

Dec. 18, 1962

F. HALOSKI ETAL
ROTARY SPRAY NOZZLE

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2 Sheets-Sheet 1

Fig. 1

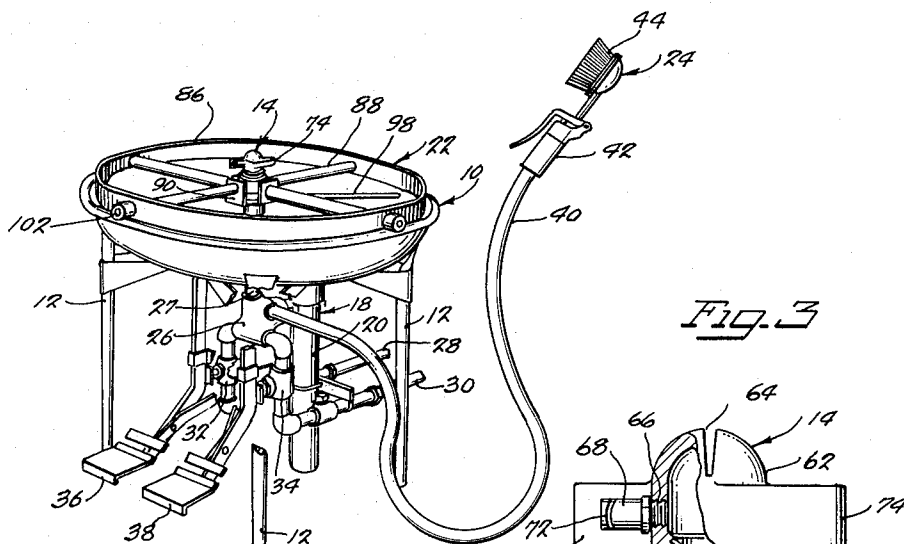
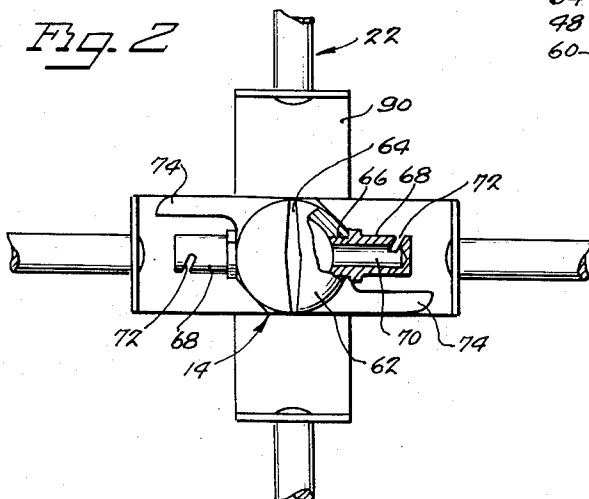


Fig. 3

Fig. 2



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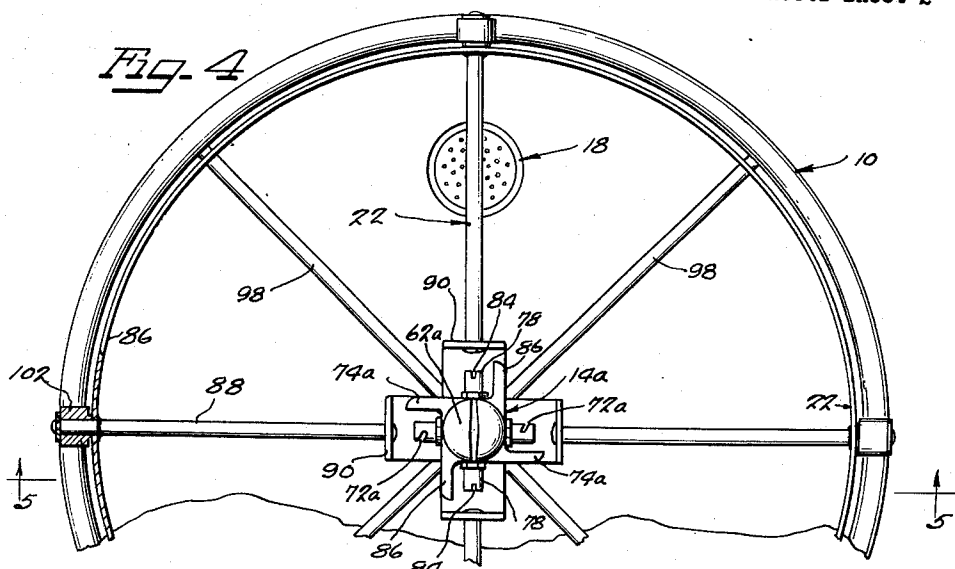
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ROTARY SPRAY NOZZLE

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4 Claims. (Cl. 239-261)

This invention relates generally to a rotary spray nozzle.

