Dec. 5, 1950 L. A. LOEB 2,532,925

DISHWASHING MACHINE HAVING AN EXTENSIBLE ROTARY BRUSH FOR RECEPTACLES

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Fig. 1.

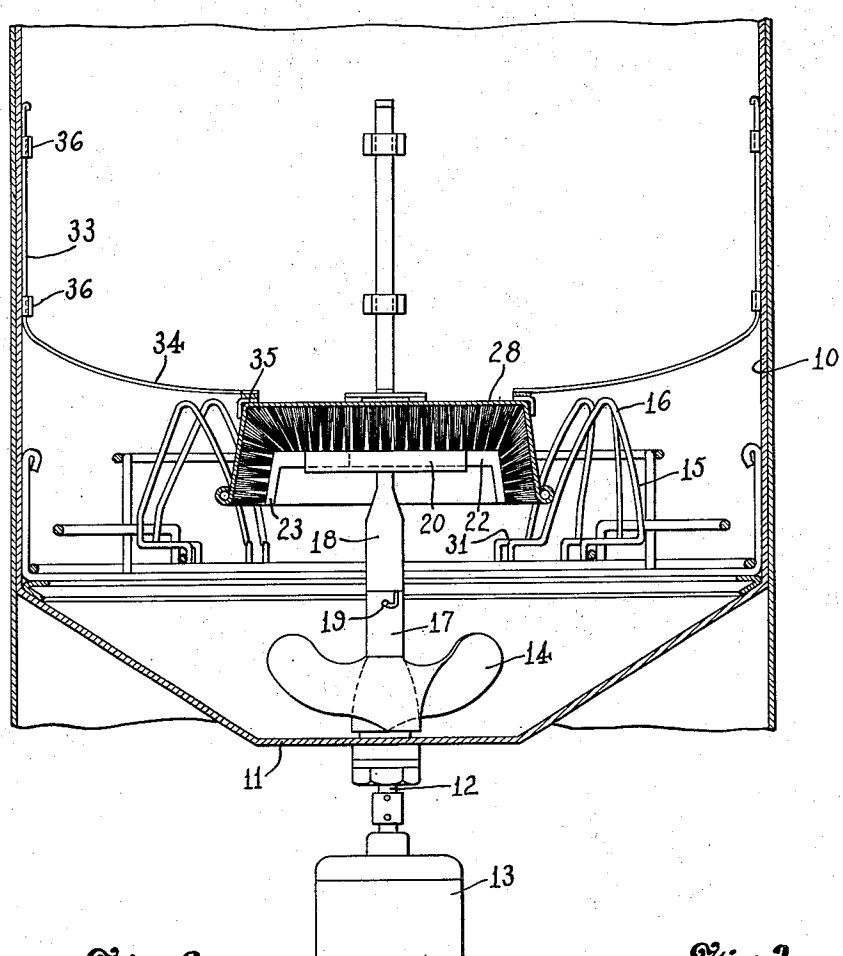


Fig. 2.

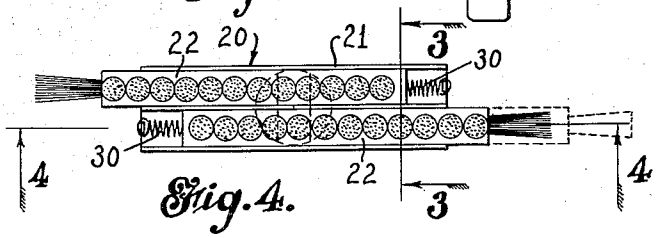


Fig. 3.

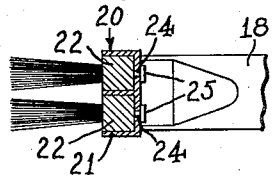
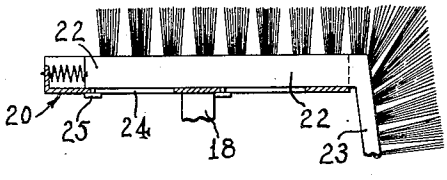


Fig. 4.



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Fig. 5.

