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PATENTED JAN. 10, 1905.

J. JEAN & W. C. SCHMITT.
AMALGAMATING APPARATUS.

APPLICATION FILED SEPT. 23, 1904.

3 SHEETS—SHEET 1.

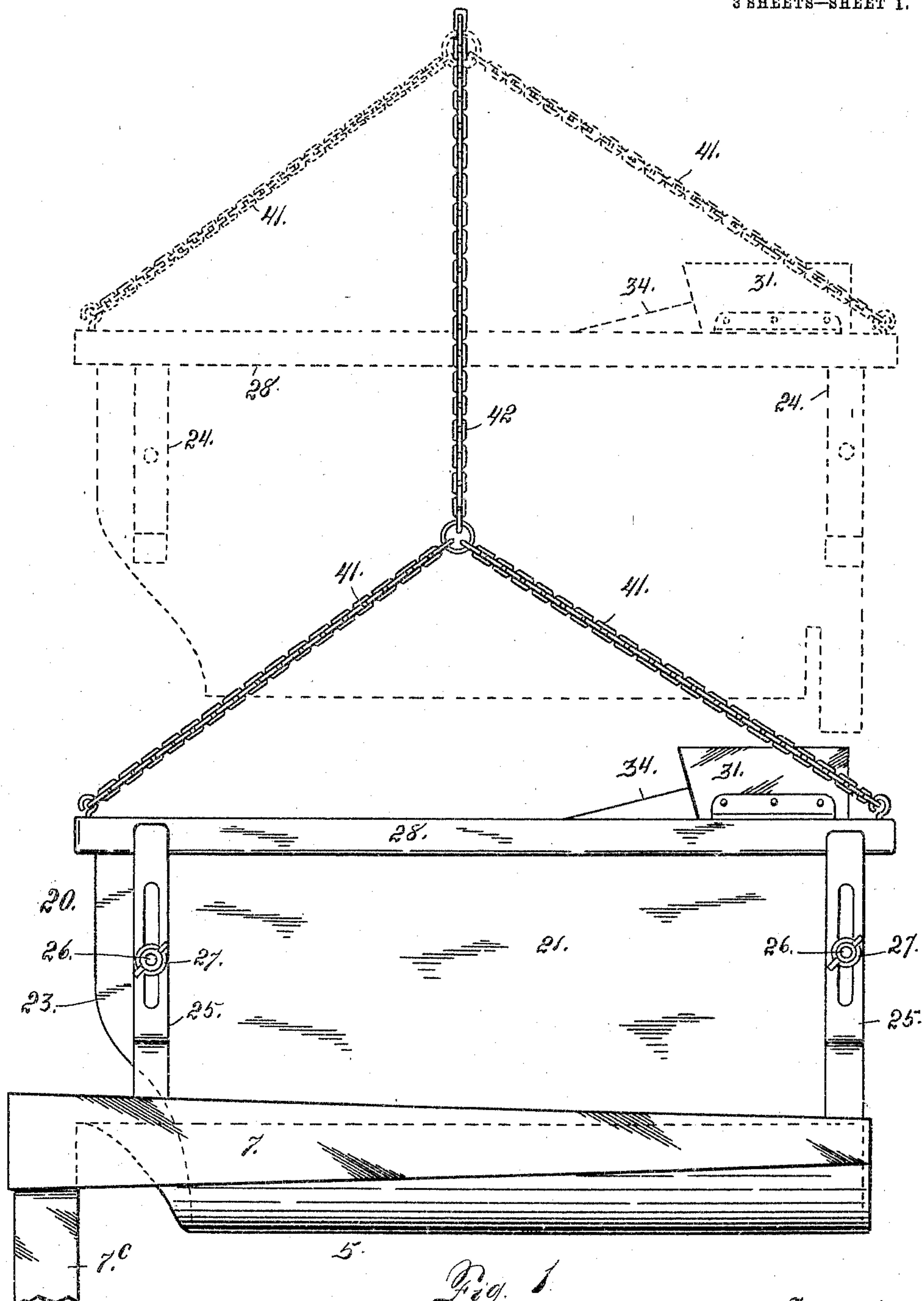


Fig. 1

Witnesses

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