R. LUCKENBACH.

AMALGAMATOR.

APPLICATION FILED SEPT. 23, 1907.

930,299.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.

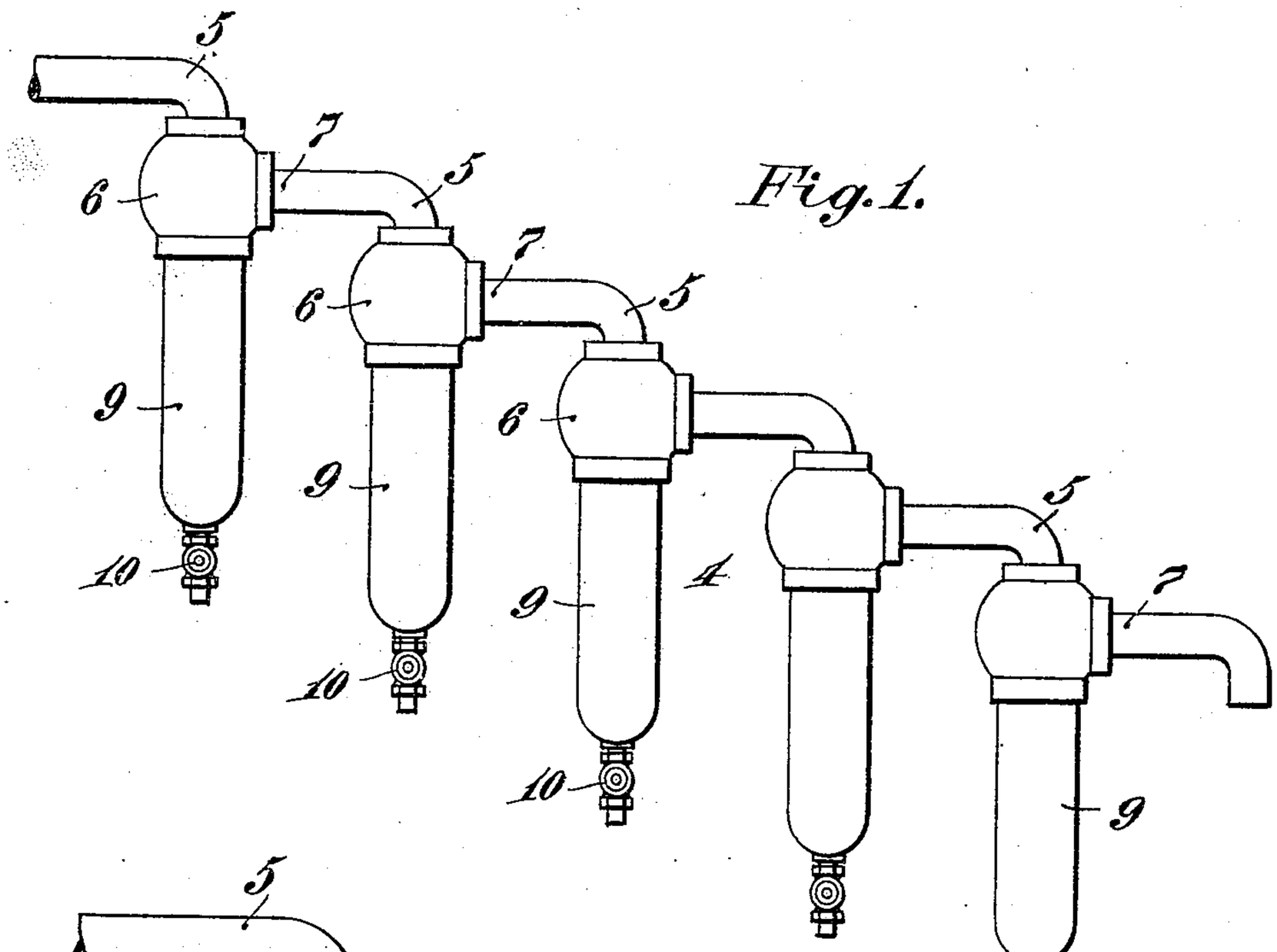

Fig. 1.

