No. 646,769.

Patented Apr. 3, 1900.

S. C. SWARTS.

HYDRAULIC DREDGE.

(Application filed Oct. 14, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

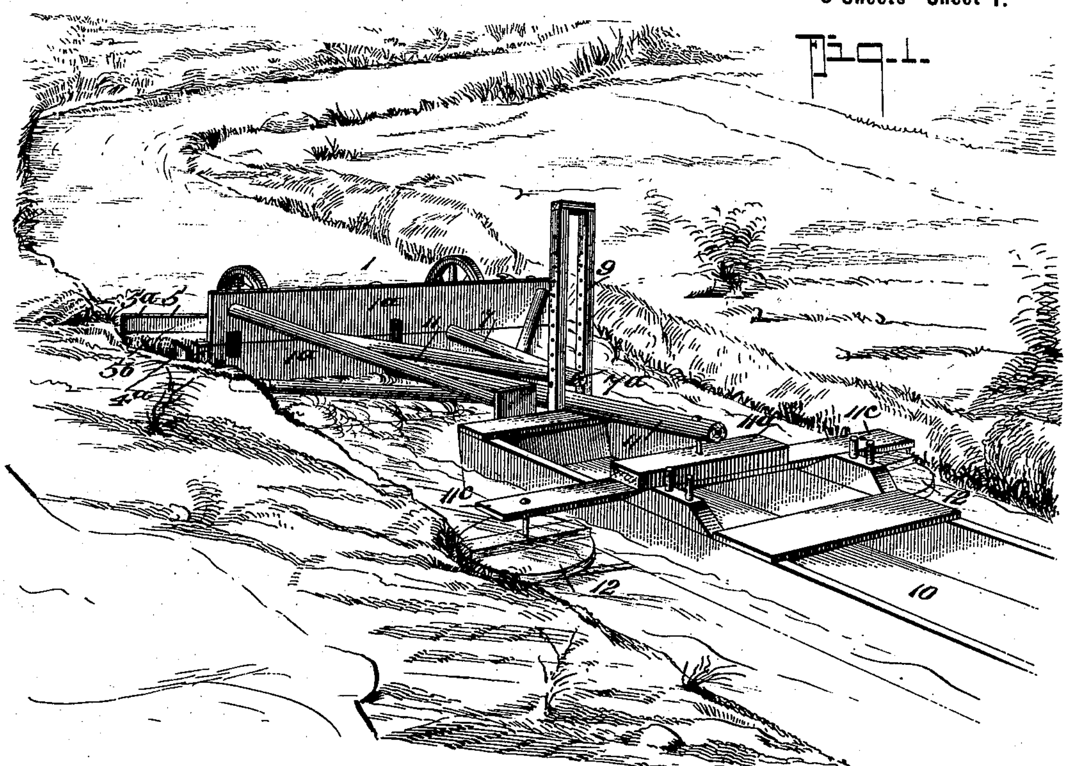

Fig. 2.

