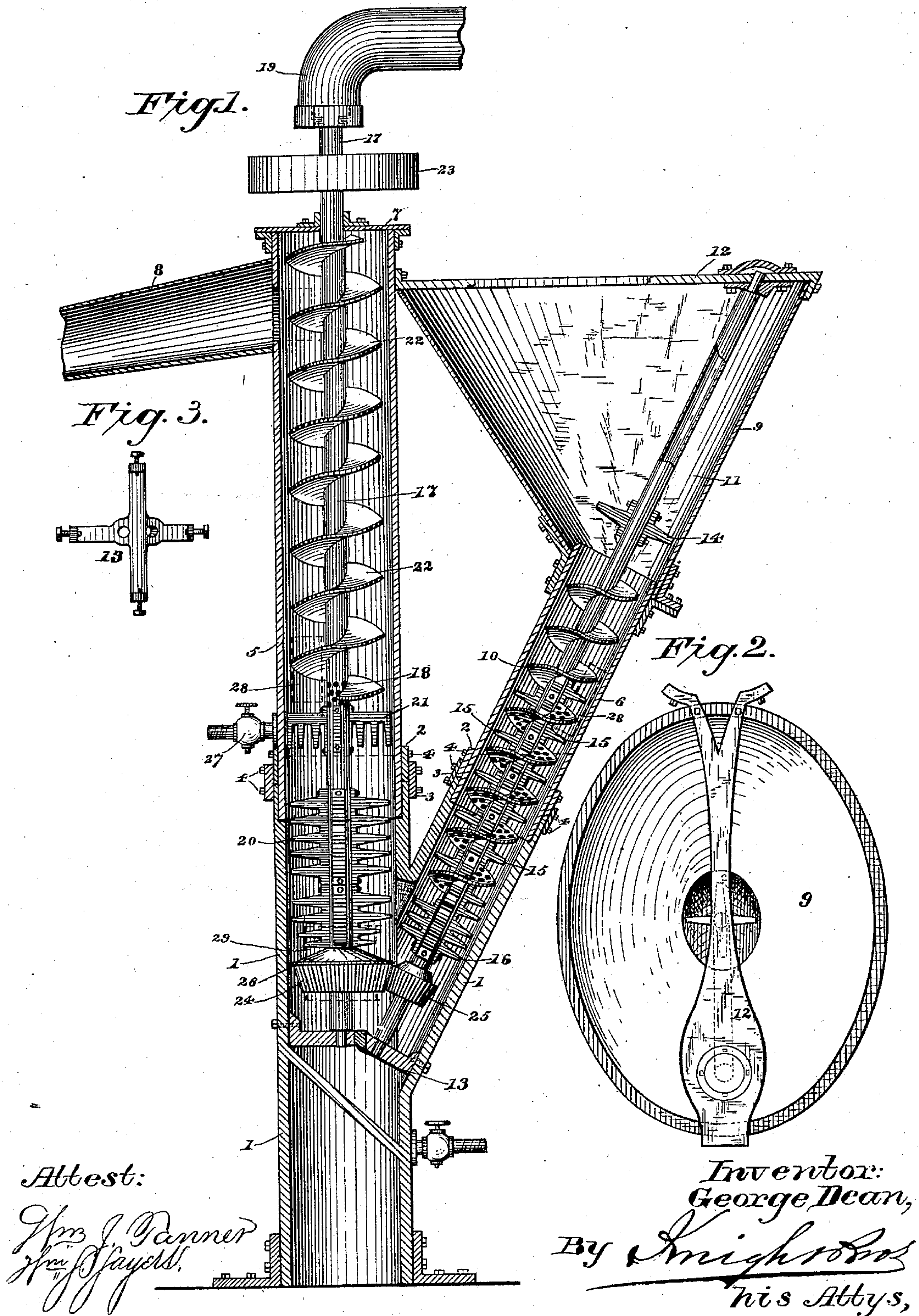


(No Model.)

G. DEAN.  
AMALGAMATOR.

No. 286,791.

Patented Oct. 16, 1883.





# UNITED STATES PATENT OFFICE.

GEORGE DEAN, OF ST. LOUIS, MISSOURI.

## AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 286,791, dated October 16, 1883.

Application filed June 20, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE DEAN, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Amalgamators, of which the following is a specification.

My invention relates to that class of amalgamators for use in placer-mining, using a bath of mercury and a spiral conveyer for carrying the material to be worked down through said mercury.

The object of my invention is to provide an amalgamating-vessel for use in placer-mining, in which all metallic particles having a greater specific gravity than mercury will remain in the bottom of the vessel and nothing but worthless material be allowed to pass out, and also to the construction of an amalgamator that is readily detachable, so that it can be easily transported from one place to another, said amalgamator also using a bath of water.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the case of my amalgamator, showing the working parts in elevation. Fig. 2 is a plan of the hopper thereof, and Fig. 3 is a plan of the bracket used for supporting the conveyers.

The casing of my improved amalgamator is constructed in sections, so as to be readily detachable for the purpose of transportation.

1 represents the base, which is formed at top with two cylinders, one projecting vertically and the other obliquely at any desired angle. To the upper ends of these cylinders are attached, by means of collars 23 and bolts 4, cylinders 5 6, respectively, the cylinder 5 being covered at top by a cap, 7, and provided with a chute, 8, for the purpose to be hereinafter explained, and to the top of the cylinder 6 is secured in any suitable or preferred manner, so as to be readily removable, a hopper, 9.

The base of the amalgamator is formed perfectly liquid-tight and charged with mercury. The floor is inclined at an angle, and the case is provided with a suitable cock at the lowest part thereof for the purpose of draining the vessel.

