No. 631,411. Patented Aug. 22, 1899.

E. C. SOOY.

ORE CONCENTRATOR.

(Application filed Apr. 19, 1898.)

(No Model.) 2 Sheets—Sheet 1.

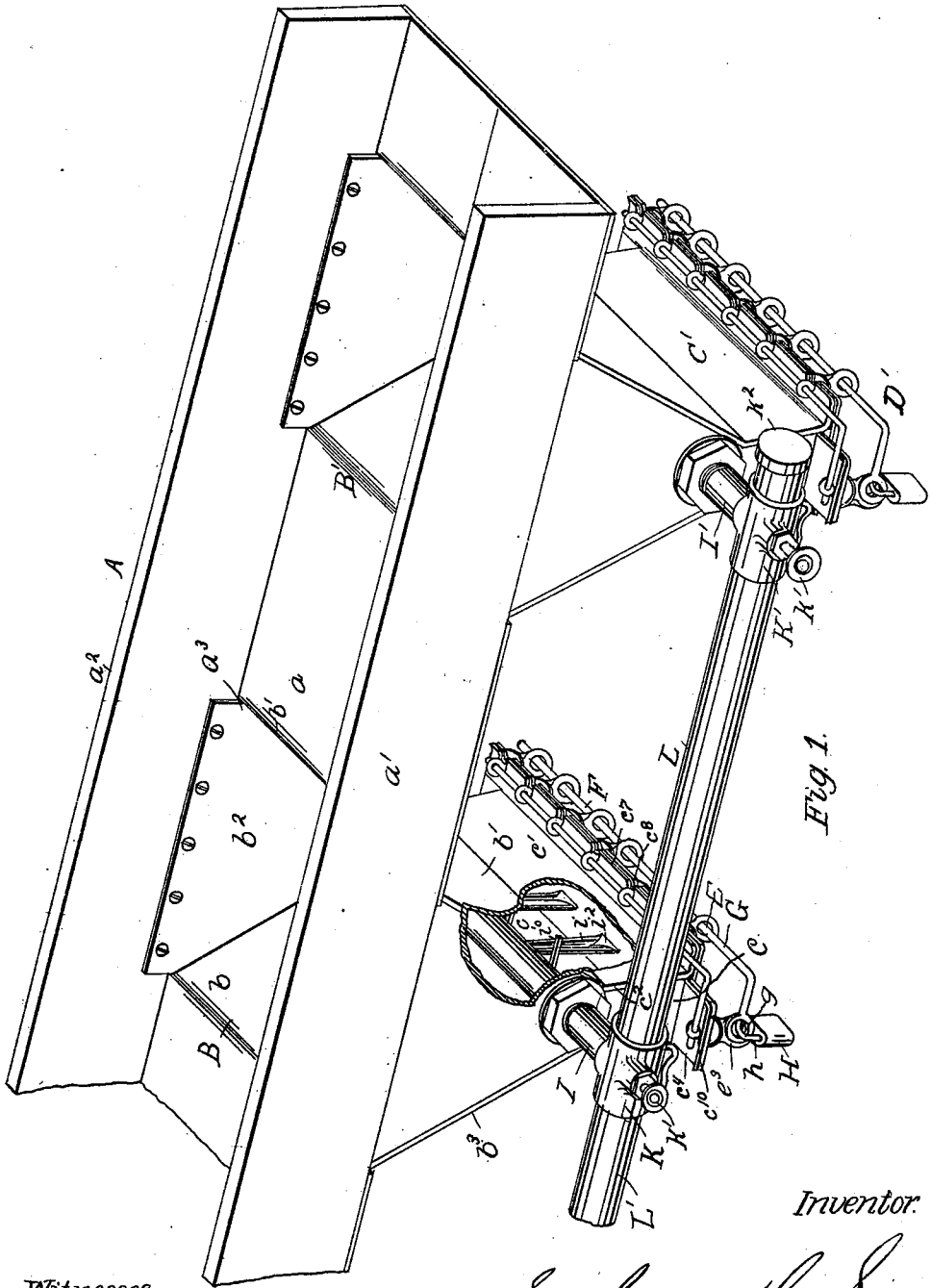


Fig. 1.