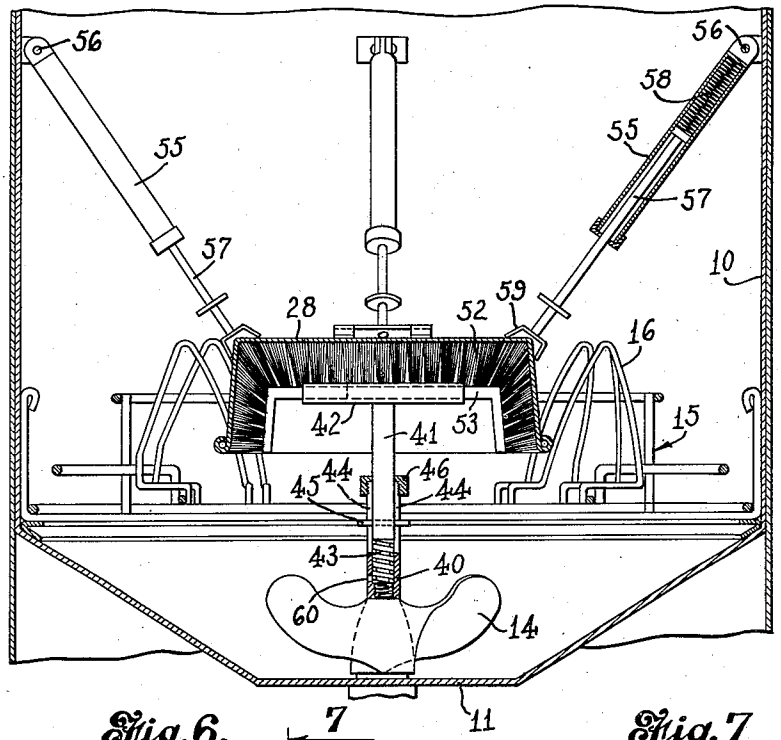


Fig. 6.

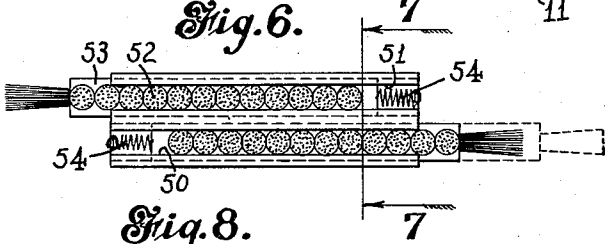


Fig. 7

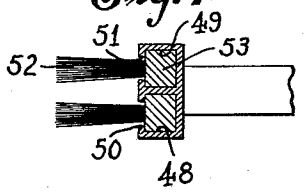
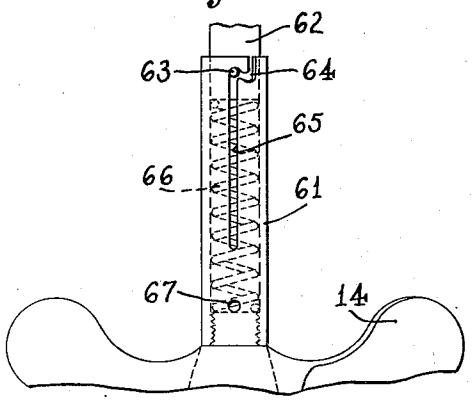


Fig. 8.



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DISHWASHING MACHINE HAVING AN EXTENSIBLE ROTARY BRUSH FOR RECEPTACLES

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Fig. 9.

