

(No Model.)

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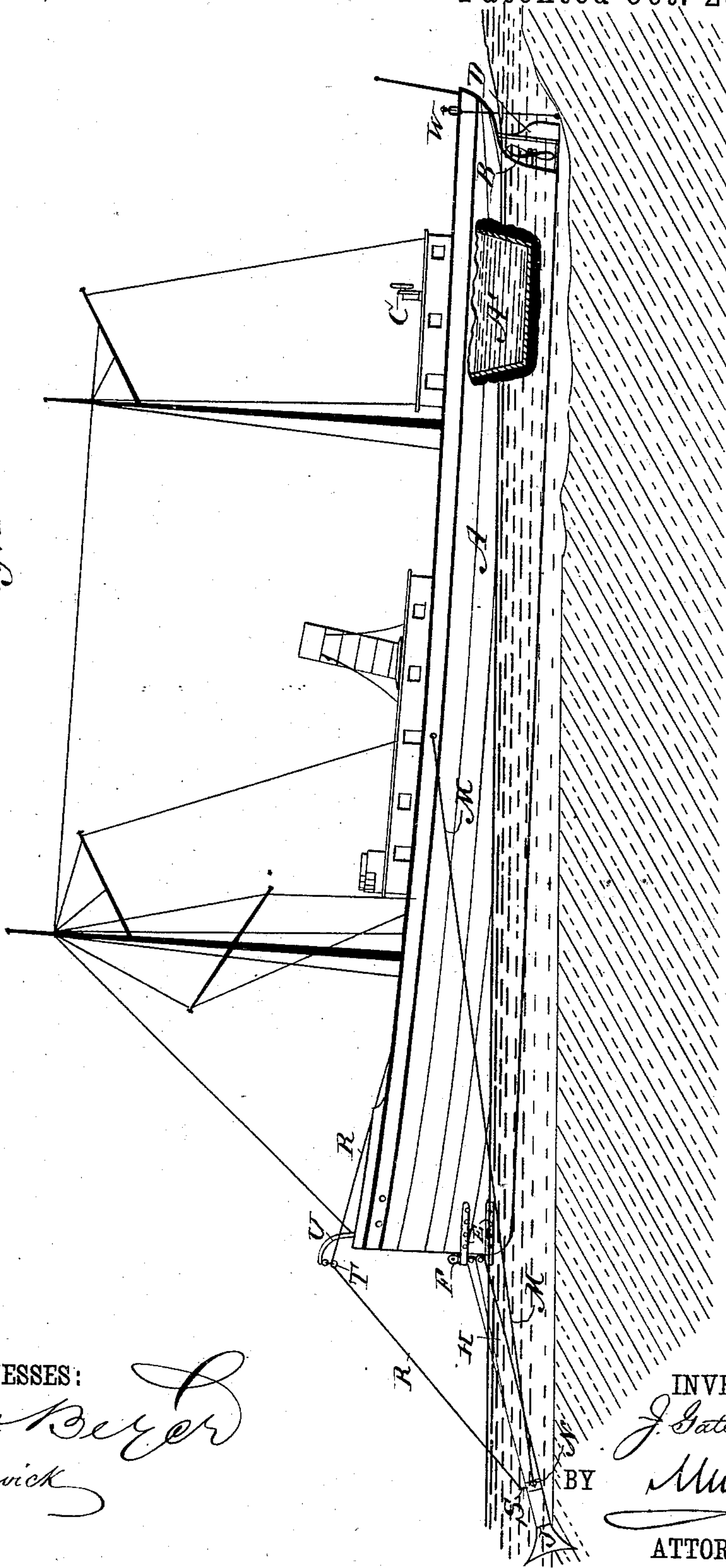
J. GATES.

METHOD OF AND APPARATUS FOR CUTTING CHANNELS IN WATER WAYS.

No. 307,288.

Patented Oct. 28, 1884.

Fig. 1.



WITNESSES:

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(No Model.)

