

R. LUCKENBACH.

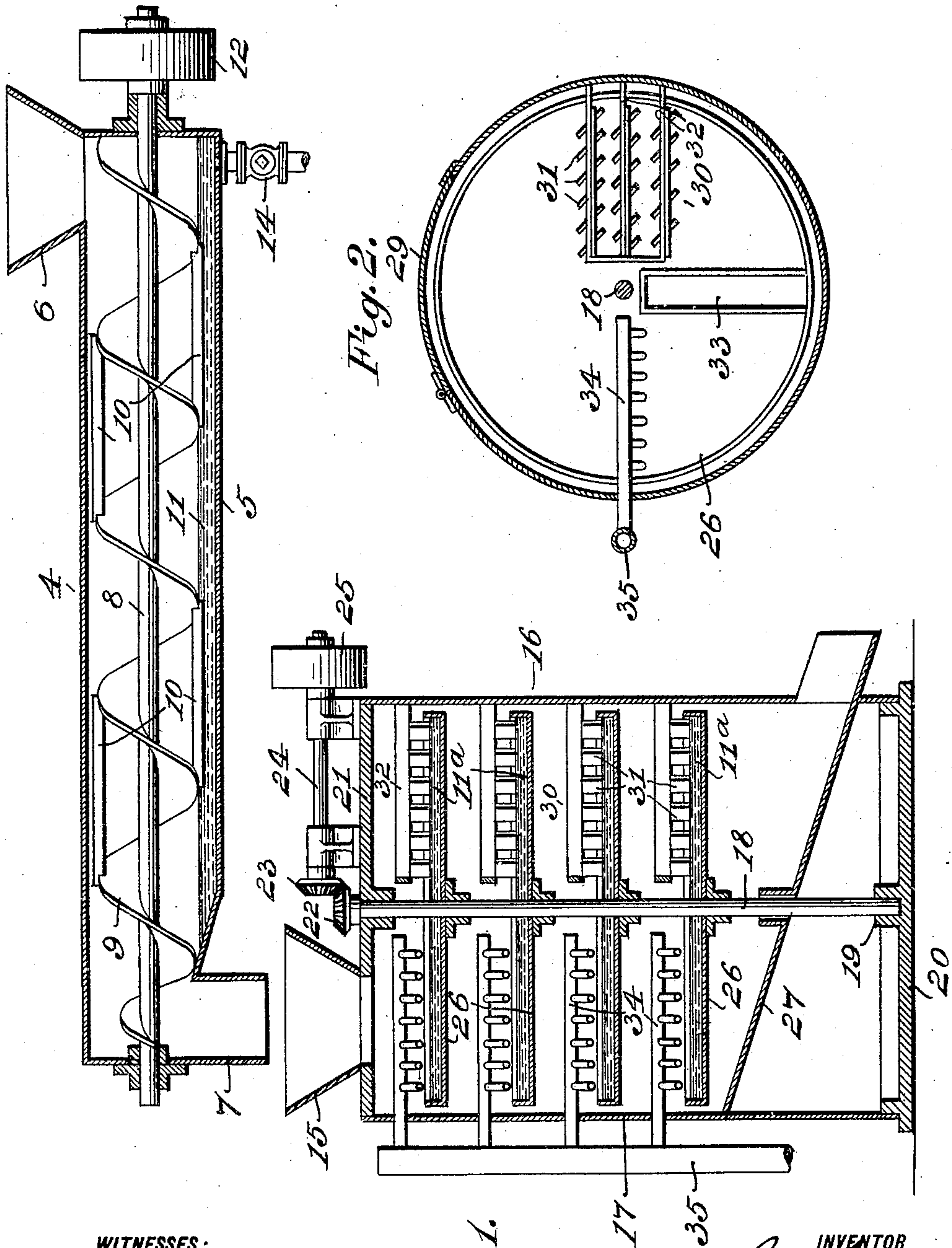
MEANS FOR THE CONCENTRATION BY AMALGAMATION OF VALUES OF METALLIC ORE MATTER.

