Aug. 2, 1960 K. J. HEINICKE 2,947,312

WASHING AND STERILIZING MACHINE FOR GLASSWARE

Filed Feb. 26, 1958

FIG. 1

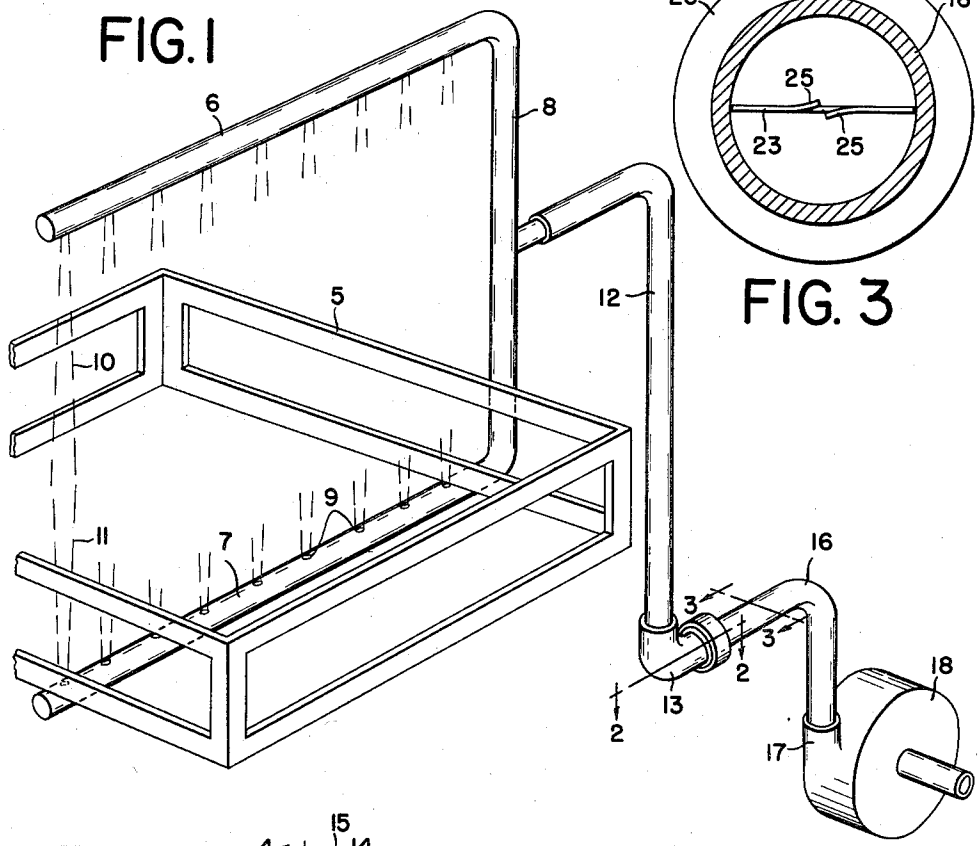
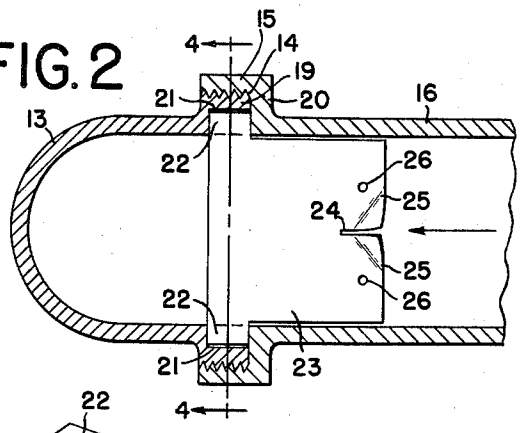


FIG. 3

FIG. 2



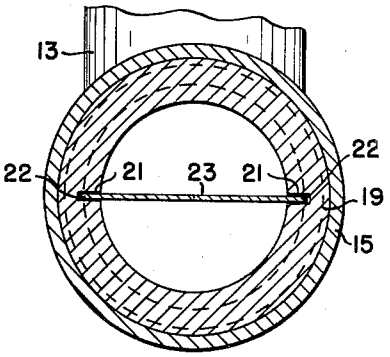


FIG. 4

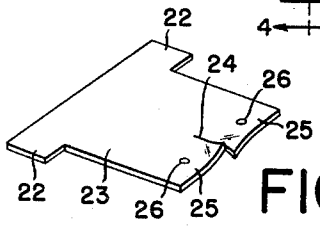


FIG. 5

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WASHING AND STERILIZING MACHINE FOR GLASSWARE

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3 Claims. (Cl. 134—191)

This invention relates to new and useful improvements in surface treating apparatus and, is an improvement over that structure disclosed in my United States Patent No. 2,827,064, issued March 18, 1958.

