May 5, 1942. M. S. POTTER 2,281,797

CENTRIFUGAL LIQUID SEPARATOR

Filed Feb. 29, 1940

Fig. 1.

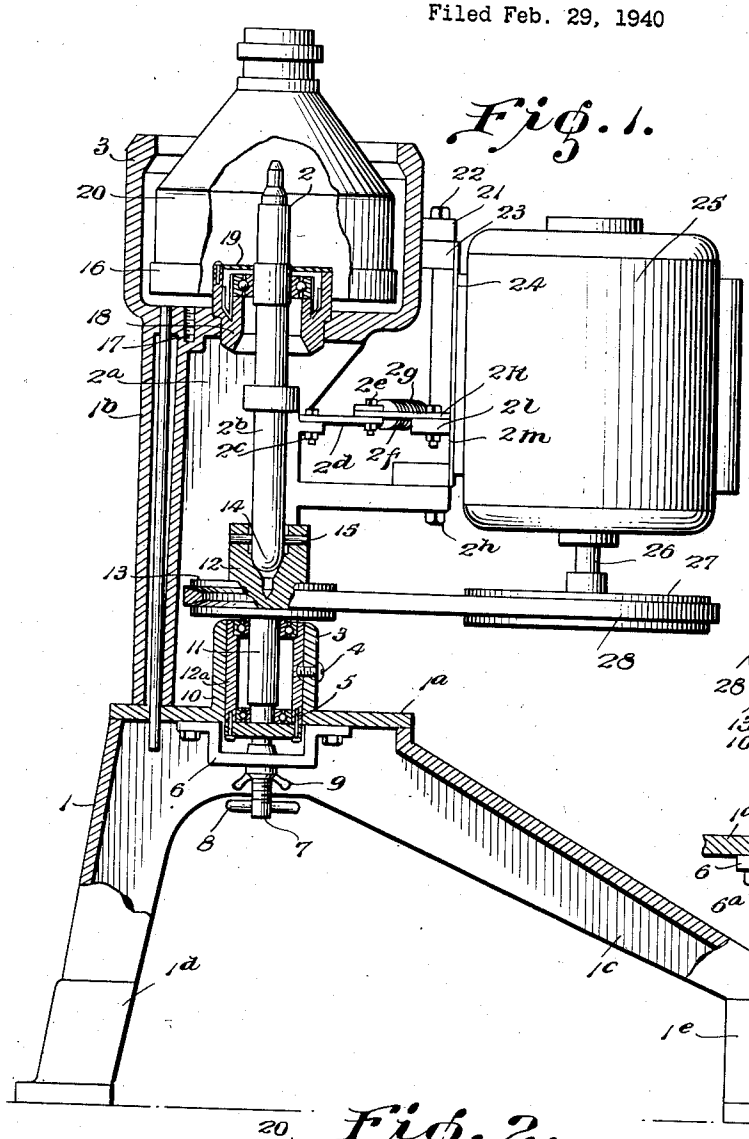


Fig. 3.

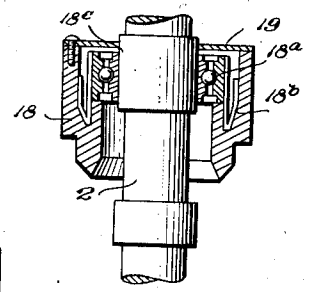


Fig. 5.

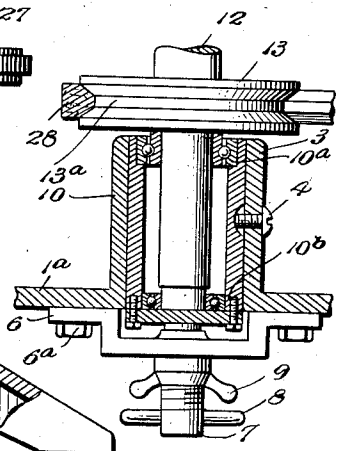


Fig. 2.

