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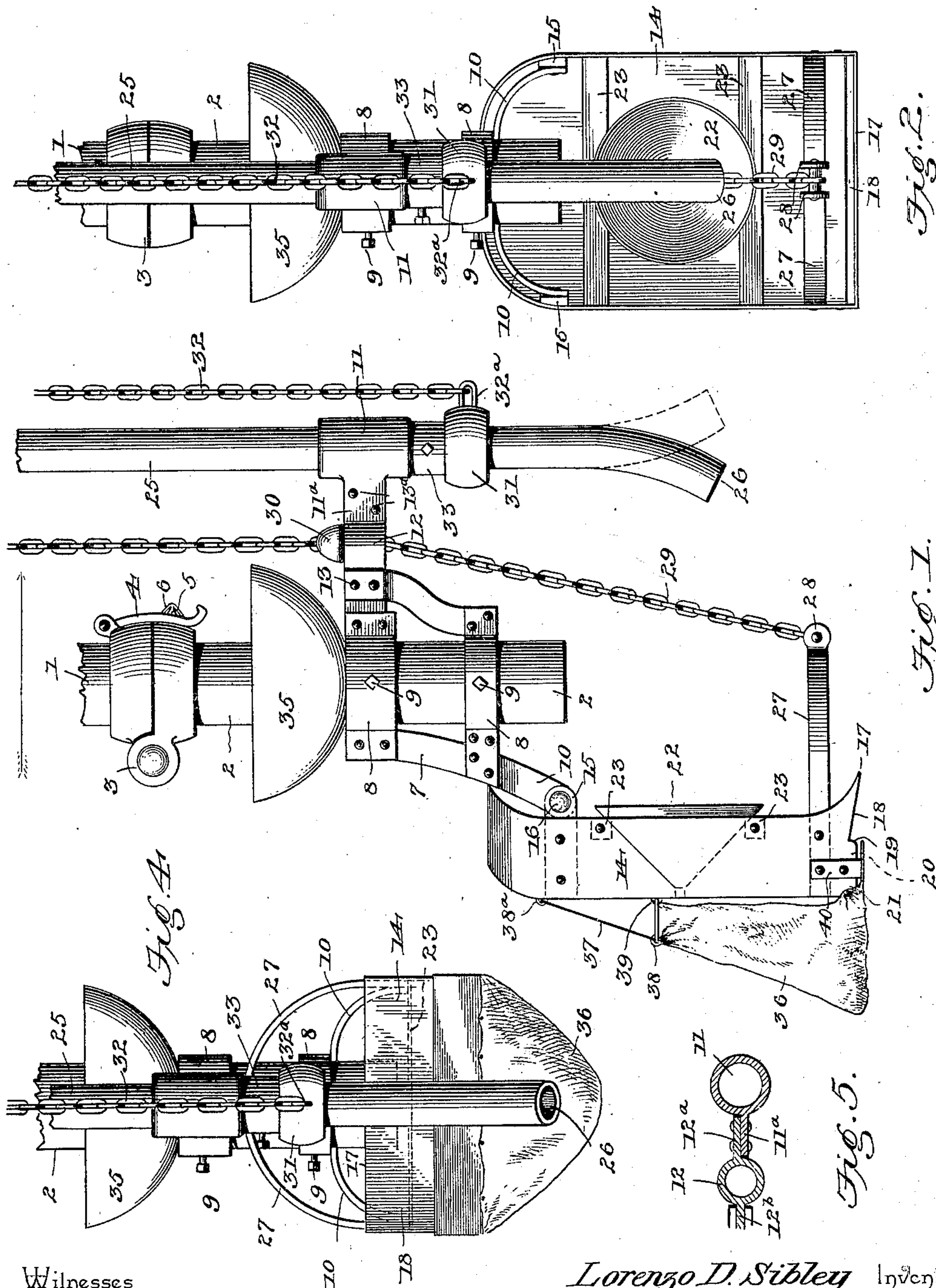
Patented July 18, 1899.

