

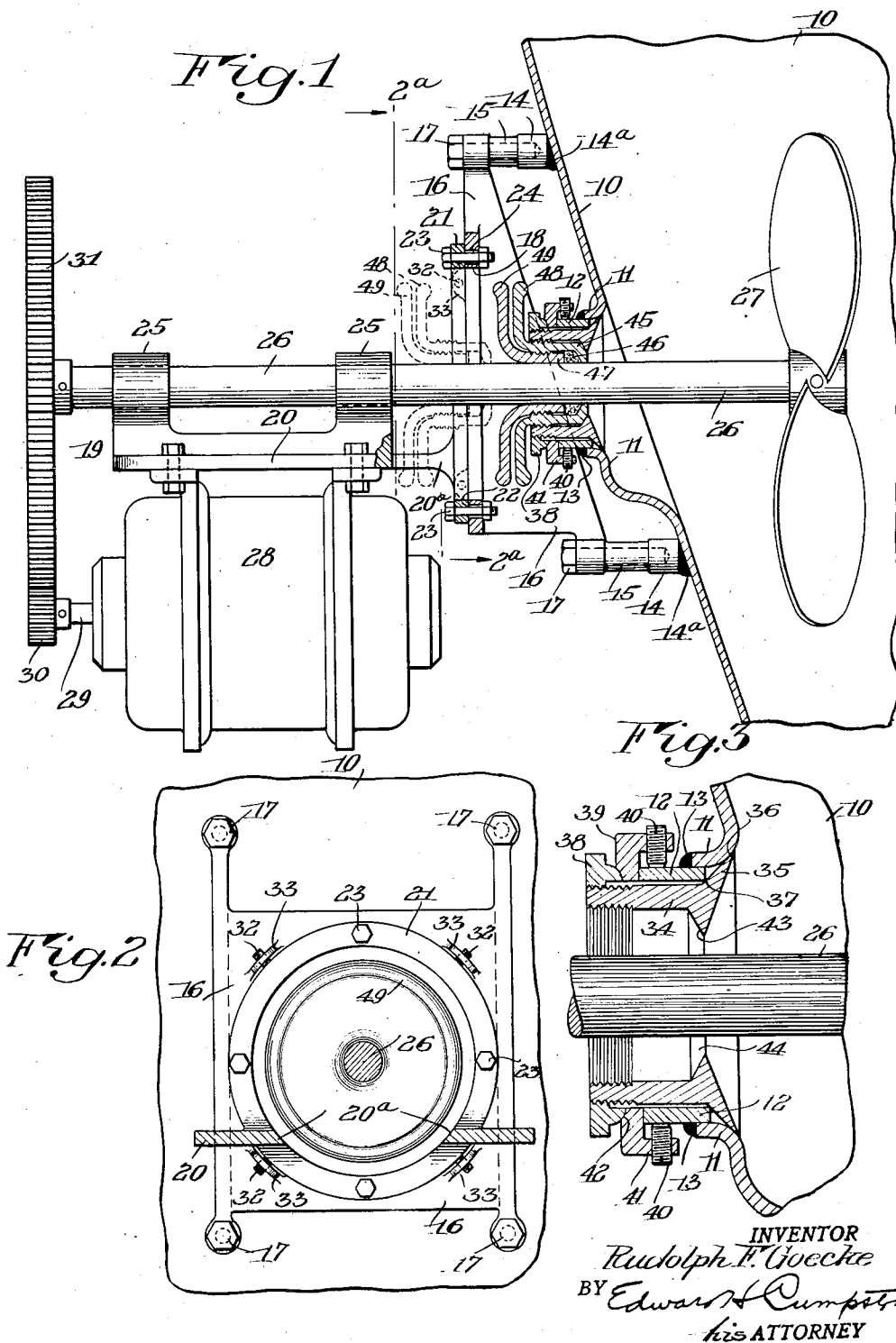
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SEAL FOR LIQUID AGITATING MEANS

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SEAL FOR LIQUID AGITATING MEANS

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8 Claims. (Cl. 286—35)

The present invention relates to liquid agitating means and has for its object to provide more particularly improvements in the method of mounting the agitating means for operation in a tank or receptacle containing the liquid.