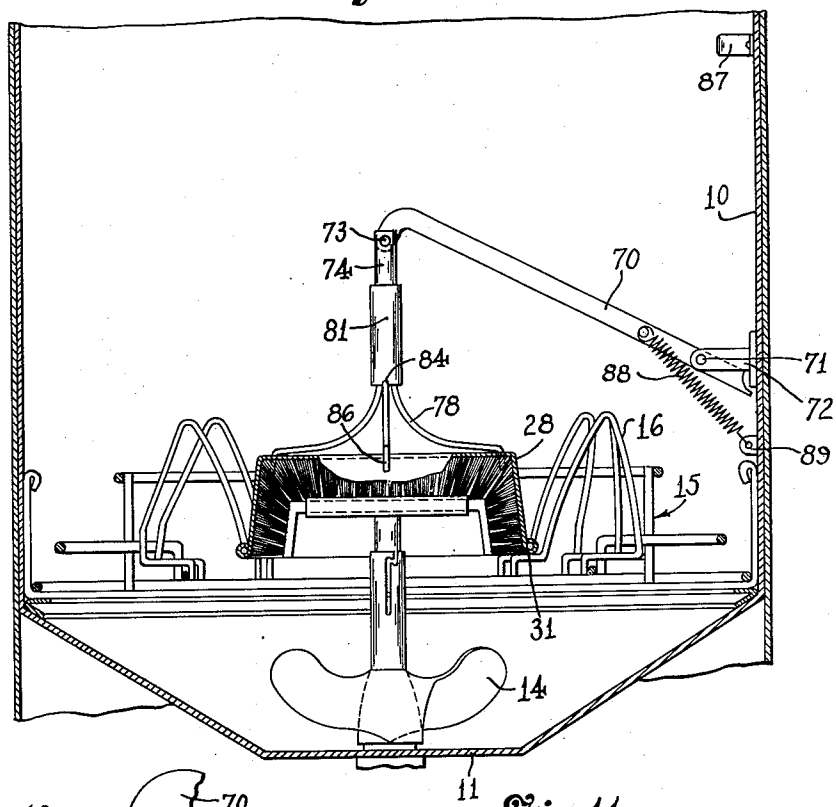


Fig. 10.

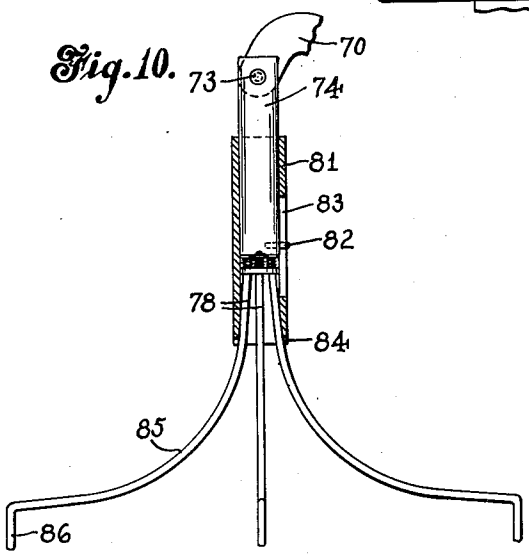
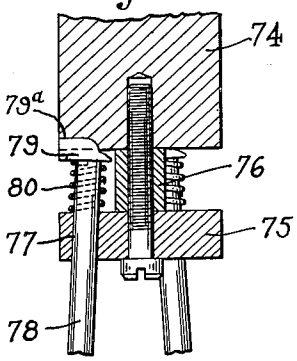


Fig. 11.



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Fig. 12.

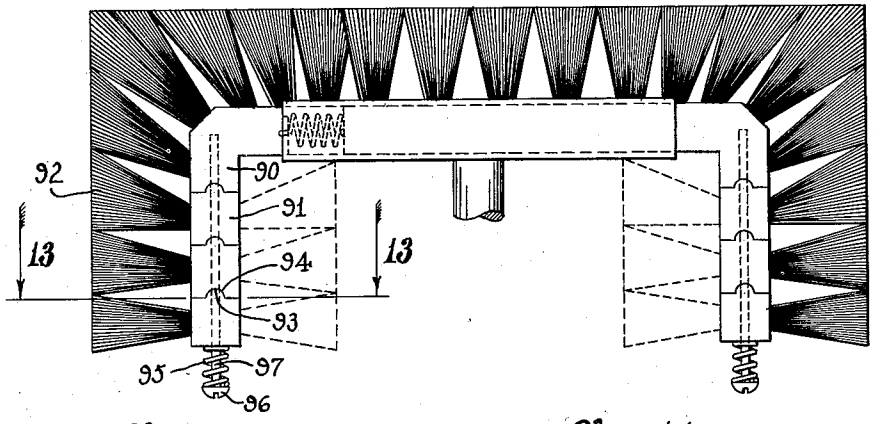


Fig. 13.

