No. 765,811. PATENTED JULY 26, 1904.

J. J. CALLAHAN.

DRY PLACER MACHINE.

APPLICATION FILED AUG. 22, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

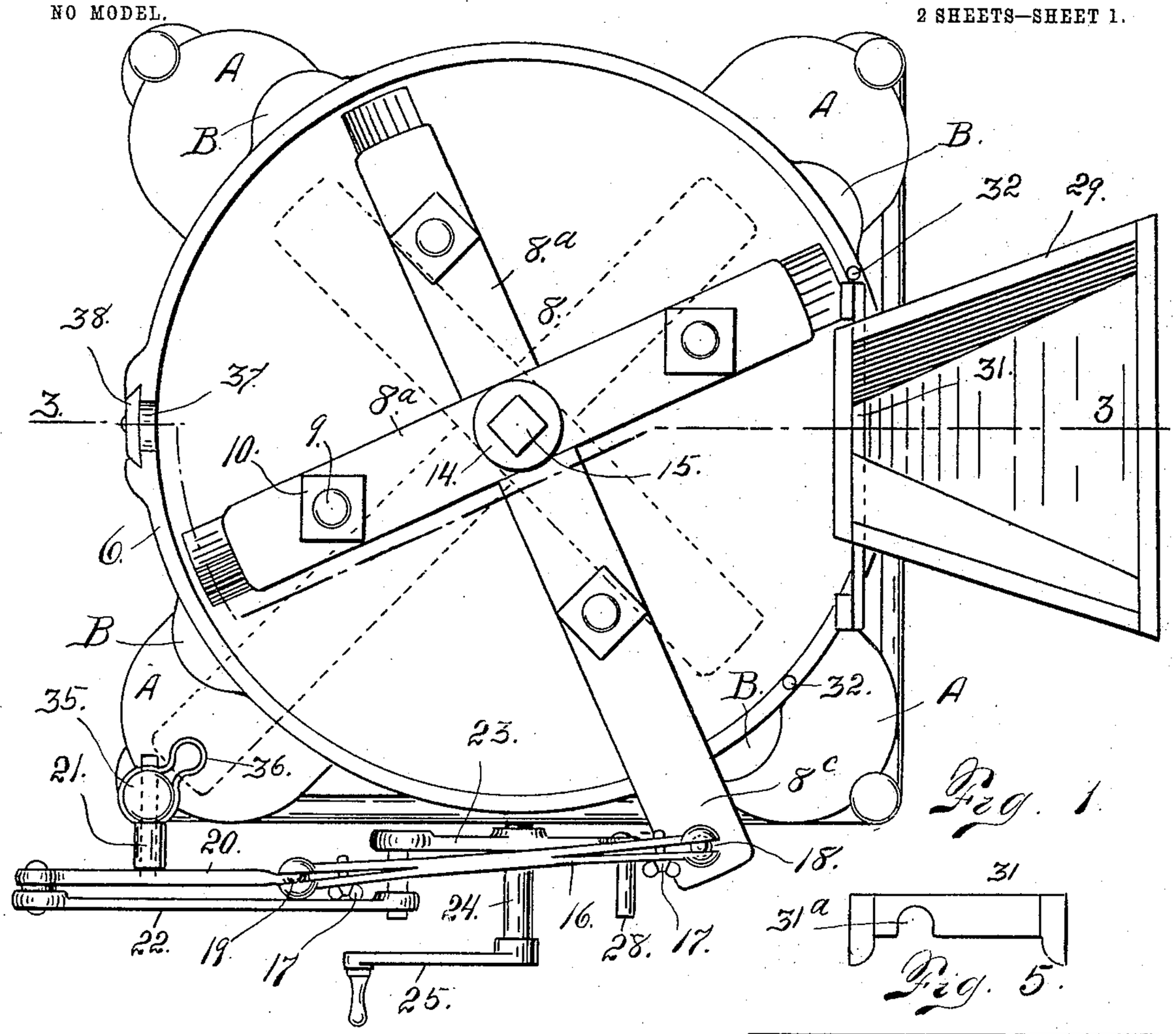

Fig. 1.