APPLICATION FILED SEPT. 23, 1907. RENEWED SEPT. 27, 1909.

938,676.

Patented Nov. 2, 1909.

2 SHEETS—SHEET 1.



WITNESSES:

Wilhelm Vogt  
Thomas M. Smith

Fig. 1.

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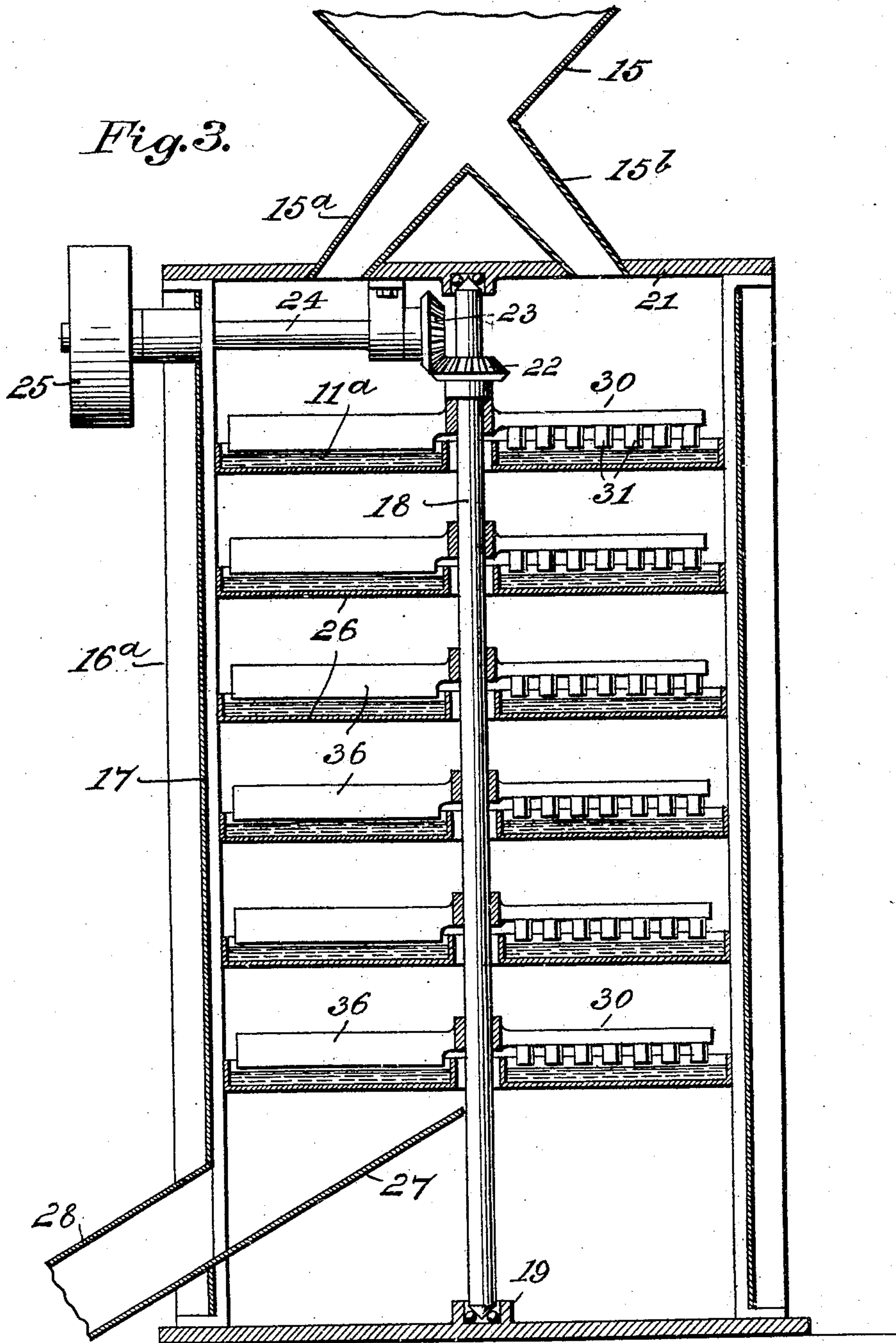
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# UNITED STATES PATENT OFFICE.

