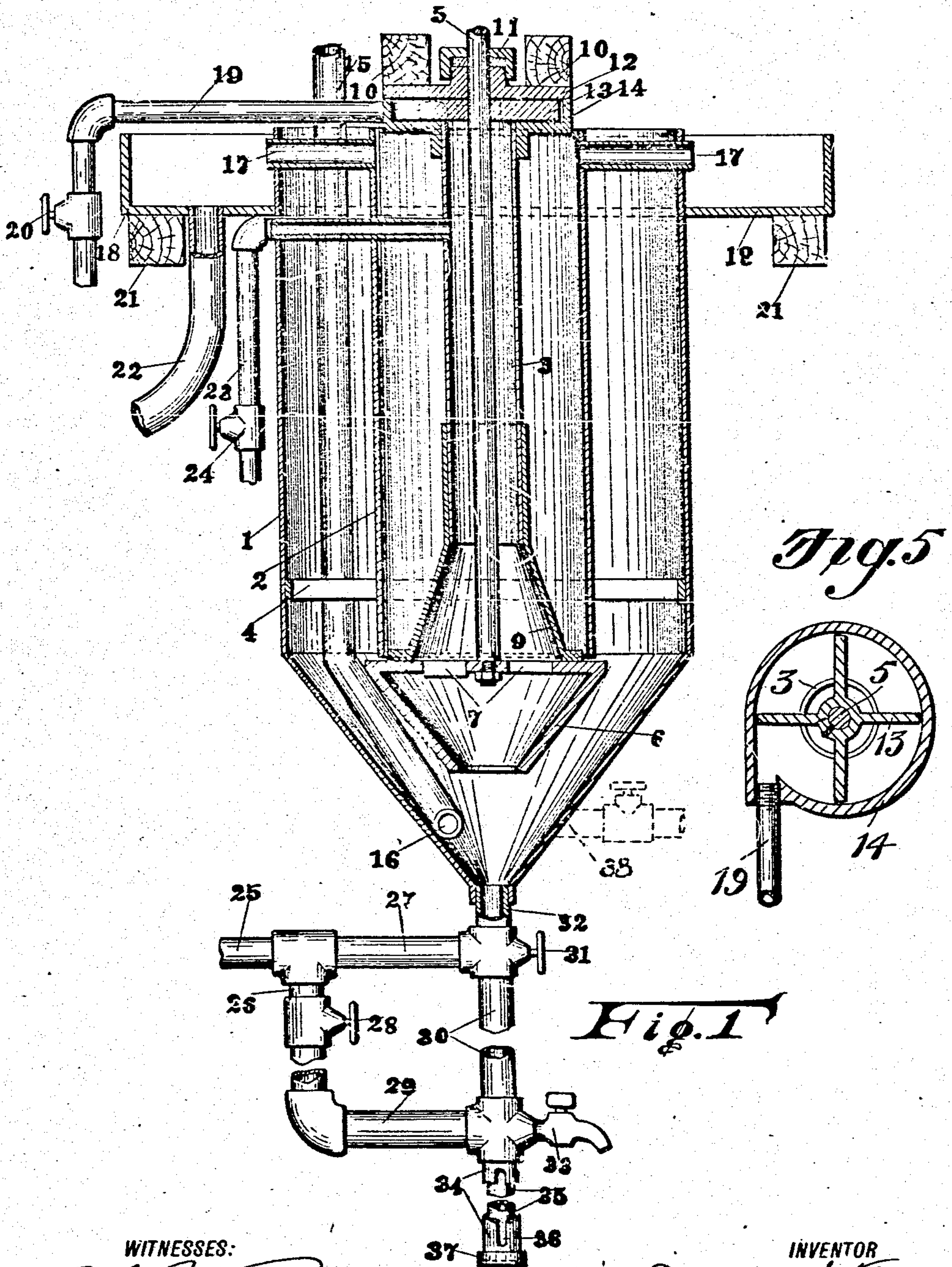


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PLACER SEPARATOR.
APPLICATION FILED JULY 7, 1908.

975,684.

Patented Nov. 15, 1910.
2 SHEETS-SHEET 1.



