No. 882,148. PATENTED MAR. 17, 1908.

J. W. HUNSAKER, V. BEISSWINGERT & R. L. DAVIS.

MINING APPARATUS.

APPLICATION FILED OCT. 21, 1907.

2 SHEETS—SHEET 1.

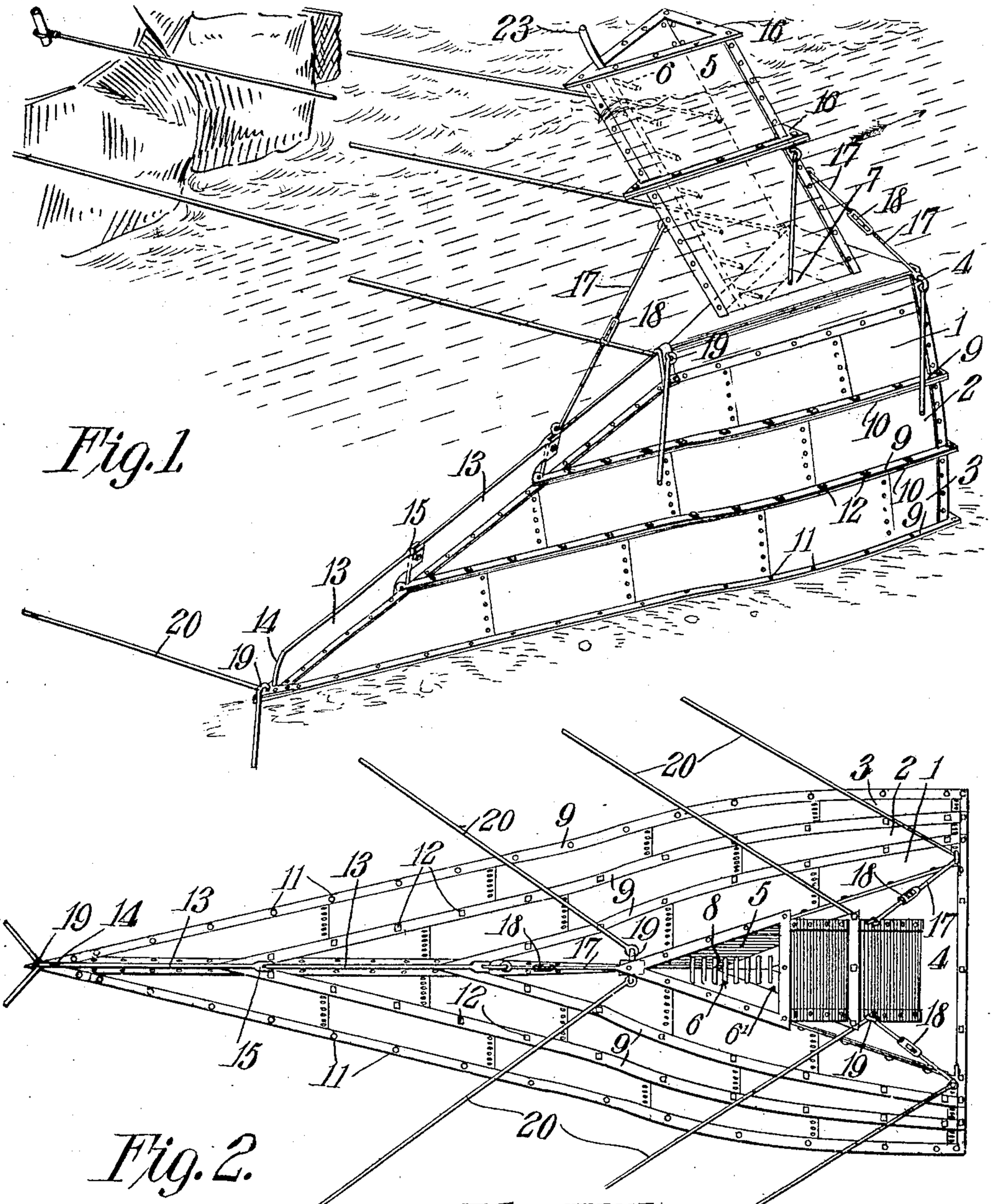

Fig. 1.

