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WASHING AND STERILIZING MACHINE FOR GLASSWARE

Filed Aug. 17, 1954

2 Sheets-Sheet 1

FIG. 1.

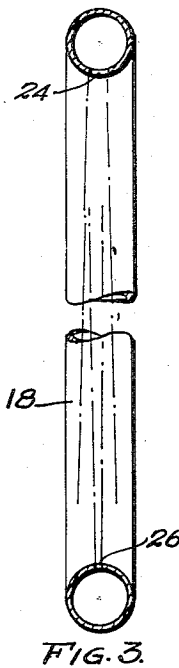
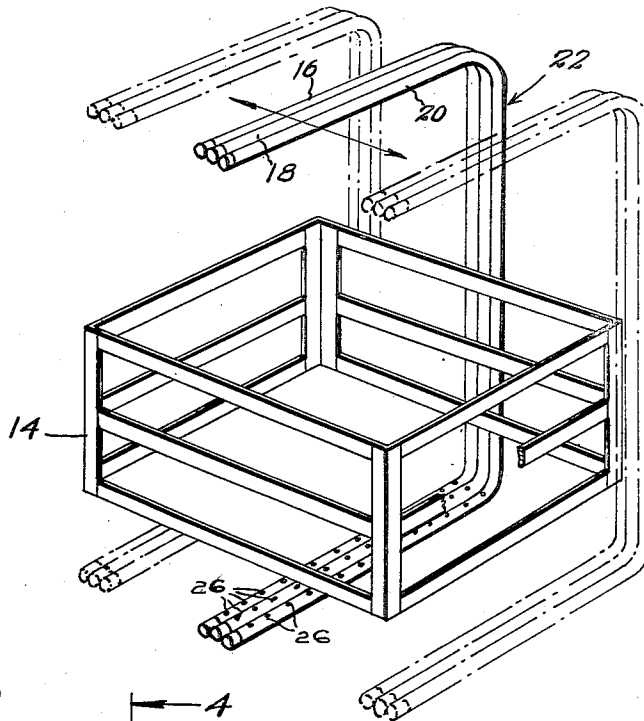
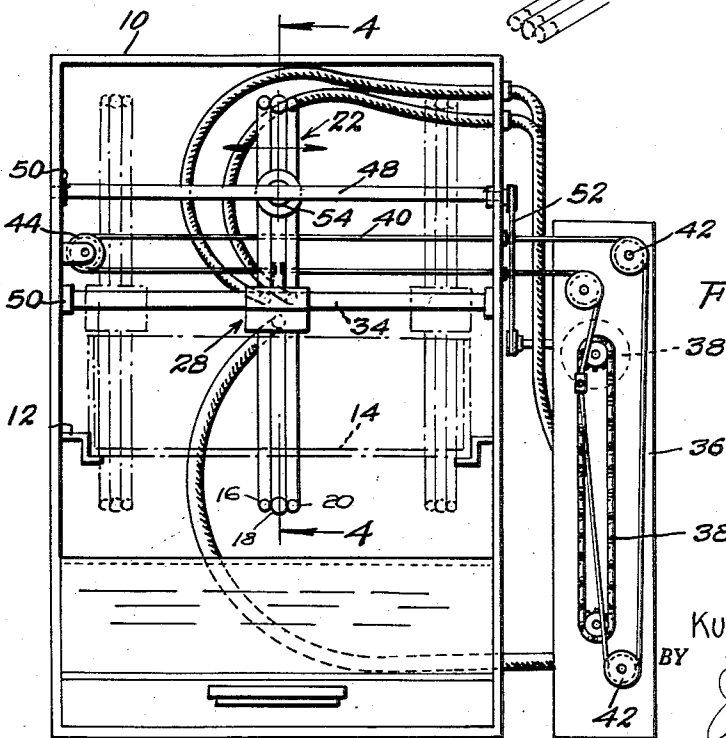


FIG. 2.



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FIG. 4.

