

R. HANSSEN, P. B. HAUG AND M. E. DARBY.

AMALGAMATOR.

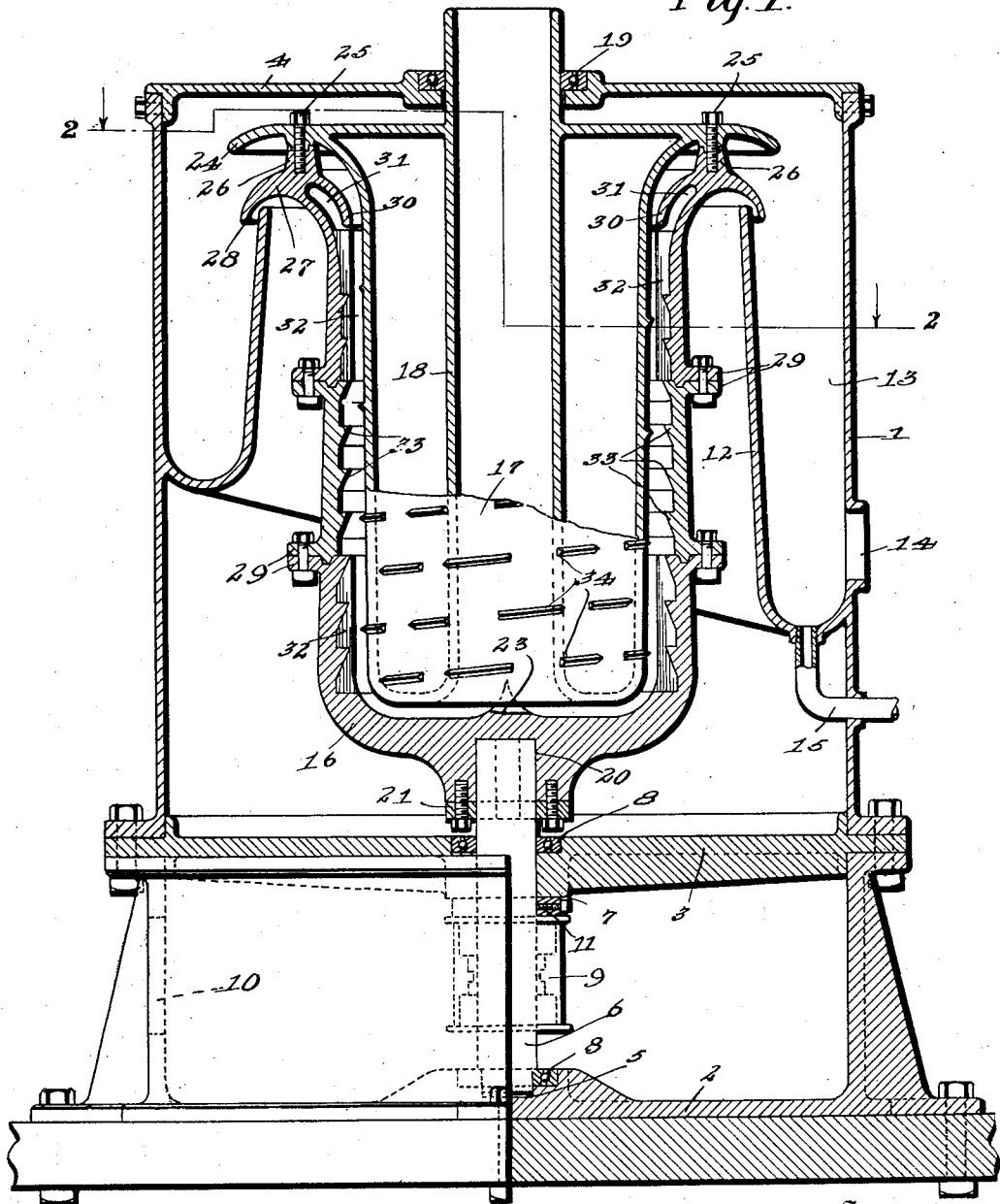
APPLICATION FILED FEB. 11, 1919.

1,361,723.

