

No. 880,631.

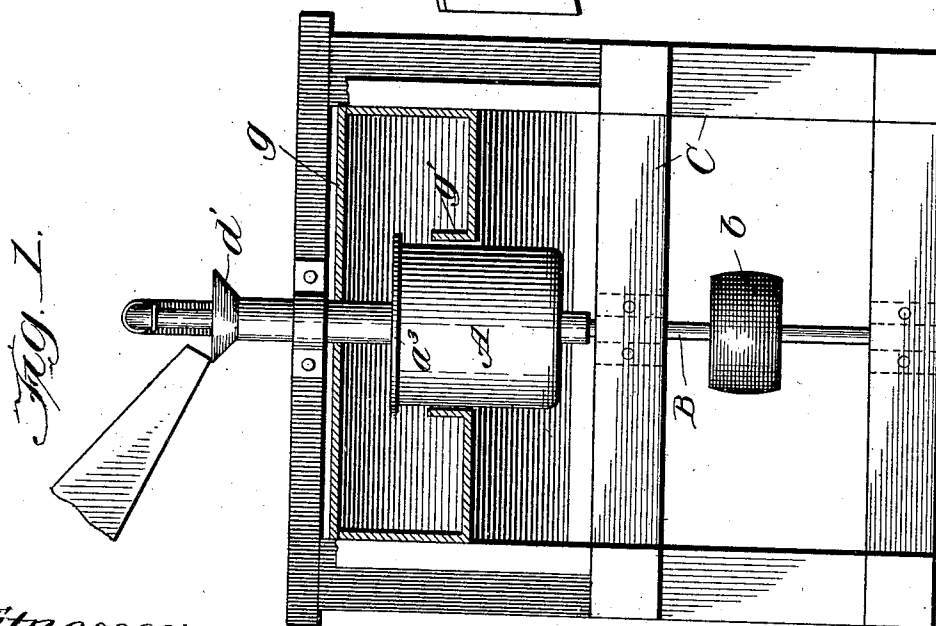
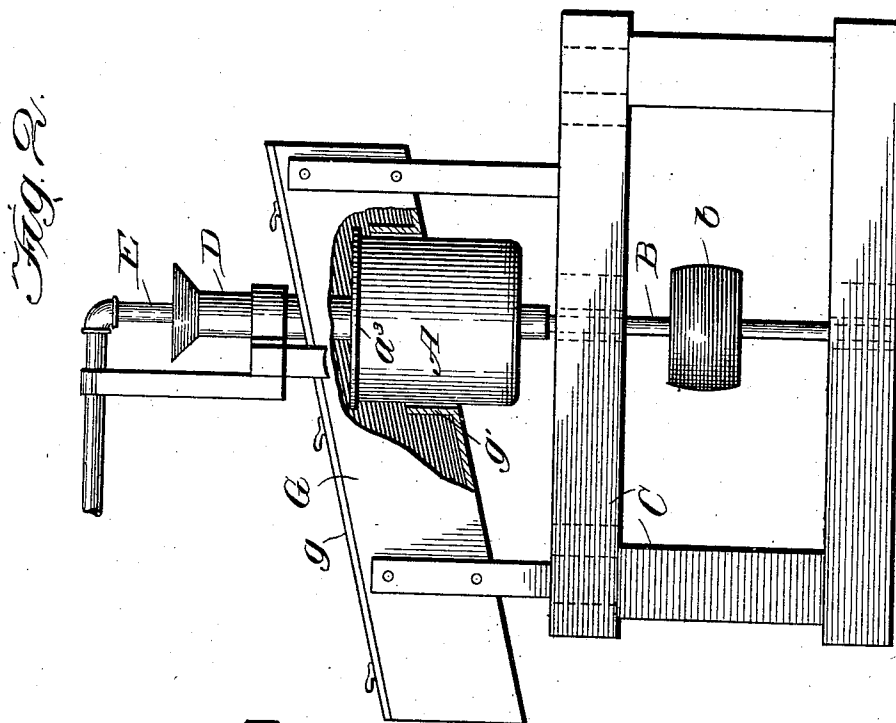
E. R. COOK.