Fig. 2.

Witnesses
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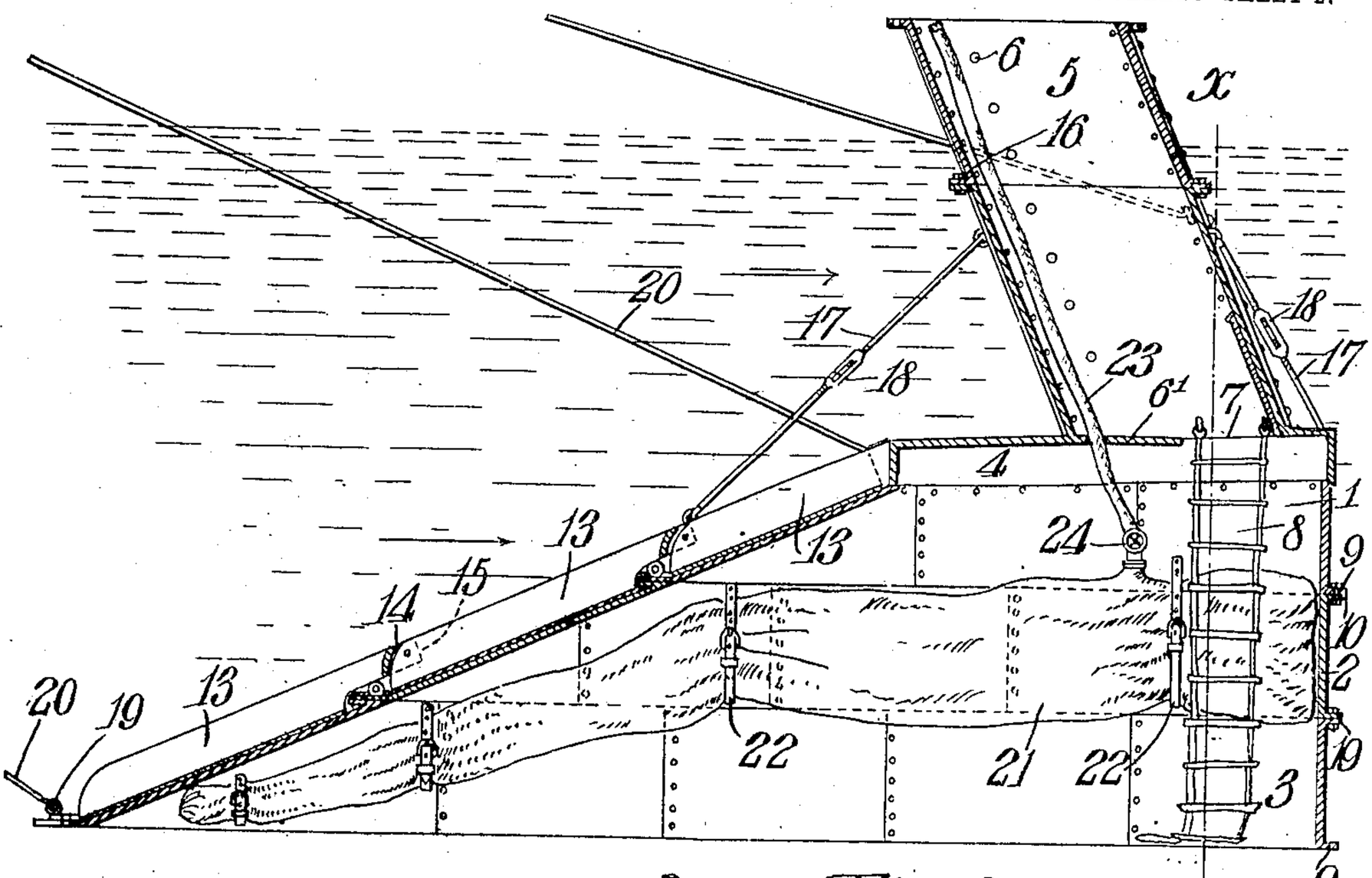

Fig. 3.