Particularly with respect to the handling of food and waste food items in restaurants or the like, there is a considerable problem in effectively washing and sterilizing the metal containers ordinarily used for such items which, for example, may be food containers and carriers, garbage cans, etc. There are, of course, health standards to be met in the cleansing of such containers and it is therefore important that apparatus used in the washing and sterilizing operation be effective to meet such health standards. Moreover, in restaurants or the like, it is especially important that the apparatus occupy a minimum amount of space, be adaptable for easy handling by an individual, and be economical to build and employ.

This application is a continuation-in-part of applicant's copending application, Serial No. 684,665, filed September 18, 1957, now patent No. 2,993,246.

An object of the invention is to provide an improved form of rotary spray means, including a plurality of jet nozzles and a center spray portion which are effective to direct pressure fluid to all interior surfaces of a container, irrespective of the size and shape of such container. Other objects and advantages will be noted with respect to the following description of the selected embodiments of the invention, which are illustrated in the accompanying drawing, wherein:

FIGURE 1 is a perspective view of washing and sterilizing apparatus embodying certain principles of the present invention;

FIGURE 2 is an enlarged plan view of the rotary nozzle assembly shown in FIGURE 1, with portions thereof broken away and in section;

FIGURE 3 is an enlarged side elevational view of the nozzle assembly shown in the preceding figures, with portions thereof broken away to more clearly illustrate the structural details of the assembly;

FIGURE 4 is a fragmentary enlarged plan view of the apparatus shown in FIGURE 1 with another embodiment of the nozzle assembly being illustrated;

FIGURE 5 is a sectional view taken along the line 5-5 in FIGURE 4;

FIGURE 6 is an enlarged side elevational view of the nozzle assembly shown in FIGURES 4 and 5; and

FIGURE 7 is an enlarged sectional view taken along the line 7-7 in FIGURE 6.

As seen particularly in FIGURE 1 of the drawings, one selected embodiment of this invention comprises a washing and sterilizing apparatus, which is particularly adapted to the handling of relatively large size containers, such as milk cans, garbage cans and the like. However, relatively small containers may also be effectively washed and sterilized by the apparatus.

In general, the apparatus includes a bowl structure 10 supported by four tubular leg members 12. A rotary

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nozzle assembly 14 which directs water and/or steam under pressure upwardly from the bowl 10 is mounted in elevated relation to the bottom of the bowl 10 in order to prevent back siphoning and contamination of the nozzle. The bowl 10 is provided with suitable drain means 18 including a pipe 20 depending from the bowl 10 which may be either placed over an open drain (not shown) or connected directly to a drain pipe. A rotatable ring-like structure 22 which is employed to support the containers in inverted relation to the nozzle assembly 14 is disposed on the bowl 10. A hand brush 24 is provided for washing the exterior surface of the containers.

Suitable plumbing is provided for directing the water and steam from sources thereof to the spray nozzle assembly 14. In the illustrated embodiment, the plumbing includes a mixing chamber 26 the output of which is connected through a pipe line 27 to the spray nozzle assembly 14. The mixing chamber 26 has fluid connection with a source of steam under pressure through a pipe line 28 and with a source of water under pressure through another pipe line 30. Each of these pipes 28 and 30 includes a self closing valve 32 and 34, respectively, which are controlled by the foot pedals 36 and 38, respectively, to thereby afford means for selectively controlling the amount of water and/or steam which flows through the mixing chamber 26 to the spray nozzle assembly.

The hand brush 24 is connected to the mixing chamber 26 by means of a flexible conduit 40, such as a rubber hose, in order to thereby permit selective discharge of water and/or steam through the hand brush. A suitable hand controlled valve 42 is connected between the conduit 40 and the hand brush 24 and the latter may include a removable bristle portion 44 to permit easy replacement thereof.

Then too, there is ordinarily incorporated in the system a vacuum breaker (not shown) which may be included in the pipe line 27 leading between the mixing chamber 26 and the nozzle assembly 14. The particular means for providing pressurized steam and/or water for the nozzle assembly and hand brush is not an essential portion of the invention and any suitable means may be employed for this purpose, it is believed that a more detailed description of the plumbing connections is unnecessary.

As shown in FIGURE 5, the pipe line 27 leading from the mixing chamber 26 extends upwardly through the bowl structure 10 and is connected thereto. The pipe line 27 serves as a support for the nozzle assembly 14 and the upper end portion thereof is externally threaded to provide a removable mounting for the rotary nozzle assembly 14.

