

# United States Patent

[19]

Durham

BEST AVAILABLE COPY

[11] 3,913,163

[45] Oct. 21, 1975

[54] DEVICES FOR CLEANING GLASSES AND OTHER DRINKING VESSELS

1,440,595	4/1966	France.....	15/76
425,638	3/1935	United Kingdom.....	15/211
737,898	10/1955	United Kingdom.....	15/164
370,206	8/1963	United Kingdom.....	15/76

[75] Inventor: Charles E. Durham, Farnborough, England

[73] Assignee: Cleanglass Electric Washer Limited, London, England

Primary Examiner—Edward L. Roberts  
Attorney, Agent, or Firm—Brisebois & Kruger

[22] Filed: Nov. 8, 1973

[21] Appl. No.: 413,820

## [30] Foreign Application Priority Data

Jan. 2, 1973 United Kingdom..... 219/73

[52] U.S. Cl. .... 15/75; 15/164; 15/182

[51] Int. Cl. .... A47L 15/38

[58] Field of Search..... 15/74-76, 164, 15/165, 211, 213, 182, 56

## [56] References Cited

### UNITED STATES PATENTS

2,571,902 10/1951 Lever..... 15/76  
2,727,267 12/1955 Osgood..... 15/182

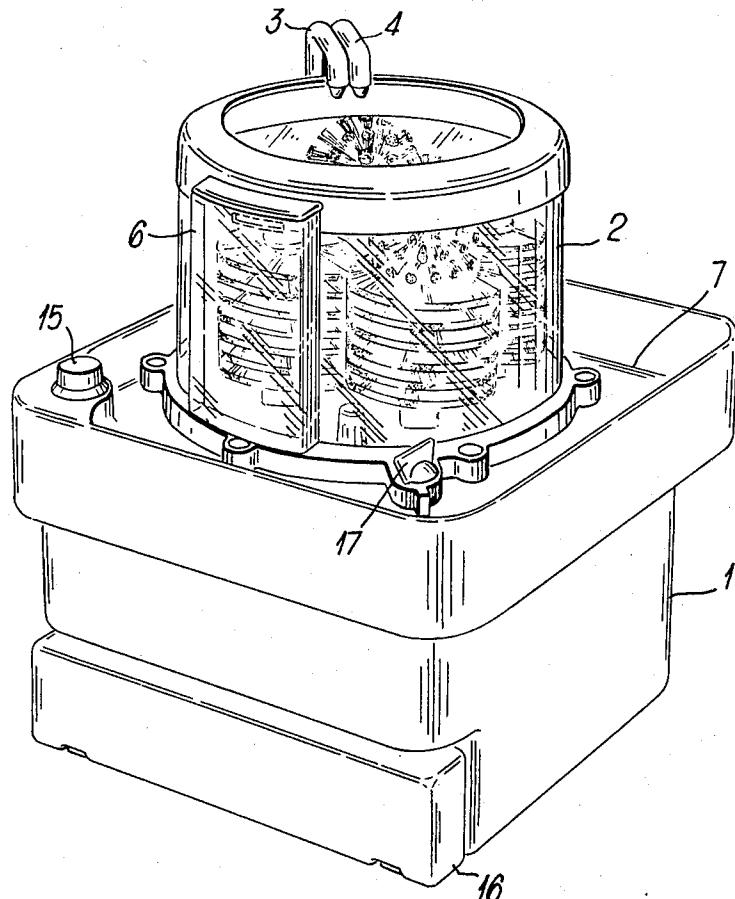
