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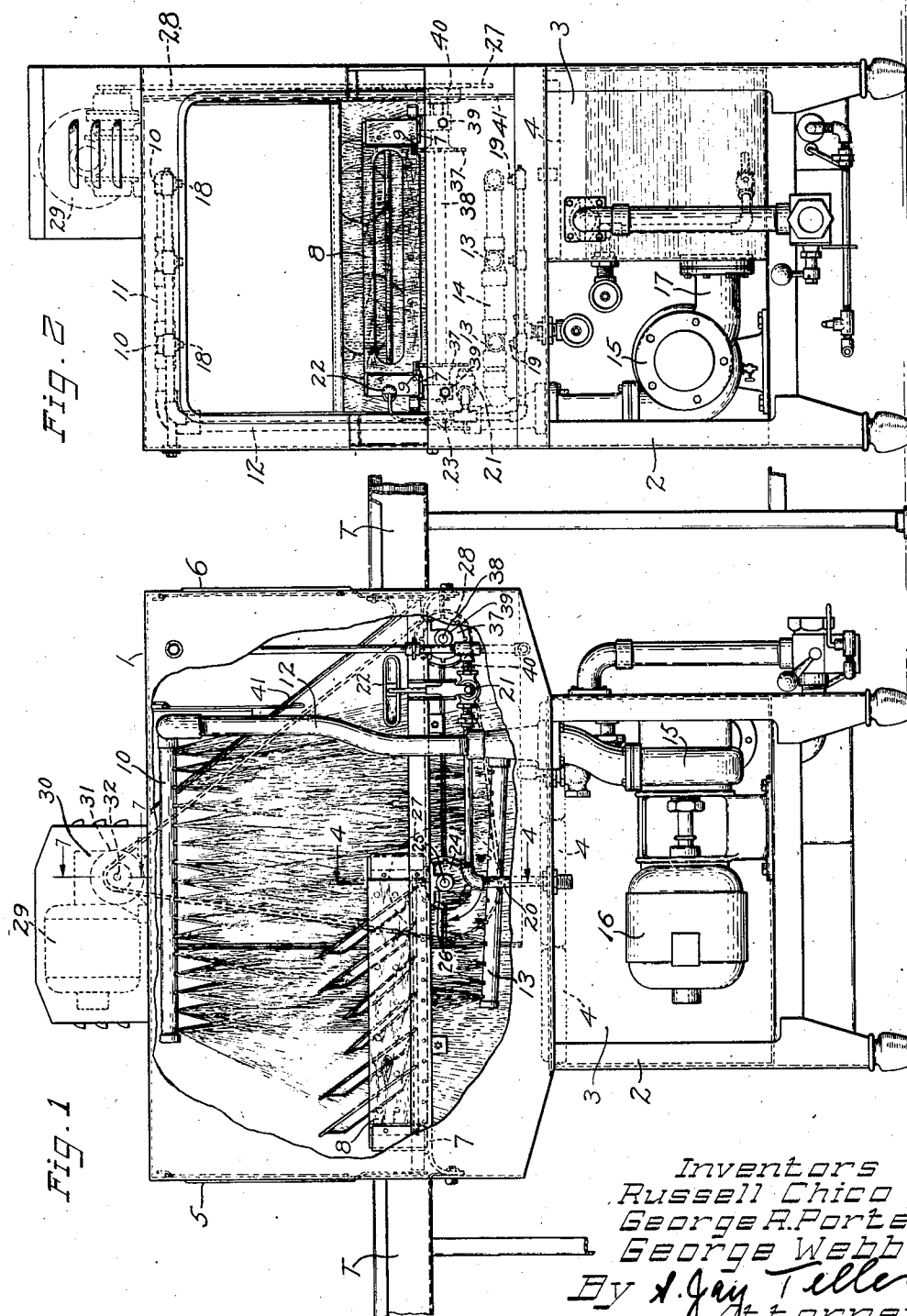
R. CHICO ET AL

