July 1, 1930. J. PETERS 1,768,928

SHIFTABLE MIXING APPARATUS

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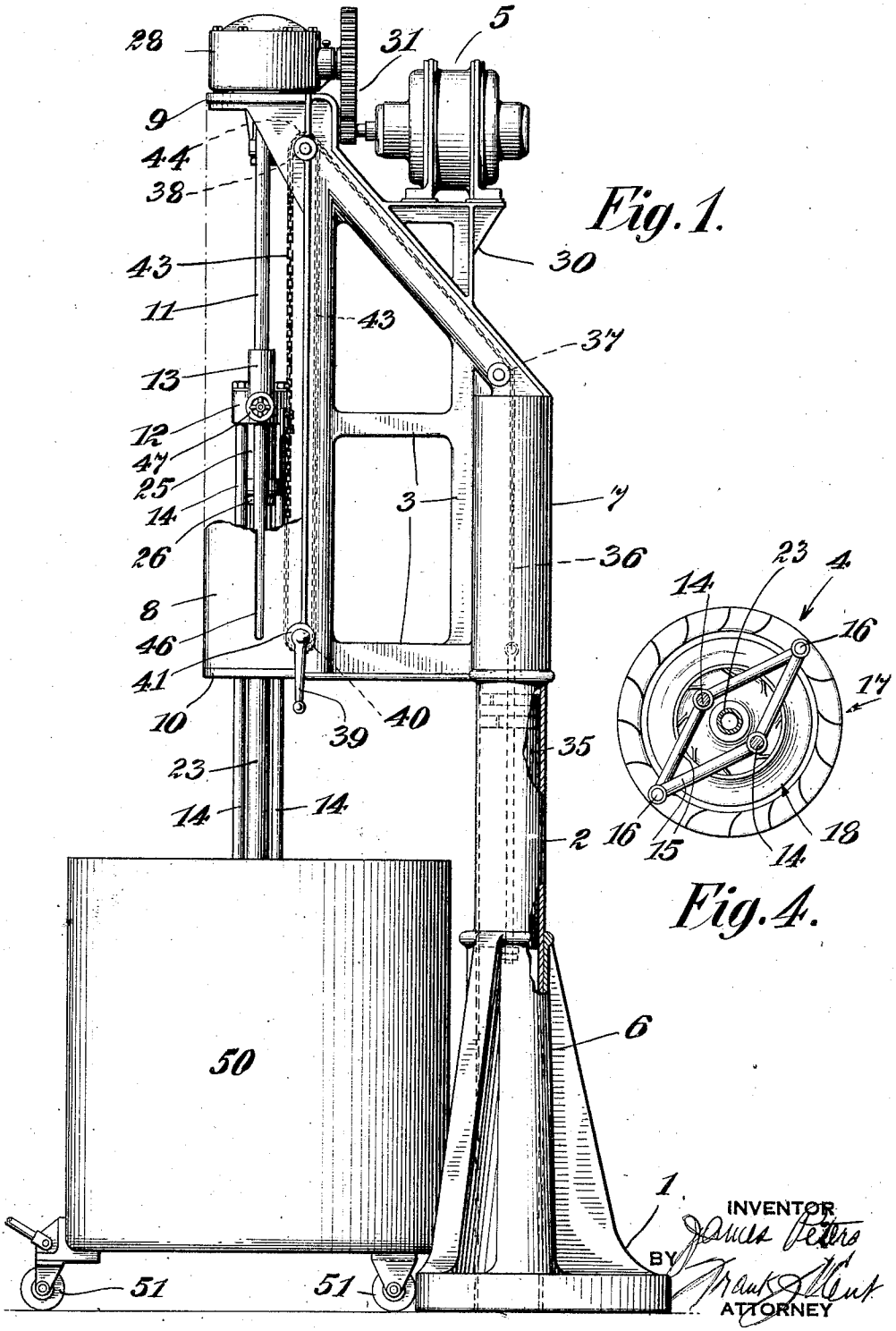


Fig. 1.