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MEANS FOR THE CONCENTRATION BY AMALGAMATION OF VALUES OF METALLIC ORE  
MATTER.

938,676.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed September 23, 1907, Serial No. 394,041. Renewed September 27, 1909. Serial No. 519,875.

*To all whom it may concern:*

Be it known that I, ROYER LUCKENBACH, a citizen of the United States, residing at Colwyn, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Means for the Concentration by Amalgamation of Values of Metallic Ore Matter, of which the following is a specification.

My invention has relation to means for the dry concentration by amalgamation of entrained values of precious metals, as gold and silver, contained in ore matter in a pulverized or granular condition and while in transit and at the same time by force mechanically exerted permitting of the liberation of foreign matter, as tailings or gangue, separated from the said matter.

The nature and scope of my present invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which—

Figure 1 is a vertical central sectional view partly in elevation, of a combined apparatus for mixing and concentrating by amalgamation of the values of ore matter embodying main features of my said invention. Fig. 2 is a transverse sectional view through one of the chambers of the apparatus for concentrating by amalgamation of values of ore matter and of the freeing thereby of the tailings or gangue thereof, the said view showing in detail the constructive arrangement of the respective chambers of the apparatus; and Fig. 3 is a vertical central sectional view partly in elevation, through a modified form of the apparatus for concentrating by amalgamation of entrained values of pulverized metallic ore matter in its passage therethrough and thorough separation of foreign matter, as tailings or gangue, therefrom.

Referring to the drawings with reference to Figs. 1 and 2, 4 is a combined mixing and amalgamating device, comprising a longitudinal trough-like casing 5, at one end of which is provided a hopper 6, and at the opposite end an outlet pipe 7. Through the center of the casing 5, is mounted a shaft 8, having a screw-like blade 9, for effecting the mixing or agitating of the dry ore matter therein, as well as partial separation by amalgamation of values thereof, in a manner

to be presently more fully explained. The screw-like blade extends the length of the shaft, within the casing 5, and between blades constituting the mixing and agitating device 9, and adjacent to the apices thereof are arranged strips 10, to assist in stirring the body of mercury or amalgam 11, placed in the bottom of the casing 5, in the agitation of the same by the screw-blade 9, for enabling the amalgam body to exert its full effect upon the pulverized ore matter constantly presented in the field thereof. The shaft 8, is revolved by means of a pulley 12, from any suitable source of power, not shown.

In operation, the mixing and agitating apparatus, as described having metallic ore matter in a finely divided or pulverized state deposited through the hopper 6, thereinto, to be then thoroughly agitated with the body of amalgam or mercury 11, by means of the mixing blade 9, so as to afford the mercury or amalgam body an opportunity by its affinity for the values of the ore matter to be partially concentrated or separated by amalgamating therewith and of matter foreign thereto being freed through the outlet pipe 7, of the mixing and amalgamating device into the hopper 15, of a combined tailings or gangue separating or concentrating apparatus 16. In this apparatus 16, any mercury with values, in the tailings or gangue not previously separated, will be completely recovered from such tailings or gangue in passage through the apparatus 16, and prior to discharge therefrom. The recovered values in the amalgam or mercury body 11, of the device 4, can be periodically removed from the casing 5, thereof, by opening the valve 14, and the values retorted from the amalgam in order that the latter may again be used upon fresh charges of pulverized ore matter introduced into the mixing and amalgamating device 4, in the manner hereinbefore fully described.

The apparatus 16, is provided with an exterior casing 17, within which the working parts or instrumentalities of the same are mainly confined.

18 is a vertical shaft mounted at the lower end in a socket 19, of the base-plate 20, and at the opposite end extends through a top-plate 21, supporting in position the feed-hopper 15. To the shaft 18, is mounted a



miter-gear 22, which meshes with a complementary gear 23, carried by a horizontal shaft 24, on which is mounted a pulley 25, for operating from a suitable source of power, 5 not shown, the vertical shaft 18, for a purpose to be presently fully explained.

