May 2, 1939. J. H. KLINGER 2,156,949

DISHWASHING MACHINE

Filed Dec. 4, 1936 3 Sheets-Sheet 1

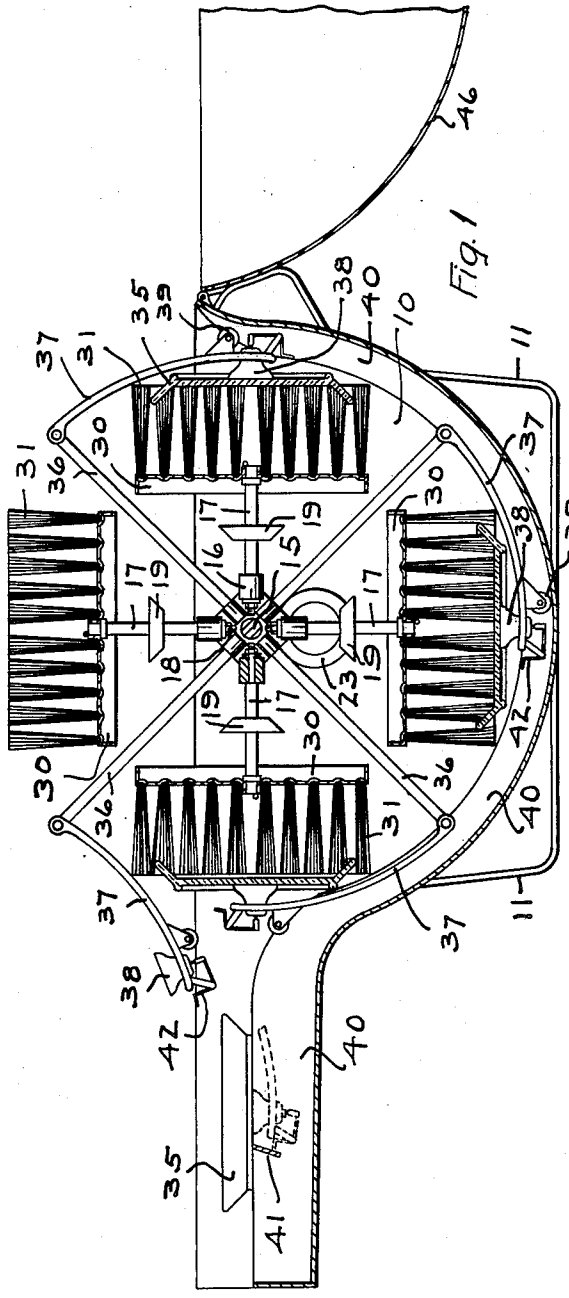


Fig. 1

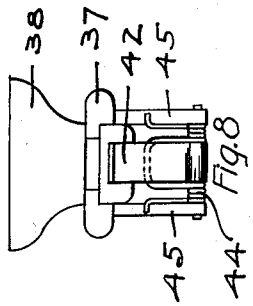


Fig. 8

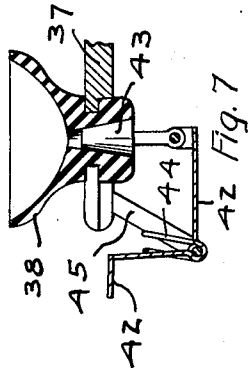


Fig. 7

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DISHWASHING MACHINE

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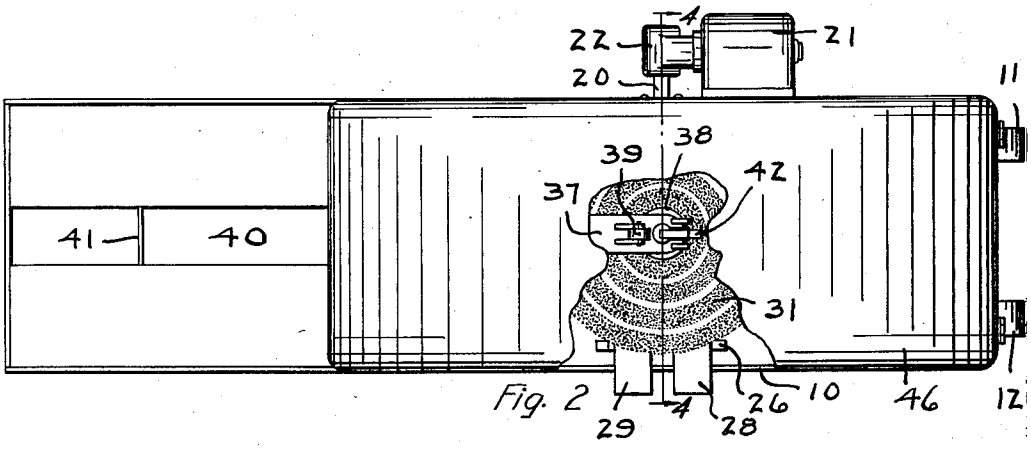


