J. T. COWLES.

GOLD DREDGE.

APPLICATION FILED JAN. 12, 1916.

1,220,197.

Patented Mar. 27, 1917.

3 SHEETS—SHEET 1.

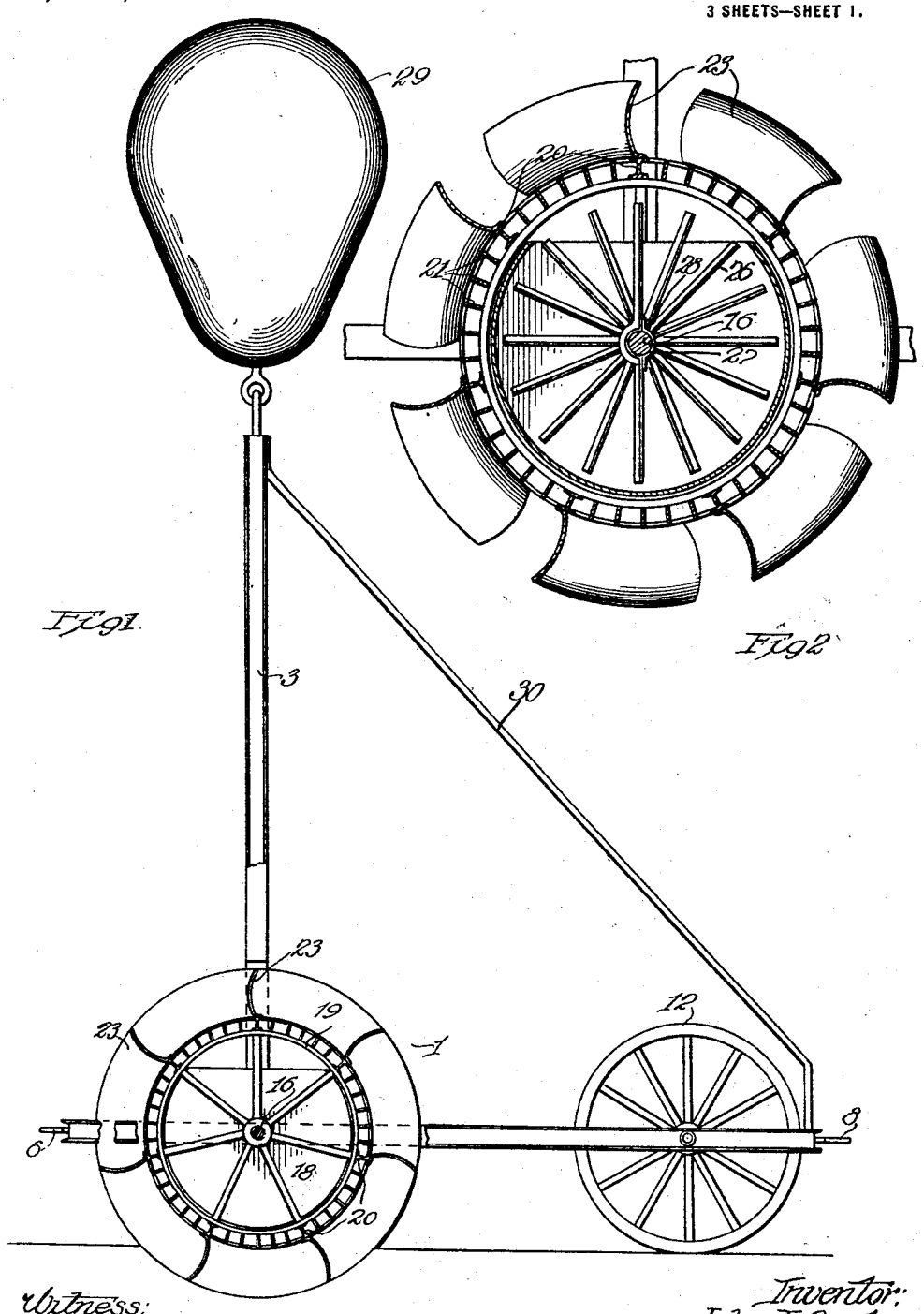


Fig 1.