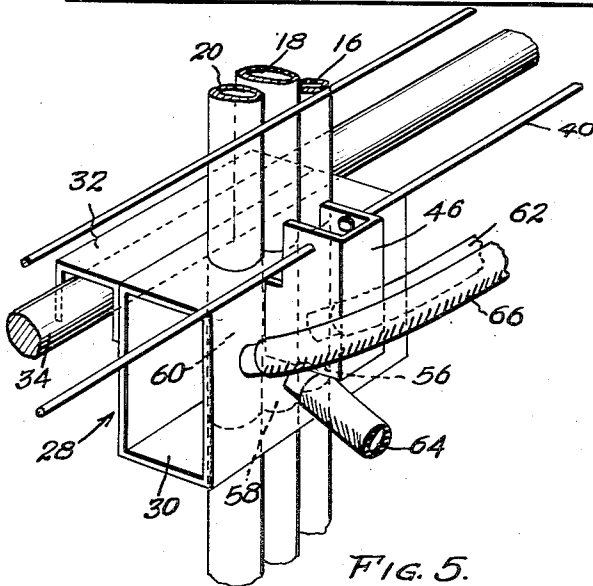
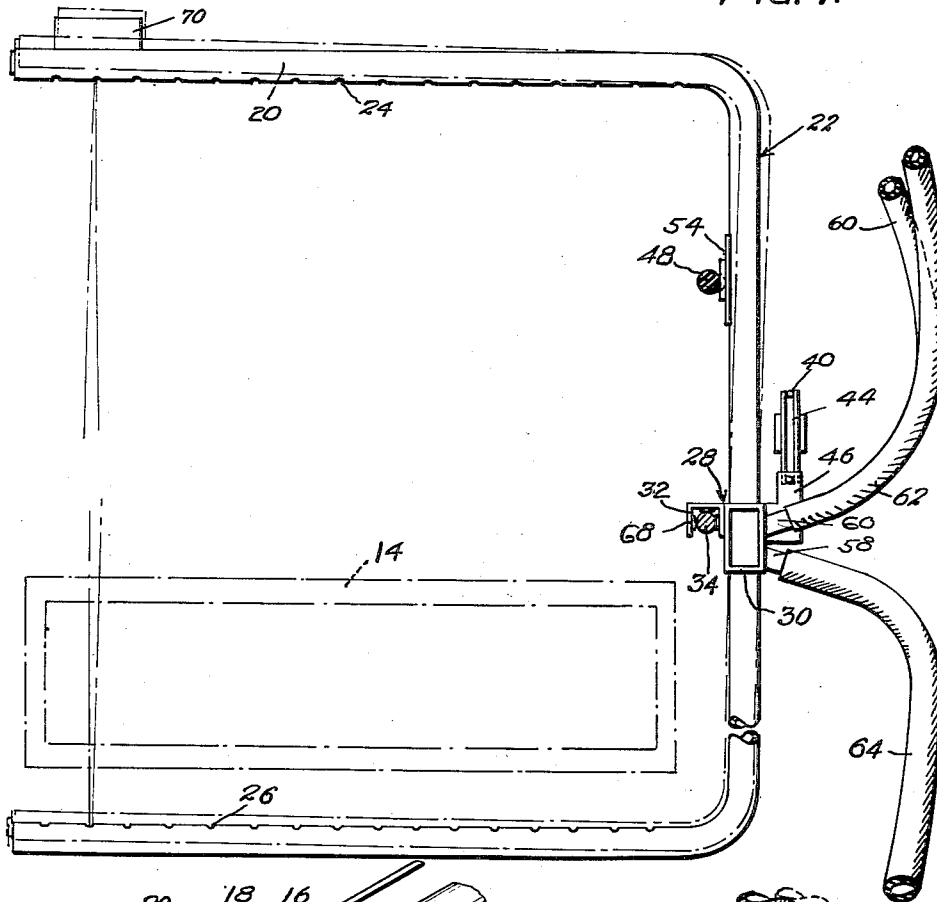


FIG. 5.

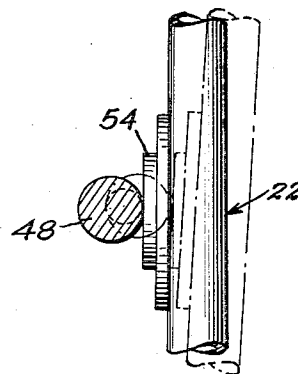


FIG. 6.

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## WASHING AND STERILIZING MACHINE FOR GLASSWARE

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3 Claims. (Cl. 134—172)

This invention relates to new and useful improvements in surface treating apparatus and the primary object of the present invention is to provide a device for washing, cleaning and sterilizing laboratory glassware such as pipettes, syringes, syringe needles, vials, test tubes, flasks, bottles, petri dishes and the like.

Another important object of the present invention is to provide a surface treating device having a fluid spray means which is reciprocated and rocked in order to effectively increase the surface coverage of an article which will be treated with a cleaning and/or sterilizing medium.

