

Aug. 24 , 1926.

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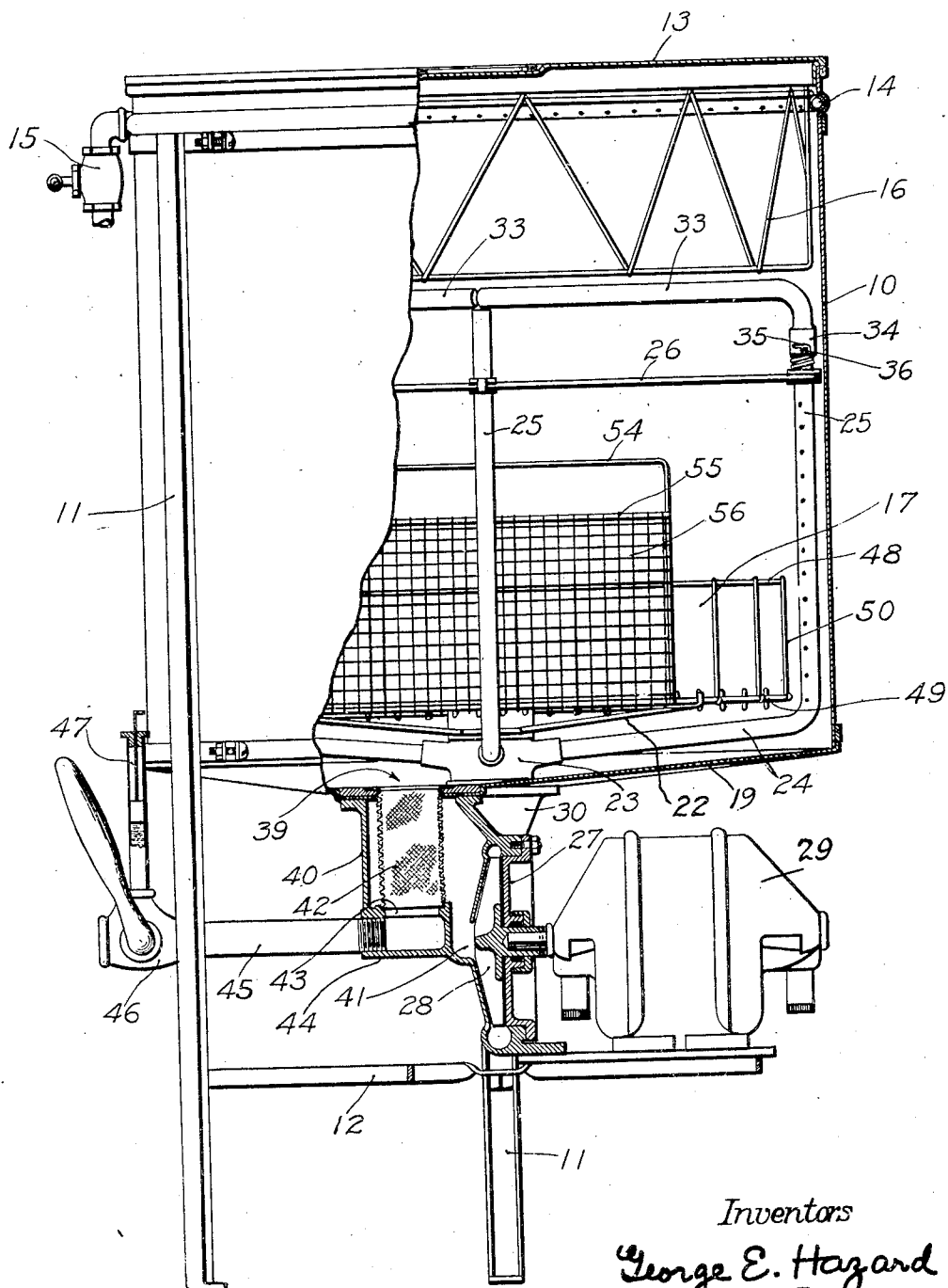
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WASHING MACHINE

