

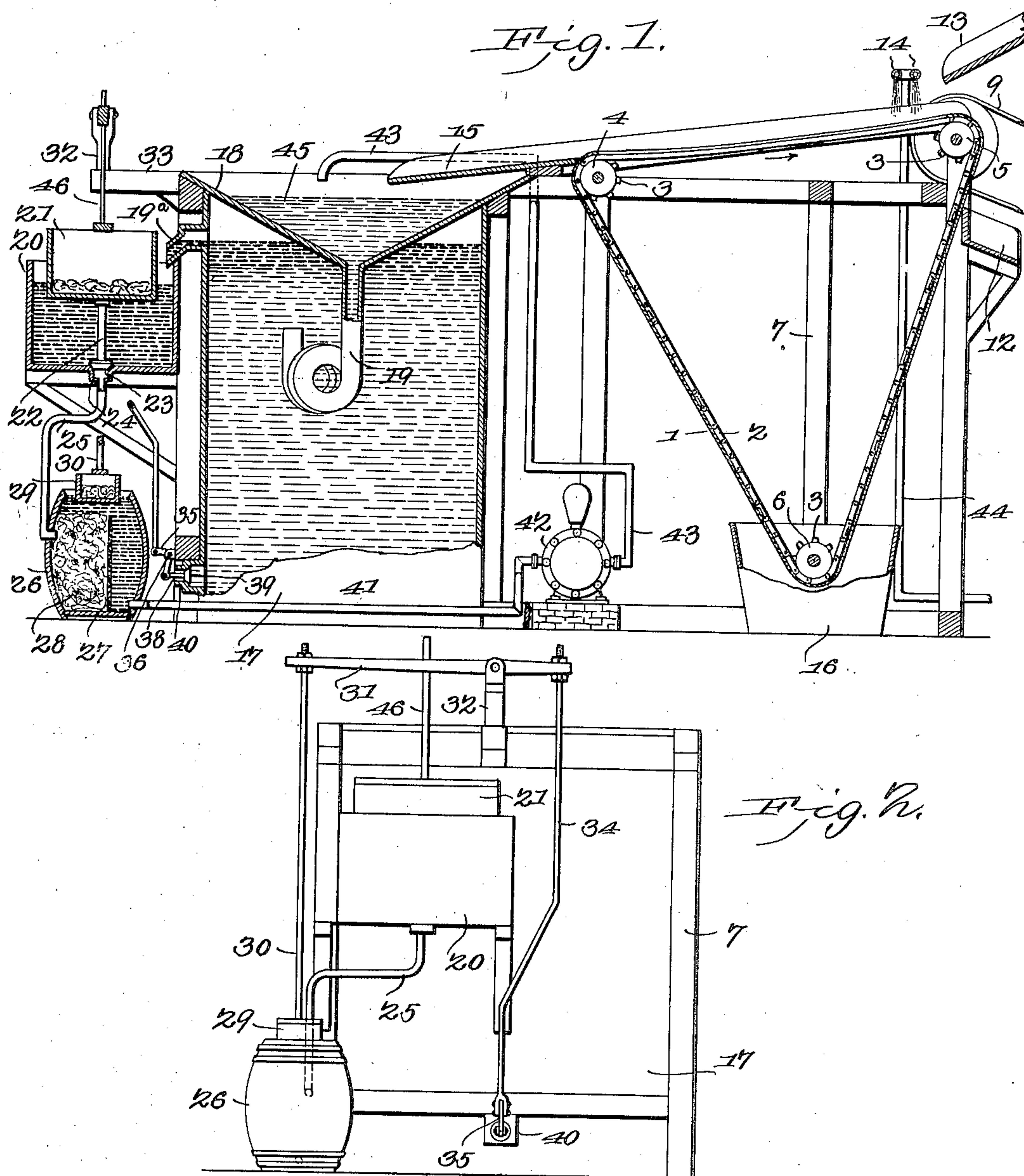
No. 822,515.

PATENTED JUNE 5, 1906.