Fig. 2

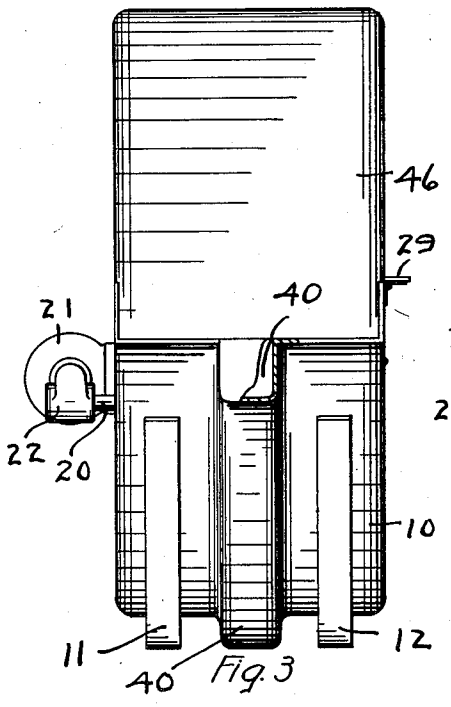


Fig. 3

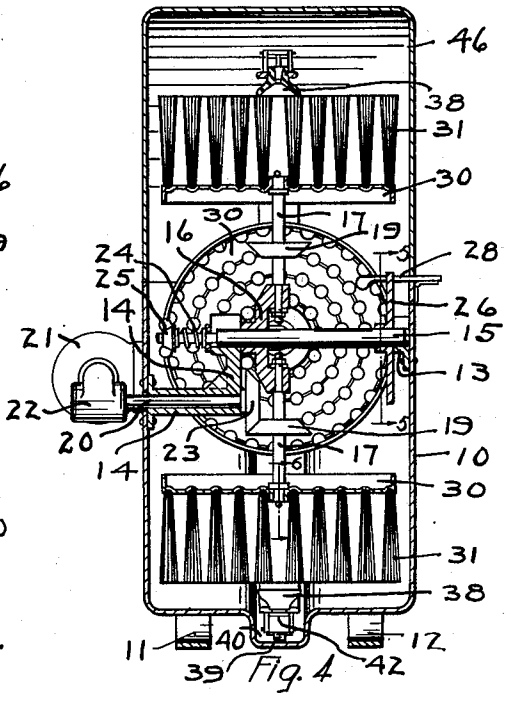


Fig. 4

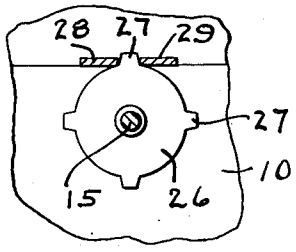


Fig. 5

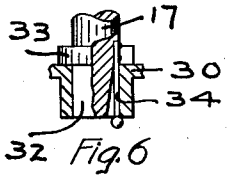


Fig. 6

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DISHWASHING MACHINE

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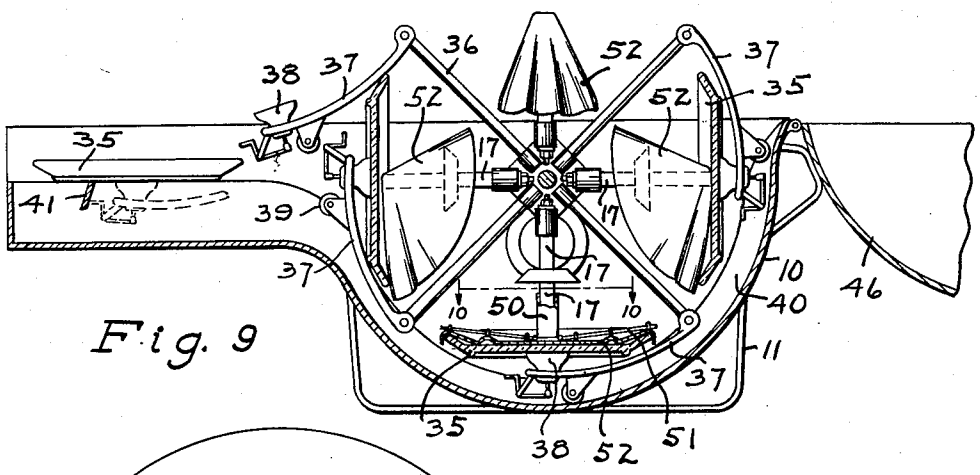