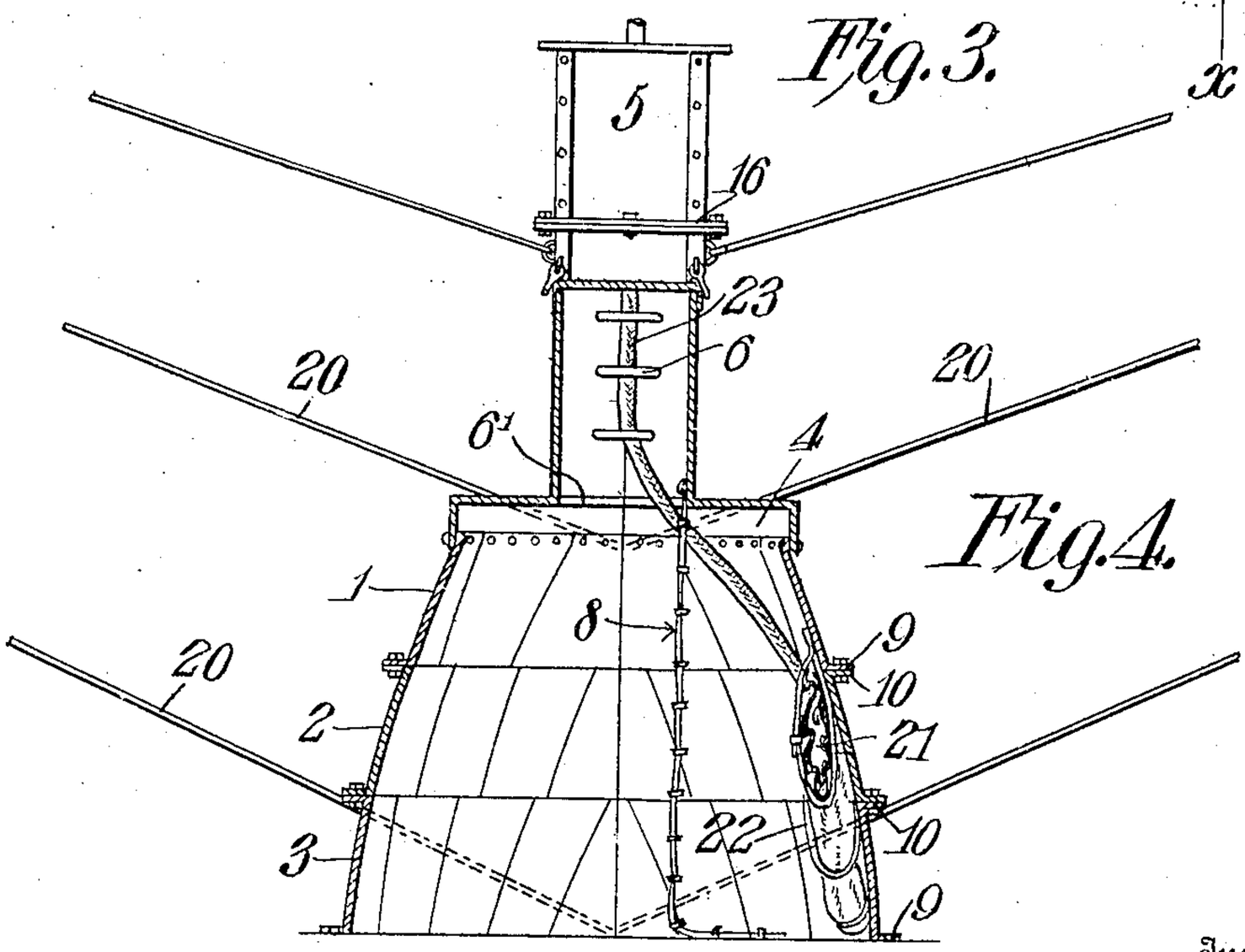

Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN WILLIS HUNSAKER, VICTOR BEISSWINGERT, AND ROBERT L. DAVIS, OF ANNA, ILLINOIS.