2,131,615

DISHWASHING MACHINE

Filed Dec. 28, 1935

2 Sheets-Sheet 1



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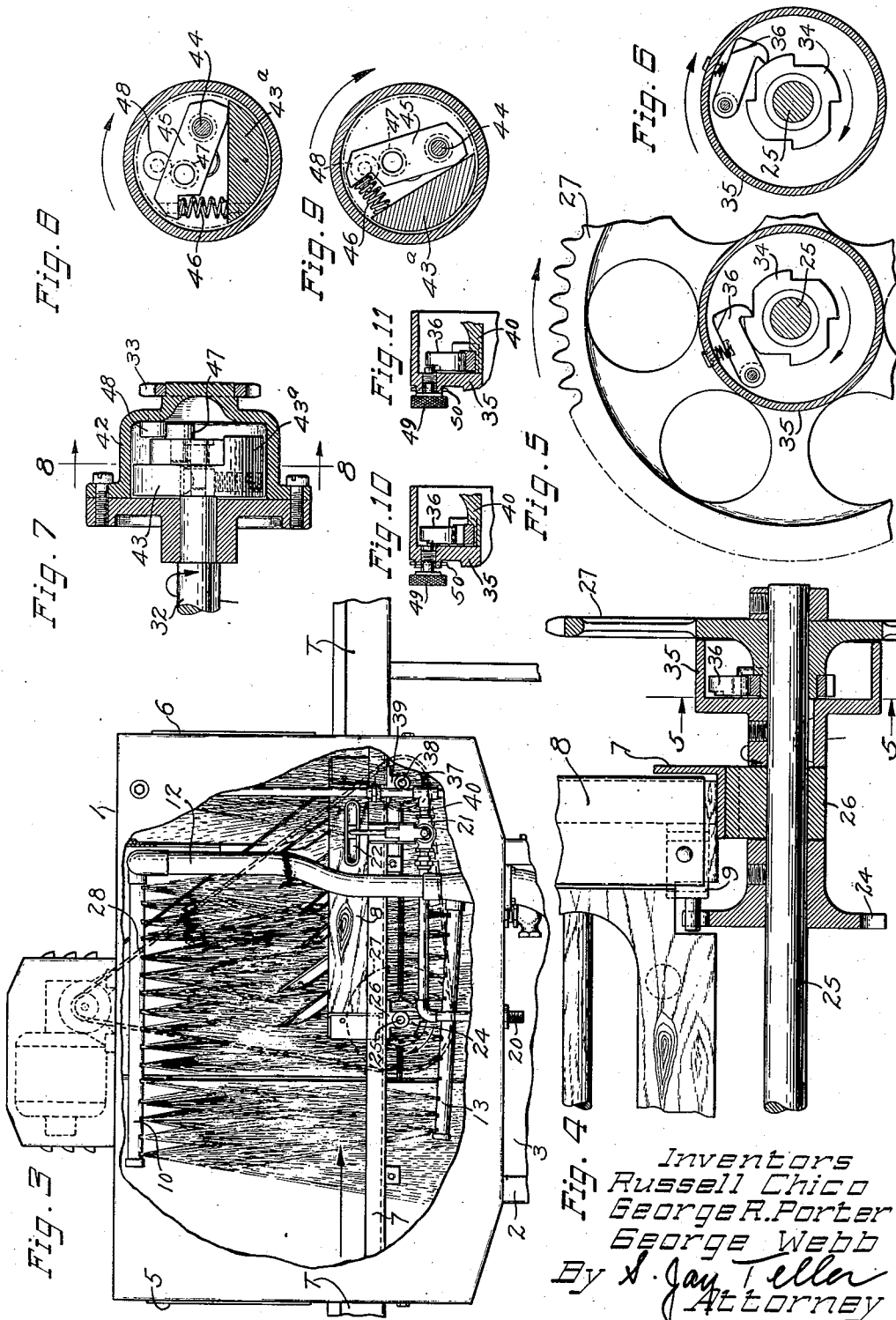
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UNITED STATES PATENT OFFICE

2,131,615

DISHWASHING MACHINE

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Application December 28, 1935, Serial No. 56,454

