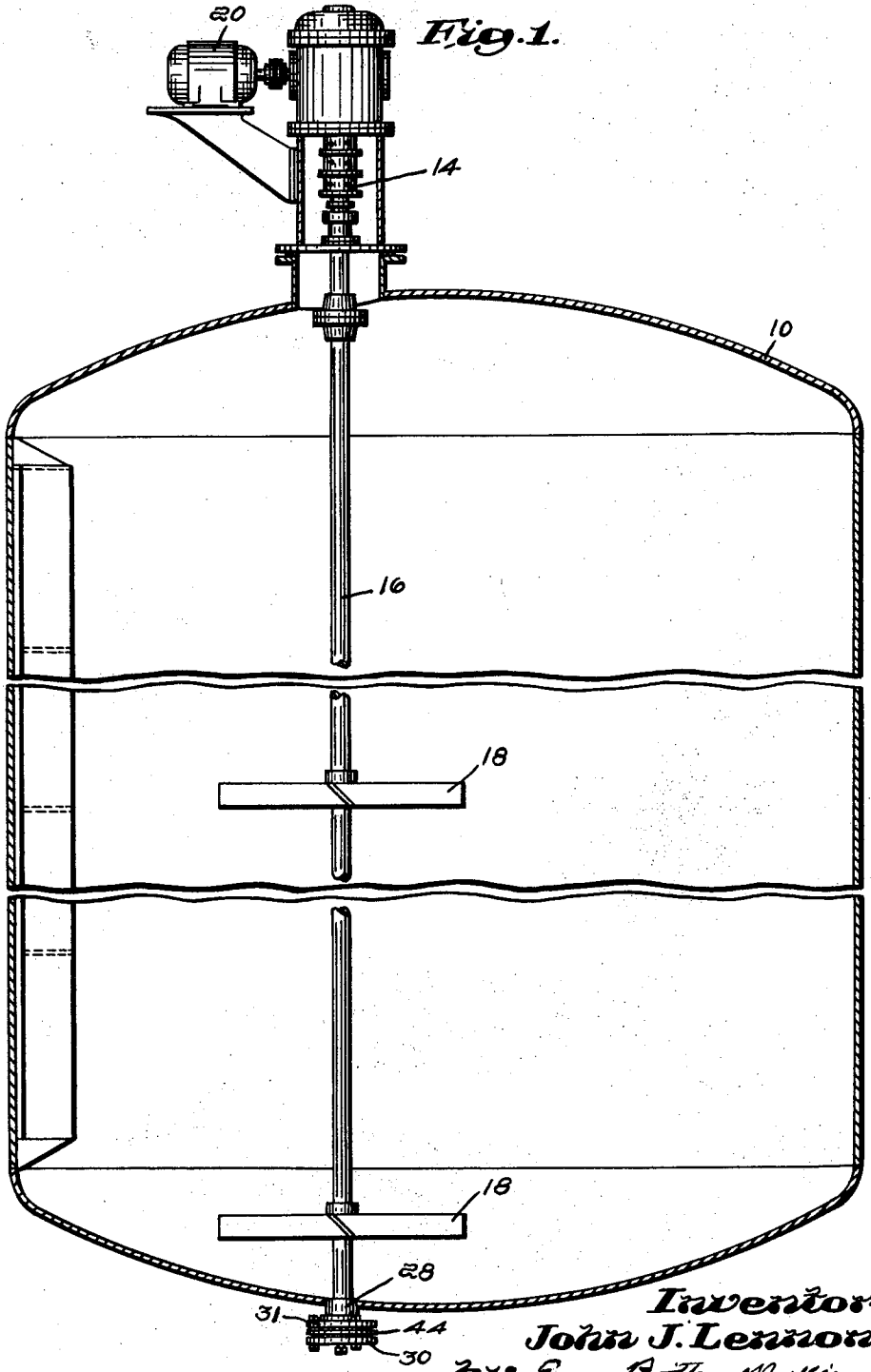
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FOOT BEARING CONSTRUCTION FOR MIXERS

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Fig. 1.