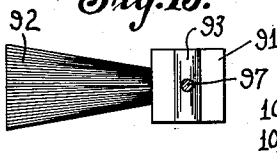


Fig. 14.

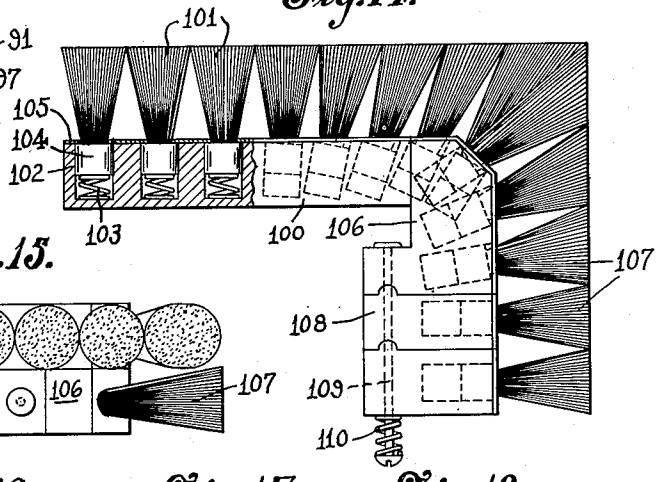


Fig. 15.

Fig. 16.

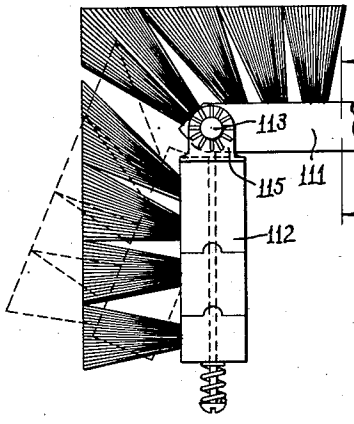


Fig. 17.

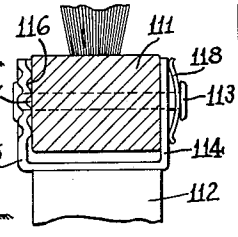
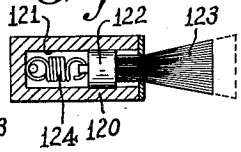


Fig. 18.



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UNITED STATES PATENT OFFICE

2,532,925

DISHWASHING MACHINE HAVING AN EXTENSIBLE ROTARY BRUSH FOR RECEPTACLES

Lawrence Anathan Loeb, New Haven, Conn.

Application February 1, 1945, Serial No. 575,651

1 Claim. (Cl. 15—56)

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This invention relates to improvements in machines for washing dishes or the like, and relates to means whereby the usefulness of the device may be improved, and its operations extended to articles which must ordinarily be cleaned by hand.

Reference is made particularly to cooking vessels such as pans and other utensils which are very difficult to clean, and which ordinarily cannot be cleaned by merely spraying water upon them, as is done in the usual dishwashing machine. Foreign matter clings very tightly to such utensils, and normally they must be scrubbed with a brush or cleaned by hand.

I contemplate by my invention the provision of a cleaning or scrubbing brush which may or may not be detachably secured to the agitator or rotor so as to be rotated thereby when in use, and readily removed from its operative position when its use is not desired. Further, I provide means for supporting the utensils within the machine in proper position with relation to the brush, and for yieldingly holding these vessels against the bristles of the brush so that the desired amount of pressure may be present between the utensil and the bristles to effect proper cleaning action.

As is well known, utensils of this character are of various dimensions, and it is necessary that the bristles of the rotating brush reach every part thereof. In order to effect this result I have provided a brush which is laterally extensible, so that it will be extended by the action of centrifugal force to reach the sides of the utensil, regardless of the dimensions thereof, within the limits of the device.

One object of the invention is to provide a new and improved dishwashing machine having means for cleaning cooking utensils and the like.

A further object of the invention is to provide a dishwashing machine having secured to the rotor thereof a cleaning or scrubbing brush to be rotated by the rotor, and means for yieldably holding the utensils in proper position with relation to the brush.