15 Claims. (Cl. 141-9)

The invention relates to article washing machines of the type wherein the articles to be washed are moved along a path through the machine and are successively moved through zones in which they are subjected to the action of treating mediums. More particularly the invention relates to and may be advantageously applied to a dish washing machine of the type wherein the dishes are placed in a suitable rack or carrier and are then passed through a housing or casing wherein they are subjected to the action of washing liquid and are then preferably acted upon by rinsing fluid just before they pass out of the casing. Automatic mechanism is provided in the casing for engaging the dish carriers to move them through the zones of action of the washing liquid and the rinse jets.

One of the objects of the invention is to provide automatically operable means for moving the articles to be washed through the effective zones of the different treating mediums at different speeds.

Another of the objects of the present invention is to provide means for engaging the dish carrier to move it successively at two different speeds, and more specifically to move it relatively slowly while in the zone of action of the washing liquid and to thereafter move it relatively rapidly while in the zone of action of the rinse jets.

A further object of the invention is to provide for the dish carrier a driving means such as a pinion which is freely movable or rotatable in the direction of its normal movement, so that the carrier can be rapidly moved manually into assured engagement with the driving means and so that the carrier can be manually advanced at a speed greater than normal at any time while in the washing zone.

Another object of the invention is to provide, in combination with the other features referred to, a drive device which is adapted to yield in the event of excessive resistance tending to prevent carrier movement, this device thus preventing injury to the driving mechanism in case movement of the carrier is obstructed.

Other objects of the invention will be apparent from the following specification and claims.

In the accompanying drawings we have shown the embodiment of the invention which we now deem preferable, but it will be understood that the drawings are intended for illustrative purposes only and are not to be relied upon as limiting or defining the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

Fig. 1 is a side view of a dish washing machine embodying the invention, a portion of the front side wall of the casing being broken away to show interior parts.

Fig. 2 is a right end view.

Fig. 3 is a fragmentary view similar to Fig. 1, but showing the dish carrier in a different position.

Fig. 4 is an enlarged fragmentary sectional view taken along the line 4-4 of Fig. 1.

Fig. 5 is a fragmentary sectional view taken along the line 5-5 of Fig. 4.

Fig. 6 is a fragmentary sectional view similar to Fig. 5, but showing the parts in different relative positions.

Fig. 7 is an enlarged fragmentary sectional view taken along the line 7-7 of Fig. 1.

Fig. 8 is a sectional view taken along the line 8-8 of Fig. 7.

Fig. 9 is a sectional view similar to Fig. 8, but showing the parts in different relative positions.

Figs. 10 and 11 are fragmentary views similar to Fig. 4 but showing an alternative detail for the drive clutch at the right hand end of the machine.

Except for the mechanism for moving the dish carriers, the washing machine is, or may be, of any usual or suitable construction, and a very brief description will suffice.

As shown, there is a main casing 1 which is generally rectangular in transverse section. The casing 1 is supported upon a suitable framework 2, which framework also carries a reservoir 3 which communicates with the casing 1 at the bottom thereof. Suitable screens 4, 4 are interposed between the casing 1 and the reservoir 3. The casing 1 is provided at the left end with a supply opening 5 and at the right end with a discharge opening 6, these openings being of sufficient size to permit the passage of a suitable dish carrier therethrough along a longitudinal path. For guiding the dish carrier through the casing from the supply opening therein to the discharge opening, there are provided longitudinal guiding means such as rails 7, 7. For convenience in loading and unloading the dish carriers and in handling them, platforms or tables such as T, T are provided adjacent the ends of the machine and at the same level as the rails 7, 7.

For use with the machine there are provided one or more dish carriers such as 8. The dish carriers are entirely separate from the dish washing machine proper and each of them consists

of a rectangular framework which is ordinarily made of wood and which carries transverse and longitudinal bars or rods which hold and support the dishes to be washed. The dish carrier 8 is preferably provided with at least one and preferably two longitudinal racks 9, 9 adapted to be engaged by pinions forming parts of the machine, as hereinafter described. The details of the dish carrier do not constitute any part of the present invention, the said carrier being described and claimed in the copending application of George Webb for Dish carrier for dish washing machine, Serial No. 56,455, filed December 28, 1935.

