

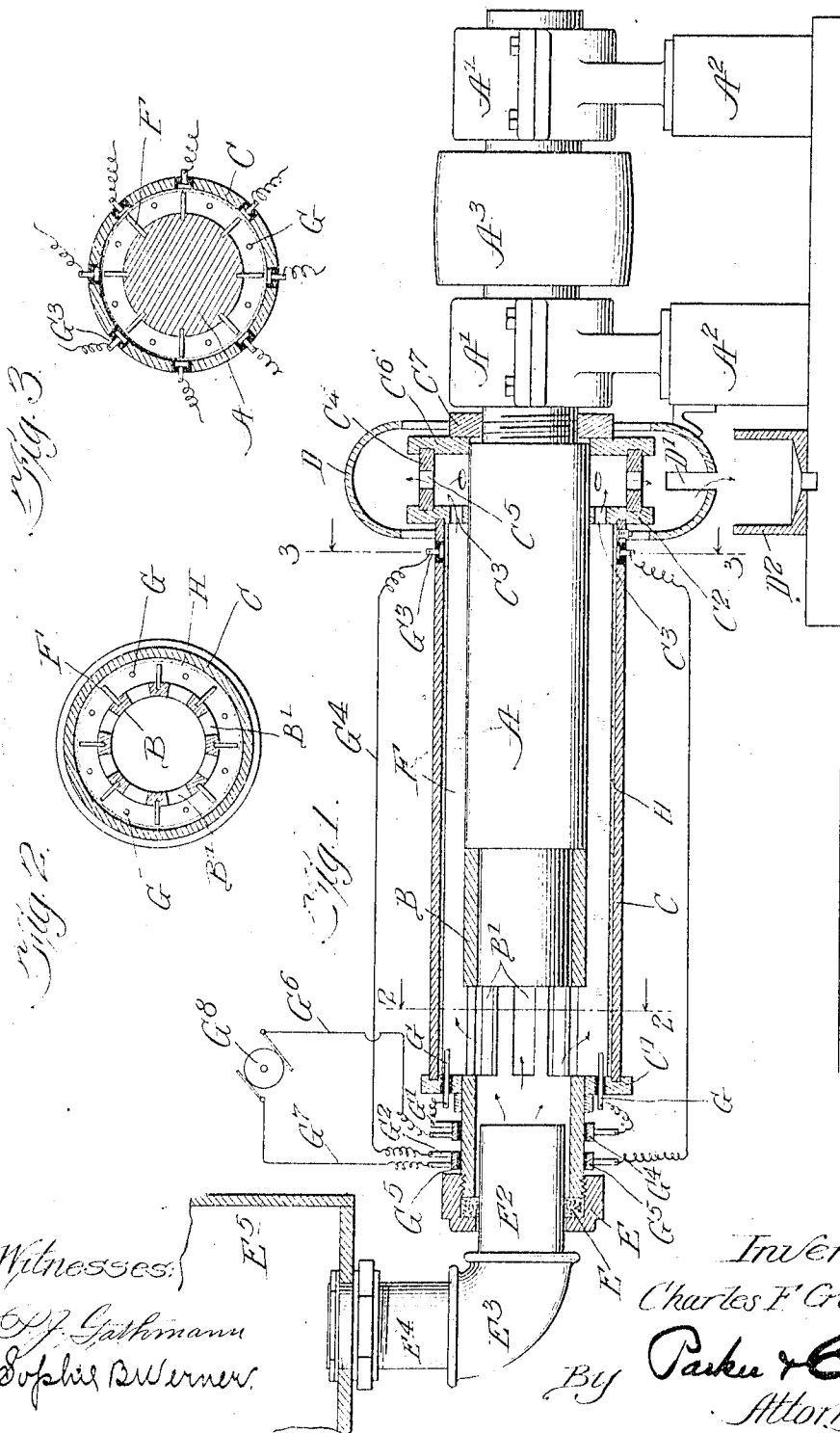
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AMALGAMATOR.

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1,035,541.

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UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, CHARLES F. CROPSEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Amalgamators, of which the following is a specification.

My invention relates to improvements in amalgamators, and has for its object to provide new and improved means for extracting ores from water or other fluids.

A form of device in which my invention is broadly disclosed is shown in the accompanying drawings, wherein—

Figure 1 is a side elevation in part section of my device; Fig. 2, a section along the line 2—2 of Fig. 1; Fig. 3, a section along the line 3—3 of Fig. 1.

Like parts are indicated by the same letters in all the figures.

The shaft A which is rotatably mounted in the bearings A¹ mounted upon the bearing blocks A² and driven from any suitable source of power applied, for example, at the pulley A³, carries at one end the pipe B provided with the longitudinal slots B¹ intermediate its two ends. The cylindrical casing C surrounds a portion of the shaft A and pipe B and is supported at one end by a collar C¹ mounted upon the pipe B, and at the other end by the collar C² having the perforations C³ in engagement with the ring C⁴ having the perforations C⁵, which in turn is in engagement with the collar C⁶ mounted on the shaft A and held in position thereon by the nut C⁷. The annular hood or collar D which is rigidly mounted upon the bearing block A² surrounds the shaft A and incloses the collars C², C⁴ and C⁶, and is provided near its bottom with a slot D¹ in opposition to the tank D². The pipe B is screw-threaded at its outer end and carries the collar E which contains the packing E¹ in engagement with the nipple E² which communicates by means of the elbow E³ and nipple E⁴ with the tank E⁵. Radial vanes F are supported at either end in the collars C⁴, C², and at one side in the pipe B and shaft A and are of such height as to extend almost to the surface of the casing C and are so located that they divide the space between the casing and the shaft into a number of sections, each of said sections in communication with the slots B¹. The collar C¹ carries the positive insulated electrodes G projecting into the space between the pipe