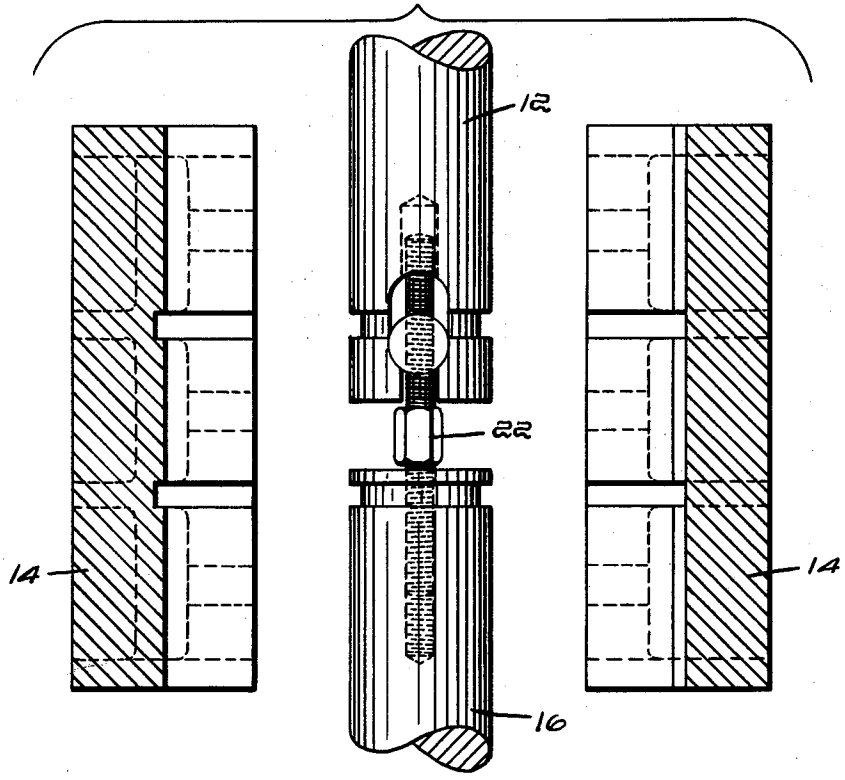
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Fig. 2.



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Fig. 3.

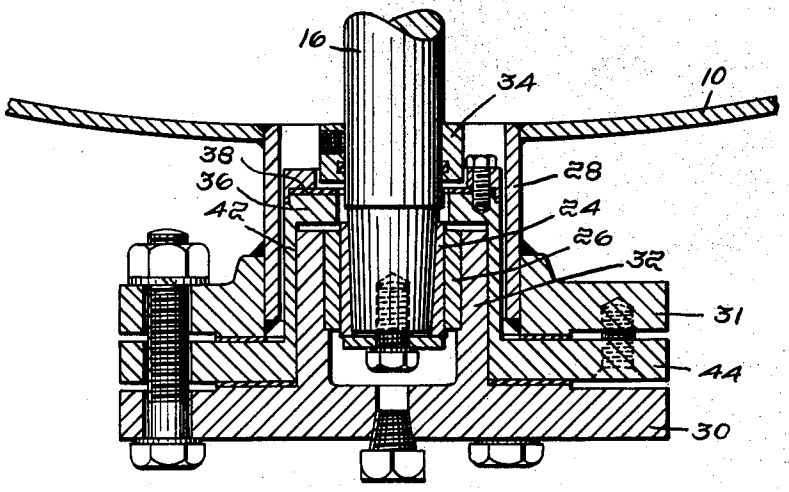
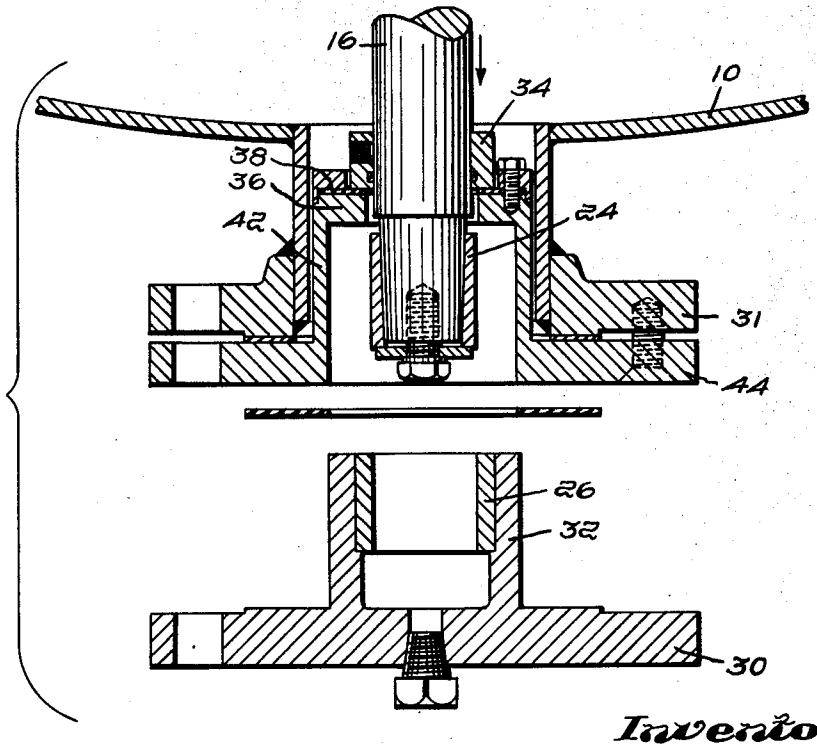


Fig. 4.