For washing the dishes carried by the carriers 8, there are provided suitable means for directing washing liquid against the dishes. While the invention is not necessarily so limited the last said means preferably comprises jet devices for forcibly directing jets or sprays of washing liquid against the dishes. So far as concerns the present invention, these jet devices may differ widely in details of construction and arrangement. As shown, there are provided above the path of movement of the dish carrier three longitudinal pipes 10, 10 having downward directed jet orifices therein. The pipes 10, 10 are served by a transverse manifold 11 and which in turn is connected with a vertical supply pipe 12 positioned at the front of the casing. Below the path of movement of the dish carrier are three longitudinal pipes 13, 13 having upward directed jet orifices. The pipes 13, 13 are served by a transverse manifold 14. The vertical supply pipe 12 and the manifold 14 are connected by means of suitable conduit members with a centrifugal pump 15 driven by an electric motor 16. The suction side of the pump 15 is connected at 17 with the reservoir 3 so that the wash liquid is withdrawn from the reservoir by the pump and is delivered under pressure to the several wash pipes and thence directed downward and upward against the dishes.

Near the discharge end of the machine are rinse nozzles or jet devices for rinse water, there being shown three jet devices 18, 18 at the top and three jet devices 19, 19 at the bottom. Rinse water is fed to the machine from an external source of supply through a pipe such as 20 having therein an automatically closing valve 21. A valve operating member 22 is provided at one side of the machine in position to be engaged by each dish carrier 8 as it approaches the rinsing end of the casing. As the dish carrier moves forward, the member 22 is moved about its pivotal axis at 23 toward the left, as viewed in Fig. 2, thus opening the valve 21 and permitting the rinse water to flow through the jet devices 18, 18 and 19, 19. As soon as the dish carrier moves beyond the operating member 22, the valve 21 is automatically closed and the flow of rinse water ceases.

In accordance with the invention, automatic means is provided in the casing for engaging the carrier to move it along the longitudinal path through the casing, that is along the guide rails 7, 7, and for moving it at a predetermined speed along that portion of said longitudinal path which is within the washing zone. Associated with the aforesaid means for engaging and moving the carrier is a means operatively dependent upon the position of the carrier for causing the movement of the carrier at an increased speed after it is beyond the washing zone, that is, particularly when it is within the rinsing zone. The

automatic means for moving the carrier, first at predetermined normal speed through the washing zone and then at an increased speed beyond the washing zone and through the rinsing zone, may be widely varied as to mechanical construction but one construction which we have found satisfactory and which is shown in the drawings will now be described in detail.

As already stated, the dish carrier 8 is provided with longitudinal racks 9, 9, and these racks are engaged by pinions which serve to move the dish carrier longitudinally through the casing. As shown in Figs. 1 and 2, there is a pair of pinions 24, 24 which are rotatable about a transverse axis, being mounted on a transverse shaft 25 supported in bearings 26, 26 secured to the guide rails 7, 7. Mounted on the shaft 25, preferably at the rear end thereof, is a drive sprocket 27 which is engaged by a drive chain 28. Preferably and as shown, a separate electric motor 29 is provided for supplying power to operate the chain 28, this motor being shown as located within a housing 30 at the top of the main casing. Connected with the motor 29 is a suitable reducing gearing 31 which may be of any usual or preferred construction and which is not shown in detail. This gearing has a transverse shaft 32, at the rear end of which is mounted a sprocket wheel 33 engaging the aforesaid chain 28. By means of the mechanism described, the driving pinions 24, 24 are operated in the direction of the arrow in Fig. 1 so as to engage the racks on the dish carrier 8 and to thus move the dish carrier from left to right along the guide rails 7, 7.

