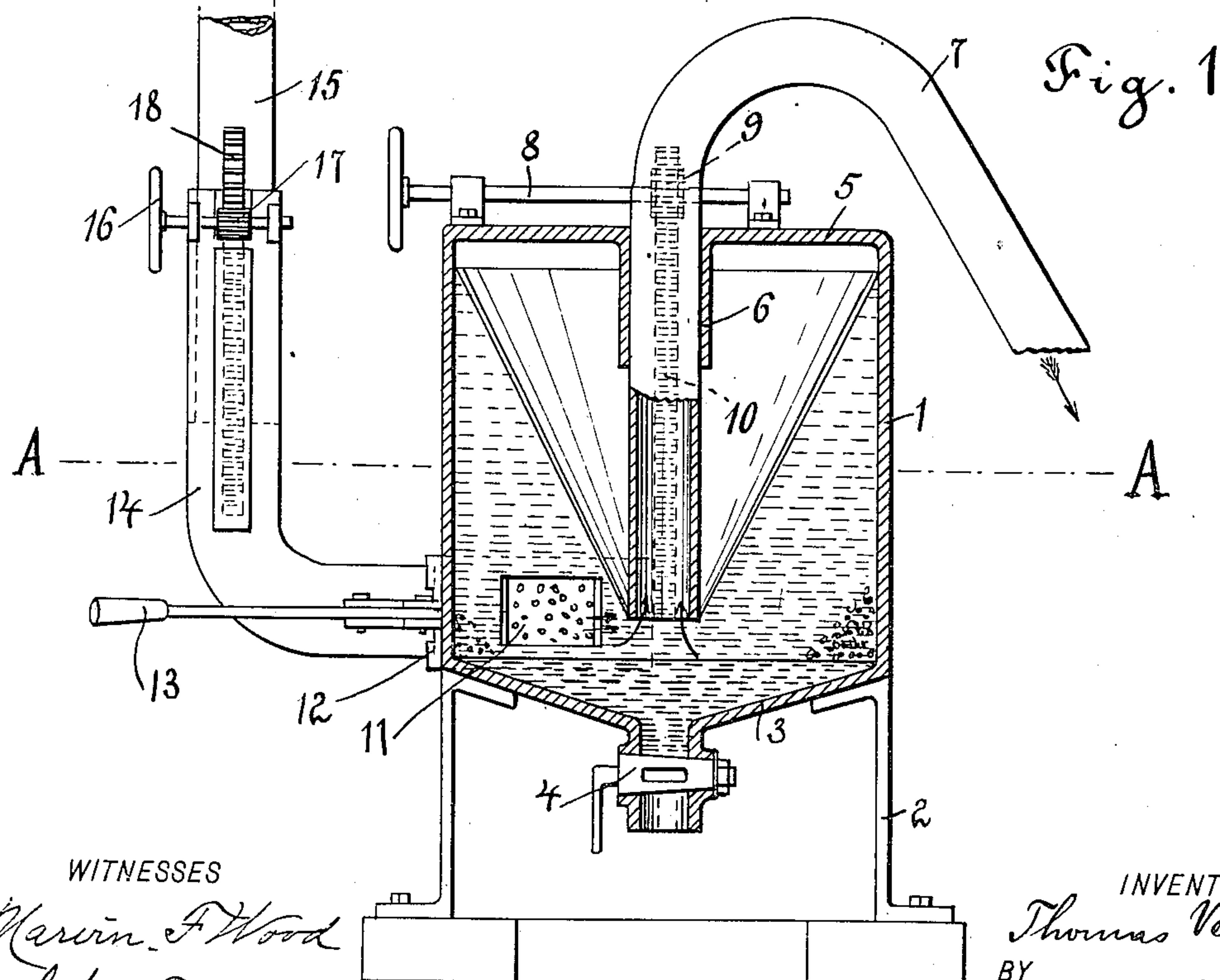
