F. W. McDONALD.

DIPPING MACHINE.

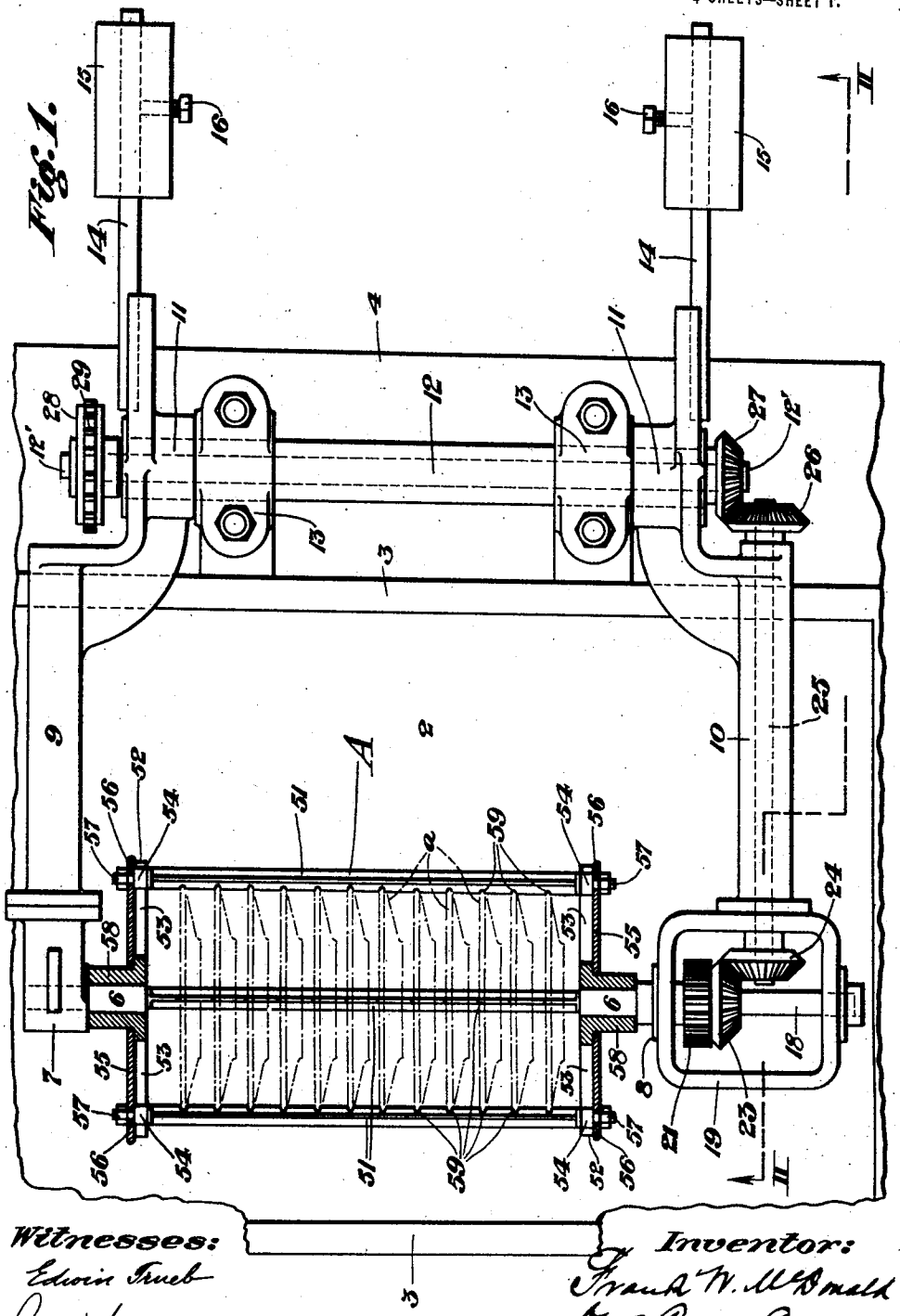
APPLICATION FILED AUG. 13, 1920.

1,404,309.

Patented Jan. 24, 1922.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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Lois Vrieman.