### FOREIGN PATENTS OR APPLICATIONS

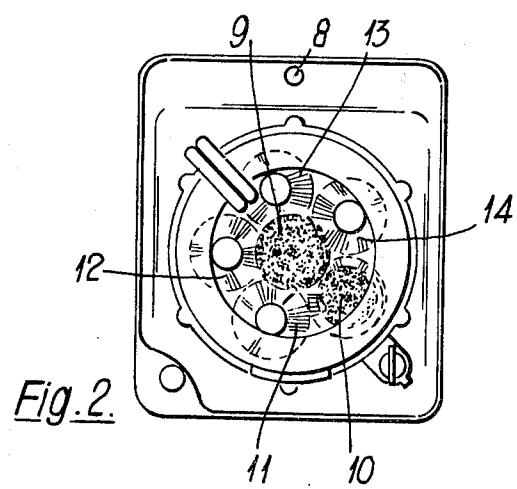
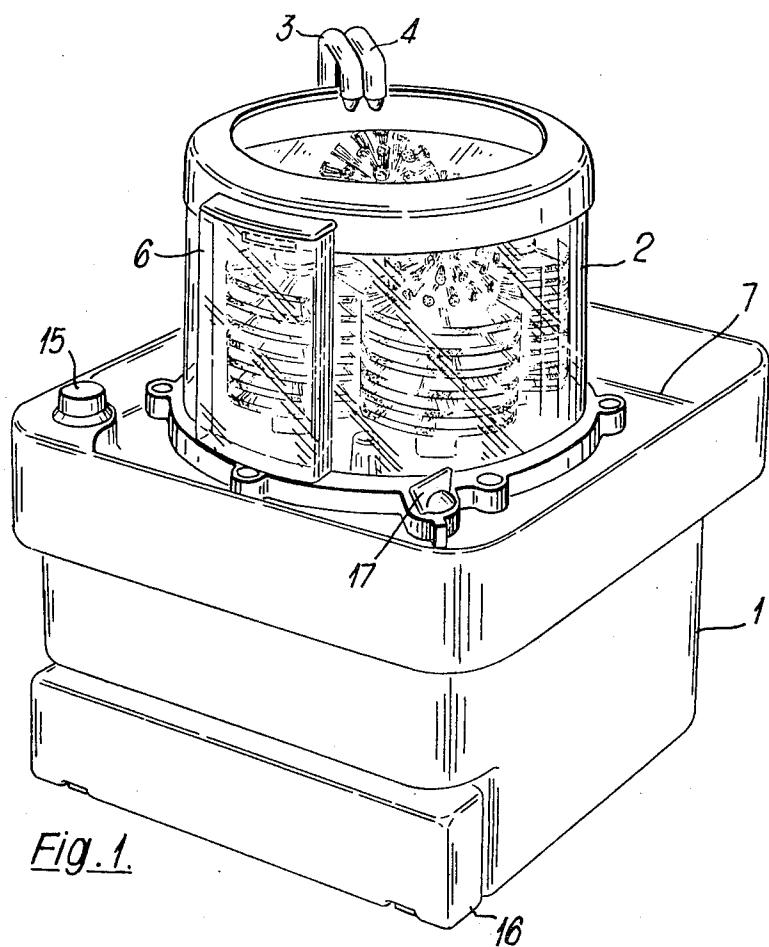
785,863 5/1935 France ..... 15/76

## [57] ABSTRACT

A device for cleaning glasses or other drinking vessels comprises a central brush having an upright core which is longitudinally compressible and has bristles projecting radially around its periphery along its length and further bristles projecting upwards from its upper end, and a group of further brushes which are arranged around the central brush and each of which has an upright resiliently bendable core provided with bristles projecting radially around its periphery and along its length. Preferably the brushes are mounted in an open-topped container for containing washing liquid and a driving mechanism is provided below the container for rotating the brushes about the upright axes of their cores.

8 Claims, 8 Drawing Figures





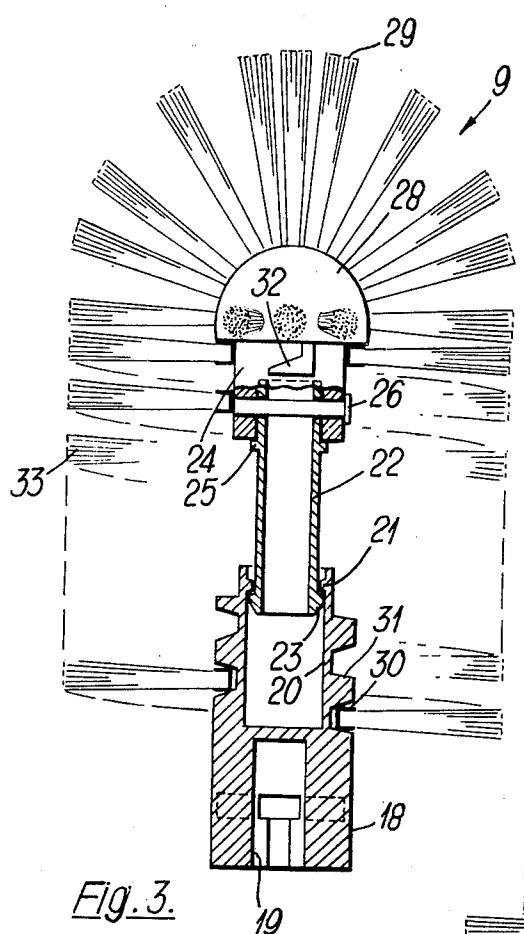


Fig. 3.

