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LIQUID MIXER

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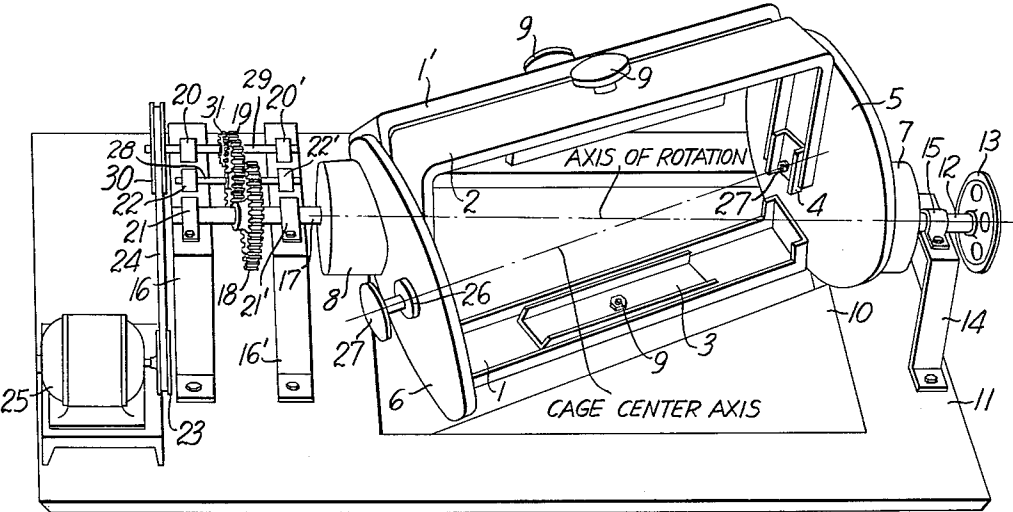


Fig. 1

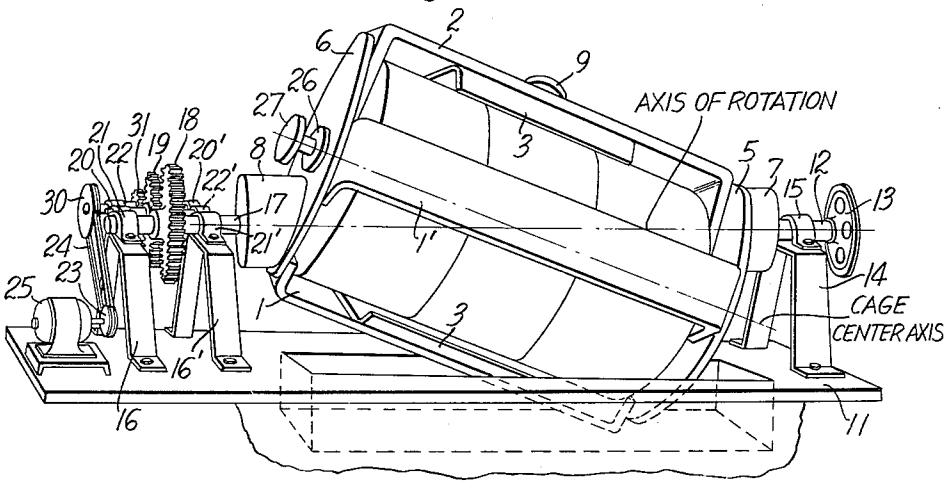


Fig. 2

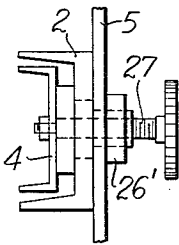


Fig. 3

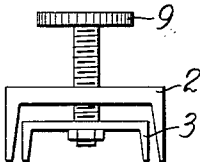


Fig. 4

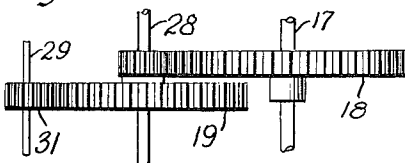


Fig. 5

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The invention for which this application is filed relates to a machine for the purpose of agitating liquids in sealed drums. Examples of liquids which may come under this invention are paints and lacquers, certain petroleum and other chemical products, the ingredients of which are composed of particles of varying specific gravities.

A primary object of the invention is to provide means whereby steel drums containing liquid may be taken from storage, the contents thoroughly mixed without opening the containers, and then returned to storage.

Another object is to remix liquids without exposing them to the air, thereby reducing dangers to health and eliminating many fire hazards.

Another object is to prepare paints and lacquers so that they may be drawn from containers for use by removing a plug and inserting a spigot in the drum.

Other objects and features of the invention will become apparent from the following description when considered with the accompanying drawings, in which:

FIGURE 1 is a perspective drawing of the invention having a cage to receive containers and in position to roll the containers into the cage without lifting them from a floor.