A still further object of the invention is to provide a dishwashing machine of the character described, wherein the brush will be laterally expansible or extensible, so that it may accommodate itself to utensils of various dimensions.

Still another object of the invention is to provide a dishwashing machine of the character described, provided with a rotatable scrubbing brush, which brush will be yieldably mounted

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whereby it may operate at different heights with respect to the fixed parts of the machine to accommodate itself to utensils of various depths.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a sectional view of a dishwashing machine embodying my improvements;

Fig. 2 is a top elevational view of the brush employed in the machine;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is a sectional view on line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 1, showing a modified form of my invention;

Fig. 6 is a top plan view of the brush of Fig. 5;

Fig. 7 is a sectional view on line 7—7 of Fig. 6;

Fig. 8 is a view of a further modification particularly relating to the connection of the brush stem with the rotor;

Fig. 9 is a sectional view of a dishwashing machine showing a still further modified form of construction;

Fig. 10 is a partial sectional view of the device shown in Fig. 9 for holding the utensils upon the brush;

Fig. 11 is an enlarged fragmentary sectional view on line 11—11 of Fig. 10;

Fig. 12 is a side elevational view of a brush of modified form;

Fig. 13 is a sectional view substantially on line 13—13 of Fig. 12;

Fig. 14 is an elevational view partly in section of a modified form of brush;

Fig. 15 is a plan view of the brush shown in Fig. 14;

Fig. 16 is a fragmentary side elevational view of a brush showing a further modification;

Fig. 17 is a sectional view on line 17—17 of Fig. 16; and

Fig. 18 is a sectional view of a brush showing a further modification.

To illustrate a preferred embodiment of my invention I have shown a dishwashing machine comprising a tank 10 having a bottom portion 11 through which extends the shaft 12 of an operating motor 13. Upon the upper end of the shaft 12 and within the tank is a rotor or agitator 14, and in the lower portion of the tank is a dish rack designated generally by the numeral 15, the dish rack being provided with a plurality of upstanding spaced elements 16 between which dishes such as plates, saucers or the like may be placed on edge for the usual washing operation.

These elements, it may be noted, are usually spaced in a more or less circular arrangement, leaving an opening in the center between them. It will be understood that the details of the dishwashing machine above described are not of importance in all aspects of the invention, as my improvements may be applied to dishwashing machines not provided with elements identical with those illustrated.

Projecting upwardly from the rotor 14 and secured thereto is a sleeve 17 to which the stem 18 of a washing or scrubbing brush means is secured by means of a bayonet joint connection 19 comprising the usual L-shaped slot and pin. It will be apparent that the stem 18 and the brush means carried thereby, as will be hereinafter described, may be readily removed from the sleeve 17 when desired, and just as readily replaced. It will also be understood that the bayonet joint will be so disposed with respect to the direction of rotation of the rotor that the stem will not tend to become disengaged from the sleeve.

The brush means includes a head 20 secured to the upper end of the stem 18, which head comprises a pair of substantially parallel channel portions 21 having slidably mounted therein bristle-supporting members 22 of L-shaped form, these members having end portions or arms 23 projecting downwardly from the brush head, one at each end thereof.

In the bottom portions of the channels 21 are arranged slots 24 which slidably receive pins 25 secured to the brush-supporting elements 22 so that these elements will be retained in the channels although permitted to slide longitudinally thereof. Upon the bristle-supporting elements 22 are provided bristles 26 which not only project upwardly from these elements but also project laterally from the depending arms 23 thereof, as shown particularly in Figs. 1 and 4. It will be seen, therefore, that there is provided a washing or scrubbing brush having both upwardly and laterally extending bristles so as to engage both the side walls and the bottoms of receptacles such as the receptacle 28 held in inverted position thereon.