Yet another object of the present invention is to provide a surface treating apparatus including upper and lower spray tubes which are disposed respectively above and below an article holder and which upper spray tube is provided with downwardly facing orifices of a size larger than upwardly facing orifices in the lower spray tube to permit a down stream of fluid to exceed an upstream of fluid, and, to thereby prevent articles in the holder from being lifted or shifted by an upstream passing from the lower spray tube.

A further object of the present invention is to provide a surface treating apparatus including a stationary tray or holder and a reciprocating spraying device of compact nature which is moved relative to the holder in order to reduce to a minimum the size cabinet required for the entire device.

A still further aim of the present invention is to provide a surface treating device of the aforementioned character that is simple and practical in construction, strong and reliable in use, efficient and durable in operation, inexpensive to manufacture, service and maintain, and otherwise well adapted for the purposes for which the same is intended.

These and other objects will be clearly apparent during the course of the following description, reference being had to the accompanying drawings, wherein has been illustrated the preferred forms of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

Figure 1 is a fragmentary perspective view showing the movement of the spraying device relative to the article holder;

Figure 2 is a front elevational view of the present invention and illustrating in dotted lines various positions of the spraying device relative to the article holder;

Figure 3 is an enlarged fragmentary vertical sectional view of the spraying device and illustrating the relative size of the upper and lower orifices;

Figure 4 is an enlarged detail vertical sectional view taken substantially on the plane of section line 4—4 of Figure 2;

Figure 5 is an enlarged fragmentary perspective view of the spraying device holding and supporting bracket and showing the manner in which the fluid ejecting tubes are connected to their inlet conduits;

Figure 6 is an enlarged detail view of Figure 4 and

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illustrating the manner in which the rocking means is operatively engaged with the spraying device.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents a suitable cabinet or housing which is provided with suitable support means 12 for a foraminous article holder or container 14, the latter being preferably removable from the support means whereby various type articles may be quickly and readily placed into or removed from the article holder in a convenient manner.

Means are provided for directing a surface treating fluid toward articles retained in the holder 14 and this means includes a plurality of juxtapositioned, substantially U-shaped tubes 16, 18 and 20 comprising a spraying device generally designated by the numeral 22. The tubes 16, 18 and 20 are suitably connected together and each is provided with an upper and lower horizontal portion adapted to be disposed respectively above and below the supported article holder 14.

The upper horizontal portions of the tubes 16, 18 and 20 are provided with downwardly facing orifices or apertures 24 which are of a diameter greater than the upwardly facing orifices or apertures 26 provided in the lower horizontal portions of the tubes 16, 18 and 20 so that a fluid directed through the lower apertures 26 will not have the tendency to lift or shift articles in the holder 15 against action of a down flowing fluid directed through the upper apertures 24.

The central portions of the U-shaped tubes 16, 18 and 20 are suitably removably or fixedly engaged with a combined guiding and supporting bracket 28 having a substantially horizontally disposed rectangular body portion 30 and a substantially channel shaped guiding portion 32. Guiding portion 32 is preferably downwardly opened to engage over a horizontal guide rail or track 34 suitably supported in the cabinet 10.

A casing 36 is suitably retained relative to the cabinet 10 and contains a powered unit, such as an electric motor 38 whose drive shaft is operatively connected to an endless chain oscillator 38', while the chain oscillator has a linked connection with a flexible member 40 trained over pulleys 42 carried by casing 36 and having upper and lower horizontal flights which parallel the rail 34 and engage a pulley 44 carried by the cabinet 10. The lower flight of member 40 is suitably attached to a connector 46 fixed to bracket 28.

The power means 38 is thus operatively connected to the bracket 28 through the medium of the flexible member 40 so that the spraying device 22 will be reciprocated relative to the article holder 14, whereby a fluid directed through the orifices 24 and 26 will impinge against articles retained in the article holder 14.

Means is provided for rocking or oscillating the spraying device 22 as the same is reciprocated relative to the article holder. This means comprises a horizontally disposed rotatable eccentric shaft 48 having cylindrical end portions supported in bearings 50 suitably secured to the side walls of the cabinet 10. One end portion of the cam shaft 48 is connected to the power means 38 as by drive 52.

Wear and contact plates or disks 54, preferably of nylon, are attached to the spray tubes 16, 18 and 20 with at least one of the disks 54 engaging the cam shaft 48 to be contacted by the cam shaft during rotating of the latter by the power means 38.

