

No. 661,193.

Patented Nov. 6, 1900.

W. W. PRIESTLEY.  
SUBAQUEOUS DREDGER.

(Application filed Aug. 8, 1899. Renewed Apr. 16, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. I.

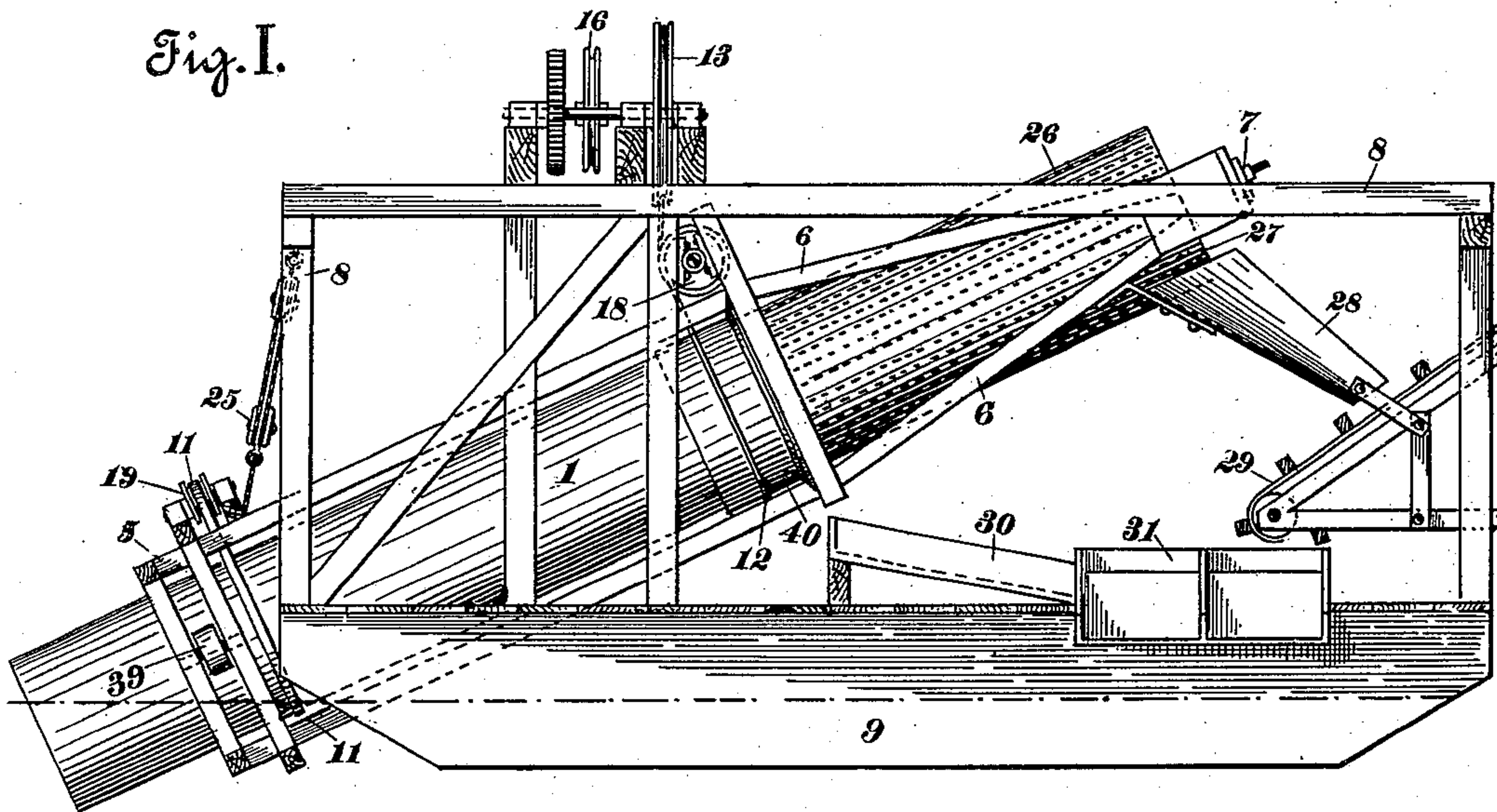
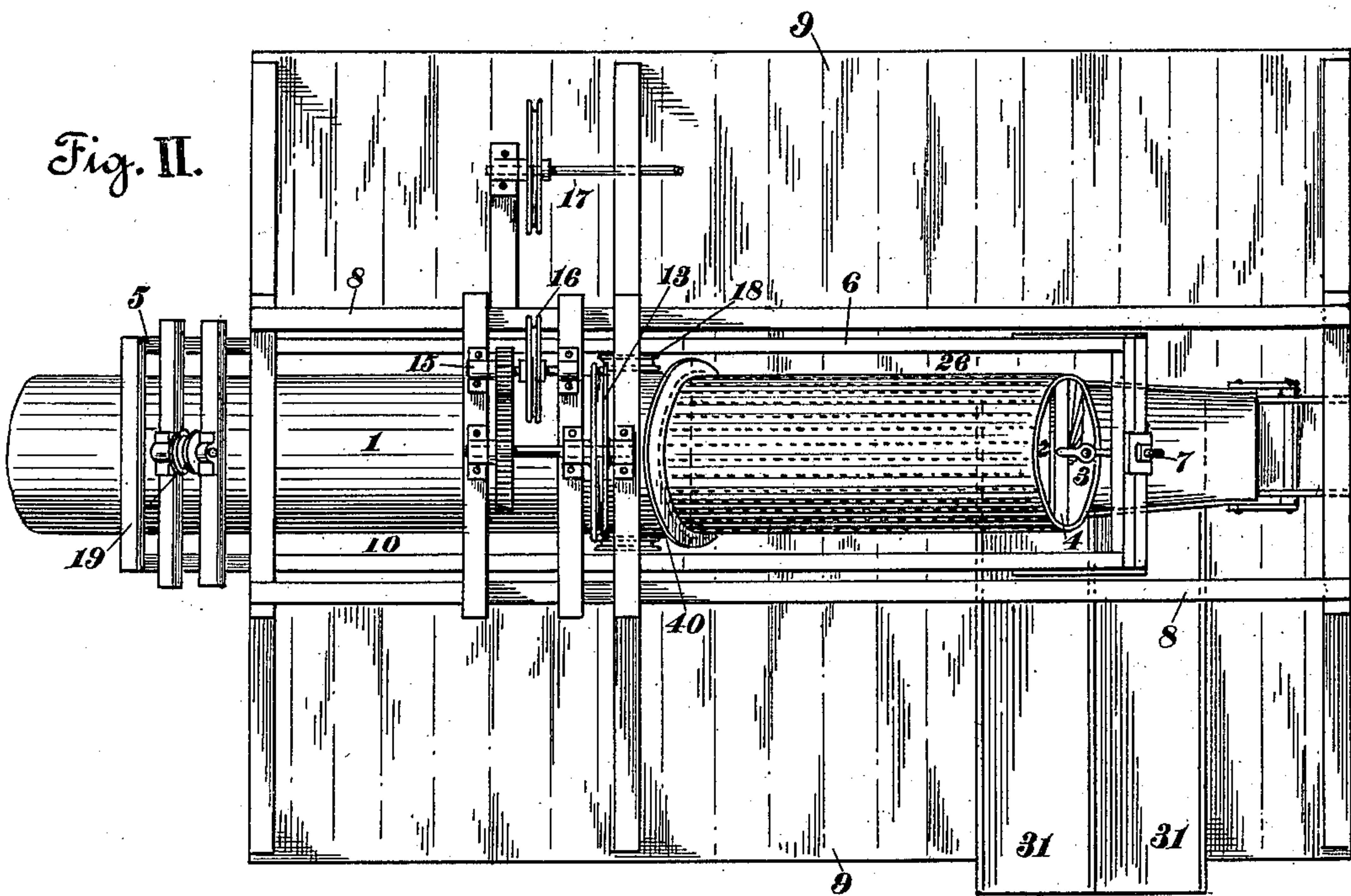