A further object of the invention is to provide improvements in shaft mountings designed to permit of adjustment of the shaft to properly align or center its axis with respect to other parts with which it is associated.

A further object of the invention is to provide relatively adjustable devices or elements for supporting a shaft for operation through an opening in the wall of a receptacle of larger diameter than the shaft, said devices being arranged for alignment one with another and one forming means for sealing and unsealing the opening surrounding the shaft without shifting or disturbing the position of the latter when once adjusted to the desired position with respect to the opening.

A further object of the invention is to provide improved liquid agitating means which may be inserted through the bottom, side, or top walls of a receptacle, either above or below the liquid level, comprising a construction embodying parts which may be adjusted or removed from the exterior of the receptacle to permit certain interior portions of the device and the receptacle to be thoroughly cleaned and sterilized without dismantling the major parts of the device.

A further object of the invention is to provide an improved device for effectively sealing and unsealing an opening in the wall of a liquid holding receptacle surrounding a shaft extending into the receptacle through the opening comprising relatively movable parts one of which is arranged to be permanently adjusted to a predetermined service position while an additional part or parts are made adjustable whereby access may be had to surfaces within the receptacle for the purpose of cleaning and sterilizing the same from time to time without dismantling or shifting the position of the shaft.

A further object of the invention is to provide improvements in agitating means affording a compact, efficient, and economical construction comprising relatively few parts which can be readily adjusted and brought to proper operating relation one with respect to another.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawing:

Fig. 1 is a fragmentary sectional elevation of an arrangement embodying the invention;

Fig. 2 is a sectional elevation taken on line 2a—2a of Fig. 1, and

Fig. 3 is an enlarged detailed section taken through the shaft bushing mounted within the opening of the tank, certain parts of which are shown removed.

The same reference numerals throughout the several views indicate the same parts.

The present invention relates to improvements in liquid treating apparatus and more particularly to an improved arrangement for supporting and operating suitable agitating means within a liquid holding tank which is operated through the wall thereof and constructed in such a manner that by adjustment of one or more parts of the device an opening may be readily provided through which a cleaning implement can be inserted or a suitable cleaning fluid or liquid introduced into the tank for maintaining the agitating means and other parts or surfaces exposed to the liquid in proper sanitary condition.

The invention further provides an improved arrangement for mounting the driving shaft of the agitating means whereby relative adjustments may be afforded between different parts thereof so that the axis of one may be properly aligned with respect to that of another. Furthermore the invention provides improved closing means for the tank opening through which the shaft extends which is so constructed as to afford a liquid tight joint between the shaft and tank wall. These improvements are especially designed for use in connection with the stirring, agitating or working of different liquids or semi-liquid materials such, for example, as milk or other liquid food products where it is desired to agitate the liquid while processing the same. However the invention is not limited to a mounting arrangement for agitator shafts, but may be advantageously employed in other forms of construction where different kinds of power driven shafts are to be mounted for operation.

In the drawing, 10 represents a portion of a tank or other receptacle of any preferred design such, for example, as a milk holding tank in which the milk or other liquid is to be stirred or agitated. The tank wall shown may constitute a portion of one of the side or end walls of the tank, which in the present embodiment extends at an inclination to the horizontal and has an outwardly projecting flanged portion 11 to which is secured an annular flange 12 united with the flanged portion 11 preferably by welding as indi-

cated at 13 and cooperating therewith to afford an opening for a shaft and its bushing as described hereinafter.

The tank wall is provided with a plurality of lugs or boss-like projections 14 suitably connected therewith preferably by welding as indicated at 14a, the lugs being provided to receive the inwardly extending portions 15 on a support or frame 16 having screws 17 extending through the projections and threaded within the lugs 14 to firmly secure the support on the wall of the tank.

The support is made deeper at its lower end than at the upper end in order that its front wall will lie in a plane substantially at right angles to the axis of the tank opening, said wall having an enlarged opening 18 therethrough provided for a purpose which will appear hereinafter.