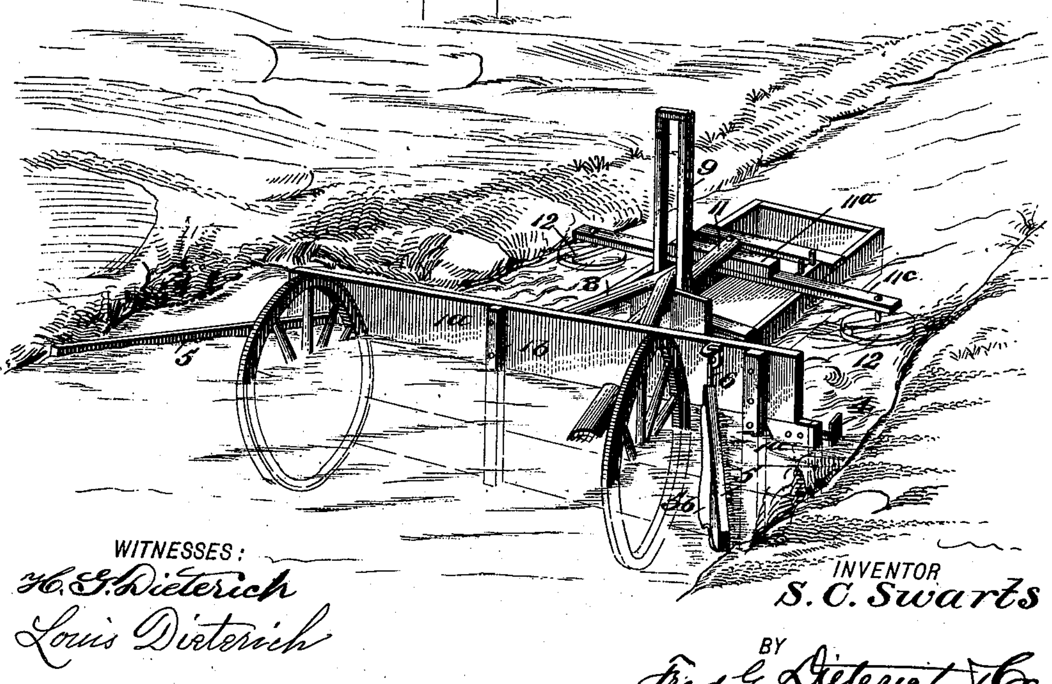

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Fig. 3.

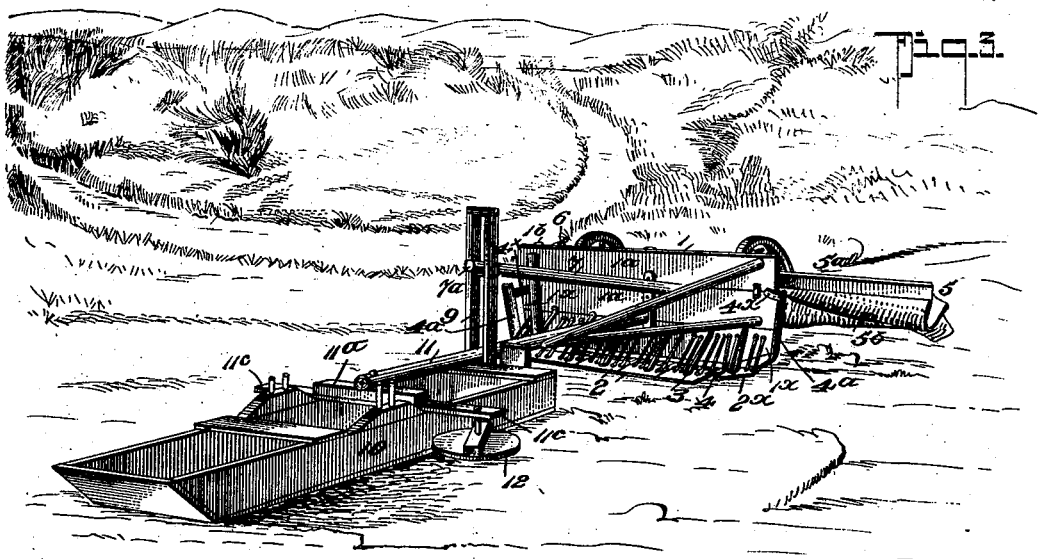

Fig. 4.

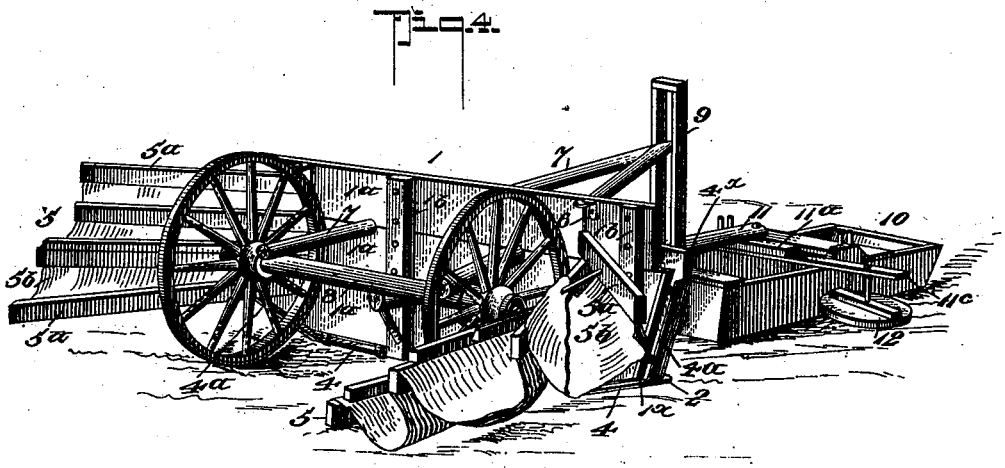

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Fig. 5.

