July 24, 1934. K. W. KARNOPP 1,967,472

STERILIZING APPARATUS

Filed July 1, 1932 2 Sheets-Sheet 1

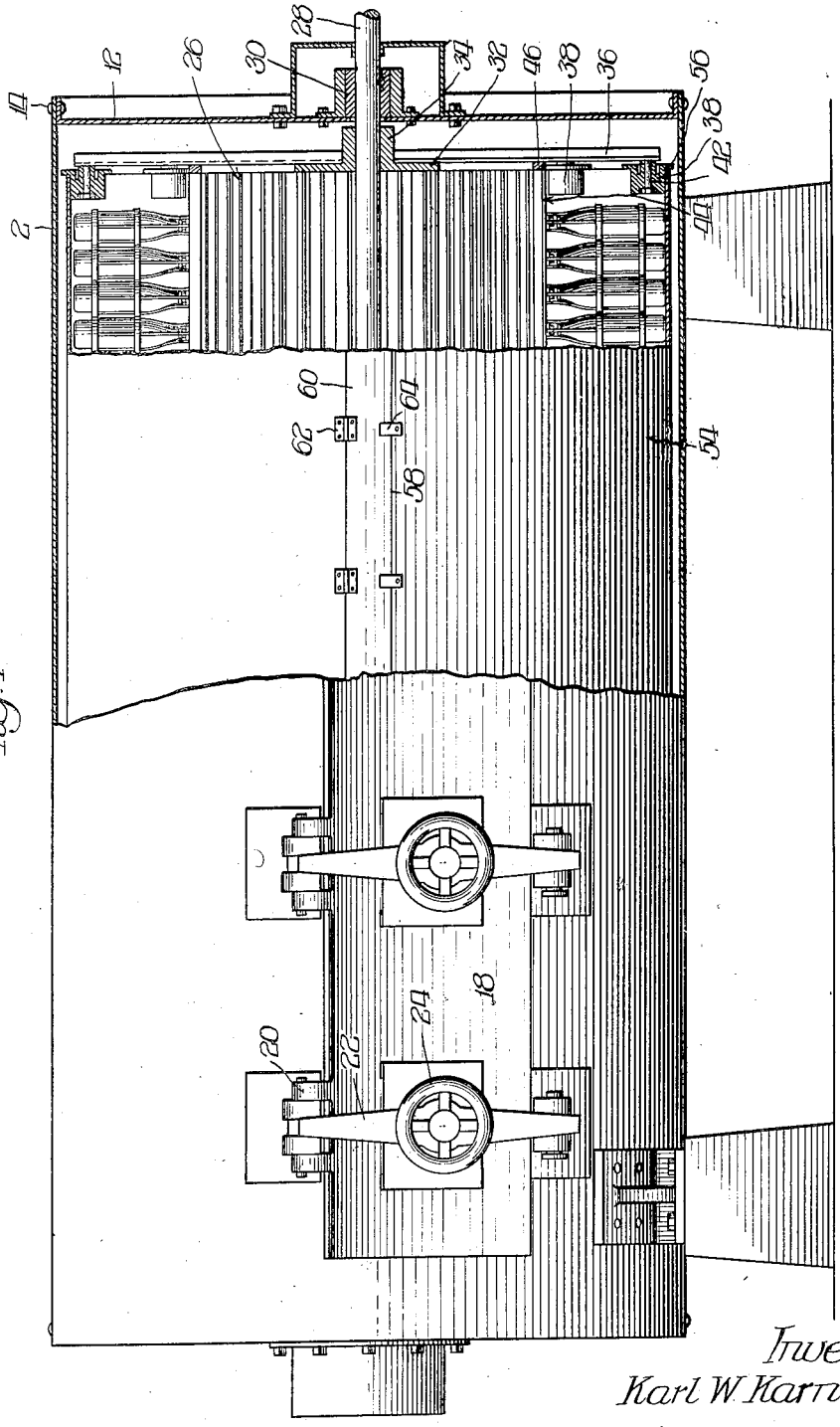


Fig. 1

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Fig. 3.