L. D. SIBLEY.
MINING DREDGE.

(Application filed May 5, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
E. A. Munn
H. J. Pemberton

By his Attorneys.

Lorenzo D. Sibley Inventor

C. A. Snow & Co.

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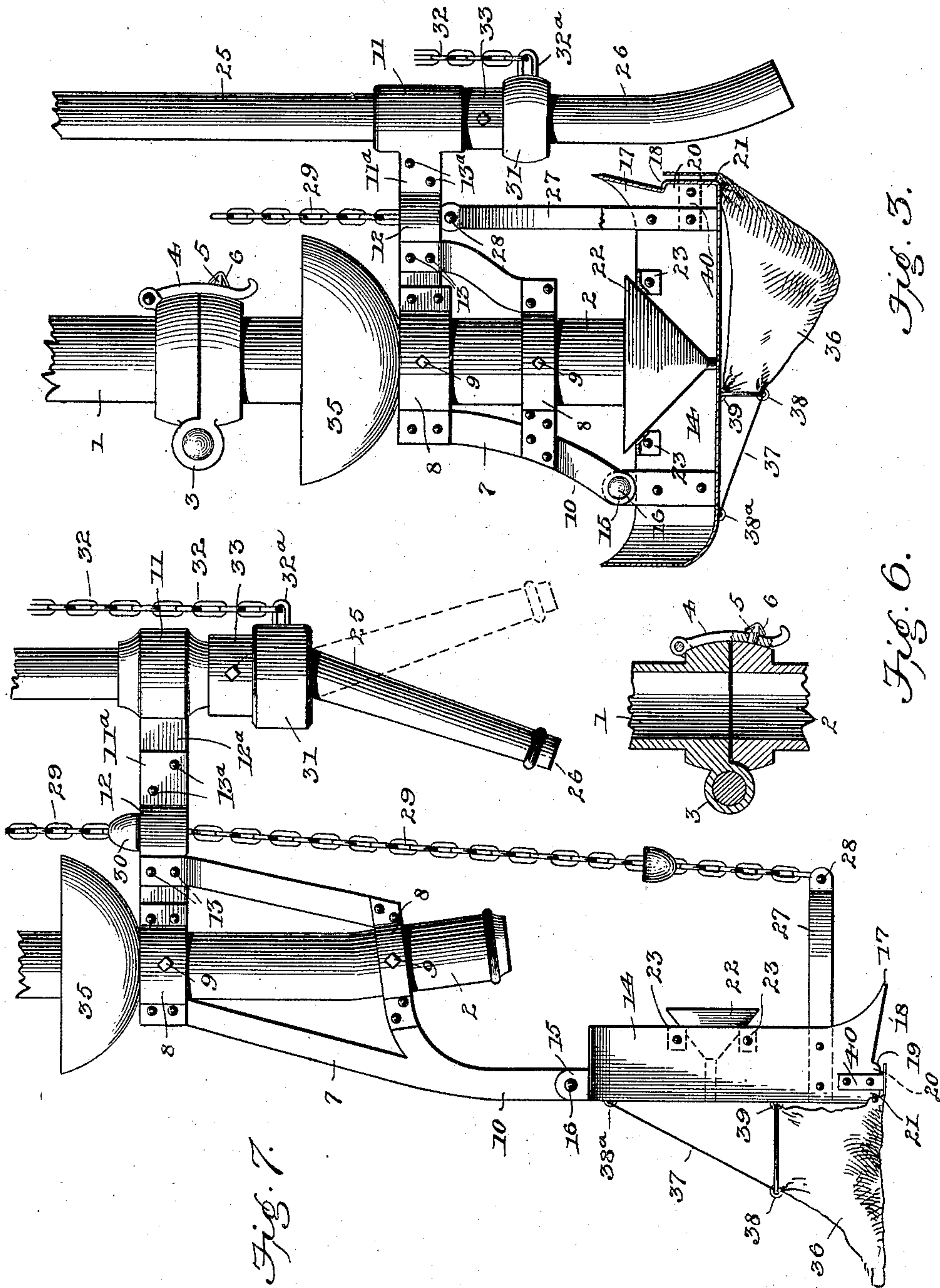
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UNITED STATES PATENT OFFICE.

