No. 871,546. PATENTED NOV. 19, 1907.

C. H. WILKIE.

CONCENTRATOR.

APPLICATION FILED APR. 20, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

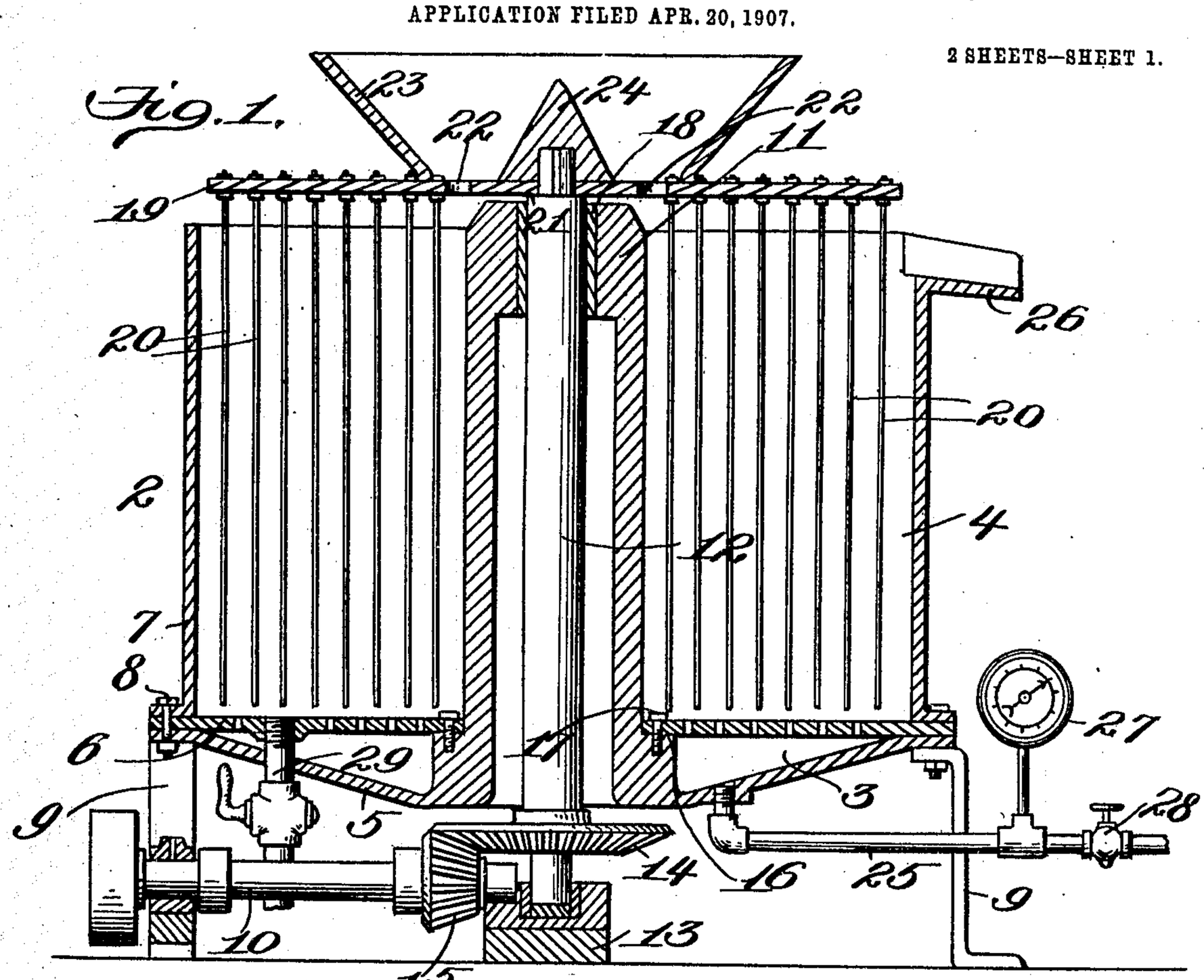
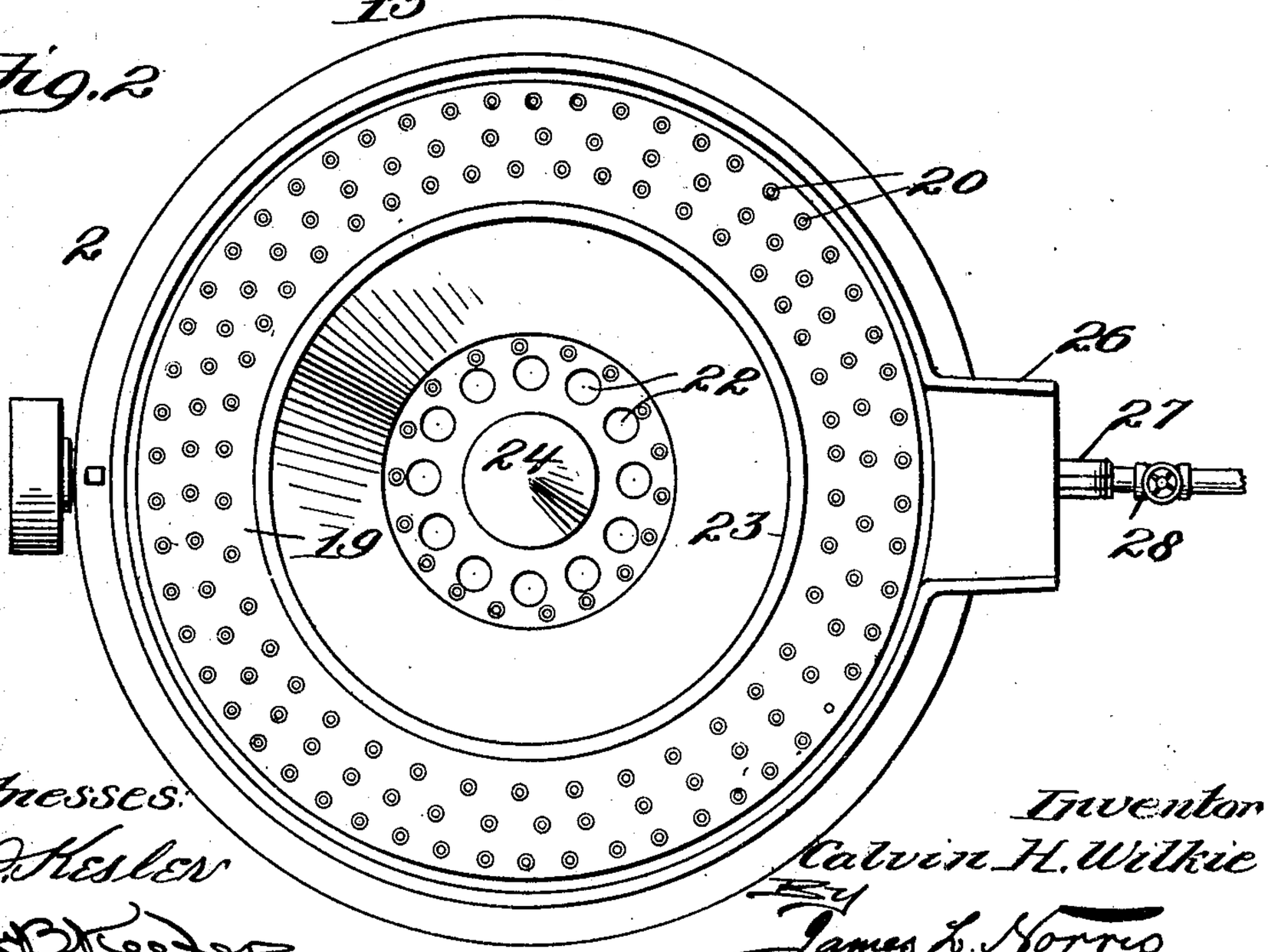