As seen particularly in FIGURES 2 and 3, the rotary nozzle assembly 14 includes a reducer bushing 46 having an internally threaded portion for engaging the threads on the upper end of the supporting pipe line 27. On top of the reducer bushing 46 there is mounted a bearing cup 50 which is threaded internally at its lower end for engagement with external threads on the upper portion of the reducer bushing 46. The upper end of the bearing cup 48 includes an inwardly turned flange portion 50 which provides, in cooperation with the side walls thereof, a seat for a bearing race 52. A plurality of balls 54

are rotatably held by a bearing retainer (not shown) in circumferentially spaced relationship around the bearing race 52.

A bearing cone 56 is disposed coaxially of the bearing cup 48 and projects through the central opening 58 at the upper end of the latter. The bearing cone 56 includes a circumferentially flanged portion 60 at its lower end and this flanged portion 60 presents a curved surface at its juncture with the vertical wall of the bearing cone 56 in position for engagement with the balls 54 held by the bearing retainer. In this respect, it will be noted that the bearing race 52 includes a horizontal and a vertical wall interconnected by a curved wall. The bearing race 52, balls 54, and the bearing surface on the bearing cone 56 are disposed to provide an annular contact bearing having points of contact which lie on a line extending at an angle of approximately 45° with respect to the vertical center line of the nozzle assembly 14. Such a bearing is capable of carrying the resulting force of the thrust and the radial load of the nozzle described hereinafter.

The upper end of the bearing cone 56 is provided with an externally threaded portion, and engaged with this is an internally threaded portion at the lower end of a center spray housing 62. This center spray housing 62 is described in applicant's aforementioned co-pending application, and includes a generally hemispherically upper end which is closed with the exception of an elongated slot 64 disposed transversely of the upper end.

More particularly, this elongated slot 64 extends through an angle of about 180°, with the side wall portions thereof tapering downwardly to thereby provide a fan-shaped opening as shown in FIGURE 3. Consequently, as pressure fluid is directed upwardly through the nozzle assembly 14, it is discharged through the slot 64 in a fan-shaped spray which covers a span of approximately 180° and has a width of approximately 5° due to the annular cross sectional shape thereof.

As shown in FIGURES 3 and 4 the center spray housing 62 includes at a position below the slot 64 a pair of diametrically opposed threaded bores 66. A cylindrical jet nozzle 68 is threaded into each of these bores 66 to thereby project laterally from the center spray housing 62. Each of these jet nozzles 68 is of relatively short length, and includes a central passageway 70 extending lengthwise of the nozzle 68, and a slotted opening 72 affording discharge of the pressure fluid from the nozzle 68. The slotted opening 72 is preferably formed at an obtuse angle with respect to the center line of the nozzle 68 and the slotted opening extends approximately 180° around the circumference of the cylindrical nozzle 68.

Each of the nozzles 68 is individually adjustable by means of its screw threaded engagement with the center spray housing 62, to selectively direct the fluid discharge from the nozzle 68 at a predetermined angle relative to the direction of the center spray. The inclination of the slotted opening 72 provides not only a lateral discharge of fluid, but also results in a rotational force on the center spray housing 62 to afford rotation of the nozzle assembly 14 as fluid pressure is being discharged.

In order to protect the jet nozzles 68 and also to serve as a fly-wheel in aiding rotation of the nozzle assembly 14, the spray housing 62 is provided with a pair of laterally projecting paralleled blades or fins 74, preferably from a continuation of opposed side portions of the spray housing 62. The blades extend in opposite directions one each of which is disposed along one side of each jet nozzle 68.

The discharging of pressure fluid through the jet nozzles 68 is effective to direct a spray toward the side walls of the container being washed and sterilized, including those portions which may be below the level of the nozzle assembly 14. It will be understood that the openings 72 in the ends of the jet nozzles 68 should be disposed so that the forces created by the passage of fluid therethrough will not be entirely in opposition to each other, and there-

by prevent rotation of the spray housing 62. These slotted openings 72 may be disposed in opposition to one another as illustrated in the drawings, or at any other selected angular relationship which will permit rotation and direct the fluid in paths which are more effective with respect to the particular shape and size of the container being washed and sterilized.

It should also be noted that, in the illustrated arrangement, the upwardly directed pressure in the nozzle assembly serves to move the bearing cone 56 in an upward direction, so that the lower end of the cone 56 is essentially free of the reducer bushing 46. Thus, the spray housing 62 is supported for thrust and rotation on the bearing surface provided by the curved surface of the bearing cone 56.