Fig. 5.

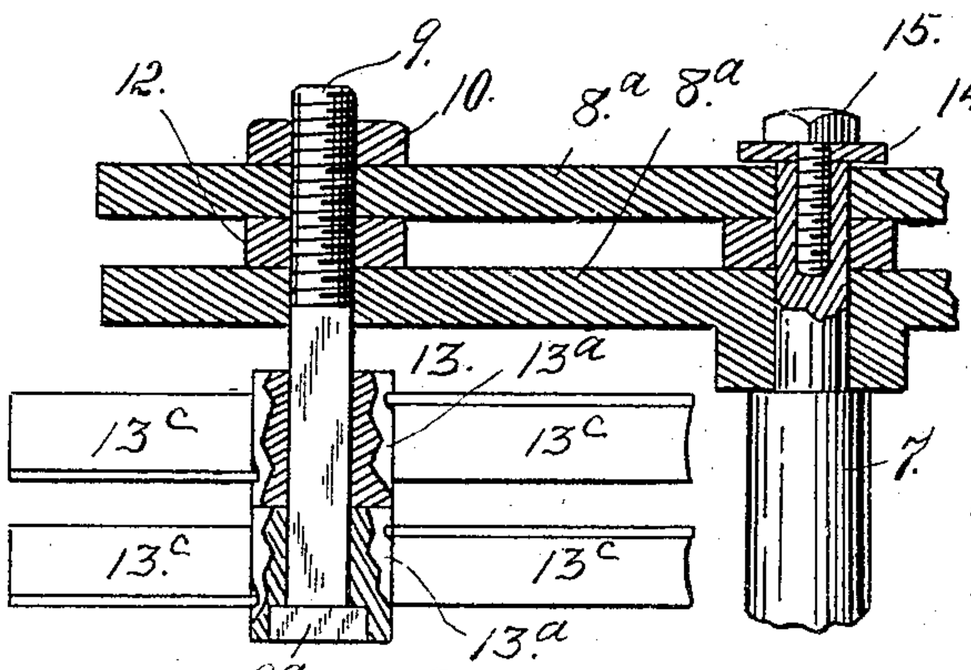

Fig. 6.

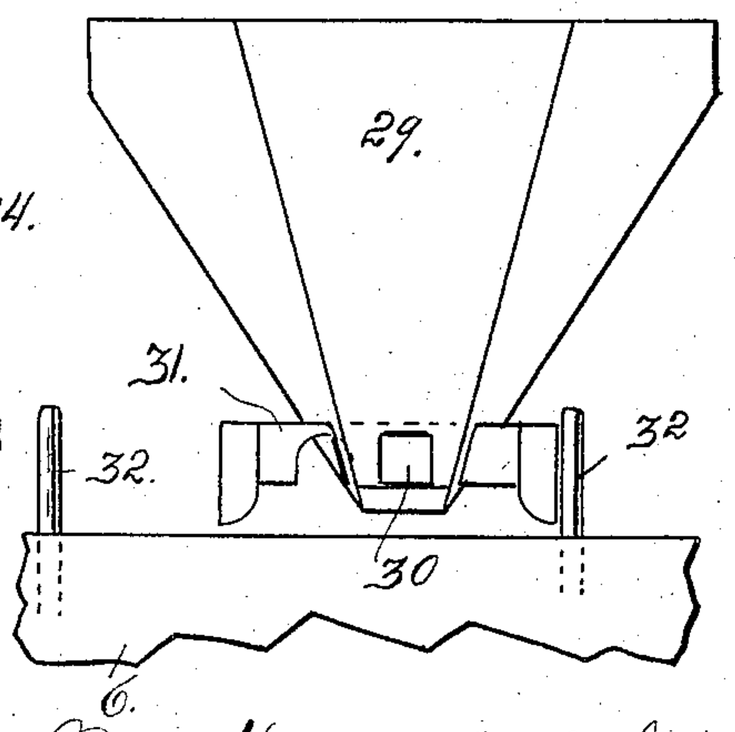

Fig. 4.