LORENZO D. SIBLEY, OF VINELAND, NEW JERSEY.

MINING-DREDGE.

SPECIFICATION forming part of Letters Patent No. 629,048, dated July 18, 1899.

Application filed May 5, 1898. Serial No. 679,841. (No model.)

To all whom it may concern:

Be it known that I, LORENZO D. SIBLEY, a citizen of the United States, residing at Vineland, in the county of Cumberland and State of New Jersey, have invented a new and useful Mining-Dredge, of which the following is a specification.

My invention relates to improvements in dredges for mining precious metals, adapted to be used for collection mechanically of the metal at the bed of a river or stream or in a mine on the land or through water in the earth for the purpose of separating the minerals from sand, gravel, or mud, leaving most of the latter in its natural bed and extracting the heavier and more valuable minerals, such as gold.

My apparatus may be used on a dredge, scow, float, or a raft when used for marine mining, or it may be supported on a suitable platform for land mining.

The apparatus contemplates the employment of a working fluid under suitable pressure, which working fluid is carried to the excavation for the purpose of forcing the heavy particles of metal in collecting devices that retain the metal and are adapted to be drawn to the surface at suitable intervals while one of the devices for directing the pressure working fluid may be allowed to remain in the excavation to continue the supply of the fluid to keep the excavation from filling by overflowing of the mud, sand, and gravel. This working fluid is directed by the appliances, so that it may be utilized as the means for clearing the path for the shovel or pan through the soil as well as for forcing the precious metal into the pan-receptacle, and under the last-named service of the pressure fluid certain devices are provided by which the fluid is deflected, so as to keep the cavity or excavation open against filling by the backflow of the soil.

The invention further consists in the novel combination of elements and in the construction and arrangement of parts which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated the preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side elevation showing the shovel-pan in its lowered working position. Fig. 2 is an elevation at right angles to Fig. 1, looking at the front side or face of the shovel-pan. Fig. 3 is a side elevation of the apparatus with the shovel-pan in its raised position. Fig. 4 is a front elevation of the dredger with the parts in position shown by Fig. 3. Fig. 5 is an enlarged detail view of the guide-frame. Fig. 6 is an enlarged detail view of the coupling by which the two lengths of the main pressure-pipe are joined together. Fig. 7 is an elevation and modified construction of the dredger.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

1 designates the main pressure-pipe, which is adapted to be lowered through the water of a river or stream or through the shaft of a mine for the purpose of forcing a fluid under pressure into the ground at a point in advance of a shovel or pan, and thus effect the washing the dirt, gravel, or sand away from the particles of metal and of forcing the latter into the shovel or pan by which they are collected. This main pressure-pipe is of proper diameter to carry the required volume of compressed working fluid, which may be either water, steam, or air, and said pressure-pipe is of proper length to reach the bed of the stream or the bottom of a mine-shaft. The lower extremity of the main pressure-pipe has a movable section 2, which is united to the pipe 1 by a hinged coupling 3, the respective members of which are attached to the pipe and its section 2, while the members of said coupling are hinged together at one side of the pipe-line and are detachably latched together by the use of a latch 4, which is hinged or pivoted to one member of the coupling and arranged to have its free end engage with a pin 5, having the spring 6.

On the lower hinged section 2 of the main pressure-pipe is clamped a frame 7, which serves to support the shovel or pan in a manner to permit the latter to have a swinging movement independently of any adjustment of the main pressure-pipe. This frame is preferably of the form illustrated by the drawings, although the particular shape thereof is not essential. Said frame is pro-

vided with vertically-alined loops 8, having the clamping-screws 9, by which the frame may be clamped to the lower section of the main pressure-pipe, and at one side of the frame it is provided with an arm 10, which serves to support the shovel or pan 14.

