

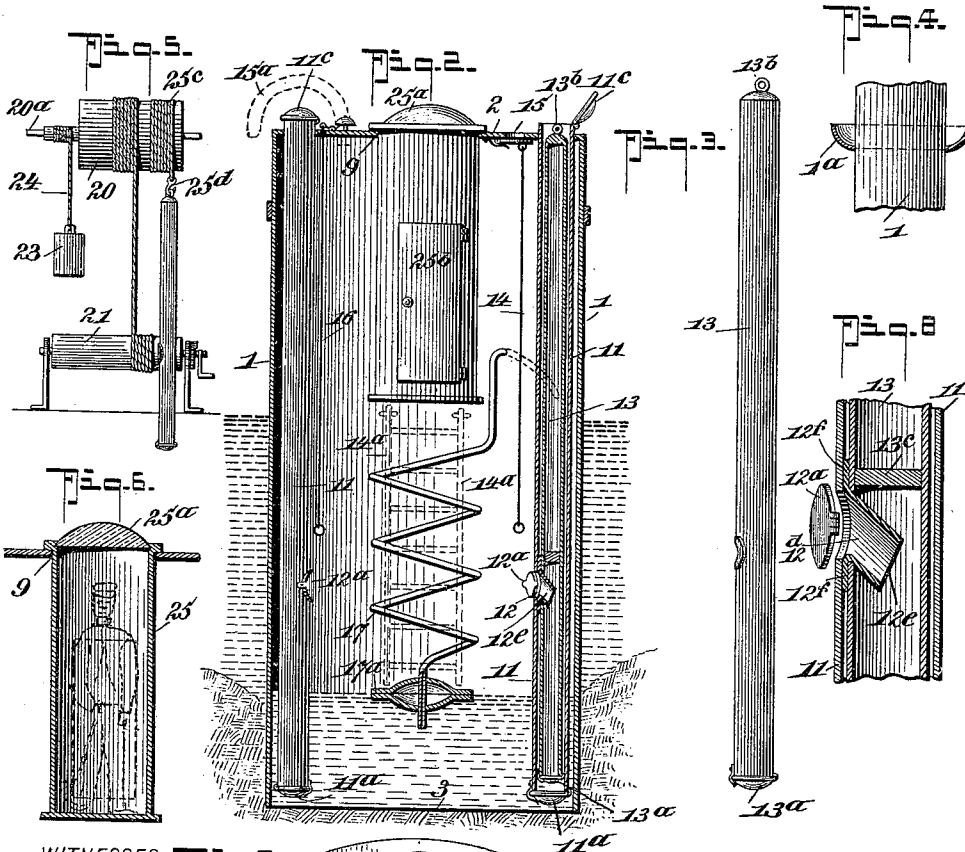
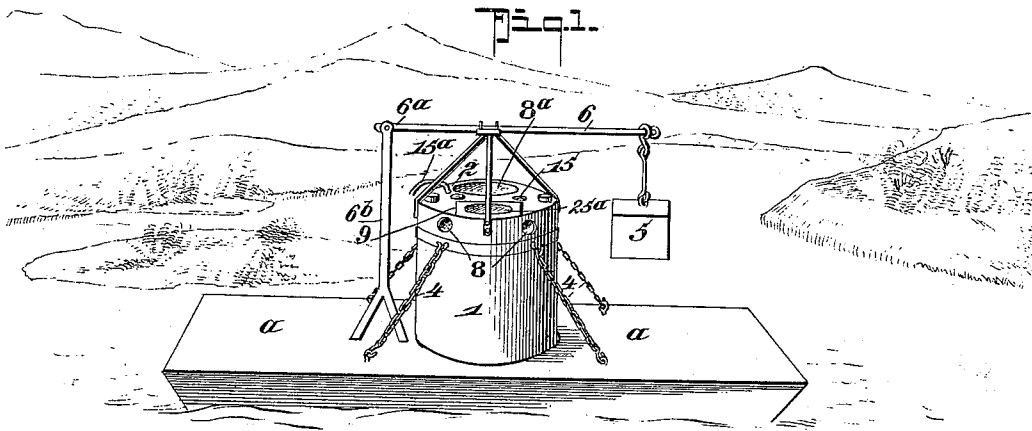
No. 621,216.

Patented Mar. 14, 1899.

J. BUCHEL.
MINING CAISSON.

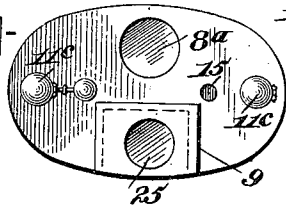
(Application filed Feb. 21, 1898.)

(No Model.)



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MINING-CAISSON.

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Application filed February 21, 1898. Serial No. 671,086. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BUCHEL, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Mining-Caisson, of which the following is a specification.