Witnesses
Otto E. Holdick.
Dena Nelson.

J. J. Callahan
Inventor
By
W. W. Owen
Attorney

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

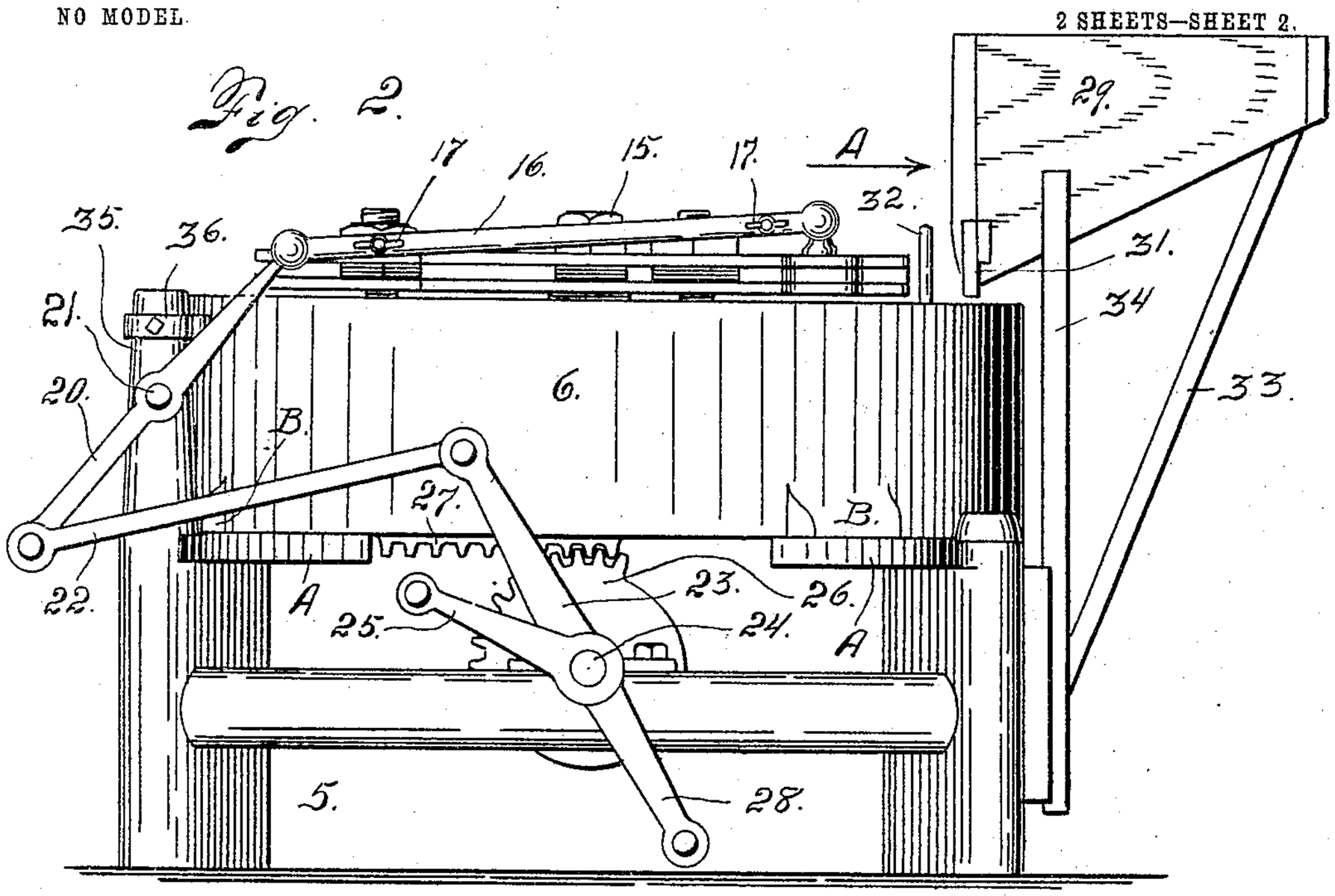
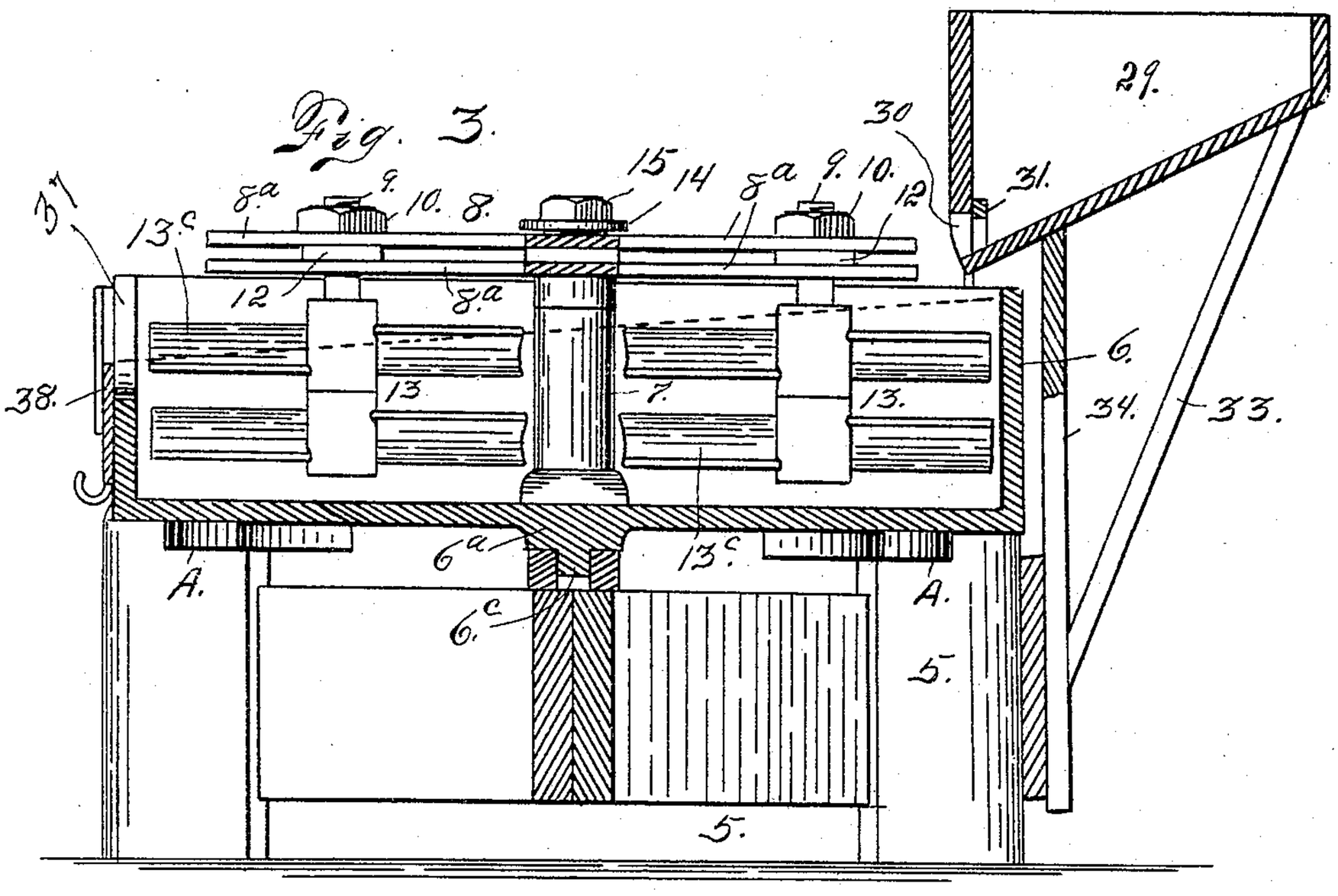


Fig. 3.



