June 4, 1957 R. J. KOEPPE 2,794,196

WATER OPERATED TUMBLER WASHER

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2 Sheets-Sheet 1

Fig. 1

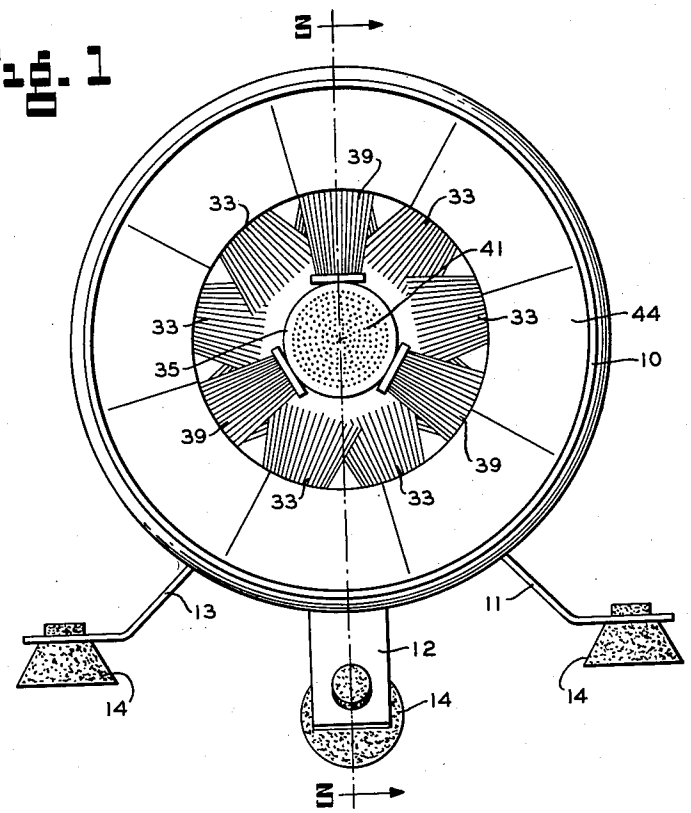

Fig. 2

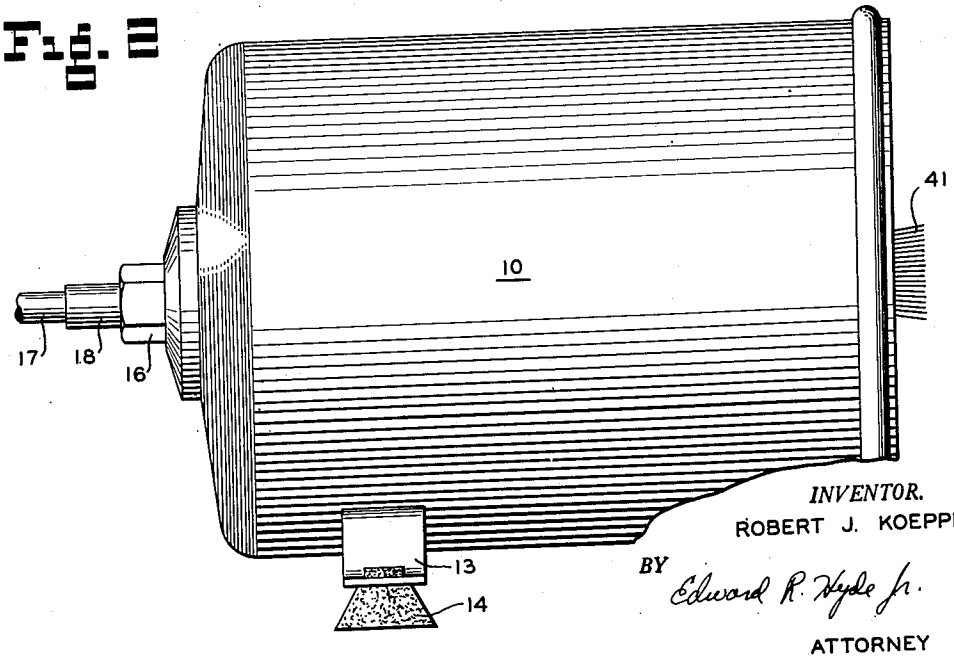

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Fig. 3

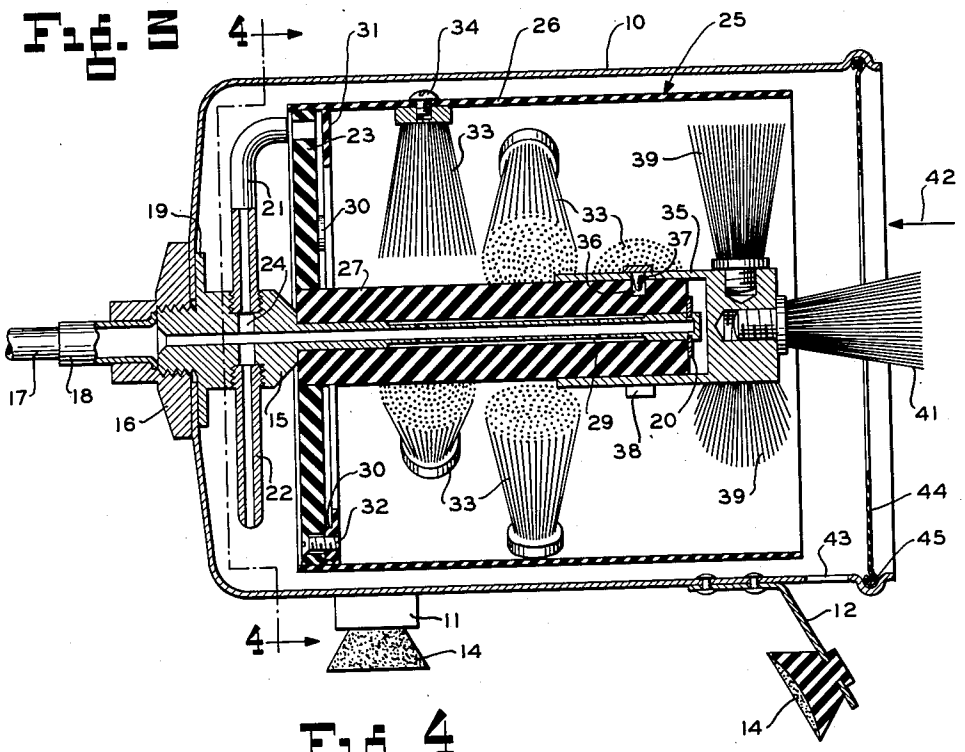
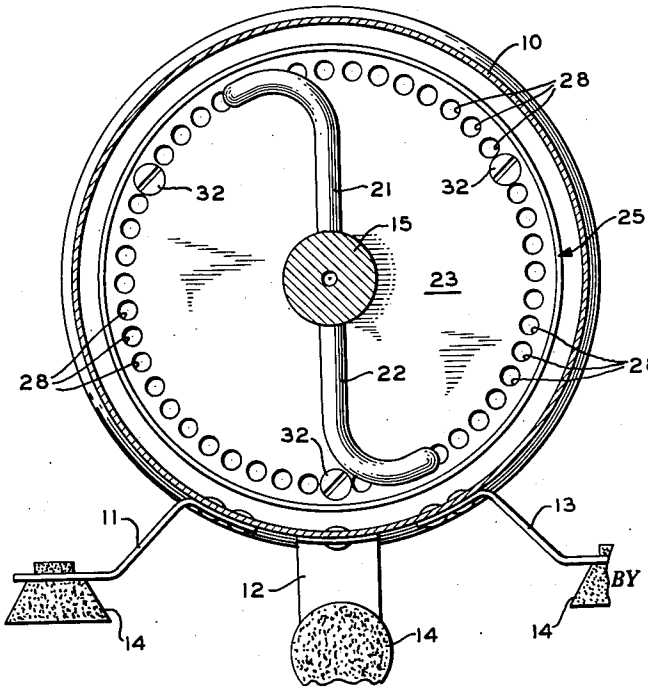


Fig. 4



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WATER OPERATED TUMBLER WASHER

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2 Claims. (Cl. 15—75)

The present invention relates to washing apparatus and more particularly to a device for washing drinking glasses or tumblers.

It is contemplated that the present invention will have particular utility in establishments that dispense beverages such as restaurants, soda fountains and taverns. These places of business where drinks are sold in glasses have a great need for a fast, convenient and thorough means for washing the drinking glasses. This need is well recognized and has resulted in various types of electrically operated devices for washing the glasses. The devices now in use are usually large, cumbersome and susceptible to malfunction and breakdown. Repairs of such machines are generally costly and time consuming. Another customary method of washing glasses is by reciprocating them over a stationary brush mounted in a vessel of water. This method is satisfactory when a small number of glasses are to be washed. However, establishments in the business of selling beverages have large numbers of glasses that must be thoroughly and quickly washed in the course of business. Manual washing is both inefficient and tiring and is often done in water that has been dirtied by previous washings.

The present invention provides a device which is designed to overcome all of the above disadvantages. Accordingly, water power derived from the conventional sink tap is utilized to drive a turbine especially designed to operate an arrangement of cooperating brushes. The brushes are so related and positioned that a properly positioned drinking glass will be washed and scrubbed both inside and outside and buffed to a high polish. Water from the sink tap passes through a pair of nozzles and is directed against the end piece of a horizontal cylindrical rotor to cause rotation thereof. The inner surface of the cylindrical rotor is equipped with a plurality of brushes which engage the outside of a drinking glass positioned within the cylinder.