A guide-sleeve 11 is a part of the shovel-carrying frame, but it is made separate from the frame and removably bolted thereto. Between the guide-sleeve and the frame 7 is arranged a guide-loop 12, and this guide-loop 12 is provided on opposite sides with lugs or plates 12^a and 12^b. The lug or plate 12^b laps against the frame 7 and is bolted rigidly thereto, as at 13, while the lug or plate 12^a of said guide-loop overlaps a plate 11^a of the guide-sleeve 11, and the parts 11 12 are rigidly united by the bolts 13^a. It will thus be seen that the guide-sleeve 11 and the guide-loop 12 are united rigidly together and to the frame 7, and said parts are thus adapted to be readily assembled or detached as may be desired.

The shovel or pan 14 is preferably a metallic structure consisting of a bottom and flanges, which extend outwardly from the bottom. Near one end of the pan is provided the clips 15, which extend outwardly therefrom and are pivotally connected, as at 16, to the arms 10 of the carrying-frame 7, the pan or shovel being thus pivotally supported on the frame to turn on a horizontal axis, and consequently swing or move in a vertical plane. The shovel or pan is hinged or pivoted to the frame at a point at one side of the vertical axis thereof and the pivotal connection between the frame and the pan is on a horizontal plane coincident, practically, with the lower extremity of the section 2 of the main pressure-pipe, whereby the shovel or pan may be raised to a horizontal position and lie directly opposite to the pressure-pipe, so as to present a reflector-pan, which is mounted on said shovel or pan immediately opposite to the discharge-mouth of the pressure-pipe. The end of the pan opposite to the hinged part thereof or at its free end is peculiarly formed for the collection and retention of the precious metals when the pan or shovel is lowered to its vertical working position. Said end wall of the pan is fashioned to provide an inclined face 18, which is in advance of an abrupt depression or angular portion 19, that forms a pocket between the inclined face 18 and the heel 21 of the pan. The edge of the inclined portion 18 at the free end of the pan is beveled or sharpened to a cutting edge or lip 17, and this construction of the pan or shovel is important because when the pan is in its working position the precious metal which is stirred or agitated by the compressed working fluid is swept across the inclined face of the pan into the pocket 20, to be retained therein by the abrupt or angular face 19, while on the elevation of the pan or shovel the cutting lip or edge 17 forces its way through the sand, mud, or gravel,

thus facilitating the elevation of the pan or shovel.

22 designates a reflector-pan which is carried by the shovel at a point above or to one side of the end of the shovel, which collects and retains the precious metal, and said reflector-pan is arranged on the shovel to lie opposite to and in vertical alinement with the pressure-pipe 1 when the shovel is raised, whereby the reflector-pan 22 is adapted to turn the course of the fluid and cause it to clean out the cavity or excavation without permitting the fluid as it escapes from the pressure-pipe to wash out the metallic particles in the shovel 14. The reflector-pan is of the conical form represented by the drawings, and it is attached to the shovel at a point at one side of the inclined face and pocket of said shovel. The reflector-pan may be attached to the shovel in any suitable way, and in the drawings I have shown the reflector as fastened to the clips 23, which are attached to the shovel 14.

25 designates an auxiliary pressure-pipe, which is preferably of smaller diameter than the main pressure-pipe and is maintained in operative relation thereto by means of the guide-sleeve 11 on the shovel-carrying frame 7. This auxiliary pressure-pipe is in advance of the main pressure-pipe, parallel thereto, and it passes loosely through the guide-sleeve 11, so that it may be turned by hand or suitable mechanical appliances axially within the guide-sleeve for the purpose of changing the position of the discharge-mouth of said auxiliary pipe. The lower extremity of the auxiliary pressure-pipe is deflected or curved to one side of the vertical axis of said pipe, thus forming a deflected discharge-mouth 26, and as the pipe 25 is adapted to rotate or turn axially within the guide-sleeve 11, through which it passes loosely, the discharge-mouth 26 may be turned to incline toward the shovel or pan or be reversed to discharge the pressure fluid in advance of the shovel and dredger, so as to clear a path for the latter and obviate undue strain on the shovel and other working parts of the dredger.