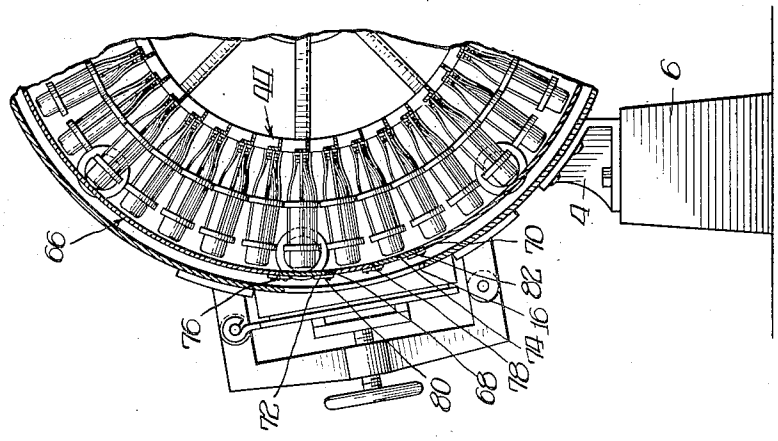
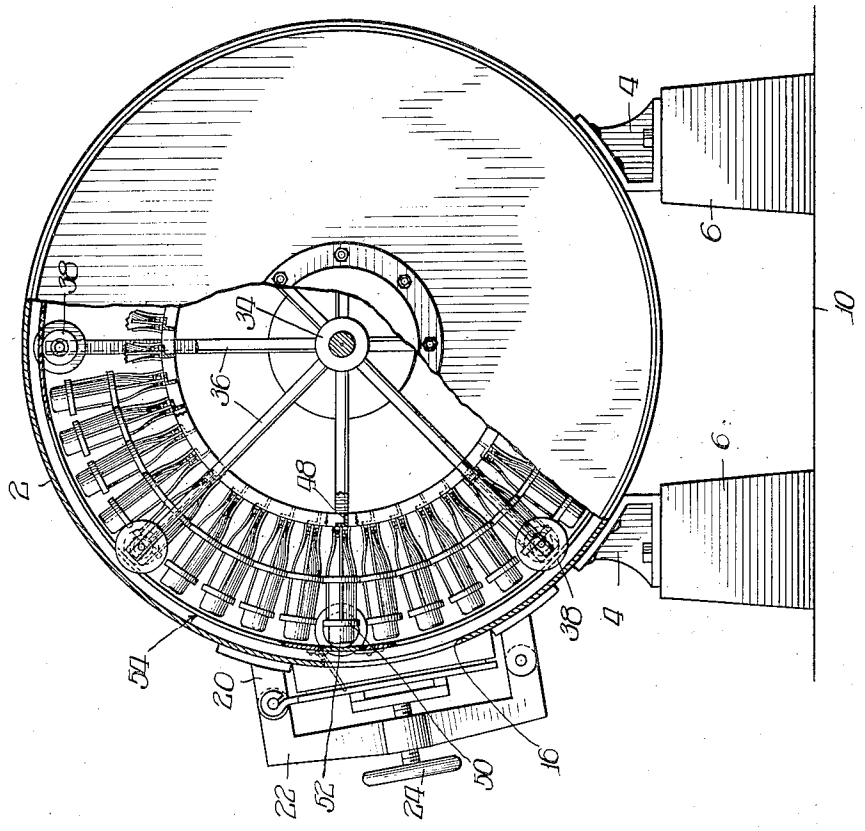


Fig. 2.



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STERILIZING APPARATUS

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Application July 1, 1932, Serial No. 620,410

15 Claims. (Cl. 167—3)

The present invention relates to sterilizing apparatuses and the like.

Among the objects of the present invention is to provide a novel sterilizing apparatus or device adapted to efficiently sterilize bottles or other similar and like receptacles which may be easily and readily placed therein and removed therefrom.

Another object of the present invention is to provide a novel sterilizing apparatus or the like which includes an outer fluid-tight casing within which is provided a receptacle holding means comprising a receptacle supporting means mounted for rotation within the casing, and a receptacle retaining means movable relative thereto.