MINING APPARATUS.

No. 882,148. Specification of Letters Patent. Patented March 17, 1908.

Application filed October 21, 1907. Serial No. 398,492.

To all whom it may concern:

Be it known that we, JOHN WILLIS HUNSAKER, VICTOR BEISSWINGERT, and ROBERT L. DAVIS, citizens of the United States, residing at Anna, in the county of Union and State of Illinois, have invented a new and useful Mining Apparatus, of which the following is a specification.

This invention has reference to improvements in mining apparatus, and its object is to provide means whereby access may be had to pockets of gravel or sand in river bottoms where the current is swift, which pockets of sand or gravel contain more or less precious metal or other material of value.

In many rivers there are accumulations of sand or gravel or both containing large quantities of precious metal but because the flow of the river is rapid it is impossible to work these pockets since workmen when partially immersed or when clad in diver's uniform and wholly immersed, cannot maintain their footing. Furthermore, in these swift running rivers the water frequently carries gravel or sand with it and so endangers the life of workmen even if they are enabled to maintain their footing. Again if coffer dams are built, these structures are so expensive to construct that their cost is prohibitive and in many instances in excess of the amount of precious metals that would be recovered.

By the present invention it is possible to reach these accumulations or pockets of gold-bearing sands or gravels in river bottoms even where the current is very swift.

The present invention comprises a metallic bell or caisson so shaped that when subjected to the action of a current of water it will be more firmly pressed into engagement with the bottom of the stream than would be the case if it was so held by gravity only. The caisson is so constructed that it may be readily made of various sizes and depths to accommodate it to varying conditions under which it may be used, and the caisson is provided with a means of access in the form of a tube or shaft of sufficient length to project from the caisson to a point above the surface of the water so that a workman clad in a diver's suit may enter the caisson from above and work therein without being subjected to the action of the flowing water, although the caisson will be filled with water up to the surface of the stream. Now, because of the action of the stream upon the caisson to more firmly anchor it in place than would be the case were it acted on by gravity only, it becomes difficult and in some cases practically impossible to pull the caisson up to the surface of the water when once in place. To overcome this action and to render the caisson more or less buoyant there is provided within the caisson an expansible air receiver, which under normal conditions is collapsed and so takes no material room, but which when it is desired to elevate the caisson is filled with air from a source located at a distance or by means of a suitable air pump, so that the air container is expanded to practically fill the interior of the caisson and thus expel the water from the same, thereby making the caisson buoyant so that it will tend to float to the top of the stream and thus be easily guided to a new location by suitable guy ropes or cables, when it may be again sunk by exhausting the air from the air container, or the caisson may be brought to the shore and if desired removed from the water. The caisson is likewise made in longitudinal separable parts, the separations being on horizontal planes so that by adding or removing sections the caisson may be adapted to streams of different depths.

The invention will be best understood by a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, in which

Figure 1 is a perspective view of the caisson in position on the bottom of a stream. Fig. 2 is a plan view of the caisson. Fig. 3 is a longitudinal vertical section of the same, and Fig. 4 is a cross section on the line *x*—*x* of Fig. 3.

Referring to the drawings, there is shown a caisson composed of a number of sections 1, 2 and 3, each approximately triangular in shape on the base or bottom and also on the top with the sides sloping from the bottom toward the top and also sloping from the apex of the bottom triangle to the apex of the top triangle so as to constitute a sloping cutwater for the structure.