As has been previously stated, the bristle-supporting elements 22 are slidably mounted on the brush head 20 so that they may move laterally away from the center of rotation of stem 18, and thus the brush is expansible or extensible to accommodate utensils of various dimensions. Under the action of centrifugal force these bristle-supporting elements will each be drawn outwardly against the side walls of the utensil 28, shown in Fig. 1, and as shown in dotted-line position in Fig. 2. In order that the brush will normally be in a contracted position, light springs 30 are connected to the inner ends of the bristle-carrying elements 22 and to the bottoms of the channels 21 of the brush head 20, which springs normally act in a direction to draw each of the elements 22 inwardly and maintain the depending arms 23 toward the ends of the brush head 20. While these springs will be sufficiently strong to hold the bristle-supporting elements inwardly when the brush is at rest, the tension of the springs will be overcome by the action of centrifugal force when the rotor is in operation so that the brush will expand and thus reach the sides of the utensil 28.

The utensil 28 will normally rest against the inner surfaces of the member 16 or upon the shoulders 31 formed at the inner ends of these members, depending, of course, upon the size of the utensil. In order that it may be held against the brushes yieldably, but with sufficient force, so that a thorough scrubbing action will be obtained, I have provided, in this form of my invention, resilient strap members to exert a downward force upon the utensils. These strap members comprise body portions 33 and inwardly bowed end portions 34 having at their inner free ends shoes 35 to contact the edge of the bottom of the utensil and exert a downward force thereon. These strap members may be held in position by being slidably received between clips or holders 36 secured to the wall of the tank and the wall itself.

It will be understood that these holding members are resilient and that the inwardly bowed ends will tend to stand in the same plane as the body portions 33 and that the latter may be moved freely upwardly and downwardly through the holders 36. Thus, to release the utensil 28 shown in Fig. 1, it is only necessary to raise the portions 33 of these straps upwardly with respect to the holders 36, thus disengaging the shoes 35 from the utensil, whereupon the bowed ends 34 will, when released, swing downwardly more or less in line with the body portions 33. A reverse of this movement is all that is required to seat the shoes 35 upon the utensil when one is placed in the machine. The inherent resilience of the members 34 will exert a downward yieldable pressure upon the utensil so as to hold it against the bristles. The latter will, of course, be yieldable to some extent, and, by this arrangement, an efficient scrubbing action will be obtained over the entire surface of the utensil.

In Figs. 5 to 7 of the drawings I have shown a somewhat modified form of my invention in which the sleeve 40 secured to the rotor is hollow and designed to receive the stem 41 secured to the brush head 42, a spring 43 being disposed in the sleeve below the stem 41 so as to exert an upward pressure upon the stem and thus tend to force the brush upwardly against the bottom of the utensil 28. The sleeve 40 may be provided with oppositely disposed slots 44 opening through the upper end thereof to receive a pin 45 secured to the stem 41 so as to connect the stem nonrotatably to the sleeve. A cap 46 may be threaded upon the upper end of the sleeve to prevent the pin 45 from being forced out of the upper end of the slots by the spring.

The brush head 42 in this form of my invention is of slightly different form from that shown in Figs. 1 to 4 in that the head is provided with a pair of longitudinally extending chambers 48 and 49, which chambers are closed at their sides except for slots 50 and 51 in their upper faces through which extend the bristles 52 attached to the bristle-supporting elements 53 which are slidably mounted in the chambers 48 and 49. By providing the slots 50 and 51 so that the edges of the slots overhang the bristle-supporting elements 53, I can eliminate the slots 24 and pins 25 shown in Fig. 3. Springs 54 are secured to the bristle-supporting elements 53 to hold them in contracted position as previously explained, and it will be understood that the operation of the parts thus far described is the same as that of the corresponding parts shown and described in connection with Figs. 1 to 4 of the drawings.

Also in this form of my invention I have a modified arrangement for holding the utensil 28 in position. In this case a plurality of cylinders 55 are pivoted at 56 to the side wall of the tank, and, within each of these cylinders, is a plunger

rod 57 urged outwardly by a compression spring 58. These plunger rods carry shoes 59 which will engage the periphery of the bottom of the utensil 28 to yieldably urge it toward the bristles 52 of the brush. It will be understood that when the plunger rods 57 are moved upwardly against the springs 58 and thus released from the utensil, the cylinders 55 may swing downwardly about their pivots against the side walls of the tank and thus be disposed in an out-of-the-way position when it is not desired to use the machine for pans or similar utensils.

