July 13, 1937. C. J. PETERSON 2,086,635

ROTARY DISK FILTER

Filed Nov. 15, 1935 2 Sheets-Sheet 1

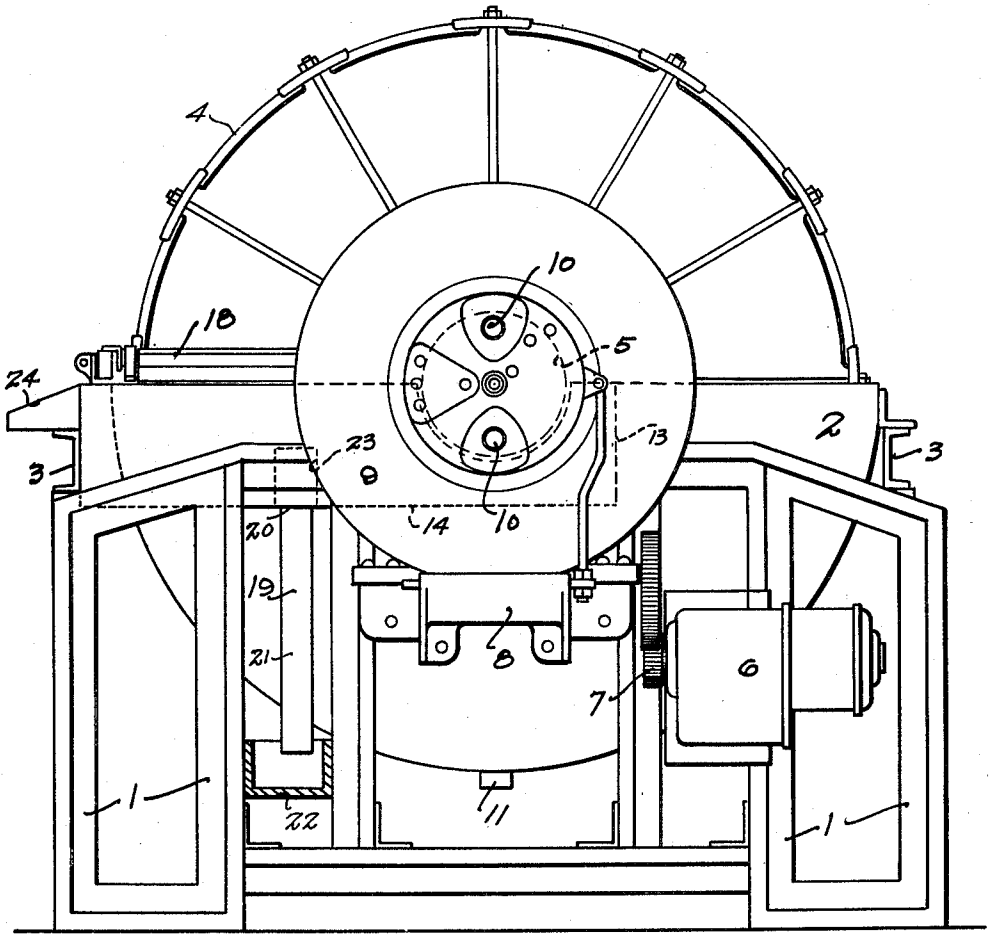

FIG. 1

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Fig. 2

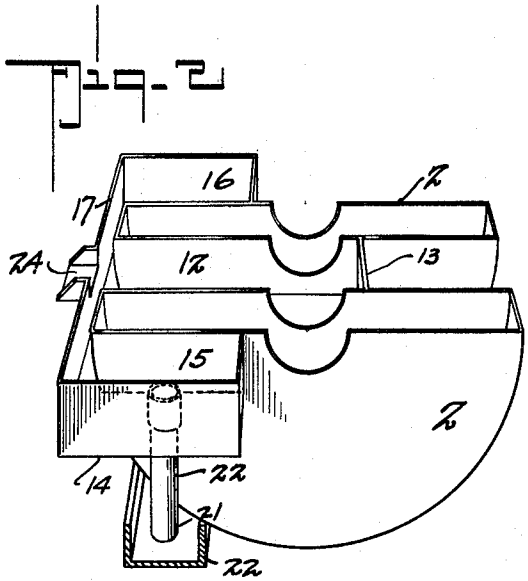
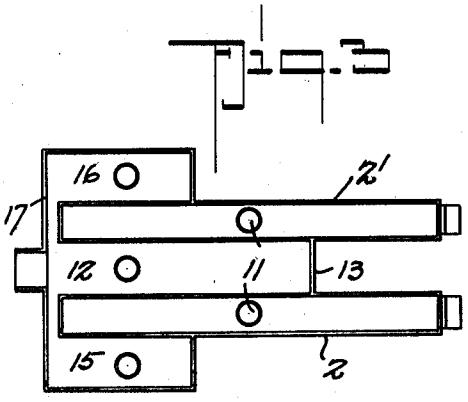