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Fig. 5.

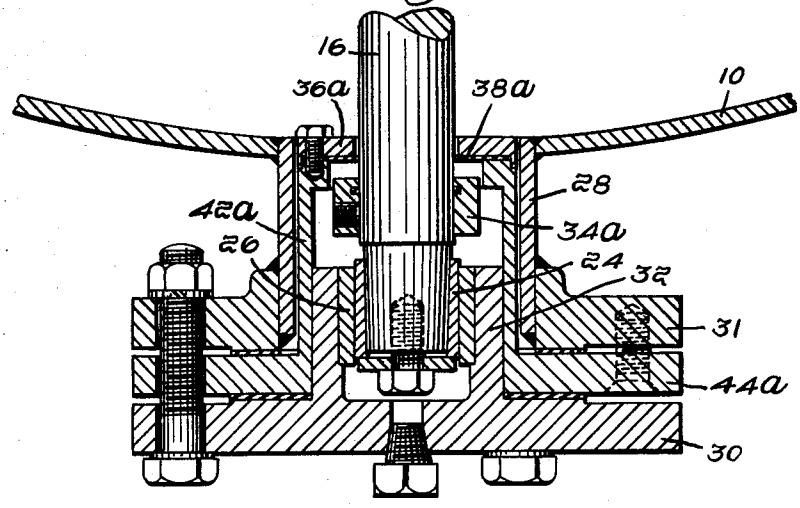
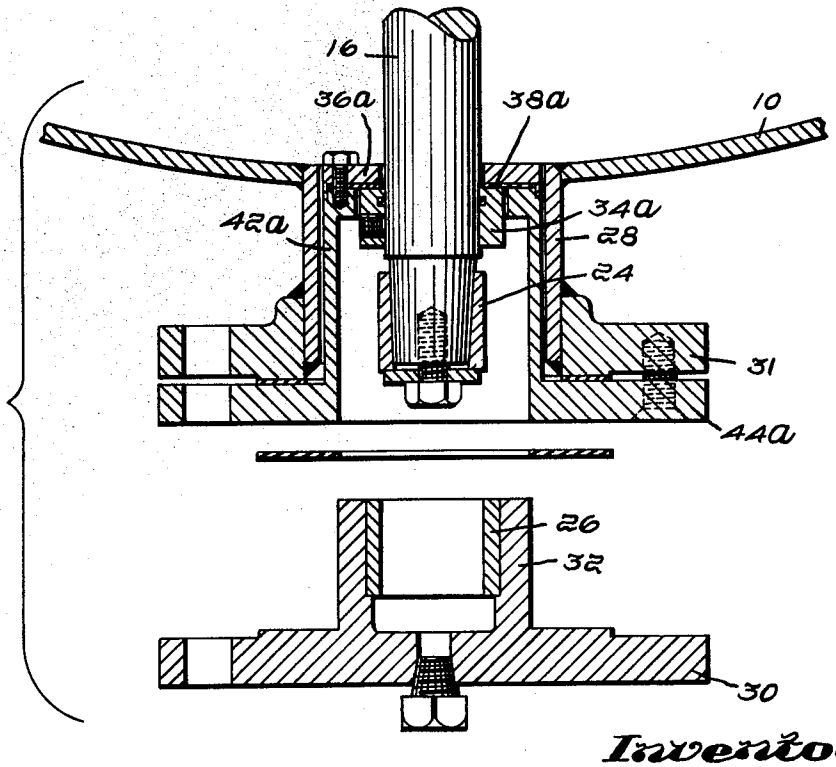


Fig. 6.



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3,149,888

FOOT BEARING CONSTRUCTION FOR MIXERS

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2 Claims. (Cl. 308—36.1)

This invention relates to mixers of the type wherein a vertical rotary shaft extends downwardly into a container and carries impellers for acting on the fluid or semi-fluid contents therein. More particularly it relates to such a mixer, wherein the shaft has a "foot bearing" at the lower end thereof, and provides a construction permitting access to said bearing for inspection, repair or replacement, even when the container is full, without loss of liquid from the tank.

My invention will be well understood by reference to the illustrative embodiment shown by way of example in the accompanying drawings wherein:

FIG. 1 is a vertical section with parts broken away, showing an embodiment of the invention;

FIG. 2 is a fragmentary view showing in elevation the opposed sections of the impeller shaft, the parts of a coupling which joins them in use being shown separated and moved to one side;

FIG. 3 is a fragmentary section showing the foot bearing in its environment;

FIG. 4 is a similar view showing certain of the parts in a different position of adjustment and some separated; and

FIGS. 5 and 6 are views similar to FIGS. 3 and 4 respectively showing a modification.