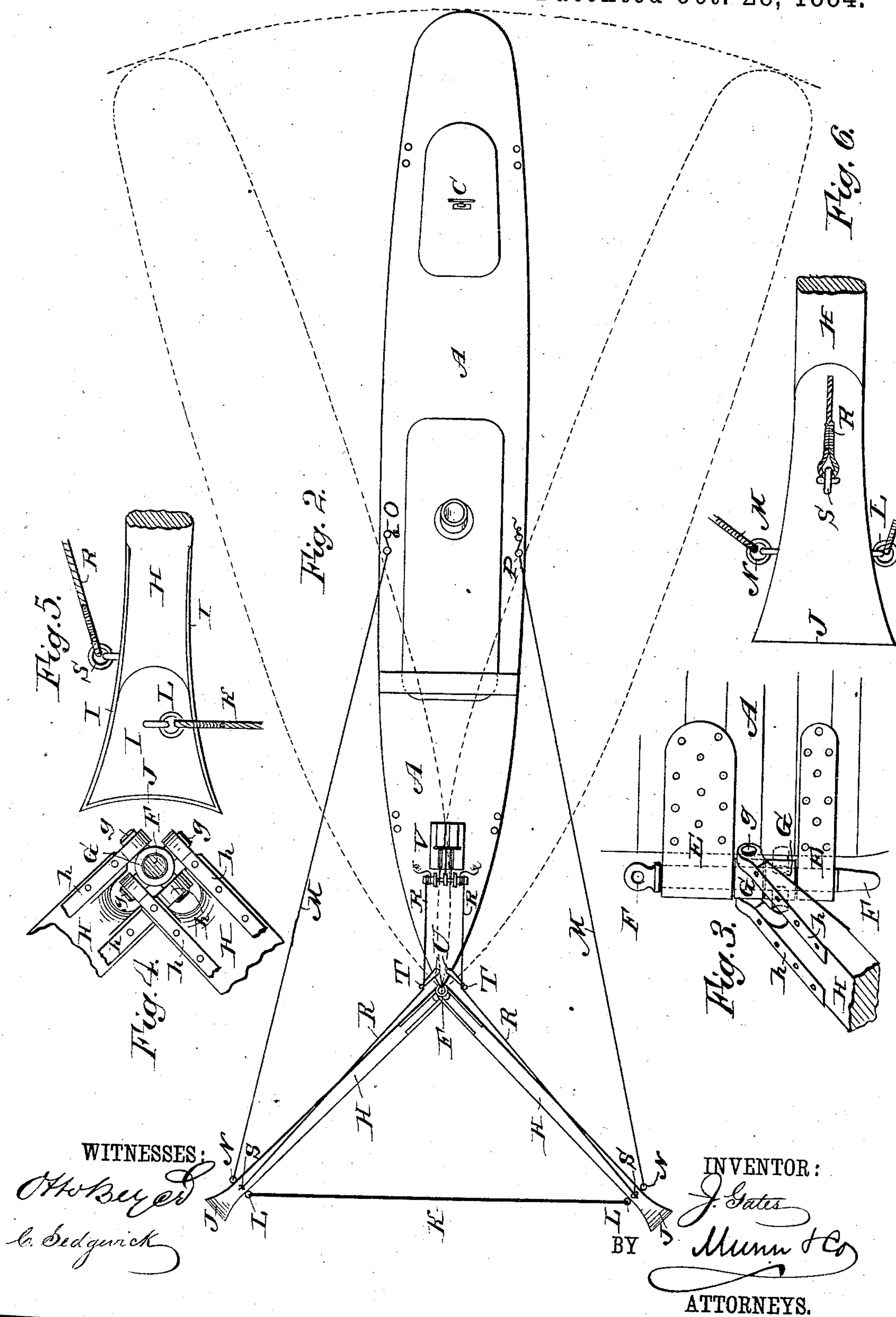
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE

JOHN GATES, OF PORTLAND, OREGON.

METHOD OF AND APPARATUS FOR CUTTING CHANNELS IN WATER-WAYS.

SPECIFICATION forming part of Letters Patent No. 307,288, dated October 28, 1884.

Application filed April 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN GATES, of Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved
5 Method of and Apparatus for Cutting Channels in Water-Ways, of which the following is a full, clear, and exact description.

My invention relates to a method of and means for cutting or sluicing channels in water-ways, the object being to insure quick and
10 effective work by a simple and practical method and apparatus.

The invention consists in the construction and arrangements of parts, as will be herein-
15 after fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

20 Figure 1 is a side elevation of a steam-propeller vessel fitted with my improved apparatus, and illustrating the method of use, the stern being partially broken away to show the water-compartment. Fig. 2 is a plan view of
25 the same. Fig. 3 shows in perspective view the inner end of one of the thrust-spars and its pivotal connection with the bows of the ship, drawn to an enlarged scale. Fig. 4 is a plan view of the inner ends of two outwardly-diverging thrust-spars, with their pivot-pin or
30 shaft in horizontal section. Fig. 5 is a side elevation of the outer end of one of the thrust-spars, and Fig. 6 is a plan view of the same.