A front bracket or support indicated generally at 19 is suitably connected with the support 16, as for example by bolting it thereto. The bracket 19 comprises a substantially horizontal plate portion 20 having at its inner end an upstanding ring-shaped portion 21 affording an opening 22 substantially the same diameter as the opening 18 in the support 16. The ring-shaped portion is seated upon the front wall of the support and connected therewith preferably by means of a plurality of bolts 23 extending through openings 24 in the support, the openings being large enough to permit of a certain amount of lateral play of the bolts therein.

The plate 20 of the bracket 19 is provided with one or more upstanding bearings 25 for receiving and supporting a shaft 26 extending through the opening in the wall of the tank and having associated therewith at any desired point within the tank suitable agitating means, such, for example, as the agitator 27 secured to the inner end of the shaft as shown in Fig. 1.

Any suitable driving means for the shaft may be provided such as an electric motor 28 which may be suspended from the horizontal portion 20 of the bracket 19 or otherwise mounted as desired. The shaft 29 of the motor in the present embodiment is provided with a driving pinion 30 engaging a gear 31 on the shaft for driving the latter and the agitator thereon. It will be understood, however, that any other suitable type of drive for the shaft may be substituted for that shown. However, by employing an electric motor and mounting it upon the bracket 19, a simple and compact arrangement is afforded whereby all parts of the agitating means is directly mounted upon and supported by the tank. Thus a unitary and economical form of construction is afforded embodying relatively few parts which occupy a minimum amount of space.

In order that the agitator shaft may be readily aligned or centered with respect to the bushing or other closing element surrounding the shaft the bracket 19 is adjustably mounted upon the tank support 16 by means of screws 32 threaded through the lugs 33 on the front wall of the support, the screws having their inner ends seated upon the peripheral portion of the ring-shaped member 21 of the bracket 19 as shown in Figs. 1 and 2. It will be seen, therefore, that the shaft and its bearings 25 may be shifted laterally within certain limits to align the shaft with respect to the bushing or the opening in the tank wall merely by properly adjusting the different screws 32. When this has been done the bolts 23 which have a certain amount of play within the holes 24 are tightened up to clamp the bracket 19 in adjusted position upon the front wall of the sup-

port 16 where it is firmly held by the bolts and prevented from lateral shifting by the screws 32 in contact with the ring-like portion 21 of the bracket 19.

The device on the shaft for sealing the opening in the tank wall surrounding the shaft includes a bushing 34 disposed within the flanged portions 11 and 12 of the tank and is made adjustable with respect to the axis of the shaft in order that it may be properly centered and maintained in parallel relation with said axis and consequently with the axes of the bearings 25. The bushing is preferably in the form of an annulus which is permanently secured to the wall of the tank and which has at its inner end a flanged portion 35 seated at 36 upon the curved base portion of the flange 11 and which may or may not be made to contact with the inner edge 37 of the flange 12 welded or otherwise secured upon the flange 11 of the tank. The bushing when properly adjusted is clamped in position by a nut 38 threaded upon the outer end of the bushing, a washer 39 being interposed between the nut and the flange 12 of the tank. Proper alignment of the bushing with respect to the shaft bearing 25 is effected by adjustment of the several screws 40 threaded in the flange 41 of the washer 39, the screws having their inner ends seated upon the tank flange 12 as best shown in Fig. 3. By providing the nut with a spherical portion 42 seated within the outer face of the washer it will readily accommodate itself to the washer when adjusting the bushing 34 into proper alignment with the bearings 25 and the axis of the shaft by turning the screws 40 with the nut slightly loosened upon the bushing. The diameter of that portion of the bushing within the flange 12 is somewhat less than the inner diameter of the flange whereby to permit of a slight rocking or lateral shifting of the bushing within the flange in order that the axis of the bushing may be properly aligned with that of the shaft when the latter has been fixed by adjusting the bracket 19 through adjustment of the screws 32. It will be seen, therefore, that relative adjustment may be effected between the bushing and the shaft to align their axes and this can be done either by adjustment of the bracket 19 or the bushing or both as may be desired.