Fig. 4.

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SHIFTABLE MIXING APPARATUS

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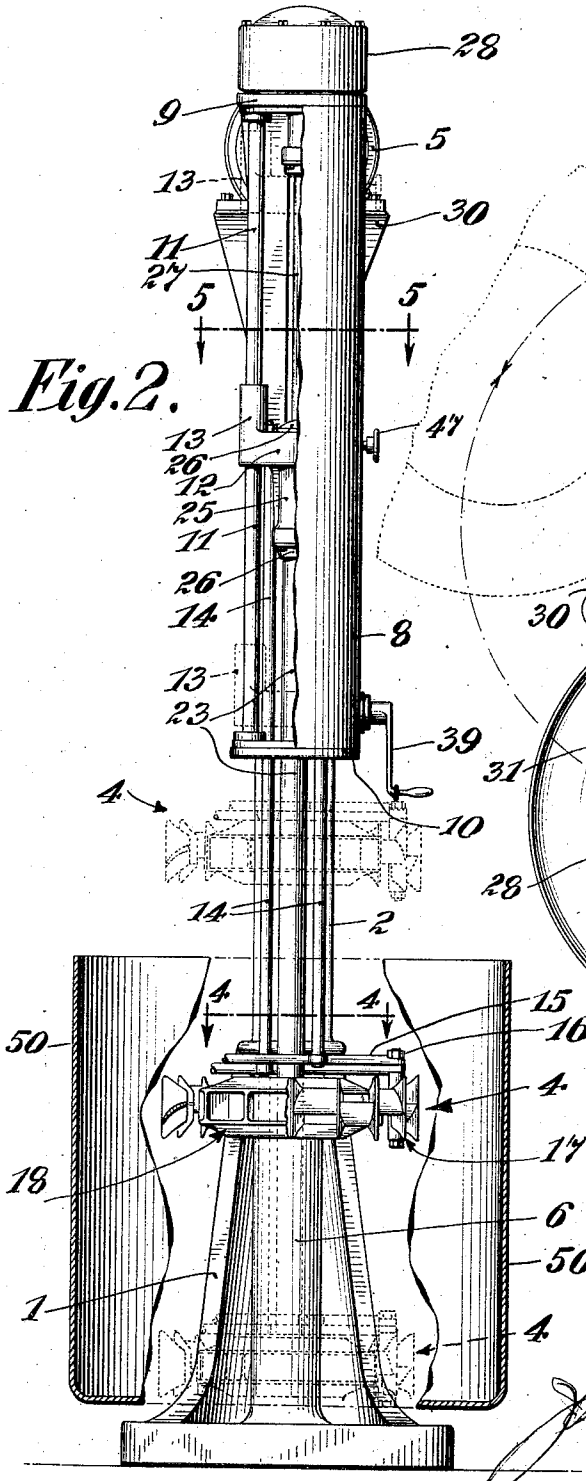


Fig. 2.