The pivoted shovel or pan is adapted to be raised and lowered on its hinged connection with the frame 7 by suitable mechanical appliances which extend vertically through the water of the stream or the mine-shaft, so as to be accessible to the miner or operator, and in one embodiment of this part of the invention I provide a bail 27, which is attached rigidly to the sides of the pan near the free end thereof. The outer end of this bail is formed with an eye 28, to which is connected the lower extremity of a cable or chain 29, that passes loosely through the guide-loop 12 on the shovel-carrying frame 7. This chain or cable 29 is provided at a suitable distance from its attachment to the bail-eye with an enlargement 30, that constitutes a stop for limiting the descent of the chain or cable and the shovel when it is lowered to its working

position. This stop 30 may be of any suitable character, and it is adapted to rest upon the guide-loop 12 when the shovel reaches its lowered vertical position, said stop and the chain preventing the shovel from moving backwardly beyond its proper position when the parts are in service. The bail 27 is of such a length and the guide-loop 12 is arranged at such a height above the lower extremity of the main pressure-pipe that the outer end of the bail 27 will abut against the lower side of the guide-loop 12 when the shovel is raised to its horizontal position, and said bail 27 is thus adapted to limit the upward movement of the shovel and cause the latter to present the conical reflector-pan 22 in proper position opposite to the discharge-mouth of the main pressure-pipe.

A loose collar 31 is fitted on the auxiliary pressure-pipe 25 at a point below the guide-sleeve 11, and said loose collar is formed with an eye 32^a, to which is attached a chain or cable 32, that serves to suspend the auxiliary pressure-pipe. The loose collar 31 abuts or bears against a fast collar 33, which is clamped or fixed to the pressure-pipe 25, and this fast collar is interposed between the loose collar 31 and the fixed guide-sleeve 11, whereby the fast collar is adapted to rotate with the pressure-pipe 25, and the said pipe may be turned axially without twisting the cable or chain which is attached to the loose collar and serves to suspend the auxiliary pressure-pipe in proper relation to the main pressure-pipe and the mineral-collecting devices.

The lower hinged section 2 of the main pressure-pipe carries a cup 35, which is situated above the deflecting-stand 22, and this cup 35 is adapted to deflect the current or fluid outwardly, so as to cause the fluid to "work" the sides of the cavity or excavation, and said cup also serves to catch and retain any fine particles of metal which may be carried up with the agitated body of water and fall within the cup. This cup is preferably of the curved or conical form shown by the drawings, and it is fitted on the hinged section 2 of the pipe 1 at a point between the hinged coupling 3 and the shovel-carrying frame. The lower part of the conical or curved cup may be united in a suitable way to the pipe-section 2, while the upper part of the cup is open for the free ingress thereto of any metallic particles of gold, whereby the cup serves a twofold purpose of reflecting the current of the working fluid or the agitated body of water and for collecting small particles of metal which may be held in suspension in the agitated current of water and drop within the limits of said cup.

When the dredge is used for working in an excavation with a rocky or hard resisting bottom, I provide a mineral-collecting bag or sack 36, which is attached to a shovel-frame so as to be supported and carried thereby. This bag or sack may be of any suitable material adapted to retain the particles of metal

