', so that it may be loosened to take up or payout the line. This line 24 is anchored either at forward end of platform 41 or downstream on the ice or to a pile or in any convenient manner, and being larger in diameter when the windlass is turned by the lever 25 to wind it on its length is taken up faster than the lengths of the smaller lines 22 are unwound. Consequently all the connected lines are drawn tighter and may be slackened by turning the windlass oppositely, so as to wind on the small lines and unwind the large one, the frame carrying the windlass moving backward and forward according to the direction of revolution of the windlass, said frame being generally left free to move thus, but provided with the pins 9 9 to tack it temporarily at any desired point either on platform or ice. The drum will remain at rest at any point it may be stopped in ordinary work; but a pinion-and-pawl locking device can easily be added for very heavy work.

When the platform is dropped downstream or the apparatus moved forward on the ice as the work progresses, the warp-lines are released in and allowed to run through the grips 18 and 19. When the drum and pulley are moved forward toward the anchorage of the line 24, said line is released by the button 23' and taken up to keep the parts in about the relative positions shown.

If at any time a pair of warp-lines is found to be slack from stretching or any other cause, the whole set may be slackened and one

of the pair released and drawn up in the grip and the tension again put on, or any individual warp-line may be drawn through the grip by other means, as wire-tighteners, when it is
5 inexpedient to slacken the whole.

The inclined movable trestle 14 supports the filling in convenient position to facilitate inverting the pairs of warp-lines and inserting the quilting-stitches 39.

10 The warp-lines may be used from the coils in which they are marketed, keeping the same forward the work and letting them pass through the grips as the work progresses.

Having fully described my invention, what
15 I claim as new, and desire to secure by Letters Patent, is—

1. In a shore or bank facing the combination of a series of pairs of warp-lines, embracing laterally extending mats of disintegrate
20 fibrous filling, and a lateral binding cable coiled around the warp-lines between the mats substantially as described.

2. In a shore or bank facing the combination of a series of pairs of warp-lines, the lines
25 in each pair alternated back and forth across each other to form a line of links embracing laterally ranged mats, lateral binding cables attached to and coiled around the warp-lines between the mats and attached to anchors in
30 the bank substantially as described.

3. In a shore or bank facing the combination of a series of pairs of warp-lines embracing lateral mats of filling, the lines in each pair alternated back and forth to opposite
35 sides of the facing, crossing each other and causing a crevice or chink between the mats, and a batten of filling bound into said chinks by lines fastened across the batten to opposite warp-lines substantially as described.

40 4. In a shore or bank facing the combination of a series of pairs of warp-lines, the lines in each pair passed back and forth across each other between and to embrace lateral filling mattresses consisting of central cells,
45 formed by pairs of longitudinal timbers with cross slats on opposite sides, within envelopes of disintegrate fibrous material substantially as described.

5. In a shore or bank facing the combination of a series of pairs of warp-lines, the lines in each pair passed back and forth across
50 each other to form links to embrace lateral installments of disintegrate fibrous filling, and quilting stitches passed through the filling to engage the warp-lines on opposite sides thereof substantially as described.

6. In a shore or bank facing the combination of a series of pairs of warp-lines, the lines in each pair passed oppositely back and
60 forth across each other, between, and to embrace filling mattresses, crosses to rest on the mattresses and connected by cables to anchors driven into the bank substantially as described.

65 7. In apparatus for constructing shore or bank facings, the combination of a lateral

beam supporting hooks to releasably suspend the upper warp-lines, with a cable running over a pulley and having grips at its ends to engage the warp-lines substantially as described. 70

8. In a machine for constructing shore or bank facings the combination of a winding drum to wind up a cable connected to a pulley carrying a cable having grips at its ends
75 to engage the warp-lines substantially as described.

9. In a machine for constructing shore or bank facings, the combination of a larger cable, one end anchored and the other end releasably attached to a winding drum journaled in a movable frame-work, one or more
80 smaller cables with one end attached to wind on the drum in an opposite direction to the larger cable, their other ends connected to the warp-lines substantially as described. 85

10. In a machine for constructing shore or bank facings the combination of a larger anchored cable releasably attached to a laterally movable winding drum, one or more
90 smaller cables to wind on the drum in an opposite direction to the larger cable, and each connected to a pulley carrying a cable having a grip at each end to engage the warp-lines, substantially as described. 95

11. In a machine for constructing shore or bank facings, the combination of a larger anchored cable connected to a laterally movable winding drum carrying in an opposite
100 direction a smaller cable connected to the warp-lines substantially as described.

12. In a machine for constructing shore or bank facings the combination of a larger anchored cable to wind on a laterally movable winding drum carrying in an opposite direction
105 a smaller cable connected by a swivel joint to a pulley carrying a cable with its ends connected to the warp-lines substantially as described.

13. In a machine for constructing shore or bank facings the combination of a larger anchored cable to wind on a laterally movable winding drum carrying oppositely a smaller cable connected to a pulley carrying a cable
110 having grips at its ends to engage warp-lines, and a lateral beam with hooks to releasably suspend the warp-lines substantially as described. 115

14. In a machine for constructing shore or bank facings the combination of a winding drum with a cable connected by a swivel joint to a pulley carrying a cable having its ends attachable to the warp-lines, with a support to releasably suspend the warp-lines
120 substantially as described. 125

Signed at Blair, in the county of Washington and State of Nebraska, this 2d day of February, 1895.

DAVID NEALE.

Witnesses:

WM. CALDWELL,
J. F. BADGEROW.