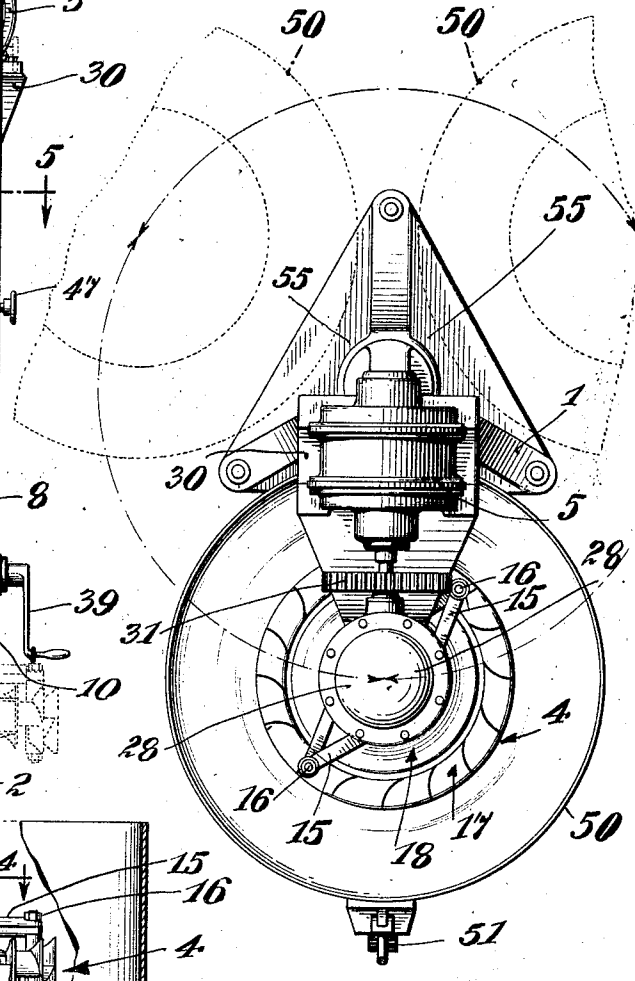


Fig. 3.

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Fig. 