Witnesses
Otto E. Hoddick.
Dena Nelson.

Inventor
J. J. Callahan.
By H. W. Sides
Attorney

No. 765,811. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

JOHN J. CALLAHAN, OF PUEBLO, COLORADO.

DRY-PLACER MACHINE.

SPECIFICATION forming part of Letters Patent No. 765,811, dated July 26, 1904.

Application filed August 22, 1903. Serial No. 170,485. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CALLAHAN, a citizen of the United States of America, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Dry-Placer Machines; and I 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 letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in dry-placer machines, being more especially intended for use in connection with mercury, whereby the free precious metal values are readily caught and saved.

An important feature of my improved apparatus consists of the agitating devices whereby the material under treatment is thoroughly broken up and stirred, thus releasing the precious metal particles and allowing them to settle to the bottom of the tank and unite with the quicksilver or mercury, if the latter is employed.

My improved machine may be advantageously employed without the use of mercury, if desired.

The apparatus consists of a suitable supporting-base, a tank revolubly mounted thereon, agitating devices mounted to rotate in the tank, means for operating the tank and agitating devices simultaneously or the tank independently, as may be desired, a feed-hopper, and an automatically-actuated cut-off slide constructed and arranged to control the discharge from the hopper.

Having briefly outlined my improved construction and the function it is intended to perform, I 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 top or plan view of my improved apparatus, the agitators being shown in two positions, one in full lines and the other in dotted lines. Fig. 2 is a side elevation of the same. Fig. 3 is a section taken on the line 3 3, Fig. 1. Fig. 4 is a front view of the hopper and cut-off, a portion of the tank being shown to illustrate the manner of operating the cut-off slide. Fig. 5 is a detail view of the cut-off slide. Fig. 6 is a fragmentary sectional detail view illustrating the agitator construction, which is shown on a larger scale.

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

Let the numeral 5 designate a relatively stationary base, which forms the support for the cylindrical tank 6, the latter being mounted to rotate on the support. On the center of the bottom of the tank a boss 6^a is formed on the outside. This boss is provided with a short depending journal 6^c, which enters a counterpart socket formed in the base. Projecting upwardly from the center of the bottom of the tank on the inside is a post 7, whose upper portion is reduced in size to receive a frame 8 of cruciform shape, and whose central portion is provided with an opening to receive the post. Each of the four radial members of this frame consists of two vertically-separated horizontal arms 8^a, to which are attached depending pins or bolts 9 by means of nuts 10 and 12. The upper portion of the bolt 9 is threaded to receive the nuts, while the lower portion of the bolt is square or polygonal in cross-section, and upon this squared portion are mounted agitators 13, each of which consists of a hub 13^a, having a square hole to fit the polygonal portion of the bolt, whereby the agitators are held securely in place. Each agitator is further provided with two blades or paddles 13^c, projecting in opposite directions and oppositely-inclined in order to thoroughly agitate the contents of the tank. These agitating-paddles are vertically adjustable by means of the nut 12, which is confined between the two parts 8^a, and therefore cannot move vertically on the bolt or threaded pin. Hence by turning this nut 12 the bolt, with its agitating-paddles, may be raised or lowered, as may be desired, according as it is necessary to lift the paddles farther above or bring them nearer to the bottom of the tank. The nut 10 is a lock-nut and may be loosened when it is desired to adjust or regulate the

paddles, as aforesaid. The lower end of the bolt 9 is provided with a head 9^a, which enters a counterpart socket formed in the bottom of the lower agitator-hub 13^a. The portion of the bolt to which the hubs are attached being square prevents the paddles from turning on the bolts when they are once placed in position. The paddles may, however, be removed and placed on the bolt in the reverse position, if desired. This will of course necessitate the removal of the bolt carrying the paddles. As shown in the drawings, four of these bolts are employed, one being connected with each duplex member of the cruciform frame. While two agitators only are shown on each bolt, it is evident that any desired number of these agitators may be employed. The number of agitators for each bolt will to some extent be determined by the depth of the tank.