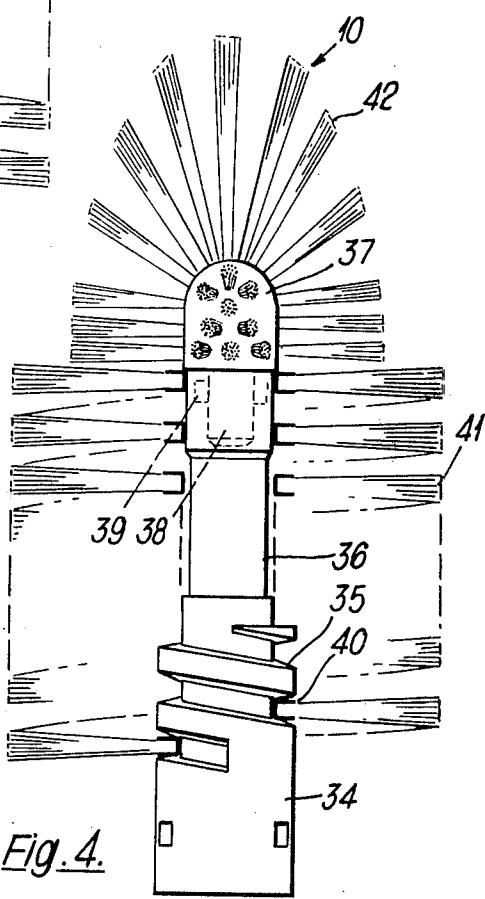
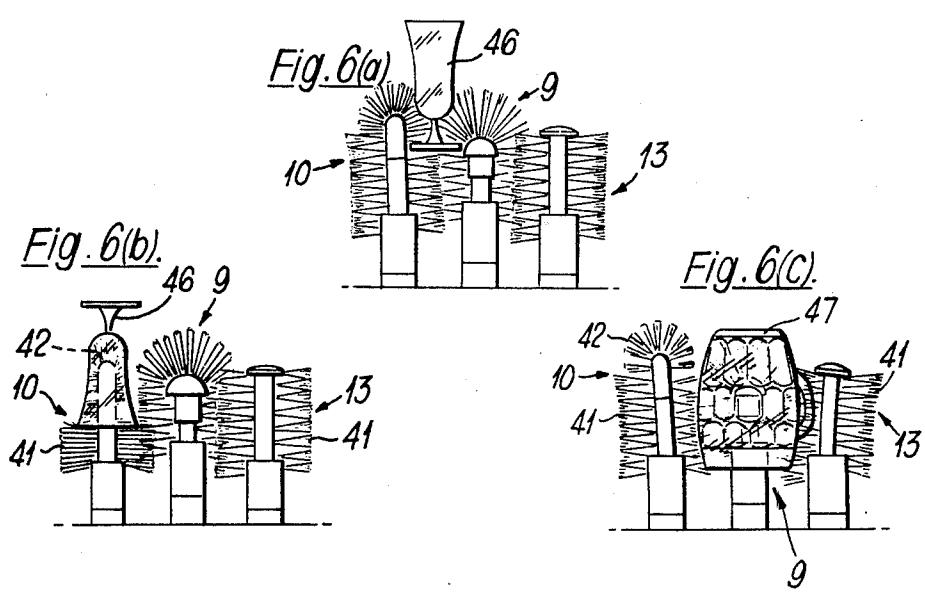
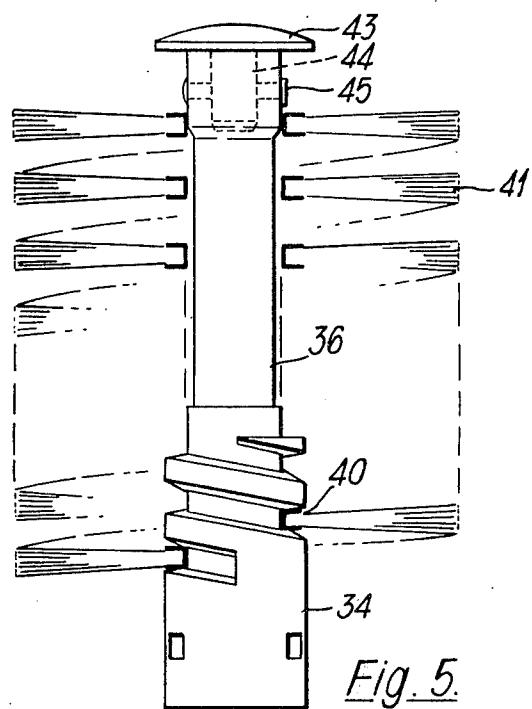


Fig. 4.