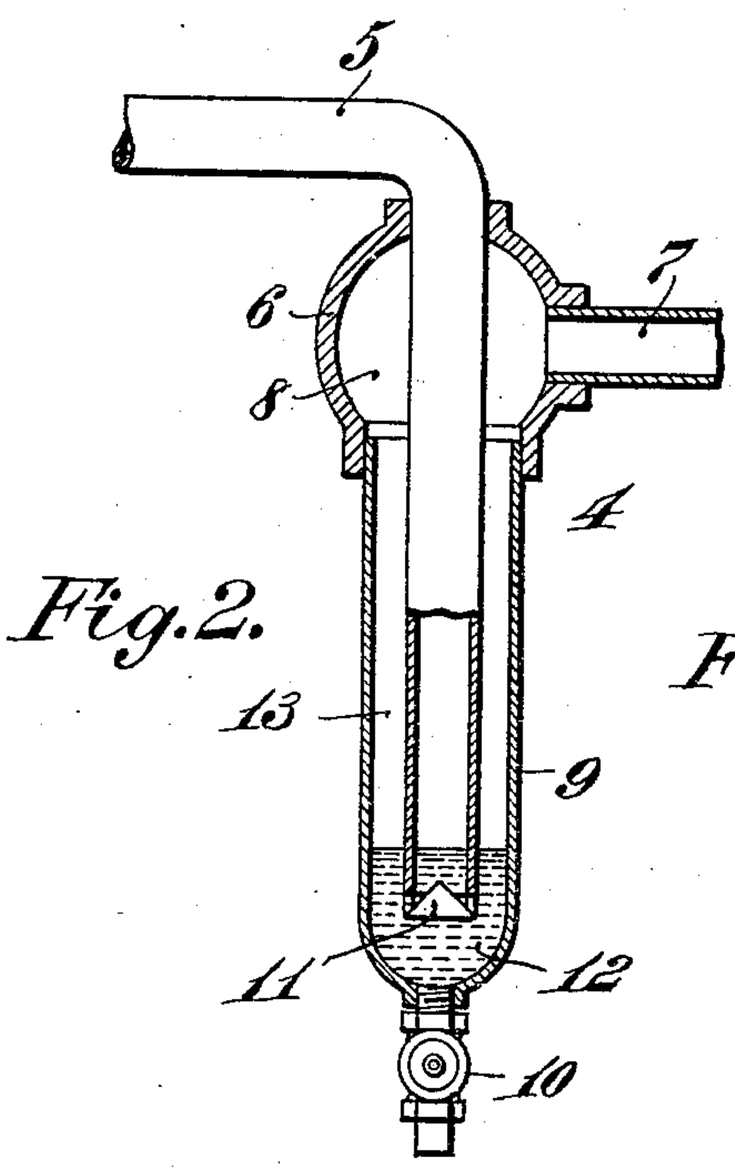

Fig. 2.