Fig. 9

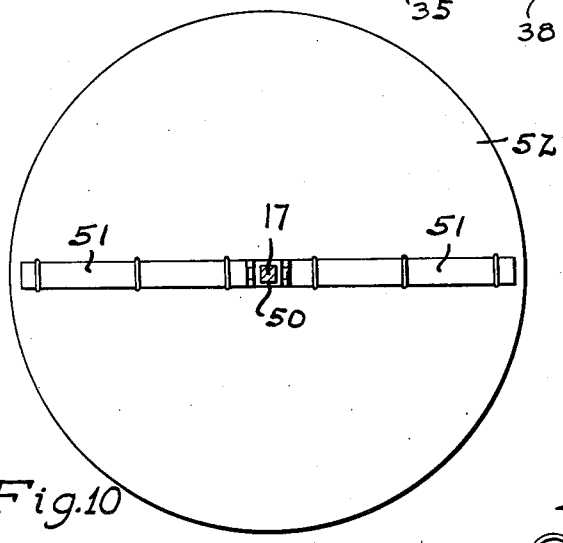


Fig. 10



Fig. 12

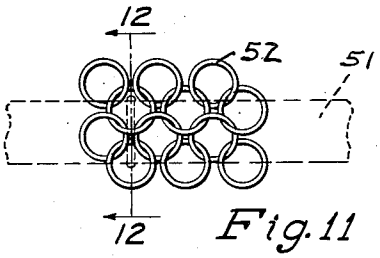


Fig. 11

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2,156,949

DISHWASHING MACHINE

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Application December 4, 1936, Serial No. 114,142

16 Claims. (Cl. 15—74)

This invention relates to apparatus for washing dishes, cooking utensils and the like and has for one of its primary objects, the provision of means for washing dishes or utensils of varying sizes and contours.

A further primary object is to provide means in a dishwasher whereby each individual dish or utensil is individually received and supported and carried into and out of a washing medium without coming into contact with other dishes or the tub of the washer. A still further primary object of the invention is to provide such a structure as will receive dishes one at a time and carry them through the washing medium or solution and carry the dish on out and deposit it on a table from which the washing medium may drain.

A still further primary object of the invention is to provide a dish washer whereby each dish may be individually subjected to some frictional wiping or scrubbing medium while the dish is being subjected to a washing fluid so that foreign matter adhering to the dish may be frictionally removed in the presence of the washing fluid.

An important object also is to provide a very simple compact and easily operated mechanism having the above objectives incorporated therein. Further it is an object of my invention to provide a structure which may be readily and easily dismantled for replacements and for cleaning. An advantage of my invention is that being of a compact and light weight nature, it may be readily employed where space is at a minimum and with the greatest of convenience and ease in kitchen sinks or the like.

These and many other objects such as the unique new association of the various elements as set forth in the accompanying claims will become apparent to those versed in the art in the following description of one particular form of the invention as illustrated by the accompanying drawings, in which

Fig. 1 is a longitudinal vertical section through a structure embodying my invention;

Fig. 2, a top plan view with the cover in closed position;

Fig. 3, a discharge table end elevation;

Fig. 4, a vertical transverse section on the line 4—4 in Fig. 2;

Fig. 5, a detail in vertical section on the line 5—5 in Fig. 4;

Fig. 6, a detail in section of a brush attaching means;

Fig. 7, a detail in vertical section of a dish gripping and release structure;

Fig. 8, an end elevation of the same structure;

Fig. 9, a view on a reduced scale similar to Fig. 1, but with a different form of dish scrubber;

Fig. 10, a section on the line 10—10 in Fig. 9 on enlarged scale;

Fig. 11, a detail on enlarged scale of the scrubbing fabric; and

Fig. 12, a detail of the attachment of the fabric to a supporting arm.

Like characters of reference indicate like parts throughout the several views in the drawings.

I form a tub 10 semi-cylindrical in shape with its upper edges terminating somewhat above the center of the radius of curvature. The tub 10 is normally open from its upper side and is provided with some means of support, here shown as the brackets 11 and 12. Within the tub 10 I provide the brackets 13 and 14 which have bearings therein slotted to open from their upper sides and to receive therein the transverse shaft 15 so as to permit it to revolve freely. On this shaft 15 I fix thereto a spindle head 16 to revolubly carry a number of spindles extending radially therefrom, the number of spindles to be used depending upon the size of the dish washer desired and its capacity. In the form herein shown, I provide four spindles 17. As indicated in Fig. 4, the inner ends of these spindles 17 have reduced diameter portions extending through bosses on the head 16 to be secured against longitudinal displacement by lock nuts 18.