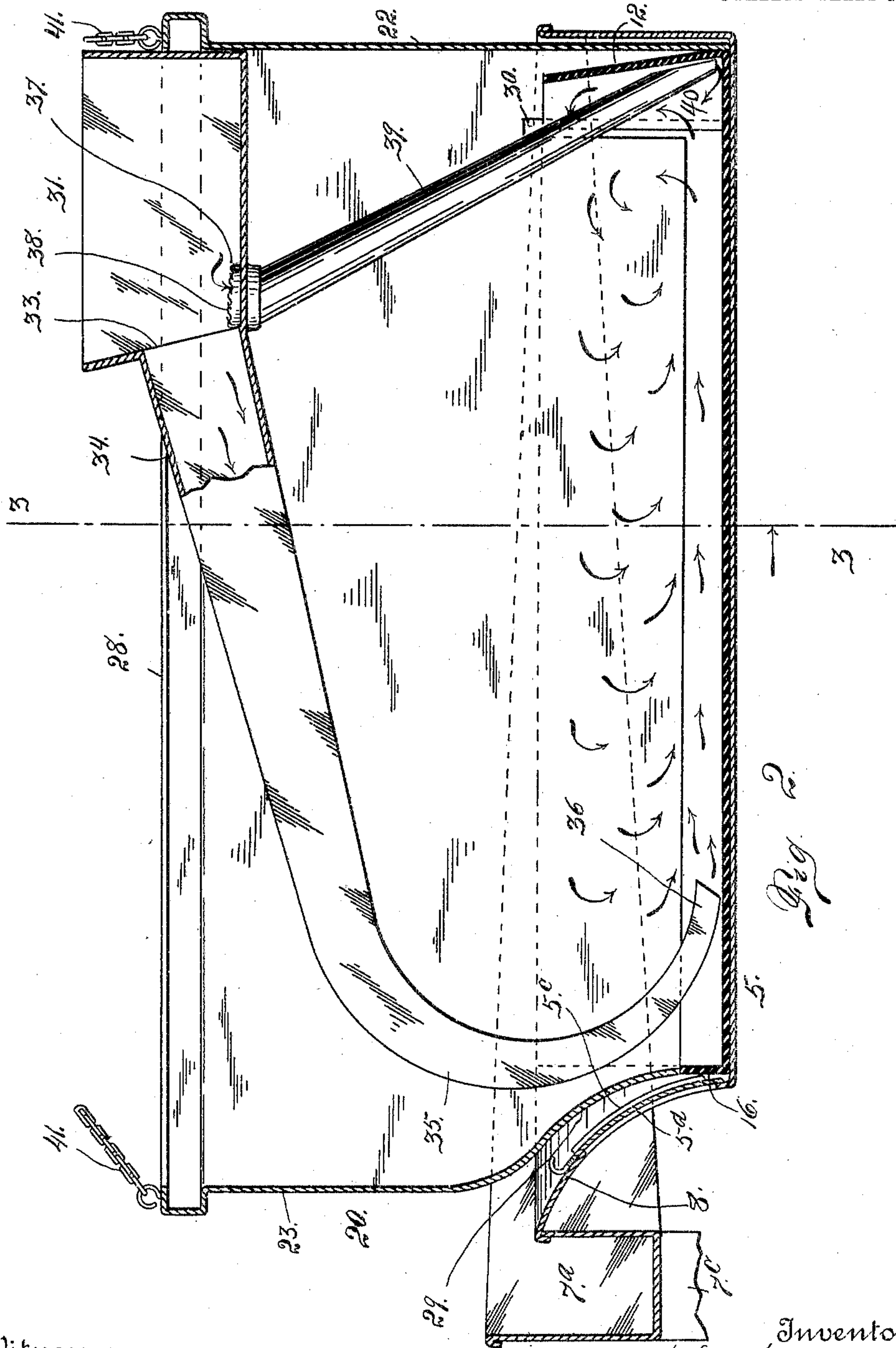
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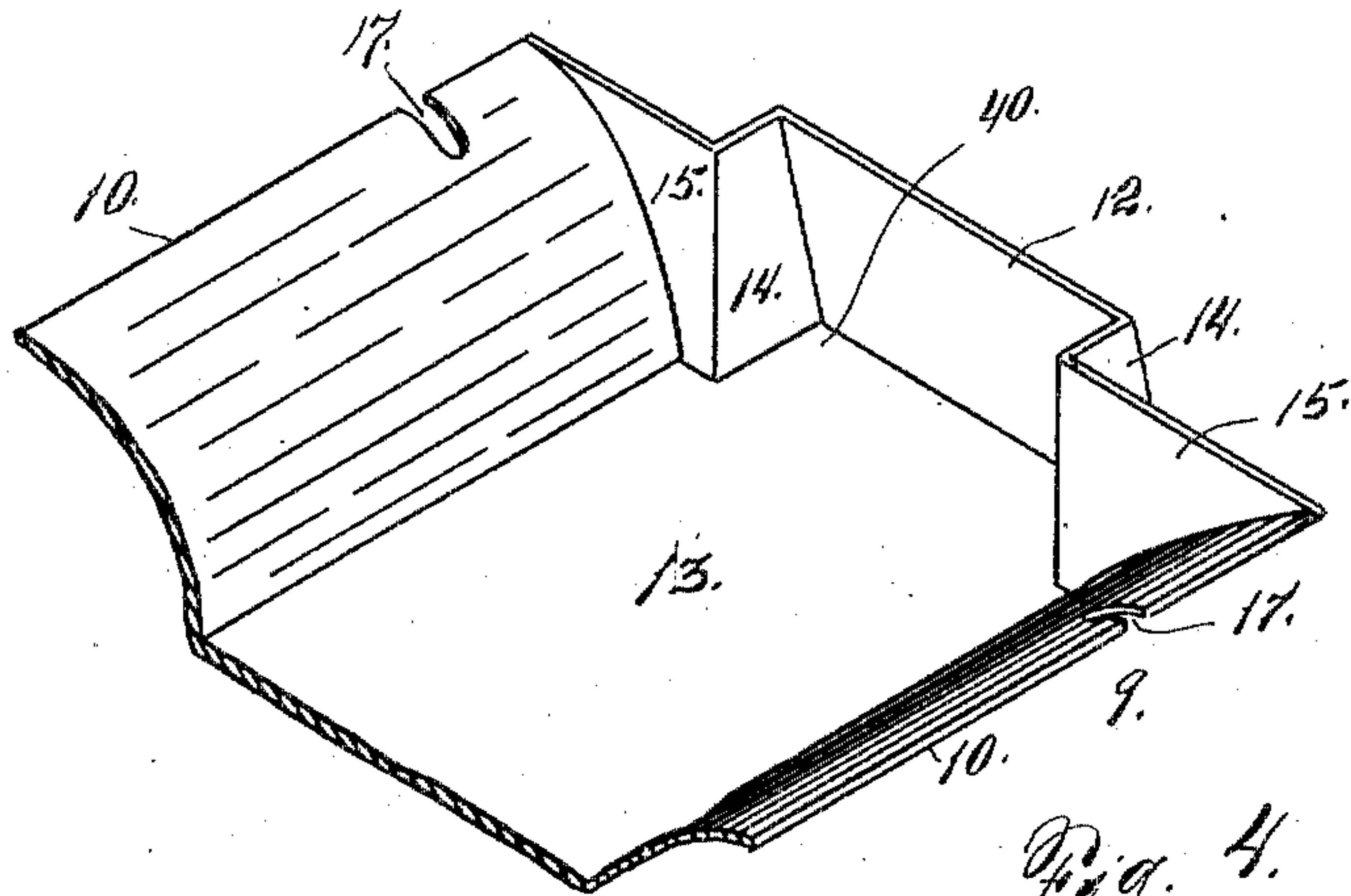


Fig. 4.