which may be deposited therein, and at its closed end it is provided with a cord 37, which is securely attached thereto in any suitable way, as at the point indicated at 38. The sack itself is attached at its closed end to the pan or shovel by a suitable device, as at 39, and the end of the cord is in like manner fastened to the shovel or pan, as at 38^a. The open end or mouth of the bag or sack is fastened to the working end of the shovel or pan at points in advance of the heel 21 thereof, and in the preferred embodiment of the means for attaching the mouth of the bag to the pan I employ the plates 40, which are rigidly fastened to the sides of the pan at points just in advance of the heel thereof, which plates are suitably engaged with the edges of the bag-mouth. The bag thus lies in rear of the pan or shovel, and its mouth is spread or held open by the plates. When the shovel is lowered to its working position and the pressure fluid flows from one or both of the pressure-pipes, the force of the fluid acting against the rock bottom in front of the shovel drives the heavy mineral particles into the pocket or depression of the shovel, and the particles which may pass beneath the shovel are forced into the open mouth of the collecting bag or sack 36, whereby a certain quantity of the metallic particles will be caught and retained by the bag or sack. It is to be understood, however, that I do not always employ this collecting bag or sack on the shovel, and its special utility resides in its employment with the shovel when the dredge is used for excavating and collecting particles of metal adjacent to a rocky or hard resisting bottom.

My apparatus is especially designed for hydraulic mining in the beds of rivers or streams, and it is designed to be carried by a dredge-scow, float, or raft of any suitable character. This support for the dredger is of course adapted to be advanced at suitable intervals and to carry with it the apparatus or dredger in the direction indicated by the arrow in Fig. 1 of the drawings. When the parts of the apparatus are in the working position shown by Fig. 1, the current of fluid under pressure from the pipe 1 agitates or stirs the mud, sand, and gravel at the bottom or bed of a stream and the metallic particles are washed from the refuse across the inclined face of the shovel, so as to be collected in the pocket 20 of the shovel or pan. When it is desired to elevate the shovel or pan with the pressure-pipe, the chain or cable 29 is raised to lift the pan to its horizontal position, and the reflector-pan 22 is thus brought to a position opposite to the main pressure-pipe 1. This pan 22 deflects the course of the fluid under pressure from the pipe 1 and causes it to clean out or keep open the cavity or excavation in the bed of the stream, and the agitated current of fluid mingled with the water of the stream is deflected outwardly by the conical cup 35 for the purpose of washing or

working the sides of the cavity, so as to keep the latter open for the ingress therein of the shovel when it is again lowered to its working position. When the shovel is raised, the progress of the dredge is arrested and the auxiliary pipe may be turned so as to cause its mouth or nozzle 36 to face toward the shovel, whereby the current from the pressure-pipe 25 may be directed in a backward direction, so as to wash out the cavity or excavation and also assist in keeping the same open for the reception of the shovel or pan when it is again lowered. As the dredge or scoop advances the auxiliary pressure-pipe is kept in a position where its deflected mouth is away from the shovel or pan for the purpose of directing the current of working fluid against the mud, sand, or gravel and open a path therein for the passage of the shovel and other parts of the dredger.

The means for attaching the reflector-pan to the shovel may be varied within wide limits—as, for example, a central part may be made as a part of the shovel and united to the apex of the conical reflecting-pan.

The end of the bag or sack near the pivotal connection of the shovel to the frame may or may not be closed; but I prefer to employ a ring which is united to the bag to hold the same in a partly-open condition for the ingress thereto of any light particles of metal which may be held in suspension in the agitated water, thus adapting the bag to collect mineral particles at both ends.

In lieu of making the bail serve as the stop in the upward movement of the shovel a separate stop may be attached to the chain, cable, or other connection which lifts the shovel, said stop being attached to the chain at a point below the guide-eye, so as to abut against the latter when the chain and shovel are drawn upward, thus using two spaced stops on the chain or cable. The lower ends of the pressure-pipes may be given any desired finish to make the structure present a more symmetrical appearance.

I am aware that changes in the form and proportion of parts and in the details of construction may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such modifications as clearly fall within the scope of the invention.

I do not contemplate at all times the use of the bag or sack conjunctively with the shovel-pan; but I may use the bag without the shovel and attach the bag to a frame. When the rock bottom is too uneven for proper working of the shovel or scoop and the latter would interfere with the entrance of the metal to the bag, I detach the shovel and use the bag or sack alone.