WITNESSES:
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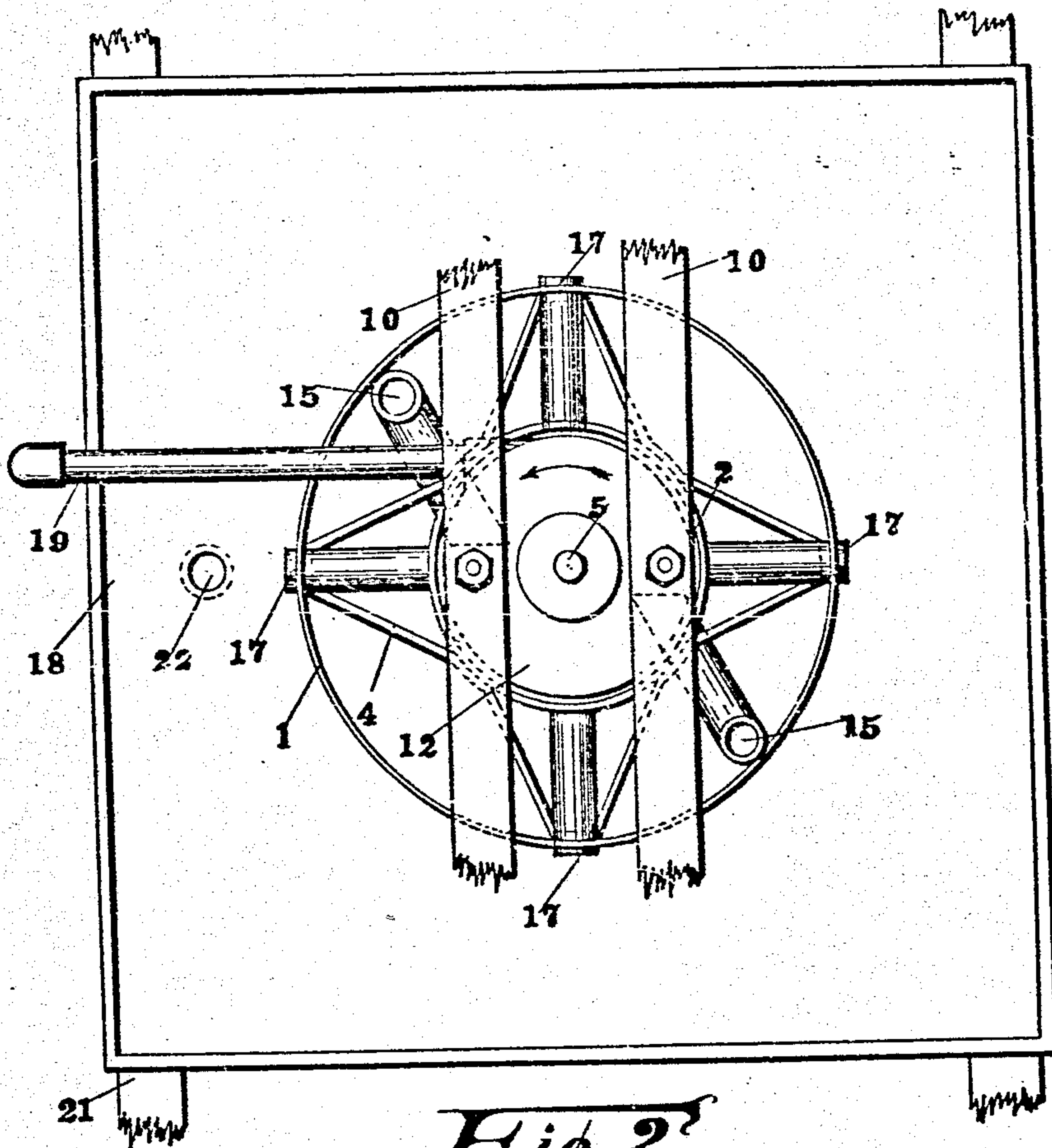


