

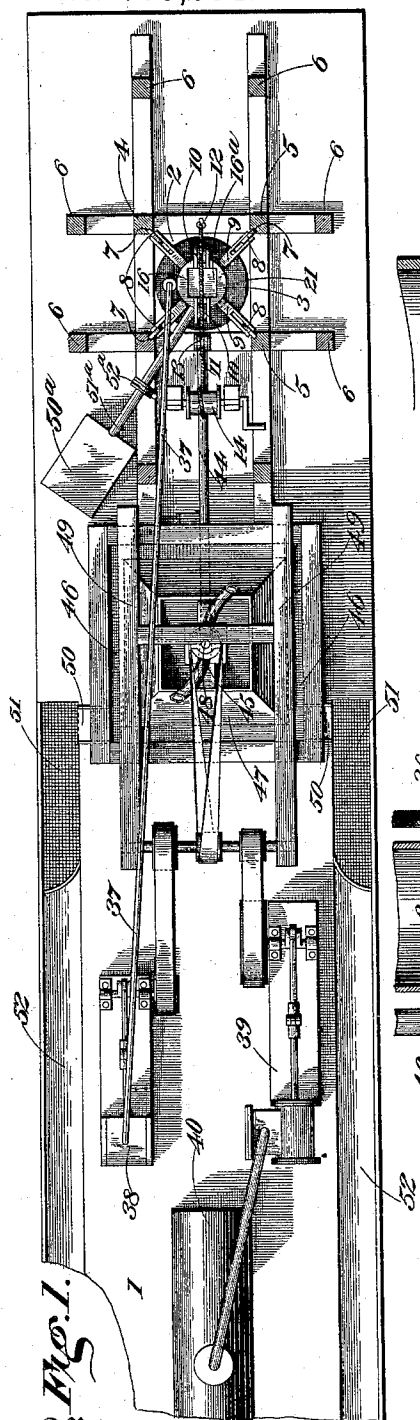
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2 Sheets—Sheet 1.

W. E. SEANOR & D. A. McCASKILL.
GOLD MINING DREDGE.

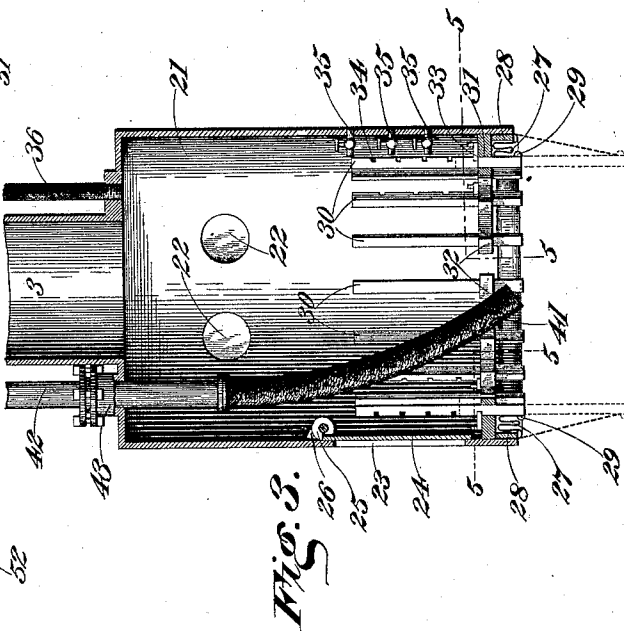
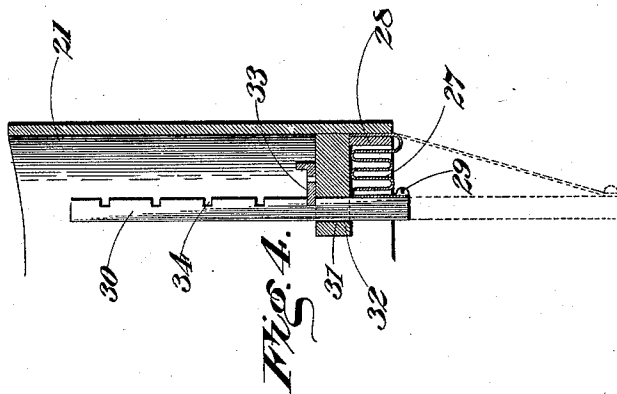
No. 569,064.

