

J. T. EDWARDS.
 APPARATUS FOR WASHING AND CLEANING TEST TUBES, BOTTLES, AND LIKE VESSELS.
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1,332,033.

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Fig. 1

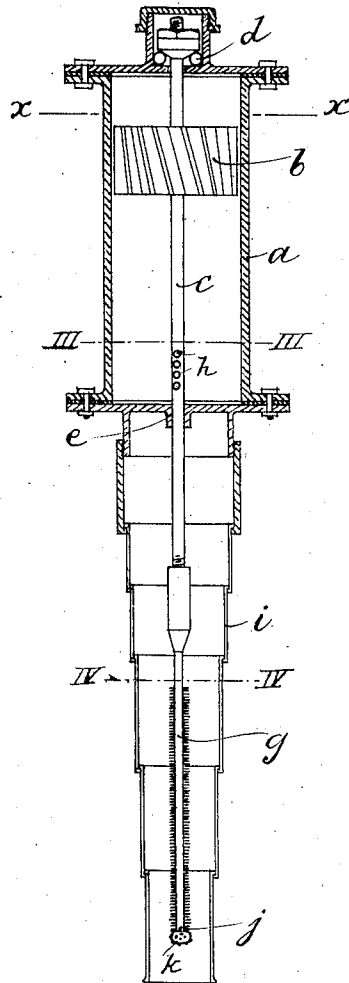


Fig. 3.

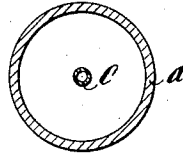


Fig. 4.

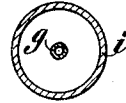
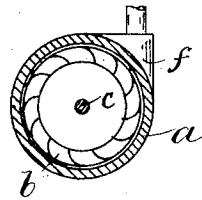


Fig. 2



Witnesses:

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APPARATUS FOR WASHING AND CLEANING TEST-TUBES, BOTTLES, AND LIKE VESSELS.

1,332,033.

Specification of Letters Patent.

Patented Feb. 24, 1920.

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To all whom it may concern:

Be it known that I, JAMES THOMAS EDWARDS, a subject of the King of Great Britain and Ireland, residing at 8 North Villas, Camden Square, London, N. W. 1, England, have invented a new and useful Improvement in Apparatus for Washing and Cleaning Test-Tubes, Bottles, and like Vessels, of which the following is a specification.

10 This invention has reference to improvements in apparatus for washing and cleaning test tubes, bottles and like vessels and it consists in improved apparatus of the type in which a brush or the like adapted to be
15 inserted into the vessel to be cleaned is mounted on a spindle which is rotated by a liquid-actuated rotor and the same liquid that drives the rotor is utilized as the washing liquid which is introduced into the vessel to be cleaned.

20 One object of the invention is to provide a simple and compact apparatus of the kind in question adapted to be readily fitted over an ordinary sink or the like and in which
25 the liquid employed for driving the rotor is utilized in the best possible manner for washing out the test tube, bottle or like vessel by being introduced into the vessel at or near its closed end through a tubular
30 brush so that the current of liquid carries away directly the matter that is detached from the wall of the vessel by the brush, the whole of the liquid employed passing through the brush and being thus fully
35 utilized in the washing operation. Further objects are, to construct the apparatus so that a minimum of power is required to rotate the brush; and to provide a shield for preventing splashing of the liquid overflowing from the test tube or the like, which
40 shield extends beyond the brush but permits of ready access to the brush and of employing brushes of different lengths.

My invention comprises broadly the combination with a liquid actuated rotor of a casing in the upper part of which the said rotor is mounted and in the lower part of which the liquid collects after it has acted upon the rotor, a hollow spindle to which
50 rotary motion is imparted by the rotor and which passes vertically through the bottom of the casing and is slotted or perforated within the casing to admit the liquid in the casing into its bore, and a tubular brush
55 which is carried by the said spindle below

the casing and the bore of which communicates with the bore of the spindle.

I preferably employ as the liquid-actuated rotor a vane-wheel adapted to be rotated by a jet of liquid under pressure impinging upon the vanes.

The shield which I provide is a telescopic shield that surrounds the brush and is adapted to be readily collapsed.

For cleaning test tubes I preferably employ a brush provided with a cushioning device at its lower end, but the cushioning device indicated in the drawing hereinafter referred to forms part of the subject matter of a separate concurrent application Serial
70 No. 326,375 relating to improvements in brushes and is not described herein.

