

Jan. 8, 1946.

H. F. LYMAN

2,392,540

FLUID SPRAYING DEVICE FOR DISHWASHING APPARATUS

Filed Nov. 30, 1943

3 Sheets-Sheet 1

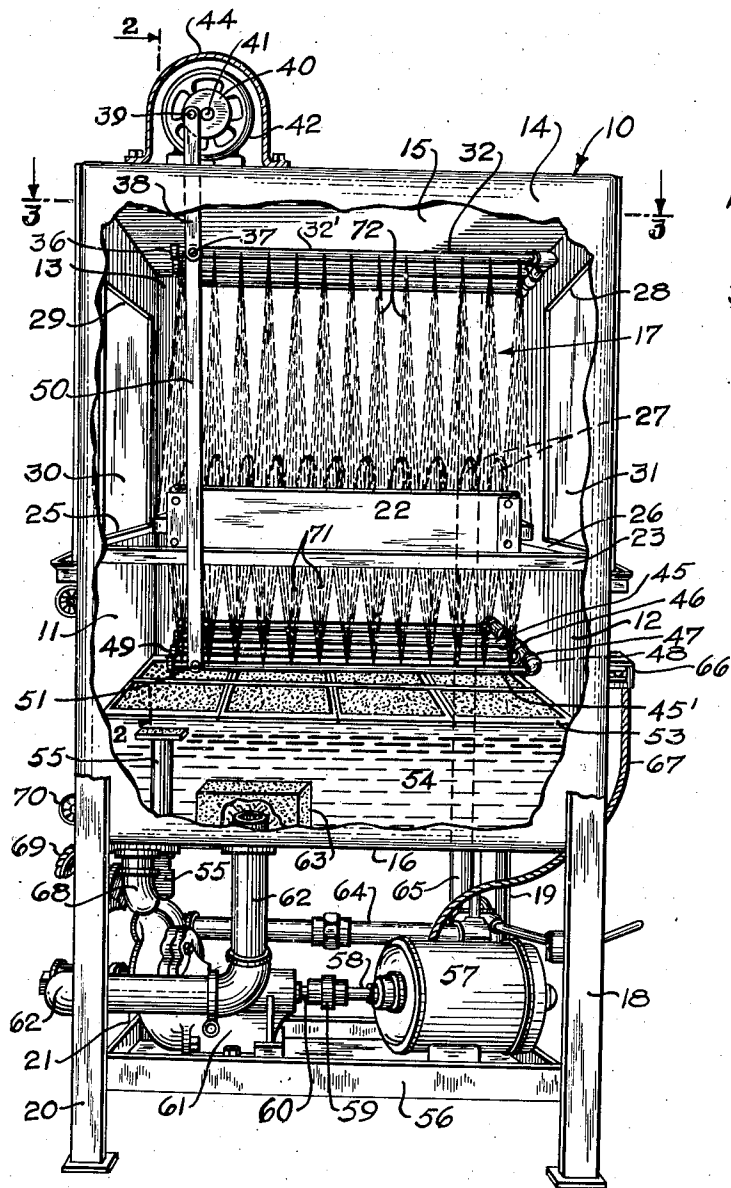


FIG. 1

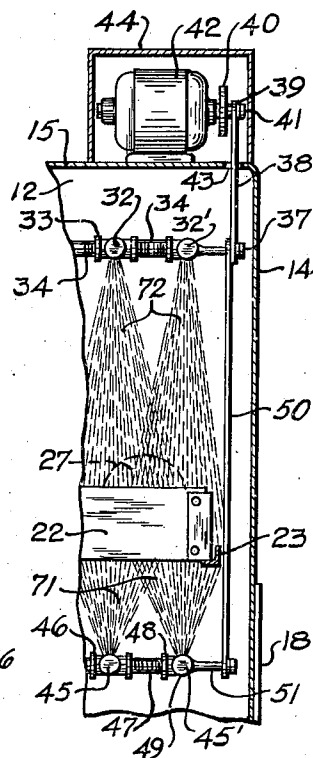


FIG. 2

INVENTOR
Homer F. Lyman.
BY *E. Francis Wentworth Jr.*
ATTORNEY