PATENTED MAR. 3, 1908.

GOLD CONCENTRATING APPARATUS.

APPLICATION FILED JUNE 6, 1907.

2 SHEETS—SHEET 1.



Witnesses:

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Ruby V. Nash

Inventor:

Edmond R. Cook
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2 SHEETS—SHEET 2.

Fig. 1.

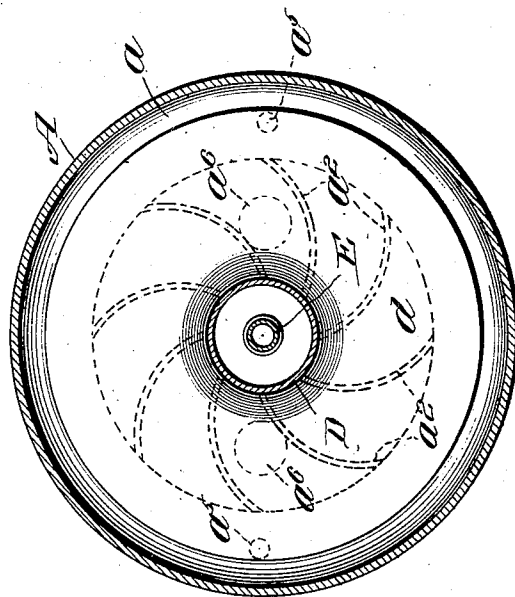
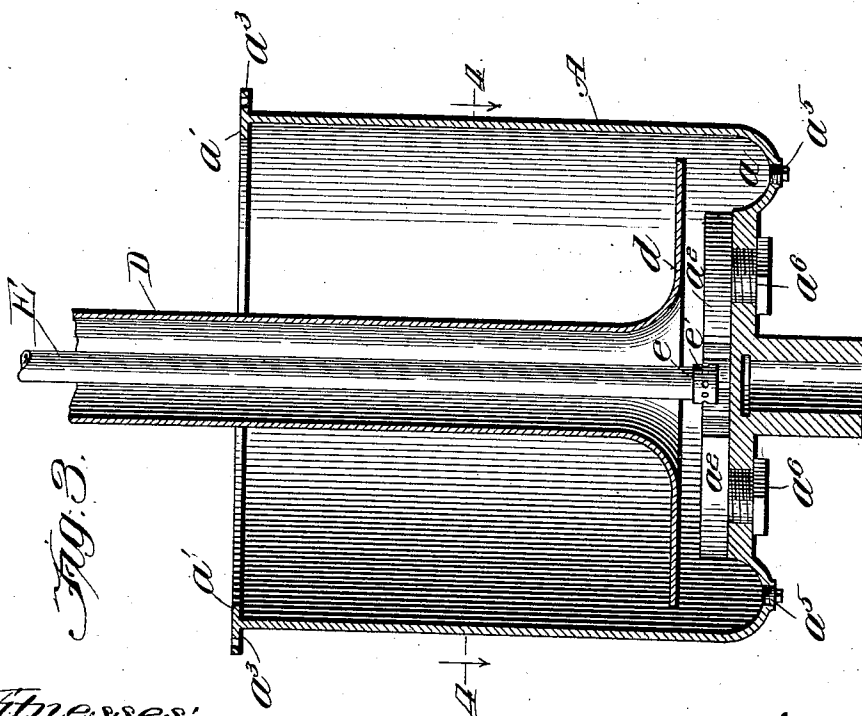


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDMOND R. COOK, OF PORTLAND, OREGON, ASSIGNOR OF ONE-HALF TO FRANK ANTHONY,
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GOLD-CONCENTRATING APPARATUS.

No. 880,631.

Specification of Letters Patent.

Patented March 3, 1908.

Application filed June 6, 1907. Serial No. 377,502.