Each spindle 17 carries a driving member 19 of some nature. In the particular form shown, this member 19 is a frustum of a cone and is fixed to the spindle 17.

The bracket 14 has a horizontal bore therethrough in which is revolubly carried a shaft 20 driven by a motor 21 mounted on the outer side of the tub 10 and having a gear reduction head 22 so that the shaft 20 which extends through the wall of the tub 10 into the head 22 may be driven at a relatively low speed. On the inner end of this shaft 20 is fixed a driving member 23. The shaft 20 is carried by the bracket 14 at a distance below the upper shaft 15 so as to give clearance thereunder for the driving member 23. This member in the form herein shown is also a frustum of a cone. Upon turning of the shaft 15, the driving members 19 may one after another be selectively brought into frictional engagement with the driving member 23 as indicated in Fig. 4 whereby upon holding the shaft 15 stationary, the respective driving member 19 may be revolved by the member 23 and thus revolve the respective spindle 17. By turning the shaft 15, that driving member 19 may be removed from influence of the member 23. In other words, the member 19 is only revolved when the particular spindle 17 is brought around by the shaft 15 to have the two members 19 and 23 in substantial tangential contact one with the other. In order to maintain sufficient friction between the two members 19 and 23 to produce the driving relation, some means may be provided for relatively adjusting the members 19

and 23 one toward the other. One such means is herein shown, Fig. 4, where a spring 24 surrounds an end of the shaft 15 between the bearing portion of the bracket 14 and a wing nut 25 on the outer end of the shaft so as to have the spring compressed between the wing nut and the face of the bracket 14 tending to pull the shaft 15 longitudinally through the bearing in the bracket 14 and thereby carry the respective driving members 19 along therewith, the member 23 being non-adjustable in this instance. Of course the face of the head 16 would serve as a stop against the other side of the bracket 14 to prevent the members 19 being carried too far.

In order to maintain the respective driving members 19 in engagement selectively with the driving member 23, I provide a stop means in association with the shaft 15 whereby the shaft 15 is rigidly maintained in each of its shifted positions for the driving transmission between the member 23 and the member 19. In the particular form of this stop means here shown, I provide a disk 26 fixed to the shaft 15 within the tub 10 adjacent the bracket 13 and form this disk 26 to have stops spaced therearound in positions corresponding relatively with the positions of the spindles 17. Thus I provide lugs 27 in the path of a pair of fingers 28 and 29 which are hinged to the tub 10, here shown as at the upper central portion thereof and spaced apart sufficiently as to permit one of the lugs 27 to fit snugly therebetween. Referring to Figs. 2 and 5, by pressing downwardly on the outer end of the finger 28 so as to lift its inner end, this inner end will then be lifted up out of the way of the lug 27 so that the shaft 15 may then turn and remove the driving member 19 from driving engagement with the member 23. The next member 19 is then brought into driving engagement with the member 23 by turning the shaft 15 and thus bringing the next adjacent lug 27 up under the inner end of the finger 29 to lift it and allow the lug to proceed on into abutting contact with the side of the finger 28, whereupon the finger 29 drops downwardly under the influence of gravity behind the lug 27 and thus effectively holds the shaft 15 in the fixed driving position. Preferably the faces of the lugs 27 are sloped so as to give a more or less wedging effect of the lug 27 between the fingers 28 and 29 to prevent any lost motion or chatter when the member 23 may be driving the member 19. In order to insure action of the fingers 28 and 29, the inner ends are preferably weighted so as to cause them to drop promptly.

The outer end of each spindle 17 is provided with some sort of a dish or utensil rubbing medium. In one form herein shown, such medium takes the form of a brush having a head 30 detachably engaging respectively the outer ends of the spindle 17 and having relatively long bristles 31 of a pliable and not too rigid a nature. The lengths and types of bristles employed may be varied depending upon the nature of the washing required. Each spindle 17 detachably receives the head 30 of the respective brush as indicated. One suitable means for engaging the brush with the spindle end is shown in detail in Fig. 6 wherein the brush head 30 has a central bore therethrough square in nature to fit over a squared end 32 of the spindle 17, the spindle 17 having a shoulder 33 limiting the engagement of the head 30 along the spindle. The squared end 32 is slotted along one side and a spring 34, fixed to the spindle 17 extends down through this slot through the head 30 to have an end engaging over the under side of the brush head, the end being here shown as being ball shaped so that the brush head 30 will be withdrawn from the spindle upon a sufficient pull being exerted, the spring 34 retracting into the slot along the spindle in this case.