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H. F. LYMAN

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3 Sheets-Sheet 2

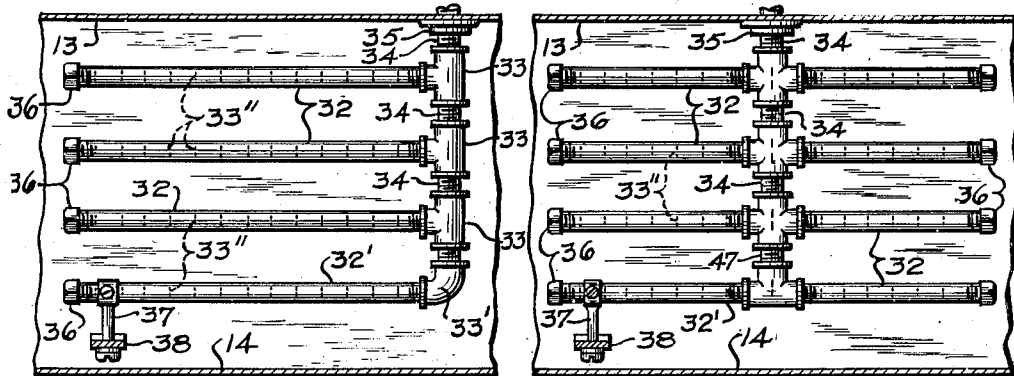


FIG-3

FIG-5

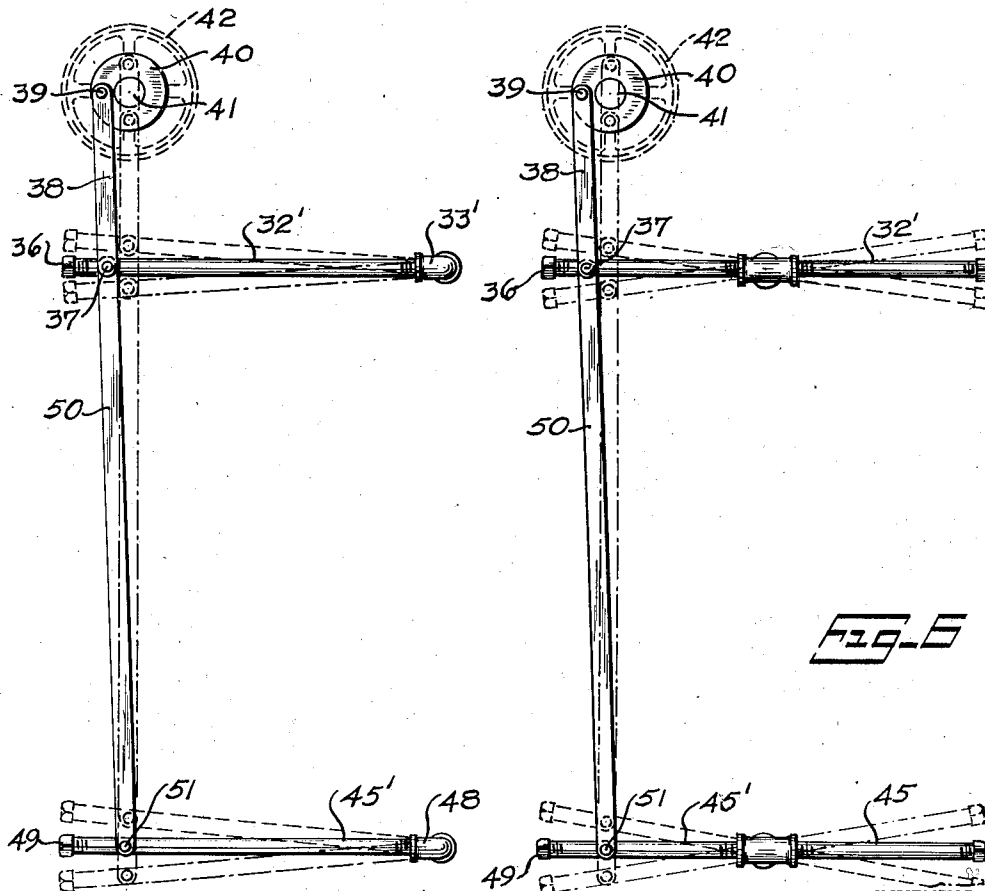


FIG-4

FIG-6

INVENTOR
Homer F. Lyman.
BY *C. Francis Wentworth Jr.*
ATTORNEY