Filed May 27, 1920

2 Sheets-Sheet 1

Fig. 1



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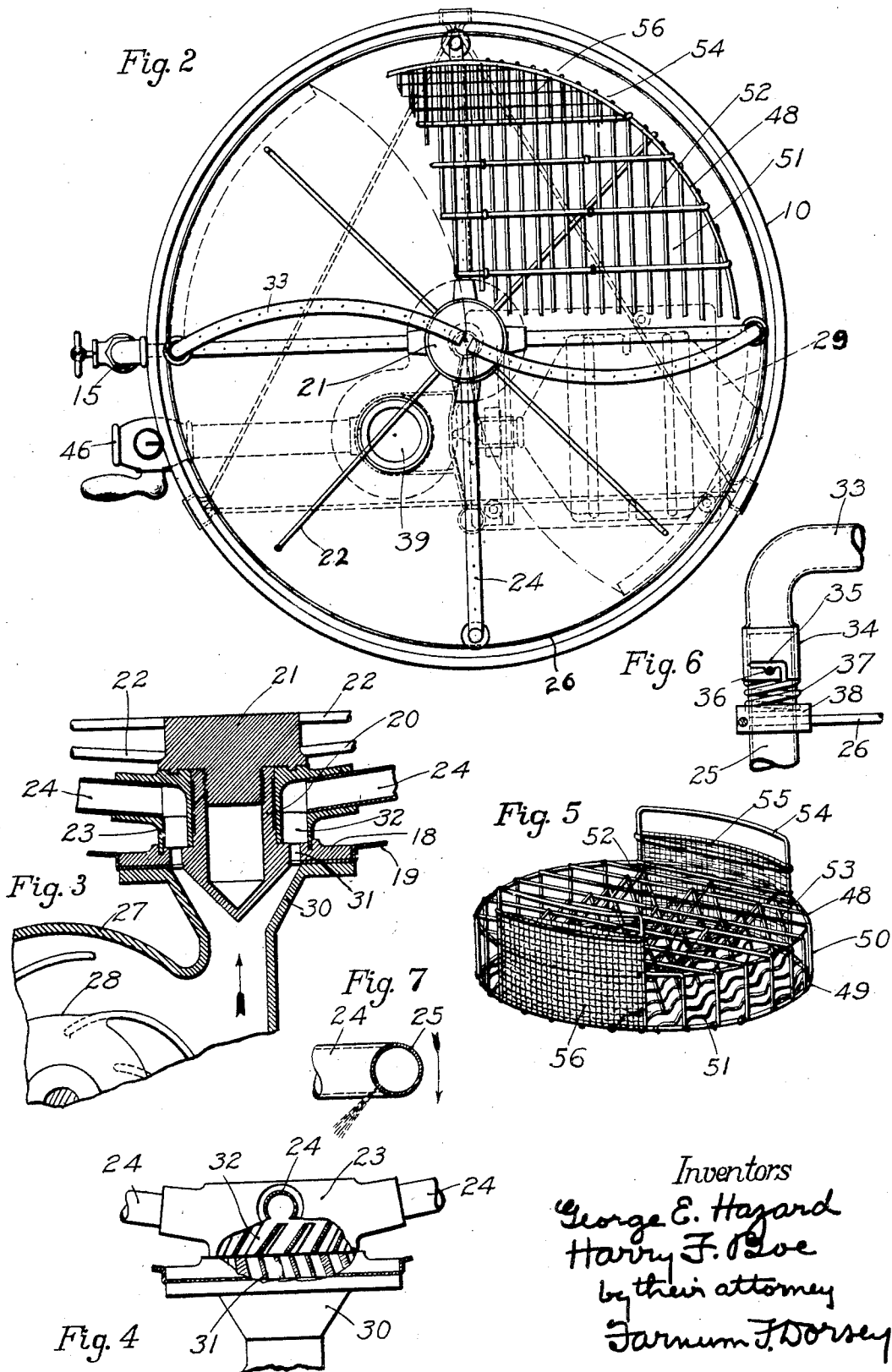
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UNITED STATES PATENT OFFICE.

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WASHING MACHINE.

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This invention relates to machines for washing articles such as dishes and kitchenware, or various other articles susceptible of washing by similar methods.

It has been found that kitchen-ware and the like may be washed thoroughly and economically by subjecting it repeatedly or continuously to sprays of hot water or soap-solution, provided these sprays impinge upon the articles from various angles so as to reach all surfaces. It has accordingly been proposed to provide machines of the type in question with various devices for splashing or spraying the cleansing liquid against the articles which are to be washed. The present machine operates on this principle, and one object of the invention is to provide the machine with efficient means for subjecting the articles to a powerful spray of suitable volume, and particularly to direct the spray against the articles from all angle so that the spray will be certain to reach out all surfaces and cavities of the articles. A further object of the invention is to economize in the use of hot water and cleansing materials by so arranging the apparatus that the spraying in question is secured by repeated use of the same comparatively small body of liquid.

Various other objects of the invention, and the features of construction by which these several objects are attained, will be set forth hereinafter in connection with the description of the illustrated embodiment of the invention.