In operating the machine, the dish carrier, after being filled with dishes, is pushed manually into the casing along the guide rails 7, 7 so as to bring the teeth of the racks on the carriers into engagement with the pinions 24, 24. In order that the racks may be easily and surely engaged with the drive pinions, the said pinions are preferably so connected with their source of power that they can be readily or freely rotated in the forward direction, that is, in the direction of their normal movement. Thus, the operator in pushing the dish carrier into position can push it far enough to rotate the sprocket wheels 24, 24 forward and thus assure their complete engagement with the teeth of the rack.

The mechanism permitting the drive pinions 24, 24 to be thus freely rotated in the forward direction can be widely varied, but it preferably comprises an over-running clutch such as is illustrated in Figs. 4, 5 and 6. As shown, the drive sprocket 27 is rotatable on the shaft 25 and carries on its inward projecting hub a ratchet wheel 34. Rigidly connected with the shaft 25 for rotation therewith is a housing 35 which surrounds the hub of the sprocket wheel 27 and also the ratchet wheel 34. Pivotaly mounted on the radial wall of the housing 35 is a spring pressed pawl 36 which normally engages one of the teeth of the ratchet wheel 34, as shown in Fig. 5. Power is transmitted to the ratchet wheel 34 by means of the sprocket wheel 27 and the ratchet wheel, by reason of its engagement by the pawl 36, serves to rotate the housing 35, the shaft 25 and the drive pinions 24, 24. However, when the dish carrier with its racks is moved into engagement with the drive pinions 24, 24, the pinions can be moved additionally in the forward direction, thus carrying the housing 35 and the pawl 36 to a forward position such as that shown in Fig. 6. It will be apparent that continued move-

ment of the ratchet wheel 34 will cause a tooth thereof to again engage the pawl 36 and thus restore the operative driving connection.

In order that the dish carrier may be moved entirely through the machine and not allowed to come to rest after moving beyond the range of action of the pinions 24, two additional pinions 37 are provided which are spaced apart to engage the racks 8. The pinions 37 are mounted on a transverse shaft 38 supported in bearings 39 secured to the guide rails 7. The pinions 37 may be driven in any suitable way, but preferably we utilize the same chain 28 which is used for driving the pinions 24. To this end the shaft 38 is provided at its rear end with a sprocket wheel 40 over which the said chain passes. The longitudinal spacing between the pinions 24 and the pinions 37 is less than the length of the racks 8 on the carrier so that the racks are engaged by the pinions 37 before they are disengaged by the pinions 24.

Preferably, the two sets of pinions 24 and 37 are rotated at such speeds that a change in the speed of movement of the carrier is effected during its travel through the washing machine. In the illustrated construction the carrier is moved relatively slowly while in the zone of action of the wash jet devices and relatively rapidly while in the zone of action of the rinse jet devices. When the pinions 24 and 37 are of the same size as is shown and as is preferred, the difference in speed of movement of the dish carrier is effected by making the sprocket wheels 27 and 40 of different diameters. As shown, the sprocket wheel 40 is one-half the diameter of the sprocket wheel 27, the result being that the pinions 37 are rotated at twice the speed of the pinions 24. It will therefore be apparent that the speed of the dish carrier is twice as fast when moved by the pinions 37 as it is when moved by the pinions 24.

Inasmuch as the racks 9 on the dish carrier are engaged by the pinions 37 before they are disengaged by the pinions 24, it is evident that the slower moving pinions 24 would tend to prevent the rapid movement of the carrier by the pinions 37. However, inasmuch as the pinions 24 are free to move forward by reason of the over-running clutch, which has already been described, the pinions have no tendency to retard the movement of the carrier.

Preferably, in order to protect the chain 28 and the sprocket wheels 27 and 40 from the action of the washing and rinse liquids, they are enclosed in a suitable housing 41 within the casing 1.

