W. Harris.

Deepening Harbors.

Patented Mar. 27, 1847.

№ 5,043.

Fig. 1

Fig. 2

Fig. 3

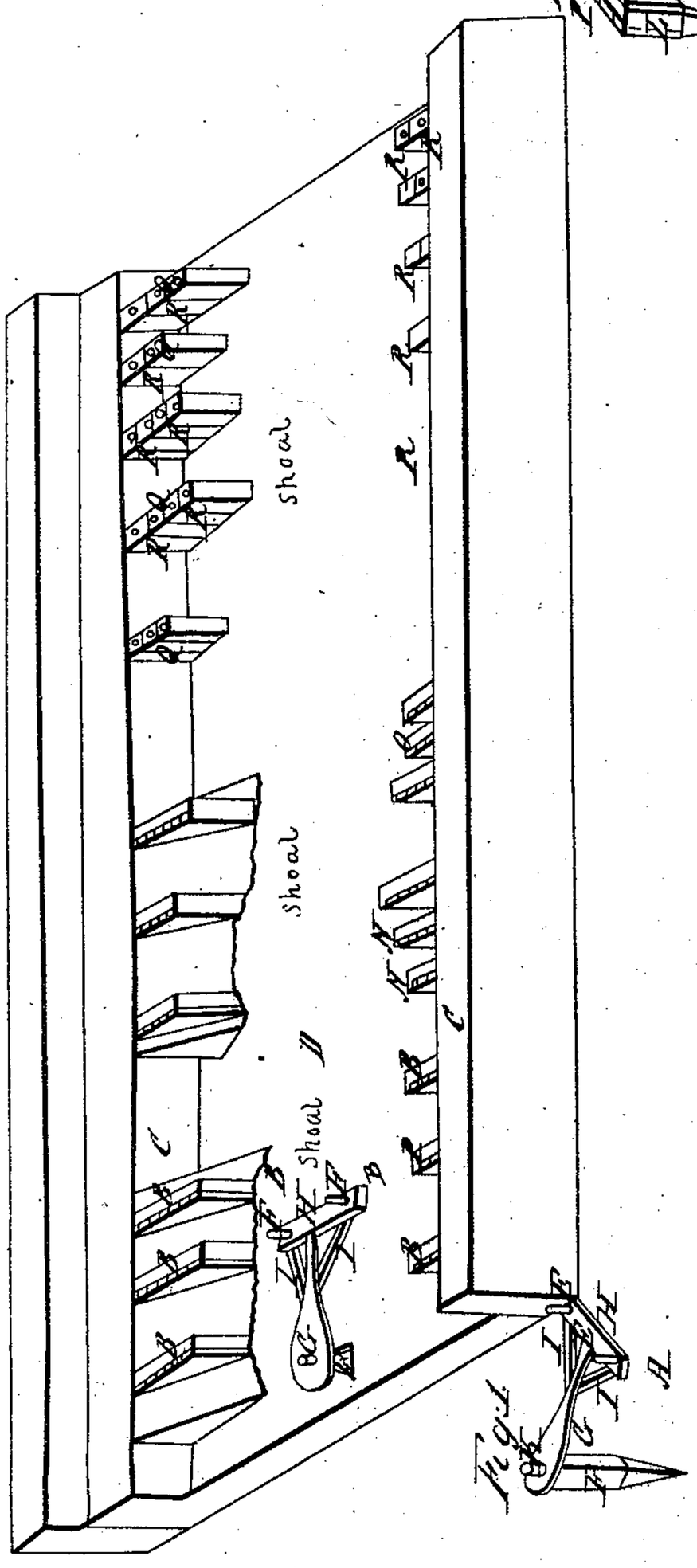
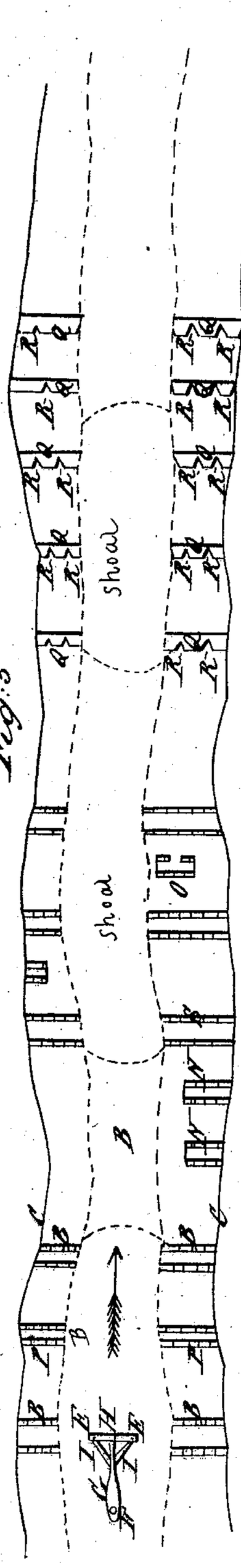