5.

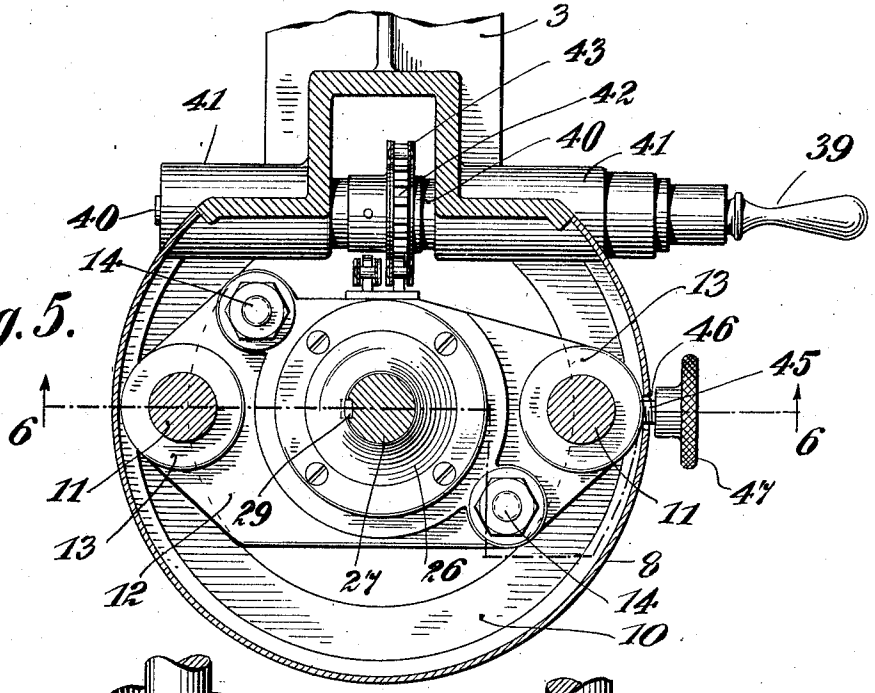
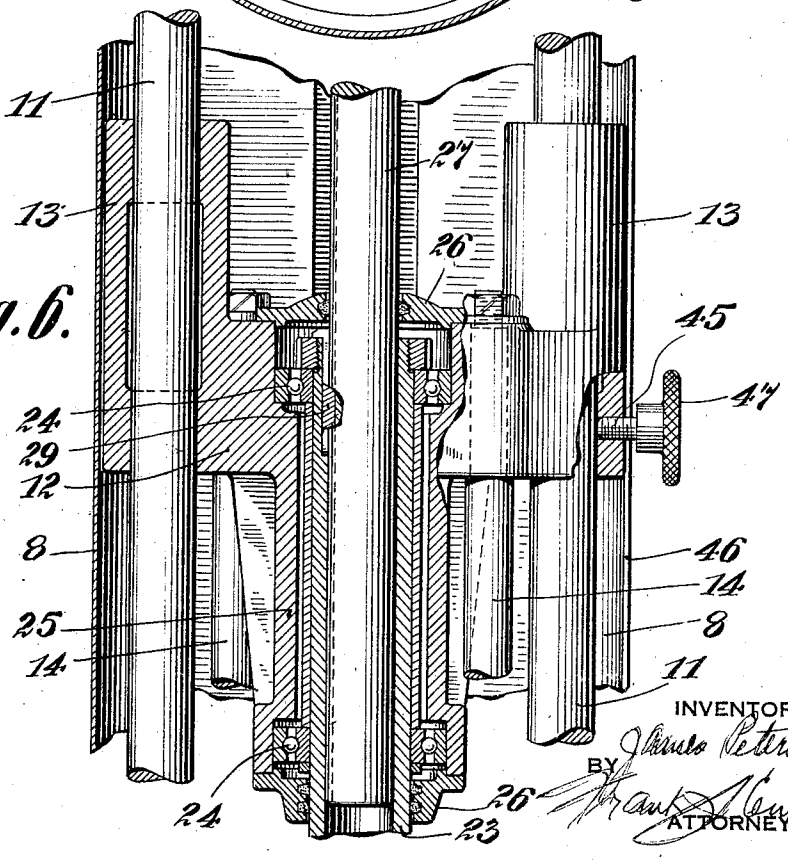