Witnesses.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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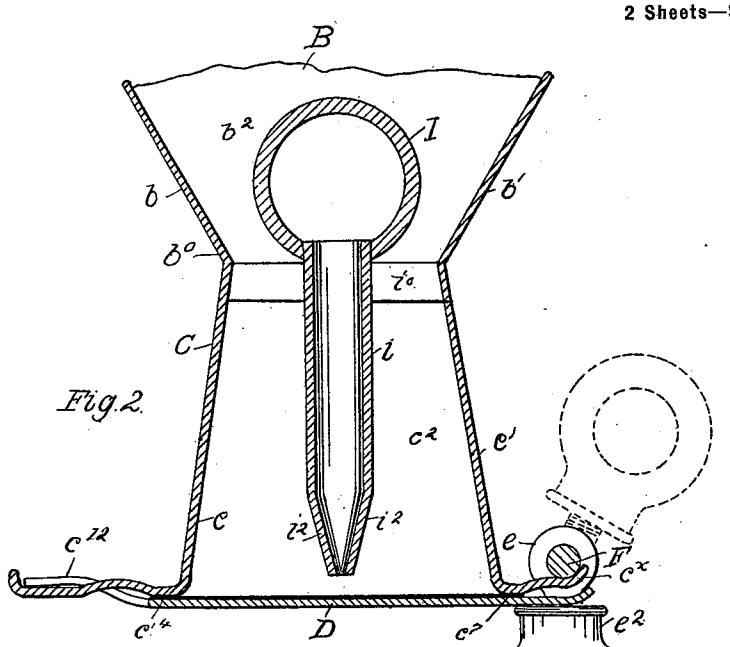


Fig. 2.

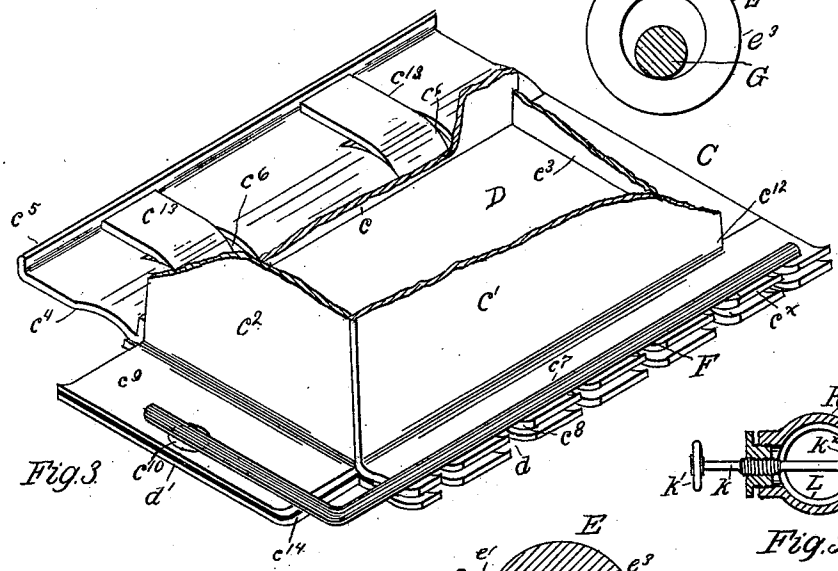


Fig. 3.

Fig. 5.

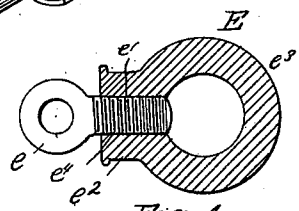


Fig. 4.

Witnesses.

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UNITED STATES PATENT OFFICE.

EPHRAIM C. SOOY, OF KANSAS CITY, MISSOURI.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 631,411, dated August 22, 1899.