In order to protect the driving mechanism from possible injury in the event of obstruction to the movement of one of the dish carriers, the said driving mechanism includes a suitable slip-clutch. The details of the slip-clutch may be widely varied within the scope of the invention, but a construction that has been found satisfactory is shown in detail in Figs. 7, 8 and 9. The sprocket wheel 33, instead of being rigidly mounted on the shaft 32, is carried by a two-part housing 42 which is rotatable on the shaft 32. Positioned within the housing and rigidly secured to the shaft 32 is a disc 43 having an axially extending projection 43^a thereon. Pivotaly mounted on the disc 43 at 44 is a rocker arm 45. A spring 46 tends to move the rocker arm 45 in the clockwise direction about its pivot, such movement being limited by the disc projection 43^a. Carried by the rocker arm 45 is a roller 47 and a similar roller 48 is carried by the outer wall of the housing 42. With the parts in their normal driving

position, as shown in Fig. 8, the roller 47 engages the roller 48 and power is transmitted through these rollers from the shaft 32 to the housing 42 and the sprocket wheel 33. It will be evident, however, that the pressure exerted by the roller 47 against the roller 48 can be no greater than the pressure exerted by the spring 46. When rotational movement of the sprocket wheel 33 is stopped or retarded, as for instance by obstructing the movement of the dish carrier, the spring 46 is compressed, thus permitting the roller 47 to move past the roller 48, which has now become stationary or substantially so. The shaft 32 and the parts carried thereby, including the rocker arm 45 and the roller 47, continue to rotate, but at each rotation the roller 47 is forced past the roller 48 until such time as the obstruction is removed and the sprocket wheel 33 is again free to rotate.

The operation of the machine will be apparent from the foregoing description. The dishes to be washed are loaded into the carriers 8, and the carriers are successively pushed into the machine manually, first assuming approximately the position shown in Fig. 1. The racks 9, on the carrier 8 are thus engaged by the pinions 24, and the carrier is moved slowly through the washing zone. The speed of carrier movement is slow and is so determined as to provide ample time for the washing of the dishes by the wash jets. When the carrier engages the valve-operating member 22, the rinse jets are started and shortly thereafter the racks on the carrier are engaged by the more rapidly moving pinions 37, and these pinions move the carrier at a much higher speed through the zone of action of the said rinse jets. It will be understood that the rinse water is supplied from an external source and flows into the reservoir 3 with the wash liquid and that it is thus desirable to reduce the time of rinsing to as great an extent as is consistent with a thorough rinsing action. By providing the two speeds, as shown and described, we are able to move the carriers slowly through the washing zone so as to give ample time for thorough washing, and to then move them quickly through the rinsing zone so as to conserve the rinse water and prevent undue dilution of the wash liquid.

The sprocket wheel 40 may be rigidly mounted on the shaft 38, but as an alternative it may be connected to the shaft by an over-running clutch similar in construction to that provided for the sprocket wheel 27. With the sprocket wheel 40 so connected, the dish carriers may be manually pushed through the casing at any desired speed, irrespective of the normal speed of the drive mechanism. In fact they may be so pushed through the machine even with the drive mechanism idle.

While the over-running clutch for the sprocket 40 is desirable, we prefer to provide means whereby it can be made inoperative. To this end a lock screw 49 may be provided as an alternative construction, as shown in Figs. 10 and 11. The lock screw 49 is provided only on the clutch which drives the sprocket 40.

The screw 49 is threaded into the side wall of the housing 35, and when in its retracted position permits the pawl 36 to operate as already described. An off-center pin 50 enters a groove in the screw to prevent accidental removal thereof. When the screw 49 is advanced to the position shown in Fig. 11, its forward end over-rides the pawl and locks it in engagement with

one of the teeth 34. In this way the over-running clutch is made inoperative.

In the drawings and in this specification we have shown and described a machine primarily adapted and intended for washing dishes, but it will be understood that this has been done for convenience and definiteness in disclosing the invention and that the invention is also well applicable to machines for washing or cleaning other articles as, for instance, metal parts requiring cleaning during or following manufacture.

What we claim is:

1. The combination in a washing machine, of a casing having supply and discharge openings and adapted to permit movement of articles to be cleansed along a path extending between said openings, means within the casing for directing a cleansing medium against said articles during movement thereof along a portion of said path, means within the casing and spaced from the first said means for directing a treating medium different from said cleansing medium against said articles, and means for automatically moving the articles along said path and through the effective zone of said cleansing medium at a predetermined speed and through the effective zone of said other treating medium at a different speed and which said means is operatively dependent upon the position of the articles along said path for changing the speed of movement thereof.