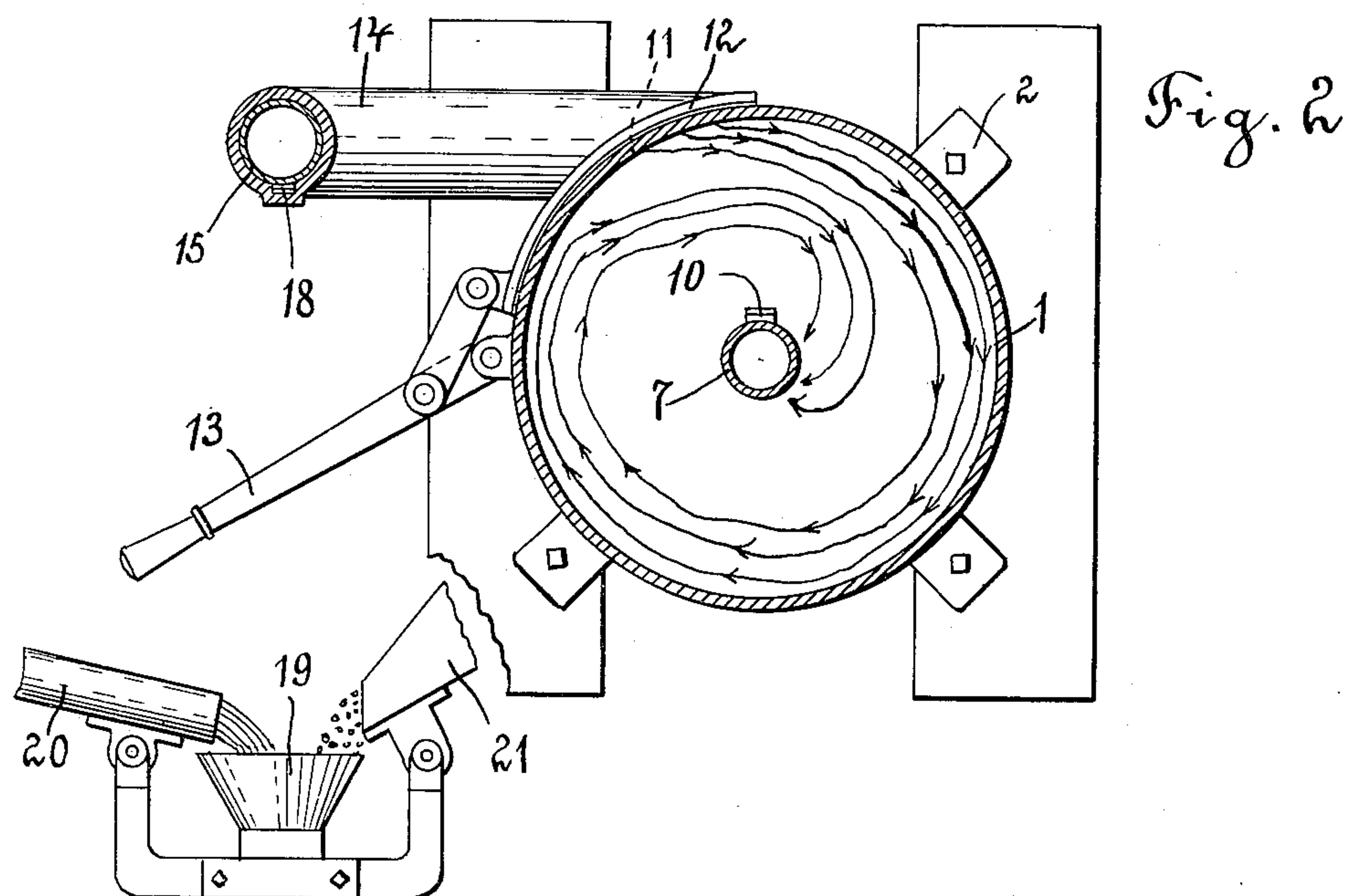