In the accompanying drawings Fig. 1 is a side-elevation of a dish-washing machine constructed in accordance with the present invention, with parts of the machine shown in section or broken away to reveal the interior construction. Fig. 2 is a plan-view of the machine shown in Fig. 1, with the cover and the upper basket removed and the lower basket partly broken away. Fig. 3 is a vertical section, on a larger scale than the preceding figures, showing in detail the construction of the turbine and adjacent parts. Fig. 4 is another partly sectional view of the turbine. Fig. 5 is a perspective view of the lower basket. Fig. 6 is a side-elevation showing, in detail, the connection between one of the vertical spray-pipes and the horizontal spray-pipe at the upper end thereof. Fig. 7 is a detail view, in horizontal section, of one of the vertical spray-pipes. The invention is illustrated as embodied

in a machine having a cylindrical metal casing 10, which is supported by three legs 11, these legs being connected near their lower ends by triangularly arranged braces 12. The upper end of the casing is normally closed by a flanged cover 13.

Hot water is introduced to the machine through a circular pipe 14, which is seated in a channel near the top of the casing. This pipe is perforated, as shown, so as to discharge jets of water inwardly, and the supply of water is controlled by an external valve 15, through which connection may be made with a suitable source of supply.

The machine is provided with two baskets 16 and 17, constructed of wire, which support the articles to be washed. The upper basket 16, which is of generally circular form, is suspended removably by engagement with the spray-pipe 14, as shown in Fig. 1. This basket preferably is used to contain hollow articles such as cups, tumblers, and deep dishes, these articles being turned up-side down so as to receive a spray which is directed upwardly, through the bottom of the basket, by means which will presently be described.

The lower basket 17 is supported on a stationary structure rising from the middle of the bottom of the casing 10, the arrangement being such that spraying devices may be caused to rotate around the periphery of the basket, so as to direct sprays inwardly against articles thereon, while the basket and its contents remain stationary. A stationary plate 18, fixed in the middle of the conical bottom 19 of the casing, is integral with an upwardly projecting stem 20, and this stem is screw-threaded to receive a head 21 at its upper end. From the head four double wire arms 22 radiate, and these arms serve as supports for the basket 17. A rotary member 23 surrounds the stem 20, and bears at its upper and lower surfaces against the head 21 and the plate 18, making substantially water-tight joints with these members but being freely rotatable between them. Four water-pipes or conduits 24 radiate, in a substantially horizontal direction, from the member 23 to points near the walls of the casing, and are there bent to form upwardly projecting conduits or spray-pipes 25. The upright pipes 25 are braced by a ring 26 which is secured to them near their upper ends.

The spray-pipes 24 are provided with up-

wardly directed spray-openings, as shown, and the upright pipes 25 are provided, on their inner surfaces, with spray-openings arranged to discharge horizontal jets, all of these sprays or jets being so directed as to impinge upon the articles in the basket 17. In order that these sprays may engage the articles from all angles, and thus cleanse them thoroughly, a rotary movement is imparted to the spraying-devices as a whole, and for this purpose the plate 18 and the member 23 are adapted to constitute, respectively, the stator and the rotor of a turbine, while the power for actuating this turbine and for maintaining the flow of liquid to produce the spray is derived, through a centrifugal pump, from an electric motor.

The casing 27 of the pump incloses the usual rotor 28, which is mounted on the armature-shaft of an electric motor 29, this motor being mounted on the frame of the machine. The outlet-conduit 30 of the pump is attached to the bottom of the casing 10 at a point where the liquid may be discharged, upwardly through a circle of holes 31 in the plate 18. As shown in Fig. 4 these holes are inclined, and the rotor is provided with a series of inclined vanes 32 against which the water discharged through the holes 31 impinges. The reaction of the water against the vanes causes rotation of the rotor and of the spray-pipes carried thereby, while the water emerges through the pipes 24 and is conducted thence to the points where it is discharged, as previously described.

It has previously been proposed to provide a washing machine with a rotary spraying-device, but in such previous machine the rotation of the device has been secured by the reaction of the liquid in issuing through the spray-orifices. Such an arrangement has the disadvantage that it is necessary to direct the jets at a suitable angle to produce such rotation. By causing rotation of the spray pipes by means independent of the reaction of the liquid in the spray-openings, it is possible, in the present machine, to arrange these openings at the angles most suitable for projecting the spray with the maximum effect against the articles. Thus, as shown in Fig. 7, some of the openings in the vertical pipes 25, may be directed in the direction of revolution of the pipes, thus causing the spray to impinge at an effective angle against surfaces which might not be reached by the oppositely directed sprays.

