

(No Model.)

2 Sheets—Sheet 1.

S. BEER.
ORE CONCENTRATOR.

No. 531,498.

Patented Dec. 25, 1894.

Fig. 1

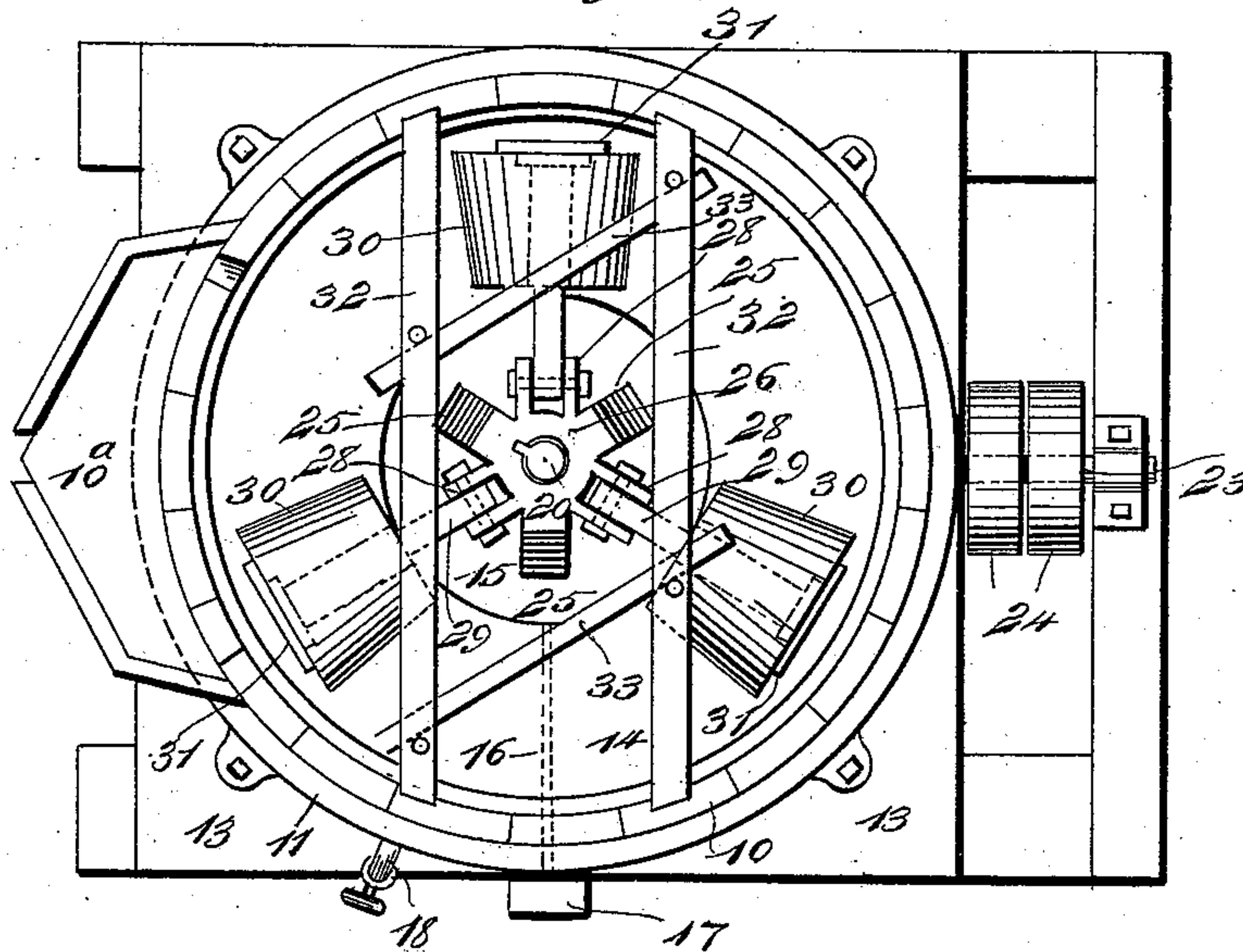
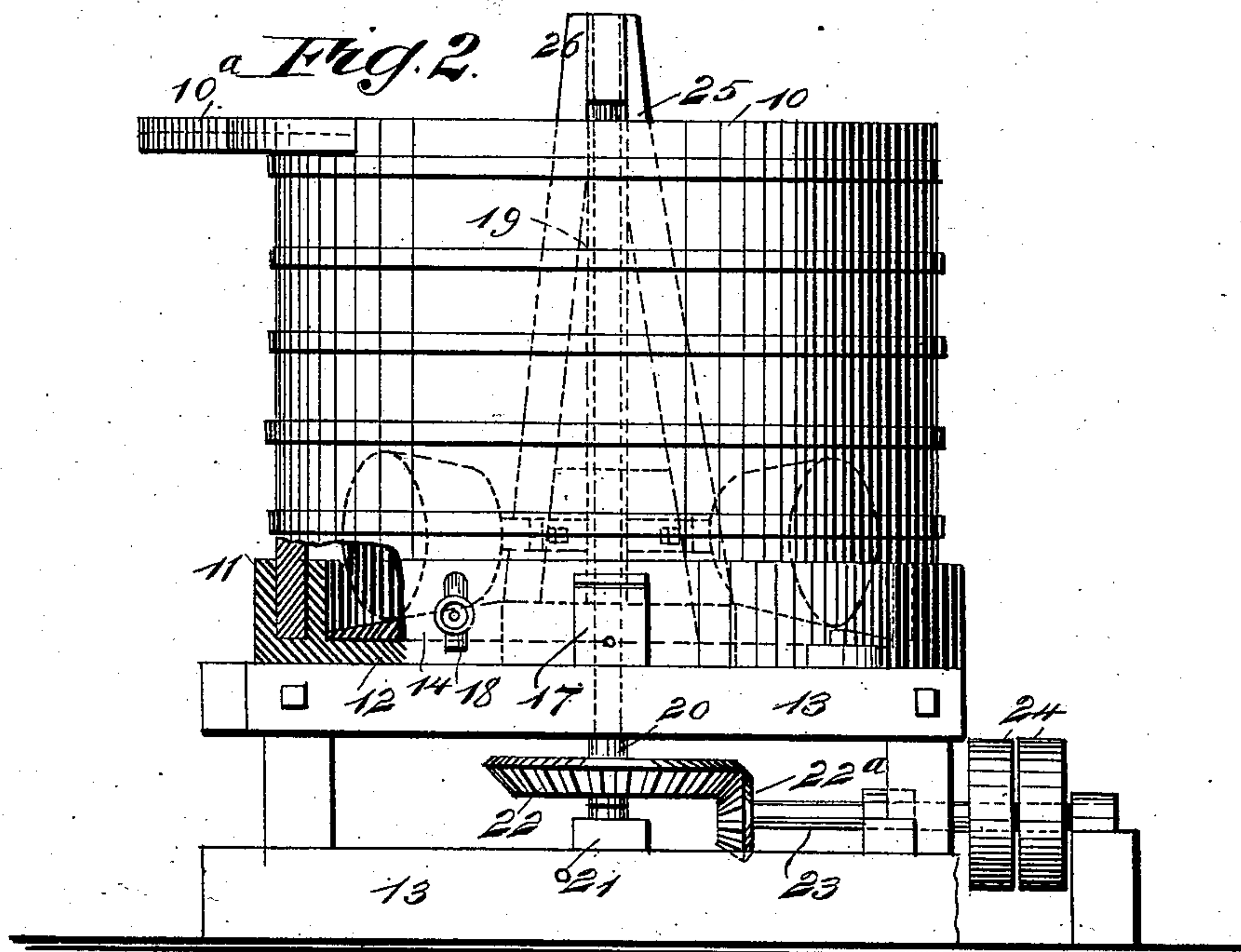