Fig. 3



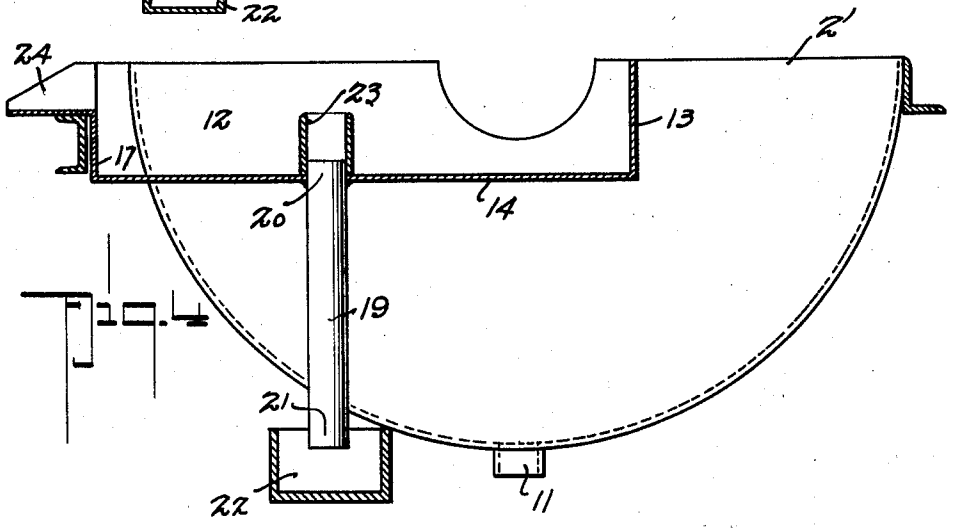


Fig. 4

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UNITED STATES PATENT OFFICE

2,086,635

ROTARY DISK FILTER

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Application November 15, 1935, Serial No. 49,906

5 Claims. (Cl. 210—200)

My present invention relates to improvements in rotary disk filters of the vacuum type, and more particularly to a container for the rotary disks and for the reception of the filtered material that is deposited on the disks and removed to the container.

In carrying out my invention I combine with the rotary disks of the filtering machine and the scrapers for removing material from said disks, a container which comprises a plurality of transversely arranged, spaced, and independent or separated pans which accommodate the series of rotary filtering disks. In addition to the pans the container includes a number of intermediate receiving hoppers, the number of hoppers being determined by the number of pans, and these intermediate hoppers are located between adjoining pans of a series. In addition to the intermediate hoppers I employ two end hoppers, one at each of the outer sides of the end pans, and the whole tank, including the hoppers may be fashioned with the pans, as a one-piece structure by welding the various parts together in suitable manner.

Means are provided for discharging the material from the hoppers or tank, and means are also provided for varying the surface level of a cake-solution in the tank, after the solution has been collected from the disks.

The invention consists in certain novel combinations and arrangements of parts as will hereinafter be more fully set forth and claimed.

Figure 1 is a view in end elevation of a continuous disk filter equipped with the devices of my invention.

Figure 2 is a perspective view, as seen from one end of the container, embodying pans and tanks employed in the filtering machine.

Figure 3 is a plan view of the container for a two-disk filtering machine.

Figure 4 is an enlarged side elevation of one of the pans and showing an intermediate hopper in section, together with a launder below the pan.

In order that the invention may readily be understood I have shown in the general assembly elevation of Figure 1 the frame 1 upon which the container is supported, one of the semi-circular pans appearing at 2, and side channels or channel bars 3 being illustrated as supporting the container, above the floor line or ground surface. One of the rotary disks filters which revolves in a pan 2, is shown at 4, and this disk revolves counterclockwise with the central shaft 5 journaled in suitable bearings. The motor 6, which supplies power for operating the machine, is connected through the reduction gearing 7 to a worm drive in the casing 8, and through the large gear in the gear casing 9, the shaft is revolved to carry with it the plurality of disks that are located in their respective pans. The numerals 10 indicate longitudinally extending ducts or passages in the shaft 5 through which the liquid filtrate is disposed of, and this shaft is also provided with usual air passages extending to the disks for vacuum purposes.