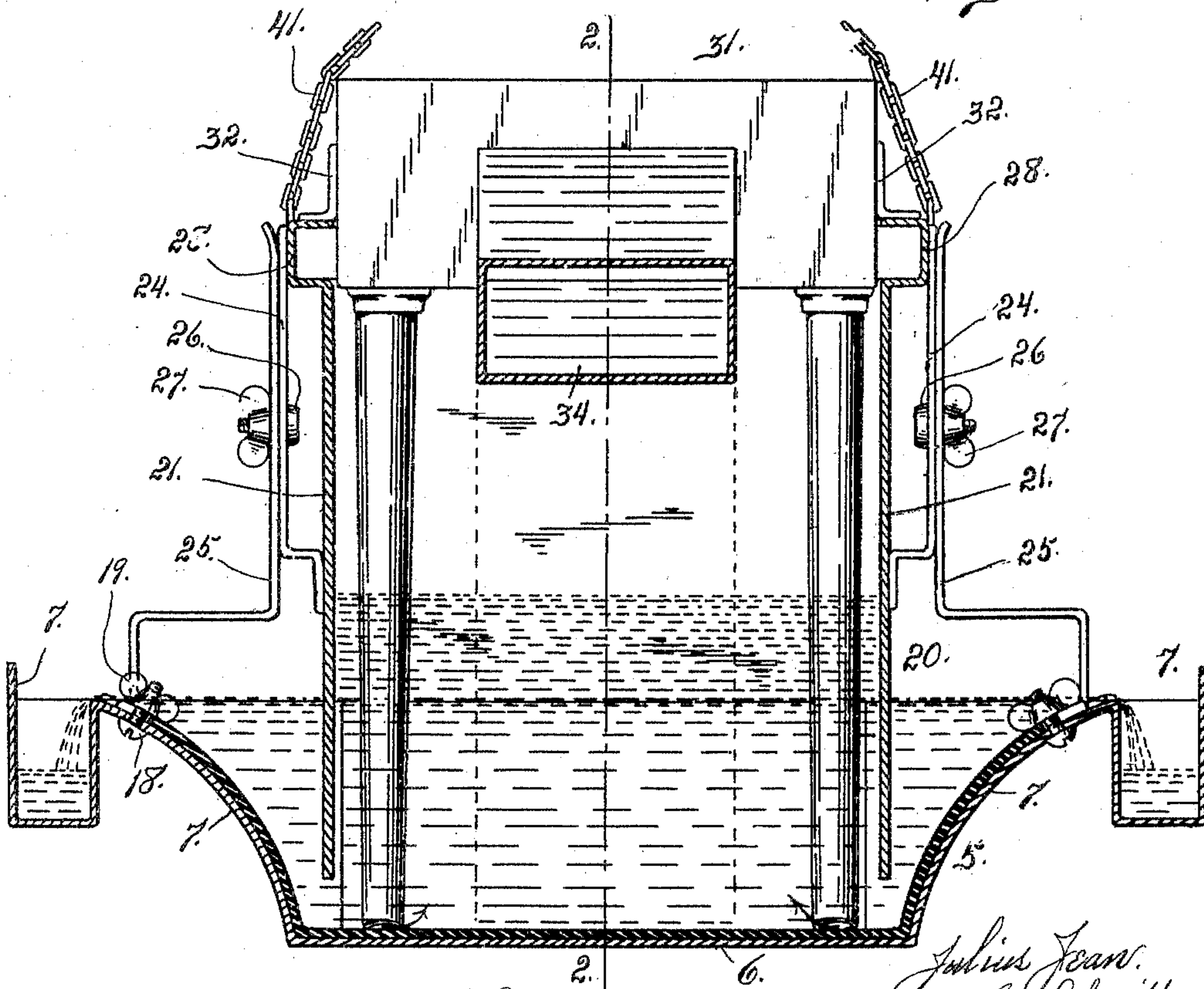


Fig. 3.