Application filed April 19, 1898. Serial No. 678,200. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM C. SOOY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Ore-Concentrators; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The objects of my invention are, first, to effect a separation of the metal from the material subjected to a washing process in an ore-washing sluice by forced currents of water and gravitation, and, second, to enable the metal to be received within a sealed receptacle after separation.

The invention consists in the novel construction and combination of parts, such as will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a view in perspective of an ore-washing sluice, showing my improvements applied thereto for concentrating the metal and for securing the metal from unauthorized removal. Fig. 2 is a detail cross-sectional view of the inner end of the ore-washing receptacles, showing the water-forcing safe-deposit box and the water-supply and branch pipes in section. Fig. 3 is a detail view of the detachable bottom to the safe-deposit box. Fig. 4 is a detail view of one of the rod-clamping eyebolts. Fig. 5 is a detail view of one of the cut-off valves.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents a sluice-box inclined in position and comprising a bottom a and sides a' a^2 of the proper height to conduct the material through the sluice, the end of the sluice being open. In the bottom a of the sluice A and in the upper end portion of said bottom is an opening a^3, extending from the inner portion of the side a' to the inner portion of the side a^2 of said sluice and from a point near the upper end portion of said bottom. With the sides of the opening a^3 are connected the respective opposite sides b b' of an ore-washing receptacle B, the lower end portion of which sides converge inwardly toward each other or in a V shape and to a position a suitable distance from each other to form an intermediate passage b^0 of a restricted width for the suspension of the heavy material.

b^2 b^3 are the opposite end portions of the receptacle B, which extend from the inner portion of the respective sides a a' of sluice A downwardly in a V shape to a position in line with the lower edge of the sides b b' of the receptacle B and secured rigidly to said sides. With the lower edge portion of the inclined sides b b' are connected the respective vertical sides c c' of the water-forcing safety-deposit box C, the lower end portion of which sides extend downwardly a short distance and are inclined outwardly and at opposing sides to each other.

The ends c^2 c^3 of the safety-box C extend from the lower portion of the ends b^2 b^3 of the receptacle B, respectively, to a position in line with the lower edge portion of the sides c c' of said safety-box C. From the lower edge portion of the side c of the box C is an outwardly and horizontally extended leaf or flange c^4, which describes a single upwardly and outwardly curved line and at its outer end is bent in an upward direction a short distance, as at c^5, in which curved portion of of the leaf or flange c^4 are openings c^6, square in form and arranged at short distances from each other in the direction of the length of said curved leaf c^4. On the lower edge portion of the side c' of the safe-deposit box C is an outwardly and horizontally extended flange c^7, shorter in width than the flange c^4 and extending the length of said side and also curved outwardly and bent upwardly, as at $c^\times$, in which flange are the slots c^8, extending transversely from the outer edge portion of said plate to the side c' of the box C, which slots are arranged at short distances apart in the longitudinal direction of said flange c^7. On the lower edge portion of the end c^2 of the box C is an outwardly and horizontally extended flange c^9, in which is a single perforation c^{10}. In the lower edge portion of the end c^3 of box C is an outwardly-extended flange c^{12}, which is the same as the flange c^9.

D represents the bottom of the box C, which consists of a flat plate extending from the outer edge of the flange c^9 to a position in line

with the outer edge portion of the flange c^{12} on the end of the box C and in width from the outer edge portion of the flange c^7 to a position in line with the outer vertical plane of the side c of said box C. On the said outer edge portion of the bottom D, beneath the vertical plane of the side c, are separate upwardly-curved lugs c^{13}, which extend upwardly through the opening c^6 in the flange or plate c^4 and abut against the inner side of the upwardly-extended outer edge portion of the flange c^4 on the box C.

In the outer edge portion of the bottom D are slots d and perforations d', which are directly in vertical line with the slots c^8 and the perforation c^{10} in the flanges c^7 c^9 on the lower edge of the sides c' and ends c^2 of the box C, respectively.

