

No. 841,990.

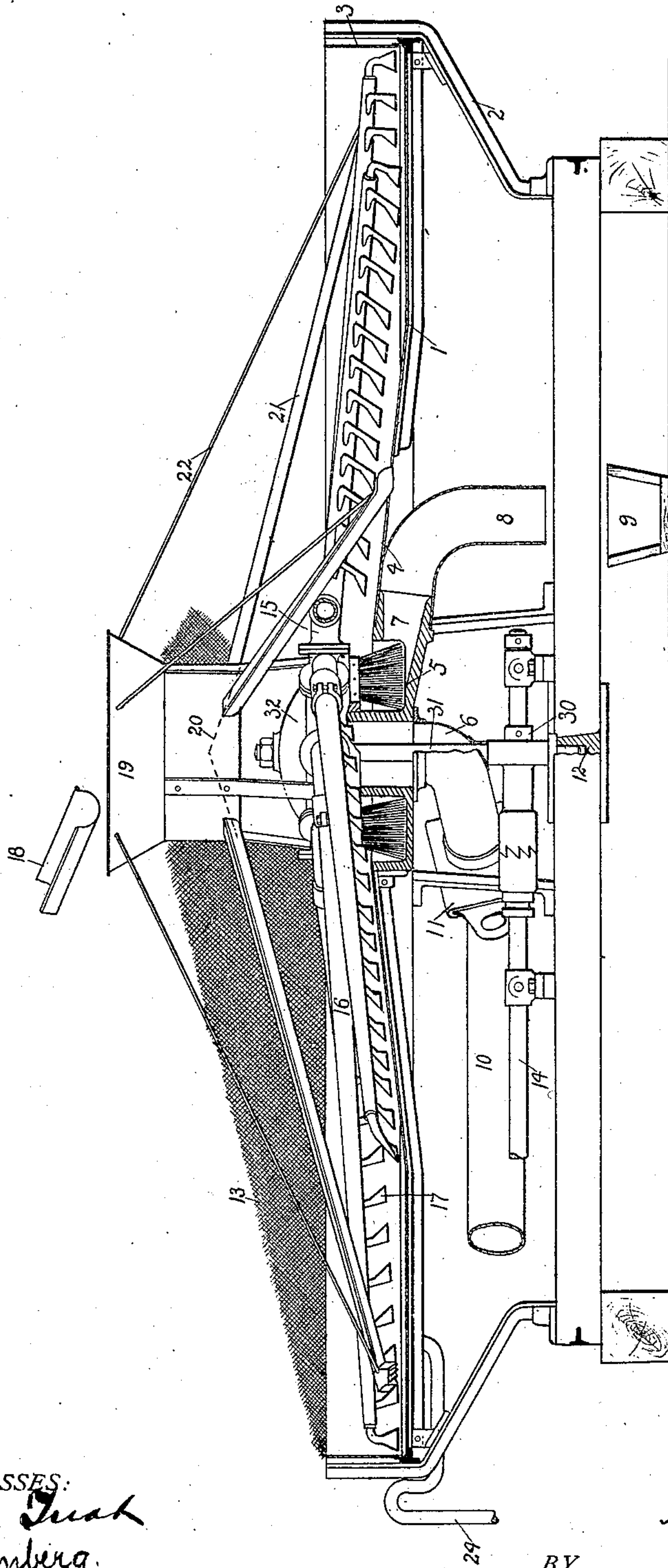
PATENTED JAN. 22, 1907.