H. F. LYMAN

FLUID SPRAYING DEVICE FOR DISHWASHING APPARATUS

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3 Sheets-Sheet 3

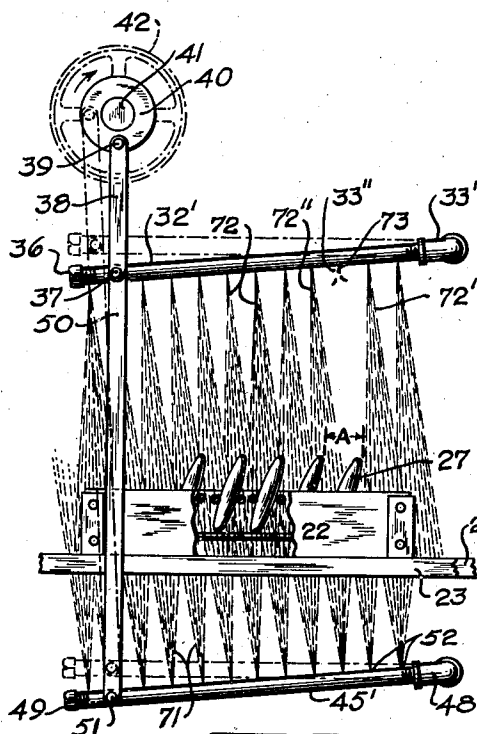


Fig. 7

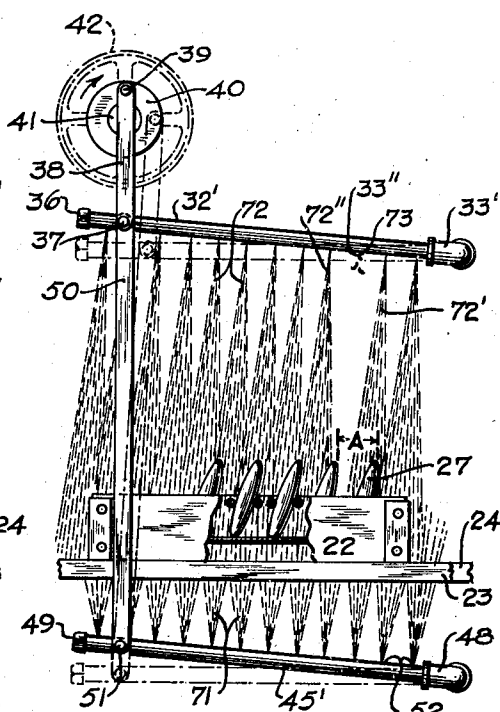
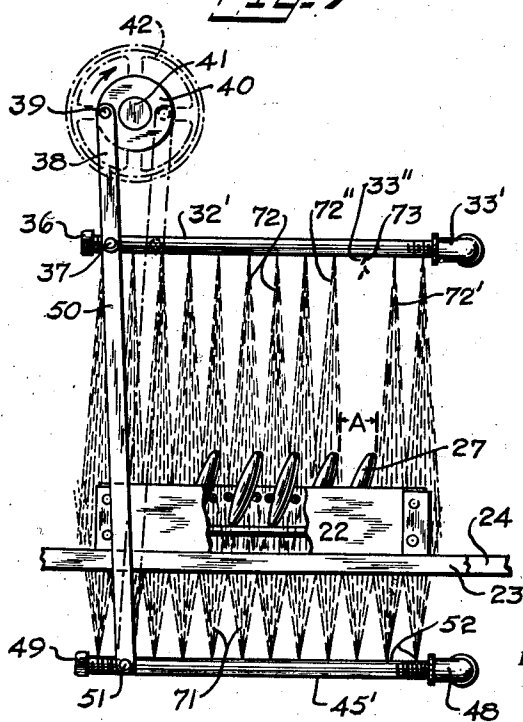


Fig. 9



INVENTOR
Homer F. Lyman.