FIGURE 2 is a side view of a device built in each end of the cage, forming a clamp on the container to prevent axial movement in the cage while the machine is in movement.

FIGURE 3 is a side view of a device built in the cage to prevent radial shifting.

FIGURE 4 is a perspective view of the invention with its rotary axis turned one quarter of a revolution from the view shown in FIGURE 1 and a drum clamped in place for remixing its contents.

FIGURE 5 is a top view of the gearing arrangement shown in FIGS. 1 and 4 and with parts of shafts positioned to support the gears shown in FIGS. 1 and 4.

Referring in detail to the drawings, a cage made up of two parallel end plates 5 and 6, rigidly fastened to stringers 1 and 1' and another stringer 2 pivoted in the center of plates 5 and 6 in hinged manner, constitute the cage assembly. In the center of plate 6 the bushing 26 is inserted. This bushing has a shoulder to resist thrust. One section is turned to a slightly larger diameter than the first to accommodate holes in the end bent section of stringers 2, and a further section is turned to a slightly larger diameter still to form a head. The center of bushing 26 is drilled and tapped to receive rod 27 and is equipped with a hand wheel to eliminate the need of wrenches in operation. Rod 27 is turned at the end to thrust against channel 4 so that said channel 4 can be tightened against the head of a drum to prevent axial motion while the machine is in operation. Stringer 2, which is made from structural channel has a hole in the end into which the bushing is inserted to form a hinge for said stringer 2. It will be observed that channel 4 is of such a size that it will nest between the flanges of stringer 2 to protect it from damage while drums are being inserted in or removed from the cage. FIGURE 2 shows the construction as above described. End plate 5 is treated in exactly the same way as end plate 6.

Welded on a diametrical line through the center of plate 6 and at a specified distance from this center, a shaft housing 8 is rigidly attached. Likewise on plate 5, but at an equal distance from the center in the opposite direction is housing 7. A line through the centers of

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housings 7 and 8 forms an axis which intersects another axis through bushings 26 and 26'. These two axes form a plane. The first of these axes will be hereinafter called the axis of rotation, while the other will be known as the cage center axis. Rigidly fixed in housing 7 is a short shaft 12 journaled in bearing 15 and mounted on pedestal 14. Also rigidly fixed in housing 8 is a shaft 17 journaled in bearings 21 and 21' which in turn are mounted on pedestals 16 and 16'.

To drive the machine at a required speed a power plant 25 is equipped with a variable speed pulley 23 driving a shaft pulley 25 by means of belt 24. Power is transmitted from the shaft pulley to the cage through a series of shafts and gears. Specifically the pulley 30 is mounted on shaft 29 together with a gear 31. The gear 31 drives gear 19 on shaft 28 which in turn drives gear 18 on shaft 17. As mentioned above shaft 17 is fixed to housing 8 and hence will rotate the cage when driven by the other gears. The shafts 28 and 29 are provided with suitable bearings 22—22' and 20—20' respectively.

Stringer 1 is bolted to the rim of plates 5 and 6 at points on a radial line through the centers of said plates 5 and 6 and perpendicular to the plane formed by the two axes in the cage. Stringer 1' is bolted on the rims of plates 5 and 6 one hundred twenty degrees from the points at which stringer 1 is attached. Stringer 2 is hinged on bushing 26 in such a manner that the two arms of said stringer 2 can be swung in the path of two arcs. All three above described stringers are made of structural channels. In the centers of these stringers a mechanism consisting of screws 9 equipped to form a thrust on channel 4, as shown in FIGURE 3, are inserted.

When the cage is rotated to a certain position, its axes lie in a horizontal plane. End plates 5 and 6 are vertical and stringers 1 and 1' and 2 are horizontal. In this position, stringer 2 can be raised to leave an opening to roll a drum into the cage. In order to do this without lifting drums from the floor, base 11 is set at floor level, and a plate 10 is placed over the opening in base 11. Pedestals 14, 16 and 16' are made of such a height that the inside edge of stringer 1 is at the floor level. After the drum is rolled in place, stringer 2 is pulled down to a position thirty degrees above the axial plane of the cage. Channels 3 are clamped against the drum. Plate 10 is removed from the floor and the whole machine is ready for operation. A balance wheel 13 is placed on the end of shaft 12 only as a convenience in adjusting the position of the cage for inserting and removing drums.

It will be noted in FIGURE 4 that when the drum is rotated about its rotary axis it assumes an entirely different position. First one end of the drum is at a high point, then after a one-half revolution the other end is high, and at still another position both ends are level. Regardless of position, the entire load is always symmetrical about the rotary axis, which symmetry means that the power requirement is at a minimum.