Revolving in the cylinder 6 is a spiral conveyer, 10, the upper end of the shaft 11 thereof

being journaled in a brace, 12, crossing the top of the hopper 9, and the lower end having bearing in a bracket, 13, Fig. 3, bolted in the base 1. Mounted on the shaft 11, at the bottom of the hopper, are radial arms 14, for agitating the material and preventing its becoming packed in the hopper before reaching the conveyer. Below the level of the mercury the blades of the conveyer are perforated and the shaft armed between the blades with radial arms or agitators 15, for thoroughly mixing the auriferous material with the mercury during its descent, thereby exposing all parts of it to the action thereof. The shaft is also provided below the conveyer with radial agitators 16, for the further disintegration of the material. The shaft 11 is preferably hollow, as shown, to facilitate the attachment of the agitating-arms and conveyer-blades, and also to reduce the weight of the machine.

In the cylinder 5 is a hollow shaft, 17, journaled at top in the cap 7, and having bearing at bottom in the bracket 13. This shaft is provided at 18 with suitable perforations, and its upper end suitably connected with a water-main, 19, for supplying the cylinder 5, above the mercury, with water. This shaft is also provided below the level of the mercury with radial arms 20, for the further disintegration of the material, to insure its perfect separation. Just above the level of the mercury it is provided with radial arms 21, having downwardly-projecting teeth, which thoroughly wash the material in the water contained in the cylinder, for the purpose of freeing any particles of mercury or amalgam which may have been carried upward, and permitting them to settle to the bottom. From this point to the top the shaft is provided with a spiral conveyer, 22, which carries the worthless material to the top of the cylinder and discharges it into the chute 8, whence it is carried off. Motion is imparted to the conveyers by a pulley, 23, mounted on the shaft 17, which carries near its lower extremity a bevel-pinion, 24, meshing with a similar pinion, 25, mounted on the shaft 11. Thus it will be seen that motion imparted to the shaft 17 in a direction necessary for raising the material in the cylinder 5 will, by means of the gearing 24 25, cause the conveyer in cylinder 6 to force the material therein downward through the mer-



cury. The pinion 24 is formed at top with a flange, 26, which overlaps the pitch-line and prevents any hard material from falling between the teeth. The cylinder 5 is provided with a cock, 27, for emptying it of water. Both cylinders are provided with water-tight windows 28, for ascertaining the height of the mercury and water. The base is provided with an opening, 29, affording access to the lower part thereof, said opening being suitably covered when the machine is in use.

The operation of the device is as follows: The vessel is first charged with mercury to about the depth shown, and then water is admitted to the cylinder 5 by means of the perforations 18 in the hollow shaft 17. The auriferous sand and gravel to be worked are then fed into the hopper and power applied to the pulley 23 on shaft 17. The material passes through the cylinder 6 until it reaches the top of the mercury, principally by its own gravity, aided, if necessary, by the conveyer 10. It is then carried down through the mercury by said conveyer, being thoroughly disintegrated during its passage downward by the combined action of the radial agitating-arms 15 and the currents of mercury passing through the perforations in the blades of the conveyer, thus exposing all parts of the material to the action of the mercury. After it has passed beyond the action of the conveyer 10, it is further disintegrated by the agitating-arms 16. By the time it reaches this point the precious metals will be pretty well separated and will sink to the bottom of the vessel, and the sand and gravel of less specific gravity than the mercury will rise in the cylinder 5, being further disintegrated in their ascent by the agitating-arms 20, to insure the perfect separation of the precious metal. On reaching the surface of the mercury it is met by the water, and is thoroughly washed therein by the toothed agitators 21, for the purpose of freeing any mercury or amalgam which may have been caught and carried up by the gravel. After it has been thoroughly washed in this way it is carried up the cylinder 5 by the conveyer 22, which ejects it through the chute 8.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In an amalgamator, the combination, with the cylinder 5, having shaft 17, journaled in cap 7 and bracket 13, driving-pulley

23, and bevel-pinion 24, of a cylinder, 6, having shaft 11, journaled in brace 12 and bracket 13, and carrying bevel-pinion 25, meshing with pinion 24, whereby the shafts are driven in opposite directions, substantially as and for the purposes set forth.

2. In an amalgamator, the combination, with a hopper and a cylinder leading therefrom, of a shaft revolving in said cylinder and carrying a spiral conveyer having perforated blades, and radial agitating-arms between said blades, as and for the purpose set forth.

3. In an amalgamator, the combination, with a cylinder having a spiral conveyer for forcing the ore into a bath of mercury, of a second cylinder having a central hollow shaft having perforations for the admission of water, radial arms having teeth for washing and separating the valuable properties from the material after it has passed through the mercury, and a spiral conveyer for elevating it, as set forth.

4. In a spirally-flanged screw-conveyer, the combination of a central hollow shaft and radial arms attached to said shaft between the spread flanges, substantially as set forth.

5. A spirally-flanged screw-conveyer having perforated blades and radial agitating-arms between said blades.

6. In an amalgamator, the combination, with the mercury bath, of a pair of cylinders having spiral conveyers working in opposite directions, and radial arms for agitating the amalgam, substantially as and for the purposes set forth.

7. In an amalgamator, the combination of cylinder 5, having cock 27, and a perforated shaft having radial arms and downwardly-projecting teeth, as and for the purpose set forth.

8. In an amalgamator, the combination, with a bath of mercury, of a spirally-flanged screw-conveyer having perforated blades and an approximately vertical cylinder, in which they are contained, as and for the purpose set forth.

9. In an amalgamator, the combination, with a bath of mercury, of a spirally-flanged screw-conveyer having perforated blades and radial agitating-arms between its blades, as and for the purpose set forth.

GEORGE DEAN.

Witnesses:

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