FIG. 1 shows a container or tank **10** into which extends from above a vertical shaft herein formed of two aligned sections, an upper section **12** (FIG. 2) joined by a coupling **14**, herein of the laterally separable type, to a lower section **16** carrying impeller blades **18**. This lower section **16** has at its lower end at the bottom of the tank a foot bearing to be described. The upper section **12** is supported by suitable bearings and is driven by gearing of conventional form from motor **20**.

In FIG. 2 the coupling **14** is shown separated and its halves laterally displaced from the ends of the shaft sections. They may of course be taken away and put down somewhere else. The figure reveals that the ends of the shaft sections **12** and **16** are joined by a screw mechanism **22**, then accessible for manipulation to raise or lower the lower section relatively to the upper. The mechanism shown is not new and is disclosed in detail in my copending application, Serial No. 799,525, filed March 16, 1959, now Patent No. 3,115,333, but it subserves a new function in the present case by its cooperation with the foot bearing and its environment which now will be described.

Referring now to the modifications shown in FIGS. 3 and 4, the foot bearing comprises a male part **24**, carried by the lower end of the shaft section **16**, and normally turning therewith, and a cooperating stationary female part **26**, and the two are housed within a cylindrical chamber at the bottom of the tank, preferably as herein shown, including a part **28** projecting downwardly therefrom as a sort of neck or nipple descending from the bottom of the tank, the chamber being completed by a removable cover **30**, which cover **30**, bolted to flange **31** of the

neck, herein carries bearing **26** in a cylindrical extension **32** projecting upwardly from the cover and entering the neck **28**. To permit removal of the cover, and to provide access to the bearing without draining the tank, a valve is provided which may be operated by movement of the lower section of the shaft **16** by operation of the screw mechanism **22** within the coupling **14** in FIG. 1 and as shown in FIG. 2, and herein in FIGS. 3 and 4 the valve comprises a valve head **34** mounted on the shaft, and opposing valve seat **36**, which carries packing washer **38**, the seat being on the end carried by a gland-like member having a sleeve portion **42** surrounding extension **32**, and a flange **44** separately bolted to flange **31** and also supported by the cover **30**. The valve head **34** and the seat washer **38** are spaced in the normal running adjustment of the mixer and liquid has access to the bearing, but if the shaft section **16** is slightly lowered to the position of FIG. 4, the valve is closed. The cover may then be removed, carrying with it the cylindrical extension **32** and the outer bearing **26** and permitting the removal or repair of that bearing and exposing the inner bearing part **24** for removal or replacement. The cover may then be bolted on and the parts **24** and **26** of the rotary bearing brought into normal cooperating relationship, and the shaft **16** returned to the elevated position of FIG. 3, opening the shutoff valve.

FIGS. 5 and 6 show a modification in which the gland-like member comprising sleeve **42***a* and flange **44***a* has secured to it a downwardly facing valve seat **36***a* with downwardly exposed washer **38***a* and the shaft **16** has a valve head **34***a*, normally spaced below the valve seat, but adapted to be seated thereon by the movement of shaft **16** upwardly as seen in FIG. 6. The bearing elements are exposed when the cover **30** is removed, as shown in FIG. 6.

I claim:

1. In a mixing apparatus comprising a liquid container having a downward extension from its bottom, through which, if it were unobstructed, the contents of the container would drain, there being a removable closure for the bottom of the extension and a vertical shaft, at least the lower portion of which is capable of limited adjusting movement vertically, projecting downwardly into the container, the lower end of which shaft extends downwardly into said extension, there being a removable annular bearing at the lower end of the shaft, and a cooperating annular bearing supported by the extension in encircling relation to the first said bearing,

in combination with said shaft and extension

a collar on the shaft above the bearings and an annular flange supported by the extension and positioned in alignment with the collar, normally in spaced relation thereto, the flange and collar on vertical adjusting movement of the shaft moving into abutting sealing relationship after which the closure may be removed and the bearings downwardly removed from the end of the shaft without loss of liquid from the container.

2. In a mixer comprising a tank and a vertical, driven shaft entering the same, at least the lower portion of which shaft is vertically shiftable by means accessible from the exterior of the tank, a small chamber at the bottom of the tank having an open top into which the lower end of the shaft extends and a removable lower

cover exposed at the exterior of the tank, cooperating members carried by the lower end of the shaft and mounted at the lower wall of said chamber respectively and providing a rotary bearing for the shaft, the shaft and the open top of the chamber having respectively a valve and a valve seat the former optionally closable on the latter by vertical shifting of the shaft as aforesaid to close the open top of the chamber.

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