Fig. 4



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UNITED STATES PATENT OFFICE.

WALTER HARRIS, OF RICHMOND COUNTY, GEORGIA.

FINDING THE DIRECTION OF STREAMS FOR DEEPENING CHANNELS.

Specification of Letters Patent No. 5,043, dated March 27, 1847.

To all whom it may concern:

Be it known that I, WALTER HARRIS, of the county of Richmond and State of Georgia, have invented a new and useful Improvement in the Mode of Raising Water on Bars, Shoals, or Shallows in Rivers, Creeks, and Watercourses Generally for Rendering Them Navigable; and I do hereby declare that the following is a full and exact description, reference being had to a drawing hereunto annexed, making a part of this specification.

The nature of my invention consists in concentrating the water on the channel of streams when at or near low-water mark or below navigable point by means of fixtures extending from one or both edges of the stream, according to circumstances, and rendering them navigable.

To enable others to avail themselves of my invention, I will proceed to describe its construction and operation (referring to the annexed drawing when necessary).

I ascertain the beginning and termination of the bar—then an indication of the channel, and fix a machine (constructed for ascertaining the direction of the current in the channel) and marked in the drawing A, Fig. 1, opposite the center of the deepest water that makes up nearest to the bar, and from 5 to 20 yards below according to the depth of water that is required to be raised.

The machine above mentioned for ascertaining the direction of the current resembles a rake turned upside down, with all the teeth removed except the two at the extremes which are lengthened for the purpose hereafter described, having a loop at the end of the handle slipped loosely over a pin inserted into the top of a post driven into the bottom of the stream the top being low enough to allow the machine to float on the surface of the water.

F, represents the post driven into the bottom of the stream, a center bar or handle floating on the surface of the stream, and K the link by which it is attached loosely to a pin injected into the top of the post, allowing it to swing freely. H, the horizontal crosshead, also floating on the surface of the water at right angles to the handle, I, I, braces, and E, vertical staffs or sights inserted at right angles to the handle into the crosshead H, for ascertaining a straight line at right angles to the axis of the current for the lines of piling for the fixtures. The operation of this machine is as follows—the post being erected, the loop at the end of the handle is put over the pin, the current carries the handle down stream parallel with the axis of the current, in the same manner a vane is directed by the wind—of course the staffs or bights at the ends of the crosshead will be in a line at right angles with the handle, and will indicate a line accordingly on which the fixtures must be constructed.

The line for the fixture being ascertained, a stake is to be driven in a line with the sights E, on the edges of both sides of the channel D, and the machine removed to the next point at which it may be necessary to construct another range of fixtures—having established the machine and ascertained the direction of the current, and staked it off as before—remove the machine to the third point, and so on till all the points for constructing the fixtures are staked that are necessary, which must be regulated by the length of the bar or shallow and the depth of the water to be raised. The water then straggling between the stakes and the shore on both sides of the channel must be measured. This is done by taking the depth at every ten feet between each stake and the shore, when the bottom is even, but when uneven at every five feet. This done, a calculation may be made so as to throw a proportional quantity of water on the channel from both sides.