F. B. FINLEY.
ORE SEPARATOR.

APPLICATION FILED JUNE 26, 1905.

2 SHEETS—SHEET 1.



Witnesses:
E. J. Stewart
R. M. Elliott

Fred B. Finley, Inventor,
by *C. A. Snow & Co.*
Attorneys.

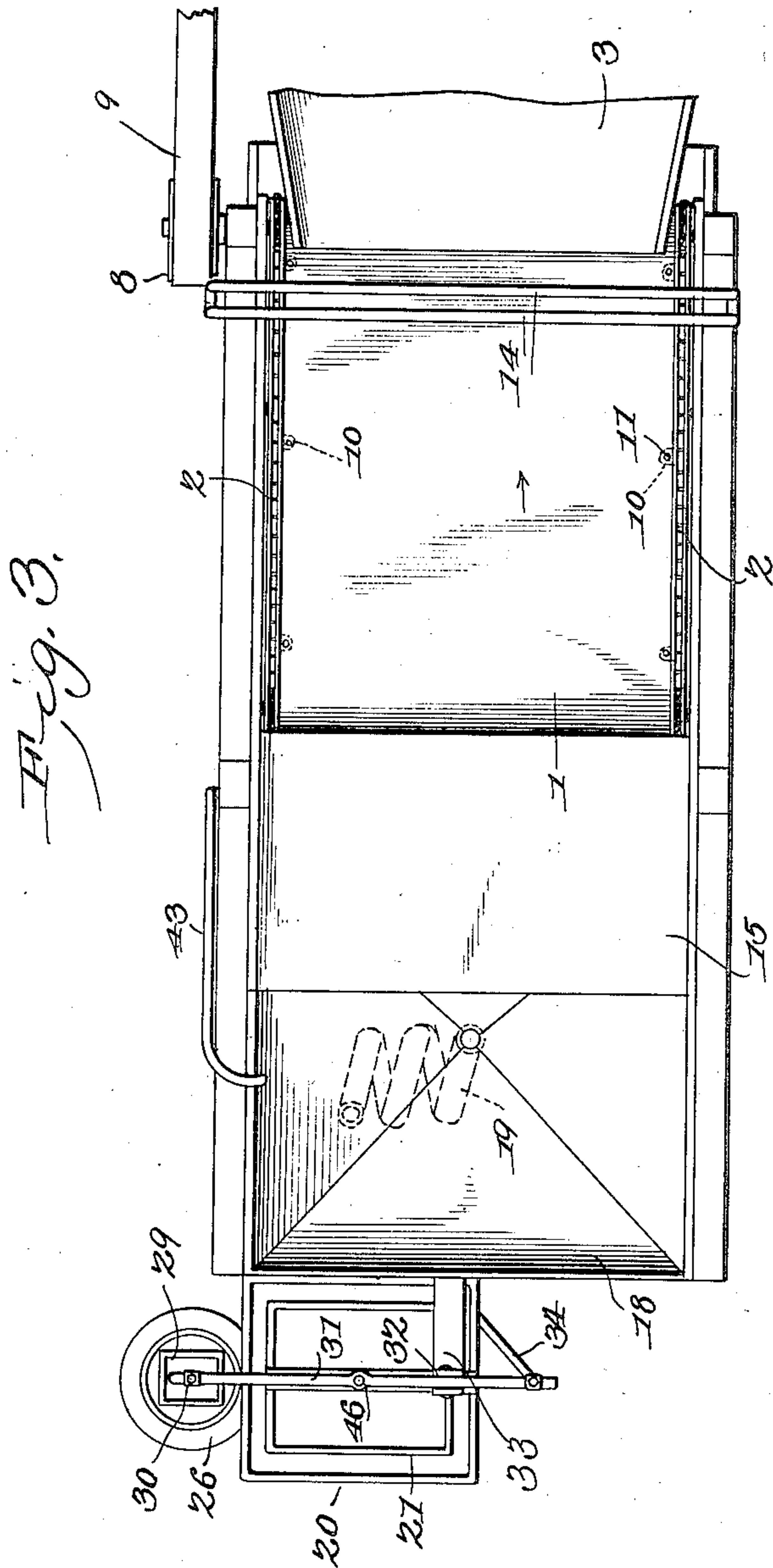
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UNITED STATES PATENT OFFICE.