Fig 2.

Witness:

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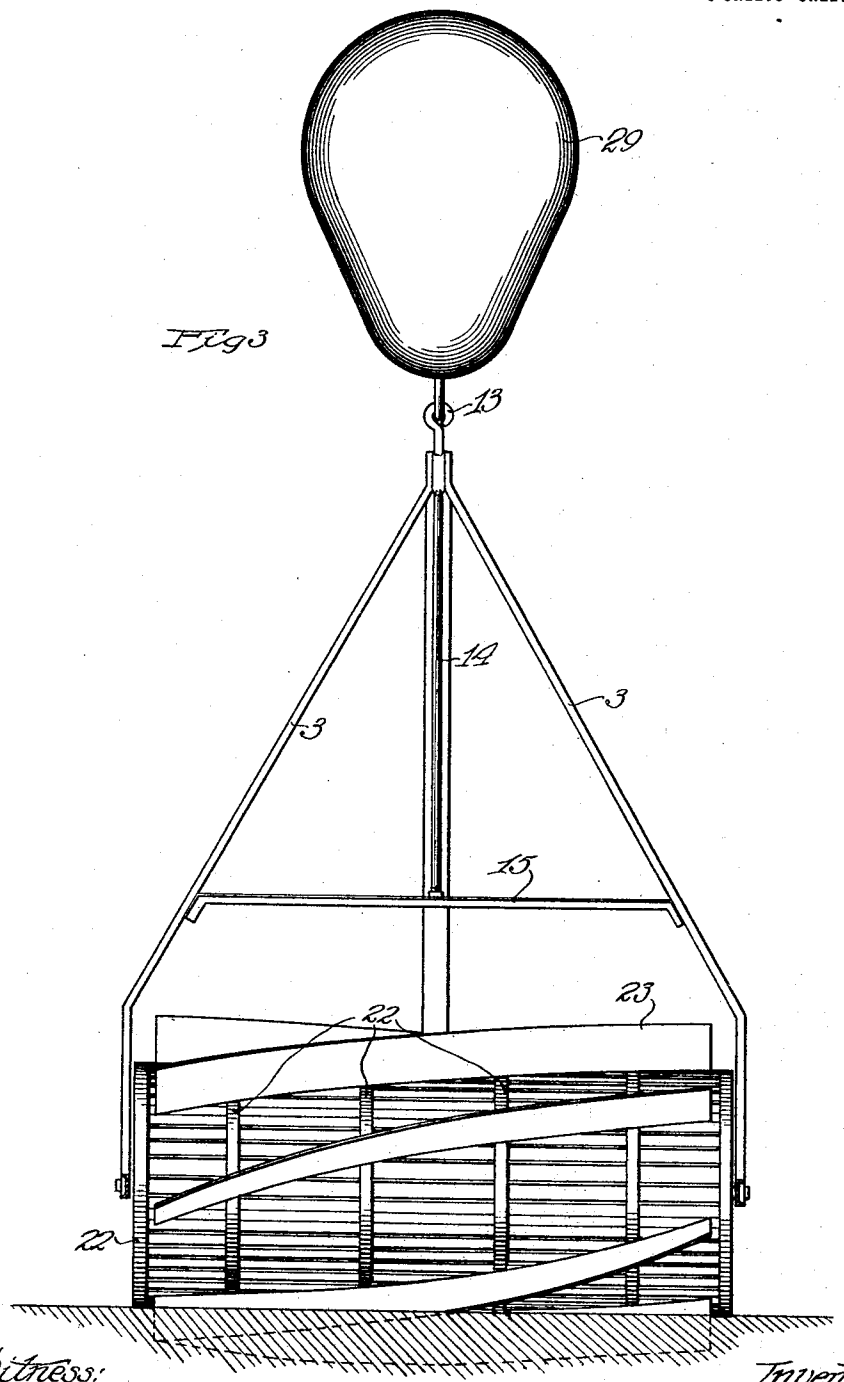
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3 SHEETS—SHEET 2.