While the structure is described, and for convenience will be described as comprising three sections, 1, 2 and 3, each successively larger from the uppermost section toward the lowermost section, it will be understood that a greater or less number of sections may

be used and that the slope of the sides may be greater or less than that shown, as may be desired, and as the swiftness of the current and other factors which may enter into the problem may demand.

The structure is designed to rest on the bottom of the stream with the cutwater up stream and the base of the triangle down stream. Now, because of the sloping sides which approach each other toward the surface of the stream the water flowing down stream is deflected outward and upward and the reaction upon the caisson is therefore in a direction to force it firmly against the bottom of the stream in accordance with the swiftness of the current.

The several sections 1, 2 and 3 are open at the top and bottom, except that the topmost section 1 is provided with a cover 4 from which rises a triangular tube or companionway 5 of sufficient length to extend up above the surface of the stream when the caisson rests on the bottom so that access may be had to the interior of the caisson through this companionway. This companionway 5 is so mounted upon the top of the section 1 that its apex is up stream and also constitutes a cutwater. Adjacent to the apex of the companionway 5 are a series of rungs 6 suitably spaced to constitute a ladder along which a diver may pass through the companionway. At the bottom of the companionway is a ledge 6′ leading through a hatch-way 7 from which depends a ladder 8 which may be a flexible ladder of ordinary type, and this ladder 8 is of sufficient length to reach to the bottom of the stream when the caisson is resting thereon. The section 1 is provided around its bottom with a lateral flange 9 matching a similar top flange 10 formed on the upper edge of the section 2, and this last-named section has a bottom flange 9, while the section 3 is provided with a top flange 10 and a bottom flange 9, and any additional sections will be likewise provided. These several flanges are provided with matching perforations 11 for the passage of bolts 12 so that they may be connected together or disconnected at will, and the height and bottom area of the caisson may therefore be such as the conditions under which it is to be used may warrant.

The cutwater of each section is composed of a plate 13 extending longitudinally of the inclined edge at the apex of each section, and each of these plates has its front end rounded, as shown at 14, and the other end formed with two ears 15 so located as to embrace the plate 13 of the next succeeding upper section so that the cutwater becomes to all intents and purposes one connected structure throughout and serves to form a deflecting rib for any material which the stream may carry and also serves to protect the forward end of the structure from harm.

The companionway 5 may be formed of a number of sections provided at the ends with lateral flanges 16 so that the height of the companionway may be greater or less, as desired. The lowermost section of this companionway is firmly connected to the top 4 and is braced by stay rods 17 made, if desired, with turn buckles 18 for adjusting them.

At the front of the caisson and at other points thereon and on the companionway are eyes 19 to which are attached ropes or cables 20 which may be carried to the shores of the stream so that the caisson may be guided to the desired point and there anchored, these ropes or cables forming a convenient means for guiding the caisson when made buoyant in the manner to be described. Located within the caisson is an air tight sack 21 which, when filled with air under sufficient pressure to expand it to its fullest capacity, will wholly or approximately fill the interior of the caisson but which when collapsed may be folded up into a small compass, and then is held by suitable straps 22 fast to one side of the caisson as a whole. This sack is in communication with an air pipe 23 leading from a valve 24 close to the sack, or otherwise located as desired, with an air pump or reservoir of compressed air located, say on the shore.

Now, let it be assumed that it is desired to gather from a swift stream the gold-bearing gravels or sands which have accumulated along the bottom of the stream or even those which are still in motion along the bottom of the stream. The caisson, with the bag 21 filled with air so as to render the caisson buoyant, is floated along the stream by means of the guy ropes 20 to the point desired. Now the air is allowed to escape from the bag 21 and the water entering the caisson through the bottom, which of course is open, quickly fills the interior of the caisson, whereupon, because of its weight and because of the action of a flowing stream on its outer surface tending to force the caisson to the bottom, the said caisson quickly sinks to the bottom of the stream where it is held by its own weight and the depressive force of the flowing water. The caisson is now full of water up to the level of the top of the stream and the bottom of the caisson rests on the stream bed. Of course under these conditions while the caisson is full of water the water within the caisson is still, being held from motion by the walls of the caisson no matter how swift or violent may be the flow of the stream exterior thereto.