## DEVICES FOR CLEANING GLASSES AND OTHER DRINKING VESSELS

One kind of device for cleaning glasses, mugs, or other drinking vessels includes a central brush having an upright core with cleaning fingers projecting radially from its periphery along its length and further fingers projecting upwards from its upper end, and a group of further brushes which are arranged around the central brush and each of which also has an upright core with cleaning fingers projecting radially from its periphery along its length.

In a simple form of device of this kind for use in a sink or bowl filled with water, the brushes are stationary and a glass or other drinking vessel to be cleaned is pushed over the central brush and is then manually turned to and fro and moved upwards and downwards so that the fingers of the central brush clean the inside and the fingers of the outer brushes clean the outside of the vessel. In a more sophisticated form of the device, the brushes are mounted in an open-topped container for containing washing liquid and a driving mechanism is provided below the container and is arranged to rotate the brushes about the axes of their cores. With this form of the device, it is only necessary to push the glass or other drinking vessel downwards over the central brush and hold it in position and it is then cleaned as the brushes rotate.

Devices of the kind described are mainly used in bars or restaurants where there are large numbers of drinking vessels to be cleaned and it is necessary for the device to be as versatile as possible with regard to the size and shape of the drinking vessel which it will clean. That is to say it is desirable for the device to clean beer mugs of different sizes and also wine glasses which are much smaller than the beer mugs and comprise a bowl with a stem and a base. For this reason, in the past, the brushes have consisted of a rubber core with integrally formed rubber cleaning fingers which are sufficiently soft to be deflected to a considerable extent when a glass is placed over them or has its outside placed against them and are also sufficiently soft to enable the base of a wine glass to be inserted between the fingers of the central brush and the fingers of one or more of the group of further brushes and for the fingers then to spring back sufficiently close to each other to clean the stem of the glass. However, although these rubber fingers produce a reasonably satisfactory cleansing effect, firmly adherent dirt on the glasses, for example grease or lipstick is not always completely removed. This difficulty is overcome to a considerable extent by the invention described in our British Specification Pat. No. 1,289,087 according to which each brush has a ring of bristles in addition to the rubber fingers, but even this arrangement leaves room for improvement.

Whilst it has been appreciated that bristles will clean the glasses or other drinking vessels more effectively than the rubber fingers, it is impossible to use conventional brushes with radially projecting bristles because they cannot be caused to deflect and then spring back sufficiently, in the same way as the rubber fingers, to cause them to scrub the whole of the internal and external surfaces of the vessel. Brushes with bristles will accommodate and conform with glasses of different sizes and shapes if the bristles are made sufficiently long, but if this is done the density of bristles at the peripheries

of the brushes is insufficient to produce an efficient scrubbing action.

With the aim of overcoming this problem, according to this invention, a device for cleaning glasses or other drinking vessels includes a central brush having an upright longitudinally resiliently compressible core with bristles projecting radially from its periphery along its length and further bristles projecting upwards from its upper end, and a group of further brushes arranged around the central brush and each having an upright resiliently bendable core with bristles projecting radially from its periphery along its length.

We have discovered that by making the central brush longitudinally compressible and the surrounding brushes laterally bendable in this way, it is possible to use bristles all the way along the brushes and yet still make the brushes conform with and scrub the internal and external surfaces of glasses or other drinking vessels of widely varying sizes and shapes.

In order to wash a conventional drinking tumbler or beer mug, the tumbler or mug is inverted and pushed over the central brush until the upwardly projecting bristles on the central brush come into contact with the inside of the bottom of the tumbler or mug. When the brushes are stationary, the tumbler or mug is turned to and fro and moved slightly upwards and downwards so that its internal surface is scrubbed by the central brush and its external surface, other than the outside of its bottom is scrubbed by the further brushes which surround the central brush. When, however, as is preferred, the brushes are mounted in an open-topped container, which in use contains washing liquid, and a driving mechanism is provided below the container to rotate the brushes about the axes of their cores, it is only necessary to push the tumbler or mug over the central brush and to hold it in position while the brushes scrub it as they rotate.