Fig. II.



Witnesses.

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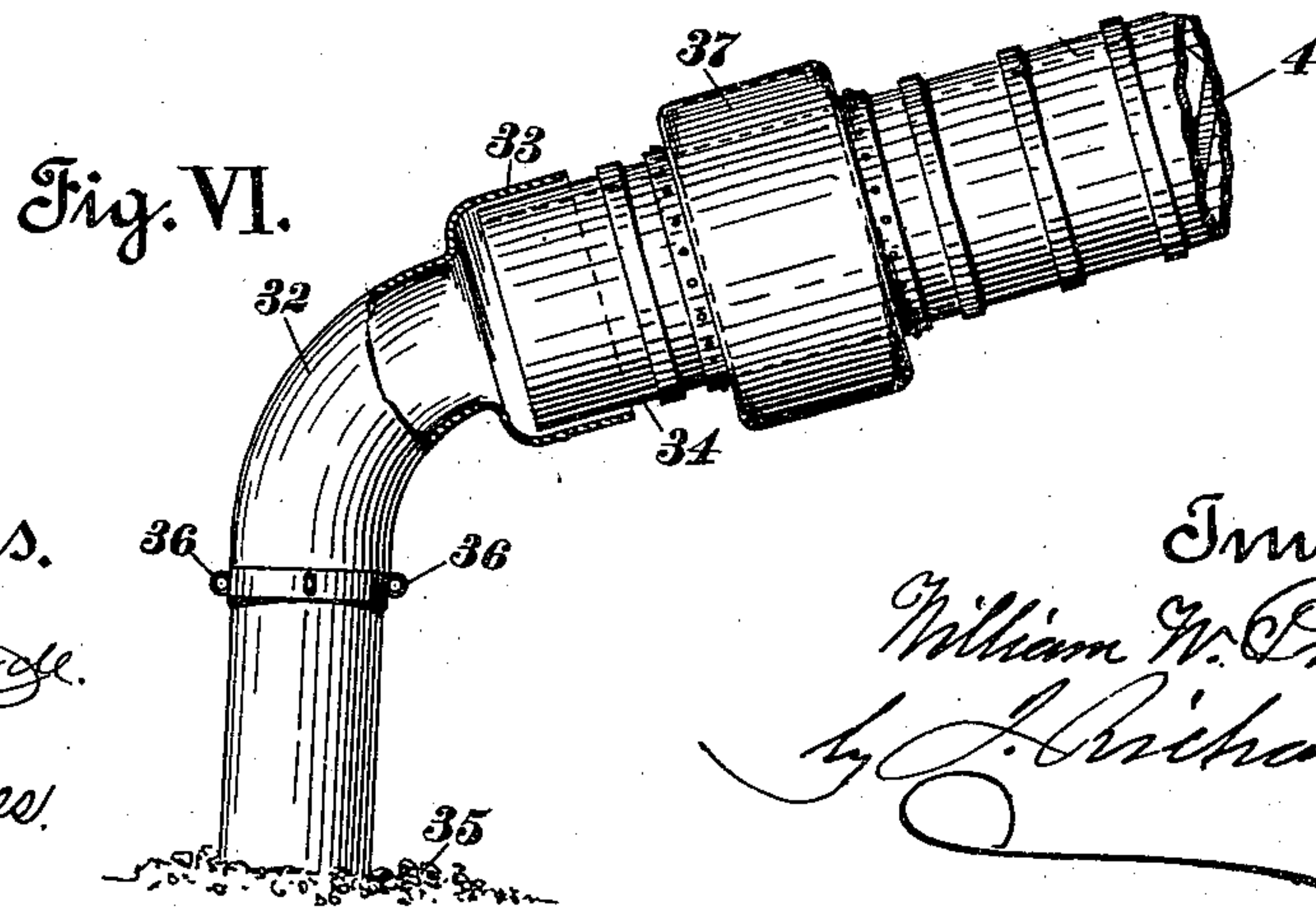