A workman suitably clad in a diver's suit may reach the companionway by means of an overhead cable track or in any other manner, and may then descend the companionway to the ladder 8 and enter the caisson by means of this ladder 8. The

workman being protected from the motion of the stream may work upon the bottom and gather the sands or gravel or other material which may be carried up through the companionway and ultimately to the shore by suitable conveying apparatus which need not be here described since in itself it forms no part of the present invention.

By means of this portable caisson the bottoms of rivers or streams heretofore inaccessible except at great expense, and in some instances practically inaccessible, are easily reached and the gold-bearing sands or gravels therein are readily extracted at insignificant expense compared with their value. Thus many deposits known to contain precious metals in paying quantities, before inaccessible, are made accessible at little expense over and above the first cost of the outfit, which first cost in itself is comparatively moderate.

Having exhausted any particular locality where the caisson is sunk, air is pumped into the bag 21 until the water within the caisson is sufficiently expelled. The expelling of the water from the caisson renders the same buoyant to an extent sufficient to overcome the depressing action of the flowing stream thereon, when the caisson will rise to the surface of its own accord and may be floated either up or down stream to another situation to be there sunk in the manner before described and the gold-bearing sands or gravels removed from the bed of the stream as before. This operation is continued so long as necessary.

For transportation from stream to stream the various parts of the apparatus are easily disassembled since they are put together very largely by bolts and by providing a number of sections of successively larger sizes and adapted one to the other, the caisson may be made large or small and deep or shallow to adapt it to the depth of streams and the conditions under which the caisson is used in practice.

What is claimed is:—

1. A placer mining apparatus comprising a caisson having an approximately triangular base and similar top of less area and having the approaching sides also slanting from the base toward the top.

2. A placer mining apparatus comprising a caisson having an approximately triangular base and similar top of less area and having the approaching sides also slanting from the base toward the top, and a companionway leading into the top and projecting above the same.

3. A placer mining apparatus comprising a caisson having an approximately triangular base and similar top of less area and having the approaching sides also slanting from the base toward the top, and a companionway leading from the top and projecting above the same, said companionway having sides sloping toward each other in the direction of the approaching sides of the base.

4. A placer mining apparatus comprising a number of assembled or separable sections each having an approximately triangular base and bottom and top parallel one to the other but with the top of smaller area than the base with the sides approaching each other and forming a slanting cutwater.

5. A placer mining apparatus comprising a caisson broader at the base than at the top and shaped to direct water flowing against the same in an upward and outward direction whereby the reaction of the flowing water tends to depress the caisson.

6. A placer mining apparatus comprising a caisson of greater area at the base than at the top and shaped to direct water flowing against the caisson in an upward and outward direction, said caisson being composed of a number of sections separable one from the other in longitudinal planes.

7. A caisson provided with a collapsible air receptacle of sufficient capacity to float the caisson when filled with air.

8. A caisson having a collapsible air receptacle normally carried therein with an air conduit leading to the exterior of the caisson, said air receptacle being of unobtrusive size when collapsed and expansible to a size sufficient to float the caisson when expanded.

9. A caisson having a slanting cutwater and slanting sides expanding rearwardly from the cutwater and provided with a companionway extending from the top thereof to a point above the surface of a stream when the caisson is resting on the bottom thereof, said companionway being shaped to present a sharp edge to the flowing water.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

JOHN WILLIS HUNSAKER.
VICTOR BEISSWINGERT.
ROBERT L. DAVIS.

Witnesses:
JAMES LAKEY,
WILLIAM C. MOSS.