Patented Oct. 6, 1896.



Witnesses

M. C. Fowler
L. P. Holmington



Inventors
Donald A. McCaskill
William E. Seanor
By *C. A. Snow*
their Attorneys

(No Model.)

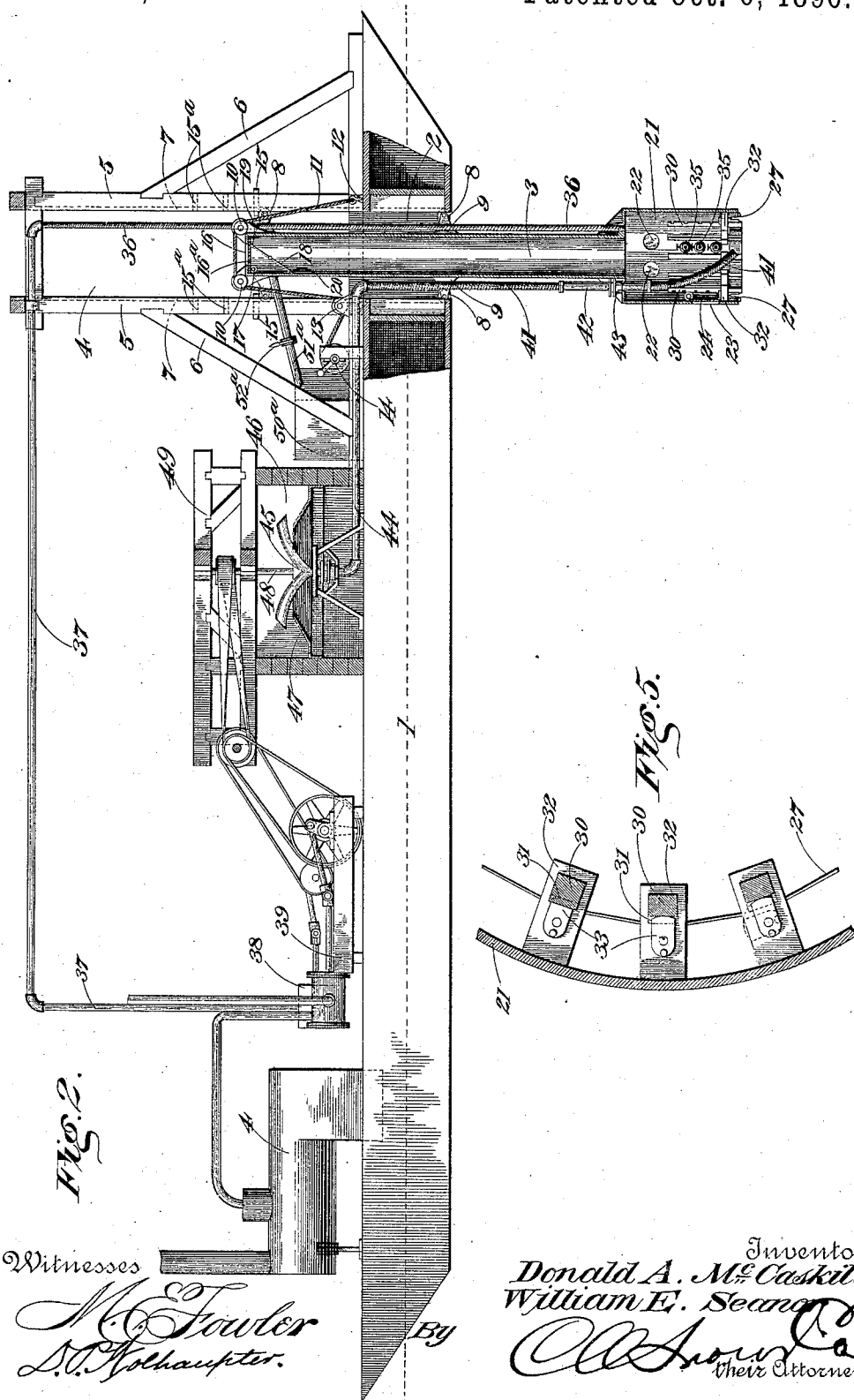
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William E. Seanor
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. SEANOR AND DONALD ANGUS MCCASKILL, OF LYTTON,
CANADA.

GOLD-MINING DREDGE.