A drain opening 60 may be provided in the sleeve 40 to permit the draining therefrom of any water which might enter through the slots 44 when the device is in operation.

In Fig. 8 of the drawings I have shown a modified form for connecting the brush stem to the rotor. As here illustrated an upwardly projecting sleeve 61 is secured to the rotor, which sleeve is hollow to receive the stem 62 of the brush. This stem is provided with a laterally projecting pin 63 to be received in an L-shaped slot 64 in the sleeve 61. The slot 64, however, is extended downwardly, as shown at 65, for a considerable distance so that after the pin 63 registers with the portion 65 of the slot, it may have a considerable range of vertical movement depending upon the pressure exerted on the bristles of the brush by the utensil. The stem 62 and brush supported thereon are held in an upward position by a compression spring 66 so that the brush bristles will be urged toward the bottom of the utensils regardless of the height or depth of the utensil. The sleeve 61 may also be provided with the drain opening 67 to permit water to drain therefrom.

In Figs. 9, 10 and 11 of the drawings I have shown a modified arrangement for holding the utensil in proper engagement with the bristles of the brush. As illustrated, an arm 70 is pivoted at 71 to a lug 72 secured to the wall of the tank, this arm extending to a position adjacent the center of the tank and having pivoted to its inner end at 73 a rod 74. To the lower end of this rod is secured a disk-shaped member 75 spaced from the lower end of the rod by a sleeve 76, the member 75 having a plurality of openings 77 therein to receive and support resilient wires 78. The ends of these wires may be headed over, as shown at 79, and compression springs 80 disposed between these heads and the members 75 to hold these wires in upper positions and also exert friction thereon so that they will not swing freely in the member 75. The heads 79 may be extended laterally as shown in Fig. 11 so as to fit into a recess 79a formed in the rod 74, so that the wires 78 will be yieldably held against rotation about their axes when they are in their operative positions.

A sleeve 81 is slidably mounted on the rod 74 and enjoys an up-and-down movement thereon as limited by the pin 82 secured to the rod 74 and the slot 83 provided in the sleeve 81. At its lower end this sleeve is provided with a plurality of recesses 84 adapted to receive the wires 78 and thus hold them in locked positions in which they are spread apart, as shown, for example, in Figs. 9 and 10.

It will be seen that the wires 78 diverge sharply below the sleeve 81, as shown at 85, and are provided with downwardly depending angular portions 86 on their free ends to engage the periphery of the bottom of the utensil 28, and that these arms have a certain amount of inherent resiliency so that, as the sleeve 81 is pulled downwardly, the end portions 86 of the wires will be drawn together to grip the pan and exert a certain amount of downward pressure thereon.

When it is not desired to use the brush, the arm 70 is moved upwardly against the wall of the receptacle and retained in this position by the clip 87, where the parts will be in an out-of-the-way position for the usual dishwashing operation. When in this position the sleeve 81 may be moved upwardly, and the wires 85 may be readily sprung inwardly out of the notches or recesses 84, whereupon these wires may then be folded together against the wall of the tank, the wires rotating in the openings 77. When it is desired again to use the part 70, 74 and wires 85, the latter are merely rotated by hand in the openings 77 until they again register with the notches 84, whereupon they will be held in their proper spread-apart positions to engage a utensil placed over the brush.

A spring 88 secured at one end to the arm 70 and at the other end to a bracket 89 secured to the wall of the tank 10 will act in the position shown in Fig. 9 to urge the arm 70 downwardly and hold the members 78 against the utensil being cleaned and also urge the utensil downwardly against the bristles of the brush. When, however, the arm 70 is swung upwardly into engagement with the clip 87, the spring 88 will pass to the other side of the pivot point 71 and will then act to hold the arm in raised position so that the clip may be dispensed with if desired.