The deflecting and collecting cup on the pressure-pipe above the outlet, at the lower end thereof, is a prime feature of my inven-

tion in that it deflects the current outwardly, and it may contain mercury to amalgamate with the gold collected therein.

Having thus described the invention, what I claim is—

1. In a mining excavator or digger, a fluid-pressure pipe for conveying fluid under pressure to be forced into the earth, a frame fixed to said pipe, above the open delivery end thereof, a shovel hinged to said frame at a point to one side of the pressure-pipe, and means for raising or lowering the hinged scoop, whereby the scoop may be raised to a horizontal position or lowered to a vertical position at one side of the plane of the pressure-pipe, substantially as described.

2. In a mining excavator or digger, the combination with a fluid-pressure pipe and a hinged shovel or scoop, of a reflecting-pan adapted to deflect the current of pressure fluid from said pipe and protect the contents of the shovel or scoop from the action of said pressure fluid, substantially as described.

3. In a mining excavator or digger, the combination with a main pressure-pipe, of a shovel or scoop supported by said main pressure-pipe and provided with an inclined face and a pocket or depression in rear of said inclined face and adapted to retain minerals of greater specific gravity than the surrounding washings which are agitated by a current of pressure fluid, and an auxiliary pipe arranged at one side of the main pressure-pipe and provided with a deflected or inclined nozzle, substantially as described.

4. In a mining excavator or digger, the combination of a pressure-pipe, a hinged scoop, a reflecting-pan carried by the scoop and arranged to be raised thereby into vertical alignment with an outlet from the pressure-pipe, and a reflecting-cup supported by said pressure-pipe above the discharge-mouth thereof, said cup adapted to deflect the pressure fluid in an outward direction against the walls of the cavity or excavation made by the action of the dredge and to collect particles of mineral which may gravitate into said cup, substantially as described.

5. In a mining excavator or digger, the combination with a pressure-pipe, of a shovel hingedly connected to said pressure-pipe at a point to one side of the vertical plane thereof and adapted to be lowered to a vertical position, means for adjusting the shovel on its hinged connection with said pressure-pipe, and a stop to limit the descent of the shovel when the latter is lowered to its vertical position, for the purpose described, substantially as set forth.

6. In a mining excavator or digger, the combination of a pressure-pipe, a collecting-shovel carried thereby, and a collecting bag or sack attached to said shovel and adapted to gather fine particles of mineral by its flexible lower and thin front edge, substantially as described.

7. In a mining excavator or dredge, the combination of a main pressure-pipe, mineral-collecting devices carried thereby in a plane at one side of the fluid-outlet from said pipe, and an auxiliary pressure-pipe disconnected from the collecting devices and situated in advance of the same, said auxiliary pressure-pipe being adjustable axially and provided with an angular discharge-nozzle adapted to direct a current of working fluid in advance of the collecting devices, and also adapted to wash the opening or excavation, for the purpose described, substantially as set forth.

8. In a mining excavator or digger, the combination of a main pressure-pipe, a collecting-shovel carried thereby, an auxiliary pressure-pipe, and a suspending-chain having a swiveled connection with said auxiliary pressure-pipe to permit the latter to turn without twisting the suspending-chain, substantially as described.

9. In a mining excavator or digger, the combination with a main pressure-pipe, of a frame connected therewith, a collector device supported by said frame, an auxiliary pressure-pipe parallel to the main pressure-pipe, and a guide on said frame and fitted loosely to the auxiliary pressure-pipe, for the purpose described, substantially as set forth.

10. In a mining excavator or digger, the combination of a pressure-pipe, a shovel movably connected thereto, and a reflecting-pan carried by said shovel, substantially as described.