BY

ATTORNEY

UNITED STATES PATENT OFFICE

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FLUID SPRAYING DEVICE FOR DISH-WASHING APPARATUS

Homer F. Lyman, Nutley, N. J.

Application November 30, 1943, Serial No. 512,291

10 Claims. (Cl. 299—62)

This invention relates to fluid spraying devices for washers and, more particularly to a fluid spraying device for dishwashing apparatus.

The present invention provides a fluid spraying device for a dishwasher which device directs a plurality of streams of washing fluid onto dishes being washed from a stream directing member, said member being actuated so that a stream of washing fluid from the stream directing member will pass through at least a part of the area of the dishwashing apparatus through which another stream from the stream directing member passes. The construction and arrangement of the fluid spraying device of the dishwasher of the present invention preferably is such that upon the failure of a stream of washing fluid due to clogging of the stream, or for other reasons, the dish or dishes normally washed by said stream will be washed by another stream of washing fluid thereby providing maximum washing efficiency.

The invention will be understood from the following description when considered in connection with the accompanying drawings forming a part thereof and in which:

Fig. 1 is a side elevational view of the dishwashing apparatus embodying the present invention, parts of the casing being broken away;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a plan view taken on the line 3—3 of Fig. 1;

Fig. 4 is a diagrammatic view showing the stream directing mechanism of the present invention;

Fig. 5 is a view similar to Fig. 3 but of another form of the invention;

Fig. 6 is a diagrammatic view illustrating the stream directing mechanism of the form of the invention shown in Fig. 5;

Fig. 7 is a diagrammatic side view of the stream directing mechanism of the form of the invention shown in Fig. 1 illustrating the stream of washing fluid being directed on dishes from one position of the mechanism, one of said streams being illustrated as not functioning;

Fig. 8 is a view similar to Fig. 7 but showing the streams directed on the dishes from another position of the mechanism; and

Fig. 9 is a view similar to Fig. 7 with the mechanism in still another position.

Like characters of reference refer to like parts throughout the several views.

Referring to Fig. 1 of the drawings, the reference numeral 10 designates a casing which is substantially rectangular in cross-section. The

casing 10 comprises opposite ends walls 11 and 12, opposite sides walls 13 and 14, a top 15 and a bottom 16 forming therebetween a washing chamber 17. The opposite end walls and the side walls adjacent thereto are preferably welded together and the top and the bottom are welded to the sides and ends so that the washing chamber 17 is water-tight. The casing 10 is supported on legs 18, 19, 20 and 21 which legs each comprise an L-shaped angle bar. Each of the legs is secured to the casing at a corner formed by the joining of the opposite sides of the casing and the opposite ends thereof.

A table adapted to support a dish rack 22 is positioned in the chamber 17 and substantially intermediate the top 15 and bottom 16. The table comprises spaced L-shaped angle bars 23 and 24 extending between the opposite end walls 11 and 12 adjacent to and in spaced relationship with the opposite side walls 13 and 14. The angle bars 23 and 24 are secured at one end thereof to a support 25 extending along the end wall 11 between the side walls 13 and 14 and at the opposite end thereof to a support 26 extending along the end wall 12 between said side walls. The rack 22, in the form of the invention disclosed, comprises an elongated tray open at the top and at the bottom thereof and having a plurality of supporting means for dishes 27 so arranged as to support the dishes in a plurality of spaced rows extending laterally of the tray. The rack 22 may be inserted in the chamber 17 either through the opening 28 in the end wall 12 or the opening 29 in the end wall 11. The opening 29 is closed by a door 30 while the opening 28 is closed by a door 31.