FRED B. FINLEY, OF LOS ANGELES, CALIFORNIA.

ORE-SEPARATOR.

No. 822,515.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed June 26, 1905. Serial No. 267,023.

To all whom it may concern:

Be it known that I, FRED B. FINLEY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Ore-Separator, of which the following is a specification.

This invention relates to ore-separators.

The object of the invention is to provide a novel form of apparatus which will in a rapid and certain manner effect separation of the fine values from the gangue and conserve them.

A further object is to provide a novel form of mixer for causing the fine gold to be brought into intimate contact with a volume of oil, thereby to cause the gold to float to permit of its being conserved.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of an ore-separator, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in side elevation, partly in section, exhibiting an apparatus constructed in accordance with the present invention. Fig. 2 is a view in end elevation. Fig. 3 is a view in top plan.

The apparatus embodies in its construction an endless belt 1, the surface of which is preferably coated with a metallic oxid—such as iron, zinc, or copper—mixed with a cement binder. This belt may be made of any suitable material, such as canvas, and has secured to its edges in any practical manner sprocket-chains 2, which are designed to engage sprocket-wheels 3, arranged on the ends of three rollers 4, 5, and 6, around which the belt passes, the rollers being supported by a suitable framework (designated generally 7.) In this instance the roller 5 is the driven one and carries at one end a pulley 8, (shown in Fig. 3,) around which passes a belt 9, connecting with a suitable source of power. (Not necessary to be shown.)

The connection of the sprocket-chains with the belts may be effected in any preferred manner and in this instance is secured by providing a plurality of the links with lateral extensions 10, (shown in Fig. 3,) which are secured to the belt by rivets 11. As shown in Fig. 1, the belt sags or dips on its upper

lead, this being necessary in order to allow the gangue to roll upon itself and by attrition separate fine particles of the slimes that would otherwise remain attached, the heavy and worthless portion of the gangue passing over the roller 5 and into a trough or chute 12, leading to a suitable point of discharge. The gangue is supplied to the belt by a spout 13, which is arranged on the higher end of the belt, or that at which the roller 5 is located, and discharges slightly back of a pair of water-spray pipes 14, which operate to cause the finer values to adhere to the belt, while the slightly coarser particles are washed from the same and onto a spout or chute 15, presently to be described. The particles that adhere to the metallic coating of the belt are washed off in a tank 16, located at the base of the machine and in which the roller 6 is journaled, any suitable means, such as a revolving brush, being employed to insure thorough cleansing of that portion of the belt within the tank.

Located at the discharge end of the chute 15 is a tank 17 to contain water and oil, and arranged within the upper end of the tank is a hopper 18, at the apex of which is connected a coiled pipe 19, constituting a mixer the discharge end of which is disposed on a plane below its feed end, as clearly shown in Fig. 1. The pipe will be of such size as to permit passage therein only of the finer values and tailings, while the coarser tailings are retained in the hopper 18, from which they will be removed from time to time.

At the upper end and to one side of the tank 17 is arranged a discharge-spout 19^a, through which the oil when it reaches a predetermined level escapes to a tank 20, in which is arranged a float 21, that may be weighted by sand or stone, the under side of the float having combined with it a rod 22, carrying at its lower end a valve 23, which normally engages the valve-seat 24 in the bottom of the tank 20, thus to preclude escape of oil until a predetermined level is reached or that at which escape of the oil from the tank will be imminent. The valve-seat has connected with it the upper end of a pipe 25, the lower end of which discharges into a barrel or other receptacle 26, in which is arranged a partition 27, on one side of which is disposed a suitable filtering medium 28, the filtering medium being arranged on that side of the barrel in which the pipe 25 enters. Disposed in the barrel and sus-

tained by the oil therein is a float 29, with which connects the lower end of a rod 30, the upper end of which is connected with a rock-beam 31; fulcrumed upon a standard 32, supported by one of the beams 33 of the supporting-frame. At the other or shorter end of the rock-beam is connected the upper end of a rod 34, the lower end of which connects with one arm of a bell-crank lever 35, fulcrumed at 36 near the bottom of the tank 17, the other arm of the lever having connected with it a valve-stem 38, that carries an inward-opening valve 39, adapted to engage with a seat 40, carried by the tank 17.