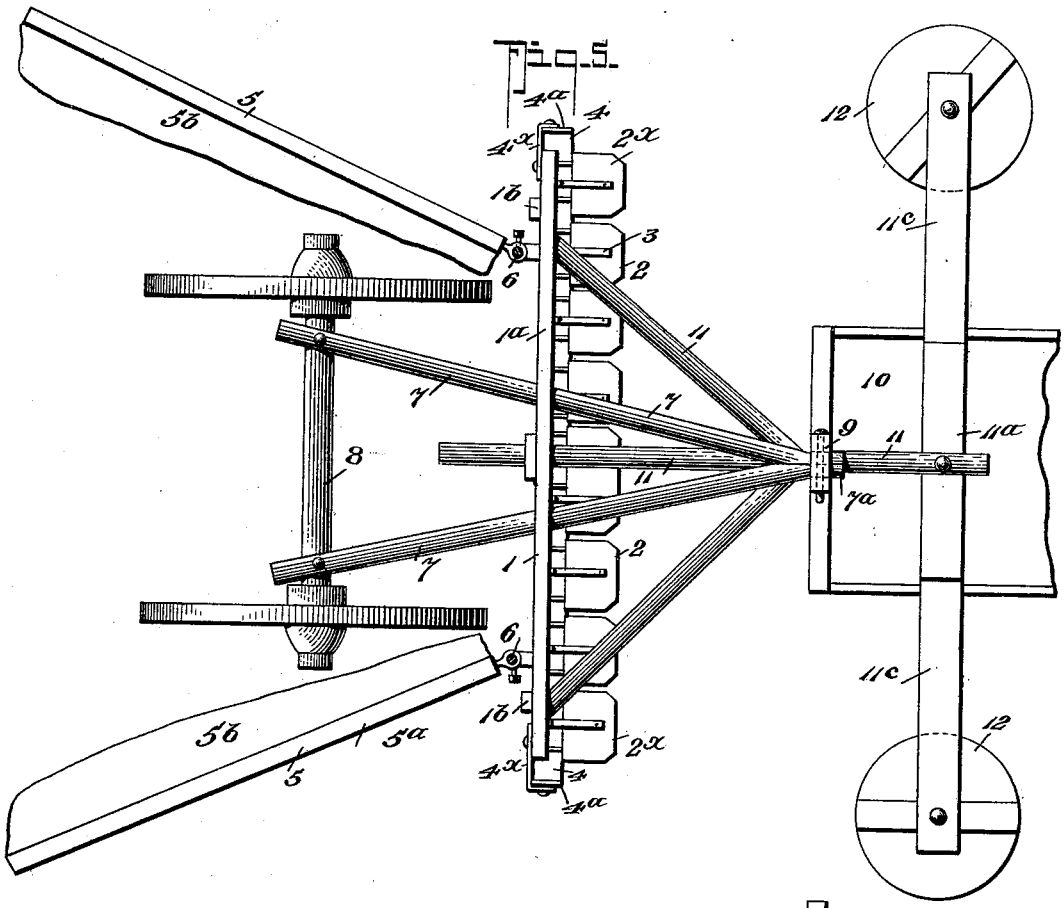
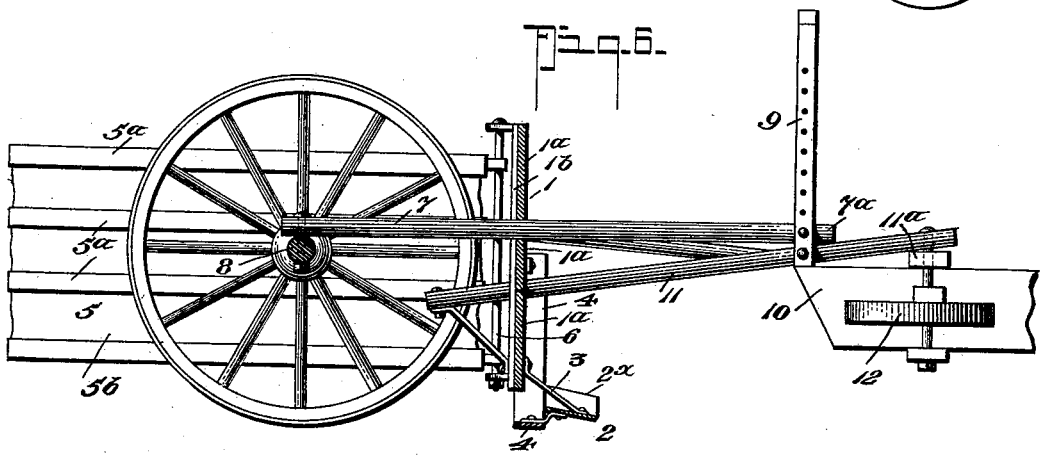