Fig 3



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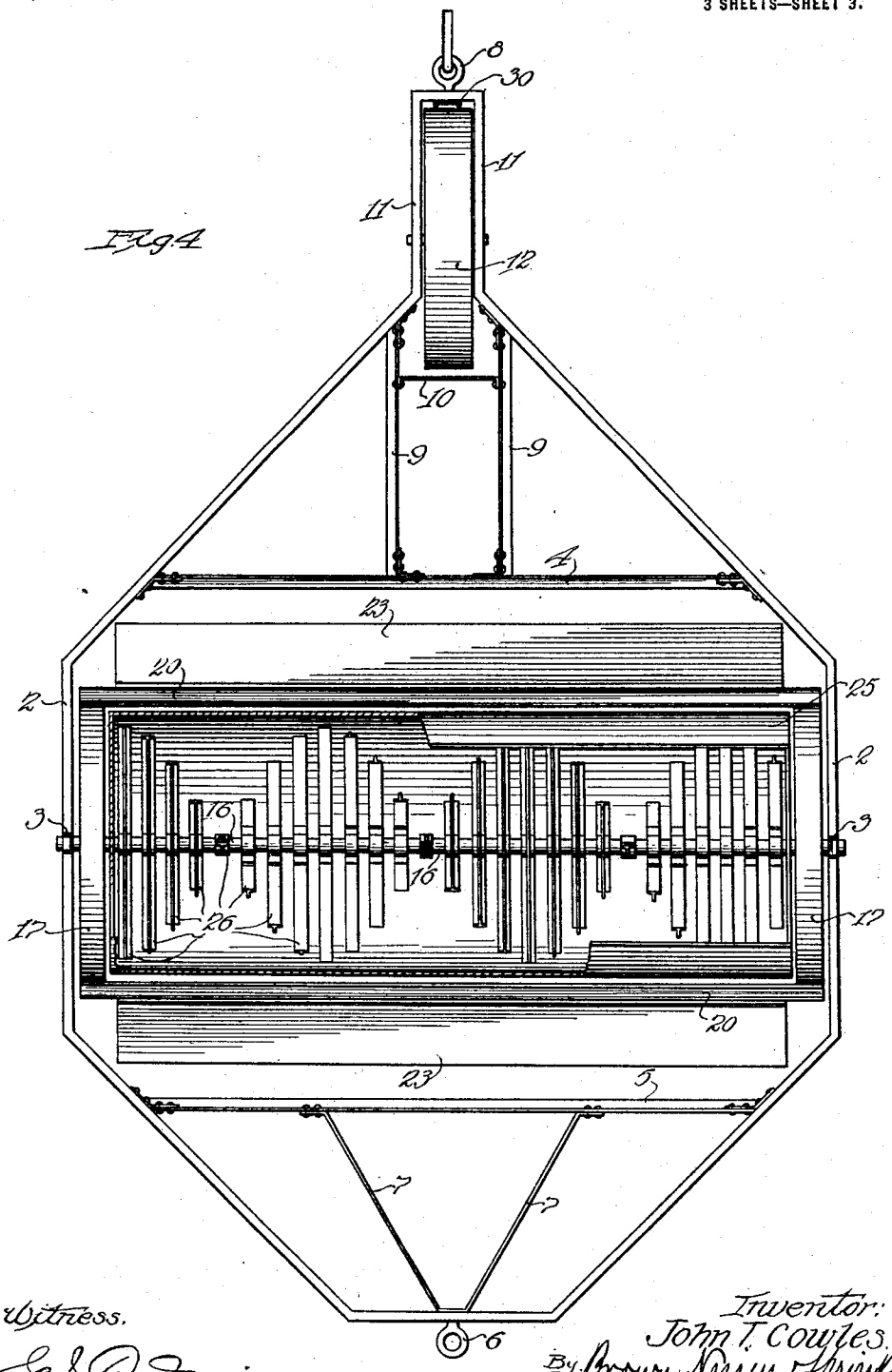
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3 SHEETS—SHEET 3.

Fig. 4



Witness.