In the two-disk machine illustrated in the drawings I employ two semicircular, flat, upright pans 2 and 2' forming part of the rigid container, and each of the pans, which accommodates a rotary disk, is provided with a bottom drain indicated at 11.

Between each of the adjoining pans, as 2 and 2' is located a receiving hopper 12, which, as best indicated in Figure 4 is located between the upper portions of the adjoining pans with its inner end wall 13 beyond the longitudinal center line of the container, or beyond the longitudinal axis of the shaft of the machine.

The sides of adjoining pans form the side walls of the hopper, and the bottom portion 14 of the hopper projects outwardly beyond one end of the pans. The hoppers between the transversely extending pans, thus form receptacles between adjoining pans, only one intermediate hopper 12, however, being indicated in the two-disk machine as shown.

In addition to the intermediate hopper or hoppers 12, I employ end hoppers 15 and 16, which are located at the outer sides of the two end pans 2, 2' of the row or series, and the outer end wall 17, which is common to the intermediate hoppers and the end hoppers, provides the container with a tank composed of communicating compartments or hoppers adapted to receive the recovered material that is scraped from the rotary disks.

It will be understood that the disks revolving counterclockwise pick up the material from the bottoms of the pans, and that the material adhering to the side surfaces of the disks is removed therefrom and deposited, as cake, in the hoppers. For this purpose scrapers 18 are mounted on the edges of the pans at opposite sides of the disks for light contact with the sides of the disk, and these scrapers in the path of the material on the disks, remove the materials and they fall by gravity into the hoppers.

In many instances it is desirable, and necessary for most efficient operation of the filtering ma-

chine, to augment the scrapers by employing a water spray directed against or on the sides of the disks for removal of the deposits from the sides of the rotary disks. Thus, the tank including its compartments or hoppers in addition to receiving the cake, also receives the water solution that is formed by spraying on the disks.

This cake solution, including the water of the sprays is disposed of in some instances, directly through chutes **19**, in the form of pipes or tubes having their upper ends **20** projecting through the bottoms of the hoppers, and their lower ends **21** terminating in position to empty the solution in a launder **22** that extends longitudinally of the machine. From the launder the solution is conveyed to a suitable station for further treatment.

Under these conditions, the surface level of the solution accumulated in the tank extends slightly above the tops **20** of the tubular chutes **19**.

As an alternative mode of disposing of the cake solution after it has been removed from the disks and discharged into the hoppers, the tubular chutes may be capped with bushings or thimbles **23**, which are thus instrumental in permitting the cake-solution to accumulate in the tank to a higher surface level. An overflow or discharge spout **24** at the upper edge of the end wall **17** of the tank may dispose of the higher-level solution, or this solution may be disposed of through both the tubular chutes and the discharge spout.

With the recovered cakes in the form of a liquid solution, this material may be conveyed, or flowed, in suitable manner to the next station for treatment.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination in a rotary disk filter with a plurality of spaced, independent pans each enclosing a portion of a rotary disk, of a container comprising intermediate receiving hoppers between adjoining pans, end hoppers at the outer sides of the end pans all of said hoppers being in open communication, one with another, means for removing material from the disks to said hoppers, and means for discharging the material from said hoppers.

2. The combination in a rotary disk filter with a series of transversely extending, spaced, independent pans each enclosing portions of rotary disks, of a receiving tank comprising intermediate hoppers between adjoining pans, end hoppers at the outer sides of the end pans, and said tank having a side wall exterior of, and spaced from the pans, and forming a passage connecting said end hoppers and said intermediate hoppers.

3. The combination in a rotary disk filter with a row of spaced pans, of a receiving tank comprising intermediate hoppers between adjoining pans and end hoppers, said tank having a wall exterior of, and spaced from the pans and forming a passage connecting said end hoppers and said intermediate hoppers, means for discharging material from the tank, and means for varying the level of a solution to be discharged from the tank.

4. A container for use with a rotary disk filter comprising a plurality of spaced, independent, pans, and a tank, said tank comprising intermediate hoppers between adjoining pans and having an end wall exterior of, and spaced from said pans and forming a passage connecting said hoppers, a discharge tube connected with the bottom of a hopper, and means for varying the height of the inlet opening of said tube within the hopper.

5. A container for use with a rotary disk filter comprising a plurality of spaced, independent, pans, and a tank, said tank including intermediate hoppers between adjoining pans, and end hoppers at the outer sides of the end pans, a side wall for the tank exterior of, and spaced from the pans and forming a passage connecting said end hoppers and said intermediate hoppers and an outlet in said wall, outlet tubes connected to the bottoms of said hoppers and opening within the hoppers, and removable thimbles mounted on the tube-openings within the hoppers.

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