This invention relates to caissons for use in mining the bed-rock of rivers or other streams where the water would fill the excavation; and such invention primarily has for its object to provide an apparatus of this character that may be readily transferred to different points in the stream and in which the miners can work directly on the river-bed and take out the material down to bed-rock.

This invention also has for its purpose to provide a mining-caisson of this character which will automatically follow down into the excavation, whereby after it is once set in position it will maintain a water-tight working space for the miner as he works the bottom and bed-rock.

The invention also comprehends the construction of a mining-caisson having a simple means for lifting the excavated material; and in its subordinate features the invention consists in the novel features of construction and peculiar combination of parts, such as will be first described in detail and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved caisson, showing the same set in place in the stream. Fig. 2 is a vertical section of the same. Fig. 3 is a detail view of one of the discharging-cylinders. Fig. 4 is a view of a modified form of caisson-top. Fig. 5 is a detail view of the lift devices hereinafter referred to. Fig. 6 is a detail view of the sliding caisson-section. Fig. 7 is a plan view of the caisson, and Fig. 8 is a detail view hereinafter referred to.

The caisson comprises an outer shell or cylinder 1, oval in horizontal section, made of iron or steel, the top 2 of which is closed, while the bottom 3 is open. This shell in practice is mounted on a suitable float *a* and held from rising therethrough by the stay-chains 4 and is provided with means for normally forcing it tightly down into the bed of the stream to follow the hole being dug and

prevent the water entering thereunder. For this purpose a counterbalancing-weight 5, suspended on the lever 6, fulcrumed on the standard 7, mounted on the shell and having its end 6^a pivoted to a bearing 6^b, may be provided, as clearly shown in Fig. 1, or the upper end of such caisson-shell may be formed with a surrounding dump-collecting pocket 1^a, as shown in Fig. 4, into which the discharge, before or after being washed, is fed to add weight to the caisson to force it down into the river-bed.

The upper end of the caisson-shell has one or more lights 8 at the side and a light 8^a at the top, and such top has at one side a man-hole 9, in which is held to slide a supplemental caisson-section 25, having a light 25^a at the top and closed at the sides and bottom, it also having a suitable door 25^b, in practice held air-tight when closed. The purpose of such sliding section will appear hereinafter.

An essential feature of this invention is to provide means for getting out the gold-bearing sand and gravel and at the same time keep up an air-pressure and excluding the water from the interior of the caisson as it follows down into the excavated bed. For this purpose one or more tubes 11, of any suitable size in cross-section, are provided, the lower ends of which have outwardly-opening valves 11^a, while the upper ends extend slightly above the top of the shell, as at 11^b, and are provided with hinged covers 11^c. At a suitable point for the convenient introduction of the sand and gravel the tubes 11 have side openings 12, having hinged valves 12^a.

13 indicate tubes of a length slightly less than that of the tubes 11, which are of a size to snugly fit within the said tubes 11, their lower ends having outwardly-opening valves 13^a, while their upper ends have lift-eyes 13^b, for a purpose presently explained.

14^a indicates a ladder held within the caisson in any suitable manner to assist the miner in reaching the bed to be worked.

12^d indicate thimbles having short tubular nozzles 12^e and shields 12^f, which are adapted to be used in connection with the tubes 11 and 13 to prevent any sand or gravel falling down between the two tubes, the shield members 12^b fitting between the two tubes, as clearly shown in Fig. 2.

14 14 indicate a pull-rod, the upper end of which connects with a vent-valve 15 in the top of the caisson-shell, in practice normally held closed, the purpose of which is to allow the operator to admit fresh air within the shell as desired.

16 indicate a pull-rod which passes up to the top of the shell and connects with the signal or bell operating trip.

17 indicates a rubber pipe, the upper end of which projects through the side of the shell at a point above the water-line, while the lower end carries an apertured float 17^a, the purpose of such float and pipe being to admit of the water being forced out of the cylinder in case the bottom of the shell strikes hard clay or sand of such a character as would likely prevent the internal air-pressure from driving the water out at the bottom.

In operation the top of the caisson-shell is held closed and such shell is sunk in the stream at the place the bed is to be worked, it being understood that in practice such shell is of such a height that the upper end will always project above the water-line. After the shell has been properly set the miner enters the air-tight previously-raised casing 25, which is lowered to afford him access to the shell or cylinder, after which air is forced into the shell through the feed-tube 15^a by a suitable air-pump (not shown) until the water within the caisson is entirely forced out from under the caisson either from the bottom or through the hose-section. After the tubes 13 have been inserted in the tubes 11 the valves 12^a are opened, the air from within the caisson being held from escaping, as will hereinafter appear. The operator then shovels the sand and gravel through the openings in the side of the tubes 11 and 13, the material being collected in the lower end of the inner tubes. When the lower ends of the inner tubes are filled, the valves 12^a are closed and held closed by the internal air-pressure or by suitable catches. The inner tubes are then pulled up out of the tubes 11 and the contents thereof emptied by opening the valves 13^a at the bottom.