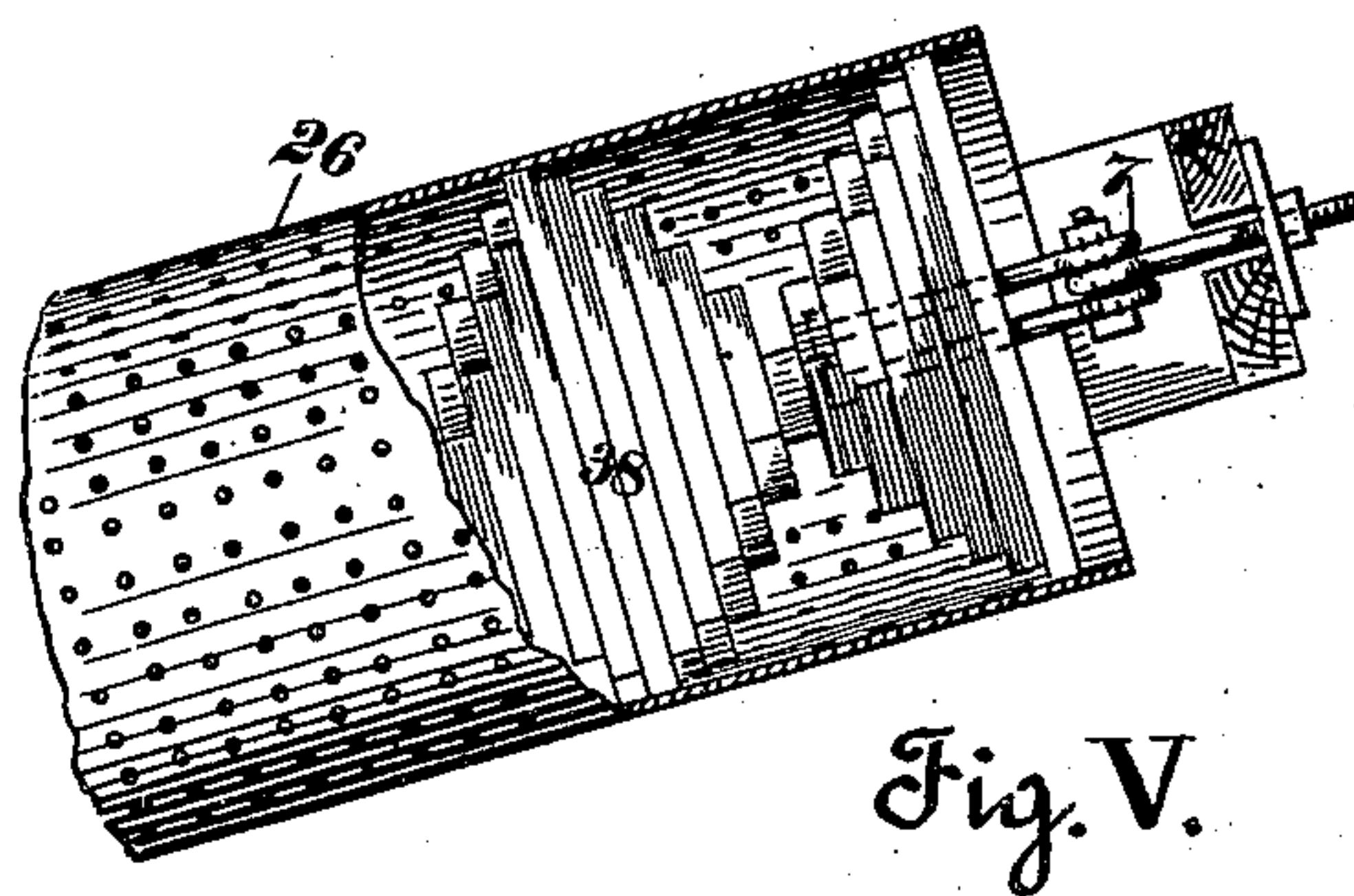
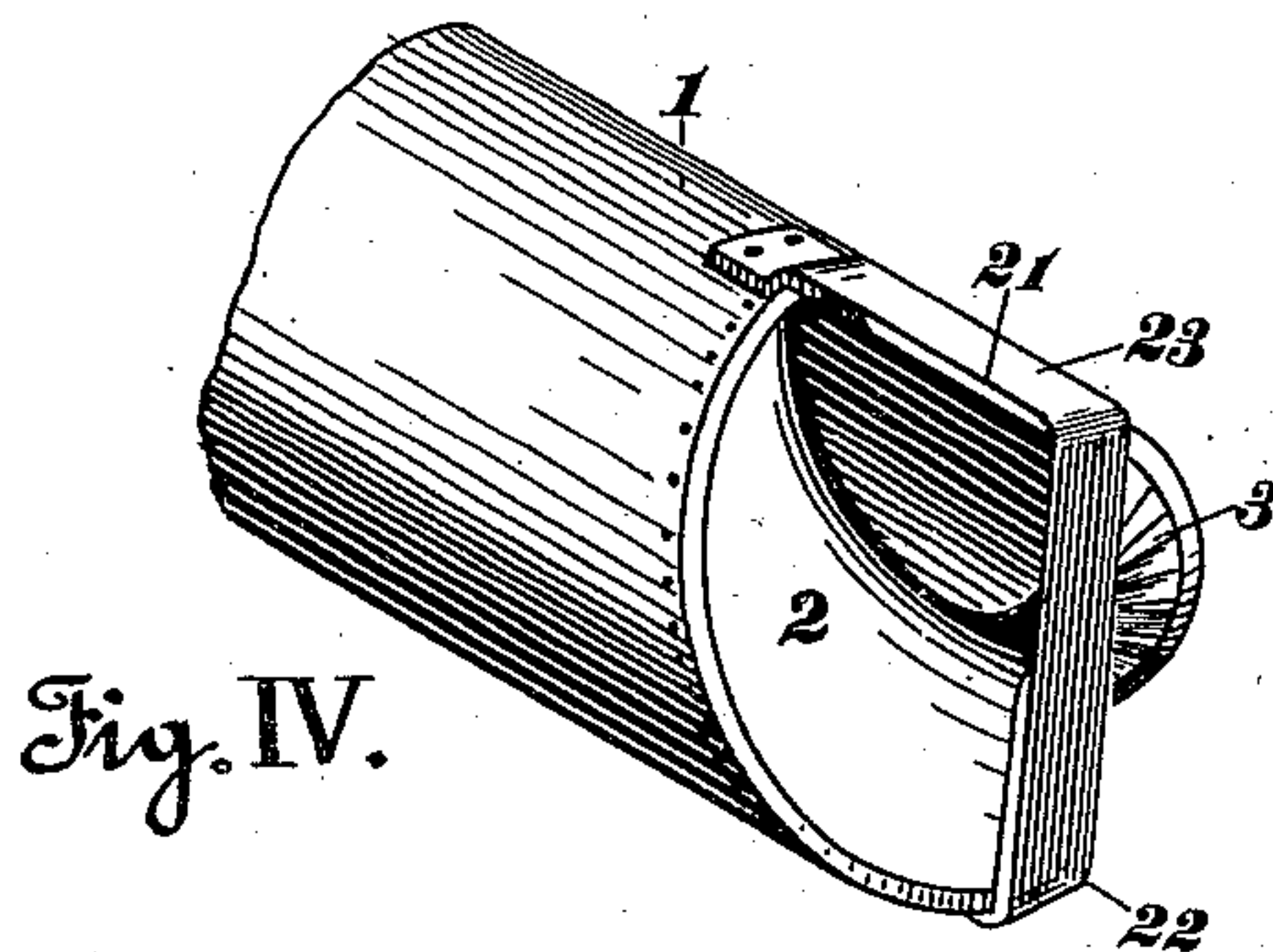
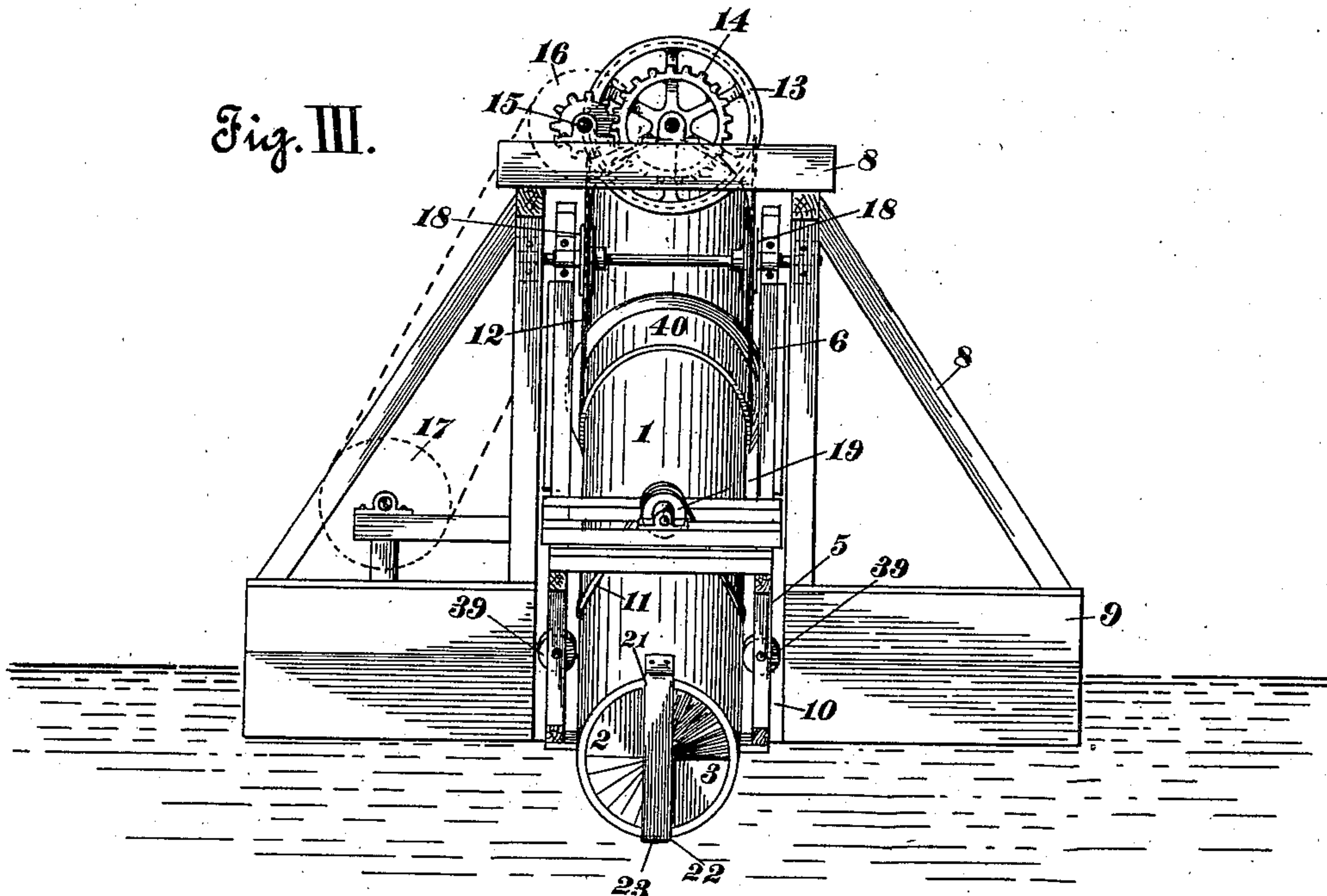
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2 Sheets—Sheet 2.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## SUBAQUEOUS DREDGER.