The dishes 27 are washed by directing streams of washing liquid under pressure on them from a plurality of wash spray pipes positioned in the chamber 17 above and below the rack 22. Adjacent the top of the chamber 17, wash spray pipes 32 extend substantially horizontally between the opposite end walls 11 and 12, the opposite ends of said pipes being spaced from said walls and the pipes laterally spaced from each other. In the form of the invention shown in Figs. 1 to 4 and 7 to 9, the distributing pipes 32 and 32' are supported at one end thereof in the chamber 17 by a rotatable tubular member 34 which is pivotally supported in a bearing 35 in the side wall 13 of the casing adjacent the end wall 12. Each of the distributing pipes except pipe 32' is secured to a T 33 and the T's are connected together by nipples to form a rotatable tubular member 34. The pipe 32' is con-

ected to the rotatable member 34 by means of an elbow 33'. Plugs 36 close the end of the pipes 32 and 32' opposite the end thereof which is secured to the rotatable member 34. The pipes 32 have a plurality of axially spaced spray slots 33'' therein through which washing fluid is directed downwardly onto the dishes. Adjacent the end of distributing pipe 32' opposite to that secured to the rotatable member 34 the said pipe 32' is pivotally connected at 37 to a crank arm 38 which, in turn, is pivotally connected to a pivot 39 carried on the surface of a wheel 40 near the periphery thereof. The wheel 40, as shown, is driven by the shaft 41 of a motor 42 mounted on the top 15 of the casing 10. The top of the casing is slotted at 43 to permit movement of the arm 38. The motor 42, wheel 40 and pivot 39 are enclosed within a housing 44. As shown, wash spray pipes 45 are positioned below the angle bars 23 and 24 and in spaced relationship to the bottom 16 of the chamber. The pipes 45 are adapted to direct washing fluid upwardly into the rack 22 supported on the angle bars. The pipes 45, like the pipes 32, extend substantially horizontally between the opposite end walls 11 and 12, the opposite ends of the pipes being spaced from said walls and the pipes being laterally spaced from each other. In the form of the invention shown in Figs. 1 to 4 and 7 to 9, the pipes 45 are supported at the end thereof adjacent the end wall 12 by a rotatable member 47. Each of the spray pipes, with the exception of the pipe 45', is secured to a T-connection 46, the T-connections, with their connecting nipples forming the feed pipe 47 which is pivotally supported in a bearing in the side wall 13 in a manner similar to feed pipe 34. The pipe 45' is connected to the feed pipe 47 by means of an elbow 48. Plugs 49 close the end of the pipes 45 and 45' adjacent the end wall 11. A connecting link 50 is pivotally connected at 37 to the pipe 32' and pivotally connected at 51 to pipe 45'. The pipes 45 and 45' have a plurality of axially spaced spray slots 52 which, as shown, are in substantial vertical alignment with the spaces between the spray slots 33'' in the pipes 32 and the pipe 32'.

Beneath the pipes 45 and in spaced relationship with the bottom 16 of the casing, is a plurality of perforated strainer pans 53 disposed contiguously and extending between the end walls 11 and 12 and the side walls 13 and 14 thereby forming a washing fluid compartment 54 between the pans 53 and bottom 16. An overflow pipe 55 is provided so that the fluid in the compartment 54 will not exceed a predetermined level.

A platform 56 supported by legs 18, 19, 20 and 21 is disposed below the bottom 16 of the casing 10 and in spaced relationship with said bottom. Mounted on the platform 56, is a motor 57 having a shaft 58 connected by means of a connector 59 to a shaft 60 of a pump 61. The pump 61 is also mounted on the platform 56. The suction side of the pump is in communication with the compartment 54 through the suction conduit 62, the intake of which is protected by a strainer 63. The discharge of the pump is in communication with the feed pipes 34 and 47 through discharge conduits 64 and 65. The feed pipes 34 and 47 are connected to the conduit 65 by any well known type of connection which will permit pivotal movement of the feed pipes in relation to the conduit 65. The motor 57 is controlled by an electrical switch 66 which is in electrical connection with the motor through electri-

cal conduits 67. The operation of the motor 42 may be controlled by the switch 66, if desired, or by a separate switch.