With a wine glass having a bowl, a stem and a base, on the other hand, the bowl is placed over the central brush with the glass inverted and the glass is then pushed further downwards and in so doing compresses the core of the central brush longitudinally. As the glass moves downwards, the bristles of the surrounding brushes spring inwards above the inverted bowl of the glass and into contact with the stem so that the stem and the base of the glass is scrubbed by the surrounding brushes as they rotate or, when the brushes are fixed in position, as the glass is rotated within the brushes. As an alternative, to clean the stem of a wine glass, the base of the wine glass may be pushed downwards between the central brush and one or more of the surrounding brushes and the bristles spring back above the base into contact with the stem. These bristles then scrub the stem as the brushes rotate or as the glass is turned between the bristles when the brushes are stationary. The resilient bending of the cores of the further brushes away from the central brush makes it possible to push the stem of a wine glass in between the brushes in this way.

Preferably one of the group of further brushes is additionally provided with bristles projecting upwardly and outwardly from its upper end and the core of this brush is made substantially incompressible in an axial direction. This brush is then used for scrubbing the insides of small glasses by inverting the glass and pushing it over the bristles projecting upwardly and outwardly from the upper end of the brush. The radially project-

ing bristles on this brush are then preferably arranged so that they can be moved downwards away from the bristles which project outwardly and upwardly from the upper end of the brush to allow the bristles at the upper end of the brush to enter the glass fully.

Preferably the radially projecting bristles of each of the brushes have their inner ends fixed to a helically wound resilient metal holder which forms a part of the core of the brush. This holder is preferably of channel-shaped section with a continuous helical row of bristles clamped between its flanges. The holder thus forms in effect a helically coiled spring with a helical row of bristles projecting radially from it. When the bristles are mounted on a helically wound holder in this way, the core of the central brush preferably comprises a rigid bottom piece which is attached to the lower end of the holder, a rigid headpiece which is attached to the upper end of the holder and carries the upwardly projecting bristles, and a rigid stem within the holder, the stem being fixed to the headpiece being axially slidably in the bottom piece.

The core of each of the further brushes then preferably comprises a rigid bottom piece which is attached to the lower end of the holder, a rigid headpiece at the upper end of the holder and a resiliently bendable stem which is fixed to the bottom piece and the headpiece and extends within the holder. With all the brushes, the rigid bottom piece may then either form a mounting by which the brush is fixed in position in the case where the brushes are stationary, or a mounting for fitting the brush onto the end of a rotatable stub shaft in the case in which the brushes are enclosed within an open-topped container and are rotated by a driving mechanism.

The novelty of the device in accordance with the invention lies in the construction of the brushes and the invention accordingly also lies in a set of brushes comprising one brush having a longitudinally resilient compressible core with bristles projecting radially from its periphery along its length, further bristles projecting axially from one end and means for mounting the brush in an upright position in the device at the other end, and a number of further brushes each having a resiliently bendable core with bristles projecting radially from its periphery along its length and means for mounting the brush in an upright position in the device at one end of the core.

An example of a device for cleaning glasses or other drinking vessels and a set of brushes in accordance with the invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of the device as seen from one side and from above;

FIG. 2 is a plan of the device to a smaller scale;

FIG. 3 is a side view to a larger scale and partly in section with some of the bristles omitted of the central brush;

FIG. 4 is a similar side view of one of the further brushes;

FIG. 5 is a view similar to FIG. 4 of any one of the remainder of the further brushes; and,

FIGS. 6(a) to 6(c) are somewhat diagrammatic side views of the brushes of the device showing the manner in which different parts of a wine glass and the inside of a mug of a larger size are cleaned with the device.

As shown in FIGS. 1 and 2, the device comprises a housing 1 having a transparent cylindrical container 2

mounted on top of it. The housing 1 has two flexible hoses, which are not shown, extending from it for connection to hot and cold water supplies respectively. These hoses lead through solenoid valves within the casing 1 to water supply pipes 3 and 4 having open ends which are directed into the container 2. In use, when the solenoid valves are open, water flows from the pipes 3 and 4 into the container 2 and when it reaches the level of an opening 5, it overflows through trunking 6 fixed to the outside of the container 2 and thence flows into a trough 7 extending around the top of the housing 1. The water then flows through a drainage opening 8 to a drain hose which is also not shown.