Another set of brushes is mounted on a shaft which is coaxial with the rotor and secured thereto. Thus the latter set of brushes also rotates to polish the inner surfaces of the drinking glass. The water used to drive the turbine passes into the washing chamber to be used for washing the glasses. Thus a continuous supply of clean, fresh water insures that each successive glass is free from possible contamination from a prior washed glass.

A primary object of this invention is to provide an improved means for washing tumblers, drinking glasses and like objects.

Another object of this invention is to provide a device for washing drinking glasses that is of simple construction and conveniently operated.

A further object of this invention is to provide a mechanical glass cleaning device that derives its power from the flowing water used in the washing process.

These and other objects of the present invention will

become apparent from the following description taken with the drawings in which—

Fig. 1 is a front elevation of the glass washing device;

Fig. 2 is a side elevation thereof;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1; and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3 showing the turbine nozzles and the end disk of the rotor or washing cylinder.

Referring now to the drawings, the glass washer is enclosed in a cylindrical housing **10** which may be made of a sheet metal such as aluminum or copper. The housing is supported by three legs **11**, **12** and **13** which are fastened to the housing in any suitable manner such as by riveting. Each leg is equipped with a rubber suction cup **14** by which the entire assembly may be firmly held to a washboard or other convenient surface. It should be noted that the suction cups on the laterally extending legs face downward to engage a horizontal surface while the suction cup on leg **12** is disposed at an angle and faces rearward as seen in Fig. 3. This arrangement permits the cup on leg **12** to engage the vertical edge of a sink or washboard while the cups on legs **11** and **12** engage the horizontal surface thereof. Thus the entire device is disposed at an angle with the horizontal surface to permit proper drainage of the wash water as will become apparent hereinafter.

A spindle **15** has an externally threaded end which passes through the center of the closed end of housing **10**. A clamping nut **16** is screwed to the threaded end of the spindle to securely hold a hose **17** and hose coupling **18** in alignment with the hollow stem of spindle **15** as seen in Fig. 3. A flange **19** on the spindle cooperates with clamping nut **16** to hold the spindle assembly in a fixed position as shown. An enlarged base portion of the spindle has a pair of threaded holes which receive the ends of nozzles **21** and **22**. The nozzles may be made of tubular material threaded at one end. As clearly seen in Fig. 4, each nozzle extends radially outward from the spindle. The outer ends of the nozzles are bent counterclockwise and forward to terminate in close proximity to rotor disk **23**.

When the nozzles **21**, **22** are screwed into in the spindle base, they are aligned with a duct **24** which passes through the spindle perpendicular to the axis thereof and hence connects with the hollow center of the spindle. This permits water from the hose **17** to flow into the hollow center of the spindle and also to the nozzles through connecting duct **24**. As the water leaves the ends of the nozzles it causes rotation of a rotor assembly generally indicated by numeral **25**. This assembly includes a cylinder **26** of sheet metal or plastic material of a diameter somewhat smaller than that of housing **10**. One end of the cylinder is closed by rotor disk **23** which fits snugly into the cylinder and may be secured thereto by a close friction fit. An opening is provided in the center of rotor disk **23** to receive a hollow shaft **27** with a friction fit so that a rigid rotor assembly is provided comprising cylinder **26**, disk **23** and shaft **27**.

Referring to Fig. 4, it is seen that the rotor disk is provided with a series of holes **28** arranged in a circle near the outer periphery of the disk. The ends of nozzles **21**, **22** hereinabove described are located adjacent the series of holes at an angle to the axes of the holes. It is seen therefore that as the water or other fluid leaves the nozzles in the form of a jet, it is directed against the sides of holes **28** to cause rotation of the rotor assembly in the manner of an impulse turbine. In the embodiment of the invention herein disclosed, the rotor turns in a counterclockwise direction as seen in Fig. 4.

When the rotor assembly **25** is positioned within the

washer housing, shaft **27** fits loosely around the narrow cylindrical portion of spindle **15** so that the rotor is free to turn. The end of the spindle is grooved to receive a spring clip **20** which holds shaft **27** in position on the spindle. In order to minimize the friction between the shaft and the spindle, the latter is cut down as at **29** so that the bearing surfaces are limited to the ends of the spindle. Thus less friction is encountered and the rotor will freely turn under the force of the water from the nozzles.

A flat ring **31** is secured adjacent the inside surface of rotor disk **23** by three screws **32**. The ring **31** is of the same diameter as rotor disk **23** so that it also fits snugly within cylinder **26** adjacent the ends of holes **28**. Spacers **30** are provided to position ring **31** a small distance away from the inside surface of disk **23** so that openings **28** are not closed by the ring. As the water from the nozzles impinges against the sides of holes **28** the rotor is caused to rotate and the water passes freely through the holes against ring member **31** which directs the water radially inward a short distance where it then flows into the washing chamber of the rotor.