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UNITED STATES PATENT OFFICE.

JOHN T. COWLES, OF CHICAGO, ILLINOIS.

GOLD-DREDGE.

1,220,197. Specification of Letters Patent. Patented Mar. 27, 1917.

Application filed January 12, 1916. Serial No. 71,609.

To all whom it may concern:

Be it known that I, JOHN T. COWLES, a citizen of the United States, residing at Chicago, in the county of Cook, and in the State of Illinois, have invented certain new and useful Improvements in Gold-Dredges, of which the following is a specification.

This invention relates to a device intended especially for recovering gold bearing earth from the ocean bed in places where the depth of the sea is too great to permit of the operation of devices heretofore used for this purpose. The device is, however, capable of operation under other conditions where dredging operations are desirable.

The invention consists in the combination and arrangement of parts hereinafter described, shown in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation with parts broken away, of a complete dredge made according to the present invention.

Fig. 2 is a transverse sectional view of the rotary dredging wheel.

Fig. 3 is a rear elevation of the machine with a portion of the frame broken away.

Fig. 4 is a top plan view of the complete dredge with portions broken away to show the parts more clearly.

In the drawings, the numeral 1 designates generally a dredging wheel journaled for rotation in a frame work comprising a horizontal yoke having side bars 2 and an upright yoke having inwardly converging side bars 3. The side bars 2 are bent inwardly on each side of the wheel 1 and the inwardly bent portions are braced by transversely extending braces 4 and 5.

The frame is provided at its rear portion with an eye 6 and strengthening members 7 to connect the cross bars 5 and the rear portion to the frame adjacent the eye 6, for adding strength and rigidity to the device. A similar eye 8 is fastened to the forward portion of the frame which portion is also provided with auxiliary strengthening members 9 and 10. Portions 11 of the forward ends of the side bars 2 are arranged parallel with one another and a wheel 12 is journaled for rotation between these parallel portions.

The side bars 3 are brought together at their upper end and have an eye 13 secured thereto at their connecting point. A tie rod 14 extends downwardly from the point of connection of the side bars 3 and is secured at its lower end to a transverse brace member 15 extending from one of the side bars 3 to the other at a position a short distance above the periphery of the wheel 1. The frame work as described may be composed of any suitable material and may well be built up from commercial channel and angle iron, such as is commonly used in building construction. It may be found advantageous to galvanize or otherwise protect the parts of the machine to prevent the destructive action of the elements.

Journaled for rotation in the side bars 2 at the point where they unite with the upright bars 3 is a shaft 16 which extends the full width of the dredge and on which the dredging wheel 1 is mounted. Rigidly secured to the shaft 16 at each end thereof near the sides of the frame work is a wheel 17 having spokes 18 and rim 19. Spaced at intervals about the periphery of the wheel 17 are a number of I beams 20 which are secured to the rims 19 of the wheels 17 and which extend from one wheel 17 to the other thus connecting the two wheels 17 to form the frame work of the complete dredging wheel 1. Extending parallel with the I beams 20 but spaced at closer intervals about the periphery of the wheels 17 are a plurality of screening bars 21 which are preferably made of comparatively thin steel plates arranged with their surfaces radial to the dredging wheel. The screening bars 21 are secured to the rims 19 of the wheels 17 and are provided with spacing rings 22 extending around the dredging wheel 1 and distributed at intervals along the wheel as shown in Fig. 3. These spacers 22 prevent lateral bending and spreading of the screening bars 21. Secured to the I beams 20 and extending outwardly from the periphery of the wheel 1 are a plurality of curved steel blades 23. As shown in Fig. 3 the blades 23 are not arranged directly parallel with the axis of the wheel but have one of their ends secured to the periphery of the wheel in advance of the other and as shown in Figs. 1 and 2 these blades are curved in section to give them a scoop formation for purposes to be explained. The arrangement of the blades 23 on the periphery of the wheel 1, with one end of the blade in advance of the other, is for the purpose of more efficient operation of the device, since by this arrangement, as the wheel is drawn

over the bottom of the sea the various points on the edge of the blade will strike the sea bottom in succession so that at all positions of the wheel some portion of a blade will be operating. In this way the blade will be more readily forced into the material on which the wheel rests and will more readily disengage the material from its position as will hereinafter appear.