Still another object of the present invention is to provide a novel sterilizing apparatus or the like which comprises an outer casing within which is provided a receptacle holding means including a receptacle supporting means mounted for rotation within the casing, and a receptacle retaining means mounted for rotation relative to and upon said receptacle supporting means.

The present invention contemplates the idea of providing a novel sterilizing apparatus or the like which comprises an outer casing formed with an opening normally closed by suitable closure means, and within which is a receptacle supporting means mounted for rotation, suitable receptacle retaining means being provided for maintaining these receptacles in position and being provided with a normally closed opening movable into communicating relation with the opening of the casing, whereby sterilized receptacles may be removed from the apparatus and replaced by other receptacles to be sterilized upon movement of the receptacle supporting means.

A further object of the present invention is to provide a novel sterilizing apparatus or the like, comprising an outer casing formed with an opening normally closed by suitable closure means and in which is provided receptacle supporting means mounted for rotation, suitable receptacle retaining means being mounted for rotation upon this receptacle supporting means for holding a plurality of receptacles in position and being provided with a normally closed opening movable relative to the receptacle supporting means into communicating relation with the opening for the outer casing, whereby sterilized receptacles or the like may be removed and replaced by receptacles to be sterilized.

A still further object of the present invention is to provide a novel sterilizing apparatus or the like comprising an outer casing formed with an opening normally closed by suitable closure means, in which a receptacle holding means is mounted for rotation, this receptacle holding means including a receptacle supporting means for supporting a plurality of rows of receptacles or the like, and a receptacle retaining means movable relative thereto and having an opening movable into communicating relation with the opening for the outer casing, whereby successive rows of sterilized receptacles or the like may be removed and replaced by receptacles or the like to be sterilized upon movement of the receptacle supporting means.

Another object within the purview of the present invention is to provide a novel receptacle holding device for sterilizing apparatuses or devices including an inner receptacle supporting member provided with means for holding a plurality of receptacles, and an outer receptacle retaining member having a normally closed opening for removal of receptacles from and replacement of receptacles in said receptacle holding means, means being further provided for mounting the receptacle supporting member and receptacle retaining member for relative movement one with the other.

Still a further object of the present invention is to provide a novel receptacle holding device for sterilizing apparatuses or devices which includes spaced members adapted to be supported upon a shaft or other similar members, and which have a plurality of radially disposed arms, each of which is adapted to support a roller member, a receptacle supporting means being movably mounted on these arms for supporting a plurality of receptacles or the like, while a receptacle retaining member is movably mounted on the rollers, whereby the same may be moved relative to the receptacle supporting member.

A still further object is to provide a novel sterilizing apparatus or the like comprising an outer casing having an opening normally closed by suitable closure means, in which is provided a receptacle holding means for holding a plurality of receptacles or the like, such means including a receptacle supporting means and a receptacle retaining means mounted for relative movement one with the other, the receptacle retaining means being formed with normally closed and spaced openings, one of which openings is adapted to provide means whereby successive adjacent receptacles may be discharged, and another of said openings providing means whereby receptacles to be sterilized may be placed in said receptacle

holding means upon movement of the receptacle supporting means.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawings:

Figure 1 is a view in elevation of an embodiment made in accordance with the present invention, with parts broken away to disclose certain portions thereof more in detail;

Figure 2 is a view in end elevation of the embodiment shown in Figure 1 of the drawings, with parts broken away to disclose the construction thereof more in detail; and

Figure 3 is a view in end elevation similar to that shown in Figure 2 of the drawings, with parts broken away to disclose another embodiment made in accordance with the present invention.