Fig. 6.



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Fig. 7.

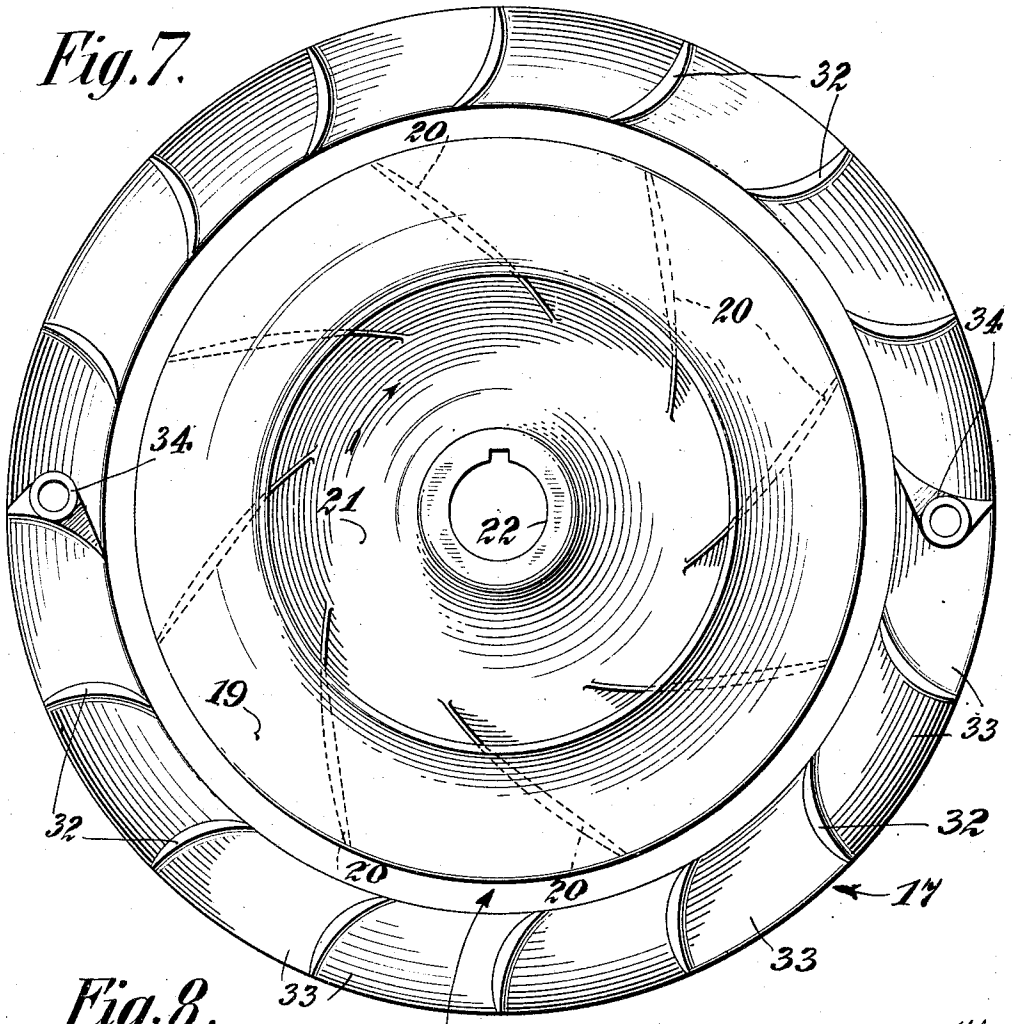
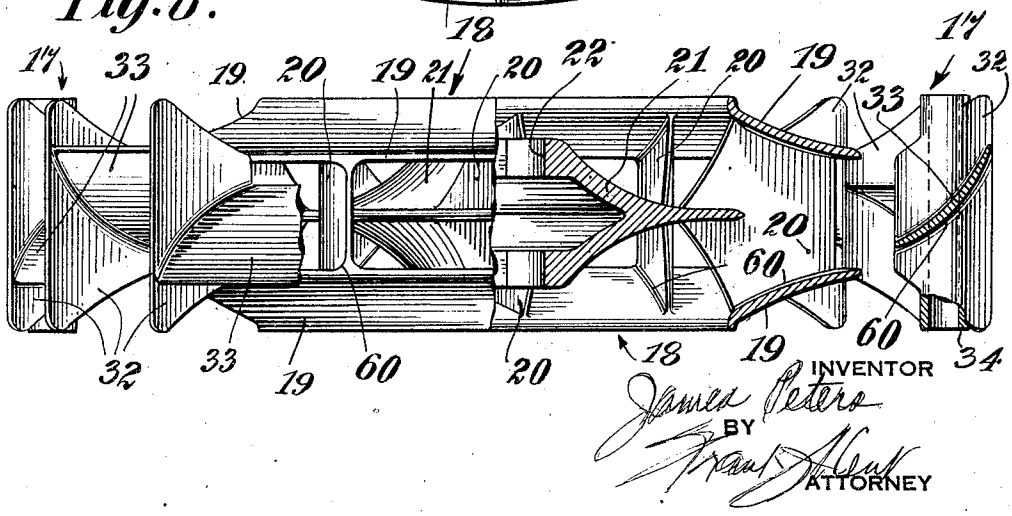


Fig. 8.



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Patented July 1, 1930 1,768,928

UNITED STATES PATENT OFFICE

JAMES PETERS, OF ROSLYN HEIGHTS, NEW YORK, ASSIGNOR TO THE TURBO-MIXER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

SHIFTABLE MIXING APPARATUS

Application filed May 2, 1929. Serial No. 359,834.

The principal object of the invention is to provide efficient mixing apparatus which can be quickly positioned within a mixing tank or tub, and removed therefrom and shifted to another adjacent tank or tub and inserted therein, so that the tanks or tubs may be charged with materials and arranged near the mixer, and the latter inserted without delay in successive tanks. In this way the handling of the mix-batches is facilitated, and various economies are effected.

Another object is to so construct or arrange the mixer that it can be easily and thoroughly cleaned.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawing, which shows one representative embodiment. After considering this example, skilled persons will understand that many variations may be made without departing from the principles disclosed, and I contemplate the employment of any structures that are properly within the scope of the appended claims.

In the drawings:

Fig. 1 is a side elevation of mixing apparatus embodying the invention in one form.

Fig. 2 is an elevation, from the left of Fig. 1.