Swung from the axle 16 and free to rotate thereon within the dredging wheel 1 as shown in Figs. 1, 2 and 4 is a trough or receptacle 25. This trough is open at the top and has its center of gravity located somewhat below its point of support on the axle 16 so that the open side will always remain upward regardless of the position of the wheel 1. Secured to the axle 16 and distributed longitudinally thereof within the trough 25 is a plurality of blades or paddles 26. These paddles occupy different angular positions about the axle 16 and may be rigidly secured thereto in any desirable manner, straps 27 and bolts 28 being shown in the drawings for this purpose.

Secured to the eye 13 at the upper portion of the yoke members 3 is a float or buoy 29. This buoy may be of any suitable construction but is preferably a closed hollow metal vessel of sufficient strength to resist the high pressure to which it is subjected when used in deep sea operations. The upper portion of the upwardly extending yoke to which the buoy 29 is secured, has fastened thereto a brace rod 30 which extends downwardly and forwardly and is fastened at its lower end to the forward portion of the horizontal frame member adjacent the eye 8 as shown in Fig. 4. The buoyancy of the float 29 is not sufficient to prevent the dredge from resting on the bottom of the water in which it is operated, but, is great enough to hold the dredge in an upright position under all conditions of operation.

The operation of the device is as follows: Cables are secured to the eyes 6 and 8 at the front and rear of the device and the cable secured to the rear eye 6 is placed around a pulley carried by a suitable anchor which is allowed to sink to the bottom of the sea at a point sufficiently removed from the shore to permit the dredge to pass over the portion of the bottom of the sea, where it is desirable to work for gold, in being drawn back and forth from the shore to the anchor. The cable secured to the eye 8 at the front of the machine extends to a suitable hauling engine which is placed upon the shore. In this way mechanism is provided for moving the dredge along the sea bottom from the position occupied by the anchor to the position of the hauling device upon the shore. As the bottom of the sea is worked the anchor and hauling engine may be moved laterally parallel with the shore line to cover any amount of the sea bottom desired. The depth of water in which the dredge may be operated is practically unlimited as there are no parts of the machine which will be affected by the pressure due to the depth of water in which the machine operates. As the dredge moves forwardly or to the right as shown in Fig. 1 over the bottom of the sea the blades 23 will be successively brought into contact with the material on the sea bottom and as the wheel 1 rotates due to the forward movement the concave portions of these blades will scoop up the material from the bottom and carry it upwardly as the blades ascend until they reach a position above the open portion of the trough 25. When the blades reach the position above the trough they will be tilted to such an angle that the material will begin to discharge from the inner edge of the blades and will fall into the trough. In entering the trough the material must pass between the screening bars 21 which bars will prevent large material such as boulders from entering the trough. Portions of material too large to pass between the bars will be carried over the top of the wheel and discharged therefrom on its descending side. As the dredge is moved along the axle 16 will be turned by the rotation of the dredging wheel and will rotate the paddles or stirrers 26 within the trough 25. Since the whole device is submerged in the sea water this rotation of the paddles within the trough will have a tendency to wash out all light materials and leave only the gold in the bottom of the trough.

Where the bottom of the sea is uneven the dredge will, of course, move up and down inclined portions of the sea bottom. In moving up an incline the wheel 12 will hold the frame work in proper position and when the dredge is moving down an incline portion, the cable secured to the eye 8, if the inclination is very great, will hold the wheel 12 free from the supporting surface. In operation the device of course is liable to strike boulders and other obstructions which will have a tendency to overturn it. It is quite important to prevent any upsetting of the device while in operation because if it should turn over the valuable material collected in the trough would be discharged therefrom and lost. With applicant's construction however this is entirely impossible since the buoyancy of the float 29 will always maintain the dredge right side up regardless of the obstructions that it may encounter.