Fig. 6.



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UNITED STATES PATENT OFFICE.

SYLVESTER C. SWARTS, OF RANGELY, COLORADO.

HYDRAULIC DREDGE.

SPECIFICATION forming part of Letters Patent No. 646,769, dated April 3, 1900.

Application filed October 14, 1899. Serial No. 733,658. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER CURTIS SWARTS, residing at Rangely, in the county of Rio Blanco and State of Colorado, have invented a new and Improved Hydraulic Dredge, of which the following is a specification.

My invention involves a new principle of construction of parts constituting a dredging apparatus which in its general application is adapted for dredging or deepening channels of rivers or other streams, it being, however, particularly intended for use to dredge creeks, canals, and other irrigating streams.

Generally my invention comprehends a means for damming the stream adapted to be moved forward with the current by the hydraulic force of the current against it and equipped with scraping devices adapted to plow or dredge the sand and other bottom deposits in the stream as the dam-forming means are carried forward by the current force, said damming means and scraping devices being arranged so that the dug-up portions as they are lifted will be scoured or disintegrated by hydraulic force and carried off with the current.

In its more specific nature my invention comprehends a gate having suitable dredging blades or scoops projected forwardly from its lower front edge and adapted to extend across the stream from bank to bank and devices for steadying the said gate or cross-head as it is forced forward in the direction of the current by hydraulic force, said gate or head being also constructed with suitable water-passages contiguous to the dredger blades or scoops, whereby as the sand and other bottom deposits are dug up they will be disseminated by the swiftly-passing water-current and carried off with the said current.

Another feature of my invention lies in providing a dredger of the character noted with self-adjusting end extensions or wings that will automatically and closely hug the opposite banks of the stream irrespective of the irregularity thereof and be held extended by the hydraulic force of the stream to effectively serve to complete the damming of the stream and by reason thereof obtain a maximum hydraulic force to operate against the gate or cross-head, whereby to cause it, together with its dredging devices, to move in a forward direction.

Another and important feature of my invention consists in combining with the cross-head or gate adapted to effectively dam the stream and carrying dredge devices and adapted to be moved along the stream by hydraulic force a float in the nature of a bateau that moves in advance of the cross-head or gate and to which the said gate is connected, wheeled support for the cross-head or gate traveling at the rear thereof, which when the dredger is working in the stream travels on the bottom of such stream and when not at work in the stream serves as a convenient means for portably conveying the apparatus to any desired point.

This invention also includes with the gate or head member supplemental fore-and-aft guiding means therefor and devices for adjusting the head or gate vertically, whereby to set it to suit the depth of the stream to be dredged.

In its more subordinate features this invention comprehends certain details of construction and peculiar combination of parts, all of which will hereinafter be fully described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a front perspective view illustrating my invention as in use and looking up the stream. Fig. 2 is a similar view of the same looking down the stream. Fig. 3 is a front perspective view of the apparatus. Fig. 4 is a rear perspective view of the same. Fig. 5 is a plan view of the apparatus. Fig. 6 is a longitudinal section of the same.

In the general construction my invention embodies substantially three parts—to wit, a gate or body portion which is adapted to extend vertically across the stream from bank to bank and which carries at its lower front edge the dredging shovels or blades, a wheeled drag that forms the aft guide and support for the body portion, and a float or bateau disposed forward of the body portion that dams the stream and which forms the front guide for the apparatus and also the carrier for the operator.

