

No. 720,338.

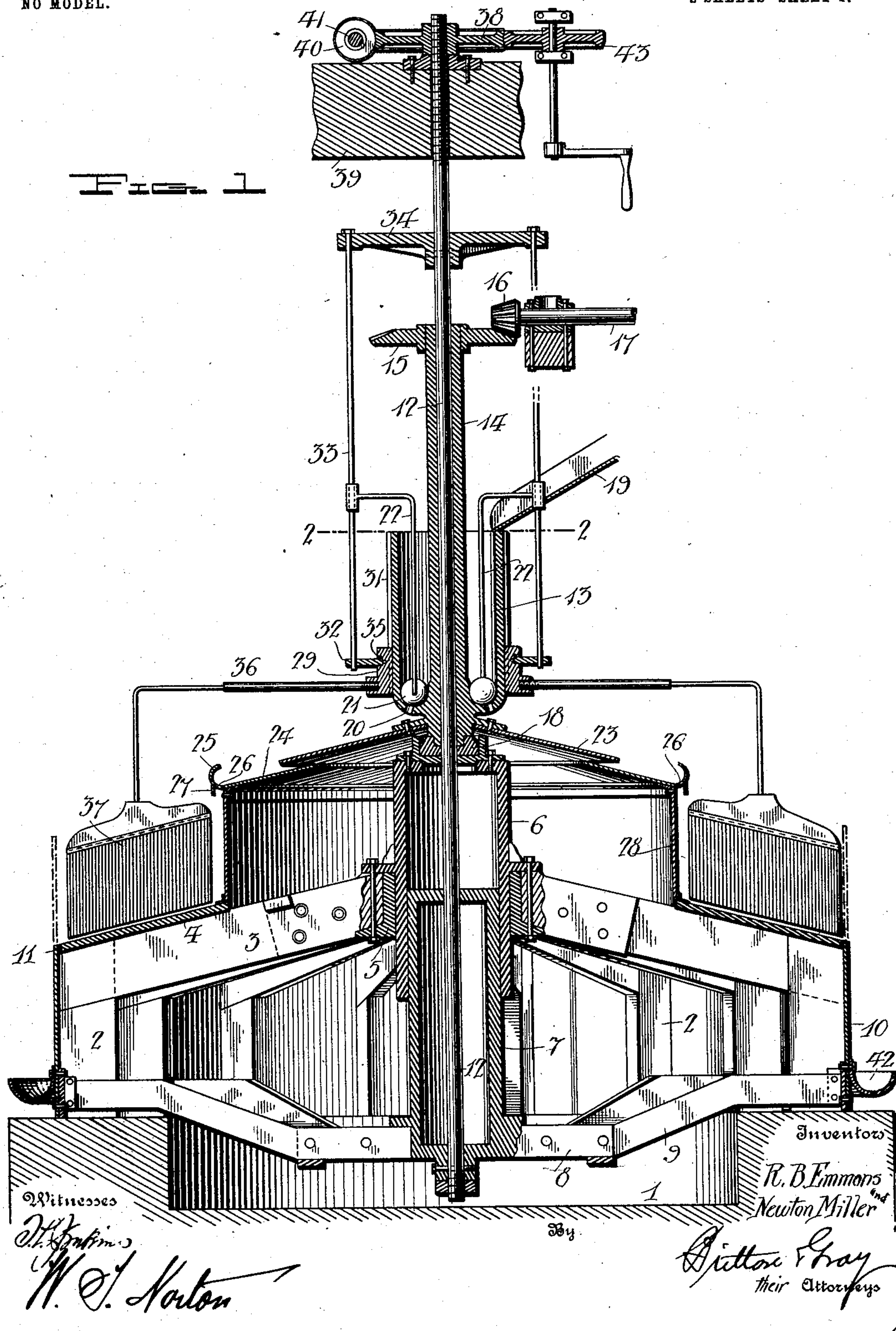
PATENTED FEB. 10, 1903.