The wall of the bushing has an inwardly extending seat 43 between which and the shaft is an annular opening 44 normally closed by a removable ring 45 engaging said seat and threaded within the bushing 34. The ring 45 is provided with one or more layers 46 of any suitable packing disposed at the end of the inner ring 47 threaded within the ring 45 for the purpose of compressing the packing to seal the opening around the rotating agitator shaft against leakage under pressure from within or without the liquid holding tank or receptacle. Handles 48 and 49 are provided respectively, on the rings 45 and 47 for unscrewing them to permit of adjustment of the same to the dotted line position shown in Fig. 1, whereby to expose the bushing and other parts for cleaning and sterilizing from time to time as set forth hereinafter.

The opening 18 in the front wall of the bracket 16 and the opening 22 in the transverse portion 21 of the bracket 19 are each made large enough to permit the handles 48 and 49 to pass therethrough when the rings 45 and 47 are adjusted from the full line position shown in Fig. 1 to the dotted line position shown therein, it being

understood that the horizontal portion 20 of the bracket 19 is cut away at 20a sufficiently to allow for the movement of the handles to the extreme outer position required. It will be understood, however, that while it is desirable to provide handles of the type shown, they may, if preferred, be omitted and the rings unscrewed by employing suitable means for turning them to release position.

The bushing can be inserted through a suitable opening in the wall of the tank and positioned within the flange 12, after which the washer 39 and nut 38 can be readily applied. The shaft is inserted through the bushing and the rings 45 and 47 which, together with the packing after being placed upon the shaft can be screwed into position when the bushing has been properly adjusted. The bracket 19 can be applied to the support 16 after the latter has been properly adjusted and secured to the tank. In mounting the frame or support 16 upon the tank its front face may be readily adjusted to occupy a plane substantially at a right angle to the axis of the shaft opening in the wall of the tank by placing suitable shims, not shown, between the lugs 14 on the tank and the projections 15 of the support.

It will be understood that the weight of the agitator and the resulting thrust produced by the operation of the agitator within the liquid will be taken up by the spaced bearings 25, shown more or less diagrammatically in Fig. 1.

In order to be able to clean and sterilize the bushing and the agitator shaft without dismantling or removing either the bushing or the shaft, the ring 47 is unscrewed and moved outwardly along the shaft, after which the ring 45 is likewise unscrewed and moved outwardly also. The withdrawal of these parts will free the opening 44 between the bushing and shaft which is large enough to permit the shaft to be thoroughly cleaned and sterilized as by means of a brush or other suitable implement and by the use of hot water, steam, or any suitable cleansing compound or sterilizing agent which it may be desired to introduce through the opening. Both the shaft and the interior surfaces of the bushing as well as other surfaces within the tank can be quickly and satisfactorily cleaned and sterilized from time to time without the expense and loss of time required in dismantling, removing, or disturbing the shaft and mountings therefor and reassembling and adjusting the same. The rings 45 and 47 when unscrewed and the bore of the bushing may also be readily cleaned and sterilized by the use of any suitable means, employed in any desired manner.

The inner face of the flange 35 of the bushing 34 is substantially coextensive with the surrounding wall of the receptacle whereby to afford a smooth surface at this point which can be easily cleaned and kept in a sanitary condition. The joint between the flange and the wall of the tank may be rendered liquid tight, in case a metal receptacle is used, by soldering or welding the same, or by any other suitable method. Where an enamel or glass lined receptacle is employed the joint may be made liquid tight by means of a rubber or other suitable gasket and the use of cement or other desirable material, not shown.

I claim:

1. In apparatus of the class described, a receptacle having an opening in its wall surrounded by a flange, a shaft of less diameter than the opening extending therethrough into the recep-

tacle, a bushing seated upon the wall of the receptacle within the opening and encircling the shaft in spaced relation thereto to afford a passage around the shaft, a nut adjustable upon the bushing, a washer interposed between the nut and the flange and having a spherical seat for the nut, radially extending screws carried by the washer having their inner ends engaging the flange, said screws being adjustable to align the axis of the bushing with the axis of the shaft and said nut when tightened serving to clamp the bushing upon the wall of the receptacle, and means adjustable upon the bushing for closing said passage including packing encircling the shaft within the bushing.