The compartment 54 is drained when desired through a drain conduit 68 controlled by a drain valve 69. The washing fluid in the compartment 54, which fluid generally comprises a solution of soap and water, is heated by live steam injected through the live steam injector 70. Other means such as steam coils or electrical heating units in the compartment 54, or gas burners beneath the compartment 54 may be used to heat the washing fluid if so desired.

In operation, the rack 22 having the dishes 27 positioned therein which are arranged in spaced, laterally extending rows is placed on the supports 23 and 24 beneath the wash spray pipes 32 and the pipe 32' and above the pipes 45 and the pipe 45'. The switch 66 is actuated to start the motor 57 which operates the pump 61 through the shaft 58, connection 59 and shaft 60. The pump 61 withdraws the washing solution from the compartment 54 through the suction conduit 62 and discharges the fluid into the discharge conduits 64 and 65. The fluid flows under pressure from the discharge conduit 65 into the feed pipes 47 and 34 thence into the wash spray pipes 45, 45' and 32, 32' respectively. The washing fluid in the pipes 45, 45' is projected upwardly through spray slots therein in a plurality of streams 71 passing upwardly through the rack 22 and over the dishes therein while the washing fluid in the pipes 32, 32' is directed downwardly through the spray slots 33'' in a plurality of streams 72 which pass downwardly through the rack 22 and over the dishes to be washed. The streams of washing fluid are under sufficient pressure to cause the foreign substance on the dishes to be washed therefrom.

Should the operation of the motor 42 also be controlled by the switch 66, the motor 42 will be set in operation at the same time as the motor 57. If the motor 42 is controlled by a separate switch, it may be set in operation at any time, either before or after the motor 57 is placed in operation. Operation of the motor 42 will cause the wheel 40 to be rotated by the shaft 41 in turn causing the pivot 39 to be rotated around the shaft 41. Rotation of the pivot 39 around the shaft 41 causes the crank arm 38 to impart an upward and downward reciprocal movement or oscillation of the pipes 32, 32', as more particularly shown in Figs. 4 and 7 to 9, since these pipes, in the form of the invention shown in Figs. 1 to 4 and 7 to 9 are secured to the feed pipe 34 which is pivotally mounted with respect to the wall 13 and the discharge pipe 65. The pivot point for the pipes 32, 32' is, therefore, the feed pipe 34. Oscillation of the pipes 32, 32', as described, will also cause the pipes 45, 45' to be actuated in a manner similar to the movement of pipes 32, 32' since the connecting link 50 is pivotally connected to the pipes 32, 32' and 45, 45', the pipes 45, 45' having as a pivot point the feed pipe 47. The streams 71 and 72 issuing from the pipes 45, 45' and 32, 32' are caused, by the oscillation of said pipes to move backward and forward in an arc toward and away from the opposite ends 11 and 12 of the casing, the streams sweeping transversely of the spaced rows of dishes.

As shown, the pivot 39 is so positioned on the wheel 40, the crank arm 38 is of such a length, and the spray slots in the spray pipes 32, 32', 45, 45' are so spaced apart that the area, or a substantial part thereof, traversed by one of the

streams of washing fluid 71 or 72 will be traversed by the streams of washing fluid next adjacent thereto. With this construction and arrangement, should a spray slot in the pipes 32, 32', 45, 45' become clogged by foreign particles washed from the dishes and circulated from the compartment 54 into said pipes, the area of the washing chamber through which the stream of fluid from the clogged slot would normally pass is traversed by streams from slots adjacent the clogged slot thereby assuring a thorough washing of the dishes over which the stream from the clogged slot normally passes.

The operation of the spray pipes 32, 32', 45, 45' is diagrammatically shown in Figs. 4 and 7 to 9. In Fig. 4, which shows the movement of said pipes without reference to the spacing of the spray slots therein, one cycle of the operation of the wheel 40, crank arm 38 and pipes 32' and 45' is illustrated. An intermediate position is illustrated in full lines, the uppermost position is shown in dotted lines, and the lowermost position is designated by dot and dash lines.