SPECIFICATION forming part of Letters Patent No. 569,064, dated October 6, 1896.

Application filed May 24, 1895. Serial No. 550,569. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM E. SEANOR and DONALD ANGUS MCCASKILL, citizens of the United States, residing at Lytton, in the Province of British Columbia, Canada, have invented a new and useful Gold-Mining Dredge, of which the following is a specification.

This invention relates to dredges for gold-mining and other submarine excavations; and it has for its object to effect certain improvements in dredges of this character whereby the same shall be available for use in removing the submarine deposits from the beds of gold-bearing streams, and also in submarine excavations for bridge and building piers and the like.

To this end the main and primary object of the present invention is to provide a dredge having the necessary adjustments and equipments whereby the same can be efficiently and practically operated in connection with the beds of all gold-bearing streams and all submarine excavating work.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a top plan view, partly in section, of a dredge constructed in accordance with this invention. Fig. 2 is a side elevation, partly in section, of the same. Fig. 3 is an enlarged detail vertical sectional view of the lower end of the adjustable tubular caisson-body. Fig. 4 is a detail sectional view of one of the sliding-bolt connections. Fig. 5 is a detail sectional view on the line 5 5 of Fig. 3.

Referring to the accompanying drawings, 1 designates a barge or flat-boat that is of a sufficient size to accommodate thereon the various parts of the dredge, so that the same can be readily and conveniently floated to any desired point in the stream where the operation of excavating or dredging for gold-bearing substances is to be carried on. The barge 1 is provided near one end with a vertically-disposed well or opening 2, in which is designed to work the vertically movable

and adjustable tubular caisson-body 3. The tubular caisson-body 3 is preferably made of sheet metal, and is made perfectly air and water tight in order to insure perfect safety to the operators therein.

The caisson-body 3 is sufficiently long, so as to be adapted for use in all ordinary depths of water, and the same is guided for movement within a vertically-disposed guide-tower 4. The guide-tower 4 is built upon the barge 1, directly over the well or opening 2 therein, and essentially comprises a connected series of corner-uprights 5 and inclined braces 6, secured to the deck of the barge and also to the corner-uprights 5. The corner-uprights 5 are preferably provided with the longitudinal guide-grooves 7, that accommodate therein the guide-rollers 8, mounted at the outer ends of the bracket-arms 9, suitably secured to the outer sides of the caisson-body 3 at suitable points and extending radially therefrom toward the corner-uprights in order to provide means for holding the caisson-body perfectly steady in its up and down adjustment.

The vertically-adjustable tubular caisson-body 3 has fitted on the extreme upper end thereof the oppositely-located guide wheels or pulleys 10, over which is arranged to pass the adjusting-cable 11, that is secured fast at one end, as at 12, to the deck of the barge at one side of the well or opening 2. At a point directly opposite the fastened end 12 of the cable 11 the said cable passes under a fixed guide-pulley 13, mounted on the deck of the barge, and adjacent to the fixed pulley 13 is arranged a fixed winch or windlass 14, around which the cable 11 is passed, so that by operating the winch or windlass in one direction the cable 11 will be wound up and will force the caisson-body 3 down in the water to the bed of the stream that is being dredged. When the caisson-body 3 has been adjusted to the bed of the stream, the same is held firmly in its adjusted position and prevented from rising by means of the adjustable stop-bolts 15. The adjustable stop-bolts 15 are adapted to be inserted in the bolt-openings 15^a, formed in the corner-uprights 5, so that the inner ends of said bolts may be disposed directly above the upper set of guide-rollers 8, for the caisson-body. By removing the bolts 15 and re-

leasing the winch or windlass 14, so as to allow the cable 11 to unwind therefrom, the caisson-body 3 may readily be floated to a position up within the tower 4, in order that the barge or flat-boat may be moved from point to point.

The caisson-body 3 is provided in the top thereof with a manhole 16, that is adapted to be covered and uncovered by the inwardly-opening door 16^a. The inwardly-opening door 16^a is arranged within the extreme top portion of the caisson-body 3, and is hinged at one edge, as at 17. A jointed brace-stay 18 is hinged at one end, as at 19, to the door 16^a, and at its opposite end, as at 20, to the inner side of the caisson-body 3, below the top door 16^a, so that by breaking the joint of the stay 18 the door 16^a may be lowered, so as to uncover the manhole 16, while on the other hand by lifting the door and straightening out the stay 18 the latter acts as a support for the door, which, when closed, makes an air-tight connection with the top of the caisson-body.