Referring now more in detail to the drawings, an embodiment selected to illustrate the present invention is disclosed in Figures 1 and 2 as comprising an outer casing 2 suitably supported as by means of standards 4 on the pedestals 6 which may be supported upon any suitable flooring 10. In the present embodiment, the casing 2 is substantially cylindrical in shape and includes and is formed with the end panels 12 suitably secured to the cylindrical casing 2, as by means of a plurality of rivets 14, to provide a fluid-tight joint. This cylindrical casing 2 is formed with an elongated opening 16 which is normally closed by a closure member 18 suitably hinged as at 20, whereby the same may be moved into and out of its closed position, a fluid-tight joint being maintained between this closure member 18 and the casing 2 as by means of a plurality of clamps 22 normally tightened by the wheel 24.

Positioned within the casing 2 is a receptacle holding means 26 which comprises a power driven shaft 28 suitably journaled within the fluid-tight bearings 30 secured to the oppositely disposed panels 12 of the casing 2, and upon which and adjacent the panels 12 are mounted spider members 32. Each of these members is formed with a hub 34 mounted on the shaft 28, to which is secured a plurality of arms 36 which extend radially outwardly therefrom, each of these arms having a flanged roller member 38 mounted adjacent the end thereof as by means of a bolt 42, or the like. Each of these spider members 32 is mounted upon the shaft 28 and is adapted to be moved therewith.

Concentrically arranged with the shaft 28 and mounted at each end on the arms 36, is a receptacle supporting means 44 comprising a member substantially of cylindrical shape, which is formed with end ring portions 46 secured to the arms 36 and between which extends a plurality of angle members 48 having a plurality of cage members 50 suitably secured thereto and therealong in spaced relation, each of these cage members being adapted to receive a receptacle 52 or the like which may be either empty, or filled with any suitable material to be sterilized.

In order to maintain these receptacles 52 in position and in association with the holding means 44, a receptacle retaining means 54 is provided, this retaining means comprising a member substantially cylindrical in shape which is mounted at each end upon the rollers 38, this member being held in place as by means of the flanges 56 formed integral with the rollers 38. It will be clearly apparent that the retaining member 54 is movably mounted with respect to the supporting means 26 and may therefore be moved as desired.

This receptacle retaining member 54 is formed with an elongated opening 58 normally closed by the closure member 60 which is hinged at a plurality of points, such as 62, whereby the same may be moved into and out of its closed position, the same being maintained in its closed position as by means of the latch member 64. As will be clearly apparent, this opening 58 for the receptacle retaining member may be moved into communicating relation with the opening 16 for the outer casing.

In operation, a plurality of receptacles or the like are maintained in position between the receptacle supporting means 44 and the receptacle retaining means 54, and the same may be rotated as by means of the power driven shaft 28 until they have been properly sterilized in the presence of fluid bodies having a high temperature which may be introduced into the casing 2. When these receptacles or the like have been properly sterilized, the closure member 18 may be moved into its open position and the receptacle retaining member 54 moved relative to the receptacle supporting means until the opening 58 is in communicating relation with the opening 16. The closure member 60 may then be moved into its open position and successive rows of receptacles 52 removed and replaced by other receptacles to be sterilized, after which the closure member 60 may be locked in its closed position and the closure member 18 moved into its closed position, and the apparatus operated for sterilizing the new batch of receptacles or the like. Any suitable means (not disclosed) may be provided for holding said retaining member 54 whereby the registry of the openings 58 and 16 is maintained while successive rows of receptacles 52 are removed and replaced.

The present invention also contemplates a novel sterilizing apparatus or the like in which suitable means is provided whereby successive adjacent receptacles or successive adjacent rows of receptacles may be simultaneously removed and replaced by other receptacles to be sterilized. Such means is disclosed in Figure 3 of the drawings, which comprises a device corresponding in all essentials to the device disclosed in Figures 1 and 2 of the drawings, with the exception that the receptacle retaining means 66 corresponding to the receptacle retaining member 54 comprises a member which is formed with spaced openings 68 and 70 normally closed as by means of the closure members 72 and 74, which are hinged as at 76 and 78 and held in position as by means of the latch members 80 and 82, respectively. Either of the openings 68 or 70 corresponds to the opening 58 of the hereinbefore referred to embodiment, and provides means, when the same is in communicating relation with the opening 70 of the casing 2, whereby successive rows of receptacles 52 may be removed or discharged from the apparatus and replaced. As in the previously described embodiment, the openings 68 and 70 are maintained in registry with the opening 16 by any suitable means (not disclosed) which holds the retaining member 66 against movement relative to the casing 2 during removal and replacement of successive rows of receptacles.