Fig. 3 is a top plan.

Fig. 4 is a section at 4—4, Fig. 2.

Fig. 5 is a section at 5—5, Fig. 2, enlarged.

Fig. 6 is a section at 6—6, Fig. 5.

Fig. 7 is a top plan of the mixer proper.

Fig. 8 shows the mixer partly in side elevation and partly in vertical section.

A base 1 supports a tubular column 2 having a laterally extending frame 3 for supporting the mixer 4, motor 5, and driving connections. The frame is rotatable about the column axis, and for this purpose the column itself may revolve in sleeve 6 on the base, or frame sleeve 7 may rotate on the upper part of the column.

The outer part of frame 3, in the specific form illustrated, is arranged as a cylindrical housing 8 with a top plate 9 and bottom plate 10, and vertical guide bars 11 extend from one plate to the other. A mixer supporting head 12 has sleeves 13 sliding on the guide bars, and supporting bars 14 are fixed in the head, extending down through bottom plate 10, and at their lower ends are connected to cross bars 15, which in turn are connected at 16 to the deflector 17 of the mixer.

In the broader aspect of the invention the mixing apparatus may be of any known or suitable type. I show specifically a turbo-mixer consisting of the deflector 17 and a rotary impeller 18; this mixer as shown is of the sub-type sometimes called "duplex," being arranged to circulate materials simultaneously in generally opposite directions; it may otherwise be of the "simplex" type, for circulation of materials in only one general course or direction.

As shown, the impeller 18 consists of annular top and bottom plates 19 connected by vertical, curved and approximately tangential blades 20; the blades are also connected to (or integral with) the peripheral part of a partition or septum 21, the central portion of which is arranged as a hollow hub 22, secured on the lower end of a tubular shaft 23. The upper end of this shaft is mounted in ball bearings 24 in a sleeve 25 of head 12, with suitable packing plates 26.

An intermediate drive shaft 27 has an upper bearing in a gear box 28, mounted on the top of frame 3, and the lower part of the shaft telescopes in hollow shaft 23 and has a spline connection 29 therewith. Motor 5 is mounted on a frame bracket 30 and is connected by gearing 31 and other gearing in box 28, to shaft 27, thus providing a double speed reduction, if desired.

The deflector 17 has vertical, curved, and approximately tangential blades 32, connected by webs or plates 33 disposed substantially perpendicularly to the vertical blades, and inclined alternately upward and downward, for deflection of discharged material in corresponding directions, upward and downward toward the tank wall. The impeller draws material into the central openings of plates 19 and discharges it through the annular nozzle formed by the plates, in tangential directions, and vertical deflector blades 32 convert this movement to flow in radial

(or axial) planes, with upward and downward diversion by plates 33, as above referred to.

Certain of the deflector blades are formed as sleeves 34 for connection of the cross bars 15 by bolts 16, to support the deflector irrevolubly in proper relation to the impeller.

The weight of the mixer, head 12 and connected parts, is counter-balanced by an adjustable weight 35 sliding in the tubular column 2, and connected to head 12 by a chain 36 running over pulleys 37 and 38. The mixer is raised and lowered by a crank 39 on a shaft 40, mounted in bearings 41 in housing 8, and having a sprocket 42 engaging a chain 43, which also runs over an upper sprocket 44 and is connected at one point to head 12.

The head may be releasably locked in position by a clamp, or a set screw 45 threaded into one of sleeves 13 and engaging the corresponding guide bar 11. The screw passes through a slot 46 in housing 8, and has its head 47 exteriorly accessible to the operator.