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UNITED STATES PATENT OFFICE.

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AMALGAMATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 780,002, dated January 10, 1905.

Application filed September 23, 1904. Serial No. 225,546.

To all whom it may concern:

Be it known that we, JULIUS JEAN and WILLIAM C. SCHMITT, both citizens of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Amalgamating Apparatus; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in amalgamating apparatus or apparatus adapted to catch and save the free precious-metal values, whether found in pulverized ore, in placer material, or in the tailings from mills.

The invention is especially valuable for use in saving the fine mineral values usually held in suspension by the water, and therefore carried off as slimes in the tailings from other machines.

Our improved apparatus is provided with an extensive amalgamating or amalgamated surface. The term "amalgamated surface" as used in this specification has reference to a surface properly coated with mercury. This coating or amalgamating of the surface may be effected in any suitable or well-known manner. In actual practice we employ a copper tray which is first coated with silver, after which the mercury coating is applied, since the silver has an affinity for mercury and the latter readily adheres thereto and may be uniformly spread thereover to form a thin coating which while adapted to catch the free mineral values it is not removed by the action of the pulp. It may, however, be scraped off from the plate after it has become loaded with the precious-metal particles, whereby an amalgam is formed.

The following is a brief description of the main features of our construction as illustrated in the drawings: The base or lowermost part of the apparatus consists of a tank having outwardly-flared walls on three sides, the tank being also provided on three corresponding sides with a trough or launder into which the overflow from the tank escapes and is dis-

charged from the machine. In this main tank is located the amalgamated tray, preferably consisting of copper. This tray is provided with outwardly-flared walls on two opposite sides to conform in a general way to the adjacent flaring sides of the tank in which it rests. One end of this tray is provided with right-angle bends or offsets, and between these offsets is a wall which is inwardly inclined from the bottom of the tray. Mounted above the tray and projecting thereinto is a vertically-adjustable bottomless casing, the lower edges of whose side walls are raised sufficiently above the bottom of the amalgamated tray to allow the pulp in the form of tailings to pass thereunder and overflow into the launder after the pulp has been impoverished of its free precious-metal values. The adjustment of the bottomless casing is preferably such as to maintain a depth of water therein greater than the depth of the bottom tank and amalgamated tray. In other words, the discharge of pulp to the machine should be sufficiently rapid to cause the level of the pulp in the casing to be higher than that in the tray and tank. Mounted on the top of the casing is a pulp-receptacle having an opening on one side registering with one extremity of a conduit which extends forwardly and is downwardly curved, whereby the pulp passing therethrough is caused to flow in a rearward direction. This pulp-receptacle is also provided with two downwardly-extending open-ended pipes whose upper extremities are covered with mesh material, whereby only comparatively-clear water passes through the said pipes. These pipes terminate a short distance below the bottom of the amalgamated tray, and their extremities project into the corners formed by the offsets in the tray, the function of the said pipes being, through the instrumentality of the discharge of water therefrom, to prevent the accumulation of solid material in the corners of the tray. This accumulation is undesirable, since it would render useless a portion of the amalgamated surface of the tray. The discharge from these pipes coöperates with the discharge from the main curved conduit to cause such an agitation or boiling of the pulp within the casing as to prevent the accumulation of solid matter on the tray and to cause all the free

particles of gold and silver to be brought into direct contact with the amalgamated surface.

The several parts of our improved apparatus are readily separable from one another, whereby a clean-up may be quickly and easily effected.