Inventor:
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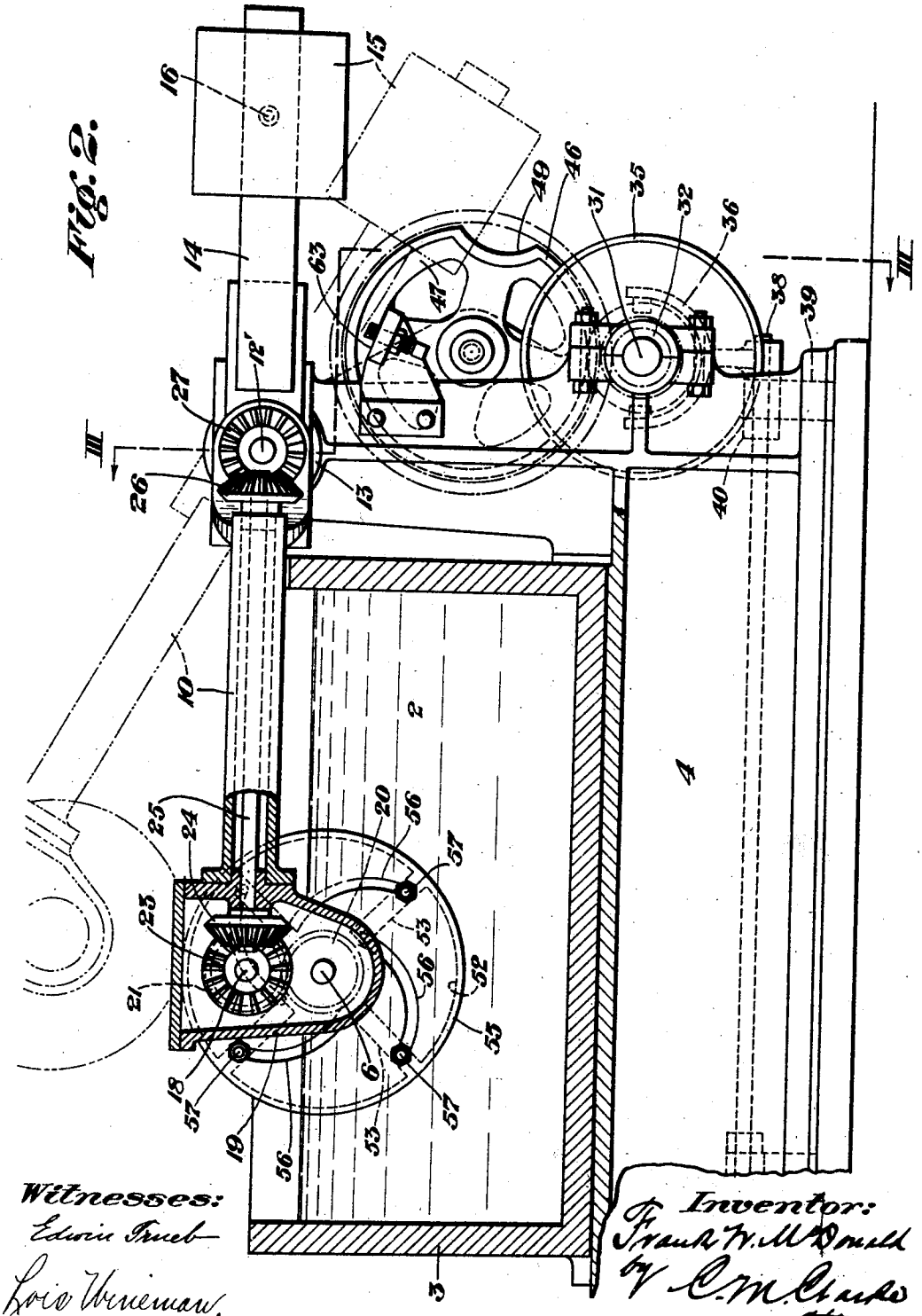
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