In the registering slots c^8 and d in the flange c^7 and bottom D is a clamping device E, composed of an eyebolt e, which is threaded at e', and a nut e^2, with which is connected a ring e^3. In the nut e^2 is a threaded opening e^4, extending from one end of the nut to the inner side portion of the ring, which is integral therewith. In the other registering slots c^8 and d of the flange c^7 are clamping-eyebolts, as described of the one clamping device E, the nut e^2 being arranged beneath the bottom B, between the upper surface of the bottom D and the flanges c^4 c^7 c^9. At the point of contact is a rubber gasket c^{14}. In the registering slots c^{10} d' on the end of the box C is a bolt-clamp, which is the same as the clamp E.

Through the eyes e in the several eyebolts is passed one end of a rod F, which extends to a position nearly in line with the outer edge portion of the flange c^{12} on the end c^3 of the box C. The other end of the rod F is bent at right angles and in a position parallel with the end c^2 of the box C and extended through the eyebolt c' in said perforations c^{10} d'. Through the ring e^3 on the nut e^2, beneath the bottom D of the box C, is inserted one end of a rod G, which also extends the length of the box C and to a position in line with the outer edge of the flange c^{12} of the end c^3 of box C. The other end of rod G is bent at right angles and parallel with the end c^2 of the box C and extends to a position opposite the perforations c^{10} d', and upon the said end of rod G is a ring g. Secured to the ring g and the ring e^3 of the clamp E, within the said perforations c^{10} and d', is a bow h of padlock H.

Through the end b^3 of the ore-washing receptacle B, at a point in the bottom portion of said receptacle slightly above the entrance to the safe-deposit box C, extends longitudinally the water-supply pipe I, which terminates near the inner portion of the side c^3 of the box C and is supported by the cross-bars i^0. With the under side portion of the pipe I are connected separate branch pipes i, which extend downwardly nearly to the bottom D of said box and are arranged at short distances apart. The lower end portions of the branch pipes i are each flattened on both sides, as at i^2, thus making a narrow passage for the exit of the water. On the outer end portion of the pipe I is a water-cut-off pipe-joint K, in which is a valve $k^\times$, which valve closes the end of the pipe I direct, the valve-stem k of which extends through the connection or joint K and is provided with the usual hand-wheel k'.

In the sluice A, and at a point toward the lower end of said sluice, is an ore-washing receptacle B', which is precisely the same as the receptacle B and having the water-forcing safe-deposit box C', with its removable bottom D' secured by the bolt fastening devices, as described of the safe-deposit box C. In the receptacle B' is a longitudinally-extended pipe I', which is the same in length as the pipe I and having a valvular pipe-joint K' in the same manner as described of the pipe K.

From the valve connections K extends a connecting-pipe L, which is also connected with the pipe-joint K'. With the valvular pipe-joint K is connected a water-supply pipe L', which is also connected with the source of supply of the water. The valvular pipe-joint K' is provided with a cap k^2 on the side opposite to that receiving the end of pipe L.

The ores to be subjected to the washing and separating process are introduced in the sluice A at the upper end. As the sluice is inclined at an angle and downwardly, the tendency of the material is toward the receptacles B B', into which the material passes in large or small quantities, as may be desired. The auriferous material subjected to the washing process is composed of sand and fine and coarse stone, and this material, as well as argentiferous ores, is more especially considered in the present invention as under treatment. The material which enters the receptacle B falls upon the pipe I, and owing to the restricted width of space between said pipe and the inner side portions of the said receptacle a lodgment of the coarse material occurs at said point. As soon as the quantity of the material in the receptacle B is sufficient for separation the valve k' is opened and water is admitted to the pipe I, which passes through the branch pipes i^2 and rises within the receptacle B and flows over the upper edge of said receptacle upon the bottom a of sluice A and thence into the receptacle B'. The sand and fine material seeking an entrance to the box C as the water passes upward is held partially in suspension in the water forced upward by the water-currents, the tendency of which prevents the sand and soil from falling into the box C, and at the same time the metal is separated and falls by its gravity upon the bottom D of the box. The force of the water in sluice A carries the surplus amount of material as the separation continues, which overflows the receptacle B into the receptacle B', where the material is also subjected to a strong upward current of water, which prevents the settling of the sand