In the embodiment of the nozzle assembly shown in FIGURES 4 through 6, wherein parts of the nozzle assembly similar to those shown in FIGURES 1 through 3 are indicated by the same reference numeral with the suffix "a," a modified form of the spray housing 62a is provided. In this connection, an additional pair of jet nozzles 78 are threaded into a pair of diametrically opposed threaded bores 80 in the spray housing 62a, to thereby form a four jet nozzle assembly. As shown in FIGURE 7, each of these additional jet nozzles 78 is of relatively short length, and includes a central passageway 82 extending lengthwise of the nozzle 78, and a slotted opening 84 affording discharge of the pressure fluid from the additional jet nozzle 78. The slotted opening 84 is formed at the end of the additional jet nozzle 78 and generally transverse thereto, as shown in FIGURES 4 through 7.

As shown in FIGURE 4, the spray housing 62a is provided with an additional pair of laterally projecting blades 86, one each of which is disposed along one side of each additional jet nozzle 78. The additional blades 86 are integrally formed with the center spray housing 62a in a manner similar to that described previously in connection with the blades 74a.

The additional pair of nozzles 78 provide direct sprays at approximately the height of the nozzle assembly 14a where normally the corners and crevices of the container being cleaned are located. This provides a better sterilizing and cleaning action for the container. Moreover, the additional blades afford a better flywheel action, and thus smoother rotation.

In order to provide a support for the container being sterilized, the spoke ring assembly 22 is provided. As shown in FIGURES 4 and 5 the spoke ring assembly 22 includes an annular member 86 having four radially extending spokes 88 fixedly connected thereto. The inner end of each spoke 88 is fastened to an upwardly extending flange portion of a pair of brackets 90 which are disposed at right angles to each other in crossing relation. The center of these brackets 90 includes a suitable opening 92 affording passage of the nozzle supporting pipe 27 therethrough. A washer type bearing 94 is connected to the lower surface of the brackets 90 at the opening 92 to facilitate rotation of the spoke ring assembly 22 relative to the nozzle supporting pipe 27, and also to preclude transverse movement of the spoke ring assembly 22 relative to the bowl 10.

The spoke ring assembly 22 is supported at its center by a tubular member 96 which is supported in concentric relation to the supporting pipe 27 by four radially extending rods 98 which are fastened thereto. The outer ends of the rods 98 are connected to the bowl. A washer type thrust bearing 100 is provided between the tubular member 96 and the bearing 92.

A cylindrical roller 102 or the like is rotatably mounted to the outer end of each spoke 88 and externally of the annular member 86. The roller is disposed in position for rolling engagement with the upper rim of the bowl 10. Consequently, a container inverted over the nozzle assembly 14 and supported by the spokes 88 of the spoke ring assembly 22 may be easily rotated to fa-

cilitate washing of the exterior surface of the container with the brush 24 without requiring the operator to change his position.

It is seen, therefore, that there is provided an improved sterilizer which is particularly effective for sanitizing containers, as by cleansing, sterilizing, and rinsing, and which performs its task thoroughly and with a minimum amount of time and effort. In this connection, the container may be easily rotated to wash and sterilize the outside thereof. Moreover, the described nozzle assembly is adjustable and affords a ready exchange of parts to best adapt the sterilizer to any size and shape of container. Also, certain of the adjustments provided in the nozzle assembly may be employed to more effectively utilize existing water pressures, whether such pressures be low or high. It will be noted that the nozzle spray assembly described herein is essentially self-supporting during its operation and transverse movement of the spray housing is minimized by the novel relationship between the bearing and the bearing cone.

Various changes and modifications may be made in the above described washing and sterilizing apparatus without deviating from the spirit or scope of the present invention.

Various features of the invention are set forth in the accompanying claims.

What is claimed is:

1. A rotary nozzle assembly comprising a center spray portion having an elongated opening at its upper end through which a fan-shaped spray of pressure fluid can be delivered, a plurality of laterally extending jet nozzles carried by said center spray portion, each of said jet nozzles having communication with the interior of said center spray portion and having a fluid discharge opening adjacent its outer end, and means for rotatably mounting said center spray portion in fluid communication with a source of fluid, said mounting means comprising a bearing cone element secured to the lower end portion of said center spray portion in coaxial relation thereto and including at its lower end an outwardly extending circumferential flange forming a bearing cone along its upper face, a bearing cup element disposed coaxially with said bearing cone element in encircling relation thereto, the internal diameter of said bearing cup element along its length being substantially greater than the external diameter of said bearing cone flange, an inwardly directed flange formed on the upper end of said bearing cup element with an internal diameter greater than the external diameter of said bearing cone element to afford axial movement therebetween, and a bearing race including a plurality of ball bearings disposed between the inturned flange on said cup element and the out turned flange on said cone element, said bearing race having a horizontal upper wall and a vertical outer side wall, said bearing race and said out turned flange having complementary bearing surfaces disposed to provide a line of contact on said ball bearings at an angle of about 45° with respect to the center axis of said nozzle assembly.