and casing and connected by means of the wire G¹ with the insulated slip ring G². The casing C carries the negative electrodes G³, G³, insulated therefrom and in communication with the space between the shaft and the casing and connected by means of the wires G⁴ with the insulated slip ring G⁵ mounted on the pipe B. The slip rings G², G⁵, are connected respectively by the wires G⁶, G⁷, with any suitable generator G⁸. The casing C contains the mercury or other suitable amalgam H which, in the case of mercury, is held in a cylindrical shell about the wall of the casing by the rapid rotation of the casing. This shell is in electrical contact with the electrodes G³ but not with the electrodes G⁴, and is of such thickness as barely to clear the vanes F. The amalgam surface becomes more broadly speaking a collecting surface and it may be formed by a body or material which under normal conditions will present a fixed or solid instead of a fluid lining for the casing.

I have shown the vanes set parallel with the axis of the shaft and casing but it will be evident that they might be otherwise around so as to retard the flow. The rotation of these vanes through the space within the casing is a retardant as touching the flow of fluid but it may not be sufficient.

It will be understood, of course, that I have simply shown one form or illustration of my invention and it will be equally clear that many other forms could be shown capable of bringing out the desired result. I wish, therefore, that my drawings be taken as in a sense diagrammatic or illustrative of the invention and not in any sense as the only complete operative plan illustrative of my invention.

The use and operation of my invention are as follows:—What I aim to secure is a body having a collecting surface thereon with means for directing a current of metal carrying fluid along such collecting surface and means for directing a current or series of currents of electricity through such fluid along such collecting surface. Such an apparatus I associate with means for depositing or inducing the particles of metal in the fluid to be deposited on the collecting surface. In the particular form of apparatus I use centrifugal force instead of gravity.

In the water which passes from many of the ordinary types of gold saving apparatuses there remains a very considerable

amount of fine gold, much of which takes the form of what is known as "float gold." In many instances it consists of very small, thin and not infrequently flat or dish shaped particles which tend to float or remain on the surface of the water or near the surface and are constantly thrown to the surface of the moving current so as not to be intercepted by the collecting surface underneath the water. These particles appear to be more or less coated or surrounded by gas or other substances which tend to aid their flotation and prevent their contact or amalgamation with the collecting surface. Of course many such particles are collected by the action of the force of gravity notwithstanding these hindrances to such collection, but a very much more complete collection can be carried out by substituting for gravity a centrifugal force of any desired character. Whatever force is employed to tend to move the particles toward the collecting surface, the application of electricity passing through the fluid tends to strip the particles of whatever surrounds or adheres to them tending to resist the force of deposit and amalgamation so that a much more effective collection is made. Thus my apparatus in one form provides a force greater than gravity and an electric stripping process, both simultaneously applied to the metal particles in the metal carrying fluid in the presence of a collecting surface toward which the metal particles tend to move.

In the operation of my device as shown and as applied to gold saving I provide a rotatable shaft surrounded by a casing and carrying vanes within said casing, the whole adapted to rotate. Gold bearing water or other fluid is introduced into a suitable tank by any suitable means not shown and carried through a pipe into the annular space between the casing and shaft. The centrifugal force causes the gold, which is heavier than water, to seek the outside where it is attracted by and, amalgamated with the mercury or the collecting surface. The water then passes on and through the series of collars and is finally discharged from the casing after the gold has been saved. In order to promote a more full and free precipitation of the gold from the water I pass an electric current through the liquid. This current operates to break up

the gaseous or other envelop frequently found about the gold particles and when this envelop has been broken up the gold more freely seeks and amalgamates with the mercury and a larger percentage of gold is brought down than would otherwise be the case. My invention, therefore, in this form of my device, provides means for increasing the relative specific gravity of the gold by the use of centrifugal force, and means for removing the envelop of gas or fluid which prevents the movement of the gold toward the collecting surface or the amalgamation of the gold with the surface material or both. It will be understood that I am here discussing the application of my invention to a case where the gold is held in suspension in the fluid. The electric current first strips the particles making them more susceptible to the process of amalgamation and more responsive to the force, which impels them toward the collecting surface and the centrifugal force being substituted for the force of gravity, which in another form of the device, might be employed, forces the particles toward the collecting surface, they probably responding more promptly than if an electric current had not been applied. A stripping force or means other than electricity might be employed to facilitate the action of the depositing force.

I claim:—

An amalgamator comprising a rotatable shaft having a hollow perforated extension, a cylinder rigidly carried by said shaft and concentric therewith and inclosing the perforated part of said extension, a supply to said extension and a discharge means from the opposed end of said cylinder, longitudinal vanes rigidly carried by said shaft and extending substantially the entire length thereof, and extending substantially out to the cylinder, electrodes located in pairs in the chambers formed by said vanes, an amalgam located about the periphery of the cylinder, one of said electrodes located in one end of the cylinder and insulated from the amalgam and the other located at the other end of the cylinder and in contact with the amalgam.

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Witnesses:

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