In each case where a lug 27 of the disk 26 is engaged between the fingers 28 and 29 there will be a spindle 17 in the form herein shown pointing vertically upwardly so that the brush carried thereon will have its bristles turned upwardly and terminating in a horizontal plane, providing the tufts are all of the same length as shown in the present form. On this upper brush surface presented by the ends of the bristles 31, the member to be washed, herein shown as a dish 35 may be laid bottom side up and preferably centered thereon. Of course in this position, the brush is not being revolved since its driving membeer 19 is far removed from the driving member 23. Now in order to retain the dish and hold it against displacement and carry it around through the tub 10, I provide a dish carrying structure which will now be described.

The spindle head 16 is employed to carry a number of arms 36, one for each spindle 17, and spaced therebetween. These arms 36 are fixed in relation to the spindle head 16 and revolve therewith when the shaft 15 is turned. On the outer end of each fixed arm 36 is hingedly mounted a swinging arm 37 properly formed to permit its being swung up around over and down onto a brush next adjacent to its supporting arm 36. On the side of the swinging arm 37 approaching the brush is mounted a vacuum cup 38. Now by swinging the arm 37 around and over the brush, the vacuum cup 38 may be pressed downwardly against the dish lying on the brush so that the air within the cup 38 may be expelled and the cup 38 thereby grip the dish under the influence of atmospheric pressure without. The dish thus gripped will then be controlled entirely in its travel by the movement of the arm 37.

Having thus engaged a dish on the brush as above indicated, the outer end of the finger 28 is pushed downwardly to release the lug 27 and the arm 37 is gripped and pulled around clockwise, Fig. 1, to have its outer end carrying the vacuum cup 38 carried down and into the tub 10 sufficiently far to have the next lug 27 come up between the fingers 28 and 29 and thus prevent further travel. In order to maintain the dish 35 in frictional contact with the bristles 31 of the brush, the arm 37 is formed to be pressed inwardly toward the brush bristles by some engagement with the inner face of the curved wall of the tub 10 after the arm 37 has entered within the tub. In the form herein shown, I provide a roller 39 which enters within a groove 40 around the tub and bears against the outer portion of the groove. Thus by varying the contour of the outer portion of the groove 40, the pressure exerted on the dish against the brush bristles may be controlled.

In the position in which the dish 35 was left in the operation above described, the dish itself still remained above the level of a washing solution in the tub 10 and remained stationary. Likewise the brush against which the dish was carried remained stationary. The next operation would be to again place a dish on the upwardly extending brush then presented beyond

the one carrying the first named dish and repeat the operation as above described, whereupon the first named dish **35** would be carried around to the extreme lower position as indicated in Fig. 1 wherein the driving member **19** is engaged with the member **23** to cause the brush to revolve and thereby rub around the inner side of the dish so as to effectively contact the entire surface thereof. The tub **10** is preferably filled with some suitable washing solution to a level approaching or even above the brush head **30**. The dish being scrubbed cannot recede from the brush to any great extent or at least any more than the resilience of the vacuum cup **38** will permit since the arm **37** cannot swing away from the brush by reason of its roller **39** bearing in the bottom of the groove **40**.

The scrubbing operation may be continued as long as desired, the motor **21** normally running constantly. The length of time is determined by the rapidity of movement of each brush from its upper position. When the scrubbing operation is continued for the desired length of time, the brush carrying spindles are given another turn, 90° in the present form, wherein the dish is carried up out of the washing solution to the left hand side of the tub **10** to remain in a draining position with the brush then being stationary. The floor of the tub **10** is carried around and out horizontally on the left hand side with the groove **40** being continued also but having a relatively greater depth across the floor portion. When the dish **35** is in the left hand elevated position, Fig. 1, as just described, it will have a tendency through its own weight and through the weight of the arm **37** to drop away from the brush bristles, but this travel is limited by the under side of the dish being in contact with the floor of the tub **10**, the arm being within the groove **40** and free from any support at its outer end. The next 90° travel of the system will cause the dish **35** under influence of gravity to slide on around and onto the horizontal floor extending from the tub. The vacuum cup **38** still remains securely attached to the under side of the dish so that the weight of the arm hanging therefrom in this position will cause the dish to gradually right itself and be turned face upwardly. Now as the arm **37** approaches its extreme outer limit of travel within the groove **40**, the vacuum cup **38** is released from the underside of the dish so as to leave that dish deposited on the floor or table.