The manhole 16 at the top of the caisson-body 3 provides access to the interior of the same when the dredge is being worked, and at its lower end the caisson-body 3 is provided with an enlarged portion 21, forming a working chamber in which the operation of dredging is carried on. The enlarged lower end 21 of the caisson-body 3 is provided in the sides thereof with suitably-arranged glass-covered side openings 22, through which the operators can readily see large rock and the like, so that the adjustment of the caisson may be properly directed, and in one side the enlarged portion 21 is provided at its lower end with the door-opening 23, that is adapted to be covered and uncovered by the inwardly-opening discharge-door 24. The inwardly-opening discharge-door 24 works entirely within the enlarged lower portion of the caisson-body and is provided at its upper end with a hinge-lug 25, pivotally connected to a similar lug 26, projected from the inner side of the caisson-body. The said door 24 provides means whereby the operators within the working chamber of the caisson-body can remove such rocks from the latter as would be too large to be otherwise removed, and at this point it is so be noted that in operating the dredge the door 24 is disposed on the downstream side of the caisson in order to avoid a rapid inrushing of the water.

On account of the small rock and gravel usually in the beds of gold-bearing streams, it is necessary to provide means for preventing the same from caving into the place being excavated or dredged by the apparatus, and in order to make provision for this a flexible air-tight sheeting 27 is employed. The flexible air-tight sheeting is preferably air-tight canvas and is arranged to extend circularly around the entire lower end of the caisson-body. The outer edge of the flexible sheeting 27 is secured within the extreme

lower end of the caisson-body by means of a circular fastening band or strip 28, suitably secured to the inner lower edge of the enlarged portion 21 of the caisson-body, and the inner edge of said flexible sheeting is fastened at 29 to the lower ends of the vertically-adjustable extension-bolts 30, arranged within the enlarged lower end of the caisson-body. The extension-bolts 30 are arranged at suitable distances apart in a circular series within the lower portion of the caisson-body and are square in cross-section, so as to loosely register in the squared guide-openings 31, formed in the guide-lugs 32, projected inwardly from the inner sides of the caisson-body and extending in a circular series entirely around the interior of the caisson-body. The said inwardly-projecting guide-lugs 32 have eccentrically pivoted on the upper sides thereof the catch-plates 33, that are adapted to be turned in and out of engagement with the catch-notches 34, formed in one side of the extension-bolts 30, so as to provide means for locking said bolts either in their lowered or elevated positions.

When the caisson-body is lowered in a stream and the lower end thereof is sunk as far into the gravel as it will readily penetrate, the extension-bolts 30 are extended downward sufficiently far so as to reach through the gold-bearing vein or streak in the bed of the stream. The bolts 30 when extended not only serve to steady the lower end of the caisson-body in position, but also provide means for extending or stretching the flexible sheeting 27 below the extreme lower end of the caisson-body, so as to effectually prevent sand or gravel from caving in upon the operators, and in this connection the extension-bolts and the flexible sheeting connected therewith are especially valuable in cases where the caisson-body is prevented from being lowered as far as desirable by reason of striking rocks or other obstructions.

The enlarged lower end 21 of the caisson-body is provided at one side with a vertical series of spaced air-escape valves 35. The air-escape valves 35 are of any suitable construction and are fitted to the caisson-body inside of the same, and are arranged at suitable distances apart in order to provide means for accurately varying the depth of water necessary within the lower end of the caisson to provide for carrying on the operation of dredging, and it will be obvious that by opening any one of the valves 35 the air within the caisson-body will escape through such valve until the water has risen sufficiently far to cover the same.