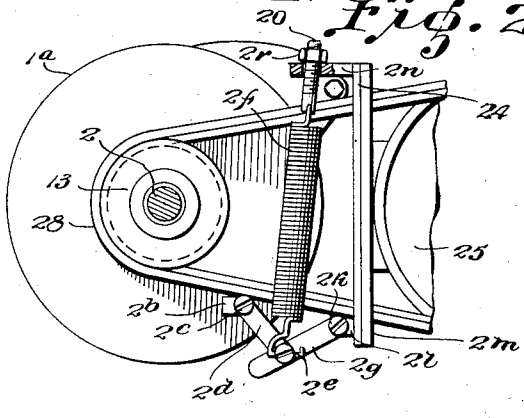
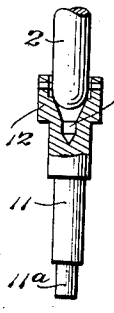


Fig. 4



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CENTRIFUGAL LIQUID SEPARATOR

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Application February 29, 1940, Serial No. 321,514

1 Claim. (Cl. 233—23)

My invention relates to improvements in centrifugal liquid separators, and one object of my improvements is to provide in the rotary mechanism thereof means for stabilizing the rotation of the separator bowl, including a separable sectional shaft therefor having a plurality of anti-friction bearings, and having adjustable basal supporting means.

These and other improvements in the assemblage will be hereinafter described and claimed, and illustrated in the accompanying drawing.

It will be understood that various changes and improvements may be used in equivalence in the machine, without departing from the inventions therein or the scope of their protection as claimed. Fig. 1 is a frontal elevation of my improved centrifugal separator and its driving means, with parts thereof removed or sectioned. Fig. 2 is a top plan, on a larger scale, of the resiliently controlled connections between the motor and the machine frame. Figs. 3 and 5 are respectively vertical diametrical sections of the bowl shaft anti-friction upper and lower bearings, with parts of the shaft broken away. Fig. 4 is a vertical elevation, in partial section vertically, of a separable assemblage of the alined bowl-shaft parts.

Referring to said Fig. 1, the base plate *1a* has at the left a like pair of outwardly inclined legs *1* with removably connected basal members *1d*, and also has at the right a similar pair of shod legs *1c* and basal members *1e*, except that the latter pair *1c* are projected at a lesser angle relative to the support for the purpose of maintaining the stability of the connected motor and separator.

The base-plate *1a* has a central upwardly directed sleeve *3a* (see Figs. 1 and 5). Referring again to Fig. 1, the numeral *1b* denotes a hollow vertical standard fixed on the left-hand part of the base-plate *1a*, and a housing *2a*, open at the right, includes said standard, while both are integral with and support at the top an open top cylindric housing part **3** with bottom closure apertured to seat therein a cylindric housing **18** for an anti-friction bearing device **19**. The bottom wall of the housing **3** has an aperture containing a removable screw-threaded plug **17**, and is also apertured to seat a depending drain-tube *1f* for the housing to discharge below the tabular plate *1a*. A separator bowl **20**, shown without interiorly assembled separator disks, has a part of its wall broken away, with the upper portion of the vertical shaft **2** extended thereinto, and said shaft traverses downwardly vertically said bearing device **18—19**, and its lower end part is recessed downwardly at **14**.

As shown in Fig 5 sleeve **5** is removably secured in the outer sleeve *3a* and secured thereto by a set-screw **4**, and also by a base-plate *3b*, beneath, secured by screws to the inner sleeves. A downwardly directed member **6** with medially downwardly offset part medially apertured and interiorly threaded, seats therethrough a short threaded shaft **7** whose upper end traverses the member **6** and bears against the lower end of the shaft part *11a*. The shaft **7** is threaded to seat in a threaded seat in the member **6** to adjustably support the alined shaft parts **11—12** and **2**. A cross handle **8** mounted through the lower end of the shaft **7**, may be turned to adjustably support the said shaft sections and the bowl **20** above. Immediately above the sleeve *3a* a circumferentially grooved belt-wheel **13** is fixed on the shaft part **11**, and carries in its V-shaped groove one end part of a V-belt **28** shown in cross-section in Fig. 5.

As the lower end of the upper shaft part **2** is downwardly bifurcated, at **14**, it seats removably and loosely on a cross-pin **15** fixed across the enlarged bearing member **12** on the lower shaft part **11**, permitting slight play to the shaft **2**. A short apertured lug **21** is fixed on the housing **3** to the right, and a longer lug **25** has its left-hand end fixed on the rear wall *2a* of the lower housing just above the member **14** and spaced directly below the upper lug **21**, with connecting end means therebetween, being a vertical member **23** having end lugs, of which the upper lug seats a fixed pin **22** in the upper angular part of said member **23**, and the lower lug seats another pin, *2h*, whereby the member or hanger **24** may limitedly rock to and fro. The member **23** is fixed on a connection *2m* on a motor housing **25**, and the motor has a depending shaft **26** upon whose lower end a belt-wheel **27** of greater diameter than the other smaller belt-wheel **13** is mounted, both said wheels having the V-belt **28** reeved thereabout, preventing escape of the belt by reason of looseness.