In Figs. 7, 8, and 9 operation of the apparatus of the present invention is shown with one of the spray slots as not functioning. The pipes 32' and 45' are shown with spaced slots and streams of washing fluid 72 and 71 issuing respectively therefrom. One of the spray slots 33' positioned at 73 in the pipe 32' is shown as not functioning due to clogging. The spray pipes are shown in their lowermost position during a cycle of operation in Fig. 7 of the drawings, while in Fig. 8 the pipes 32' and 45' are shown in their intermediate position, and in Fig. 9 the pipes are shown in their uppermost position. It will be noted that, with the construction and arrangement of apparatus shown in Figs. 7 to 9, as the pipes 32' and 45' are operated from the lowermost position, as shown in Fig. 7, to the uppermost position shown in Fig. 9, the area A which is in the part of the washing chamber 17 in which the dish 27 in the rack 22 is positioned and into which area the clogged spray slot positioned at 73 in the pipe 32' normally projects a stream of washing fluid, is swept by the streams of washing fluid 72' and 72'' on opposite sides of the clogged spray slot. A dish, such as dish 27, positioned in the area A would, therefore, be subjected to the stream of washing fluid from both of the streams 72' and 72'' during a cycle of the wheel 40. While the wheel 40 is illustrated as rotating in a clockwise direction, it will be understood that it could be rotated in a counter-clockwise direction without changing the principle of operation of the present invention.

In the form of the invention shown in Figs. 5 and 6, the pipes 32, 32' and 45, 45' are secured to feed pipes 34 and 47 respectively substantially intermediate the opposite ends of said pipes. The pipes 32, 32' and 45, 45' are, therefore, pivoted substantially intermediate the opposite ends thereof instead of at one end thereof as in the form of the invention shown in Figs. 1 to 4 and 7 to 9. The operation of the form of the invention disclosed in Figs. 5 and 6 is essentially the same as the operation of the form of the invention illustrated in Figs. 1 to 4 and 7 to 9.

Inasmuch as changes may be made in the form, location and relative arrangement of the several parts of the invention without departing from the principles thereof, it will be understood the invention is not to be limited, excepting by the scope of the appended claims.

What is claimed is:

1. A device for spraying cleaning fluid, comprising a supply tube for cleaning fluid, a tubular member rotatably secured to said supply tube, a distributing pipe fixed to said rotatable member, said rotatable member and distributing pipe being spaced from an article to be cleaned, said distributing pipe having a plurality of axially spaced discharge openings directed toward the said article, and means for oscillating the said rotatable member so that the said distributing pipe will move in an arc toward and away from the said article and so that each oscillation of said rotatable member will cause a stream of fluid from each of three discharge openings to strike the same point on the article.

2. A device for spraying cleaning fluid comprising a pivotally mounted distributing pipe, means through which a cleaning fluid is conducted to said distributing pipe, the distributing pipe being spaced from an article to be cleaned, said pipe having a plurality of axially spaced discharge openings directed toward said article, and means for oscillating the distributing pipe so that said pipe will move in an arc toward and away from said article and each oscillation of said pipe will cause a stream of fluid from each of at least three discharge openings to be directed to substantially the same points on the article.

3. A fluid spraying device for a dishwashing machine, said device comprising a distributing pipe mounted to pivot on an axis extending transversely of the longitudinal axis of said pipe, means through which a fluid is conducted to said distributing pipe, the distributing pipe being spaced from an article to be cleaned, said pipe having a plurality of axially spaced discharge openings directed toward said article, and means for oscillating the distributing pipe so that said pipe will move on its pivot in an arc toward and away from said article and each oscillation of said pipe will cause a stream of fluid from each of at least three discharge openings to pass over the same surface of the article.

4. A fluid spraying device for a dishwashing machine, said device comprising a distributing pipe mounted adjacent one end thereof to pivot on an axis extending transversely of the longitudinal axis of said pipe, means through which a fluid is conducted to said distributing pipe, the distributing pipe being spaced from an article to be cleaned, said pipe having a plurality of axially spaced discharge opening directed toward said article, and means for oscillating the distributing pipe so that said pipe will move on its pivot in an arc toward and away from said article and each oscillation of said pipe will cause a stream of fluid from each of at least three discharge openings to be directed to substantially the same points on the article.