A head of liquid may be maintained in the casing by making the cross section of the inlet to the hollow spindle slightly less than
75 would be required to carry off the liquid as it collects in the casing, and by adjusting the tap which controls the supply; and, if it be desired to obviate any waste of the liquid when the apparatus is only being used occasionally, a valve may be provided on the hollow spindle to shut off the outflow on the completion of a washing operation.

A feature of my apparatus which distinguishes it clearly from all the known apparatus of the type in question is that my apparatus is designed and adapted to utilize the whole of the liquid twice—first for driving the rotor and then for washing out the test tube, bottle or like vessel—in such a
85 manner that the rotor meets with no resistance from the liquid after it has imparted its *vis viva* to the said rotor, and the liquid flows in a continuous current from the closed end of the vessel to its open mouth, thus
90 washing out the vessel thoroughly.

I have illustrated my invention in the accompanying drawing, in which:

Figure 1 shows the complete apparatus as designed more particularly for use in laboratories and hospitals for cleaning test tubes, the casing and shield being shown in section;

Fig. 2 is a transverse section on the line $x-x$ of Fig. 1.

Fig. 3 is a section on the line III—III of Fig. 1; and

Fig. 4 is a section on the line IV—IV of Fig. 1.

Referring to the drawing: a is a cylin- 110

drical casing within which a vane-wheel *b* is carried on a vertical spindle *c* suspended rotatably on ball bearings *d* and passing through a gland *e* in the bottom of the casing. The vane-wheel *b* is rotated by a jet of liquid under pressure impinging tangentially upon the vanes of the wheel through a nozzle *f* that projects the liquid into the casing, and the spindle *c* carries at its lower end a tubular brush *g* adapted to enter the vessel to be cleaned, the said spindle being itself tubular at its lower end and perforated at *h* for the purpose of conducting through the tubular brush to the bottom of such vessel—when it is pushed up over the brush—the liquid that collects below the wheel *b* in the casing *a*.

Below the casing *a* a telescopic shield or guard *i* is mounted concentrically with the spindle *c* for preventing splashing of the liquid which overflows from the vessel being cleaned. The telescopic construction of this shield obviates any need for changing the shield to suit the length of the brush and enables the shield to be pushed up when it is desired to fit, or to observe the action of, a new brush.

The liquid enters the test tube or the like through the slots *j* formed in the end of the brush core, and if there is a head of liquid in the casing *a* the current of liquid exerts a certain reaction upon the brush, tending to raise it. This reaction, in conjunction with the slight pressure exerted in holding a test tube up to the brush, relieves the pressure on the ball bearings *d* so that the vane-wheel and its spindle practically float and require very little power to rotate them.

Any suitable form of brush with a tubular core may be employed, the abrading means being ordinary bristles, wire bristles, chains or the like carried by the said core. The cushioning device *k* shown on the end of the brush has already been referred to. The preferred arrangement for securing the

brush to the hollow spindle *c* is to adapt its core to be screwed into a socket on the end of the spindle.

What I claim as my invention and desire to secure by Letters Patent is:—

1. Apparatus for washing and cleaning test tubes, bottles and like vessels, comprising in combination a liquid-actuated rotor, a casing in the upper part of which the said rotor is mounted and in the lower part of which the liquid collects after it has acted upon the rotor, a hollow spindle to which rotary motion is imparted by the rotor and which passes vertically through the bottom of the casing and in the portion of which within the casing radial apertures are formed to admit the liquid in the casing into its bore, and a tubular brush which is carried by the said spindle below the casing and the bore of which communicates with the bore of the spindle and from the free end of which the liquid escapes into the vessel to be cleaned.

2. Apparatus for washing and cleaning test tubes, bottles and like vessels, comprising in combination a vane-wheel adapted to be rotated by a jet of liquid impinging upon its vanes, a casing in the upper part of which the said vane-wheel is mounted and in the lower part of which the liquid collects after it has acted upon the said vane-wheel, a hollow spindle on which the said vane-wheel is mounted and which passes vertically through the bottom of the said casing and in the portion of which between the vane wheel and the bottom of the casing radial apertures are formed to admit the liquid in the casing into its bore, and a tubular brush carried by the said hollow spindle below the said casing the bore of which brush communicates with the bore of the spindle and conducts the liquid to the free end of the brush.

JAMES THOMAS EDWARDS.