Tubes 16, 18 and 20 are centrally provided with T-fittings 56, 58 and 60 whose stem portions are coupled to the outlet ends of flexible conduits 62, 64 and 66. The inlet ends of the conduits 62, 64 and 66 extend to and are suitably connected to a pump device within casing 36 capable of actuation by independent power means so

that fluid may be impelled through the various conduits and into the spray tubes.

The conduits are independently operatively connected to a source of detergent; a rinse solution, such as water; and a distilled or steam rinse whereby articles in the holder 14 will be sterilized, cleaned and steam dried and additionally sterilized. Obviously, the number of spraying tubes may be increased and reduced without affecting the operation of the described apparatus.

In order to reduce wear on the rail 34 and the bracket 28, the inner surfaces or walls of the portion 32 are provided with preferably nylon wear plates or buttons 68 that contact the periphery of rail 34 as illustrated in Figure 4 of the drawings.

Although it is possible to so locate the eccentric shaft with respect to the spray tubes that the horizontal portions of the tubes will tend to remain in a horizontal position, weight means 70 is applied to the upper horizontal portions of the spray tubes to aid in the vertical rocking of the tubes in conjunction with the rotating eccentric shaft.

In practical use of the present invention as thus described in Figure 1 through 6, inclusive, the power means 38 is actuated to move the endless member 40 and cause rotation of eccentric shaft 34. Spray device 22 is thereby caused to move horizontally relative to holder 14 with fluids directed through orifices 24 and 26 onto articles retained in the holder 14.

Inasmuch as cam shaft 34 rides against wear plates 54, the spraying device is vertically rocked during its horizontal movement to thereby effect a larger spraying surface directed through the orifices for the purpose of permitting the spraying fluid to pass into even small tubes, such as pipettes within the article holder.

The power means 38 is preferably of the reversible type so that the flexible member 40 will be driven sequentially clockwise and anti-clockwise to reciprocate the spraying device.

The conduits are conventionally operatively connected to timed valves whereby the fluid ejected from the tubes will be periodic to permit first a detergent, then a rinse and finally a steam or sterilizing spray to be directed onto the articles in the holder, after which the power means will be arrested to permit drying of the articles in the holder. Obviously the various types timing and arresting devices adaptable to the present invention are not here referred to specifically since many commonly known in this art could be incorporated in the invention to operate as described without effecting the novel features thus inferred.

The forms of the invention herewith shown and described are illustrative of a novel method of most effectively subjecting articles to a thorough washing, rinsing and sterilizing which heretofore has been most ineffective, especially slender articles, such as pipettes, etc.

The novel means whereby the tubes 22 are reciprocated, results in a very obvious saving of room, since the cabinet need be very little larger than the article holder 14.

Although the principles here disclosed are preferred, changes in structural details are contemplated as readily fall within the spirit of the invention and as determined by the scope of the subjoined claims.

Having described my invention, what I claim as new and desire to secure by letters-patent is:

1. A surface treating apparatus comprising an article holder, supporting means for said holder, a substantially U-shaped spraying device including an upper horizontal portion overlying said holder and having downwardly facing orifices, said spraying device also including a lower horizontal portion underlying said holder and having upwardly facing orifices, and means operatively connected to said spraying device for reciprocating and rocking the latter relative to said holder.

2. A surface treating apparatus comprising an article holder, supporting means for said holder, a substantially U-shaped spraying device including an upper horizontal portion overlying said holder and having downwardly facing orifices, said spraying device also including a lower horizontal portion underlying said holder and having upwardly facing orifices, and means operatively connected to said spraying device for reciprocating the latter relative to said holder, said downwardly facing orifices being of a size larger than said upwardly facing orifices to permit an increased flow of a cleaning medium from said upper portion than from said lower portion to prevent an article in said holder from being lifted against a cleaning medium directed from said upper portion.

3. A surface treating apparatus comprising an article holder, a supporting means for said holder, a substantially U-shaped spraying device including an upper horizontal portion overlying said holder and having downwardly facing orifices, said spraying device also including a lower horizontal portion underlying said holder and having upwardly facing orifices, means operatively connected to said spraying device for reciprocating the latter relative to said holder, means engaging said spraying device for transversely rocking said spraying device during reciprocatory motion of said device, the said downwardly facing orifices being of a size larger than said upwardly facing orifices.

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