H. L. LIGHTNER.  
AMALGAMATOR.

APPLICATION FILED FEB. 23, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



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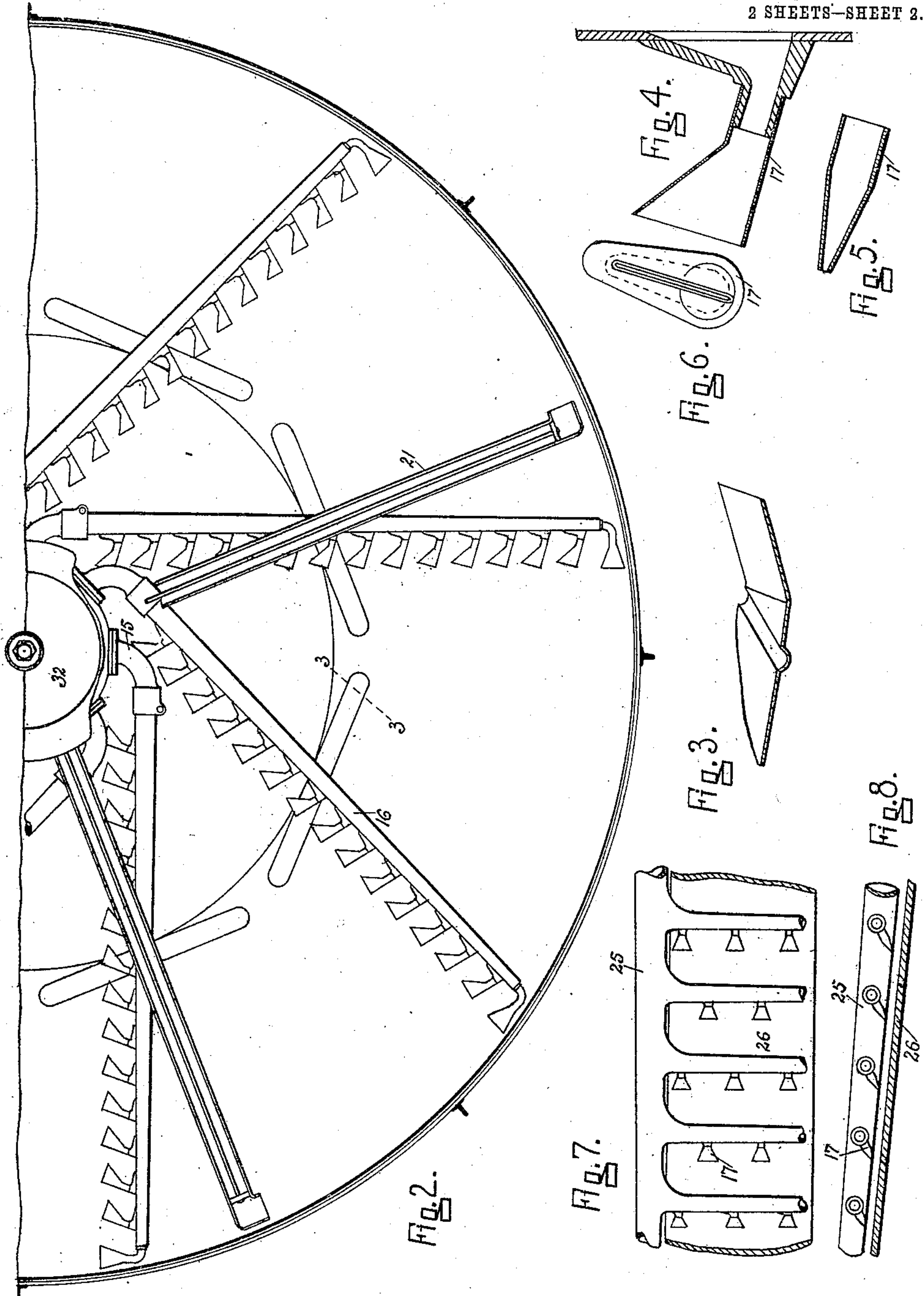
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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ONE-THIRD TO WILLIAM PRIEST AND ONE-THIRD TO HENRY FEIGE,  
OF SAN FRANCISCO, CALIFORNIA.

## AMALGAMATOR.

No. 841,990.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed February 23, 1906. Serial No. 302,336.

*To all whom it may concern:*

Be it known that I, HENRY L. LIGHTNER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Amalgamators, of which the following is a specification.

This invention relates to an amalgamating apparatus, the object of the invention being to provide an apparatus of this character which will be more effective than heretofore in saving particles of precious metals, especially the finer particles, and which will be particularly advantageous in districts where an abundance of water cannot be secured.

In the accompanying drawings, Figure 1 is a vertical section, partly in side elevation, of the apparatus. Fig. 2 is a broken plan view of the same. Fig. 3 is a sectional and perspective view on the line 3 3 of Fig. 2. Fig. 4 is an enlarged longitudinal section of one of the nozzles. Fig. 5 is a cross-section of the same. Fig. 6 is an end view of the same. Fig. 7 is a broken plan view of a modified form of the device. Fig. 8 is a sectional view of the same, showing the arm in side elevation.