SPECIFICATION forming part of Letters Patent No. 661,193, dated November 6, 1900.

Application filed August 8, 1899. Renewed April 16, 1900. Serial No. 13,138. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM W. PRIESTLEY, a citizen of the United States, residing at Smartsville, county of Yuba, and State of California, have invented certain new and useful Improvements in Subaqueous Dredgers; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to subaqueous dredging, especially in streams and estuaries or other waters containing auriferous material, and to certain improvements in machinery and apparatus therefor.

My improvements consist of a revoluble cylinder or tube of the type known as an "Archimedean screw," supported, adjusted, revolved, and operated in a peculiar manner, provided with an internal helix and at the end screens to select and means to separate the fine sand and gravel, with minerals they contain, from the coarse or waste material; also, in means to suspend and adjust the cylinder or tube to operate at different depths and to regulate the inflow at the induction end of the same; also, in various features of a constructive and operative nature, as hereinafter pointed out, and illustrated in the drawings herewith, forming a part of this specification.

The objects of my invention are to provide a simple and inexpensive apparatus for raising and washing auriferous material, to reduce the number of working and perishable parts in such machinery and provide for inexpensive renewal of surfaces subject to wear, to avoid sliding metallic surfaces and loss of power by friction, and to reduce the cost of attendance in operating.

