

Feb. 17, 1953

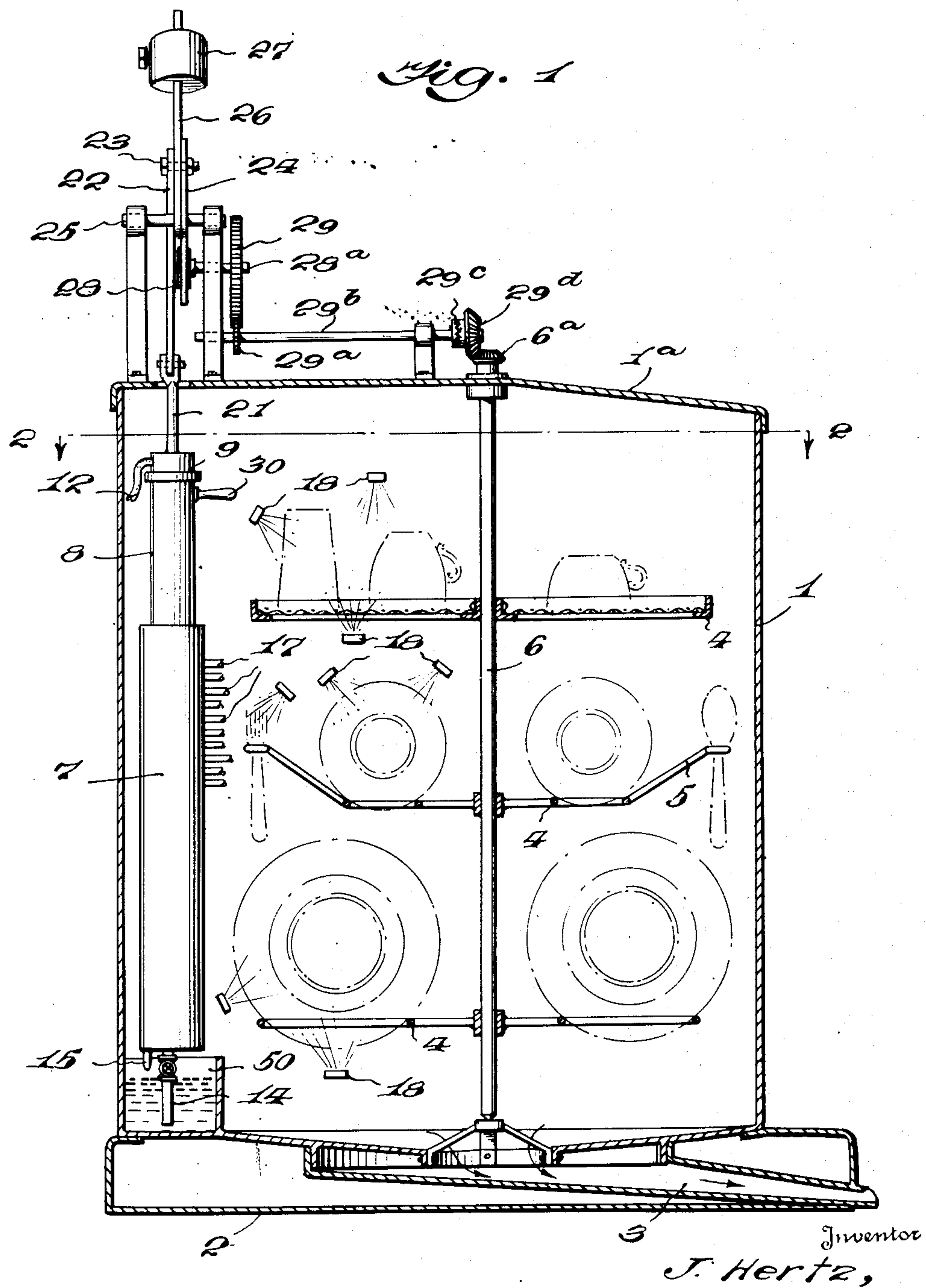
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SPRAY CONTROL SYSTEM FOR DISHWASHING MACHINES