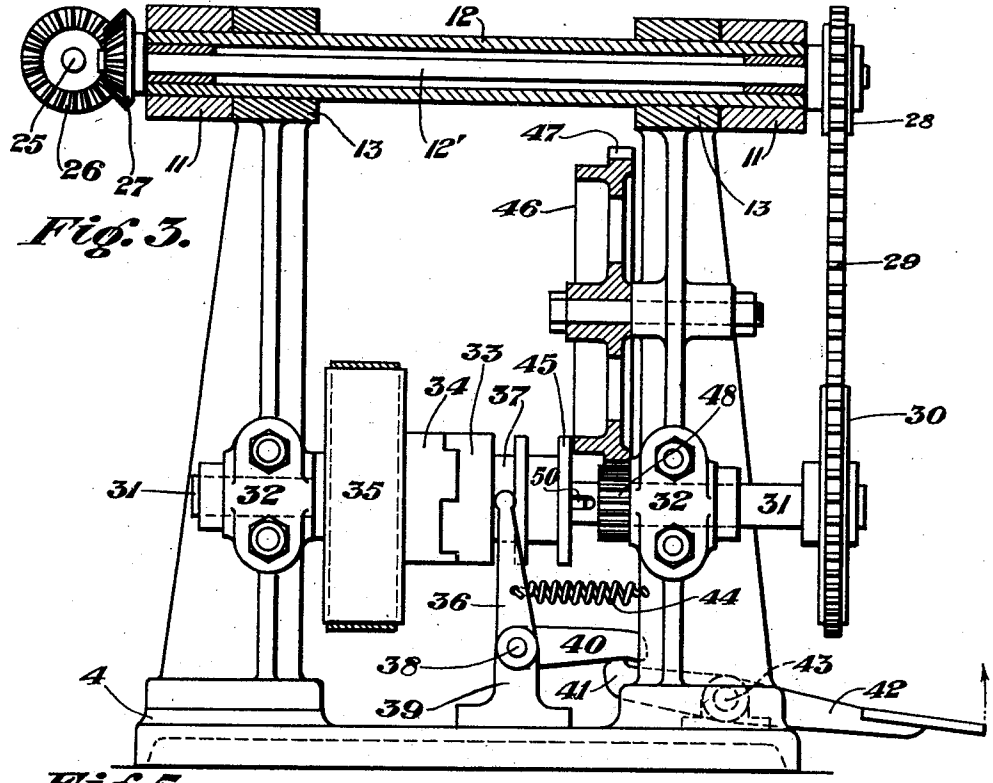


Fig. 3.

Fig. 5.

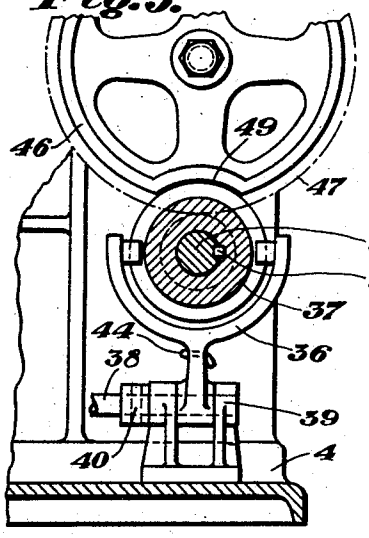
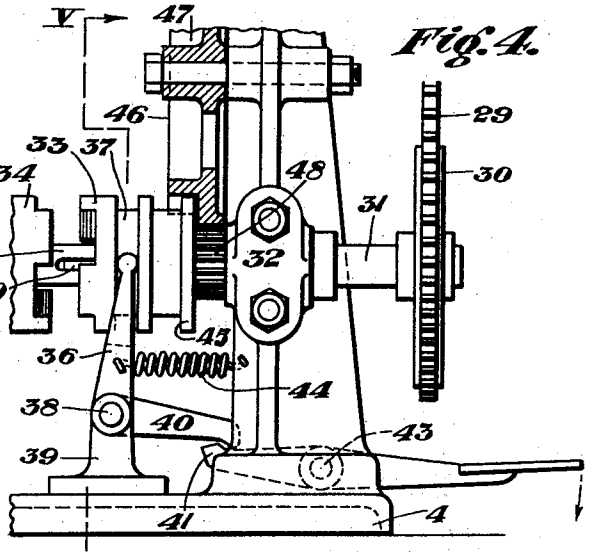


Fig. 4.