2. A rotary nozzle assembly comprising a center spray portion having an elongated opening at its upper end through which a fan-shaped spray of pressure fluid can be delivered, a pair of oppositely directed laterally extending jet nozzles carried by said center spray portion, each of said jet nozzles having fluid communication with the interior of said center spray portion and having a fluid discharge opening adjacent its outer end which is adjustably positionable to direct a stream of fluid through a path which is spaced from the axis of said center spray portion so as to provide rotation of said center spray portion, an additional pair of oppositely directed, laterally extending jet nozzles carried by said center spray portion, each of said additional jet nozzles having fluid communication with the interior of said center spray portion and having a fluid discharge opening which extends trans-

versely thereof at its outer end so as to direct a stream of fluid laterally of the center spray portion, and means for rotatably mounting said center spray portion in fluid communication with a source of fluid, said mounting means comprising a bearing cone element secured to the lower end portion of said center spray portion in coaxial relation thereto and including at its lower end an outwardly extending circumferential flange forming a bearing cone along its upper face, a bearing cup element disposed coaxially with said bearing cone element in encircling relation thereto, the internal diameter of said bearing cup element along its length being substantially greater than the external diameter of said bearing cone flange, an inwardly directed flange formed on the upper end of said bearing cup element with an internal diameter greater than the external diameter of said bearing cone element to afford axial movement therebetween, and a bearing race including a plurality of ball bearings disposed between the inturned flange on said cup element and the out turned flange on said cone element, said bearing race having a horizontal upper wall and a vertical outer side wall, said bearing race and said out turned flange having complementary bearing surfaces disposed to provide a line of contact on said ball bearings at an angle of about 45° with respect to the center axis of said nozzle assembly.

3. A rotary nozzle assembly comprising a center spray portion with a generally hemispherical top having an elongated opening across said top through which an upwardly directed fan-shaped spray of pressure fluid can be delivered, means for rotatably mounting said center spray portion in fluid communication with a source of fluid, said mounting means comprising a bearing cone element secured to the lower end portion of said center spray portion in coaxial relation thereto and including at its lower end an outwardly extending circumferential flange forming a bearing cone along its upper face, a bearing cup element disposed coaxially with said bearing cone element in encircling relation thereto, the internal diameter of said bearing cup element along its length being substantially greater than the external diameter of said bearing cone flange, an inwardly directed flange formed on the upper end of said bearing cup element with an internal diameter greater than the external diameter of said bearing cone element to afford axial movement therebetween, and a bearing race including a plurality of ball bearings disposed between the inturned flange on said cup element and the out turned flange on said cone element, said bearing race having a horizontal upper wall and a vertical outer side wall, said bearing race and said out turned flange having complementary bearing surfaces disposed to provide a line of contact on said ball bearings at an angle of about 45° with respect to the center axis of said nozzle assembly, and a plurality of laterally extending jet nozzles equally spaced on said center spray portion at a position below said orifice, each of said jet nozzles having fluid communication with the interior of said center spray portion and having a fluid discharge opening adjacent its outer end, the fluid opening of one of said nozzles being disposed so as to direct a stream of fluid through a path spaced from the axis of said center spray portion and in angular relation thereto to provide rotation of said center spray portion, the fluid opening of another of said nozzles being disposed so as to direct a stream of fluid laterally of the center spray portion.

4. A rotary nozzle assembly comprising a center spray portion having an elongated opening at its upper end through which a fan-shaped spray of pressure fluid can be delivered, a pair of oppositely directed laterally extending jet nozzles carried by said center spray portion, each of said jet nozzles having fluid communication with the interior of said center spray portion and having a fluid discharge opening adjacent its outer end which is adjustably positionable to direct a stream of fluid through a path which is spaced from the axis of said center spray

portion so as to provide rotation of said center spray portion, an additional pair of oppositely directed laterally extending jet nozzles carried by said center spray portion, each of said additional jet nozzles having fluid communication with the interior of said center spray portion and having a fluid discharge opening which extends transversely thereof at its outer end so as to direct a stream of fluid laterally of the center spray portion, and means for rotatably mounting said center spray portion in fluid communication with a source of fluid.

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