Referring now to the accompanying drawings, in which like numerals indicate like parts in all the figures, 1 indicates the body portion or gate, which acts as a means for damming the stream and also as a support for the dredging blades or shovels, presently referred to, said gate or body portion 1 being, however, loosely held within the stream, whereby the impact or hydraulic force of the current against it will move it along down the stream. The body portion 1 in practice is made up of strong rough timbers of a length to suit the width of the stream it is intended to be used in and in its simplest form may consist of a series of horizontally-arranged boards 1^a, bolted to vertical bars 1^b, as clearly shown in Fig. 4, and to provide for moving the body 1 freely along the lower edge of the bottom board is shaped to suit the shape of the creek-bottom, the opposite ends of the lowermost board in the drawings being shown as cut on an upward incline at its outer ends, as indicated by $1^\times$.

2 2 indicate a series of dredger-shovels consisting each of a horizontally-disposed blade held in a plane below the lower edge of the bottom board 1^a and made fast by brace-rods 3, bolted to the boards 1^a, the end blades $2^\times$ being inclined parallel with the end incline edges of the lower board. To strengthen the entire series of blades 2, a strap-iron 4 is bolted to the under side of their inner ends, which iron has its ends 4^a bent up at right angles over the outer edges of the body 1, said ends being bolted thereto, as indicated by $4^\times$. (See Figs. 3 and 5.) The object in disposing the dredger-blades in a plane below the lower edge of the body 1 is twofold—first, it provides for effecting a positive penetration of the said blades into the sand and mud; secondly, it provides for a free flow of water in a compressed stream between the lower edge of the body 1 and the blades, and thereby insures a thorough scouring action or dissemination of the collected or dredged particles, they being, as it were, sufficiently churned up to pass off with the current. As the banks of the streams are always more or less irregular, it follows that to make the body of a length to always exactly extend across the stream is impossible, and said body 1 is therefore usually made of a length approximately that of the minimum width of the stream in which it is to be used and to provide for automatically extending the gate or body 1, so as to practically cross from one bank of the stream to the other bank, whereby to effect a more complete damming of the stream. The said body is equipped at each end with wing-like extensions 5, each extension 5 being pivotally connected to the body to swing in a horizontal plane and has independent action and is held extended to follow the irregularity of the stream-bank by the water force against it.

The extensions 5 are each held for vertical adjustment on the body 1, whereby they can be set high or low, as the depth of the stream may make necessary, to produce the desired results.

The extensions 5 consist each of a number of horizontally-disposed beams 5^a, pivotally secured at their inner ends on vertical rods 6, mounted on the rear of the body 1, near the outer edges thereof, the several beams 5^a of each extension being connected by flexible canvas members 5^b. It will be noticed by referring more particularly to Figs. 2 and 5 that the extensions are so pivoted as to readily swing outward and held to drag against the banks of the stream by the water-pressure against them.

The body 1 is supported on a central bar 11, that forms a tongue, and a pair of hounds 7, that extend through the body 1 and have their rear ends bolted to the axle 8 of the wheeled drag that forms the rear support for the said gate or body 1. The hounds 7 converge forwardly and terminate in an end 7^a, which enters and is vertically adjustable in the slotted standard 9, projected from the rear end of the bateau or float 10, which forms the front support for the body 1. The tongue 11 also passes through the slotted standard 9 and has its front end bolted to the cross-bar 11^a, supported upon the bateau or float, the ends 11^c of which project on the sides of the bateau and support pendent guides in the nature of rotary disks 12, which are adapted to engage with the banks of the stream at intervals, and thereby serve to keep the tongue and bateau in the middle of the stream. By connecting the tongue 11 and the hounds 7 with the bateau in the manner described it is obvious I can readily adjust the body 1 to the depth desired, it being understood that the wheels of the drag, which consists of an axle 8 and the wheels 12, will travel on the bed of the stream and form the one rear support for the dam-forming body 1, said drag-frames also providing for an easy means of conveying the apparatus over lands to such points desired.

It will be noticed by reference to Fig. 4 of the drawings that the several beams of each extension or wing 5 are adapted to project from the body 1 in such manner as to permit them to better accommodate themselves to the irregular slopes of the bottom of the stream.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the operation and advantages of my invention will be readily understood.