11. In a mining excavator or digger, the combination of a pressure-pipe, a hinged shovel connected thereto, a reflecting-pan carried by said shovel to be presented thereby opposite to the discharge-mouth of said pipe, and a reflector-cup supported on the pressure-pipe above its open discharge-mouth, substantially as described.

12. In a mining excavator or digger, the combination with a pressure-pipe, of a hinged shovel having a collecting-pocket, a bag or sack attached to said shovel, and devices for spreading the mouth of the bag and keeping the same in an open position at the working end of the shovel, substantially as described.

13. In a mining excavator or digger, the combination with a pressure-pipe, of a carrying-frame attached thereto and having an arm which depends below the open mouth of said pressure-pipe, a shovel hinged to said depending arm of the frame and arranged to be lowered to a vertical position at one side of the vertical plane of the pressure-pipe, and means for swinging the shovel in a vertical plane on its hinged connection with said frame, substantially as described.

14. In a mining excavator or digger, the combination of a pressure-pipe, a carrying-frame attached thereto, a shovel hingedly connected to the frame and arranged to assume a vertical position at one side of the vertical plane of the pressure-pipe, a bail attached to

the shovel and arranged to abut against the frame for limiting the upward movement of said shovel, and a chain connected to the bail, substantially as described.

15. In a mining excavator or digger, the combination of a pressure-pipe, a frame attached to said pipe and provided with a guide-loop, a shovel hinged to said frame, a bail attached to said shovel, a chain passing through the guide-loop and connected to the bail, and a stop on said chain and arranged to rest on the guide-loop, whereby the stop limits the vertical adjustment of the bail and scoop and serves to sustain the scoop in its vertical position when the dredge is advanced, substantially as described.

16. In a mining excavator and digger, the combination of a main pressure-pipe, a collecting-shovel carried thereby, means for adjusting said shovel, an auxiliary pressure-pipe independent of the main pressure-pipe and having an inclined discharge-mouth arranged at one side of the collecting-shovel, said auxiliary pressure-pipe being adjustable axially to vary the angle of presentation of its deflected discharge-mouth, and means for suspending said auxiliary pressure-pipe, substantially as described.

17. In a mining excavator or digger, the combination of a main pressure-pipe, a frame supported by said pipe and having at its free end a guide-sleeve, a shovel attached to said frame, an auxiliary pressure-pipe fitted loosely in said guide-sleeve for axial adjustment freely therein, and provided below said sleeve with an inclined discharge-mouth, a suspension-chain, and swivel connections between said chain and the auxiliary pressure-pipe, substantially as described.

18. In a mining excavator or digger, the combination of a main pressure-pipe, a frame having a guide-sleeve, a shovel attached to said guide, an auxiliary pressure-pipe fitted loosely in said sleeve, a fast collar on the auxiliary pressure-pipe, a loose collar also fitted to the pressure-pipe and impinging against the fast collar, and a suspension-chain connected to the loose collar, substantially as described.

19. In a mining excavator or digger, a shovel provided at one end with an inclined face having a sharpened cutting edge or lip, and an abrupt ledge or shoulder at the rear terminal of the inclined face and forming between the latter and the heel of the pan a pocket or depression, combined with a frame to which the heel of the scoop is hinged, and means for raising or lowering the shovel on its hinged connection with the frame, substantially as described.

20. In a mining excavator or digger, the combination of a pressure-pipe, a frame supported thereby, and a collecting bag or sack attached to said frame and having a thin front edge, said bag or sack having its mouth held in an open position by the frame at one side

of the vertical plane of the pressure-pipe, substantially as described.

21. In a mining excavator or digger, the combination with a pressure-pipe, of an amalgam cup or pan connected with the pressure-pipe above its outlet end, for the purpose of collecting particles of minerals forced upward by fluid from the pressure-pipe, collecting devices supported by the pressure-pipe on a horizontal plane below the amalgam cup or

pan, and a reflecting device mounted on the collecting device, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LORENZO D. SIBLEY.

Witnesses:

S. F. HURD,

JOHN P. ASHWORTH.