Any suitable means may be provided for conveniently lifting the tubes 13 out of the tubes 11. I prefer, however, to employ a counterbalanced windlass mechanism, such as is shown in Fig. 5, in which 20 indicates a drum mounted in bearings on the frame secured on the float, to which is secured one end of the rope or cable, the other end of which is wound about and secured to the windlass 21.

23 indicates a counterweight suspended on the cord or cable 24, wound upon the shaft 20^a of the frame 20, and 25^c indicates a cord or cable also wound upon the frame 20 and having its free end provided with a hook 25^d, adapted to engage the eye 13^b on the tube 13. The windlass has a ratchet-and-pawl mechanism 26.

By providing a lifting mechanism, as de-

scribed, it is manifest that by tripping the pawl from engaging with the ratchet the counterweight 23 will serve to shorten up the rope or cable 25 to lift the tube 13 out of the tube 11. When it is desired to lower the said tube, the operator turns the windlass to raise the counterweight 23 to unwind the lift-cable 25.

While I have shown two tubes, one arranged at each side of the caisson-shell, it is manifest that but a single tube need be employed, or when more than one tube is used all of the tubes may be nested at one side of the shell. It will also be understood that changes in the details of construction and arrangement of the several parts may be made without departing from the scope of the appended claims.

By providing the cuff members or shields 12^d (see Fig. 8) the escape of air from the interior of the caisson into the tubes 11 is prevented, and to further confine the air without the caisson the inner tubes 13 have a closure 13^c, which prevents air rising up in the said tubes 13 above the inlets thereof.

As in the practical use of my invention it is necessary to maintain, so far as possible, a fresh-air supply within the casing, I have provided the supplemental slide-casing 25, which effectively holds the manhole 9 closed and yet is capable of being lifted above the caisson-shell top to a point to admit of the miner entering same, it being manifest that by closing the door the miner can be let down into the shell 1 and emerge through the door 25^d without opening the manhole and without appreciable loss of air-pressure within the shell or cylinder 1.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A caisson, comprising a shell, and the removable tubular sections extending from the top to the bottom of the shell, and having communication with the interior of the same, and adapted to be withdrawn through the top thereof, substantially as described.

2. A caisson, comprising a shell open at the bottom and having a feed-port into which air can be forced, removable tubular sections for discharging the collections extending from the top to the bottom of the shell and adapted to be withdrawn through the said top, and suitable valves for closing off the escape of air from the interior as such sections are being removed as set forth.

3. A caisson, comprising a shell having an open bottom, and an air-supply pipe, tubes depending from the top of the shell, adapted to be withdrawn from the same and having feed-openings at their side, and closure-valves therefor, and tubes 11 having drop-valves at the bottom, side openings and closure-caps for the upper end, all being arranged substantially as shown and described.

4. A caisson, having an open bottom, a man-hole having a closure-cap, a pendent tube or

tubes, having outwardly-opening valves at the lower end, side openings and closure-valves therefor, supplemental or discharging tubes, having outwardly-opening valves at the bottom, and side openings to register with those of the pendent tubes, when fitted therein, and an air-supplying pipe, all being arranged substantially as shown and described.

5. A caisson comprising a shell closed at the top and open at the bottom, having an apertured float provided with an escape-pipe having its discharge end projected through the shell at a point above the water-line, as set forth.

6. A caisson comprising a shell open at the bottom and closed at the top, means for forcing air into the shell, and a vertical apertured float having a flexible pipe, the upper end of which is extended through the shell at a point above the water-line, substantially as shown and described.

7. A caisson, having an open bottom, a pendent top outwardly extended through the top of the caisson and provided with a side opening having a closure-valve, a supplemental or discharge tube adapted to be fitted

within the first tube, said discharging-tube being closed at the top and having an outwardly-opening valve at the bottom provided with a side opening adapted to register with the opening in the first or outer tube, and the guide-shield 2^d, all being arranged substantially as shown and for the purposes described.

8. In a caisson as described the combination with the shell 1, having a manhole 9, of the supplemental caisson-section 25, held to slide in the manhole 9, and having a suitable door 25^b adapted to be arranged above and below the top of the shell by raising and lowering the caisson-section 25, as specified.

9. In a caisson as described, the combination with the shell 1; and the tube 11, having a valved filling-opening, of the inner tube 13, having a filling-opening corresponding to the outer-tube opening and having its portion above such opening closed, as described.

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Witnesses:

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