Referring to the drawings, 1 represents a circular amalgamating-table supported by arms 2 and having a peripheral wall 3. The bottom of said table is substantially horizontal in the outer portion, but slopes gently upward, as shown at 4, to an annular channel 5, surrounding an air-conduit 6, said channel having a discharge-outlet 7 connected with a chute 8, leading to a trough 9. The air is supplied to said air-conduit from any suitable compressor by means of a pipe 10, controlled by a gate 11, and discharges from the upper end of said conduit against the concave surface of a compressed-air chamber 32, supported upon a vertical shaft 31, having a step-bearing 12, revolved by means of spiral gears 30, or by any other suitable mechanism, from a shaft 14. The bottom of said compressed-air chamber revolves in close contact with the upper end of the conduit 6 and has secured thereto at suitable intervals the elbows 15, which carry tapered hollow arms 16, forming air-conduits from which extend nozzles 17. The openings in these nozzles are flattened so as to be

very narrow vertically, while having considerable horizontal length, and are directed slightly downward, as shown in Fig. 1, and also slightly inward or toward the center of the table. The table is covered with a fine screen 13, permitting the escape of air, while protecting the material on the table.

The material to be treated is fed by a chute 18 into a hopper 19, falling upon a conical bottom 20, from which it passes by gravity down chutes 21, supported by ties 22, said chutes being bent at right angles at the ends, so as to discharge the material at the periphery of the table without piling up against the wall. As the material is being distributed upon the table and the nozzles attached to said tube arrive thereat in the revolution of the air-conduits the material is carried to the center, leaving the gold or other metals on the plate. The entire surface of the table is amalgamated, the level portion forming a reservoir for an excess of mercury, which with this apparatus may be used in the batteries to advantage, as it will be impossible to lose any amalgam or mercury. The effect of air as applied by this apparatus will cause the gold, amalgam, or flour quicksilver to impact on the plate or mercury. The gangue is thus separated from the particles of gold or other precious metals, and these are caught by the mercury and amalgamated therewith. The gangue thus separated from the precious metals continually moves upward and is eventually blown into the annular channel 5, where, by means of a brush 23 revolving with the air-chamber, it is swept into the outlet 7, and thus discharged into the trough 9. The precious metals will be recovered from the amalgam at suitable intervals in the usual manner.

While not absolutely necessary, an important advantage of this apparatus is that it can be effectually used with cyanid to recover the very finest particles of gold. For this purpose the cyanid is mixed with the water supplied to the stamp-mills or sands in placer mining and is conveyed into the amalgamating-table with the material and water by the chute 18. It is difficult, if not impracticable, to use cyanid in this manner with the amalgamating-plates commonly used to recover gold from the material pulverized by stamp-mills, as the cyanid renders the mer-



cury so fluid that it runs off the plates. It will be observed that this objection does not apply to the present apparatus. Consequently cyanid can be used with this apparatus to advantage, the effect being to dissolve the finer particles of gold and clean the heavier gold so that it will amalgamate. The excess of mercury is drawn off by the siphon 24. The table is formed at suitable locations therein with pockets 25 to catch the platinum and other metals which sink below the mercury by reason of their greater specific gravity.

Figs. 7 and 8 illustrate a modification of the invention in which a straight air-conduit 25 is used over a slightly-inclined amalgamating-plate 25. In this case the nozzles are directed downward at a suitable angle upon the plate, the direction of the air-current being longitudinally of the plate and toward the upper end thereof.

I claim—

1. In an apparatus of the character described, the combination of an amalgamating-table having in the middle portion thereof a channel, and a chute leading therefrom, an air-chamber, hollow arms extending from said air-chamber, nozzles connected with said arms and discharging downward and inward on said table, and means for feeding material to the periphery of the table, substantially as described.

2. In an apparatus of the character described, the combination of a table having a peripheral wall, a central air-conduit, a channel around said conduit into which the material is discharged from the table, an air-chamber revolving above the end of the conduit and means for supplying compressed air thereto, a hopper above the air-chamber, a launder leading from the hopper to the peripheral portion of the table, air-conduits leading from the air-chamber, and nozzles connected with said conduits and discharging compressed air against the material upon the table, said nozzles being directed inwardly or toward the center of the table, substantially as described.

3. In an apparatus of the character described, the combination of an amalgamating-table having in the middle portion thereof a channel, and a launder leading therefrom, the outer portion of the table being substantially horizontal and covered with mercury while the inner portion slopes slightly upward from said horizontal portion, a revolving air-chamber, hollow arms extending from said air-chamber, nozzles connected with said arms and discharging downward and inward on said table, substantially as described.