Fig. 2.



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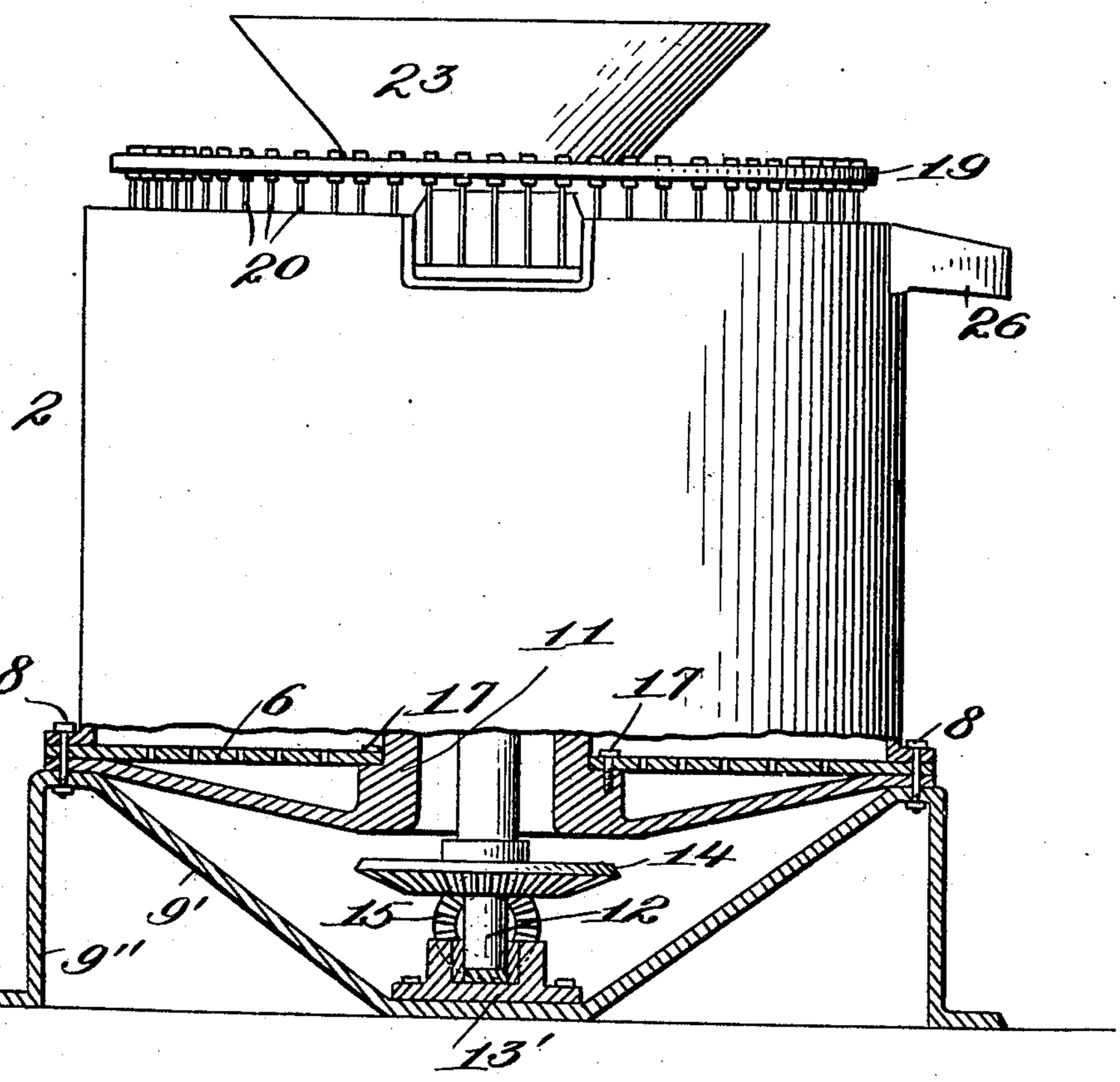
2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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CONCENTRATOR.

No. 871,546. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed April 20, 1907. Serial No. 369,359.

To all whom it may concern:

Be it known that I, CALVIN H. WILKIE, a citizen of the United States, residing at Douglas, in the county of Cochise and Territory of Arizona, have invented new and useful Improvements in Concentrators, of which the following is a specification.

This invention relates to concentrators or, as they are also known, ore separators, the invention being particularly adapted for incorporation in that type of devices known as hydraulic separators.

The object of the invention is to provide an apparatus of this character which is comparatively simple in construction, yet strong and effective in operation.

In the drawings accompanying and forming part of this specification I show in detail certain forms of embodiment of the invention which, to enable those skilled in the art to practice the same, will be fully set forth in the following description, while the novelty of the invention will be included in the claims succeeding said description.

Referring to said drawings: Figure 1 is a central vertical section of an amalgamator or hydraulic ore separator involving my invention. Fig. 2 is a top plan view of the same. Fig. 3 is an elevation with a modified form of supporting means shown in section.

Like characters refer to like parts throughout the several figures.

The device includes in its make-up a tank as 2 which contains a water pressure chamber as 3 and a separating chamber as 4. The tank in the present case comprises a bottom as 5, a diaphragm as 6, and a body or shell as 7. These several parts may be made in any desirable way, for example, by casting. The bottom 5 consists of a dish-like part, while the diaphragm 6 preferably consists of a disk. I prefer to make the body or shell 7 of cylindrical form. The bottom 5, diaphragm 6, and shell 7 are connected together in some water-tight manner as by bolts 8 at the marginal portion of the disk. The space between the bottom 5 and diaphragm 6 presents the chamber 3 to which I have previously referred, while the diaphragm and shell 7 present together the separating chamber 4 to which I have also previously referred. The shell 2 is non-rotative and from it depend several standards as 9, one of which suitably supports the shaft 10 driven in any desirable way and from which the agitating mechanism hereinafter described receives its motion.