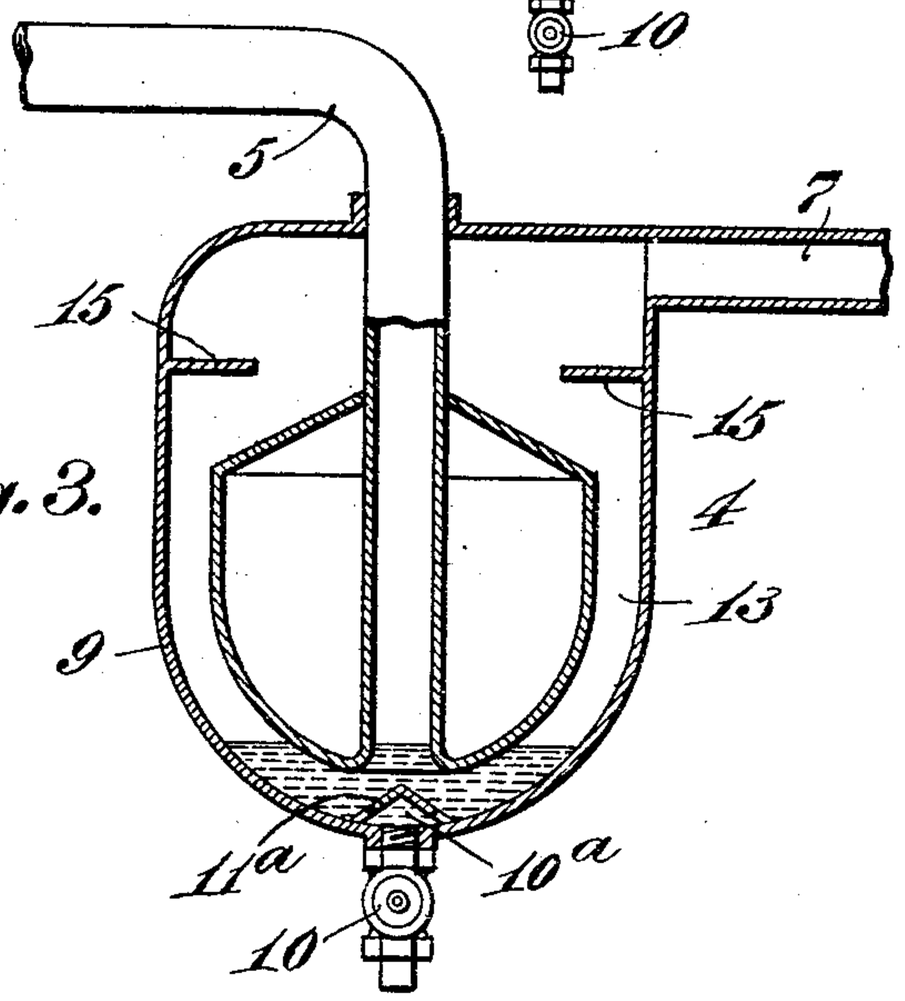

Fig. 3.

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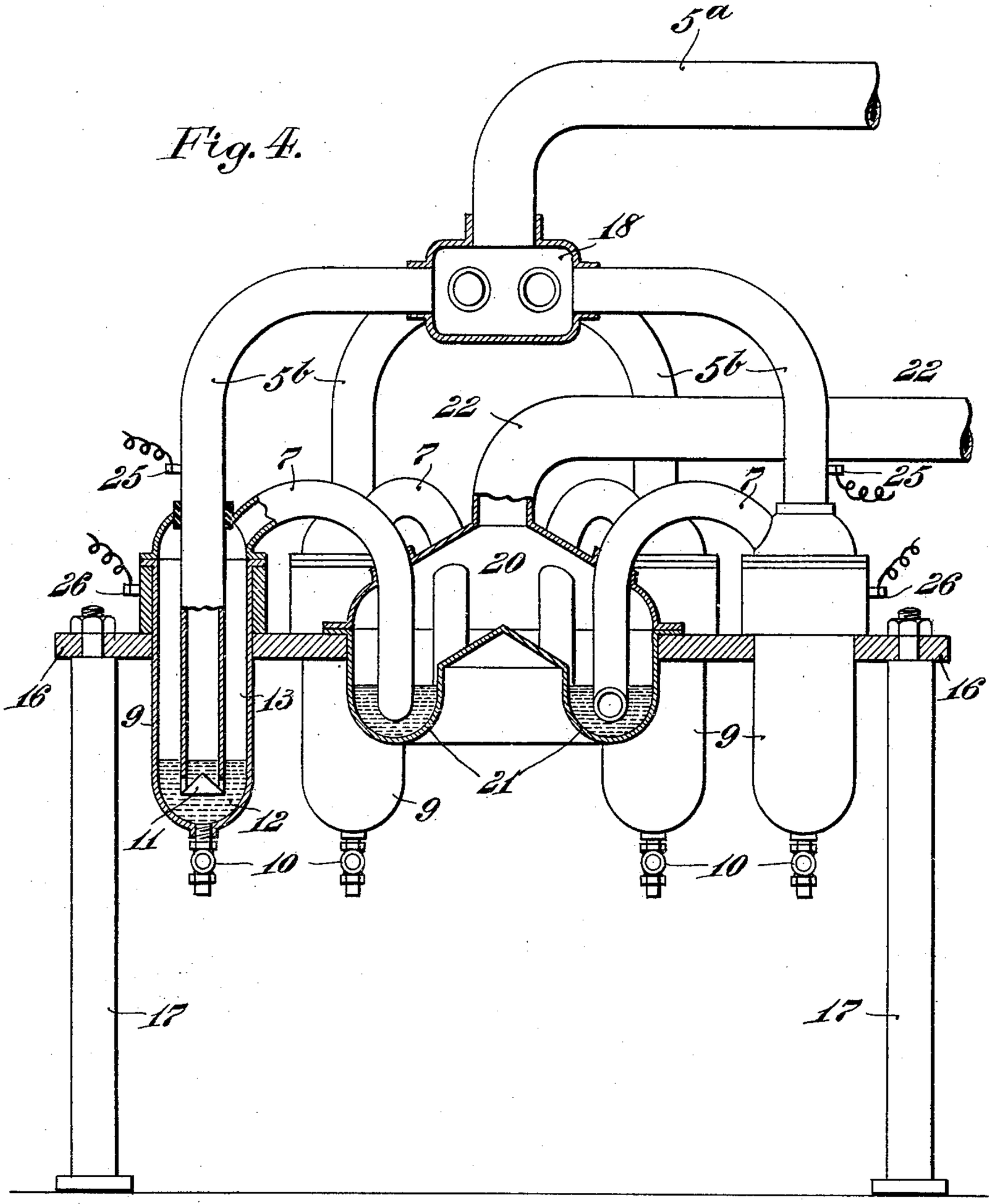
Fig. 4.