Also within the housing 1 is an electric motor which drives a driving mechanism which is connected to six stub shafts which project upwards through the top of the housing 1 into the container 2. A central brush 9 is mounted on a central stub shaft which is rotated in a counter-clockwise direction as seen from above and further brushes 10 to 14 which surround the central brush 9 are mounted on the remainder of the stub shafts and are rotated in a clockwise direction as seen from above.

The electric motor is controlled by a switch which is operated by a knob 15 and rotation of this knob also controls the setting of a thermostat, which is not shown, within the container 2. The thermostat controls the opening and closing of the solenoid valves which in turn control the flow of hot and cold water through the pipes 3 and 4 to maintain the temperature of the water flowing through the container 2 at a pre-set value in dependence upon the position into which the knob 15 is turned. The electric motor further controls a metering pump which draws detergent from a tank 16 and discharges it through a small tube, which is not shown, but which is mounted in between the pipes 3 and 4. A drainage cock 17 is provided at the base of the container 2 to enable the water remaining in the container 2 to be discharged into the trough 7 and thence through the drain 8 when the device is out of use and both the solenoid valves are closed.

The mechanism by which the stub shafts carrying the brushes 9 to 14 together with the solenoid valves and their water connections and the metering pump are all of conventional construction and are not therefore described in detail.

The central brush 9, which is shown in detail in FIG. 3, comprises a bottom piece 18 which is moulded out of plastics material and has a cylindrical recess 19 in its underside for fitting over the stub shaft by which the brush is carried. The bottom piece 18 has a further cylindrical recess 20 in its upper end and this recess is provided near its upper end with a ridge 21. A tubular stem 22 has a shoulder 23 at its lower end and this shoulder is a snap fit through the ridge 21 so that the stem 22 can slide upwards and downwards in the recess 20 but is prevented by the ridge 21 from being withdrawn completely from the recess 20 once it has been snapped into position.

A headpiece 24 fits over the upper end of the stem 22 and is located axially by a flange 25 on the stem 22. The headpiece 24 is fixed in position by a rivet 26. The headpiece 24 has a domed top 27 provided with tufts of outwardly and upwardly extending nylon bristles 29.

A helically coiled holder 30 made of stainless steel and of channel-shaped cross-section has its bottom end screwed into a coarse right-hand screwthread 31

formed in the outside of the top of the bottom piece 18. The upper end of the holder 30 engages with a projecting lug 32 which is moulded integrally with the headpiece 24. Thus when the bottom piece 18 is rotated counter-clockwise by the stub shaft on which it is mounted, the holder 30 is rotated with it and the holder 30 in turn rotates the headpiece 24. A helical row of tufts of nylon bristles 33 are clamped between the flanges of the channel-shaped holder 30 so that they project radially outwards from the core of the brush formed by the bottom piece 18, the stem 22, the headpiece 24 and the holder 30.

The holder 30 forms a helically coiled spring which presses the headpiece 24 upwards and holds the shoulder 23 of the stem 22 against the ridge 21. By placing a glass over the bristles 29 and pushing it downwards, however, the core of the brush 9 can be compressed axially with the holder 30 being compressed and the stem 22 sliding downwards within the recess 20. When the glass is released, the brush springs upwards again into the position shown in FIG. 3 of the drawings.

The brush 10 forming one of the group of further brushes is constructed as shown in detail in FIG. 4 of the drawings. It comprises a bottom piece 34 which is somewhat similar to the bottom piece 18 and has a recess in its bottom end for fitting over a stub shaft, but it is provided with a recess in its upper end without any ridge corresponding to the ridge 21 and it has a left-hand thread 35. A tubular stem 36 which in this example is made of synthetic rubber, but may alternatively be made of plastics material of a hard rubber-like resilience, is a push fit in the recess in the top of the bottom piece 34 and is fixed in position by a rivet. A headpiece 37 has a spigot 38 which is a push fit in the top of the stem 36 and is fixed in position by a rivet 39.

A holder 40 which is similar to the holder 30 except that it is coiled with a left-hand thread is screwed into the screwthread 35 and surrounds the stem 36. It is provided with a helical row of tufts of nylon bristles 41 similar to the bristles 33. Further tufts of bristles 42 project outwards and upwards from the headpiece 37. The holder 40 with its bristles 41 is placed in position of the brush by screwing it through the bristles 42 on the headpiece 37. When the bottom piece 34 is rotated by its stub shaft in a clockwise direction as seen from above, the holder 40 is rotated by its engagement in the screwhead 35 and the stem 36 rotates the headpiece 37.