In order to wash the articles on the basket 16, it is desirable to project the spray upwardly through the bottom of the basket. For this purpose two of the spray-pipes 25 are arranged to carry inwardly-extending horizontal spray-pipes 33. These

latter pipes are perforated, as shown in Fig. 2, on their upper surfaces, and are closed at their adjacent inner ends. When the basket 17 is to be introduced or removed from the machine, together with its contents, it is necessary to move the spray pipes 33 out of the way, and provision for this is made by connecting these pipes pivotally with the pipes 25. As shown particularly in Fig. 6, the spray-pipe 33 has a short vertical sleeve 34 at its outer end, which loosely embraces and turns on the upper extremity of the corresponding pipe 25. A slot 35 in the sleeve 34 is engaged by a pin 36 projecting outwardly from the pipe 25. A coil-spring 37 presses upwardly against the sleeve 34, and rests upon a collar 38, which is fixed to the pipe 25 and which serves also as the means for attaching the hoop 26 to the pipe. When the spray-pipe 33 is in its normal operative position, as shown, the pin 36 engages a notch in the bottom of the slot 35. When it is desired to swing the pipe out of the way the pipe is depressed sufficiently to disengage the pin from said notch, and the pipe may then be swung into a position in which it rests close to the inner surface of the casing, as shown in dotted lines in Fig. 2, the pipe being somewhat curved in form for this purpose. When it is necessary to clean the machine after use the spray pipe 33 may be entirely removed by passing the pin 36 through the vertical end-portion of the slot 35, access being thus secured to the interior of the pipes 25 and 33.

The pump is arranged to draw the liquid from the bottom of the casing 10 and discharge it through the spraying devices, the liquid then draining back into the bottom of the casing and thus being repeatedly circulated by the pump. For this purpose an outlet opening 39 is provided in the bottom of the casing, this opening delivering the liquid into a chamber 40 formed integrally in a casting which constitutes the forward part of the pump-casing. The liquid is drawn from the chamber 40 and fed to the pump through a pump-intake passage 41 at the eye of the pump.

To prevent the spray-openings from becoming clogged by matter washed from the dishes or other articles, it is necessary to strain the liquid before it is delivered to the spraying-devices. For this purpose a cylindrical strainer 42 of wire-gauze or other foraminous material is arranged as shown in Fig. 1, the upper end of the strainer filling the outlet-opening 39, while the lower end is seated in an annular seat 43 near the bottom of the chamber 40. This arrangement is such that all of the liquid which passes from the casing to the pump must first enter the upper end of the strainer and then emerge through the walls thereof, being thus freed

from solid particles of a size too large to pass the perforations of the strainer.

The solid matter collected by the strainer sinks into a space 44 at the bottom of the chamber 40, and when the washing operation is completed it may be discharged thence, together with the liquid, through the drain passage provided by an outlet-pipe 45 which is controlled by a valve 46. A float-gauge 47 attached, for convenience, to the body of the valve 46, is arranged to indicate the depth of liquid in the machine.

The lower basket 17 is particularly adapted to support plates, saucers, and the like, and also cutlery. As shown particularly in Fig. 5, the lower basket comprises upper and lower circular rings 48 and 49, connected at suitable intervals by vertical wires 50. The bottom of the basket comprises a series of parallel wires 51 which are corrugated in vertical planes. Across the ring 48 a series of parallel wires 52 extends, these wires being arranged at right-angle with the wires 51. This arrangement is such that one or more plates or other approximately flat articles may be stood on edge between each two adjacent wires 52, such articles being maintained in upright position by engagement of their lower edges with the corrugations or depressions in the wires 51. To reinforce the construction and prevent the articles so introduced from falling out of position, diagonal wires 53 are arranged to interconnect the wires 51 and 52, these diagonal wires lying in the vertical planes of the wires 52.

On opposite sides the basket is provided with U-shaped upwardly extending bails or handles 54, and these handles serve also as portions of two compartments which are particularly adapted for the reception of cutlery or other small articles. These compartments have the form of narrow segments of the circular outline of the basket, and are inclosed, at the sides and bottom, with wire-netting 56 of a sufficiently fine mesh to retain the articles in question, the netting extending upwardly above the ring 48, and being attached, at its upper edges to wires 55 supported by the bails 54.

Articles of cutlery may be stood in vertical position in the compartments just described, in which position they will be effectively washed, particularly by the sprays directed inwardly against them from the pipes 25.