Fig 2

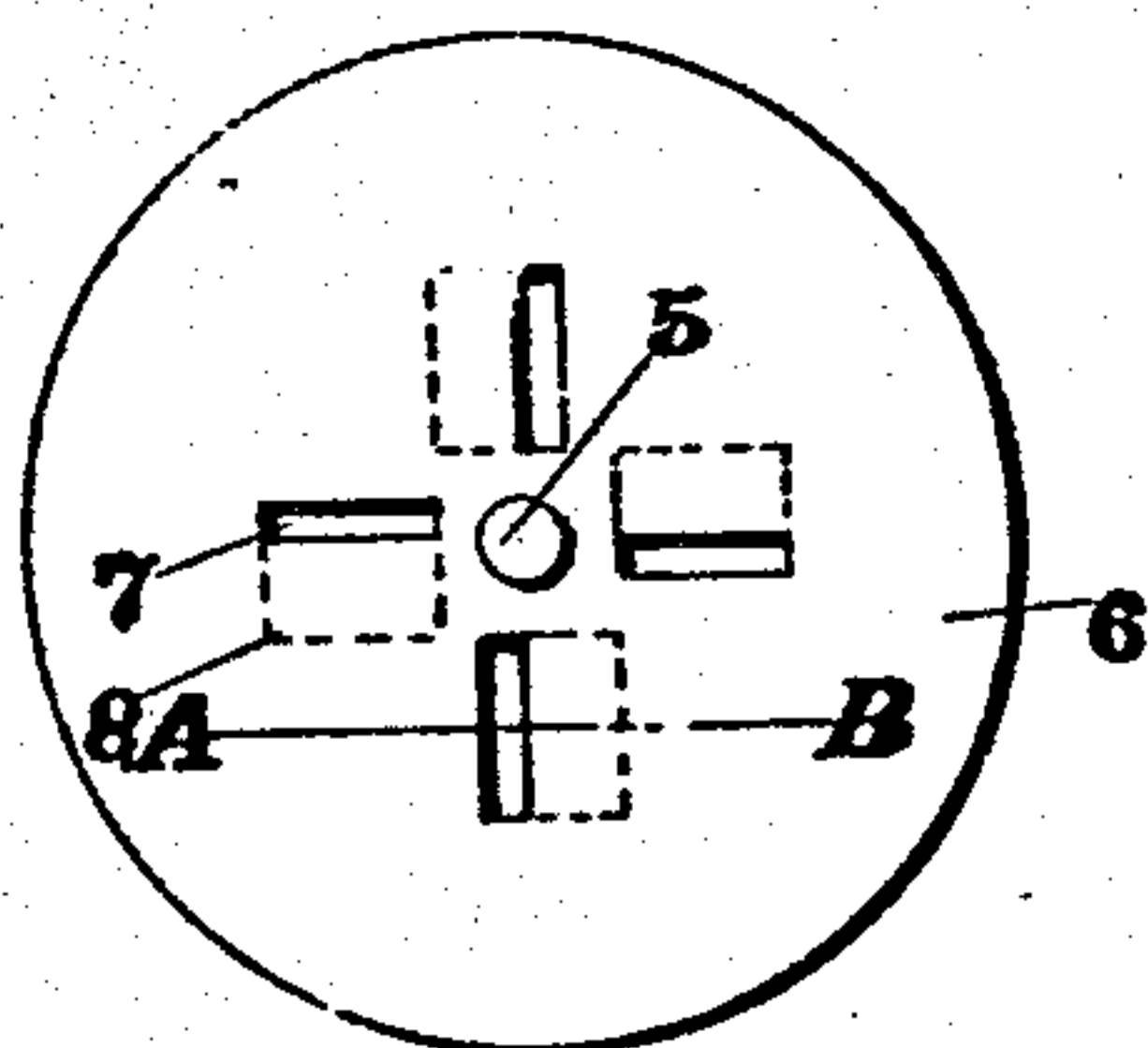


Fig 3

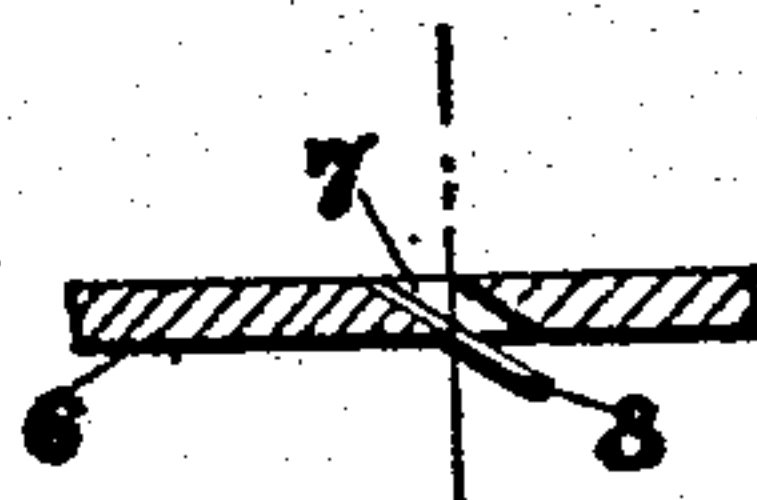


Fig 4

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UNITED STATES PATENT OFFICE.

DUDLEY J. FORBES, OF PORTLAND, OREGON, ASSIGNOR TO THE HYDRAULIC GRAVITY SEPARATOR CO., OF PORTLAND, OREGON.

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975,684.

Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed July 7, 1908. Serial No. 442,378.

To all whom it may concern:

Be it known that I, DUDLEY J. FORBES, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Placer-Separators, of which the following is a specification.

This invention relates to certain new and useful improvements in placer separators.

The object of my invention is to provide a separator of the class described in which the heavy precious metal will be collected within a transparent receptacle, the refuse being carried away in an upwardly traveling column, insuring every particle of gold gravitating to the bottom of the separator in the operation of extracting the gold.

With these and other objects in view, the present invention consists in the combination and arrangement of parts as will be hereinafter more fully described and particularly pointed out in the appended claims, it being understood that changes in the specific structure shown and described may be made within the scope of the claims without departing from the spirit of the invention.

In the drawings forming a part of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a sectional elevation with parts broken away of a separator embodying my invention. Fig. 2 is a top view. Fig. 3 shows a top view of the lifting pump. Fig. 4 is a section on line A—B of Fig. 3. Fig. 5 shows a detail view in horizontal section through the upper pump.

In carrying out the aim of my invention, I employ a preferably square over-flow tank 18, carried by means of suitable supporting sills 21. This tank has a central opening within which is held the cylindrical drum 1, the upper open end of which extends above the upper edge of the over-flow tank 18. This drum 1 has a conical bottom or settling chamber carrying the nipple 32, to which is secured an ordinary valve 31 having two branches, one receiving the vertically disposed settling pipe 30, and the other the horizontally disposed water supply pipe 27. Connected to the settling pipe 30 by means of a tee is the valve 33, while extend-

ing from the tee is the water supply pipe 29, this pipe by means of an elbow, pipe 26 and a tee being secured to the supply pipe 27. Secured to the lower end of the pipe 30 is the slotted extension 34 within which is held the glass settling tube 35 which is visible through the slot 36 within this lower pipe section 34. The tube 35 is snugly held within the slotted pipe 34 and is retained by means of the cap 37. Extending from the over-flow tank 18 is the drain pipe 22. Entering the drum 1 from above are two or more feed pipes 15 shown in Fig. 2, which vertically enter the drum and have their lower ends so bent as to empty tangentially within the conical bottom of the drum.

Held centrally within the drum is an open ended cylinder 2; the upper end of this cylinder is approximately on a line with the top of the drum while the lower edge of this cylinder ends at the upper edge of the conical bottom of the drum as shown. At its lower end this open ended cylinder is held to the drum by means of the supporting bars 4. At its upper end this drum 2 is provided with a plurality of escape openings from which extend the escape pipes 17 which pass through the drum and empty into the over-flow tank 18. These escape pipes 17 support the cylinder at the upper end.

Supported by means of the sills 10, is the pump casing 14 which is of a diameter slightly smaller than the diameter of the open ended cylinder and is held squarely above this cylinder as is shown in Fig. 1. Extending from this pump casing is a tube 3 which ends a suitable distance above the lower end of the cylinder 2 and at its lower end carries the bell 9, the lower largest end of which is of a diameter less than the inner diameter of the cylinder 2, this bell ending with the cylinder.

Held within the pump casing 14, is the pump head 13 which is carried upon the operating shaft 5, which is continued through the pump casing, the pump head 13, the tube 3, and below extends beyond the bell 9. Secured to the lower end of this driving shaft 5, is a frusto-conical lifting head the lower smaller end of this lifting pump being positioned squarely above the settling tube 30. The bottom of this lifting pump is provided with a plurality of radially extending slots 7,

within which are obliquely held the downwardly directed agitating blades 8. As shown, the bottom of this lifting pump is of a greater diameter than the cylinder 2. The top of this lifting pump 6 is held proximately to the lower end of the cylinder 2 there being a slight escape opening between the cylinder and lifting pump as clearly disclosed in Fig. 1.

10 Extending from the tube 3 and passing through the cylinder 2 and drum 1, is the outlet pipe 23 this pipe extending from near the upper end of said tube and being provided with an ordinary valve 24. By extending the pump beyond the cylinder horizontally the former serves as a deflector helping to keep the concentrates from the overflow.

The operation of my device is very simple. 20 The crushed ore is fed into the drum through the feed pipes 15. At the same time the valve 31 will have been opened permitting an inrush of water through the supply pipes 25 and 27 to flood the drum, as well as the cylinder and tube 3. The upward force of the water tends to separate the lighter particles of placer from the heavier and more valuable particles which glide into the settling pipe. The rotation of the shaft 5 30 causes the pump head 13 to rotate as well as operating the lifting pump so that the material within the drum is being continually agitated. The pump 13 is a suction pump which draws the water upward and discharges through the escape pipe 19 which is provided with a controlling valve 20 as shown. A certain amount of refuse is raised and carried upward within the cylinder 2 and finds an escape through the pipe 17 into 40 the over-flow tank.