R. B. EMMONS & N. MILLER.
ORE SEPARATOR.

APPLICATION FILED AUG. 15, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 2

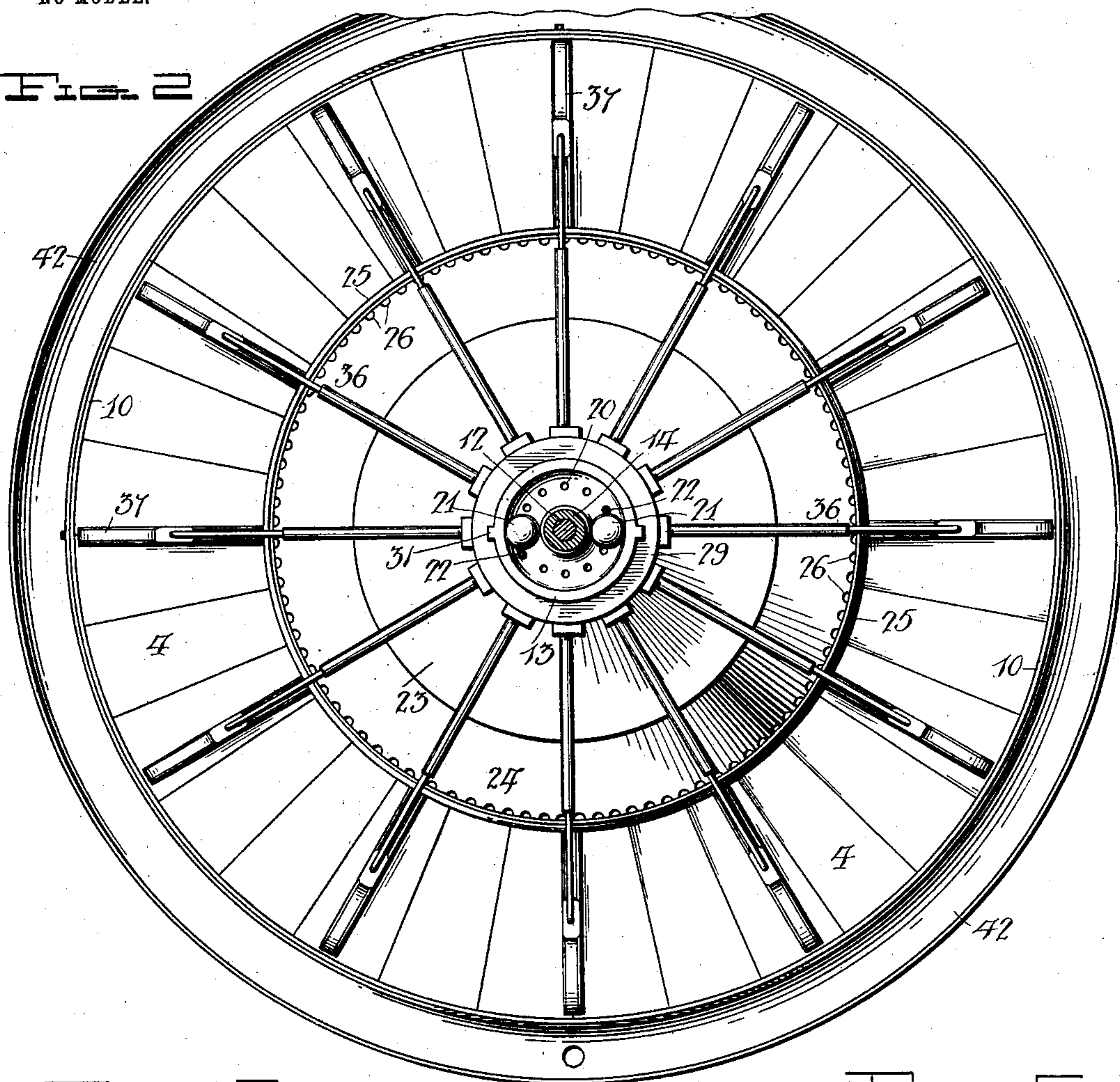


FIG. 3

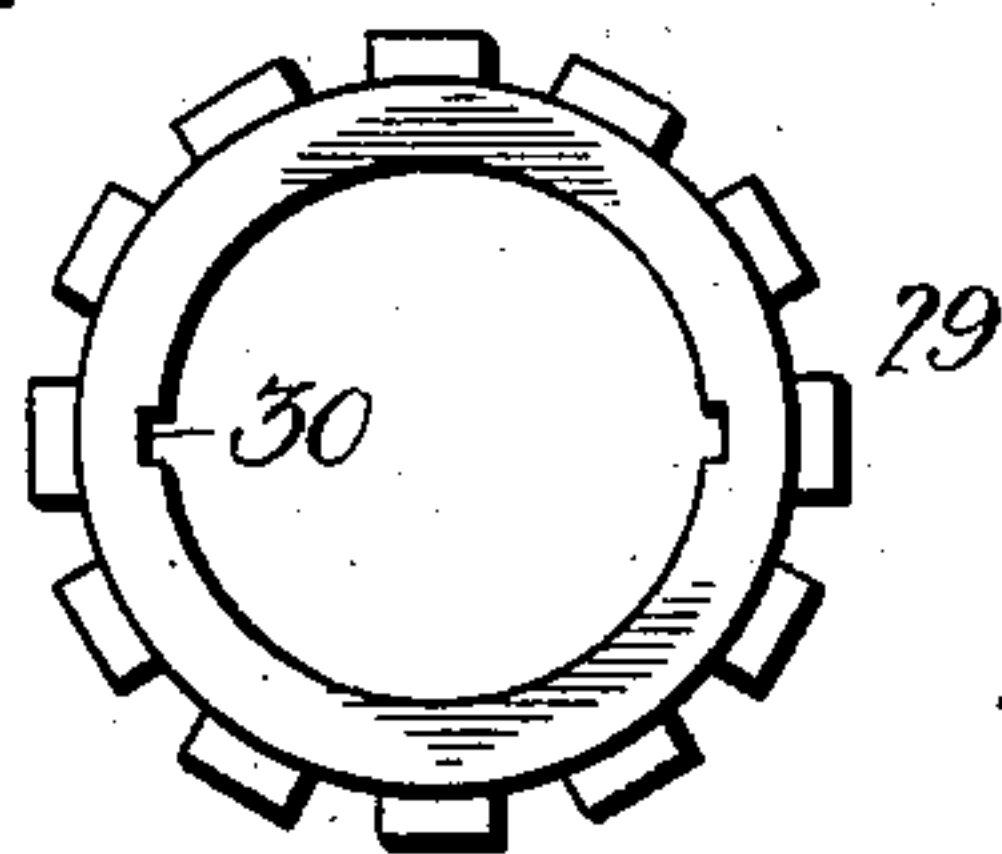


FIG. 5