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UNITED STATES PATENT OFFICE.

ROYER LUCKENBACH, OF COLWYN, PENNSYLVANIA, ASSIGNOR TO BORINDUM EXTRACTION COMPANY, A CORPORATION OF ARIZONA TERRITORY.

AMALGAMATOR.

No. 930,299. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed September 23, 1907. Serial No. 394,042.

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 Amalgamators, of which the following is a specification.

My invention has relation to automatic appliances for entrapping during transit through the apparatus the values of metallic ore matter and liberation of tailings or gangue from the entrapped values of the said ore matter; and in such connection it relates to the particular constructive arrangement of the entrapping apparatus for the defined purposes.

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 side view of entrapping apparatus in one form embodying main features of my said invention. Fig. 2 is a view enlarged, partly in longitudinal section and partly in side elevation, of the entrapping appliances of the series, connected with each other of Fig. 1. Fig. 3 is a similar view of a slightly modified form as to internal arrangement thereof; and Fig. 4 is a similar view, of still another type of such apparatus, consisting of a series of chambers vertically arranged and in circular form to render compact as to space occupied thereby, the series of entrapping devices thereof provided with a central receiving compartment or chamber for liberated tailings or gangue, prior to final discharge from the appliance.

Referring to the drawings with reference to Figs. 1 to 3, 4 is the entrapping appliance, as to two of the types thereof, and which comprises an inlet conduit 5, connected with a suitable ore crushing or pulverizing appliance, not shown, but which may be of the type forming the subject-matter of an application for a patent filed by me, under date of September 16th, A. D. 1907, Serial No. 392,990. The conduit or pipe 5, is detachably fitted to a ball-shape connection 6, having an outlet 7, to the next in series of traps to be hereinafter more fully explained. The connection 6, internally thereof, is formed into a substantially ball-shape chamber 8, and screwed into the same is a long tubular casing 9, the end of which terminates in a ball valve 10, for freeing matter from the bottom of the casing 9, therethrough. The conduit or pipe 5, extending into and through the connection 6, terminates within the casing 9, above the valve 10, and is provided with a cone at 11, to enable matter descending through the pipe to be diverted by the coned end 11, into a body of mercury or amalgam 12, placed within the casing 9, and adapted to be discharged through the valve 10, when open. The pipe 5, extending downward within the casing 9, forms a chamber 13, but the same is sealed by the amalgam body 12, by the placing and maintaining of the same above the outlet of the internal pipe 5, within the said casing 9.