Patented Dec. 7, 1920.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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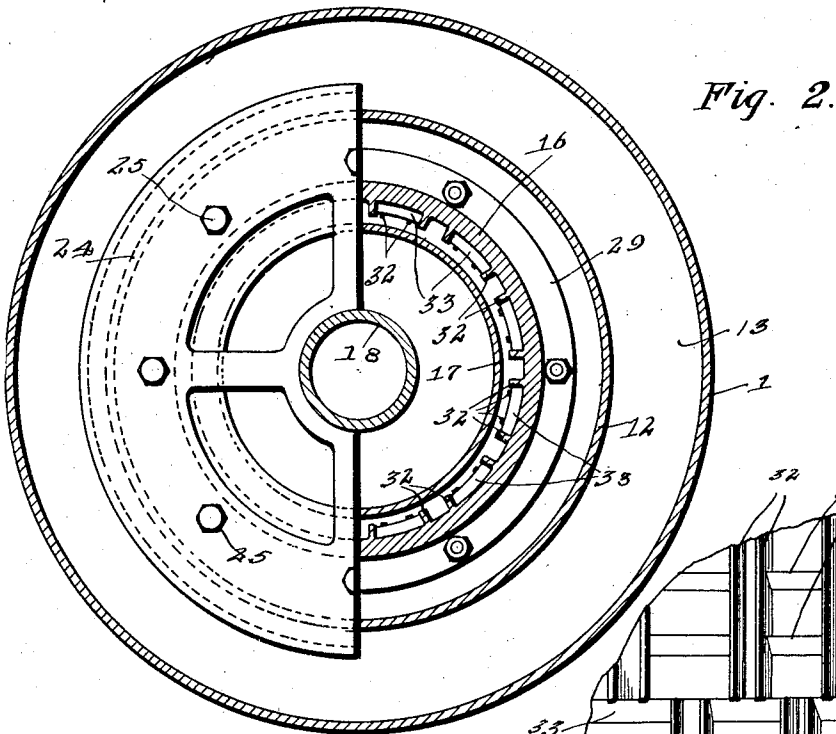


Fig. 2.

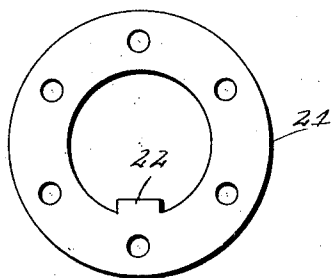
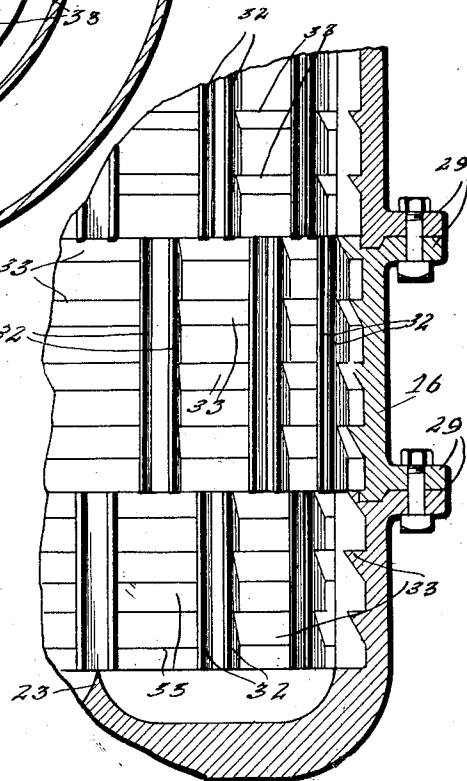


Fig. 4

Fig. 3.



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UNITED STATES PATENT OFFICE.

RALPH HANSSEN AND PEDER B. HAUG, OF GREAT FALLS, MONTANA, AND MARTIN E. DARBY, OF TACOMA, WASHINGTON.

AMALGAMATOR.

1,361,723.

Specification of Letters Patent.

Patented Dec. 7, 1920.