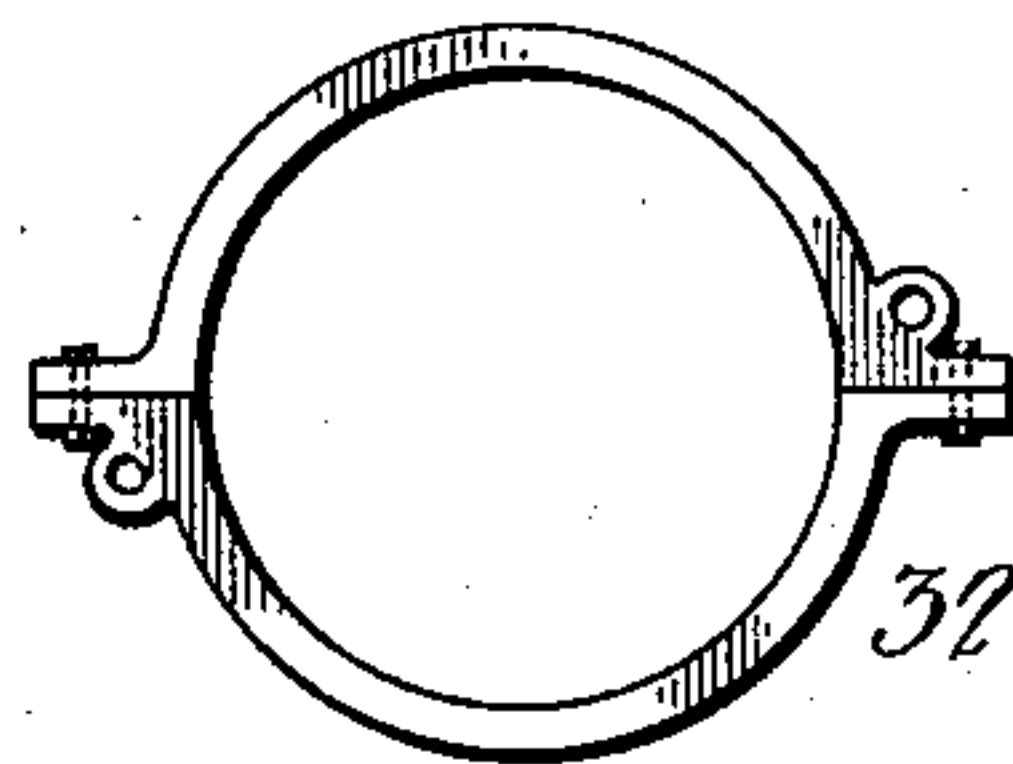
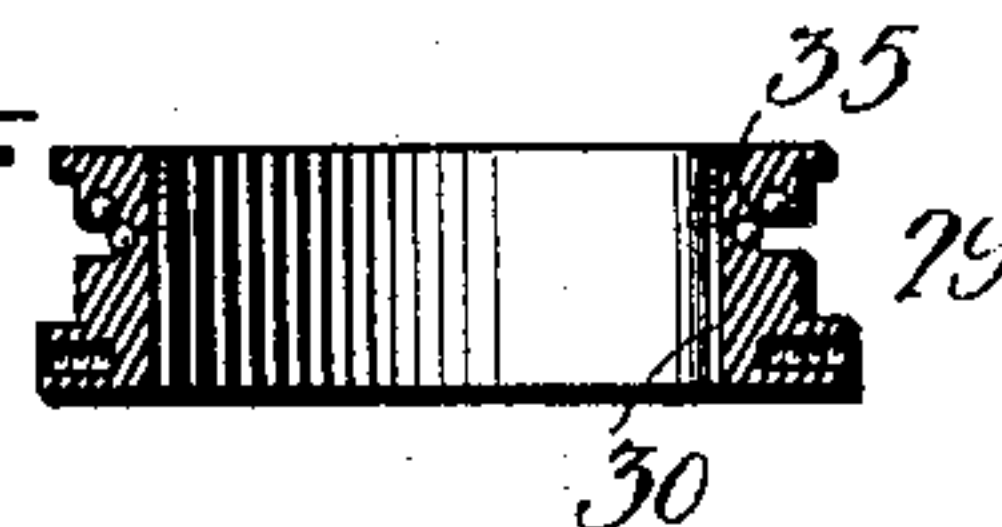


FIG. 4



Witnesses

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334

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UNITED STATES PATENT OFFICE.

RICHARD B. EMMONS, OF GALENA, KANSAS, AND NEWTON MILLER, OF JOPLIN, MISSOURI.

ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 720,338, dated February 10, 1903.

Application filed August 15, 1902. Serial No. 119,783. (No model.)