2. In apparatus of the class described, a liquid holding receptacle having an opening in its wall, a shaft extending through the opening, a bushing seated upon the wall of the receptacle within the opening and encircling the shaft in spaced relation thereto to afford a passage around the shaft for the introduction of cleaning means within the receptacle, a recessed member surrounding the shaft and adjustable within the bushing to and from closing position relative to said passage, packing engaging the shaft within said member, and means adjustable on said member for securing the packing therein.

3. In apparatus of the class described, a liquid holding receptacle having an opening in its wall, a bushing secured within said opening and encircling the shaft in spaced relation thereto to afford a passage around the shaft for the introduction of cleaning means within the receptacle, a recessed member detachably mounted within the bushing adapted to form a closure for said passage, packing engaging the shaft adapted to seal the joint between the latter and the recessed member, and a bearing for the shaft surrounding the latter within said recessed member and detachably secured therein.

4. In apparatus of the class described, a liquid holding receptacle provided with an opening having an annular flange surrounding the opening, a shaft extending through the opening, a bushing within the flange encircling the shaft in spaced relation thereto to afford a passage around the shaft for the introduction of cleaning means within the tank, said bushing having a laterally extending flange-like portion seated upon and substantially flush with the portion of the wall of the receptacle immediately surrounding the opening, means detachably securing the bushing within said flange, a recessed member surrounding the shaft within the bushing and adjustable therein to and from closing position relative to said passage, and means for sealing the joint between the shaft and said member.

5. In apparatus of the class described, a liquid holding receptacle provided with an opening in its wall and having an annular flange surrounding the opening, a shaft extending through the opening in spaced relation to the flange, a bushing within the flange having a laterally extending flange-like portion seated upon and substantially flush with the portion of the wall of the receptacle immediately surrounding the opening said bushing having an inwardly extending annular shoulder, a nut on the outer end of the bushing for clamping the latter upon the wall of the receptacle, a recessed member threaded within the bushing and seated upon the shoulder of the latter, packing encircling the shaft within said recessed member adapted to seal the joint between the latter and the shaft, and a bearing

for the shaft threaded within the recessed member.

6. In apparatus of the class described, a liquid holding receptacle provided with an opening in its wall and having an annular flange surrounding the opening, a shaft extending through the opening in spaced relation to the flange, a bushing within the flange having a laterally extending flange-like portion seated upon and substantially flush with the portion of the wall of the receptacle immediately surrounding the opening, said bushing having an inwardly extending annular shoulder, a nut on the outer end of the bushing for clamping the latter upon the wall of the receptacle, a recessed member threaded within the bushing and seated upon the shoulder of the latter, packing encircling the shaft within said recessed member adapted to seal the joint between the latter and the shaft, a bearing for the shaft threaded within the recessed member, a ring shaped member on the flange of the receptacle forming a seat for the nut, and adjustable means interposed between the flange and said ring shaped member adapted to move the nut and bushing transversely of the axis of the shaft.

7. In apparatus of the class described, a receptacle provided with an opening and having an annular flange surrounding the same, a bushing within the opening having its inner end seated upon the wall of the receptacle and having its outer end projecting through the flange, a nut on

the outer end of the bushing for clamping the latter upon the receptacle, said bushing having an inwardly extending annular shoulder, a recessed member threaded within the bushing and having its inner end seated upon the shoulder and provided with a shaft opening, and a bearing for the shaft threaded within the recessed member and cooperating therewith to form a pocket for the reception of packing for sealing the joint between the shaft and the recessed member.

8. In apparatus of the class described, a receptacle provided with an opening and having an annular flange surrounding the same, a bushing within the opening having its inner end seated upon the wall of the receptacle and having its outer end projecting through the flange, a ring shaped member abutting the outer end of the flange, a nut threaded on the outer end of the bushing and seated upon said ring shaped member, means for moving the ring shaped member and nut laterally of the axis of the opening to adjust the bushing transversely of said axis, a recessed member threaded within the bushing and provided with a shaft opening, and a bearing for the shaft threaded within the recessed member and cooperating therewith to form a pocket for the reception of packing for sealing the joint between the shaft and the recessed member.

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