The invention provides a system and apparatus for cleaning glassware and particularly laboratory glassware such as pipettes, syringes, syringe needles, vials, test tubes, flasks, bottles, petri dishes and the like.

Basically, as shown in the patent above noted, there was provided a rack or other support and a pair of spray heads or tubes that were disposed above and below the rack to project both a cleaning and sterilizing spray to the glassware supported in the rack, and, with either the spray heads or the rack being reciprocated in a horizontal path to bring the several articles of glassware into the line of the streams of water or sterilizing medium forcibly ejected from the spray heads in opposed relation so that the glassware was cleaned and/or sterilized both internally and externally.

It has been found that certain deposits such as autoclaved protein could only be removed with difficulty if at all. This also applied to other recalcitrant deposits upon the walls of the glassware.

The purpose of this invention is to dispose within the fluid pressure line leading to the spray heads, a device whereby to set up in the stream a pulsing effect and with the pulsing effect being carried throughout the fluid to the jet streams being projected upwardly and downwardly by the spray heads, producing in effect a push-pull action against the deposits in the glassware that successfully remove the deposits with a minimum of effort and in a minimum of time.

Further advantages of the invention will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated a preferred form of the invention and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

Figure 1 is a perspective view of a washer constructed in accordance with the invention,

Figure 2 is a horizontal section taken on line 2—2 of Figure 1,

Figure 3 is a transverse section taken substantially on line 3—3 of Figure 1,

Figure 4 is a section taken substantially on line 4—4 of Figure 3 and,

Figure 5 is a perspective view of the pulsation creating vane disposed within the fluid line.

Referring specifically to the drawings, the numeral 5 designates an open rack of any desirable construction, usually having partitions or the like for the upright support of laboratory glassware, such as that above noted. The rack 5 may either be stationary or reciprocatory, this being determined by a spray device to be described.

Overlying and underlying the rack 5 are a pair of tubular spray heads 6 and 7, connected by a common conduit 8. The spray heads 6 and 7 are in parallel opposed relation and are apertured throughout their length as shown at 9, and with the apertures of the upper and lower heads 6 and 7 being in axial opposed relation. As pointed out in the patent above noted, the jet streams 10 from the upper spray head 6 are relatively stronger than the jet streams 11 of the lower spray head 7 and whereby, to impart a downward pressure upon the articles of glassware to prevent their possible dislodgement from the rack by the force of the lower jets 11. This has all been clearly described and claimed in my prior patent.

Connected intermediate the height of the conduit 8, is a fluid line 12, having an L-coupling 13 at its lower end. The coupling is threaded at 14 for the threaded reception of a flange 15 carried by a fluid line 16. The fluid line 16 corresponds substantially to the diameter of the fluid line 12. The fluid line 16 has connection with the discharge side 17 of a conventional pump 18, driven in any conventional manner. The coupling 13 is provided with a hub portion 19, while the line 16 has a hub portion 20, carrying the threaded flange 15. As clearly shown in Figures 2 and 4, the hub 19 is slotted at diametrically opposite points as at 21.. Disposed within the slots 21 are wing portions 22 of a flat metallic vane 23. The vane is disposed centrally with respect to the fluid line 16 and whereby fluid passing through the line 16 to the line 12 will engage with equal force and volume above and below the vane 23. The vane at its forward edge is slotted at 24, forming vibratory tongues 25. One tongue 25 is slightly curved upwardly from the slot 24, while the opposite tongue 25 is slightly curved downwardly from the slot 24, providing a pair of reed-like elements against which the stream of water impinges. Each of the tongues 25 are apertured at 26.