In the present embodiment, however, both of these openings are to be used and it will be noted that when the receptacle retaining means 66 is in the position as shown in Figure 3 of the drawings, the opening 70 is so disposed that the receptacles in opposite relation thereto are in a downward-

ly inclined position, whereby the same will automatically move downwardly through the opening 70 and may be easily grasped by the operator of the apparatus. Simultaneous with the removal of this row of receptacles, another row of cage members 50 is disposed in opposite relation to the upper opening 68 whereby, if desired, a plurality of receptacles to be sterilized may be inserted therein simultaneously with the removal of the receptacles in opposite relation to the opening 70. When a row of receptacles has been removed as described, the receptacle supporting means 44 may be rotated to a position whereby the next successive row of receptacles to be removed is in a position for discharge through the opening 70. This movement causes another empty row of cages to be oppositely disposed in relation to the opening 70, whereby receptacles to be sterilized may be inserted therein.

It is of course understood that the movement of the receptacle supporting means of either embodiment may be automatic and intermittent, the time interval between successive moves thereof being controlled by means, such as a Geneva movement, properly adjusted to coincide with the time necessary to discharge and load a row of receptacles.

While I have herein described and upon the drawings shown an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. In a sterilizing apparatus, the combination of a casing having an opening normally closed by a closure member, means mounted for rotation in said casing for supporting a plurality of receptacles, receptacle retaining means mounted for rotation on said supporting means, said last named means being provided with an opening movable into registry with the opening of said casing for introducing receptacles in and withdrawing receptacles from said supporting means, and a closure member for the opening of said retaining means.

2. In a sterilizing apparatus, the combination of a casing having an opening normally closed by closure means, means mounted for rotation in said casing for supporting a plurality of receptacles, and receptacle retaining means mounted for rotation on said supporting means and having an opening normally closed by closure means and adapted to be moved into registry with the opening of said casing, said receptacle supporting means being movable relative to said retaining means whereby successive adjacent receptacles may be removed and replaced by other receptacles to be sterilized.

3. In a sterilizing apparatus, the combination of a casing having an opening, means for closing said opening, means mounted for rotation in said casing for supporting a plurality of rows of receptacles, and receptacle retaining means mounted for rotation and movable relative to said supporting means, said retaining means having an opening movable into registry with the opening of said casing, closure means for said opening, said receptacle retaining means being movable relative to said retaining means whereby successive adjacent rows of receptacles are moved into registry with said openings for removal and replacement by other receptacles to be sterilized.

4. In a sterilizing apparatus, the combination of a casing having an opening, means for closing said opening, means mounted for rotation in said casing for supporting a plurality of rows of receptacles, and receptacle retaining means mounted for rotation on said supporting means and movable relative thereto, said retaining means having an opening movable into registry with the opening of said casing, closure means for said opening, said receptacle retaining means being movable relative to said retaining means whereby successive adjacent rows of receptacles are moved into registry with said openings for removal and replacement by other receptacles to be sterilized.

5. In a sterilizing apparatus, the combination of a casing having an opening, means for closing said opening, means mounted for rotation in said casing for supporting a plurality of receptacles, roller means mounted on said supporting means, and receptacle retaining means mounted on said roller means and movable relative to said supporting means, said retaining means having an opening movable into registry with the opening of said casing, said receptacle supporting means being movable relative to said retaining means whereby successive adjacent receptacles may be removed and replaced by other receptacles to be sterilized.

6. A receptacle holding device for a sterilizing apparatus, comprising spaced spider members, a receptacle supporting member mounted thereon, a plurality of roller members mounted on said members, and a receptacle retaining member mounted on said roller members.