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To all whom it may concern:

Be it known that we, RALPH HANSSEN, PEDER B. HAUG, and MARTIN E. DARBY, all citizens of the United States, the said HANSSEN and HAUG residing at Great Falls, in the county of Cascade and State of Montana, and the said DARBY residing at Tacoma, in the county of Pierce and State of Washington, have invented new and useful Improvements in Amalgamators, of which the following is a specification.

This invention relates to a novel construction of a centrifugal amalgamator, and the principal object of the invention is to provide a vertical wall of mercury with means for forcing the gold bearing material up through the same.

Another object of the invention is to provide means for agitating the material in its passage along the mercury wall so as to redeem every particle of the gold in a minimum amount of time.

Another object of the invention is to provide shelves for collecting the amalgam in an upper pocket for receiving the richest amalgam after the shelves are filled.

The invention also consists in certain other features and in the construction and arrangement of the several parts, to be hereinafter fully described and illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a vertical section with the parts in elevation.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal section through a portion of the outer cylinder.

Fig. 4 is a detail view.

In these views, 1 indicates the outer casing provided with a base plate 2, a sub-base 3 and a top plate 4. The base 2 is provided with a centrally located socket 5 for receiving the end of the shaft 6 and the sub-base 3 is provided with a hub 7 for said shaft. This hub and socket are provided with ball bearings 8. A pulley 9 is connected with the shaft and the lower part of the casing is provided with an opening 10 through which the belt passes to said pulley. The belt is

driven by any suitable source of power. A collar 11 is secured to the shaft and said collar engages with the lower face of the hub to prevent upward movement of said shaft. An annular partition 12 is placed in the casing with its bottom of semi-circular form and connected with the interior walls of the casing. This partition forms a chamber 13 for receiving the tailings. The bottom of this chamber is inclined so as to direct the tailings to an outlet opening 14, formed in the casing. The curved bottom of the chamber adjacent said opening is located below the opening and a curved pipe 15 has one end connected with said bottom at its lowest point and its other end passing through the casing. This pipe is for receiving the amalgam that escapes from the centrifugal device.

The rotary elements consist of an outer cylinder 16 and an inner cylinder 17, the inner cylinder having a centrally located feed pipe 18 therein with its upper end projecting above the top plate 4 and acting as an axle for the rotating parts. Ball bearings 19 are located between said plate 4 and the pipe. The upper end of this pipe is open to receive the ore and its lower end opens through the bottom of the inner cylinder. The lower end of the outer cylinder is closed and is provided with a socket 20 to receive the upper end of the shaft 6. The cylinder is secured to said shaft by means of a ring 21 bolted to the cylinder and having a key 22 engaging a slot formed in the shaft. The inner face of the bottom of the outer cylinder is provided with a cone projection 23 which projects into the lower end of the pipe 18 for directing the incoming ore evenly to the sides of the outer cylinder. The inner cylinder is supported in the outer cylinder by means of a flange 24, formed at the upper end of the inner cylinder which is provided with holes to receive the bolts 25, which engage lugs 26 spaced around the curved top 27 of the outer cylinder. Thus a space is left between the upper parts of the two cylinders for the escape of the tailings to the tailing chamber. The curved top 27 of the outer cylinder is provided with a downwardly extending lip 28 which extends over the top of the partition 12.

We prefer to make the outer cylinder of slightly tapered form with its upper end of smaller diameter than its lower end. In this

way the walls of the two cylinders are closer together at the top than at the bottom. We also prefer to form the outer cylinder in three parts, said parts being provided with horizontal flanges 29, which are bolted together and the meeting edges of the parts are tongued and grooved, as shown. The curved top of the outer cylinder is provided with an inwardly extending and downwardly curved annular flange 30, which forms a pocket 31 at the top of the outer cylinder, the mouth of the pocket being directed downwardly. The inner walls of the outer cylinder are provided with vertically extending ribs 32, which extend from the mouth of the pocket to a point adjacent the bottom of the outer cylinder. The said cylinder is also provided with horizontal riffles 33, located between the ribs. These riffles form shelves and as will be seen the shelves at the bottom of the cylinder are of greater width than those at the top. The riffles are constructed so as to be twice as long as they are deep and they are of less depth than the depth of the ribs. We prefer to arrange the ribs in pairs on the three sections of the cylinder with the ribs on the center section alternating with the ribs on the other sections. By this staggered arrangement of the ribs a smooth wall of mercury is produced.