Upon the upper side of the bottom 5 and rising substantially centrally therefrom is an imperforate tube or sleeve 11 through which the shaft 12 extends, the said shaft extending from out the lower end of said tube and through the bottom and its lower end being stepped in a bearing as 13. By employing a tube or sleeve as 11 which is imperforate I prevent the substances within the tank 2 from passing into said tube. Said shaft is shown as having fastened thereto below said bottom a beveled gear as 14 meshing with a beveled pinion as 15 on the main shaft 10. When, therefore, the shaft 10 is rotated, the shaft 12 will be also rotated. The tube 11 is externally of different diameters, by reason of which there is formed thereon near the base thereof an annular shoulder as 16 on which the central portion of the diaphragm or disk 6 is supported so that there is no possibility of the disk collapsing by reason of the weight of the mass of material thereon. It will be understood, of course, that the disk has a central opening through which the reduced diametrical portion of the tube 11 passes. I prefer to positively connect the diaphragm or disk 6 with the shoulder 16, and for this purpose may provide several screws as 17. I prefer to interpose between the rotary shaft 12 and the stationary sleeve or tube 11 a collar as 18 of Babbitt or equivalent metal. The bottom 5 and tube 11 I prefer to make integral.

The agitating means consists in the present case of a head as 19 and a multiplicity of rods as 20 depending from the head. The head 19 is preferably made in the form of a disk of slightly less diameter than the shell 7, has a central opening through which the upper reduced end of the shaft 12 passes, and rests on a shoulder as 21 near the top of the shaft. The head or disk 19 can be splined or otherwise connected to said shaft 12 for rotation therewith. The agitating rods 20, of which there are a large number, are connected rigidly at their upper ends in any desirable way to the head 19, are arranged in annular rows or groups, are straight, and extend near to the diaphragm 6. The head or disk 19 has therein an opening or openings through which the pulp can be fed to the chamber 4. I prefer to provide a number of these openings as 22 and to arrange them in circular order within that part of the head or

disk which constitutes in effect the bottom of the hopper 23 fastened in some suitable way to the upper side of the head of disk 19.

I prefer to fit over the upper end of the shaft 12 a deflector or cone as 24 which prevents the material from collecting at the central part of the hopper 23. The pulp is delivered into said hopper 23 and gravitates through the openings 22, the cone 24 serving to positively guide the pulp toward and into said openings. When the pulp leaves the openings 22 it enters the chamber 4 and descends toward the diaphragm 6.

A supply pipe as 25 is provided for admitting water under pressure into the chamber 3, the delivery end of the pipe being shown as fitted into the chamber 5. The water under pressure rises through the chamber or space 3 and passes through the perforations in the diaphragm, so as to effectually wash the material and to cause the elevation of the light particles in the pulp, which in the form of tailings rise in the chamber 4 and are discharged therefrom by way of a spout as 26 leading from the shell 7 below the lower edge thereof. The mineral values being heavy descend onto said diaphragm. When the water is being supplied into the pressure chamber 3 the agitating means hereinbefore described is being operated so as to thoroughly stir up the material in the chamber 4 to facilitate separation of the mineral values from the refuse. I prefer to connect with the pipe 25 a pressure gage as 27 serving its customary function, and I may regulate the pressure in the chamber 3 by the manipulation of the valve 28, or the water may be entirely shut off by this valve.

From time to time I draw off the mineral values as by way of the valved pipe 29 shown as extending through the bottom 5 and fitted in the diaphragm 6.

The only difference between what is shown in Fig. 3 and what is represented in Figs. 1 and 2, or more particularly in Fig. 1, is in the bearing means below the tank 2. The bearing means in said Fig. 3 consists of a dish-like casting as 9′ provided with a step-bearing 13′ for receiving the shaft 12. This member 9′ is connected to the tank 2 by the bolts 8 which unite the parts of said tank together, and it is provided with a depending flange 9″ which, with the central portion of the dish-like bearing 9′, rests upon a suitable foundation.

What I claim is:

1. In a concentrator, a tank comprising a bottom, a perforated diaphragm, and a shell suitably connected together, the diaphragm and bottom being separated to provide a pressure chamber, and the diaphragm and shell constituting together a separating chamber, said bottom having an imperforate tube rising therefrom, extending through, and supporting the central portion of the diaphragm, a shaft extending through the tube, means connected with one end of the shaft for rotating the same, a cone fitted to the other end of the shaft, an agitating head rotative with the shaft and located between the cone and tube, and agitating devices connected with the head and extending into said separating chamber.

2. In a concentrator, a tank comprising a bottom, a perforated diaphragm, and a shell suitably connected together, the bottom having an imperforate tube extending upward therefrom, through and supporting the central portion of the diaphragm, a shaft extending through the tube, driving means connected with the lower end of the shaft, a head connected with the upper portion of the shaft and provided with pendent agitating devices extending into the shell, a cone fitted to the upper end of the shaft, and a hopper fastened to the head and extending around the cone, the head having openings between the cone and hopper for the entrance of material into the shell.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CALVIN H. WILKIE.

Witnesses:
SAM L. ELDER,
W. S. DIXON.