Witnesses:

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4 SHEETS—SHEET 4.

Fig. 7.

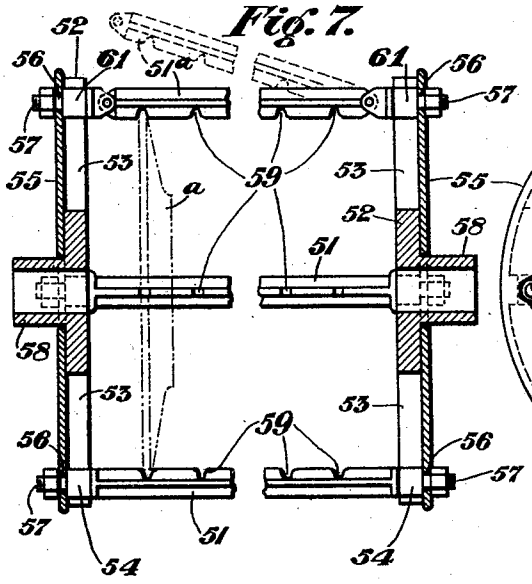


Fig. 6.

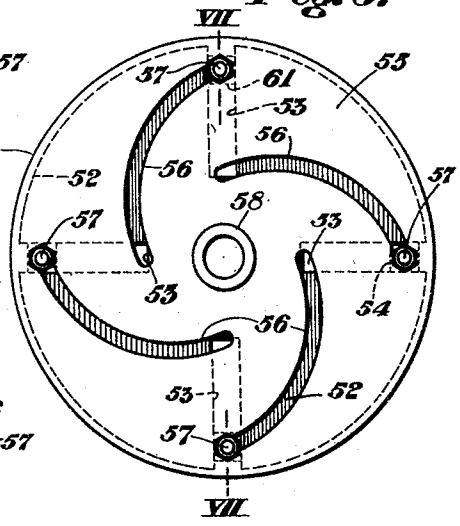


Fig. 9.

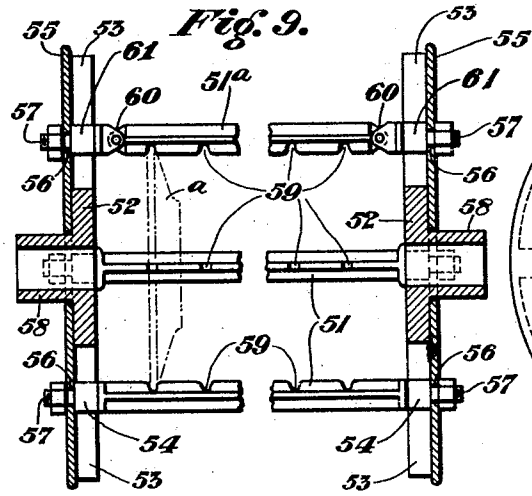


Fig. 8.

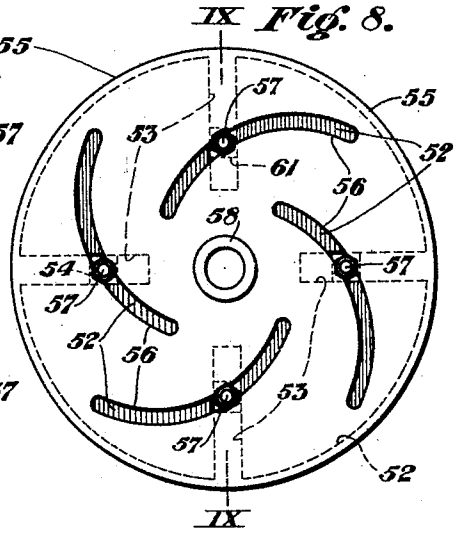
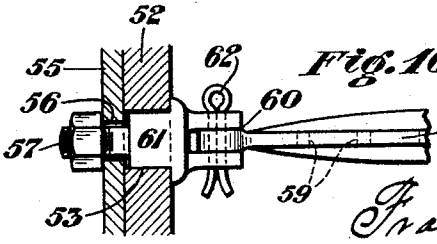


Fig. 10.



Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK W. McDONALD, OF NEW BRIGHTON, PENNSYLVANIA.

DIPPING MACHINE.

1,404,309. Specification of Letters Patent. Patented Jan. 24, 1922.

Application filed August 13, 1920. Serial No. 403,243.

To all whom it may concern:

Be it known that I, FRANK W. McDONALD, a citizen of the United States, residing at New Brighton, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Dipping Machines, of which the following is a specification.

My invention relates to improvements in dipping machines for use in applying plastic enamel or other similar coating to china or other ware. It has in view to provide a machine capable of fixedly carrying or supporting a series of pieces of ware, as plates, saucers, etc., by edge engagement and in spaced relationship within a supporting frame capable of being rotated, immersed, dripped, and raised or lowered with relation to the bath.

In apparatus of this kind, in order to evenly distribute the liquid enamel or covering over the ware, it is desirable that each piece be subjected to the liquid enamel evenly throughout for thorough coating; also, that the excess enamel may have opportunity to freely drip off back into the bath; that the individual pieces of ware may be so held by their edges as to facilitate the even distribution of the enamel and avoid any bare spots; and that the entire set of pieces being treated may be subjected to the bath and rotated therein for a regular interval, for which purpose the machine is provided with gearing adapted to be automatically disconnected after a certain number of revolutions of the supporting rack or frame have been made.

One preferred embodiment of the invention is illustrated in the accompanying drawings in which,

Fig. 1 is a general plan view partly in section;

Fig. 2 is a view in partial elevation and section indicated by the line II—II of Fig. 1;

Fig. 3 is a transverse sectional view indicated by the line III—III of Fig. 2;

Fig. 4 is a partial detail view, similar to Fig. 3, showing the clutch mechanism in reversed position;

Fig. 5 is a detail sectional view on line V—V of Fig. 4;

Fig. 6 is an enlarged detail view showing one of the adjusting plates for the supporting rotatable rack;

Fig. 7 is a vertical sectional view therethrough partly broken away on the line VII—VII of Fig. 6;

Fig. 8 is a view similar to Fig. 6 showing the adjusting plate in altered position for ware of smaller diameter;

Fig. 9 is a sectional view similar to Fig. 7 on the line IX—IX of Fig. 8;

Fig. 10 is a detail sectional view showing the mounting and connection of one of the ware-supporting bars.

Referring to the drawings, the bath of enamel 2 is contained within a suitable tank 3 mounted upon the frame 4 of the machine, into which bath the ware is adapted to be immersed by lowering, and removed by raising the ware carrying frame, generally indicated by the letter A.

Said frame is composed of endmost relatively movable supporting heads and plates, each of which, by a terminal shaft 6, is rotatably mounted in a bearing 7 and 8 respectively of swinging arms 9 and 10. Each of said arms is journaled by a bearing portion 11 on a hollow cross shaft 12 carried in bearing 13 extending upwardly from the main frame 4. Arms 9 and 10 extend beyond their journal portions 11, as shown, and are provided with counter-balancing arms 14, one or both of which is provided with a relatively adjustable counter-weight 15 secured by a set screw 16 to arms 14.

The adjustable ware holding frame is capable of being lowered into the enamel bath, as in Fig. 2, and rotated therein by means of the gearing shown and hereinafter described, and also of being raised above the bath, as indicated in dotted lines in Fig. 2.

At one side of the holding frame, and extending by a supplemental shaft 18 beyond bearing 8, is the gear enclosing casing 19, fixedly connected to the outer end of arm 10 so as to completely surround the rotating gearing and protect it below from the enamel. Shafts 6 are below shaft 18 and one of them is provided with the gear 20 in mesh with a pinion 21 on shaft 18, which shaft is provided with a mitre wheel 23 in mesh with a similar mitre wheel 24 of shaft 25 extending backwardly through hollow arm 10. At its outer end, shaft 25 is pro-

vided with a mitre wheel 26 in mesh with a similar mitre wheel 27 of inner shaft 12', and said shaft has secured to its other end a sprocket wheel 28 driven by chain 29 from sprocket wheel 30 of shaft 31.