Referring to the drawings, Figure I is a side elevation of dredging apparatus arranged for shallow working constructed and operating according to my invention, the cutting or disintegrating devices being omitted. Fig. II is a plan view of Fig. I. Fig. III is an end view of Figs. I and II. Fig. IV is a broken view in perspective of the forward end of the main barrel with the cutting devices thereon. Fig. V is a broken view, partially in section, of

the rear or delivering end of the main barrel, showing the manner of constructing the helical division when made of wood. Fig. VI is a detail drawn to a smaller scale, showing an extension of the main barrel employed in operating when the depth of water exceeds the range of inclination possible with the main barrel.

In subaqueous dredging for gold, to which the present invention is especially directed, the process is usually divided into three operations—namely, loosening and securing the material to be treated, raising the same and disintegrating, and then sluicing or washing to loosen, free, and catch the mineral. These several operations are commonly performed by separate and extensive machinery; but by my invention these functions are all combined in or performed by one moving part—a main barrel or tube—which digs or disintegrates the material, raises and further crushes or mixes it at the same time, and then separates it by screening into waste and fine material, the latter being made ready to enter sluice-boxes.

Referring to the drawings, 1 is the main barrel or tube, which can be made of wooden staves strongly hooped, as seen in Fig. VI, and lined on the interior with metal plates where exposed to scour by the material raised and treated or can be made of metal throughout, as the circumstances of construction and use may render most expedient.

In the interior of the main barrel 1 are formed two spiral channels 2 and 3, produced by a helical diametrical division 4, the convolutions of which have by preference a pitch about equal to the diameter of the barrel 1, varied, however, to suit the depth of working or inclination of the main barrel and other conditions of operating. This helix or screw 4 can be made of metal or wood, and in the latter case is covered with sheet-metal armor to prevent abrasive wear. Wooden construction of the main barrel and of the helix permits the work to be assembled or wholly made and also renewals or repairs at the place of use by unskilled people and also imparts to the parts a degree of elasticity desirable in structures of this kind.

The main barrel 1 is mounted in an embrace-



ing-frame 5, that swings therewith, having a rearward extension 6, provided with suitable devices 7 to prevent longitudinal movement of the barrel 1. This barrel 1 is suspended  
5 on a main frame 8, consisting of the usual cross, vertical, and longitudinal members employed in such frames, and for subaqueous working this frame 8 is erected on a barge or pontoon 9, either built in two parts connected  
10 together or with a recess 10 at one end to provide clearance for the main barrel 1, the frame 5, and their adjustments to various angles, as the depth of the water may require.

The main barrel 1 is suspended in the slings  
15 11 and 12, which are preferably made of wire rope, but may be chains of suitable construction for this purpose. The sling rope or chain 12, which sustains the greater portion of the weight of the barrel, is deflected to a vertical  
20 line by the idle pulleys 18 and passes over the pulley 13, which latter is driven by the spur-gearing 14 and a second shaft 15, that is in turn connected by the pulley 16 to the motive power, that may be of any suitable kind,  
25 situated as indicated at 17 in Figs. II and III. The main barrel 1 is thus driven by friction or traction of the sling 12 and will stop without injury to the parts in case of obstruction of any kind by the sling 12 sliding on the bar-  
30 rel 1. The barrel 1 is reinforced by a renewable covering 40 to prevent abrasive wear of the main shell by the driving-sling 12.

The lower or forward end of the main barrel 1 is supported by the sling 11, that passes  
35 over the idle pulley 19, mounted on the frame 5, the whole being raised and lowered by means of the pulley-tackle 25, as seen in Fig. I, the main barrel 1 and the frame 5 turning longitudinally about the point of sus-  
40 pension on the idle pulleys 18. Lateral thrust on the barrel 1, caused by the excavating-cutters acting at the bottom side thereof, is resisted by the rollers 39, mounted in or on the frame 5, as seen in Figs. I and III. Similar  
45 rollers can be applied at other points along the frame 5, or the number at any point can be increased. The arrangement shown has operated well in practice. In shallow work-  
50 ing the material is excavated or loosened by the edges 21 22 on the bar 23 and passes into the helical passages 2 and 3, as indicated in Fig. IV; but any other form of cutting or excavating devices can be employed, as the nature of the material may require. The form  
55 shown has been found suitable for operating in river silt and gravel.