I accomplish this release by destroying the vacuum within the cup **38** through admittance of atmospheric air. To do so, I provide a projection **41** extending into the groove **40** and in the path of the outer end of a rocker **42** which is rockably supported by the arm **37** to extend around thereunder and pivotally engage a valve **43** which is conical in shape and enters a conical bore in the vacuum cup **38**. Thus as the outer end of the rocker **42** strikes the projection **41**, it is rocked to pull the plug **43** out of the bore in the cup **38** and thus permit the entrance of air, whereupon the vacuum cup **38** becomes detached from the dish and the entire arm is permitted to drop within the groove **40** and be retracted and carried around upwardly to the solid line position as indicated ready for the next dish loading operation on the upwardly extending brush. In order to insure a seating of the plug **43** in the cup **38**, a return spring **44** is employed, this spring being a torsional spring engaging between the rocker **42** and the rocker carrying arms **45** extending from the arm **37**. The stop **41** may preferably be made to incline away from the approaching rocker **42** so that pressure thereagainst by the end of the rocker will tend to urge the arm **37** downwardly to insure quick release of the cup **38** from the dish. It is contemplated that in the operation of the structure described, a dirty dish will be placed upon the upper brush and a clean dish removed from the table on the side of the tub on each turning operation of the brushes. The tub **10** is preferably provided with a cover **46** hinged to the end opposite that from which the table extends so that it may be swung around and over the structure to completely enclose the tub **10** from its upper side. In its open position, the cover may serve as a dirty dish receptacle.

Another form of the dish rubbing medium other than the brush **31** is shown in Figs. 9–12. This form has some advantages over the brush type. In utilizing this form, each spindle **17** is provided with a cross section to receive a sleeve **50** in such manner that the sleeve may be pressed over the outer end of the spindle and be driven by the spindle. In the form herein shown, the cross section of the spindle is square and the sleeve **50** is correspondingly square to fit thereover.

On the outer end of the sleeve **50** are hinged one or more arms **51**, here shown as two in number, the arms being hinged in such manner that they may swing outwardly away from the sleeve **50** but are revolved with the sleeve without lagging therebehind. Secured to the under or outer sides of these arms **51**, is the rubbing medium. The essential characteristics of the medium in this form are that the medium be flexible and also have sufficient weight whereby as the spindle **17** may be revolved when in its lower position, the medium **52** will tend to adapt itself very closely to the contour of the dish or utensil thereunder and at the same time, under the action of centrifugal force, cause the medium to spread outwardly over the periphery of the dish or utensil, the medium being of such nature that it will assume this position even in the presence of and while submerged in the washing fluid. One particular medium which operates very satisfactorily is the circular disc of a chain mesh fabric of metal. This fabric is preferably made up from a plurality of interlocking rings of metal such as is indicated in Figs. 11 and 12. Where the rings are interlocked as the drawings show, the rings will be inclined to the surface of the dish or utensil over which the fabric is being revolved so that the individual links of the fabric present corners or rounded portions which actually scrape on and rub over the article being washed. In this manner, there is provided a plurality of scraping and rubbing edges tending to free the utensil from foreign matter adhering thereto such as dried egg, dried gravy, and the like. Where this chain mesh is made up of links of relatively small diameter, the external diameter being in the neighborhood of one-eighth of an inch or less, an extremely effective operation is secured.

The disk of fabric **52** is loosely attached to the two arms **51** as indicated in Figs. 10–12 by having the fabric clipped to the arms in such manner that the fabric will always be extended along the arms. As the arms sweep through their planes including the sleeve **50**, the fabric can not wad up at the center but is held in the extended position, the outer periphery of which position

depends upon the degree of outward swinging of these arms, and this degree is of course determined by the shape of the vessel into which the arms are inserted. By means of the use of this particular structure, drinking glasses and the like may be washed perfectly accurately as well as plates and more shallow articles. A further advantage is to be seen that in merely by slipping the sleeve 50 off of the spindle 17, the fabric 52 may be removed for cleansing and drying if desired. In any event the fabric may be replaced readily.

While I have herein shown and described my invention in the one particular form, it is obvious that structural variations may be employed without departing from the spirit of the invention and I, therefore, do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. In a dishwashing machine, a tub, a dish rubbing member located in the tub, means located in the tub comprising a swinging arm and a vacuum cup carried by the arm for gripping and holding a dish in juxtaposition with said dish rubbing member, means comprising a rotatable arm to which the swinging arm is hinged for shifting said dish gripping means relative to said tub, means for shifting the rubbing member in fixed relation to the gripping means, a spindle carrying the dish rubbing member, a cone gear on the spindle and a rotating cone gear intermittently rotating the spindle cone gear by movement of the spindle past the rotating cone gear.