The cruciform frame is connected with the center post 7 of the tank by means of a washer 14 and a stud-bolt 15. This bolt must be so adjusted that the frame will turn freely on the post.

One member of the frame 8 projects outwardly beyond the circumference of the tank 6, as shown at 8^c, and with it is connected a rod 16, forming a part of the operating mechanism. This rod 16 has split or bifurcated extremities which are provided with ball-sockets. The tension of these split ends is regulated by set-screws 17. One extremity of the rod 16 engages a ball-shaped stud 18, mounted on the extension 8^c of the frame 8, while the opposite end of this frame engages the ball extremity 19 of a lever 20, centrally fulcrumed on a stud 21 and connected at its extremity remote from the rod 16 with a rod 22, which is also connected with a lever-arm 23, fast on a shaft 24, to whose outer extremity is attached a crank 25. The shaft 24 is journaled in the supporting-base of the machine, and to its inner extremity is attached a segmental gear 26, which meshes with a cogged rack 27, formed on the bottom of the tank 6. The shaft 23 is also provided with a depending lever-arm 28 for convenience in connecting the apparatus with any suitable power.

The material to be treated is fed to the tank 6 from a hopper 29, having an opening 30 at its discharge end. The discharge from this opening is regulated by a cut-off slide 31, slidably mounted in the hopper and actuated by pins 32, fast in the upper edge of the tank on opposite sides of the slide. The hopper is mounted above the upper edge of the tank and held in place by suitable supporting parts 33 and 34, connected with the tank-supporting base. (See Figs. 2 and 3 of the drawings.)

When the apparatus is in use, the shaft 24 is given partial rotations in reverse directions either by the use of the hand-crank 25 or any other suitable power connected with the arm 28. This back-and-forth movement of the rock-shaft imparts partial rotations to the tank in reverse directions. This movement of the rock-shaft also actuates the agitators by virtue of the operating parts 16, 20, 22, and 23, heretofore explained. It will be seen that as the shaft 24 is operated as described the agitators and the tank are simultaneously moved in opposite directions, whereby the maximum degree of agitation is attained for a given movement of the shaft.

If it is not desired to move the agitating mechanism, the rod 16 may be disconnected from the cruciform frame and the said frame turned to the position shown by dotted lines in Fig. 1, after which the frame may be secured to an upwardly-projecting part 35, connected with the base. The upper end of this part 35 is suitably connected with the cruciform frame by means of a clamping device 36. The rod 22 should also be disconnected from the arm 23 of the rock-shaft. The shaft may then be operated without moving any superfluous parts. In this event the tank only will be moved by virtue of the engagement of the segmental gear 26 with the rack 27 of the tank.

When the machine is in operation, the material to be treated is discharged into the hopper 29 and the machine set in motion either by hand or other power. As the tank 6 is moved back and forth the pins 32 alternately engage the ends of the slide 31, whereby the latter is moved back and forth. This slide is provided with a recess 31^a, which when the slide is moved in one direction is made to register with the opening 30 of the hopper, while when the slide is moved in the opposite direction the opening 31 is thrown out of register with the opening in the hopper and the feed to the tank cut off. In this way there is an intermittent discharge from the hopper into the tank of any desired magnitude. The tank is further provided with a vertical opening 37, which is controlled by a gate 38. This gate is slidably mounted in suitable ways formed on or connected with the tank and is vertically adjustable. When the machine is in operation, the gangue is discharged through the opening 37 and over the top of the gate 38. It is evident that by means of this gate any desired depth of material may be maintained in the tank.

Before beginning the operation of the machine the necessary quantity of liquid mercury is placed in the tank. This mercury naturally occupies the lowermost position, and as the machine is operated the metal values seek the lowest possiblelevel and are caught and saved by the mercury.