The metallic ore matter, containing gold, silver or other values is conducted in solution under pressure whether the ore matter be of a free milling or refractory nature through the central pipe 5, in the casing 9, wherefrom it is forced into and through the body of mercury or amalgam 12, in the lower part of the casing 9, and extending into the interior of the pipe 5, as clearly illustrated in Fig. 2, whereby due to the affinity of the said body for the different values of the ore matter, in solution, the same is concentrated by amalgamation with the body 12, and the matter foreign to the recovered values contained originally in the ore matter and still containing values, in solution is carried off by rising in the chamber 13, and passing through the chamber 8, and outwardly by the outlet pipe 7, to the next in series of such traps, and so on until the last of them is reached, when the final tailings or gangue discharged will be found to be entirely freed of values so that the resultant product of the recovered metallic matter may then be conveyed into a waste receptacle, not shown. The use of a series of such traps for continuous automatic treatments is essentially necessary, as practice has demonstrated, because the most of metallic ores contain values of a free milling as well as refractory nature and if in transit of such in a pulverized condition and in solution or even in a dry state be passed through a trap and the values are not fully recovered by amalgamation with the body of mercury or amalgam provided in each trap this is subsequently accomplished thoroughly and eco-

nomically by passing the liberated matter still containing values through a series of such traps as shown in Fig. 1.

The appliance of Fig. 3, differs from that of Figs. 1 and 2, only as to constructive internal arrangement, but the same results are obtained, as in and by the use of the appliance of Figs. 1 and 2. By the placing of the cone 11^a, in the bottom of the casing 9, over the outlet 10^a, containing the ball valve 10, the ore matter in solution conducted in a downward direction through the internal pipe 5, is diverted down through the body of mercury or amalgam 12, to enable the same by its affinity for the values contained therein whether of a free milling character or not to be taken up thereby, and amalgamated therewith, while matter foreign to that containing values and of a more or less refractory character or nature liberated from the body 12, will be carried off through the outlet 7, into the next in series of such traps and subjected to like treatments therein, for finally by such actions recovering all the values of the original ore matter, in solution. In the upper portion projects internally from the wall or casing 9, a rim or projection 15, so that any matter lifted will by contact therewith be thrown downward onto and into the body 12, for reclaiming traces of values that by nature is capable of being recovered and thus to render the said appliance that much more effective for the defined purposes.

The apparatus illustrated in Fig. 4, is the same as that already fully described, save that the series of entrapping devices are arranged vertically and in circular form supported in position by a skeleton frame 16, provided with standards 17. The ore matter in either a dry or wet condition in this arranged apparatus is conducted through the main conduit 5^a, into a central receiving compartment or chamber 18, and from which by a series of branches 5^b, the ore matter in solution or in a pulverized or finely divided state, is conducted through the series of collective traps at once and the final tailings into a central receiving chamber 20, through the series of pipes 19, connected with the series of entrapping devices and extending into the central receiving chamber 20. In the trough-like bottom 21, of which chamber 20, may be placed mercury or amalgam to reclaim further any values adhering to the free tailings in this chamber, as it often happens in the treatment of more or less refractory ores whether in solution or in a pulverized condition values will adhere to the tailings and as well as the mercury or amalgam be carried therewith and to avoid which in the one instance as well as loss in the other has been provided the central chamber 20, and so that the best possible reclaiming results in the treatment of ore matter, containing values in the said appliance can be effected, not only economically, but most thoroughly. From the central receiving chamber 20, by means of the outlet conduit 22, the final tailings are discharged therethrough into a suitable waste receptacle.

The several grouped entrapping devices as illustrated and described may be provided with electrical means from a suitable source of energy to intensify the effect of the amalgamating bodies upon the ore matter in the entrapping devices in the passing of such ore matter through and about the said body and to that end 25 is the cathode and 26 the anode, of an electric current from a source of energy provided for the said defined purpose.

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

In combination, a plurality of amalgamating receptacles adapted to contain amalgamating material, arranged in a circle, a primary conduit terminating in a head, feed conduits extending from said amalgamating receptacles, one such feed conduit for each receptacle, a centrally located amalgamating receptacle, a conduit extending from each of the first mentioned receptacles to the centrally located receptacle and adapted to deliver the tailings from the former to the latter, and an overflow conduit leading from the middle of said centrally located conduit.

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

ROYER LUCKENBACH

Witnesses:
J. Walter Douglass,
Thomas M. Smith.