A plurality of brushes **33** are fastened to the inside surface of rotor cylinder **26** and extend radially inward as more clearly shown in Figs. 1 and 3. The brushes **33** are arranged in three sets of three brushes with the brushes of each set helically arranged as shown. The brushes may be fastened to the cylinder **26** by means of screws **34** which pass through the cylinder and are received in threaded holes in the base of each brush. It is apparent that brushes **33** serve to clean the outside surface of a drinking glass inserted axially within the washing chamber.

A brush holder **35** is provided to fit over shaft **27** and rotate therewith. In order to prevent slippage between these members a small circular opening in holder **35** is made to coincide with a hole **36** in shaft **27**. A pin **37** on the inside surface of a clip ring **38** passes through the aligned holes to insure that holder **35** turns with shaft **27**. A set of three brushes **39**, each with a screw threaded base portion is secured to the end of the brush holder. These brushes are equidistantly spaced circumferentially around the holder and extend radially outward. Another brush **41** is screw threaded to the end of holder **35** as shown in Fig. 3.

It may be readily understood that the water or other fluid from the nozzles causes the rotor assembly to rotate. Thus all of the brushes revolve and the water passes into the washing chamber within cylinder **26**. A drinking glass to be cleaned is inserted open end first into the end of the washer in the direction of arrow **42**. As the glass enters the washer, rotating brushes **39** thoroughly clean the inside surface of the glass and the brushes **33** clean the outside surface thereof. As the glass is inserted all the way within the washer, brush **41** engages the bottom inside surface of the glass and the flexible bristles of the brush will spread to cover the entire surface. Water from the nozzles is of course splashed about the washing chamber, thoroughly wetting the brushes and all of the surfaces of the drinking glass to be cleaned to insure a complete washing and cleaning operation. The hose **17** is conveniently coupled to a sink faucet in any suitable manner. It is seen that the glasses are washed in continuously running water which serves to carry away dirt and other foreign matter.

The wash water runs off through openings or perforations **43** in the bottom of the housing. In order to protect the operator from being splashed with the wash water during the washing process, a splash ring **44** of rubber or other similar flexible material is provided. The outer edge of ring **44** is fastened to a wire ring **45** of spring steel. The ring is snapped into a circular groove in the inner surface of the housing near the forward edge thereof.

An alternative construction of the hereinabove described rotor assembly would be that cylinder **25**, disk **23** and shaft **27** be formed of one casting. These elements may be of any suitable plastic or other material and convenience of manufacture would determine whether they are formed integral or of separate sections as illustrated in Fig. 3. The two constructions are considered equivalents and the terms cylinder, disk and shaft as used in the appended claims of course apply to either construction.

Though the present invention has been disclosed with reference to a specific embodiment thereof, it is understood that this is not to be considered as limiting the scope of the invention as defined in the following claims.

I claim:

1. A device for washing drinking glasses comprising a washing chamber formed by a rotatably mounted cylinder and a disk secured to one end thereof, a shaft fastened at one end to said disk coaxial with said cylinder, first brush means secured to the inner surface of the cylinder, second brush means secured to said shaft, said disk having a series of openings passing therethrough, a plurality of nozzles located outside the washing chamber and having the open ends thereof adjacent said series of openings and angularly disposed to the sides of the openings whereby fluid passing out of the nozzles is directed against the sides of said openings to cause rotation of said cylinder, disk and shaft, said fluid passing through said openings into said washing chamber, and a flat ring located adjacent the inner surface of said disk and spaced therefrom, said ring having an outer diameter equal to the inside diameter of said cylinder whereby water passing through the disk openings is directed toward the center of said washing chamber.

2. A device for washing tumblers comprising an open ended cylindrical housing, a spindle mounted within said housing, a shaft rotatably mounted on said spindle, a flat disk secured at the center thereof to said shaft, a cylindrical member secured at one end to said disk coaxial with said shaft, a pair of nozzles each secured at one end to said spindle, a duct passing through said spindle and connecting with said nozzles, means to secure a water hose to said spindle joining with said duct means, a first plurality of helically arranged brushes secured to the inner surface of said cylindrical member, each of said brushes extending radially inward, a second plurality of brushes secured to said shaft and extending radially outward therefrom, a single brush secured to the end of said shaft and extending axially outward, said flat disk having a circular set of openings therethrough, the ends of said pair of nozzles being located adjacent said set of openings and angularly disposed with respect to the sides thereof whereby jets of water from the nozzles are directed against the sides of the openings to cause rotation of said disk, said water passing through said openings, a ring shaped member secured to the side of said disk remote from said nozzles and spaced therefrom whereby water passing through said openings is directed radially inward, and means secured to the open end of said housing to prevent water from splashing out of said housing.

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