2. In a dishwashing machine, a tub, a dish rubbing member located in the tub, means located in the tub comprising a swinging arm and a vacuum cup carried by the arm for gripping and holding a dish in juxtaposition with said dish rubbing member, means comprising a rotatable arm to which the swinging arm is hinged for shifting said dish gripping means relative to said tub, means for shifting the rubbing member in fixed relation to the gripping means, a spindle carrying the dish rubbing member, a cone gear on the spindle and a rotating cone gear intermittently rotating the spindle cone gear by movement of the spindle past the rotating cone gear, means for actuating the last cone gear, and positioning mechanism selectively retaining in said spindle position with the spindle cone gear engaging the rotating cone gear.

3. In a dishwashing machine, a tub, a dish rubbing member and means located in the tub comprising a swinging arm and a vacuum cup carried by the arm for gripping and holding a dish in juxtaposition with said dish rubbing member, and means for shifting said dish gripping means relative to said tub, means for shifting said dish rubbing member relative to said tub but in fixed position relative to the gripping means, and means for creating relative movement between said dish rubbing member and said gripping means.

4. In a dishwashing machine, a tub, a dish rubbing member and means located in the tub comprising a swinging arm and a vacuum cup carried by the arm for gripping and holding a dish in juxtaposition with said dish rubbing member, and means comprising a rotatable spindle head carrying an arm to which the swinging arm is hinged for shifting said dish gripping means relative to said tub, means for shifting said dish rubbing member relative to said tub but in fixed position relative to the gripping means comprising a spindle carried by said spindle head to which the rubbing member is attached, and means for creating relative movement between said dish rubbing member and said gripping means, and mechanism actuating said last means in a selected position only of the shifting of said dish rubbing member.

5. In a dishwashing machine, a tub, an arm mounted to swing into said tub, a dish engaging member carried by the arm comprising a vacuum cup carried by an arm hinged to the first arm, a spindle mounted to swing into said tub, a dish rubbing member carried by the spindle, a gear wheel also carried by the spindle, said dish engaging member being mounted to enable the dish to contact said rubbing member, and a rotating gear wheel in the tub to engage said first mentioned gear wheel and to revolve said rubbing member when swung into said tub to the position of the rotating gear wheel whereby said dish may be frictionally rubbed thereby in the presence of a washing fluid within the tub.

6. In a dishwashing machine, a tub, a shaft mounted transversely in the tub, a disk on the shaft having spaced apart lugs, an arm mounted on the shaft to swing into said tub, a dish engaging member carried by the arm comprising a vacuum cup carried by an arm hinged to the first arm, a spindle mounted on the shaft to swing into said tub, a dish rubbing member carried by the spindle, a gear wheel also carried by the spindle, said dish engaging member being mounted to enable the dish to contact said rubbing member, and a rotating gear wheel in the tub to engage said first mentioned gear wheel and to revolve said rubbing member when swung into said tub to the position of the rotating gear wheel whereby said dish may be frictionally rubbed whereby in the presence of a washing fluid within the tub, and releasable means for engaging a lug on the disk for maintaining said spindle and said engaging member in selected positions relative to said tub.

7. In a dishwashing machine, a tub, a post mounted to swing into said tub, a dish engaging member carried by the post, a spindle mounted to swing into said tub, a dish rubbing member carried by the spindle, said dish engaging member being mounted to enable the dish to contact said rubbing member, and means to revolve said rubbing member when swung into said tub whereby said dish may be frictionally rubbed thereby in the presence of a washing fluid within the tub, said tub having an arcuate floor curving downwardly from a dish entering side around and up to continue laterally to form a washed dish receiving table, and said dish engaging member being on an arm hinged to said post and mounted thereby to have its free end enter said tub ahead of its hinged end whereby said arm may drop outwardly from said rubbing member upon swinging up to leave the tub and carry its engaged dish out onto said table.

8. In a dishwashing machine, a tub, a post mounted to swing into said tub, a dish engaging member carried by the post, a spindle mounted to swing into said tub, a dish rubbing member carried by the spindle, said dish engaging member being mounted to enable the dish to contact said rubbing member, and means to revolve said rubbing member when swung into said tub whereby said dish may be frictionally rubbed thereby in the presence of a washing fluid within the tub, said tub having an arcuate floor curving downwardly from a dish entering side around

and up to continue laterally to form a washed dish receiving table, and said dish engaging member being on an arm hinged to said post and mounted thereby to have its free end enter said tub ahead of its hinged end whereby said arm may drop outwardly from said rubbing member upon swinging up to leave the tub and carry its engaged dish out onto said table, and means releasing said engaging means from the dish at said table.