In many places and notatably near the coasts of the gold regions of Alaska rich deposits of gold and other precious metals are known to exist on the bottom of the sea but heretofore it has been impossible to recover the gold from such deposits because of

the difficulties of working at great depths below the surface. While this invention is capable of application to many different conditions, it is especially designed for recovering gold found in the conditions above explained.

I do not wish, however, to confine my invention to any particular conditions of operation or to the recovery of any particular material.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination a dredging device, means for moving said device over a surface at the bottom of a body of water, means for excavating and collecting material from said surface, and means attached to and submersible with said dredging device, for automatically maintaining said device in upright position independently of contact with said surface to prevent escape of the material so collected.

2. In combination a dredging device adapted to operate under water and arranged to collect and retain material from the bed beneath said water, and means attached to and submersible with said dredging device for automatically maintaining said device in correct operating position while submerged.

3. In combination a dredging device comprising means for collecting and transporting material from the bed beneath a body of water, and a buoy attached to said device and submersible therewith for maintaining said device in operating position.

4. In combination a dredging device comprising means for collecting, retaining and transporting material from the bed beneath a body of water, and a float secured to said dredging device for maintaining said dredging device in operating position when submerged in water, said float being of sufficient buoyancy to prevent overturning of said dredging device, but, not buoyant enough to support the weight of said dredging device when said device and float are submerged.

5. In combination a wheeled frame, dredging mechanism, carried by the lower portion of said frame, a receptacle carried by said frame for receiving material from said excavator, and a float secured to the upper portion of said frame and spaced above the wheels thereof to maintain said frame in upright position when said frame and float are submerged.

6. In combination a frame, a rotary dredging wheel, mounted in the lower portion of said frame, a guide wheel, mounted in the lower portion of said frame, and a float secured to the upper portion of said frame for maintaining said wheels in position to bear on the bed beneath a body of water when said frame and wheels are submerged.

7. In combination a rotary dredging wheel, a guide wheel, a frame having a horizontally disposed yoke connecting said wheels and spacing them from one another, a vertically extending yoke secured to said horizontal yoke, and a float secured to the upper portion of said vertically extending yoke.

8. In combination a cylindrical dredging wheel, a frame in which said wheel is mounted, said frame comprising a horizontally extending yoke having side bars located one at each end of said cylindrical wheel, a vertically extending yoke, a brace member for holding said yokes in fixed relation to one another, and a float secured to the upper portion of said vertically extending yoke for maintaining said dredging device in upright position.

9. In a dredging device, a wheel arranged to roll over the surface of the material to be worked, and blades secured to the periphery of said wheel to roll therewith and arranged to loosen and dislodge portions of said material from said surface.

10. In a dredging device, a wheel arranged to roll over the surface of the material to be worked, curved blades secured to the periphery of said wheel and arranged to be projected into the surface of said material as the wheel rolls thereon to gather up portions of said material, a frame work in which said wheel is mounted, and means for moving said frame work to cause said wheel to roll upon the surface of said material.

11. In a dredging device, a hollow cylindrical wheel arranged for rotary movement over the surface of the material to be worked, the surface of said wheel being formed of an open work screen, and blades secured to the periphery of said wheel for excavating portions of said material and discharging said material through said screen into the interior of said wheel.

12. In a dredging device, a hollow cylindrical wheel arranged for rotary movement over the surface of the material to be worked, bars extending longitudinally of said wheel at the periphery thereof to form a screen, and curved blades secured to the periphery of said wheel for excavating portions of said material and arranged to discharge said material through said screen into the interior of said wheel, when said blades are caused to approach their uppermost position by the rotation of said wheel over the surface of the material being excavated.

13. In a dredging device, a cylindrical dredging wheel, comprising end spiders spaced apart and having their rims connected by bars extending longitudinally of said wheel to form the periphery thereof, curved blades secured to the periphery of said wheel and extending approximately radially thereof, and means for rolling said wheel over

the surface of the material to be excavated to cause said blades to enter the surface of said material and to remove portions therefrom.