In Figs. 12 and 13 of the drawings I have shown a brush similar to that illustrated in Figs. 1 to 4, except that the vertical arm 90 of the brush is articulated and is composed of several sections 91, each carrying laterally extending bristles 92. These sections are provided with cooperating ribs 93 and recesses 94 and are held in assembled relation by a spring 95 acting against the lower section 91 and against the head 96 of a screw 97 threaded into the upper portion of the vertically extending arm. With this construction it will be apparent that, owing to the interfitting ribs 93 and recesses 94, the bristles will be resiliently held in their operative positions shown in Fig. 12. However, if the utensil to be washed is a very shallow one with a shallow side wall, some of the sections 91 may be rotated through an angle of 180° or from the full-line positions of Fig. 12 to the dotted-line positions shown in that figure. They will then be out of the way as they will be pointed inwardly toward the axis of the brush. If, however, the utensil is a deep one, as many of the sections 91 may be turned outwardly as is required to cover the surface of the side wall of the utensil.

In Figs. 14 and 15 of the drawings I have shown one section of a similar brush in which the bristles are resiliently mounted so as to be spring pressed outwardly. The bristle-supporting member 100 which carries the vertically disposed bristles 101 is provided with sockets 102 in which are mounted compression springs 103 urging upwardly the bristle bases 104. These bases are prevented from being expelled from the sockets by the plate 105, this plate having openings through which the bristles extend but which will not receive the base 104.

Secured to the end of the bristle support 100 is a vertically extending bristle support 106 having laterally projecting bristles 107 supported in the same manner as the bristles 101. This vertically extending bristle support is also articulated and comprises a number of sections 108 resiliently

held in their operative positions by the pin 109 and spring 110. It will, of course, be obvious that the sections 108 may be reversed about the pin 109 when it is not desired to employ all of them, this reversal being as described in connection with the brush shown in Figs. 12 and 13.

In Figs. 16 and 17 of the drawings I have shown a brush provided with a horizontal section 111 and an articulated vertical section 112, the latter being pivoted to the section 111 by the pivot pin 113. This pin passes through the arms 114 and 115 of a U-shaped yoke secured to the section 112, these arms embracing the supporting member 111. The arm 115 is provided on its inner surface with a plurality of radial valleys 116 in which is adapted to seat a rib 117 provided upon the member 111, and the pin 113 is resiliently urged to the right as shown in Fig. 17 by the spring 118.

It may be desired to swing the section 112 outwardly about the pivot 113 in order to accommodate utensils with flaring instead of straight sides. With this construction, the section 112 may be swung outwardly from its full-line position shown in Fig. 16 to a position shown in dotted lines. It will be seen that the spring 118 will permit the arm 115 to swing away from the section 111 so as to clear the rib 117 and seat this rib in another of the radial valleys 116. While only one adjusted position is shown in Fig. 16, it will be appreciated that any number of such positions are provided according to the number of radial valleys 116 in the arm 115.

In Fig. 18 of the drawings I have shown a sectional view of a bristle-supporting member 120 provided with a socket 121 in which is slidably mounted a bristle base 122 carrying bristles 123. A tension spring 124 tends to retract the base 122 within the socket 121 so as to contract the width of the brush, this arrangement being provided on the laterally extending bristles such, for example, as the bristles 107 shown in Fig. 14. When a utensil is placed over the brush and the machine set into operation, the effect of centrifugal force will overcome that of the light spring 124 and project the bristles outwardly into contact with the wall of the utensil. If necessary, the base 122 may be weighted so as to give the required ballast to enable the action of centrifugal force to overcome that of the spring 124.

While I have shown and described some preferred embodiments of my invention, it is to be understood that it is not to be limited to the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claim.

What I claim is:

A dishwashing machine comprising a tank, a rotatable agitator therein, a stem secured to the agitator and extending upwardly therefrom, a brush head secured to the stem and extending transversely thereto, a pair of L-shaped bristle-carrying members, said head being provided with parallel open-ended guideways, one arm of each of said head members being slidably received in one of said guideways, the other arm of each of said members depending downwardly from the head and having outwardly facing bristles thereon, said members being moved outwardly by centrifugal force upon rotation of the agitator, and means normally urging said depending arms toward the stem, the first-named arm of one member overlapping the corresponding arm of the other member and said overlapping arms having upwardly directed bristles thereon.

LAWRENCE ANATHAN LOEB.

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