When the caisson has been submerged to the proper point, or until the same comes in contact with the rock in the bed of the stream, the water is forced out of the body of the caisson by means of compressed air introduced into the enlarged lower end of the caisson through the compressed-air hose 36. The hose 36 is connected at its lower end to the

top of the enlarged portion 21 of the body 3, and at its upper end the said hose is suitably connected with one end of a compressed-air supply-pipe 37, the other end of which pipe is connected with an ordinary air-compressor 38, suitably belted or geared with an engine 39, mounted on the deck of the barge and receiving its steam from a steam-boiler 40, also mounted on the barge. While the hose 36 provides for supplying the interior of the caisson-body with compressed air, the flexibility of such hose allows the caisson-body to be readily adjusted without interfering with the compressed-air supply. The gold-bearing substances are removed from the bed of the stream within the lower end of the caisson by means of the suction-hose 41. The suction-hose 41 is provided directly above its lower end, within the lower end of the caisson-body, with a stiff sliding pipe-section 42, that is arranged to slide within the stuffing-box 43, fitted in the top of the enlarged portion 21 of the caisson-body, and by reason of the flexibility of the lower end of the hose 41 and its sliding pipe-section 42 it will be obvious that the lower end of the suction-hose can be carried to any part of the enlarged lower end of the caisson-body, as may be necessary during the operation of dredging.

The upper end of the suction-hose 41 is suitably connected with the main suction-pipe 44, which suction-pipe is connected with the inlet of a centrifugal or rotary pump 45. The pump 45 is arranged to work within a side-inclosed pump-chamber 46, and secured within the pump-chamber to the inner sides thereof is an annular discharge trough or basin 47, the inner edge of which is arranged directly under the discharge-ports of the pump 45, so as to receive the discharge of the pump. The pump 45 has connected therewith a vertical drive-shaft 48, journaled within a suitable bearing-frame 49, built on top of the pump-chamber 46, and said drive-shaft is suitably belted with the engine 39, that also operates the air-compressor 38, as described.

The interior annular discharge trough or basin 47 within the chamber 46 has connected to opposite sides thereof the short chutes 50, that lead to the grills 51, located at opposite sides of the barge within one end of the side sluice-boxes 52, that are arranged longitudinally along opposite sides of the barge and provide means for discharging the tailings of the gold-bearing substances, while the grills 51 provide for separating large rock and the like from the water carrying the gold-bearing substances.

During the operation of dredging it is necessary to provide for the removal of material that cannot conveniently pass through the pump, and to provide for this an air-tight collecting-box 50^a is arranged on the deck of the barge at a point conveniently adjacent to the caisson-body. Suitably connected to the air-tight collecting-box 50^a is one end of a flexible hose 51^a, the other end of which is

connected with one side of the caisson-body near the upper end thereof, and the hose 51^a provides means for directing the material manually placed therein into the collecting-box 50^a. At a suitable point intermediate of its ends the hose 51^a is designed to have connected therewith a suitable cut-off clamp 52^a, which, when closed onto the hose 51^a, provides for preventing the escape of air from the interior of the caisson-body while the box 50^a is being emptied.

From the above it is thought that the operation and construction of the herein-described dredge will be readily apparent to those skilled in the art, but referring again to the operation of the dredge it will be understood that when the barge has been moved to the point desired in the stream the caisson-body is submerged by the means described until it contacts with the rock in the bed of the stream. At this time one or more men enter the caisson-body through the top door thereof, which is then closed, and the compressed air introduced into the interior of the caisson-body until the water is forced out of the same. It is then simply necessary for the operators within the caisson-body to remove the large rock from the bottom of the caisson through the lower side door thereof, and when such rock has been removed one of the air-escape valves 35 is opened, so as to allow the water to rise sufficiently high to supply the suction of the pump. By now starting up the pump and manipulating the lower end of the suction-hose the gold-bearing substances will be elevated from the bed of the stream and discharged into the sluice-boxes 52.

It will of course be understood that the machine can be used in all submarine excavating work, as before stated, and changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a dredge, a barge, a submergeable tubular caisson-body mounted for adjustment on the barge, a compressed-air-pipe connection with the caisson-body, and a flexible pump suction-pipe passed into the caisson-body near the lower end of the latter, said pump suction-pipe having a sliding connection with the caisson-body at the point where it enters the same, substantially as set forth.

2. In a mining-dredge, a barge provided with a vertically-disposed opening, a guide-tower built on the barge over the opening therein, a tubular submergeable caisson-body arranged to work within the guide-tower and provided on its upper end with exterior guide-pulleys, an adjusting-cable arranged to be drawn downward over the guide-pulleys at the top of the caisson-body, means for positively fastening the caisson-body in its low-

ered position, and suitable compressed-air and suction pipe connections with said caisson-body, substantially as set forth.