2. The combination in a washing machine, of a casing having supply and discharge openings at opposite ends thereof and adapted to permit movement of articles to be cleansed along a path extending longitudinally therethrough, means within the casing for directing a cleansing medium against said articles during movement thereof along a portion of said path, means within the casing and longitudinally spaced from the first said means for directing a treating medium different from said cleansing medium against said articles, and means for continuously and automatically moving the articles along said path and through the effective zone of said cleansing medium at a predetermined speed and through the effective zone of said other treating medium at a different speed and which said means is operatively dependent upon the position of the articles along said path for changing the speed of movement thereof.

3. The combination in a washing machine for dishes and similar articles, of a casing having supply and discharge openings at opposite ends thereof and adapted to permit the movement of a dish carrier along a path extending longitudinally therethrough, means within the casing for directing washing liquid against dishes in the carrier during the movement thereof along a portion of the said path, means within the casing for directing rinsing water against dishes in the carrier during a subsequent portion of the movement of the carrier along the said path, automatic means within the casing for engaging the carrier to move it along the said longitudinal path and for moving it at a predetermined speed along that portion of the said path which is within the washing zone, and automatic means associated with the said carrier engaging means and operatively dependent upon the position of the carrier for causing the movement of the carrier at an increased speed after it is beyond the washing zone and within the rinsing zone.

4. The combination in a washing machine, of

a casing having supply and discharge openings at opposite ends thereof and adapted to permit movement of articles to be cleansed along a path extending longitudinally therethrough, means within the casing for directing a cleansing medium against said articles during movement thereof along a portion of said path, means within the casing and longitudinally spaced from the first said means for directing a treating medium different from said cleansing medium against said articles, propelling means for automatically moving the articles along a portion of said path and through the effective zone of said cleansing medium at a predetermined speed, and another propelling means for automatically moving the articles along another portion of said path and through the effective zone of said other treating medium at a different speed.

5. The combination in a washing machine, of a casing having supply and discharge openings at opposite ends thereof and adapted to permit movement of articles to be cleansed along a path extending longitudinally therethrough, means within the casing for directing a cleansing medium against said articles during movement thereof along a portion of said path, means within the casing and longitudinally spaced from the first said means for directing a treating medium different from said cleansing medium against said articles, and propelling means automatically operable for moving the articles along a portion of said path and through the effective zone of said cleansing medium at a predetermined speed, another propelling means automatically operable for moving the articles along another portion of said path and through the effective zone of said other treating medium at a different speed, and a single power delivering means for imparting propelling movement to both of said propelling means.

6. The combination in a washing machine for dishes or similar articles, of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding a dish carrier therethrough, means in the casing between the ends thereof for directing a cleansing medium against the dishes in the carrier, means in the casing longitudinally spaced from the first said means for directing a treating medium different from said cleansing medium against the dishes in the carrier, a toothed driving element for moving the dish carrier through the effective zone of the first mentioned cleansing medium at a predetermined speed, a second toothed driving element for moving the dish carrier through the effective zone of said other treating medium at a different speed, and means for simultaneously actuating said toothed elements to cause their movement at different effective speeds.

7. The combination in a washing machine for dishes or similar articles, of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, means in the casing between the ends thereof for directing washing liquid against dishes in the carrier, devices in the casing near the discharge opening therein and longitudinally spaced from the washing liquid means for directing rinsing water against dishes in the carrier, a toothed driving element for engaging the rack on the dish carrier to move the said carrier through the washing zone, a second toothed driving element for subsequently engaging the rack on the dish carrier to move

the said carrier through the rinsing zone, and means for simultaneously actuating the said toothed elements to cause their movement at different effective speeds, the second said element having an effective speed greater than that of the first said element.