The resilience of the stem 36 is such that it can bend laterally, but it is substantially incompressible longitudinally compared with the stem of the brush 9. The upper end of the holder 40 with its bristles 41 is not, however, fixed in position so that when a small glass is inverted and pushed over the bristles 42, it will come into contact with the sides of the bristles 41 and can compress the holder 40 and cause the bristles 41 to move away from the bristles 42. This enables the shorter bristles 42 to penetrate fully into the glass even though the glass may be of too small a diameter to allow the bristles 41 to enter it.

The remaining brushes 11 to 14 are all identical to each other and one of the brushes is shown in FIG. 5. This brush is the same as the brush 10 shown in FIG. 4 except for its headpiece. Thus the brush comprises a bottom piece 34, a stem 36 and a holder 40 with bristles 41, but instead of the headpiece 37, there is a headpiece in the form of a button 43 having a spigot 44

which fits in the top of the stem 36 and is held in position by a rivet 45. The button 43 prevents the holder 40 from being unscrewed from the bottom piece 34 and being withdrawn upwardly from the stem 36.

To use the device, the knob 15 is turned to switch on the motor in the housing 1 so that the brushes 9 to 14 are rotated in the manner already described. The knob is turned to set the thermostat at the required temperature and the solenoid valves are opened to cause hot and cold water to flow through the pipes 3 and 4 into the container 2 in the proportions to produce the temperature determined by the thermostat. The inflowing water has a small proportion of liquid detergent metered into it and it overflows when the container 2 is filled to the level of the opening 5 and then flows away through the drain opening 8 as already described.

Any dregs in the glasses to be washed are tipped into the trough 7 so that they are flushed away and the glasses are then washed in varying manners according to their size and shape. Thus, to wash a small wine glass such as a sherry glass 46 as shown in FIGS. 6(a) and 6(b), the base and stem of the glass are first inserted with the glass upright between the brushes 9 and 10. The base of the glass can be inserted into this position owing to the ability of the core of the brush 10 to bend away from the brush 9. These brushes then scrub the top and bottom of the base of the glass and also the stem and the bottom of the outside of the bowl of the glass. The glass is pushed further downwards to wash the upper part of the outside of the bowl.

Next the glass 46 is removed and inverted and then the bowl is pushed downwards over the top of the brush 10. The bristles 42 enter the bowl of the glass to scrub it and the bristles 41 are pressed downwards by the rim of the glass in the manner already described. Finally, with the glass still inverted, its bowl may be pushed down between the brushes 9 and 10 in the position of the base as shown in FIG. 6(a).

In order to clean a much larger vessel such as a beer mug 47 shown in FIG. 6(c), the mug is inverted and it is pushed downwards over the top of the brush 9. Since the core of the brush 9 is axially compressible, the mug 47 can be pushed downwards so that the bristles 41 of the brushes 10 to 14 clean the whole of the outside of the periphery of the mug. As the mug is pushed over the brush 9 the cores of the brushes 10 to 14 bend away from the brush 9 to allow the wall of the mug and its handle to enter between the bristles 33 of the brush 9 and the bristles 41 of the other brushes. As the core of the brush 9 is compressed, the bristles 29 are pressed firmly against the inside of the bottom of the mug so that it is very efficiently scrubbed.

After the whole of the inside of the mug and the outside of its periphery have been cleaned in this way the outside of the bottom can be cleaned merely by pressing it gently between the tops of the brushes 9 and 10.

In the illustrated example, all the brushes are approximately 9 cm in diameter measured to the tips of the bristles 33 and 41 and the holders 30 and 40 of the brushes 9 and 10 have an axial length of approximately 8 cm and the holders 40 of the brushes 11 to 14 have an axial length of approximately 10 cm.

I claim:

1. In a device for cleaning glasses and other drinking vessels, said device including an open-topped container for containing washing liquid, an elongated central brush, means mounting said central brush in an upright

position in said container, a plurality of further elongated brushes and means mounting said further brushes in said container in upright positions around said central brush, the improvement comprising a driving mechanism mounted below said container and means operatively connecting said driving mechanism to said brushes for rotating said brushes about upright axes extending longitudinally of said cores, and wherein said central brush comprises an upright longitudinally resiliently compressible core, bristles projecting radially from said core around the periphery and along the length thereof and further bristles projecting upwards from the upper end of said core, and each of said plurality of further brushes comprises an upright resiliently bendable core and bristles projecting from said bendable core around the periphery and along the length thereof.