In further explanation of the construction it may be well to state that the supporting-base is provided at each corner with a horizontal ledge A, upon which the outer portion of the tank rests. Each part of the tank where

it engages a ledge A is reinforced, as shown at B, to give an increased bearing-surface and form a more stable support for the tank.

Attention is called to the fact that while my machine is more especially intended for use as a dry-placer machine it may be advantageously employed with water or wet apparatus. It must therefore be understood that the construction covered by the claims hereinafter presented is equally applicable to the treatment of pulverized ores or placer dirt, whether the same is introduced in a dry or wet condition.

Having thus described my invention, what I claim is—

1. The combination with a suitable support, of a tank mounted to rotate thereon and having a central post, a cruciform frame mounted on the post and provided with agitators, one arm of said frame projecting beyond the periphery of the tank, and means connected with the projecting arm and acting on the tank for simultaneously actuating the tank and agitators.

2. The combination with a suitable support, of a tank mounted thereon and provided with a central post, a cruciform frame revolubly mounted on the post and provided with agitators, one part of said frame projecting beyond the periphery of the tank for operating purposes, and means for vertically adjusting the agitators upon the frame.

3. The combination with a support, of a tank mounted thereon, a frame revolubly mounted on the tank and provided with duplex members whose parts are vertically separated, threaded pins passing through openings in the said duplex members, agitators mounted on the pins, and nuts applied to the threaded portions of the pins and fitting closely between the parts of the duplex members, for regulating the vertical position of the agitators.

4. The combination with a support, of a tank mounted thereon, a frame revolubly mounted on the tank and provided with duplex members whose parts are vertically separated, threaded pins passing through openings in the said duplex members, and having shanks polygonal in cross-section, agitators mounted on the polygonal portion of the pins whereby they are prevented from relative rotary movement thereon, and nuts applied to the threaded portions of the pins and fitting closely between the parts of the duplex members for regulating the vertical position of the agitators.

5. The combination of a tank suitably mounted, a frame revolubly mounted on the tank and composed of radial duplex members, the parts of each member being vertically separated, a threaded pin passing through each radial member, a nut applied to the threaded portion of the pin and fitting closely between the parts of the member, an agitator arranged on the pin below the radial member of the frame, and a lock-nut applied to the upper extremity of the pin and engaging the uppermost duplex member.

6. The combination of a tank revolubly mounted and provided with a segmental cogged rack attached directly to the bottom of the tank, a segmental gear engaging said rack, a rock-shaft to which the last-named gear is secured, an agitator revolubly mounted on the tank, and an operative connection between the rock-shaft the tank and agitator whereby as the said shaft is operated, the tank and agitator are given partial rotations in reverse directions, the said parts moving simultaneously in opposite directions.

7. The combination of a tank revolubly mounted, means for imparting to the tank partial rotations in reverse directions, a hopper mounted in operative relation with the tank, a cut-off slide extending across the discharge-mouth of the hopper, and means mounted on the tank for reciprocating said slide which is provided with a recess which registers intermittently with the discharge-mouth of the hopper as the slide is actuated.

8. The combination of a tank revolubly mounted and provided with a cogged rack attached directly to its bottom, an operating rock-shaft, a gear fast on said shaft and meshing with the rack of the tank, an agitator relatively mounted on the tank, and an operative connection between the agitator and the rock-shaft, comprising a crank made fast to the shaft, a lever fulcrumed on the frame, a link connecting one arm of the lever with the crank, and a connecting-rod leading from the opposite arm of the lever to the agitator.

9. The combination of a tank suitably mounted and provided with a central post, a cruciform frame mounted to rotate on said post, agitators movably connected with the frame, one part of the said frame projecting beyond the periphery of the tank, an operating-shaft, a gear fast thereon, a gear fast on the tank and meshing with the gear of the shaft, a crank fast on the shaft, a lever having a relatively stationary fulcrum, a link connecting the crank of the shaft with one arm of the lever, and a rod connecting the opposite arm of the lever with the projecting part of the agitator-frame.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN J. CALLAHAN.

Witnesses:

GILBERT C. WELLS,

JOHN H. H. LOW.