My improved method of cutting or deepening
35 ing channels in or through water-ways or across bars or shoals is practically a sluicing process, carried out by directing a current of water forced back from a stern paddle-wheel or a screw-propeller of a steam-vessel onto
40 the bottom, shoal, or bar, which is gradually washed away by the current from the paddle-wheel or screw-propeller, assisted, it may be, by the natural currents of the water-way. The novelty of the method consists, mainly, in
45 the arrangement of the vessel to swing on a pivot at the bows, and to be there held, while the vessel's stern is swung from side to side, preferably, by the power of the paddle-wheel or propeller, which sluices out the channel at
50 the stern of the vessel, as the vessel is backed intermittently and swung from side to side,

to the extreme width of the channel to be cut, the vessel being "harnessed," so to speak, to its work.

I shall herein particularly describe the improvement as carried out by a vessel fitted
55 with a screw-propeller at the stern.

The letter A indicates the vessel, fitted with means for generating power—steam-power, for instance—for driving a screw-propeller, 60 B, fitted in the usual way at the stern of the vessel. The vessel is provided with any approved system of tanks or chambers A' at and near the stern, for receiving water or other ballast to depress the stern and propeller B 65 to about the proposed depth to which the channel is to be cut, and suitable steering-gear will be provided aft, as at C, by which to shift the rudder D, to carry the stern to either side during the channel-cutting operation. 70

In strong forge irons or straps E, fixed to the bows of the vessel A, I fit a stout pin or shaft, F, on which, between the irons E, I place loosely the collars G, which have jointed to them the inner ends of thrust-spars H, several of which spars may be used; but I have
75 shown two only, which are pivoted by their eye-straps h to opposite side pins, g g, of the collars G, the connection of the spars with the vessel being such that the spars may rise and
80 fall at their outer ends, and also swing sideways, or rather permit the vessel A to swing sidewise at the stern either way on the shaft F, as a pivot when the outer ends of the thrust-spars are fixed or anchored in the river bed or
85 bottom to resist a forward movement of the vessel. The inner ends of spars H may connect with the collars G by a tongue on the end of the spar entering between two brackets or cheek-pieces projecting from the front or one
90 side of the collar, and hinged thereto by a pin; but the forked construction of the end of the spar to engage diametrically-opposite pins or trunnions g g of the collar, as shown, is preferred, as it makes a more substantial connection, and permits greater freedom of universal
95 motion in the joints of the spars with the vessel's bows. At their outer ends the spars H carry strong metal plates I, suitably bolted to them and backed solidly, and flared suitably
100 to give an enlarged head or fluke, J, to the spars, so that they shall take firm hold of the

bottom. The spars H preferably diverge from the shaft F in pairs, one of each pair to either side, and the opposite spars are stayed together by a suitable cable, K, fastened to rings or eyes L at the inner sides of the heads J, and cables M, fixed to opposite eyes, N, connect the spars with the starboard and port sides of the vessel by attachment to suitable blocks, O P, thereat, or led to any approved hoisting or winding drums or steam-capstans suitably located. Cables R are fastened to rings or eyes S, pass upward over suitable shears, T, (here shown fixed to davits U,) to any approved hoisting engine or apparatus V near the bows of the vessel. Thus arranged the spars H are stayed apart preferably at an angle of about ninety degrees, and may together be lifted from the bottom or let fall thereto, or held in the water free from the bottom and swung to one side or the other in the water, to serve by their flukes J as a steering apparatus while the vessel is being backed to its work, as hereinafter more fully set forth.

The operation is as follows: With the spars H held up out of the water by the cables R the vessel A is steamed to the place where the channel is to be cut or deepened, and on arrival the vessel is headed up stream with the stern at a point above the shoal. The stern is then depressed by taking in water-ballast to about the depth required for the channel to be cut, the channel being marked by buoys at each side, and a center range of buoys or shore-beacons indicating the longitudinal center of the channel, and by which center range the position of the vessel along the center of the channel may be guided, the side ranges indicating the limit of the swing of the vessel's stern to either side. For instance, if the channel is to be two hundred feet wide, the side ranges will be one hundred feet each side of and parallel with the center range. The vessel is now backed down in the central position until she strikes the shoal or bar, a leadsman at W measures the depth of water, and, the vessel being now guided by a pilot or helmsman at the aft wheel, C, the spars H are now dropped until their flukes J enter the bottom, and the propeller B is started to move the vessel slowly ahead until the flukes J take firm hold, when the propeller B is run ahead full speed. The ship does not go ahead, but steers quite the same as when "running off free," and the after helmsman shifts rudder D as required to swing the stern to either side range on a radius or sweep from the forward pivot-shaft, F, of the spars H as a center. The sluicing is done by the powerful back-current of water caused by the propeller, said current impinging on the bottom to drive the deposit before it to either side, the keel of the vessel meanwhile gaging accurately the clear depth of the channel. The propeller, being above the keel and forward of the deposit, is unharmed and revolves nearly as fast as when the vessel runs ahead freely. When the first sweep or cut is taken clear across the