Plates and the like supported in upright position in the lower basket are subjected in this machine to horizontally discharged jets or sprays of water which impinge against them from all angles, owing to the continuous rotation of the spray-pipes, and since the plates are arranged in parallel positions these sprays will find their way between the adjacent plates and against all

surfaces thereof, even though the plates be packed close together up to the full capacity of the basket. The machine is thus capable of washing a large number of articles at one time, and by the provision of the cutlery containers and the upper basket 16 for tumblers and the like the machine is capable of washing table-ware of all varieties.

While the invention has been described particularly as embodied in a machine adapted for washing table-ware it will be apparent that with respect to most, if not all, of its novel features of construction and operation it is not limited to this particular use, but may be employed in the washing of articles of various kinds, and it will be apparent, in general, that the invention is not limited to the embodiment thereof hereinbefore described and illustrated in the accompanying drawings, but may be embodied in various other forms within the scope of the following claims.

The invention claimed is:

1. A washing-machine having, in combination: a support for articles to be washed; a spraying device, one of these parts being rotatable relatively to the other; and means for producing such relative rotation; the spraying device being provided with orifices directed in the direction of rotation of the spraying device.

2. A washing-machine having, in combination: means for supporting and for spraying articles, said means including a spray device rotatable to change the point of application of the spray; a pump; a turbine-stator fed by the pump; a turbine-rotor cooperating with said stator and attached to and actuating said rotary member; and a conduit for conducting fluid from the rotor to the spray-device.

3. A washing-machine having, in combination: a central stationary member comprising a turbine-stator; a support, for articles to be washed, mounted on said stationary member; a turbine-rotor cooperating with said stator; and a conduit supported and actuated by said rotor, extending upwardly alongside said support, and perforated with spray-orifices.

4. A washing-machine having, in combination: a support for articles to be washed, and a spraying-device, one of these parts being rotatable relatively to the other; the spraying-device comprising a conduit beneath said support, an upright conduit alongside the support, and a conduit above the support, and the last-mentioned conduit being pivotally connected with the upright conduit and movable horizontally into and out of a position directly over the support.

5. A washing-machine having, in combination: a substantially cylindrical casing; a central stationary member within the casing; a support for articles to be washed,

mounted on said stationary member; a head rotatable around said member; a conduit extending horizontally, from said head, beneath said support, to a point near the wall of the casing and thence upwardly alongside the support; and a spraying-device fed and supported by said conduit and pivoted to the upper part thereof so as to be movable horizontally into and out of position directly over said support, said device being curved so as to lie close to the wall of the casing when moved out of position over said support.

6. A washing-machine having, in combination: a casing; a stationary member at the bottom of the casing; a lower support for articles to be washed, mounted on said member; an upper support, for articles to be washed, supported by the upper part of the casing; a head rotatable about said member; and a spraying-device carried by said head and comprising a conduit extending outwardly below the lower support, upwardly alongside said support, and inwardly between the upper and lower supports.

7. A washing-machine, as in claim 6, in which said conduit is movable into and out of position between said upper and lower supports.

8. A washing-machine, as in claim 6, in which said stationary member and said head constitute the members of a turbine actuated by the flow of liquid through said conduit.

9. A washing-machine having, in combination: a central stationary member provided with a passage for fluid; an annular body rotatable about said stationary member and provided with a passage communicating with that in the stationary member; a perforated spray-conduit supported by said body and communicating with said passage therein; a removable member screwed to

said stationary member and retaining the body thereon; arms projecting from the removable member; and a support, for articles to be washed, supported on said arms.

10. A washing-machine having, in combination: a casing; a body, at the bottom of the casing, comprising a pump-housing, a turbine-stator, and a passage connecting said housing and stator; a turbine-rotor cooperating with said stator; a spraying-member and an article-supporting member, one of said members being rotated by said turbine-rotor; and a pump-rotor working in said pump-housing and acting to force fluid through the turbine and the spraying-member.

11. A washing-machine having, in combination, a casing with an outlet at the bottom; a chamber in communication with said outlet; a drain-passage and a pump-intake passage being provided from said chamber; a pump fed through said intake-passage; a spraying-device fed by said pump; and an open-ended tubular strainer removably seated at both ends in said chamber and completely screening the pump-intake passage, the lower end of the strainer communicating directly with the drain-passage.

12. In a washing-machine, the combination, with a casing for enclosing articles to be washed, of a pump; a unitary hollow member located below and directly attached to said casing and having an inlet-opening from the casing; an outlet-opening to the pump, and a drain-opening; and a strainer, in the form of a foraminous tubular body, enclosed in said member and registering, at one end, with said inlet-opening and, at the other end, with said drain-opening.

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