To all whom it may concern:

Be it known that I, EDMOND R. COOK, a citizen of the United States, residing at Portland, county of Multnomah, State of Oregon, have invented a certain new and useful Improvement in Gold-Concentrating Apparatus, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to apparatus for extracting precious metals from sand or gravel with which it may be mixed, and it has for its object to provide an apparatus of this character which shall be simple and compact in construction and efficient and reliable in operation.

Generally speaking my invention contemplates means for causing the finely divided material, such as sand or gravel, with which gold or other precious metal may be mixed, to flow over a quantity of mercury in such a manner that the material is positively brought into intimate contact with the mercury, and in such a manner that the precious metal contained therein may readily be taken up by the mercury so as to form therewith an amalgam. In order to secure compactness in construction as well as insure the engagement of the material with the mercury under pressure, I propose to hold the mercury in a revolving receptacle around the walls of which the mercury is spread in a thin layer through the action of centrifugal force. The material bearing the precious metal is fed into the receptacle at a point near the center and the bottom thereof so that it flows outwardly and then upwardly under the action of centrifugal force; flowing in a continuous stream across the surface of the mercury and out of the top of the receptacle. The precious metals, being denser than the remainder of the material, are naturally thrown to the outer circumference of the revolving mass and therefore into engagement with the mercury. The sand and gravel are preferably mixed with water as they pass through the amalgamating receptacle.

The various features of novelty which characterize my invention will be hereinafter pointed out with particularity in the

claims; but for a full understanding of my invention and of its various objects and advantages, reference is to be had to the following detail description taken in connection with the accompanying drawings, wherein:

Figure 1 is a view partly in end elevation and partly in cross-section of an apparatus arranged in accordance with the preferred form of my invention; Fig. 2 is a side elevation of the apparatus, a portion of the trough for receiving waste material being broken away; Fig. 3 is a vertical section taken through the amalgamating receptacle; and Fig. 4 is a section taken on line 4—4 of Fig. 3.

Reference being had to the drawings: A designates a cylindrical receptacle closed at the bottom and open at the top. This receptacle may be made of cast iron or of any other suitable material. The receptacle is supported upon a vertical shaft B which is suitably mounted and supported in the frame work C and provided with a pulley b whereby it may be rotated. When the shaft is set in rotation the receptacle is caused to revolve about its vertical axis. The bottom wall of the receptacle is depressed so as to form an annular groove or depression a at the intersection between the bottom wall and the cylindrical side wall. This groove is of such size as to hold sufficient mercury to coat the entire cylindrical wall of the receptacle when the apparatus is set in operation. It will, of course, be understood that when the receptacle begins to rotate, the mass of mercury contained in the groove is thrown outwardly by the action of centrifugal force and, because of its fluidity, rises in the receptacle and is spread in a thin sheet around the interior thereof. In order to prevent the mercury from flowing out of the top of the receptacle I provide a flange a' which projects inwardly from the upper edge of the receptacle. Therefore the mercury is free to rise until it comes into engagement with the flange and further upward movement thereof is thereby prevented. The sand or gravel bearing the precious metal is fed into the receptacle near the bottom thereof in any suitable manner and is acted upon in the same way as the mercury by centrifugal force so that it also flows outwardly and then upwardly. It is not, however, stopped when it reaches the top of the receptacle, but is free to flow beyond the top and be thrown outwardly from

the receptacle. The precious metals being heavier than the remainder of the mass are, of course, thrown radially farther than the lighter materials, consequently the precious metals are carried into intimate engagement with the mercury and are taken up thereby. The minerals are preferably mixed with water either before or after they enter the receptacle so that the whole mass is fluid in character.

In the drawing there is shown a very satisfactory arrangement for feeding the sand and gravel to the receptacle. D indicates a tube supported in any suitable way from the frame work so as to extend axially into the receptacle to a point near the bottom thereof. The bottom of the tube is made bell-shaped and provided with a flange *d* which extends almost to the walls of the receptacle. The tube is provided at its upper end with a funnel or hopper *d'* into which the sand and gravel are dumped. It will be seen that by this arrangement the sand and gravel are deposited in the bottom of the receptacle and, in order to escape therefrom, must flow upwardly throughout the entire length of the receptacle so as to pass over the top thereof. The bottom wall of the receptacle may be provided with a series of vanes *a*² which project from a point near the center thereof to the annular groove on the bottom of the receptacle. These vanes assist in dividing the material in such a way that it is uniformly distributed about the walls.