Having briefly outlined our improved construction, as well as the function it is intended to perform, we will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of our improved apparatus, showing in dotted lines the bottomless casing lifted out of the amalgamated tray for purposes of a clean-up. Fig. 2 is a vertical longitudinal section taken through the apparatus approximately on the line 2-2, Fig. 3, and shown on a larger scale than in Fig. 1. Fig. 3 is a cross-section taken on the line 3-3, Fig. 2. Fig. 4 is a fragmentary detail view in perspective of the amalgamated tray.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a tank or receptacle having a plain bottom 6, outwardly-flared sides 7, and an outwardly-flared end 8. Surrounding this tank on three sides is a launder 7, which receives the overflow from the tank. The sides of this launder are downwardly inclined from one end of the tank to the end launder part 7^a, which is provided with outlets 7^c for the discharge of the tailings. In this tank 5 is placed a tray 9, having outwardly-flared sides 10 and an end 12 inwardly inclined from the bottom 13. The end 12 is connected with the flared sides by parts 14 and 15, occupying positions at right angles to each other, each part 14 extending inwardly from the part 12 and each part 15 extending outwardly to a flared side 10 of the tray. The opposite end 16 of the tray, as shown in the drawings, is shallow and vertical. The upper edges of the flared sides of the tray are provided with slots 17 open at the top and adapted to receive bolts 18, held in place by winged nuts 19. By removing these bolts the tray is readily detachable from the tank for clean-up purposes. Mounted above the tray and projecting downwardly thereinto is what I will term the "bottomless casing" 20, having parallel vertical side walls 21 and end walls 22 and 23. The side walls terminate a suitable distance above the bottom of the tray, whereby the material after being deprived or largely deprived of its free precious-metal values may pass under the said sides and overflow from the tray into the launder. If the material after passing under the said sides still contains any free values, they will be caught by the flared sides of the amalgamated tray.

The device 20 is provided with side brack-

ets 24, which engage brackets 25, mounted on the receptacle 5. The brackets 24 are slotted, while brackets 25 are provided with openings to receive bolts 26, held in place by thumb-nuts 27. The casing may be vertically adjusted by loosening the thumb-nuts and raising or lowering it, as may be desired. The upper part of the device 21 is provided with a U-shaped bend 28 for strengthening purposes. The rear end 23 of the device 20 is curved, as shown at 29, and its lower edge occupies a position in engagement with or directly above the shallow end 16 of the tray. The front end 22 of this device passes downwardly into the receptacle 5 in front of the inclined end 12 of the tray. The sides of the device 20 near the front end are slotted, as shown at 30, to receive the parts 15 of the tray.

Mounted on the parts 28 of the device 20 at the forward end of the apparatus is a receptacle 31, provided with angle-brackets 32 on opposite sides. These angle-brackets directly engage the said parts 28. This receptacle 31 is open at the top and provided with a rear opening 33, where it communicates with a rearwardly-extending conduit 34, which is downwardly inclined from the receptacle, its rear portion being curved, as shown at 35, and its lower extremity being forwardly directed, as shown at 36. Both ends of this conduit 34 are open. The area of the cross-section of the discharge end 36 is considerably less than that of the forward extremity of the conduit. In fact, the cross-section of the conduit continually diminishes from the receptacle 31 to this discharge extremity in order to increase the force of the discharge. The bottom of the receptacle 31 is provided at or near its rear extremity with two openings surrounded by upwardly-projecting flanges 37, which are covered with mesh material, as shown at 38. Leading downwardly from these openings are pipes 39, whose lower extremities terminate in the corners 40, formed by the end 12 and the adjacent parts 14 of the tray, whereby the discharge of water into these corners is sufficient to prevent the accumulation of solid material therein.

The device 20 is provided at each end with a chain 41 to facilitate lifting the said device out of the tray when for any purpose it is desirable to do so. This may be done by connecting the two chains 41 with a chain 42 and applying any suitable lifting power to the latter. In this event the device 20 may be raised to the position indicated by dotted lines in Fig. 1.

The rear end of the receptacle 5 is provided with an opening 5^a, normally closed by a slide-gate 5^b. When it is desired to drain the receptacle, this gate is opened.