3. In a dredge, a barge provided with a vertically-disposed opening, a guide-tower built on the barge over said opening and provided with corner-uprights having a series of bolt-openings therein, a tubular submergeable caisson-body arranged to work within the guide-tower and provided with a series of radial bracket-arms carrying guide-rollers engaging with said corner-uprights, means for lowering said caisson-body, stop-bolts adapted to be inserted in said bolt-openings above said bracket-arms, and suitable compressed-air and suction pipe connections with said caisson-body, substantially as set forth.

4. In a dredge, a barge provided with a vertically-disposed opening, a guide-tower built on the barge over said opening, a tubular submergeable caisson-body arranged to work within the guide-tower and provided on its upper end with exterior guide-pulleys, a fixed guide-pulley mounted on the deck of the barge at one side of the caisson-body, an adjusting-cable secured fast at one end at a point opposite the fixed guide-pulley, and passed over the guide-pulleys on the caisson-body and under the fixed guide-pulley, an adjusting device connected with said cable, and suitable compressed-air and suction pipe connections with said caisson-body, substantially as set forth.

5. In a dredge, the combination of a barge, a vertically-adjustable submergeable caisson-body mounted on the barge and provided at its extreme upper end with a door-inclosed manhole and near its lower end with a vertical series of spaced air-escape valves, and suitable compressed-air and suction pipe connections with said caisson-body, substantially as set forth.

6. In a dredge, the combination of a barge, a vertically-adjustable submergeable caisson-body mounted on the barge and provided with a door-inclosed manhole at its upper end and at its lower end with an enlarged portion having in one side a door-opening, an inwardly-opening discharge-door mounted within the enlarged lower end of the caisson-body over said side door-opening, and suitable compressed-air and suction pipe connections with said caisson-body, substantially as set forth.

7. In a dredge, a barge, a vertically-adjustable submergeable caisson-body mounted on the barge and provided at its upper end with a door-inclosed manhole, a flexible air-tight sheeting connected at one edge to the extreme lower edge of the caisson-body, adjusting devices connected with the other edge of said sheeting and adapted to extend the same below the lower end of the caisson-body, and suitable compressed-air and suction pipe con-

nections with the caisson-body, substantially as set forth.

8. In a dredge, a barge, a vertically-adjustable submergeable caisson-body mounted on the barge and provided with an enlarged lower end portion having near its lower edge a circular series of inwardly-projecting guide-lugs having guide-openings therein, sliding extension-bolts mounted in the guide-openings of said guide-lugs, a catch device for securing the extension-bolts in adjusted positions, a flexible air-tight sheeting arranged to extend circularly around the entire lower end of the caisson-body and secured at one edge to the lower edge of the caisson-body, the other edge of said sheeting being secured at the lower ends of the sliding extension-bolts, and suitable compressed-air and suction pipe connections with the caisson-body, substantially as set forth.

9. In a dredge, a barge, a vertically-adjustable submergeable caisson-body mounted on the barge and provided with an enlarged lower end portion having a stuffing-box in its top, a compressed-air-pipe connection with the enlarged lower end of the caisson-body, and a flexible pump suction-pipe having a stiff sliding pipe-section arranged to work in said stuffing-box, substantially as set forth.

10. In a dredge, a barge, a submergeable caisson-body mounted for adjustment on the barge, a flexible compressed-air supply-pipe connected with the caisson-body, a flexible pump suction-pipe having its lower end arranged within the lower end of the caisson-body, a side-inclosed pump-chamber arranged on the deck of the barge, an interior annular discharge trough or basin arranged within the pump-chamber, a suitable pump arranged within the pump-chamber and suitably connected with said suction-pipe, and sluice-box connections with said discharge trough or basin, substantially as set forth.

11. In a dredge, a barge, a submergeable caisson-body mounted for adjustment on the barge, suitable compressed-air and suction pipe connections with the caisson-body, an air-tight collecting-box arranged on the deck of the barge, a flexible pipe connection between said collecting-box and the upper end of the caisson-body, and a cut-off clamp adapted to engage said flexible pipe connections at a point intermediate of its ends, substantially as set forth.

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

WILLIAM E. SEANOR.

DONALD ANGUS MCCASKILL.

Witnesses:

HUGO F. KRICK,

ALFRED S. BLACK.