Modifications and changes in details of construction may be resorted to without departing from the spirit of the invention as claimed. Having described the invention, what is claimed as new is:

1. A liquid mixer comprising: a cage having a pair of axially spaced end plates, a first stringer extending between and attached to the periphery of said plates, a second stringer extending between and attached to the periphery of said plates at a position substantially 120 degrees removed from said first stringer, a third stringer extending between and adjustably connected to said end plates, said third stringer being movable in an arc of 240 degrees between said first and second stringers, means for securing said third stringer in its adjustable position, a first shaft housing mounted on one of said end plates,

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said first housing being connected to said plate on a radius of said plate at a point between the center of said plate and its periphery, a second shaft housing mounted on the other said end plate on a radius 180 degrees removed from the radius of said first plate to form an axis of rotation there between that intersects an axis through the centers of said plates, a drum secured in said cage by said plates and said stringers, and driving means connected to one of said shaft housings to rotate said cage about said axis of rotation and thereby transmit motion to said cage.

2. A liquid mixer comprising: a cage having a pair of axially spaced end plates, a first stringer extending between and attached to the rim of said plates, a second stringer extending between and attached to the rims of said plates at a position substantially 120 degrees removed from said first stringer, a third stringer extending between and adjustably connected to said end plates, said third stringer being movable in an arc of 240 degrees between said first and second stringers, means for securing said third stringer in its adjustable position, a first shaft housing mounted on one of said end plates, said first housing being connected to said plate on a radius of said plate at a point between the center of said plate and its rim, a second shaft housing mounted on the other said end plate on a radius 180 degrees removed from the radius of said first plate to form an axis of rotation there between that intersects an axis through the centers of said plates, shafts extending from said housings, bearing means surrounding said shafts for rotatably supporting said cage, a drum secured in said cage by said plates and said stringers, and driving means connected to one of said shafts to rotate said cage about said axis of rotation and thereby transmit rotary and oscillating motion to said cage.

3. A liquid mixer comprising: a cage having a pair of axially spaced end plates, a first stringer extending between and attached to the rims of said plates, a second stringer extending between and attached to the rims of said plates at a position substantially 120 degrees removed from said first stringer, a third stringer extending between and adjustably connected to said end plates to form a cage, a drum positioned within said cage, said third stringer being movable in an arc of 240 degrees between said first and second stringers to form a retaining means for said drum means for securing said third stringer in its adjusted position and applying thrust against the drum to prevent axial movement of the drum relative to said cage, a shaft housing mounted on one of said end plates, said housing being connected to said plate on a radii at a point between the center of said plate and its rim, a second shaft housing mounted on the other said end plate on a radius 180 degrees removed from the radius of said first plate to form an axis there between that intersects an axis through the centers of said plates, and driving

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means connected to one of said shaft housings whereby rotary and oscillating motion is transmitted to said cage.

4. A liquid mixer comprising: a cage having a pair of axially spaced end plates, a first stringer extending between and attached rims of said plates, a second stringer extending between and attached to the rims of said plates at a position substantially 120 degrees removed from said first stringer, a third stringer extending between and adjustably connected to said end plates, said third stringer being movable in an arc of 240 degrees between said first and second stringers, means for securing said third stringer in its adjustable position, a shaft housing mounted on one of said end plates, said housing being connected to said plate on a radii at a point between the center of said plate and its rim, a second shaft housing mounted on the other said end plate on a radius 180 degrees removed from the radius of said first plate to form an axis there between that intersects an axis through the centers of said plates, shafts extending from said housings, bearing means surrounding said shafts for rotatably supporting said cage, a drum secured in said cage by said plates and said stringers, and variable speed driving means connected to one of said shaft housings whereby rotary and oscillating motion is transmitted to said cage.

5. A liquid mixer comprising: a pair of axially spaced end plates, a first shaft housing mounted on one of said end plates, said housing being connected to said plate on a radii at a point between the center of said plate and its rim, a second shaft housing mounted on the other said end plate on a radius 180 degrees removed from the radius of said first plate and at a point between the center of said plate and its rim to form an axis of rotation there between that intersects and defines a plane with an axis through the centers of said plates, a first stringer extending between and attached to the rims of said plates on a radius of said plates that is perpendicular to the plane of said axes, a second stringer extending between and attached to the rims of said plates at a position substantially 120 degrees removed from said first stringer, a third stringer extending between and adjustably connected to said end plates, said third stringer being movable in an arc of 240 degrees between said first and second stringers, means for securing said third stringer in its adjustable position to form with said other stringers and said end plates a cage, a base having an opening formed therein, bearing means mounted on said base for rotatably supporting said shafts, said base being positioned so that said cage rotates partially within said opening, a drum secured in said cage by said plates and said stringers, and driving means connected to one of said shaft housings whereby rotary and oscillating motion is transmitted to said cage.

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