Keyed to the shaft 18, within the casing 17, housing the working parts of the apparatus 16, in superposed relationship are dish-shaped pans 26, each of which is adapted to 10 contain amalgam or mercury 11<sup>a</sup>. Below the last in series of these pans 26, is arranged an inclined platform 27, terminating in a chute 28, projecting beyond the casing 17, and onto which platform and through which 15 chute, the final tailings or gangue are discharged from the apparatus 16. In the casing 17, are provided one or more doors 29, in order that access may be had to the interior of the appliance for repairs and for 20 removing or supplying mercury or amalgam to the pans 26. Arranged above each of the pans 26, and in juxtaposition to the amalgam bodies 11<sup>a</sup> thereof, are plow-like 25 devices 30, provided with shares or fingers 31, in staggered relationship to each other, suspended from a frame 32, projecting from the interior wall of the casing 17, as clearly illustrated in Fig. 2, to permit by the revolution of the shaft 18, the amalgam body 11<sup>a</sup>, 30 of each pan to be stirred or agitated so as to act upon ore matter falling onto or deposited in the field thereof.

In one portion of each pan 26, is provided 35 an oblong slot 33, clearly illustrated in Fig. 2, for permitting the discharge of separated ore matter as tailings or gangue still containing values from one pan onto the other in order to undergo similar actions to those 40 already explained. Above each of the series of pans 26, is located a series of jet tubes 34, connected with a source of air supply, through the main pipe 35, as clearly shown in Figs. 1 and 2. These jet tubes 34, are 45 adapted to by a darting action or effect to free from the amalgam bodies, containing recovered values of the ore matter, the tailings or gangue from one pan to another of the series until finally reaching the platform 50 27, whence the gangue entirely freed of values is conducted through the chute 28, onto a dump or into a waste receptacle.

The tailings or gangue separating apparatus 16<sup>a</sup> of Fig. 3, is the same in general 55 constructive arrangement as the apparatus

hereinabove explained save as to detailed arrangement thereof, in which the series of superposed pans 26, in this instance are stationary and the plow-like devices 30, rotate as well as scrapers 36, and are respectively secured to the vertical shaft 18, and project therefrom into the respective pans 26. The hopper 15, is supported in the top-plate of the casing 17, and by branches 15<sup>a</sup> and 15<sup>b</sup>, the ground or pulverized metallic 65 ore matter, to have values separated therefrom, passes therethrough into the uppermost pan 26, of the apparatus 16<sup>a</sup>, containing a body of amalgam 11<sup>a</sup>, and after the action of the plow-like devices 30, in the 70 amalgam body 11<sup>a</sup> thereof, and with the ore matter acted upon at the same time and which is advanced in a circular course as shown, by the scrapers 36, and removed thence by a pushing action with any sand or 75 foreign matter from the other matter concentrated, by amalgamating with the body 11<sup>a</sup>, of a pan 26, into the next successively in series of bodies of the other pans 26, and so on, until finally the tailings entirely freed 80 of values are discharged onto the inclined platform 27, and pass thence through the chute 28, onto a dump or into any suitable receptacle therefor.

Having thus described the nature and objects of my invention what I claim as new and desire to secure by Letters Patent is:—

In an apparatus of the character described, a vertical shaft, a pan carried by said shaft and adapted to contain an amalgamating substance, said pan having a radial slot with upturned edges, an agitator frame extending radially over the pan and consisting of a plurality of bars, each supporting a row of 95 diagonally disposed scrapers, the scrapers of successive bars being in staggered relation, a row of jet tubes radially supported over the pan opposite the scraper frame, the jet tubes being adapted to deliver fluid to the material upon the pan, and means for rotating the pan, substantially as and for the 100 purposes described.

In witness whereof, I have hereunto set my signature in the presence of two subscribing witnesses.

ROYER LUCKENBACH.

Witnesses:

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THOMAS M. SMITH.