The separator is simple and comparatively inexpensive in construction, and both durable and efficient in operation.

45 Having thus described my said invention what I claim as new and desire to secure by United States Letters Patent is:

1. The herein described separator, comprising the combination with an over-flow tank, of a drain pipe extending from said tank, a drum carried by said tank and extending above said tank having a conical bottom, a settling pipe extending from the bottom of said drum, a water supply pipe communicating with said settling pipe, a feed pipe entering said drum and entering tangentially within said bottom, an open ended cylinder held with said drum and above said conical bottom and ending in alinement with the top of said drum, escape 60 pipes extending from said cylinder and entering into said over-flow tank, a pump casing positioned above said cylinder, a tube extending from said pump casing and held within said cylinder, a bell extending from 65 said tube and ending in alinement with said

cylinder, a rotary pump head within said casing, a driving shaft extending through said casing, pump head and below said bell, a frusto-conical lifting head at the lower end of said shaft having a slotted bottom of a diameter greater than said cylinder and held proximal to the lower end thereof, obliquely held downwardly extending agitating blades within said slots, an outlet pipe extending from the upper end of said tube, and an escape pipe extending from said pump casing. 75

2. The herein described separator comprising a drum having a conical bottom, a settling tube extending from said bottom, means for supplying water to said settling tube, a discharge pipe entering said drum, an over-flow tank secured to the upper end of said drum, an open ended cylinder within said drum, escape pipes extending from said cylinder and emptying into said over-flow tank, a pump head above said cylinder, a tube extending from said pump head and ending above said settling pipe, and a lifting pump at the lower end of said cylinder and communicating with said tube all arranged 85 substantially as and for the purpose set forth. 90

3. The herein described separator comprising a drum, a settling tube extending from said drum, means for supplying water to said settling tube, a discharge pipe entering said drum, an overflow tank secured to the upper end of said drum, an open ended cylinder within said drum, escape pipes extending from said cylinder and emptying into said overflow tank, a pump head above said cylinder, a tube extending from said pump head and ending above said settling pipe, a lifting pump at the lower end of said cylinder and communicating with said tube, and a discharge pipe extending from said tube. 10

4. The herein described separator comprising a drum, a settling tube extending from said drum, means for supplying water to said settling tube, a discharge pipe entering said drum, an overflow tank secured to the upper end of said drum, an open ended tube within said drum, an escape pipe extending from said drum, a pump secured to the upper end of said tube, a pump secured to the lower end of said tube, and means to simultaneously operate said two pumps. 15

5. A device of the character described consisting of a drum, a settling chamber forming the lower end of said drum, a cylinder within the latter and having overflow outlets and a lower opened end, a tube within the cylinder, a lifting pump located within the lower portion of the drum and below the cylinder and delivering to the tube, said pump being formed to extend horizontally beyond the open end of the cylinder and substantially closing said cylinder except for the annular slit formed by slightly spacing 1

the pump from the cylinder, and means for operating said pump as and for the purpose described.

6. In combination, a drum, a settling
5 chamber at the lower end of said drum, an open ended cylinder within said drum, an open ended tube within said cylinder, a shaft extending through said tube, a pump at the lower end of said shaft proximal to said cylinder, a second pump at the upper end of
10 said shaft proximal to said cylinder, means for simultaneously operating said pumps and a discharge pipe entering said drum.

7. The herein described separator comprising a drum, the lower portion of which
15 forms a settling chamber, a cylinder located within said drum and having overflow outlets at the top and an open end, a tube within the cylinder, a lifting pump delivering to
20 the tube positioned slightly below the lower open end of the cylinder and closing the same except for the narrow annular space

between the end of the cylinder and the pump, and means for directing ore within the drum and below said lifting pump. 25

8. The combination with a drum having a settling chamber at the lower end thereof, of an open ended cylinder within said drum, means for supplying water to said drum, a tube within said cylinder having an enlarged
30 flared end partly inclosing the lower end of said cylinder, a shaft passing through said tube, a pump head secured to the lower end of said shaft and communicating with said cylinder and tube, escape pipes extending
35 from said tube, escape pipes extending from said cylinder, and a pump at the upper end of said shaft communicating with said tube.

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

DUDLEY J. FORBES.

Witnesses:

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PETER C. LASSEN.