Tapped into the lower portion of the barrel or receptacle 26 is one end of a pipe 41, the other end of which connects with a pump 42 of any preferred character, and with the latter connects the lower end of a pipe 43, the upper end of which discharges into the hopper, as clearly shown in Fig. 1.

The operation of the apparatus is as follows: The gangue is supplied to the upper lead of the belt from the chute 13 and is sprayed by water from the spray-pipe 14, which is supplied with water through a pipe 44, communicating with a suitable source of supply. As the belt runs in the direction indicated by the arrow in Fig. 1 and as the upper lead thereof, as stated, sags, it will be seen that the gangue is retained in a pocket and that rotary motion is imparted to it, due to the travel of the belt. The heavier portions of the gangue pass up the belt and over the roller 5 to the chute 12, while the medium-fine particles pass from the belt down the chute 15 into the hopper, the finer portions of the values that adhere to the belt being carried into the tank 16, where they are removed. The finer tailings and values that enter the hopper sink through the body 45 of oil and into the mixer 19, where all the values are caused to be enveloped in a coating of oil, and after passing from the mixer they float upon the surface of the oil in the tank 17 and escape through the conduit 19^a into the tank 20, whence they are removed. As the oil is being constantly pumped to the hopper 45, it will be seen that there will be a steady discharge of oil into the tank 20, and without some means to prevent it the oil would soon overrun the tank and escape. To obviate this, the float 21 is provided, which, as will be seen, will lift when a predetermined level of the oil is passed and will open the valve 23, thereby permitting the oil to escape to the receptacle 26. In order to cause the proper cooperation between the valve 23 and its seat, there is a guide-rod 46, combined with the rod, which works in an orifice in the rock-beam 31, provided for the purpose. In order to prevent an overflow of oil from the recep-

tacle 26, the float 29 is provided, it being seen that when the oil reaches a predetermined level the float will rise and through the medium of the rod 30 will lift one end of the rock-lever and cause its other end, or that to which the rod 34 is connected, to be depressed, thereby opening the valve 39 and permitting water to escape from the tank 17 until the escape of oil to the tank 20 ceases, whereupon all of the valves will resume their normal positions and the operation of the machine will continue as before.

By forming the mixer 19 of a plurality of coils or turns the values or tailings that pass thereto are caused by the pressure of the oil to travel in a tortuous route, whereby the particles are positively coated with oil, and thus rendered buoyant.

While but three belt-supporting rollers are herein shown, it is to be understood that the number may be increased, if found necessary or desirable, and that they may be arranged in other positions than that shown, and as this will be obvious detailed illustration of any modified manner of disposition is omitted.

Having thus described the invention, what is claimed is—

1. In an ore-separator, the combination of a tank provided with an outlet-valve, a combined hopper and coil mixer arranged within the tank, a second tank into which the first tank discharges, a third tank into which the second tank discharges, a float-operated valve in the second tank for controlling passage of oil to the third tank, a valve in the first tank, a rock-beam, and a connection between the rock-beam and the float of the second tank and the valve of the first tank.

2. An ore-separator comprising a tank provided with an outlet-valve, a combined hopper and coil mixer arranged within the tank, a second tank into which the first tank discharges, a third tank into which the second tank discharges, a float-operated valve in the second tank for controlling passage of oil to the third tank, a valve in the second tank, a rock-beam, a connection between the rock-beam and the float of the second tank and the valve of the first tank, means for supplying classified gangue and oil to the hopper, and means for withdrawing the surplus oil from the second tank and returning it to the hopper.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRED B. FINLEY.

Witnesses:

W. T. CARTER,
W. W. WILSON.