In operation the gate or body 1 is adjusted to suit the depth of the stream, the bateau holding the said body 1 from falling forward and also guiding it. It is manifest as the said body 1 dams the stream the hydraulic force against it will cause it to travel in an upright position down the stream, dredging the bottom in its movement, the speed of which is dependent upon the force of water-pressure against it and the speed in which the plowed sand or bottom deposits are disseminated by the water-currents.

My hydraulic dredge can be constructed of the roughest kind of timber and readily put up by unskilled labor, a great desideratum in an apparatus of this kind, as its use is most general at places where unskilled labor can be conveniently secured.

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

1. A hydraulic dredge comprising a gate or cross-head loosely held in the stream and adapted to be moved in an upright position with the current by the force of the current against it; dredging devices carried by the gate or cross-head and means for sustaining the gate in its upright position as it moves forward.

2. A hydraulic dredge, comprising means for damming the stream, adapted to be moved down the stream by the water-pressure against it; dredging shovels or plows carried thereby said plows being held in a plane below the bottom of the damming means, whereby to provide for a flow of water over the plows to disintegrate or scour the material loosened thereby, as specified.

3. A hydraulic dredger, comprising a portable gate or cross-head adapted to extend across the stream and dam the current and movable with the current by the pressure of water against it, said cross-head carrying forwardly-projecting dredging shovels or plows at the lower end, and a floating guide arranged in advance of the cross-head and connected therewith, as shown and described.

4. A hydraulic dredge, comprising a cross-head carrying dredging-plows at the lower end, said cross-head being adapted to dam the stream and having a forwardly-projecting tongue; a floating guide disposed in advance of the cross-head; a supporting member held upon the floating guide connected with the tongue of the cross-head, said supporting member having its ends projecting beyond the guide and carrying pendent roller-disks, substantially as shown and for the purposes described.

5. The combination with the body portion forming the damming gate or cross-head, said body carrying the dredge members at the lower end; a wheeled drag adapted to travel on the bed of the stream and forming a rear support for the body 1, and a floating guide disposed in advance of the cross-head; and connections between said guide and the cross-head, substantially as shown and described.

6. A hydraulic dredge, comprising a body portion forming a gate or cross-head adapted to dam the stream and carrying dredger-plows at its lower end; a floating guide in advance of the cross-head having connections with the cross-head and adapted to sustain the same in an upright position, and a wing or extension for each end of the cross-head adapted to be swung outward by the pressure of water thereagainst, substantially as shown and for the purposes described.

7. The combination with the body portion forming a cross-head or gate; plows secured to the lower end thereof and projected forwardly; means for sustaining the cross-head in a vertical position as it moves along the stream; of an extension or wing for each end of the cross-head pivotally secured thereto to be swung outward against the bank of the stream by the water-pressure thereagainst, said extensions consisting each of a series of beams projected rearwardly from the cross-head at different angles, and flexible portions connecting the several beams, substantially as shown and for the purposes described.

8. The combination with the body portion forming a cross-head or gate to dam the stream and movable down the stream by the pressure of water thereagainst; and a floating guide for sustaining the said cross-head in its vertical position; of the pivoted end extensions, said extensions being of a depth less than that of the cross-head, and plows secured to the lower end of the cross-head and projected forwardly therefrom, substantially as shown and for the purposes described.

9. The combination with the body portion forming the cross-head or gate, and the wheeled drag forming a rear support for the cross-head; of a floating guide disposed in front of the cross-head, said guide having a vertical standard, the cross-head having projecting members engaging the said standard and vertically adjustable therein, whereby the cross-head may be adjusted to suit the depth of the stream, substantially as shown and for the purposes described.

10. A hydraulic dredge, consisting of means for damming the stream, said means being adapted to be moved forward in an upright position by the pressure of water against it; a floating guide for holding the said damming means in an upright position as it moves along the stream; dredging-plows disposed in a plane below the bottom of the damming means and secured thereto, said plows being adapted to travel over the bed of the creek and hold the lower end of the damming means above the bottom of the creek, whereby to provide for a passage of water between the plows and the damming means to disintegrate the dredged particles as the damming means is carried forward by hydraulic pressure, for the purposes specified.

SYLVESTER C. SWARTS.

Witnesses:
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