width of the channel, the flukes J are raised or not, as the flukes will drag on the bottom as the vessel is backed down on the center range until she again strikes bottom, and, the flukes being down, the propeller is started, and by the time the flukes take firm hold the vessel's stern may swing freely and the sluicing operation is repeated for a second cut, as before, and so on continuously for any desired length and depth of channel, and after the first few feet are cut the vessel will be held or moored in the cut by the banks at either side of the channel, the dislodged silt, sand, or gravel being carried aft and spread to either side of the channel by the currents from the propeller, assisted, it may be, by the natural current of the water-way. The leadsman at W warns the helmsman at C, who signals the engineer when the nature of the bottom at any point requires a slowing-up or stopping of the propeller—as, for instance, when a snag is met which is embedded firmly in the bank at one side and projects into the proposed channel-way—in which case chains or cables are made fast by grappling devices to the snag, the flukes J are lifted, and the vessel started ahead to haul out the snag, which, being done, the vessel is backed to its last position, and as she backs the fluked spars H may be used to steer her, for which purpose either spar H may be raised from while the other is lowered into the water, or both spars H may be swung together to either side and in the water by taking in on one side line M and paying out on the opposite line, the spars H and their connecting-cables thus making a complete steering apparatus while backing the vessel to her last position, and the flukes are again lowered to the bottom, and the sluicing operation is continued as before.

A head-line to an anchor may be used to keep the shaft F on the center range; but the two flukes, or a like number of flukes at each side, will generally hold the shaft well to the center of the channel; but if the vessel works the shaft F to one side the ship may be breasted off to either side to center her again by raising one fluke, J, and giving a turn ahead or backing, and paying out on the line from the fluke aft. In going ahead with the "port" fluke down the bows and shaft F will go to "starboard," and in backing will go to port.

In practice the ship may be backed about thirty feet each time when cutting or sluicing out to a depth of ten feet below the natural bottom in heavy sharp sand, and in lighter material the distance backed would be greater.

In making shallower cuts a stern-paddle-wheel vessel may be used, and she will be fitted with rudders abaft the wheel, so that when pushing against the spars H J the stern can be swung sidewise on pivot-shaft F by the force of water passing the rudders, the same as with a screw-vessel.

In widening channels—say from two hundred to five hundred feet—the vessel would be held close to the bank at, say, the port side, and the screw B or paddle-wheel worked to

throw the dislodged material out from the channel already made to avoid filling it up.

My improved method and apparatus are simple, and in practice have proved effective
5 for economically carrying out the work for which they are designed.

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

10 1. In apparatus for sluicing channels in water-ways, in combination with the vessel A, and projecting in advance thereof, the fluked spars H, pivoted at the bows of the vessel so as to have a relative vertical movement, and
15 means for holding, raising, and lowering the spars, substantially as shown and described, and for the purposes set forth.

2. In apparatus for sluicing channels in water-ways, the combination, with the vessel A, of
20 the fluked spars H, pivoted at the vessel's bows on a shaft, F, by collars G, and so as to permit both vertical and lateral swing of the spars, and of means for holding, raising, and lowering the spars, substantially as shown and
25 described, and for the purposes set forth.

3. In apparatus for sluicing channels in water-ways, the combination, with the vessel A, having means for depressing the stern by water or other ballast, of the fluked spars H H, pivoted to the vessel's bows, so as to rise and
30 fall and permit the vessel's stern to swing laterally, said spars being stayed apart by a cable, K, connected to the opposite sides of the vessel by the cables M M, and connected by the cables R R with apparatus V, for raising
35 and lowering the spars together or separately, substantially as shown and described, and for the purposes set forth.

4. In apparatus for sluicing channels in water-ways, the combination, with the vessel A
40 and its forward shaft F, of the fluked spars H, forked at the inner ends, and connecting by straps h h with side trunnions, g g, of the collars G, fitted loosely on the shaft F, substantially as shown and described, and for the
45 purposes set forth.

JOHN GATES.

Witnesses:

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G. E. WATKINS.