5. A fluid spraying device for a dishwashing machine, said device comprising a distributing pipe mounted intermediate the opposite ends thereof to pivot on an axis extending transversely of the longitudinal axis of said pipe, means through which a fluid is conducted to said distributing pipe, the distributing pipe being spaced from an article to be cleaned, said pipe having a plurality of axially spaced discharge openings directed toward said article, and means for oscillating the distributing pipe so that said pipe will move on its pivot in an arc toward and away from said article and each oscillation of said pipe will cause a stream of fluid from each of at least three dis-

charge openings to be directed to substantially the same points on the article.

6. A device for spraying cleaning fluid comprising a rotatably mounted tubular member, means for introducing a cleaning fluid into said tubular member, a plurality of distributing pipes fixed to and in communication with said rotatable member, said distributing pipes being spaced from one another axially of said member, said rotatable member and distributing pipes being spaced from an article to be cleaned, said distributing pipes having a plurality of axially spaced discharge openings directed toward the said article, and means for oscillating the said rotatable member so that the said distributing pipes will move in an arc toward and away from the said article and so that each oscillation of said rotatable member will cause a stream of fluid from each of at least three discharge openings to be directed to substantially the same points on the article.

7. A cleaning fluid spraying device comprising a distributing pipe mounted to pivot on an axis extending substantially horizontally and transversely of the axis of said pipe, means through which fluid is conducted to said pipe, the distributing pipe being spaced from an article to be cleaned, said pipe having a plurality of axially spaced discharge openings directed toward said article, and means for oscillating the distributing pipe so that said pipe will move on its pivot in an arc and in a substantially vertical plane toward and away from said article and each oscillation of said pipe will cause a stream of fluid from each of at least three discharge openings to be directed to substantially the same points on the article.

8. A fluid spraying device for a dishwashing machine comprising a rotatably mounted tubular member, means for introducing a cleaning fluid into said tubular member, a plurality of distributing pipes fixed to and in communication with said rotatable member, said distributing pipes being spaced from one another axially of said member and extending substantially parallel to one another in substantially the same plane, said rotatable member and distributing pipes being spaced from an article to be cleaned, said distributing pipes having a plurality of axially spaced discharge openings directed toward the said article, and means for oscillating the said rotatable member so that the said distributing pipes will move in an arc toward and away from the said

article and so that each oscillation of said rotatable member will cause a stream of fluid from each of at least three discharge openings to pass over the same space on the article.

9. A device for spraying cleaning fluid comprising a pivotally mounted distributing pipe, the distributing pipe being spaced from an article to be cleaned, another pivotally mounted distributing pipe, said other pipe being spaced from said article in a direction opposite to that of said first-mentioned pipe, said pipe and said other pipe having a plurality of axially spaced discharge openings directed toward said article, means through which cleaning fluid is conducted to said pipe and to said other pipe, and means for oscillating said pipes so that each of said pipes moves in an arc toward and away from said article and each oscillation of said pipes will cause a stream of fluid from each of three discharge openings in each of the pipes to pass over substantially the same surface of the article.

10. A fluid spraying device for a dishwashing machine comprising a supply tube for cleaning fluid, a substantially horizontally extending upper tubular member rotatably secured to said supply tube, a plurality of distributing pipes fixed to and in communication with said upper rotatable member, the distributing pipes being above and in spaced relationship to articles to be washed, said distributing pipes being spaced from one another axially of said member, a substantially longitudinally extending lower tubular member beneath said upper tubular member rotatably secured to said supply tube, a plurality of distributing pipes fixed to and in communication with said lower rotatable member, said distributing pipes being spaced from one another axially of said member below and in spaced relationship to said articles to be washed, said upper and said lower distributing pipes having a plurality of axially spaced discharge openings directed toward said articles, and means for oscillating said upper and said lower rotatable members so that the distributing pipes will move in an arc toward and away from the said articles and so that each oscillation of said rotatable members will cause a stream of fluid from each of three discharge openings in each of the pipes to pass over substantially the same surface of an article.

HOMER F. LYMAN.