To all whom it may concern:

Be it known that we, RICHARD B. EMMONS, residing at Galena, county of Cherokee, State of Kansas, and NEWTON MILLER, residing at Joplin, in the county of Jasper and State of Missouri, citizens of the United States, have invented certain new and useful Improvements in Ore-Separators; 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.

This invention relates to ore-separators and contemplates an improved apparatus of the wet-process type adapted to effect in a highly-expeditious manner a complete separation from the gangue of the valuable material regardless of the degree of fineness of the latter, the apparatus being especially designed to treat slimes and like masses and to work tailings, which are the result of the treatment of materials by other methods or machines.

The nature of the invention will be readily comprehended, reference being had to the following detailed description of the construction and operation and to the accompanying drawings, illustrating the apparatus in its preferred form, it being understood that various changes may be made therein without departing from the spirit of the invention as defined by the claims.

In the drawings, Figure 1 is a vertical central sectional view of an ore-separator embodying the invention. Fig. 2 is a horizontal sectional view on line 2 2 of Fig. 1, certain of the parts being omitted. Fig. 3 is an enlarged detail plan view of a collar carrying the brush-supporting arms. Fig. 4 is a cross-sectional view of the collar. Fig. 5 is a detail view of a split ring carried by the collar.

Referring to the drawings by numerals, 1 denotes a foundation upon which is erected a preferably circular series of uprights 2 2, forming supports for the outer ends of radially-disposed beams 3 3. The beams, which incline upwardly from their forward ends, form the support for a sloping circular table

4, and the inner ends of the beams are joined to a central spider 5, having an opening in which is secured a tubular casing 6, forming the guide for a vertically-movable casing 7, having at its lower end a spider 8, from which extend radial arms 9 9. Fixed to the outer ends of the arms 9 is a casing-wall 10, circular in form and having the proper diameter to secure close contact between it and the outer edge of the table 4, a suitable packing 11 being interposed for a purpose presently to be stated.

12 is a shaft secured at its lower end centrally to the spider 8 and extending vertically through and considerably beyond the telescoping casings 6 and 7. Supported on the top of the casing 6 is a rotatable cylinder 13, having a central tubular stem 14, loosely receiving the shaft 12 and carrying at its upper end a bevel-gear 15, which meshes with a bevel-gear 16 on a power-shaft 17. The cylinder 13 is continuously rotated about the shaft 12 through power applied at the shaft 17, and between its lower end and the casing 6 is a step-bearing 18. The material with water is supplied to the cylinder through a feed-spout 19 and falls onto the cylinder-bottom, in which are provided outlets 20 20. The material is fed in a finely-divided state, and to further reduce and agitate the particles and keep the outlets open there are provided balls 21 21, which revolve over the correspondingly-formed cylinder-bottom, the positions of the balls during the rotation of the cylinder being maintained by stationary arms 22 22, extending into the cylinder and mounted in the manner presently to be described. Inasmuch as the arms extend nearly to the bottom of the cylinder they also serve as stirrers for the material. The material leaving the cylinder by the outlets falls onto a conical circular plate 23, carried by and consequently rotated with the cylinder. From the plate 23 the material falls onto a stationary circular dish 24, the outer edge 25 of which is upturned, and adjacent to said edge are openings 26 26, through which the material passes to the table 4. At each opening 26 is a depending lip 27, serving to direct the material to the highest portion of the table. Between the table and dish is a wall 28, fitting the in-

ner edge of the table closely and affording the support for the dish, to which it is secured inside of the line of openings 26.