8. The combination in a washing machine for dishes or similar articles, of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, means in the casing between the ends thereof for directing washing liquid against dishes in the carrier, devices in the casing near the discharge opening therein and longitudinally spaced from the washing liquid means for directing rinsing water against dishes in the carrier, a rotatable pinion for engaging the rack on the dish carrier to move the said carrier through the washing zone, a second rotatable pinion for subsequently engaging the rack on the dish carrier to move the said carrier through the rinsing zone, and means for simultaneously actuating the said pinions to cause their rotation at different effective speeds, the second said element having an effective speed greater than that of the first said element.

9. The combination in a washing machine for dishes or similar articles, of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, jet devices in the casing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, two pinions rotatable about transverse axes and positioned for engaging the rack on the dish carrier, the said pinions being longitudinally spaced apart by a distance less than the length of the rack on the carrier, means for driving one pinion at a speed to move the carrier relatively slowly while in the zone of action of the wash jet devices, and means for driving the other pinion at a speed to move the carrier relatively rapidly while in the zone of action of the rinse jet devices.

10. The combination in a washing machine for dishes or similar articles, of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having two parallel transversely spaced longitudinal racks thereon, jet devices in the casing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, a pair of pinions rotatable about a transverse axis adjacent the said wash jets and spaced transversely to engage the racks on the dish carrier, a second pair of pinions rotatable about a transverse axis near the discharge opening and spaced transversely to engage the racks on the dish carrier, and means for rotating the pinions at such speeds that the carrier is moved at a higher speed when engaged by the pinions of the second pair.

11. The combination in a washing machine for dishes or similar articles, of a main casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, jet devices in the cas-

ing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, two longitudinally spaced pinions rotatable about transverse axes and positioned for engaging the rack on the dish carrier, and means for driving one pinion at a speed to move the carrier relatively slowly while in the zone of action of the wash jet devices and for driving the other pinion at a speed to move the carrier relatively rapidly while in the zone of action of the rinse jet devices, the driving means including a slip-clutch adapted to yield in the event of excessive resistance tending to prevent carrier movement.

12. In a washing machine for dishes or similar articles, the combination of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, jet devices in the casing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, two pinions rotatable about transverse axes and positioned for engaging the rack on the dish carrier, and means for driving the said pinions to move the carrier, the said driving means including two overrunning clutches connected respectively with the pinions and permitting each of them to be freely rotated in the direction of its normal movement.

13. In a washing machine for dishes or similar articles, the combination of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, jet devices in the casing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, two pinions rotatable about transverse axes and positioned for engaging the rack on the dish carrier, the said pinions being longitudinally spaced apart by a distance less than the length of the rack on the carrier, and means for driving the said pinions to move the carrier, the said driving means including an over-running clutch permitting one pinion to be freely rotated independently of the other in the direction of its normal movement.

14. In a washing machine for dishes or similar articles, the combination of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, jet devices in the casing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, two pinions rotatable about transverse axes and positioned for engaging the rack on the dish carrier, the said pinions being longitudinally spaced apart by a distance less than the length of the rack on the carrier, means including an over-running clutch for driving one pinion at a speed to move the carrier relatively slowly while in the zone of action of the wash jet devices, and means for driving the other pinion at a speed to move the carrier relatively rapidly while in the zone of action of the rinse jet devices.

15. In a washing machine for dishes or similar articles, the combination of a casing having supply and discharge openings at opposite ends thereof, means in the casing for guiding longitudinally therethrough a dish carrier having a longitudinal rack thereon, jet devices in the casing between the ends thereof for directing jets of washing liquid against dishes in the carrier, rinse jet devices in the casing near the discharge opening therein and longitudinally spaced from the wash jet devices, two pinions rotatable about transverse axes and positioned for engaging the rack on the dish carrier, the said pinions being

longitudinally spaced apart by a distance less than the length of the rack on the carrier, and means for driving the pinions at different speeds, the said means including a slip-clutch adapted to yield in the event of an excessive resistance tending to prevent carrier movement and the said means also including an over-running clutch associated with the slower pinion and permitting the said pinion to be freely rotated in the direction of its normal movement.

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