When much depth of water is wanted the fixtures should be placed nearer together, when less farther apart; but in all cases sufficiently near to keep the current in an onward unbroken volume else the effect will be lost. The fixtures B, are to be constructed on a level as high as the water is required to be raised from both sides of the stream *c*, Fig. 3, at the same time if convenient if not alternately extending them in proportion to the quantity of water, and the distance the channel D, is from either shore—say the channel is 200 yards from the right, and only 100 yards from the left edge of the stream, and there is 200 square feet of water straggling on the right—and only 100 on the left side of the channel—extend the fixtures from the right twice the distance of the one from the left shore, and so on in due proportion, so as to throw double the quantity of water on the channel from the right—that is from the left side, ranging the fixtures from both

shores in a direct line with the staffs or sights E, in machine A, or the stakes driven on each edge of the channel D, as before stated,—thus continuing till the water rises to a level with the fixtures, when the depth required is obtained—the work is finished and navigation goes on. But should the water continue to decline, so as to lose the depth required, the fixtures must be continued in the same proportion till it's regained.

In constructing the fixtures, two stobs L, Fig. 2, must be driven in a line with the staffs or sights E, in machine A, or the stakes in their line, not exceeding ten feet apart—say two poles from 5 to 7 inches diameter firmly in the ground with a piling machine if the water is deep and strong, on the top of which fasten a sill M, 5 by 7 or 6 by 8 inches square according to the force of water to be resisted, by iron bolts or wooden pins driven through the sill into the top of the stob L. Then commence driving piling P water tight. In the beginning and particularly where the water is shallow $1\frac{1}{4}$ inch plank will answer, but in conclusion and where the water is deep and strong $1\frac{1}{2}$ inch plank should be used, all spiked or strongly nailed to the sill, with occasionally one on the opposite or lower side to brace and strengthen the sill, which must not only be made strong enough to resist the force of the current, but to sustain the logs and craft that may lodge upon it in a falling river.

As an example of the plan,—suppose a channel 3 feet deep, and that $3\frac{1}{2}$ feet are required, commence driving the piling on each shore at a point that will level 6 inches above the water and continue then till it rises to the top of the piling as above described. The advantage of bringing a proportional quantity of water—or as nearly so as possible from both sides to act on the channel, is their meeting harmoniously and flowing smoothly without producing eddies or whirls or impinging more upon one side of the channel than the other. This is the most perfect mode—but in an experiment when the measurement was dispensed with (except by the eye) it was found to answer every purpose.

It sometimes happens when the channel inclines much to one shore—or when it is thought best to divert it from a straight line in order to impede its velocity, to extend the fixtures to a great length, as in the example at S, that a cross current sweeps along the extended fixture from the shore to the channel—bearing upon its base, and might in time blow it up, to prevent which, the short fixtures N, may be thrown out but never extended farther than is necessary to effect that purpose. To prevent the water from diverging from the channel when it is curved, the fixtures O, must be thrown out, as it is important to keep the water still in the interstices or spaces between the different ranges of fixtures, except when it rises and flows smoothly over them all, by which means those spaces will fill up and become firm earth, thereby insuring the permanence and stability of the fixture.

On a rock foundation where piling cannot be driven, though stone walls may be built, yet it will be found, that the fixture may be made with more expedition and less expense by making strong wooden boxes A, and filling them with rock which will confine them to their places. They should be formed as represented in the drawing, with the upper side—or the side up stream about 2 or 3 inches shorter than the lower—by which means they can be kept in better line, and the aperture R, will receive trash and sediment from above which will form a better joint than could be made by square end boxes. Should the current become too rapid by being narrowed, which can be ascertained by the fall, the channel should be lengthened as much as possible by crooking or curving it from side to side of the stream, and then throwing out two or three ranges of fixtures above and below the shoal will greatly tend to diminish its velocity.

What I claim as my invention and desire to secure by Letters Patent is,

The method of obtaining a line at right angles to the current of a stream, for the erection of eddies, piers or other fixtures employed in deepening streams, by means of the floating apparatus A, provided with the staffs E, and turning on the post F, in the manner described.

WALTER HARRIS.

Witnesses:
JAS. S. READ,
A. MALLOY.