To the upper or delivering end of the main barrel 1 and forming a continuation of its bore is a perforated cylinder or screen 26, the  
60 helical division 4 being continued through this screen, so the stones or other solids that will not pass through the screen are carried up and discharged over the end at 27, descend in a spout 28, and are carried off by a conveyer  
65 29 or otherwise disposed of in the usual manner of such apparatus. The finer material which contains the gold falls through the

screen 26 into a spout 30 and passes to the sluice-boxes 31 for extraction by any of the well-known means of catchment, such as by  
70 riffles and amalgamation with mercury.

When the depth of the water or place of excavating is too low to be reached by the main barrel 1, there is employed an angular  
75 extension 32, (shown in Fig. VI,) that is provided at the top with a socket 33, that fits loosely over the end of the main barrel 1 when the excavating devices are removed, as in Figs. I and II. The bore of this extension  
80 32 is made less in area than that of the two spiral passages in the main barrel 1, and as only a small amount of water enters around the nipple 34, which is submerged, the main barrel acts as a pump, causing suction and a  
85 rapid flow up the extension-pipe 32, which can be when necessary supplemented with any of the usual means of excavating and loosening the material 35 at the bottom. This ex-  
90 tension-pipe 32 is supported and connected to the frame 5 by any suitable means, such as metal rods fastened in the lugs 36. When  
95 the extension 32 is added on the end of the frame 5, it causes an excess of weight on the sling 11, compensated by a sealed buoyancy-chamber 37, placed around the main pipe 1, so as to sustain a portion of the weight. This  
100 latter device is, however, not necessary when the extension-pipe 32 is made small enough to prevent the spiral passages 2 and 3 from filling. The buoyant effect results from these  
105 passages being partially filled with air.

In Fig. V the helical division in the main tube 1 is shown as it appears when made of wood and previous to being leveled off on the  
110 faces and covered with iron plates. The pieces 38 of which it is composed, as will be seen, are in effect braces or struts of rectangular section spanning the interior of the main tube. When these pieces are set spirally, as shown in Fig. V, they are trimmed  
115 or beveled on the projecting corners, and plates of thin iron are nailed on to form a smooth surface on the forward or working face of the helix 4.

Having thus described the various con-  
120 structive features that have been developed in applying my invention, I do not confine myself to the particular form of these when there are obvious equivalents or modifications required to meet the varied conditions in dredging various kinds of material and at  
125 different depths; but

I do claim and desire to secure by Letters Patent—

1. In dredging apparatus, a revoluble bar-  
130 rel or tube provided with interior helical passages, adjustably mounted in slings and driven by traction of the same, substantially as specified.

2. In dredging apparatus, a revoluble bar-  
135 rel or tube having helical passages therein, set in an inclined position and adjustably supported in and driven by the traction of a sling or slings, means to raise and lower the



outer or working end of the barrel and excavating devices attached to the submerged end thereof, substantially as specified.

3. In dredging apparatus, a revoluble barrel having helical passages therein, means to revolve and support the same in an inclined and adjustable position, and in combination therewith a cylindrical screen having a like diameter and continuation of the helical passages through this screen, substantially as specified.

4. In dredging apparatus, a main revoluble barrel having helical passages therein, set in an inclined position and provided with excavating devices at its lower or working end, an inclosing frame 5 around this main barrel, fixed in respect to the barrel's rotation but moving longitudinally and laterally therewith, substantially as specified.

5. In dredging apparatus, a main revoluble barrel set in an inclined position and having helical passages therein, an inclosing frame 5 around this barrel, means to prevent longi-

tudinal movement of the barrel therein, a sustaining-roller 19 mounted on this frame 25 and the lateral bearing-rollers 39 at its sides, substantially as specified.

6. In dredging apparatus, a main revoluble barrel adjustably mounted in an inclined position, helical passages therein formed of struts of timber spanning and bracing the outer shell, in the manner and for the purposes substantially as specified and described.

7. In dredging apparatus, a main revoluble barrel set in an inclined position, sustained in slings and driven by traction thereof, provided at its lower or working end with removable excavating devices and also an angular extension 32 for use in deep working, the whole arranged, combined and operating substantially as specified.

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