4. In an apparatus of the character described, the combination of an amalgamating-table having in the middle portion thereof a channel, and a launder leading therefrom, a revolving air-chamber, hollow arms extend-

ing from air-chamber, substantially tangential to said air-chamber, nozzles connected with said arms and discharging downward and inward on said table, and means for feeding material to the periphery of the table, substantially as described.

5. In an apparatus of the character described, the combination of an amalgamating-table having in the middle portion thereof a channel, and a launder leading therefrom, a revolving air-chamber, hollow arms extending from said chamber, nozzles connected with said arms and discharging downward and inward on said table, said nozzles being flattened at their discharge ends so as to be narrow vertically and wide horizontally, and means for feeding material to the periphery of the table, substantially as described.

6. In an apparatus of the character described, the combination of an amalgamating-table having in the middle portion thereof a channel, and a launder leading therefrom, the table having pockets containing mercury to catch platinum and other metals of greater specific gravity, a revolving air-chamber, hollow arms extending from said air-chamber, nozzles connected with said arms and discharging downward and inward on said table, and means for feeding material to the periphery of the table, substantially as described.

7. In an apparatus of the character described, the combination of an amalgamating-table having in the middle portion thereof a channel, and a launder leading therefrom, a revolving air-chamber, a brush revolving in said channel with the air-chamber, hollow arms extending from said air-chamber, nozzles connected with said arms and discharging downward and inward on said table, and means for feeding material to the periphery of the table, substantially as described.

8. In an apparatus of the character described, the combination of an amalgamating-table, an air-chamber over the center of said table, an air-conduit leading upward through the center of said table to said air-chamber, air-conducting arms leading from said chamber over the table, nozzles carried by said arms and discharging downward onto said table, and means for feeding the material to be treated onto said table, and means for revolving said air-chamber and arms, substantially as described.

9. In an apparatus of the character described, the combination of a table, an air-chamber at the center thereof, an air-conduit beneath the table and leading to said air-chamber, air-pipes leading outward from said air-chamber, downwardly-directed nozzles carried by said pipes, substantially as described.

10. In an apparatus of the character de-



scribed, the combination of an amalgamating-table, an air-chamber over the center of said table, an air-conduit leading upward through the center of said table to said air-chamber, tapered air-conducting arms leading from said chamber over the table, nozzles carried by said arms and discharging downward onto said table, and means for feeding the material to be treated onto said table, and means for revolving said air-chamber and arms, substantially as described.

11. In an apparatus of the character described, the combination of a table, an air-chamber, hollow arms extending therefrom, nozzles carried by said arms and directed downward upon the table, and means for revolving said arms located beneath said table, substantially as described.

12. In an apparatus of the character described, the combination of a table, an air-chamber, hollow arms extending therefrom, nozzles carried by said arms and directed downward upon the table, means for conducting compressed air to said chamber first beneath the table and then upward through the center thereof, and means for revolving said arms located beneath said table, substantially as described.

13. In an apparatus of the character described, the combination of a table, an air-chamber, hollow arms extending therefrom, nozzles carried by said arms and directed downward upon the table, a conduit leading beneath said table and upward through the center thereof into said chamber, a shaft leading upward through said conduit and connected to said chamber to rotate the hollow arms, and means located beneath the table for revolving said shaft, substantially as described.

14. In an apparatus of the character de-

scribed, the combination of a table, a shaft arranged vertically through the center of said table, means beneath the table for revolving said shaft, an air-chamber and a hopper carried by said shaft, hollow arms extending outward from the air-chamber, chutes extending outward from the hopper, nozzles carried by the arms and discharging downwardly upon the table, and an air-conduit leading to said air-chamber upward through the center of the table, substantially as described.

15. In an apparatus of the character described, the combination of a table, a shaft arranged vertically through the center of said table, means beneath the table for revolving said shaft, an air-chamber and a hopper carried by said shaft, hollow arms extending outward from the air-chamber, chutes extending outward from the hopper, nozzles carried by the arms and discharging downwardly upon the table, and an air-conduit leading to said air-chamber, substantially as described.

16. In an apparatus of the character described, the combination of a table, a revolving air-chamber, hollow arms extending from said air-chamber, nozzles connected with said arms and discharging downward on said table, said nozzles being flattened at their discharge ends so as to be narrow vertically and wide horizontally, and means for feeding material to the table, substantially as described.

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

H. L. LIGHTNER.

Witnesses:

F. M. WRIGHT,  
R. B. TREAT.