From the foregoing description the use and operation of our improved amalgamating apparatus will be readily understood. Assum-

ing that the parts are assembled, the material to be treated is discharged into the receptacle 31 and the pulp passes downwardly through the conduit 34 into the amalgamated tray, and this pulp is directed rearwardly, as indicated by the arrows in Fig. 2. At the same time the water passing downwardly through the pipes 39 enters the forward extremity of the tray and is given a rearward and upward impetus, the result of the two forces being to place the pulp in a thorough state of agitation, giving it a boiling or rolling tendency, whereby the bottom of the tray is kept clear of solid matter, whereby the amalgamated surface of the tray is allowed to catch the free values. If it were not for this agitation of the pulp in the tray, the solid particles of matter would settle on the surface thereof and render the same inactive for saving the values, and thus destroying the utility of the apparatus.

Having thus described our invention, what we claim is—

1. The combination of a bottom receptacle having outwardly-flared walls, an amalgamated tray located in said receptacle and having correspondingly-flared side walls, a bottomless casing mounted above the tray and projecting thereinto, the said casing being suitably supported and vertically adjustable, and a feed-receptacle suitably supported and provided with a rearwardly and downwardly extending conduit having a forwardly-curved discharge extremity terminating in suitable proximity to the bottom of the tray, the said receptacle being also provided with depending open-ended tubes extending downwardly into the forward extremity of the tray, the upper extremities of the tubes communicating with openings in the receptacle whereby the tubes receive their supply.

2. The combination of a bottom receptacle having outwardly-flared walls, an amalgamated tray located in the receptacle and also having outwardly-flared walls, a bottomless casing projecting into the tray and having its lower edges supported above the bottom of the tray, a feed-receptacle mounted on the casing, a rearwardly-extending downwardly-curved conduit connected with the feed-receptacle, and depending open-ended tubes also connected with the feed-receptacle their lower extremities terminating in the forward part of the tray for the purpose set forth.

3. The combination with a bottom receptacle having outwardly-flared walls, a removable amalgamated tray located in said receptacle, a bottomless casing projecting into the tray and supported to leave a space between the lower edges of the tank and the bottom of the tray, the distance between the side walls of the casing being less than the width of the bottom of the tray, a feed-receptacle, and con-

duits leading downwardly from the feed-receptacle into the tray for the purpose set forth. 65

4. The combination of a receptacle having outwardly-flared walls, the said receptacle being provided with an amalgamated surface, a vertically-adjustable bottomless casing mounted in said receptacle and raised sufficiently to permit a discharge underneath the lower edges of the tank, and suitable means for feeding the material to be treated into the receptacle. 70

5. The combination of a receptacle provided with an amalgamated surface, a bottomless casing projecting into the receptacle and vertically adjustable, a feed-receptacle mounted on the top of the casing and provided with downwardly-extending conduits terminating respectively in the forward and rearward portions of the receptacle for the purpose set forth. 75 80

6. The combination of an amalgamated tray having outwardly-flared sides, an inclined end extending inwardly from the bottom of the tray, said end being connected with the flaring sides by angular parts, a bottomless casing projecting into said tray and having slotted sides to receive portions of the angle parts of the tray, and suitable means for feeding the material into the tray through the bottomless tank. 85 90

7. The combination of a bottom receptacle having flaring sides, an amalgamated tray located in said receptacle and having correspondingly-flared side walls, a vertically-adjustable bottomless casing projecting into said tray, and a feed-receptacle provided with conduits for carrying the material to be treated downwardly into the tray, the said conduits being located between the side walls of the casing. 95 100

8. The combination of a receptacle, a removable amalgamated tray located therein, a vertically-adjustable casing projecting into the tray, said casing being open at the bottom, and means for discharging the material to be treated into the tray between the side walls of the casing. 105

9. The combination of a bottom receptacle surrounded by a launder to receive the overflow from the receptacle, a removable amalgamated tray, a casing projecting into the tray and open at the bottom, the said casing being vertically adjustable and having the lower edges of its side walls above the bottom of the tray, and suitable means for discharging the material to be treated into the tray between the side walls of the tank. 110 115

In testimony whereof we affix our signatures in presence of two witnesses. 120

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WILLIAM C. SCHMITT.

Witnesses:

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