2. A device as claimed in claim 1, wherein said means operatively connecting said driving mechanism to said brushes rotates said central brush in one direction and rotates said plurality of further brushes in an opposite direction.

3. In a device for cleaning glasses and other drinking vessels, said device including an elongated central brush, means mounting said central brush in an upright position, a plurality of further elongated brushes and means mounting said further brushes in upright positions around said central brush, the improvement wherein said central brush comprises an upright longitudinally resiliently compressible core, bristles projecting radially from said core around the periphery and along the length thereof and further bristles projecting upwards from the upper end of said core, and each of said plurality of further brushes comprises an upright resiliently bendable core and bristles projecting from said bendable core around the periphery and along the length thereof, the core of each of said brushes includes a helically wound resilient metal holder forming part of said core of said brush and means mounting the inner ends of said radially projecting bristles in said holder, and wherein said core of said central brush comprises a rigid bottom piece, means connecting said bottom piece to the lower end of said holder, a rigid head piece, means attaching said rigid headpiece to the upper end of said holder, means fixing said upwardly projecting bristles to said headpiece, a rigid stem within said holder, means fixing said rigid stem to said headpiece and means axially slidably connecting said rigid stem to said bottom piece.

4. In a device for cleaning glasses and other drinking vessels, said device including an elongated central brush, means mounting said central brush in an upright position, a plurality of further elongated brushes and means mounting said further brushes in upright positions around said central brush, the improvement wherein said central brush comprises an upright longitudinally compressible core, bristles project-

ing radially from said core around the periphery and along the length thereof and further bristles projecting upwards from the upper end of said core, and each of said plurality of further brushes comprises an upright 5 resiliently bendable core and bristles projecting from said bendable core around the periphery and along the length thereof, the core of each of said brushes includes a helically wound resilient metal holder forming part of said core of said brush and means mounting the inner 10 ends of said radially projecting bristles in said holder, and wherein said core of each of said further brushes includes a rigid bottom piece, means connecting said rigid bottom piece to the lower end of said holder, a rigid headpiece, a resiliently bendable stem extending axially within said holder, means fixing one end of said 15 stem to said bottom piece and means fixing said headpiece to the other end of said stem.

5. A device as claimed in claim 4, wherein said bendable stem is made of material of a rubber-like resilience.

6. A set of brushes for use in a device for cleaning drinking vessels, said set comprising one brush including a longitudinally resiliently compressible core, bristles projecting radially from said core around the periphery and along the length thereof, further bristles projecting axially from one end of said core and means 25 for mounting said brush in an upright position in said device at the other end of said core, and a plurality of further brushes mounted in upright positions around said one brush, each of said further brushes including a resiliently bendable core, bristles projecting radially from said bendable core around the periphery and along the length thereof and means for mounting each further brush in an upright position at one end of said core thereof, and each of said brushes including a helically wound resilient metal holder forming part of said core and means fixing the inner ends of said radially projecting bristles to said holder.

7. A set of brushes as claimed in claim 6, in which said core of said one brush includes a rigid bottom piece, means attaching said bottom piece to one end of said holder, a rigid headpiece, means attaching said headpiece to the other end of said holder, bristles projecting axially from said headpiece, a rigid stem within said holder, means fixing said headpiece to one end of said stem and means axially slidably mounting the other end of said stem in said bottom piece.

8. A set of brushes as claimed in claim 6, wherein said core of each of said further brushes includes a rigid bottom piece, means attaching said bottom piece to one end of said holder, a rigid headpiece, a resiliently bendable stem extending axially within said holder, means fixing one end of said stem to said bottom piece and means mounting said headpiece on the other end of said stem.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION

PATENT NO. : 3,913,163  
DATED : October 21, 1975  
INVENTOR(S) : Charles E. Durham

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

[73] Assignee: Clenaglass Electric Washer Limited,  
London, England

Signed and Sealed this  
*thirteenth Day of April 1976*

[SEAL]

Attest:

RUTH C. MASON  
*Attesting Officer*

C. MARSHALL DANN  
*Commissioner of Patents and Trademarks*