Shaft 31 is mounted in bearings 32 of main frame 4, and is provided with a clutch 33 adapted to be thrust into clutch engagement with the hub 34 of the driving pulley 35. Clutch 33 is thrust into clutch engagement with the driving pulley by a rocker arm 36 engaging groove 37 of the clutch, which rocker arm is pivoted at 38 on bearing 39 and is provided with lever arm 40. Said arm is in range of the terminal 41 of a foot actuated lever 42 pivoted at 43, by which the clutch may be thrown into engagement and retracted by a spring 44.

For the purpose of effecting automatic disengagement of clutches 33—34, the shifting clutch 33 is provided with an annular rear extension 45 adapted to cooperate with the face 46 of an idle gear 47. Said gear is in mesh with a driving pinion 48 of shaft 31, and the face portion 46 of gear 47 extends sufficiently beyond the teeth thereof to provide for a clearance space 49 having an annular contour slightly larger and corresponding to the periphery of the clutch extension 45. Clutch 33 is splined on shaft 31, as indicated at 50, and by the construction just described, when thrust into engagement with clutch 34, will remain so engaged even though the treadle 42 is released by the face engagement of extension 45 against the face 46. The clutch will so remain in operative engagement until, upon rotation of gear 47, clearance space 49 comes into register with the clutch extension, as in Fig. 5, whereupon, spring 44 will retract the clutch backwardly into recess 49, and release it from the driving pulley, as indicated in Fig. 4. By this arrangement, it will be seen that it is merely necessary to depress lever 42 to commence the operation, after which the clutch will be automatically disengaged after the ware holder has been sufficiently rotated.

The rotation of the ware holder itself is accomplished through the constantly operating gearing 30, 29, 28, mitre gears 27, 26, and 24, 23, as will be readily understood.

The ware holder itself, in so far as it is adapted to various diameters of ware, is provided with a plurality of cross bars 51 preferably arranged at equally spaced intervals between spanners 52 at each end, each of which is provided with a series of radial slots 53 adapted to receive the squared ends 54 of bars 51, whereby the bars are capable of being adjusted inwardly or outwardly in the spanners 52.

For the purpose of so adjusting all of the bars together, I provide at each end of the frame a relatively adjustable rotatable plate 55 provided with a series of cam slots 56 engaging the bolt terminals 57 of the several bars at each end.

Each plate 55 is journaled concentrically with its adjacent spanner, upon a hub 58 thereof, so that the plate 55 may be maintained in concentric relationship with the spanner, and adjustment of the plates together will move the several bars 51 outwardly and inwardly together. Each bar is provided at its inner side with a series of notches 59 adapted to engage the edges of the ware *a* to maintain the several pieces in fixed relationship to each other in the rack, and with suitable intervening clearance spaces for ample exposure to the liquid enamel.

One of the cross bars 51ª is arranged for adjustment to provide for insertion and removal of the ware, and is therefore pivoted at each end, as indicated at 60, to a supplemental terminal 61, similar in all other respects to the end portions of the one-piece bars 51. By pivoting, as at 60, either end may be detached, as by the removal of a cotter pin 62, whereupon, the bar may be thrown upwardly on its other pivot end, as indicated in dotted lines in Fig. 7. Such arrangement facilitates easy manipulation of the ware and also provides for the adjustment of all of the bars together in the manner described.

The construction and operation of the invention will be readily understood and appreciated from the foregoing description and by those skilled in the art.

The holding frame having been elevated by lowering the counter-weights 15, to a position of rest upon adjustable supports 63 of any suitable kind mounted on the frame, the already dipped ware may be removed after the surplus enamel has dripped back into the pot, and a new set of ware is then inserted. The adjustable bar 51ª having then been secured in position, and any necessary adjustment of cam plate 55 having been made, the frame is then lowered into an immersed position in the bath, clutch 33 is engaged, and the ware holder and ware are rotated until the automatic disengagement of the clutch is effected, whereupon, the ware holder is emptied and the operation just described is repeated.