I have, however, supplied additional means for keeping the V-belt taut in spite of wear or lengthening due thereto. This means is illustrated in Figs. 1 and 2 which is shown and claimed in my divisional applications Serial Number 362,110, filed October 21, 1940. In Fig. 2 a lug *2b* is fixed upon one wall part *2a* of the separator housing, and an arm *2d* has one end rockably mounted on a bolt *2c* traversing the lug and directed toward the motor casing **27**,

obliquely. A similar arm 2*g* has one end likewise rockably mouted on a bolt 2*k* traversing the lug 21 fixed at one end of a bar 24, which is in turn fixed on and along a similar bar 2*m* fixedly mounted on the motor casing 25, above the belt-wheel 27. The outer ends of the arms 2*d* and 2*g* are adjustably pivotally connected by a bolt 2*e*. A fixed arm 2*n* on the opposite end part of the bar 24 is apertured, and a short rod has one end loosely traversing said aperture. A nut 2*r* is mounted adjustably on said rod to bear upon the rear face of the arm 2*n*. A coiled tension spring 2*f* has bent end parts of which one is connected to the hither end of the rod 20, and the other bent end connected to said pin 2*e*. In normal use and position, the arms 2*d* and 2*g* are angularly disposed toward each other as shown. It will be seen that undue vibration of the motor is dampened by reason of the action of the spring 2*f* on said arms, and at the same time the spring 2*f* exerts a resilient action upon both the motor and the V-belt 28, tending to prevent escape of the belt from the V-groove in its edge in the event of wear or lengthening of the belt. The ball bearings at opposite parts of the connected shaft elements also tend to obviate lateral vibrations of the shaft and the separator bowl 20, when jointly rotating at high speeds, and the separable assemblage of the shaft sections as connected at the cross-pin 15 gives necessary flexibility thereto in the maintenance of the shaft in its bearings and in coaction therewith.

I claim:

In a centrifugal liquid separator, in combination, a base-plate having a plurality of depending legs, and having an upwardly directed hollow standard fixed on and at one side of the plate and terminating upwardly in an upwardly cupped housing, cylindrical, and having a central circular bottom-apertured seat, and having offset therefrom a drain pipe traversing said bottom to depend therethrough and below said base-plate, a central upwardly directed tubular sleeve whose upper part is offset outwardly to seat removably on the inner rim upper face of the bottom of the housing and whose lower part depends through said apertured seat, the inner upper part of the sleeve being offset inwardly to provide an inner shoulder supported removably on the inner rim, said base-plate having a central integral upwardly directed cylindrically hollowed part, a cylindrical liner mounted removably in said hollowed part and having circular upper and lower recesses therearound in its inner wall, like ball-bearings mounted movably in said recesses, a centrally apertured plate secured coaxially and removably across the lower face of the base-plate, a cross-bar medially offset downwardly, having its end parts secured removably dependingly across the lower face of the base-plate and medially upwardly apertured and threaded centrally, an axial shaft positioned within the cylindrical liner and spaced laterally therefrom and with its upper part above the liner widened in diameter, said ball bearings being non-rotatably mounted on the lower diminished part of the shaft, said lower part of the shaft below the lower bearing plate terminating above said offset cross-bar, a downwardly directed threaded stem seated rotatably in the medial apertured part of the cross-bar to depend therefrom and to contact the lower end of said stem, a nut mounted on said threaded stem below the cross-bar for vertical adjustments of the shaft, said axial shaft widened upper part being downwardly cupped, a rod crossing said cupped part and end-secured therethrough, an upper shaft section alined with the lower shaft part and having its lower termination transversely grooved to seat astride said rod, the upper shaft section extending upwardly and seated axially through said upper ball bearing, U-springs mounted contactingly between said ball bearing and the abutting inner wall of the tubular sleeve, a liquid separator bowl mounted axially and removably upon said offset sleeve mounted on said bowl bottom part, and means mounted on the lower shaft section to rotate it at a desired speed.

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