Fig. 2



WITNESSES:

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ATTORNEYS.

(No Model.)

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Fig. 3.

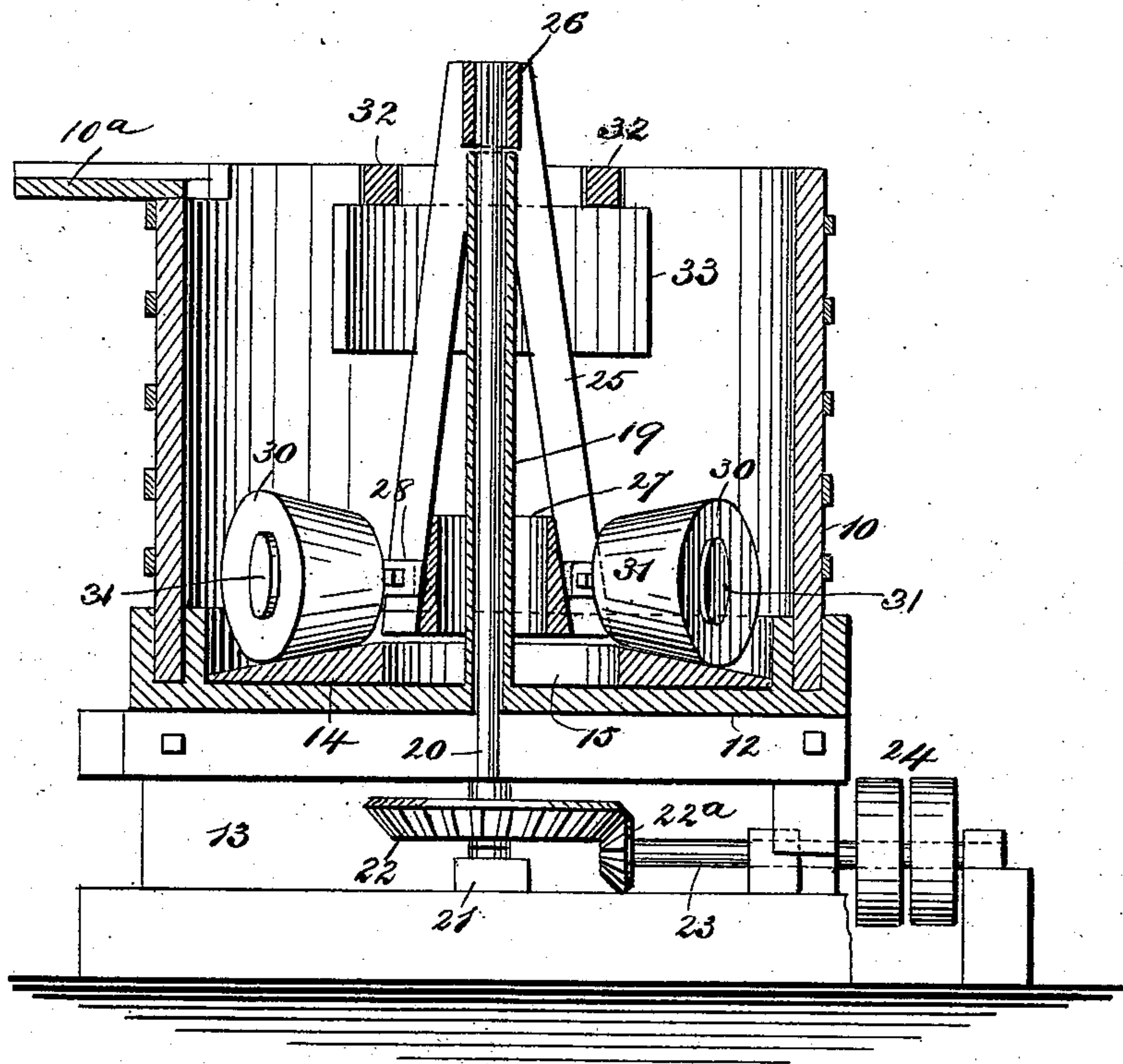
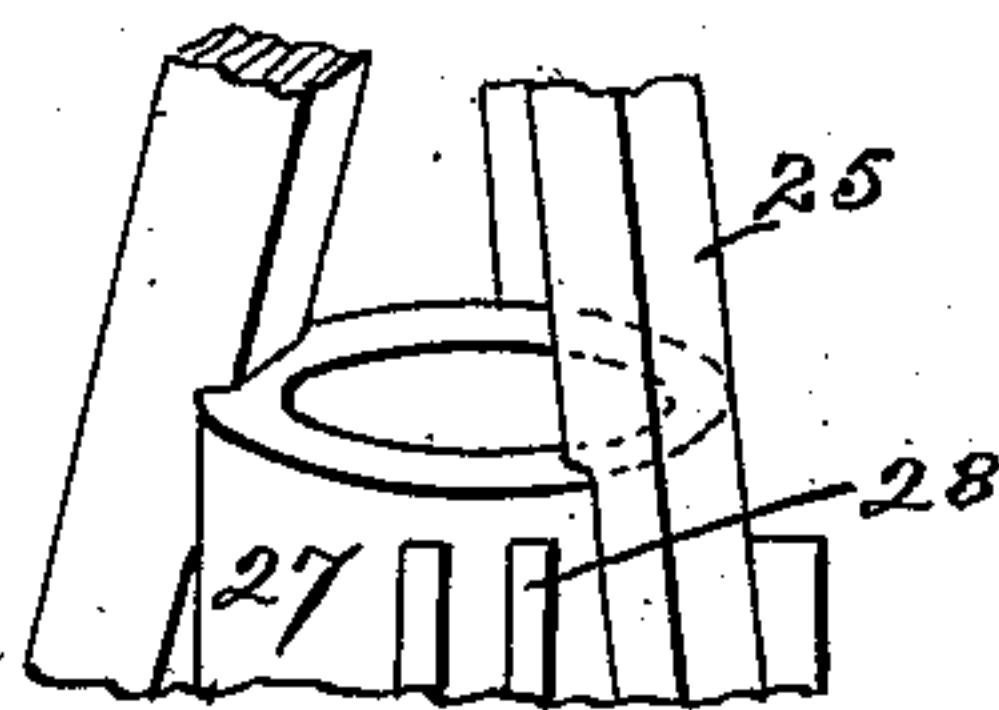