The inner cylinder is provided with a spiral tapering worm thread 34, which is interrupted at frequent intervals, as shown, and the thread gradually decreases in size toward the top.

Sufficient mercury is placed between the cylinders to fill the spaces between the ribs when the parts are rotated so as to provide a vertical wall of mercury, the circumference of which will be level with the tips of the ribs. The ore to be separated is fed into the upper end of the pipe 18. This material will strike the cone 23 and will be thrown by centrifugal force against the wall of mercury. As it moves upwardly the interrupted worm threads on the inner cylinder will facilitate its upward movement and at the same time will agitate the material, so that all particles will be subjected to the action of the device. The heavy amalgam will remain at the bottom and will be caught by the shelves. The richest amalgam will be caught by the pocket after the riffles or shelves are filled. The tailings will be discharged into the tailing chamber and will pass from the machine to the opening 14. The amalgam that escapes from the machine may be recovered through the pipe 15.

Having described the invention, what is claimed is:

1. An amalgamator of the class described comprising an outer and an inner cylinder spaced apart, means for feeding the material to the bottom of the space between

the two cylinders, the upper ends of the cylinders being spaced apart to form an outlet opening, an annular pocket formed at the upper end of the outer cylinder below the outlet opening, said pocket having its upper end closed and its lower end open and mercury supporting means on the walls of the outer cylinder below the pocket, such means consisting of horizontally arranged riffles and vertically arranged ribs.

2. An amalgamator of the class described comprising an inner and outer cylinder, means for feeding the material to the bottom of the space between the two cylinders, outwardly extended flanges on the upper ends of the cylinders spaced apart to form an outlet opening, an inwardly and downwardly curved annular flange at the upper end of the outer cylinder forming a pocket, riffles on the inner wall of said outer cylinder, vertically extending ribs on said wall having their upper ends located adjacent the mouth of the pocket, a worm thread on the inner cylinder and means for rotating the cylinders.

3. An amalgamator of the class described comprising a casing, a shaft journaled in the lower portion thereof, an outer cylinder having its lower end closed and connected with said shaft, an inner cylinder, an inlet pipe for feeding the material to the space between the bottoms of the cylinders, outwardly curved flanges at the upper ends of said cylinders, means for connecting said flanges together in spaced relation, a partition in said casing forming a tailing chamber for receiving the material passing from between the flanges, horizontally arranged riffles on the inner wall of the outer cylinder, the riffles at the bottom of the cylinder being of greater width than those at the top, an inwardly and downwardly extending annular flange at the upper end of the outer cylinder forming a pocket, vertically extending ribs on the inner wall of the outer cylinder, said ribs having their upper ends located adjacent the mouth of the pocket, said ribs being formed in pairs with the ribs at the center of the cylinder alternately arranged with the ribs at the ends of the cylinder and said ribs being of greater depth than the depth of the riffles and an interrupted worm thread on the inner cylinder.

4. An amalgamator of the class described comprising a casing, a shaft rotatably mounted in the lower part thereof, an outer cylinder having its bottom closed, and connected with the shaft, an inner cylinder, an inlet pipe for feeding the material to the space between the bottoms of the cylinders, outwardly curved flanges at the upper ends of the cylinders, means for connecting said flanges together in spaced relation, a partition in said casing forming a tailing chamber for receiving the material passing from

between the flanges, the outer cylinder being of slightly tapered shape with its upper end of less diameter than its bottom portion, horizontally arranged riffles on the inner
5 wall of said outer cylinder, said riffles gradually increasing in depth upwardly, vertical ribs formed on the inner wall of said outer cylinder, the ribs on the central part of the cylinder being out of alinement with those
10 on the end portions, an inwardly and down-

wardly extending annular flange at the upper end of the outer cylinder forming a pocket and an interrupted worm thread on the outer wall of the inner cylinder.

In testimony whereof we affix our signatures. 15

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