No. 880,430.

PATENTED FEB. 25, 1908

T. VEITCH.
ORE SEPARATING APPARATUS.
APPLICATION FILED DEC. 19, 1906.



WITNESSES

Marvin F Wood
John Brown

INVENTOR

Thomas Veitch
BY

BY

Sigmund Herzog
his ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS VEITCH, OF NEW YORK, N. Y., ASSIGNOR TO INTERNATIONAL PATENT CORPORATION, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF SOUTH DAKOTA.

ORE-SEPARATING APPARATUS.

No. 880,430.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Original application filed November 12, 1906, Serial No. 343,075. Divided and this application filed December 19, 1906, Serial No. 348,637.

To all whom it may concern:

Be it known that I, THOMAS VEITCH, a citizen of the United States, and resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Ore-Separating Apparatus, of which the following is a specification.

In many branches of manufacture it is desirable to graduate and separate granular material according to its specific gravity, and a large number of devices have been constructed for purposes of this general character. It has been found that when adding liquids to granular material, the separation sought to be brought about is particularly facilitated by using apparatus in which the centrifugal force is the specific means for graduating the material and separating it according to its specific gravity. It is a well known fact in science that in using such a process, material of higher specific gravity will tend to place itself at a greater distance from the axis of rotation than material of lower specific gravity. In applying machines of this character to mining, and more particularly to the recovery of precious metals from ore, it has been found that the combination of a process of separating material of different specific gravity with that of amalgamating precious metals for the purpose of removing the metal from its ore, would greatly simplify the treatment of ore, and it is the object of the present invention to provide a process and an apparatus for this purpose, which will accomplish the same work in one simultaneous and continuous process and in one apparatus as heretofore has been accomplished by an entire series of separating processes and apparatus.

With this end in view, the present invention consists of an apparatus for separating and graduating granular material by subjecting the same in the presence of suitable liquids to the action of centrifugal force, while, in treating metalliferous ores if desired, the amalgamation of the separated metallic components may be brought about by the use of mercury. The waste and gangue in both cases are removed by continuous siphoning.

The present application is a division of the application, Serial Number 343,075, filed November 12th, 1906, and limited to the apparatus, while the original case describes

and claims the process used in the separation of the ore.

The apparatus, used in carrying out the several objects of the present invention, consists in a preferably cylindrical receptacle, into which by means of an adjustable head-pressure, liquids, having distributed therein the granulated material, intended to be separated, are forced by means of a tangential duct, whereby a rotary movement of the contents of the receptacle is brought about, resulting in the separation and graduation of the component parts, according to their different specific gravities, and simultaneously removing the liquids and the components having the lowest specific gravity through siphoning by means of a centrally located draft-tube.

If metalliferous ores are used, the separation of the precious metals from the ores may be brought about by the process of amalgamation through mercury, suitably located in the apparatus.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation and in part section of the apparatus, and Fig. 2 a horizontal cross section in the line A—A of Fig. 1.

The apparatus consists of a casing or receptacle 1, made of metal or wood, and resting upon a suitable support 2. This receptacle is provided with a bottom 3, inclined toward the center and having a faucet 4. A top or cover 5 closes the upper end of the receptacle and may be attached thereto in any suitable manner. A sleeve or stuffing-box 6 of this top surrounds a draft-tube 7, movable therein by means of a hand wheel on a shaft 8, having a pinion 9 in mesh with a rack 10 on the tube 7. The tube 7 may reach to the bottom of the receptacle 1, while its upper end may be bent downward in form of a siphon.

The receptacle 1 has at or near its bottom an opening 11, coinciding with a feed-tube 14, connected to the receptacle 1 in a tangential direction, so that any liquid entering the receptacle through the tube is compelled to move around the inner walls of the receptacle and cause a rotary motion of the entire contents, depending in its speed and force upon the degree of pressure resulting from the difference in level between the surface of the liquid in the receptacle and in the

inlet or feed-tube. The opening 11 is closed by means of a slide 12, adapted to be operated by a lever 13. A tube 15 is inserted into the tube 14 and movable therein by means of a hand-wheel 16 and a pinion 17 on the tube 14, and a rack 10 on the tube 15. The upper end of the tube 15 is in the shape of a funnel 19 and serves to receive liquids from a supply-pipe 20 and granulated material from a chute 21.

By raising or lowering the tube 15, the head of liquid, contained in the tube, will be altered. The raising or lowering of the pipe 7 in a similar way changes the level of the liquid in the container or receptacle 1 of the apparatus as will be noticed hereinafter, and the changing of the inlet opening 11 affects the speed and the amount of the liquid and granulated material entering the receptacle.