7. A receptacle holding device for a sterilizing apparatus, comprising spaced spider members, a receptacle supporting member mounted thereon, a plurality of roller members mounted on said members, and a receptacle retaining member mounted on said roller members, said retaining member having an opening, and means for closing said opening.

8. In a sterilizing apparatus, the combination of a casing having an opening, means for closing said opening, a rotatable shaft mounted in said casing, receptacle holding means mounted on said shaft, said means including spaced members having a hub mounted on said shaft, said members having a plurality of radially disposed arms, roller members mounted on each of said arms, a receptacle supporting member mounted on said arms, and a receptacle retaining member mounted for rotation on said outer roller members.

9. In a sterilizing apparatus, the combination of a casing having an opening, means for closing said opening, a rotatable shaft mounted in said casing, receptacle holding means mounted on said shaft, said means including spaced members having a hub mounted on said shaft, said members having a plurality of radially disposed arms, roller members mounted on each of said arms, a receptacle supporting member mounted on said arms, a receptacle retaining member mounted for rotation on said roller members, said receptacle retaining member having an opening movable into registry with the opening of said casing, and means for closing said opening, said receptacle supporting member being movable relative to said retaining member whereby successive adjacent receptacles may be removed through said openings and replaced by other receptacles to be sterilized.

10. In a sterilizing apparatus, the combination of a casing having an opening, means for normally closing said opening, receptacle supporting

means mounted for rotation in said casing, receptacle retaining means associated with said supporting means and being provided with a plurality of openings communicating with said first named opening, means for normally closing said openings, one of said last named openings providing means for the discharge of sterilized receptacles from said supporting means and another of said last named openings providing means for introducing receptacles to be sterilized into association with said supporting means.

11. In a sterilizing apparatus, the combination of a casing having an opening, means for normally closing said opening, receptacle holding means mounted for rotation in said casing, said means including receptacle supporting means, and means movable relative to said supporting means for retaining said receptacles in position, said retaining means having a plurality of openings movable into communicating relation with the opening of said casing, means for normally closing said openings, one of said openings providing means for discharge of successive adjacent receptacles upon movement of said supporting means and another of said last named openings providing means for introducing receptacles to be sterilized in place of those discharged.

12. In a sterilizing apparatus, the combination of a casing having an opening, means for normally closing said opening, receptacle holding means mounted for rotation in said casing, said means including means for supporting a plurality of rows of receptacles, means movable relative to said supporting means for retaining said receptacles in position, said retaining means having a pair of spaced openings movable into communicating relation with the opening of said casing, and means for normally closing said openings, one of said openings providing means for discharge of successive rows of sterilized receptacles upon movement of said supporting means, the other of said openings providing means for introducing successive rows of receptacles to be sterilized in place of those discharged.

13. In a sterilizing apparatus, the combination of a casing, receptacle supporting means mounted for rotation in said casing, receptacle retaining means for holding said receptacles in association with said supporting means, said retaining means and casing having aligned passage means for discharge of successive adjacent sterilized receptacles from said casing and aligned passage means whereby receptacles to be sterilized may be successively placed in association with said supporting means to replace the sterilized receptacles discharged.

14. In a sterilizing apparatus, the combination of a casing, receptacle supporting means mounted for rotation in said casing, receptacle retaining means mounted for rotation relative to said supporting means for holding said receptacles in association with said supporting means, said retaining means and casing having aligned passage means for discharge of successive adjacent sterilized receptacles from said casing and aligned passage means whereby receptacles to be sterilized may be successively placed in association with said supporting means to replace the sterilized receptacles discharged, and closure means for said passage means.

15. In a sterilizing apparatus, the combination of a casing, receptacle supporting means mounted for rotation in said casing for supporting a plurality of receptacles disposed in rows, receptacle retaining means mounted for rotation relative to said supporting means for holding said receptacles in association with said supporting means, said retaining means and casing having aligned passage means for discharge of successive adjacent rows of sterilized receptacles from said casing upon rotation of said supporting means and aligned passage means whereby successive rows of receptacles to be sterilized may be placed in association with said supporting means to replace the sterilized receptacles discharged, and closure means for said passage means.

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