Fig. 4.



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UNITED STATES PATENT OFFICE.

SAMSON BEER, OF BUTTE, MONTANA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 531,498, dated December 25, 1894.

Application filed April 19, 1894. Serial No. 508,164. (No model.)

To all whom it may concern:

Be it known that I, SAMSON BEER, of Butte city, in the county of Silver Bow and State of Montana, have invented a new and Improved Ore-Concentrator, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of apparatus which are used in crushing, concentrating and amalgamating precious ores; and the object of my invention is to produce a very simple and comparatively cheap apparatus which is adapted for use in wet crushing, which combines the function of a crushing mill, amalgamator and concentrator, and which is constructed and arranged in such a way that the said operations are very rapidly and completely performed, effecting a greater saving of gold and silver than other machines for this purpose.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the apparatus embodying my invention. Fig. 2 is a broken side elevation of the apparatus. Fig. 3 is a central vertical section of the same, and Fig. 4 is a broken detail perspective view of the spider frame which carries the crushing roller.

The apparatus is provided with a tub 10 which forms its body and the staves of which are set in the flanges 11 of the iron bottom 12, which is adapted to rest on a supporting frame 13 and has a bed plate 14 within it, which bed plate is slightly thinner at its outer edge than at its inner edge so that the tapering crushing rollers, hereinafter referred to, may fit and follow it nicely, and the said bed plate has a central opening 15 which serves as a basin in which the quicksilver may lie.

On the outer side of the tub is an amalgam box 17 which connects by a duct 16 with the central basin, and quicksilver poured into the amalgam box flows into the said basin.

At one side of the amalgam box is a valve controlled pipe 18, which opens from a point near the bottom of the tub and through which water and concentrates may be drawn.