When liquids, such as water, and granulated material are fed into the funnel 19 and enter in a tangential direction the receptacle 1 through the opening 11, the liquids with the granulated material will attain a rotary motion, the speed of which increases with the head of the liquids, or in other words with the height of the feed-tube. The granulated material contained in the liquid becomes graduated and separated into concentric circular layers or zones of different specific gravity. The components of higher specific gravity are located further away from the axis of rotation than the ones of lower specific gravity. The liquid and its floating components further attain the form of a hollow inverted cone or whirlpool, rising along the walls of the receptacle, while the apex of the inverted cone is in the axis of the receptacle. Should the tube 7 be absent and the receptacle open at its upper end, the liquid contents of the same would simply be thrown off over the edge of the receptacle.

When in the course of the operation the tube 7 is now lowered into the inverted cone, the liquid of the receptacle enters the tube and is thereby removed from the range of the centrifugal force causing the rotation of the liquid within the receptacle, and when the level of the liquid in the tube 7 reaches the upper bend, the same is siphoned off of the receptacle, which process continues under the laws of hydrostatics as long as liquid is present in the receptacle.

Any solid particles suspended in the liquid have been arranged, as already stated, according to their specific gravity in concentric circular zones, and the particles of the lowest specific gravity are now sucked in and siphoned off through the tube 7. If, for instance, precious-stone bearing clay should be used, having been previously granulated to a suitable size, the clayey material will remain suspended in the liquid and siphoned off through the tube 7, while the precious stones or any other suspended par-

ticles of higher specific gravity may be removed by suspending the entire operation, in which case these particles will be found in superimposed layers at and near the bottom and lower end of the walls of the receptacle, or they may be removed by means of suitably placed tubes, the openings of which reach within the receptacle at greater or lesser distance from its axis, or finally drawn off through the faucet 4.

When now the apparatus is intended to be used for the concentration of metalliferous ores and more particularly for the recovery of precious metals from the ore, the bottom 3 of the receptacle 1 may hold a supply of mercury, while the inner face of the walls may also be covered with a lining of amalgamating plates, so that when the precious metal particles come in contact with the mercury, they form the corresponding amalgam, which may be removed from time to time from the apparatus.

The process of treating granulated material in an apparatus constructed according to the present invention is continuous, and the separation and graduating of the granular material, and, in case of treating metalliferous ores, also the process of amalgamating is simultaneous. The means for changing the head of liquid, the substitution of siphon tubes of different diameters, the raising and lowering of the siphon tubes and the regulation of the size of the inlet opening into the receptacle, allows of variation of the process within wide margins, so that for different material an adjustment of the apparatus, based upon practical experiments, brings about a final result, representing the highest percentage of the possible output.

As new and useful is claimed and desired to be secured by Letters Patent of the United States:—

1. The combination with a closed circular receptacle, of a vertically adjustable feed-tube adapted to feed granulated material in the presence of liquid tangentially into said receptacle at or near the bottom of the same, a vertically adjustable siphon tube, the portion of the same within the receptacle being centrally located and the adjustment of the same having a range extending substantially the whole height of the receptacle, and means for lowering and raising said siphon tube.

2. The combination with a closed circular receptacle having a conical bottom adapted to hold a quantity of mercury, of a vertically adjustable feed-tube adapted to feed granulated material in the presence of liquid tangentially into said receptacle at or near the bottom of the same, a vertically adjustable siphon tube, the portion of the same within the receptacle being centrally located and the adjustment of the same having a range extending substantially the whole height of

the receptacle, and means for lowering and raising said siphon tube.

3. The combination with a closed circular receptacle, of a vertically adjustable feed-
5 tube adapted to feed granulated material in the presence of liquid tangentially into said receptacle at or near the bottom of the same, a vertically adjustable siphon tube, the por-
10 tion of the same within the receptacle being centrally located and the adjustment of the same having a range extending substantially the whole height of the receptacle, a rack on

said siphon, a pinion and turning shaft on the top of the receptacle and engaging said rack and adapted to raise and lower said 15 siphon.

Signed at New York, in the county of New York and State of New York, this 30th day of November, A. D. 1906.

THOMAS VEITCH.

Witnesses:

SIGMUND HERZOG,
MARVIN F. WOOD.