14. In a dredging device, a cylindrical dredging wheel, having continuous blades secured to the periphery thereof and extending approximately radially thereto in position to be projected into the surface of material over which said wheel is rolled, and arranged longitudinally of said wheel with one end of each of said blades at an angular position on said wheel in advance of the other end thereof.

15. In a device of the character described, a cylindrical dredging wheel, having continuous blades extending approximately radially from the periphery thereof, and arranged longitudinally of said wheel the opposite ends of each of said blades being arranged at different angular positions on said wheel whereby said blades are held at an angle to the axis of said wheel.

16. In a dredging machine, a cylindrical excavating wheel having blades secured to the periphery thereof, said blades being made of relatively thin plates of sheet metal, extending approximately radially of said wheel, being curved in cross section and having the ends thereof arranged at different angular positions on said wheel.

17. In a device of the character described, a dredging wheel, a trough swung within said wheel for receiving material excavated thereby and a buoy connected with said wheel for preventing overturning of said trough when said device is submerged.

18. In a device of the character described, a dredging wheel, blades secured to the periphery of said dredging wheel for excavating material, a trough swung within said wheel for receiving the material excavated by said blades and a buoy connected with said wheel and spaced upwardly from said trough for preventing overturning of said trough when said device is submerged.

19. In a device of the character described, a hollow cylindrical dredging wheel, an axle for said wheel extending longitudinally thereof, a trough mounted for rotation on said axle within said wheel and a buoy connected with said wheel and spaced upwardly from said trough for preventing overturning of said trough when said device is submerged.

20. In a device of the character described, a hollow cylindrical dredging wheel, a trough mounted within said wheel for rotation about the axis thereof, said trough having its center of gravity below the axis of said wheel and having an opening at its upper portion for receiving material and a buoy connected at a fixed point relative to said wheel and submersible therewith to maintain said wheel in upright position.

21. In a device of the character described, a hollow cylindrical dredging wheel, a trough having an open side and arranged within said wheel to remain in position with its open side upward independently of the angular position of said wheel, blades secured to the periphery of said wheel and arranged to discharge material inwardly through the periphery of said wheel into said trough as they are carried toward their uppermost position by rotation of said wheel and a buoy connected with said wheel and spaced upwardly from said trough for preventing overturning of said trough when said device is submerged.

22. In a device of the character described, a hollow cylindrical dredging wheel, having its periphery formed of open work to constitute a screen, blades secured to said periphery approximately radially of said wheel and curved to receive and retain material as said wheel is drawn over a surface and arranged to discharge said material through said screen into the interior of said wheel as said blades approach their uppermost position, and a trough mounted within said wheel to receive said material.

23. In a device of the character described, a frame, a guide wheel, journaled in said frame, an upstanding yoke secured to said frame, a float secured to said upstanding yoke, a dredging wheel journaled for rotation in said frame, said wheel comprising a hollow cylindrical body, having its periphery composed of an open frame work to form a screen, blades secured to said periphery and arranged to receive and retain material as said wheel is rolled upon a surface and to discharge said material from their inner edges through said screen into the interior of said wheel as said blades approach their uppermost position, and a trough within said wheel for receiving said material.

24. In a dredging machine, a dredging wheel, a trough for receiving the material excavated by said wheel, and means driven by movement of said machine for stirring the material deposited in said trough.

25. In a dredging machine, a hollow cylindrical excavating wheel having an axle extending longitudinally thereof and held for rotation with said wheel, a trough rotatably mounted on said axle, and stirrers secured to said axle for rotation therewith within said trough.

26. In a device of the character described, a hollow cylindrical dredging wheel having an open work periphery, blades carried on the periphery of said wheel for rotation therewith into and out of contact with the surface over which said wheel is moved, a trough mounted within said wheel for receiving the material excavated by said blades and arranged to rotate relative to the axis thereof and having its center of gravity

located below the axis of rotation of said wheel, and paddles mounted on the axis of said wheel for rotation within said trough in unison with said wheel for stirring the material deposited therein by said blades.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 10th day of January A. D. 1916.

JOHN T. COWLES.

Witnesses:
CHAS. M. NISSEN,
GERTRUDE M. BARNES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."