In the center of the tub is a casing 19 which is preferably cast integral with the bottom 12, and in this casing is held the driving shaft 20 which projects downward through the bottom and is stepped in a suitable bearing 21 and is provided with a gear wheel 22 which meshes with and is driven by a pinion 22^a from the driving shaft 23, this being mounted in suitable bearings and having thereon tight and loose pulleys 24 which receive a driving belt. On the shaft 20 is a spider frame 25 having a collar 26 on its top, which turns above the casing 19 and is keyed to the shaft 20, see Fig. 1, and the arms of this frame merge at their lower ends in the collar 27 which surrounds the casing 19.

On the collar 27 and lugs 28, between which are pivoted the shafts 29 of the crushing rollers 30, the shafts being arranged so as to swing vertically and this arrangement enables a roller to ride over a particularly large rock without doing any damage, as if the rock is too big and hard to be crushed by the first roller, it will be pulverized by the next. The rollers 30 taper slightly, being larger at their outer ends and they run on the bed plate 14. The rollers have, at their outer ends, countersunk washers 31 which are secured to the shafts 29 and which prevent any of the concentrates from passing into the rollers and around the shafts.

In the tub, just above the rollers, is a cross frame comprising the parallel cross plates 32 and the diagonal plates 33 connecting the cross plates. The object of this frame is to check the rotary current of water generated by the revolution of the rollers 30 so that the quicksilver is not disturbed in the basin 15.

The mill is used as a wet mill and the tailings flow out with the water through the spout 10^a at the top of the tub. When the mill is to be used it is charged with quicksilver, which settles in the basin 15, the rollers are set in motion, water in sufficient quantities is supplied to the tub, and the ore is fed into the tub in any convenient way. If desired, the feeder may be run from the shaft 20 or the frame 25.

As the spider frame and rollers revolve, the rollers crush the ore and the free metal amalgamates with the quicksilver, while the concentrates settle on the bed plate 14 and

the tailings run off over the spout 10^a. In cleaning up, the concentrates may be drawn out through the pipe 18 and the amalgam removed and treated in the usual manner.

5 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus of the kind described, comprising a tub having a central basin and an
10 outwardly inclined bed, a driving shaft, a frame carried by the driving shaft, and crushing rollers having their shafts pivotally connected with the said frame, substantially as described.

15 2. An apparatus of the kind described, comprising a tub provided with a vertical central casing and an outwardly inclined bed having a central basin, a driving shaft turning in said casing and projecting above the top of the
20 same, a frame secured to the end of the shaft projecting above the casing and extending down to within a short distance of the bottom of the tub, shafts pivoted to the frame, and rollers mounted on the said shafts, substantially as described.

25 3. An apparatus of the kind described, comprising a tub having in its bottom a bed plate with an inclined top and a central basin, a shaft casing projecting upward from the tub
30 bottom, a driving shaft turning in the casing, a frame carried by the driving shaft, and tapering rollers journaled on the frame to run on the bed plate, substantially as described.

35 4. An apparatus of the kind described, comprising a tub provided with a central casing and an outwardly inclined bed having a cen-

tral basin, a vertical driving shaft revolving in the tub, a frame carried by the shaft, tapering rollers having their shafts pivoted to the frame, and traveling on the inclined bed, 40 and a current breaker, comprising a frame formed of cross and diagonal plates secured in the upper part of the tub above the rollers, substantially as described.

5. An apparatus of the kind described, com- 45 prising a tub, a shaft casing projecting upward from the tub bottom, a bed plate arranged in the tub bottom the said bed plate being thinner at its outer edge than at its inner edge and provided with a central basin, 50 a driving shaft turning in the casing, a frame carried by the driving shaft, and vertically swinging rollers projecting radially from the frame and running on the bed plate, substantially as described. 55

6. In an apparatus of the kind described, the combination with the tub, and revolving rollers therein, of a current breaker in the tub, and comprising cross plates and diagonal plates secured to and connecting said cross 60 plates, substantially as described.

7. The combination, with the tub, the inclined bed therein and the basin in the bed, of the crushing rollers running on the bed, and the amalgam box arranged outside the 65 tub and connected with the basin, substantially as described.

SAMSON BEER.

Witnesses:

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O. H. PERRY.