9. In a dishwashing machine, a tub having a concave floor one side of which extends outwardly into a washed dish receiving table, a rotating means in the tub having a hinged arm traversing the curved portion of the floor and then swinging onto the washed dish receiving table, a dish engaging member on the arm comprising a flexible vacuum cup, a valve controlling and normally closing a passage into the cup, a rocker arm connected with the valve, and means on the table for actuating the arm to actuate the valve by the travel of the arm onto the table.

10. In a dishwashing machine, a tub having a concave floor one side of which extends outwardly into a washed dish receiving table, a rotating means in the tub having a hinged arm traversing the curved portion of the floor and then moving onto the washed dish receiving table, a dish engaging member on the arm, a dish release member also on the arm, and means on the table for actuating the release member and releasing the dish by the travel of the arm on the table.

11. In a dishwashing machine, a tub, an arm mounted to swing into said tub, a dish engaging member carried by the arm comprising a vacuum cup carried by an arm hinged to the first arm, a spindle mounted to swing into said tub, a dish rubbing member carried by the spindle, a gear wheel also carried by the spindle, said dish engaging member being mounted to enable the dish to contact said rubbing member, and a rotating gear wheel in the tub to engage said first mentioned gear wheel and to revolve said rubbing member when swung into said tub to the position of the rotating gear wheel whereby said dish may be frictionally rubbed thereby in the presence of a washing fluid within the tub, said first mentioned arm and said spindle being mounted from the same head to swing in unison maintaining fixed positions relative to each other.

12. In a dishwashing machine, a tub, an assembly including at least one dish carrying and one rubbing member and a rotatable spindle carrying each rubbing member, the assembly being revolubly carried by the tub to turn about a horizontal axis, a rotating beveled wheel driving member presented adjacent said assembly, and a beveled wheel carried by the spindle for each rubbing member and placed to be selectively moved into and out of engagement with said driving member upon turning of the assembly.

13. In a dishwashing machine, a tub, a horizontal shaft centrally of the tub, an assembly including at least one dish carrying and one rubbing member, the assembly being revolubly carried by the horizontal shaft, a disk with marginal lugs on said shaft, a driving member presented adjacent said assembly, and a driven member carried by the assembly for each rubbing member and placed to be selectively shifted into and out of engagement with said driving member upon turning of the assembly, and interlocking means comprising plates for engaging the lugs on the disk successively for releasably maintaining the shaft in any one position of said engagement.

14. In a dishwashing machine, a tub, an assembly including at least one dish engaging and one rubbing member, the assembly being revolubly carried by the tub to turn about a horizontal axis, a driving member presented adjacent said assembly, and a driven member carried by the assembly for each rubbing member and placed to be selectively shifted into and out of engagement with said driving member upon turning of the assembly, said dish engaging member being shiftable toward and away from said rubbing member, and guide means carried by the tub for controlling the travel of the engaging member in relation to said rubbing member as said assembly is turned to carry the engaging member through the tub, the floor of said tub curving downwardly from one side and around, up and out laterally on the other side to form a dish receiving table, said guide means comprising a channel with a cam shaped bottom to contact and shift the engaging member, said guide means being carried out with said table to permit the dish carried by said engaging means to be carried out onto the table.

15. In a dishwashing machine, a tub, an assembly including at least one dish engaging and one rubbing member, the assembly being revolubly carried by the tub to turn about a horizontal axis, a driving member presented adjacent said assembly, and a driven member carried by the assembly for each rubbing member and placed to be selectively shifted into and out of engagement with said driving member upon turning of the assembly, said dish engaging member being shiftable toward and away from said rubbing member, and guide means carried by the tub for controlling the travel of the engaging member in relation to said rubbing member as said assembly is turned to carry the engaging member through the tub, the floor of said tub curving downwardly from one side and around, up and out laterally on the other side to form a dish receiving table, said guide means being carried out with said table to permit the dish carried by said engaging means to be carried out onto the table, said dish engaging means comprising a vacuum cup carried by a swingable arm in said assembly, and means for releasing said cup from its carried dish as the dish is placed on said table.

16. In a dishwashing machine, a tub having substantially a semi-cylindrical floor, a spider mounted across the tub to turn on a horizontal axis, at least one spindle revolubly carried by the spider, a dish rubbing member carried with the spindle to be swung through the tub by turning the spider, at least one post carried by the spider, a dish engaging vacuum cup, an arm hinged to the post to carry the cup over the rubbing member, a driving member, a driven member on the spindle positioned to be swung into and out of engagement with the driving member as the spider is turned, stop means selectively retaining the spider in position to retain the driving and driven members in interengaging relation so as to revolve said spindle, said arm bearing against said tub floor in travelling thereover, a valve in said cup, and valve operating means.

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