in the said receptacle and which is constantly discharged over the lower end of the sluice. The metal which falls into the box C is removed at the proper times by unlocking and removing the padlock H from the ring e^3 upon the nut, which it secures, and also removing the nut from the eyebolt in the perforations c^{10} d', then withdrawing the rod G and removing each clamp from the slots c^8 and d and turning said clamps upwardly, as seen in dotted lines, (see Fig. 2,) the nuts e^2 being first loosened from contact with the bottom D, which nuts serve to draw the flanges c^7 c^9 downwardly upon the bottom D, and consequently bend the inner portions of the flanges upon the rubber gasket c^{14} and prevent escape of the water.

The improved sluice may be extended any desired length and the force of water increased or lessened in the separate ore-washing receptacles.

In my invention I aim to prevent any unauthorized tampering with the safe-deposit boxes containing the metal. In order to open any one of the series of the ore-concentrating safe-deposit boxes, which may be accomplished without interfering with or stopping the flow of water and that of the material through the sluice A, the valve k' in the pipe connection K to the pipe I is turned to cut off the supply of water to the particular box C from which the metal is to be taken. The material in said box, which has been held in suspension by the water, at once settles in the box. The padlock H is unlocked and the rod Y removed from the series of rings in the several nuts, after which each nut e^2 is turned in a reverse direction on the bolt to release the clamping parts and then turned back in the position as seen in dotted lines on Fig. 2, allowing the bottom D to drop, and the concentrated material in the safe-deposit boxes is caught in a receptacle employed for the purpose. The bottom D is then returned to its place, the clamping bolts and nuts secured in position, and the rod G locked as before and the water turned on and the operation continued as before. It will thus be observed that the other boxes may be cleaned up and the contents removed in the same manner without interfering with the steady operation of the sluice. The first box C, near the upper end of the sluice, will require to be opened and the contents removed with greater frequency than the boxes at the lower end of the sluice. The sluice A being supplied with a number of the receptacles B and box C the consequent passage of the material from one receptacle to another will insure a complete saving of the metal. The pipe I and the cross supporting-bars i^0 prevent egress through the material to the metal in the box C, so that the procuring of the contents of each box is only through the removal of the bottom, as heretofore described.

Having fully described my invention, what I now claim as new, and desire to secure by Letters Patent, is—

1. A receptacle for ores having sides and outwardly-extended flanges upon the lower portions of said sides a detachable bottom to said receptacle, a hinged connection of one side of said bottom with one side of said receptacle, the free edge of said bottom and the adjacent flange on said receptacle having openings registering with each other, a clamping-nut opposite each of the several openings having a ring integral with said nut an eyebolt in each opening within its respective nut a link connecting one of said clamping-nuts with another and a separate link connecting one eyebolt with another and a locking device connected with each link.

2. A safety-deposit box for ore-concentrators, having sides and outwardly-extended flanges on the lower portions of said sides, and openings in said flanges, a detachable bottom to said box having openings registering with the openings in the flanges on the sides of said box, a clamping-nut opposite one of the registering openings beneath the bottom of said box, having a ring integral with said nut, a bolt on said nut within the said registering openings, a link connecting one of said clamping-nuts with another, and a lock securing said link and nut.

3. A safety-deposit box for ore-separators, having sides and outwardly-extended slotted and perforated flanges at the lower portion of said sides, a detachable bottom to said box, having slots registering with the slots in the flanges on the sides of said box, and a clamping-nut on the under side portion of said bottom, opposite one of said registering slots, and a ring integral therewith, and an eyebolt within said nut in the registering slots, separate rods in the series of eyebolts and also in said rings upon one side of said box, and bent at an angle to and in the plane of the end of said box, a ring on one of said rods, and a lock for said ring, and the ring on the clamping-nut.

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Witnesses:
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