E is a pipe which extends through the tube D to the bottom thereof and at the bottom of the pipe is a cap *e* having a series of perforations *e'*. The pipe is connected to any suitable source of supply from which water may flow through the pipe and out of the bottom thereof into the receptacle.

It will be seen that the perforations, extending radially, permit the formation of jets in the space between the vanes so that the water is thoroughly mixed with the sand or gravel and assists in propelling it toward the side of the receptacle.

In order that the stream of gravel and water which is discharged from the receptacle may be controlled, I provide a closed trough G which surrounds the upper end of the receptacle and which prevents the sand, gravel and water from being scattered about the premises. This trough may be made of wood or any suitable material and be supported in any suitable manner from the frame work. The trough is preferably inclined and open at its lower end so that the material which is received therein may flow by gravity downwardly and outwardly therefrom. The top *g* of the trough is preferably made removable so that the interior of the receptacle may be examined by simply removing the top of the trough. The trough

is also preferably provided with a raised annular wall *g'* which closely surrounds the receptacle and prevents the material discharged from the receptacle from falling down through the opening in the trough through which the receptacle extends. The flange at the top of the receptacle is therefore also preferably extended outwardly as at *a*³ in order to project over the wall *g'*.

In using the apparatus, the stream of water and sand or gravel is allowed to flow until the mercury has taken up a proper amount of precious metal and the operation may then be stopped long enough to allow the amalgam to be withdrawn through openings *a*⁵ in the bottom of the receptacle, after which a new supply of mercury may be poured into the groove. Before the amalgam is removed, or at any other time when it is desirable to do so, the contents of the receptacle, except the mercury of amalgam, may be removed by taking out plugs *a*⁶ in the bottom of the receptacle.

It will now be seen that I have produced an apparatus for gathering precious metals from the sand or gravel with which it is mixed, which consists of but few parts occupying only a small space and wherein any desired mass of material may be acted upon so as to positively remove therefrom all of the precious metals contained therein. It will be seen that by varying the speed at which the receptacle rotates, the precious metals may be forced radially with any degree of pressure which the character or condition of the material with which they are mixed makes it necessary or desirable.

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

1. In an apparatus for collecting precious metals, a receptacle, means beneath the receptacle for revolvably supporting it, a plurality of horizontal radiating vanes projecting above the bottom of the receptacle and extending from points near the axis thereof to points near the side walls of the receptacle, a tube extending axially into the receptacle and having a wide laterally extending flange at its lower end arranged in close proximity to the vanes, and a water pipe smaller in diameter than the tube extending through said tube into the bottom of said receptacle, said pipe having a head arranged in the space between the inner ends of the vanes, and there being perforations in the sides of the head to permit the water to be discharged into the space between the vanes in the form of jets.

2. In an apparatus for collecting precious metals, a receptacle, means beneath the receptacle for revolvably supporting it, a plurality of horizontal radiating vanes projecting above the bottom of the receptacle and extending from points near the axis thereof, 130

to points near the side walls of the receptacle, a tube extending axially into the receptacle and having a wide laterally extending flange at its lower end arranged in close
5 proximity to the vanes, and a water pipe smaller in diameter than the tube extending through said tube into the bottom of said receptacle, said pipe having a head arranged in the space between the inner ends of the
10 vanes, and there being perforations in the sides of the head to permit the water to be

discharged into the space between the vanes in the form of jets, said receptacle having a groove for containing mercury surrounding the outer ends of said vanes.

In testimony whereof; I sign this specification in the presence of two witnesses.

15

EDMOND R. COOK.

Witnesses:

JAY H. UPTON,
MINNIE SMITH.