Surrounding the cylinder is a collar 29, 5 provided with vertical grooves 30, engaging splines 31 on the cylinder, whereby the collar rotates with and is vertically adjustable on the cylinder. In an annular recess in the collar is loosely fitted a split collar 32, from 10 which are erected rods 33 33. These rods form the supports for the arms 22 22, and their upper ends are secured to a cross-head 34, which is keyed to the shaft 12. The cross-head, rods, arms 22, and split collar are incapable of rotation, and to minimize friction 15 between the split collar and collar 29 a ball-bearing 35 is provided. Fixed to and extending radially from the collar 29 are arms 36 36, to depending portions of which are secured 20 brushes 37 37, made, preferably, of woven fabric. The brushes rotate with the cylinder 13 and normally contact with the table 4, and to enable worn brushes to be readily replaced by new brushes the arms are made of detach- 25 able telescoping sections.

The casing-wall 10 and brushes are adjusted vertically as the material accumulates on the table 4. The shaft 12 is screw-threaded at its upper end and engages a threaded 30 opening in a worm gear-wheel 38, mounted to revolve on an upper supporting-beam 39. The worm gear-wheel is revolved by a worm 40, keyed to a power-shaft 41.

In operation the material falling from the 35 dish 24 onto the table is agitated by the rotating brushes 37, and the separation of the valuable particles is accomplished at the higher side of the table, the gangue being carried over the outer edge of the table and 40 is conveyed away by a trough 42. When the feed of material has progressed to a certain extent, the shaft 41 is set in motion and the vertical shaft 12 is, through the described gearing, raised, carrying with it the brushes 45 and the wall 10. The elevation of the wall (indicated by dotted lines) forms an annular receptacle for the material, the valuable particles being retained therein and the gangue washing away over the top of the wall. The 50 elevation of the wall is very gradual and its movement is timed according to the feed of the material and the nature and consistency of the mass. The packing 11 between the wall and table edge prevents leakage at this point 55 and renders the annular receptacle when formed practically water-tight. The wall being guided by the telescoping casings 6 7 has a uniform and regular movement, thus insuring a uniform height throughout at all times. The 60 brushes following the movement of the wall are immersed in the material to the proper extent regardless of the depth of material, there-

by securing uniformity in treatment. After a sufficient amount of material has been treated 65 clean water is run through the apparatus to convey the separated particles to a suitable receptacle, and this may be accomplished by means of the trough 42. The wall 10 and brushes are gradually lowered as the washing takes place, this being accomplished by 70 means of a hand-operated gear-wheel 43, which meshes with the wheel 38, the worm 40 being unclutched during the operation.

We claim as our invention—

1. In an ore-separator, the combination of a 75 circular table, a revoluble cylinder centrally above the table receiving the material and provided with an annular bottom having discharge-outlets, walls on the cylinder-bottom, fixed arms extending into the cylinder and 80 engaging the balls to prevent travel thereof, and means to direct the material from the outlets onto the table.

2. In an ore-separator, the combination of a 85 circular table, a vertically-movable shaft central of the table, a vertically-movable circular wall at the outer table edge connected with the shaft, a guide for the movement of the wall, a feed-cylinder rotatable about the shaft, and arranged to discharge the mate- 90 rial onto the table, a collar rotatable with and vertically movable on the cylinder and brushes at the table connected with the said collar.

3. In an ore-separator, the combination of a 95 circular table, a vertically-movable shaft central of the table said shaft having a threaded portion operatively connected with gearing for raising and for lowering the shaft, a vertically-movable circular wall at the outer 100 table edge connected with the shaft, a rotatable feed-cylinder having a central tubular portion loosely receiving the shaft and provided with outlets in its bottom, means for directing the material onto the table, balls in 105 the bottom of the cylinder, a collar rotatable with and vertically movable on the cylinder, brushes at the table carried by the collar, and a stationary collar around the aforesaid collar and carrying arms engaging the balls 110 to prevent travel thereof.

In testimony whereof we have signed our names to this specification in the presence of the subscribing witnesses.

RICHARD B. EMMONS.
NEWTON MILLER.

Witnesses to signature of Richard B. Emmons:

W. T. NORTON,
I. L. J. BRIBINS.

Witnesses to signature of Newton Miller:

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EDWARD L. SHEPHERD.