As shown, the ware holder is merely lowered slightly more than one-half of its own depth in the bath, so that one rotation therein is sufficient to entirely cover the ware. Thereupon, it may be raised and maintained in its upper position during the remaining rotations, allowing the enamel to be very evenly distributed over the ware, with ample opportunity for the surplus to drip off.

The construction and operation of the invention greatly facilitate the dipping of ware and contribute to the speed, regularity, and economy of application of the enamel,

while greatly minimizing the expense of manual application. As will be obvious, two or more machines may be operated by the same set of attendants, one machine being charged or emptied while another is being rotated or is stationary and elevated to provide for the necessary dripping.

Various changes or modifications may be made in the construction or detail arrangement of the parts as to their design, size, etc., by the skilled mechanic, but all such changes are to be considered as within the scope of the following claims.

What I claim is:

1. A dipping machine having a rotatable ware holder, pivotally mounted arms engaging the ware holder by each end, and counter-weighting mechanism therefor.

2. A dipping machine having a rotatable ware holder, pivotally mounted arms for lowering it into a bath, and rotating mechanism incorporated therewith embodying a pivotal drive shaft.

3. A dipping machine having a rotatable ware holder provided with radially adjustable notched bars for engaging and holding the ware in spaced relationship.

4. A dipping machine having a rotatable ware holder provided with separately adjustable notched cross bars for engaging and holding the ware by its edges in spaced relationship.

5. A dipping machine having a rotatable ware holder, means for rotating the ware holder to a limited extent, and a pivotal supporting arm at each side of and pivotally supporting the ware holder for lowering it into a bath and raising it therefrom.

6. A dipping machine provided with a pair of pivotally mounted supporting arms and a rotatable ware carrier having terminal trunnions supported thereby, and means incorporated with one of said arms for actuating the ware carrier.

7. A dipping machine provided with a pair of supporting arms, a pivotally mounted rotatable ware carrier supported thereby having means for engaging and holding the ware in spaced relationship, and means for actuating the ware carrier.

8. A dipping machine provided with a pair of supporting arms, a pivotally mounted rotatable ware carrier supported thereby having radially adjustable ware holding arms and means for actuating the ware holder.

9. In a machine of the class described a ware holder having oppositely disposed pivotally mounted heads, radially adjustable ware holding arms, and adjusting means therefor.

10. In a machine of the class described, a ware holder having oppositely disposed pivotally mounted heads, radially adjustable ware holding arms, and annularly adjustable cam plates engaging the arms.

11. In a machine of the class described, a ware holder having oppositely disposed pivotally mounted heads, radially adjustable ware holding arms, adjusting means therefor, and means for rotatably actuating the ware holder.

12. In combination, a pair of supporting arms, a rotatable ware carrier supported between the terminals thereof, and gearing carried by one of said arms for rotatably actuating the ware carrier.

13. In combination, a pair of supporting arms, a rotatable ware carrier supported thereby, gearing carried by one of said arms for actuating the ware carrier, and means for protecting the gearing from contact with the bath contents.

14. In combination, a pair of pivoted supporting arms, a rotatable ware carrier supported thereby, gearing incorporated therewith for actuating the carrier, and means for automatically disengaging the gearing.

15. In combination, a pair of pivoted supporting arms, a rotatable ware carrier supported thereby, gearing incorporated therewith for actuating the carrier, a driving shaft having clutch mechanism incorporated therewith, and means for disengaging the clutch mechanism at a predetermined time to arrest rotation of the carrier.

16. In combination, a pair of pivoted supporting arms, a counterweighted extension for one of said arms, a rotatable ware carrier supported by said arms, gearing incorporated therewith for actuating the carrier, and means for automatically disengaging the gearing.

17. In combination, a pair of pivoted supporting arms, a rotatable ware carrier supported thereby, gearing incorporated therewith for actuating the carrier, a driving shaft having clutch mechanism incorporated therewith, a clutch controlling wheel geared with the shaft having a clearance recess for the clutch, and a spring adapted to move the clutch from engagement when in register with said recess.

In testimony whereof I hereunto affix my signature.

FRANK W. McDONALD.