While the apparatus is adapted for a great variety of mixing operations, its utility is sufficiently explained in connection with paint mixing. The "colors," oils, etc., are measured into tanks or tubs such as 50, these being usually mounted on wheels 51, and two, three or more of the tubs are placed about column base 1, which preferably has side recesses 55 to accommodate the tubs, and locate their centers at a radial distance from the column, corresponding practically to the radial position of impeller shaft 23. With the mixer elevated above the level of the tub tops, frame 3 is swung around to align the shaft axis with the center of one of the tubs or tanks, and the mixer is then lowered, by operation of crank 39, to a desired (adjustable) vertical position, either near the tank bottom, or at an intermediate or upward position therein, depending on the character of materials, or other considerations. The motor is energized to run the impeller at a desired speed, and the materials are quickly and thoroughly mixed; the mixer is then raised, swung over another tank, lowered, and so on. The tanks or tubs may be "changed" while mixing is going on in any one of them. Thus by relatively simple apparatus I provide for practically continuous mixing operations, exchange of tanks or tubs, etc., with obvious convenience and economy.

When it is necessary to clean the mixer, (as for example, when it is to be used in a different mixture or composition) this may easily be done by lowering it into a tank containing a suitable cleaning liquid. I preferably make the mixer in such form that it is easily cleaned, and especially avoid sharp corners when material would accumulate and could not easily be dislodged by a brush or scraper. Thus, I provide fillets at 60 where blades 20 join plates 19, and also at the lines of juncture of blades 32 and webs 33.

I claim:

1. Mixing apparatus comprising an upright, a mixer arranged to swing about the upright and also to be moved vertically into and out of receptacles arranged about the upright, the mixer comprising a rotary impeller and a stationary deflector, and means supporting the deflector in fixed position relative to the impeller.

2. Mixing apparatus comprising a column, a frame extending laterally therefrom and revoluble about the column axis, a head guided for vertical movement in the frame, and a mixer carried by the head, the mixer including a rotary impeller, an upper drive shaft and driving connections thereto, and a lower shaft having sliding connection to the upper shaft and connected to the impeller, and a stationary deflector about the impeller and irrevolubly connected to the head.

3. Mixing apparatus comprising a column, a frame extending laterally therefrom and revoluble about the column axis, vertical guide bars in the frame, a head having sliding mounting thereon, and supporting bars depending from the head, and a deflector connected to the supporting bars.

4. Mixing apparatus comprising a column having a base and lower portion adapted for the location of a plurality of tanks about the column, a frame mounted for rotation about an upward part of the column above the level of the tanks, guides on the frame, mixing apparatus arranged for vertical movement on the guides for insertion in any of the tanks when the frame is swung to position the mixing apparatus thereover, driving mechanism on an upper portion of the frame, and a connection from the driving mechanism to the mixing apparatus and arranged to admit the vertical movement thereof, the mixing apparatus including a rotary turbo-impeller and a stationary turbo-deflector about the impeller and vertical struts on which the deflector is mounted in stationary relation to the impeller.

5. Mixing apparatus comprising a column having a base and lower portion adapted for location of a plurality of tanks about the column, a frame mounted for rotation about an upward part of the column above the level of the tanks, guides on the frame, mixing apparatus arranged for vertical movement on the guides for insertion in any of the tanks when the frame is swung to position the mixing apparatus thereover, driving mechanism on an upper portion of the frame, and a connection from the driving mechanism to the mixing apparatus and arranged to admit the vertical movement thereof, upper and lower sprockets in the frame, a chain running over the sprockets and operatively connected at one point to the mixing apparatus, and a crank

at one of the sprockets to effect vertical movement of the apparatus.

6. Mixing apparatus comprising a column having a recessed base and lower portion adapted for the location of a plurality of tanks close about the column, a frame mounted for rotation about an upward part of the column above the level of the tanks, guides on the frame, mixing apparatus arranged for vertical movement on the guides for insertion in any of the tanks when the frame is swung to position the mixing apparatus thereover, driving mechanism including a motor on an upper portion of the frame, a connection from the driving mechanism to the mixing apparatus and arranged to admit the vertical movement thereof, a rotary turbo-impeller and a stationary deflector about the impeller and vertical struts on which the deflector is mounted in stationary relation to the impeller.

In testimony whereof I affix my signature.

JAMES PETERS.