In the use of the device, with the spray device including the spray heads 6 and 7 and the conduit 8 being assembled and supported in any desirable manner relative to the rack 5, the fluid lines 12 and 16 are assembled with respect to the pump 18. Prior to the assembly of the fluid line 16 with the coupling 13, the vane is engaged with the coupling 13 by sliding the wings 22 into the slots 21. The wings may have a snug engagement within the slots and if desired, they may be soldered for permanent connecion to the coupling 13. The fluid line 16 is then connected and also connected with the coupling and also connected with the pump 18. No attempt has been made to show various unions or other common expedients for assembling the fluid line, since this forms no important part of the invention. If the spray heads are of the type that reciprocates back and forth with respect to the rack 5, it will be clearly apparent that a flexible fluid line will be substituted for the fluid line 12. Now with the parts in fully assembled relation, a rack 5 containing the glassware to be cleaned is installed within the machine to lie within the range of the spray heads 6 and 7. If the rack reciprocates, then the parts will be substantially as shown. The pump is then actuated and a relative high pressure stream is forced through the lines 16, 12 and distributed through the conduit 8 to the spray heads 6 and 7. As the stream of water passes the vane 23, a vibratory motion is imparted thereto, that is carried by resonance throughout the line 12, conduit 8, spray heads 6 and 7 and through the jets 10 and 11, impinging upon the glassware both internally and externally and setting up substantially a push-pull force that acts upon the deposits in the glassware and this push-pull action acts to quickly loosen and remove the racalcitrant deposits that would ordinarily not be disturbed by jet streams having no pulsing action. The tongues 25 act upon the stream of water to create this pulsing effect and in actual tests, this pulsing is con-

tinued throughout the system and also throughout the jet streams 10 and 11. The apertures 26 likewise create miniature jets within the streams and these jets coupled with the vibratory motion set up by the tongues 25, create the pulsing flow of the water and/or sterilizing medium. To create the desirable pressure within the fluid lines, a suitable high pressure pump has been found necessary. While the coupling 13 has been illustrated as an L-coupling, it will be apparent that a union may be disposed within the line 12 or the line 16 for supporting the vane 23. The function of the vane 23 is similar in either types of coupling members.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be 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 of the character described comprising an article holder for supporting articles to be cleaned in an upright manner, a substantially U-shaped spraying device including an upper horizontal portion overlying said holder and having downwardly facing orifices, such spraying device also including a lower horizontal portion underlying said holder and having upwardly facing orifices and whereby to spray a cleaning medium from above and below in opposed relation, the said spraying device and the article holder being relatively movable in a horizontal plane, a fluid line for conducting fluid jointly to the upper and lower horizontal portions of the spraying device, a pump connected to the fluid line, a coupling disposed within the fluid line, a flat vibratory element disposed within the coupling centrally thereof to substantially span the diameter of the fluid line, the vibratory element being anchored at one end to one member of the coupling and with its major length extending into the fluid line, the extended end of the vibratory element being slotted intermediate its width to form a pair of tongues that are disposed in the line of flow of the cleaning medium, the said tongues imparting a pulsating action to the fluid passing thereby and with the pulsating action being maintained throughout the fluid line and throughout the opposed sprays being directed to the articles within the article holder, the said sprays imparting a push-pull action upon the articles in the article holder for removing recalcitrant deposits.

2. The structure according to claim 1 wherein the coupling embodies a hub section that is externally threaded for the reception of a female coupling carried by the fluid line, the hub section being slotted at diametrically opposite points, the said vibratory element comprising a flat relatively thin vane, a pair of wing portions formed upon the vane at one end for engagement within the slots and whereby to dispose the vane substantially centrally with respect to the axis of the fluid line, the vane having a free portion that extends into the leading end of the fluid line, the free end of the vane being longitudinally slotted to form a pair of vibratory tongues, each of the tongues adjacent to the slot being bent upwardly and downwardly, the fluid passing through the fluid line first engaging the said tongues to impart a pulsation to the fluid to be discharged from the spray device.

3. The structure according to claim 1 wherein the coupling embodies a hub section that is externally threaded for the reception of a female coupling carried by the fluid line, the hub section being slotted at diametrically opposite points, the said vibratory element comprising a flat relatively thin vane, a pair of wing portions formed upon the vane at one end for engagement within the slots and whereby to dispose the vane substantially centrally with respect to the access of the fluid line, the vane having a free portion that extends into the leading end of the fluid line, the free end of the vane being longitudinally slotted to form a pair of vibratory tongues, each of the tongues adjacent to the slot being bent upwardly and downwardly, the fluid passing through the fluid line first engaging the said tongues to impart a pulsation to the fluid to be discharged from the spray device, each of the tongues being apertured to impart miniature jet streams both above and below the vane.

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