Original Filed Nov. 22, 1938

2 SHEETS--SHEET 1



By Attorney
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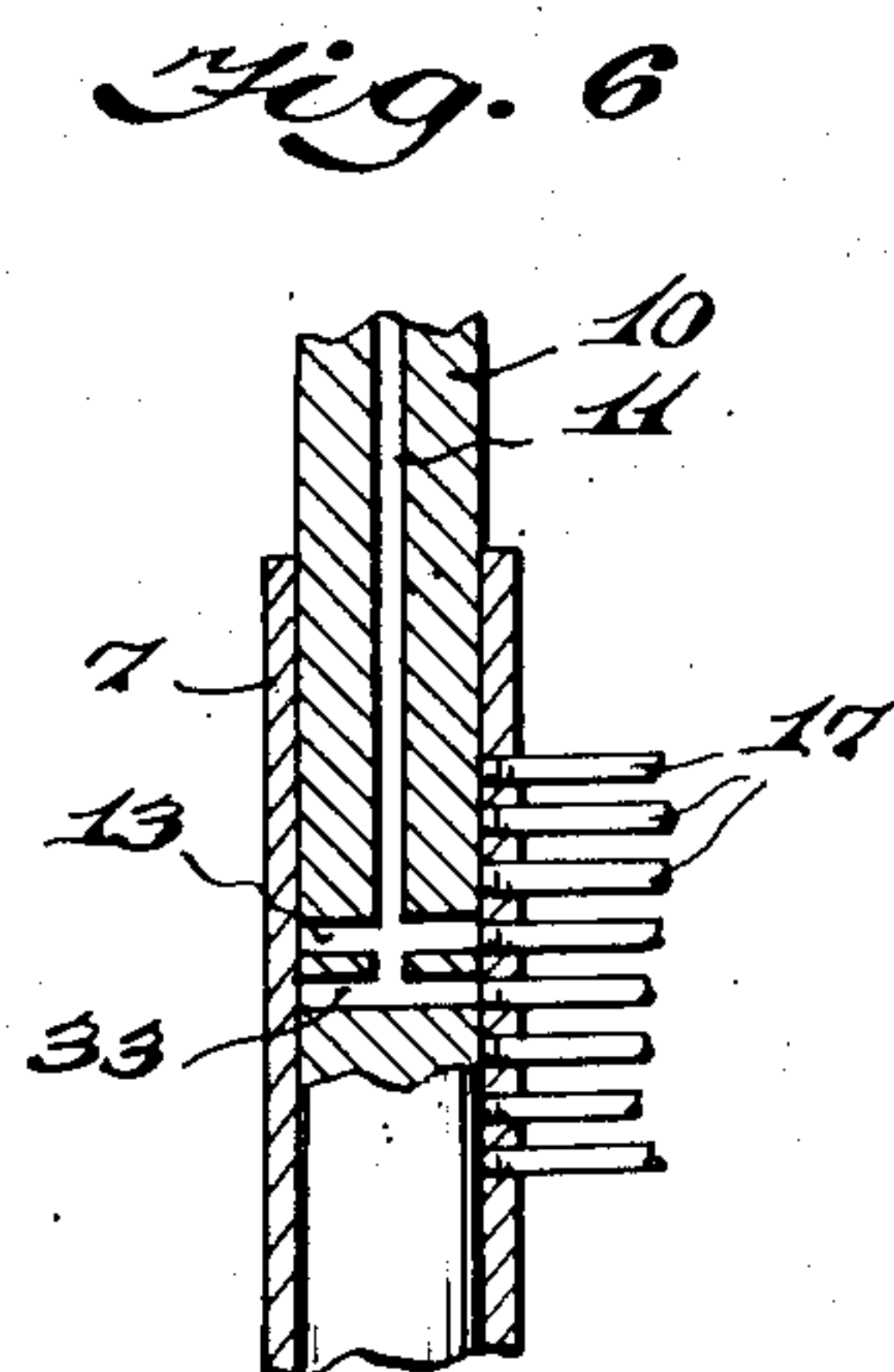
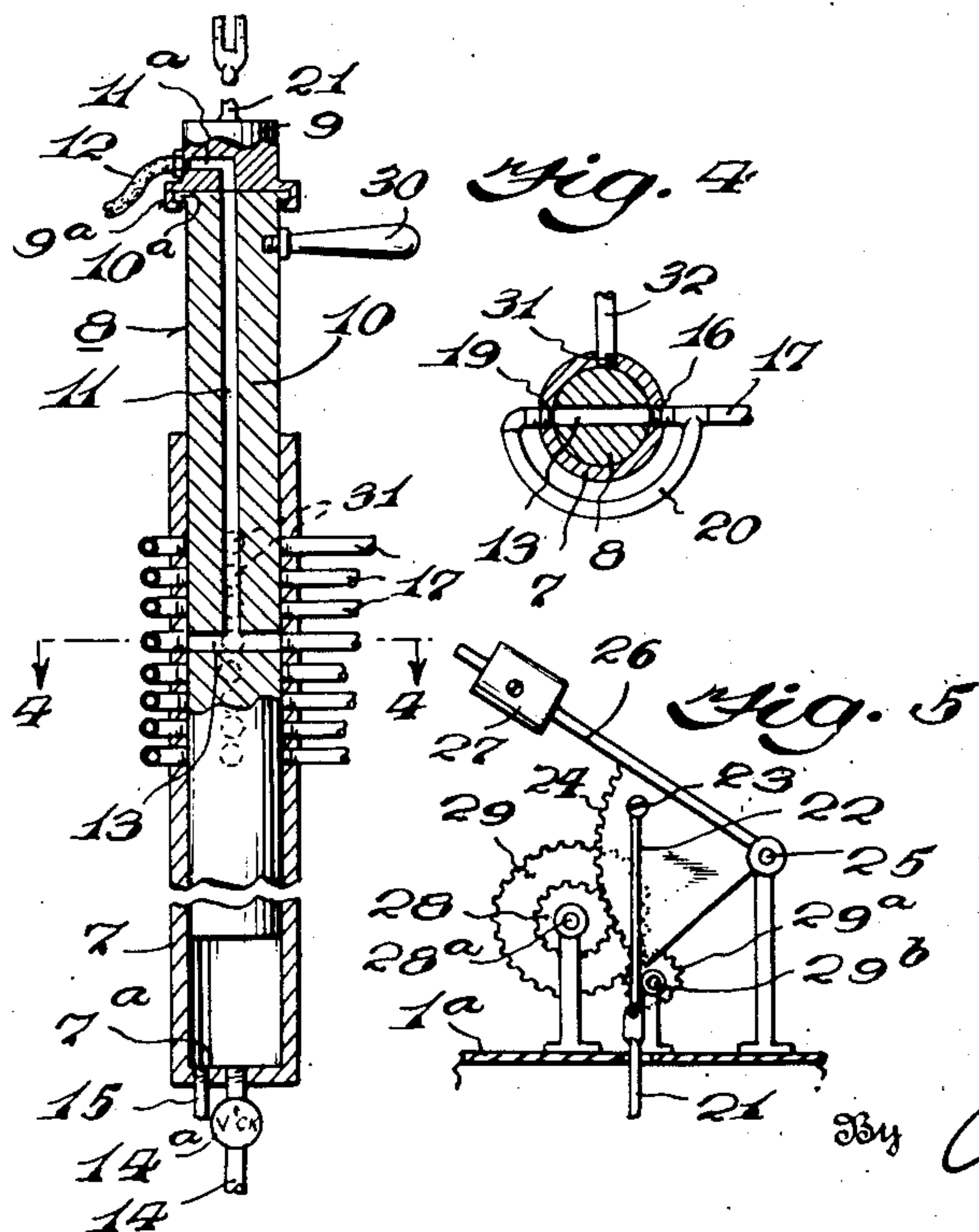
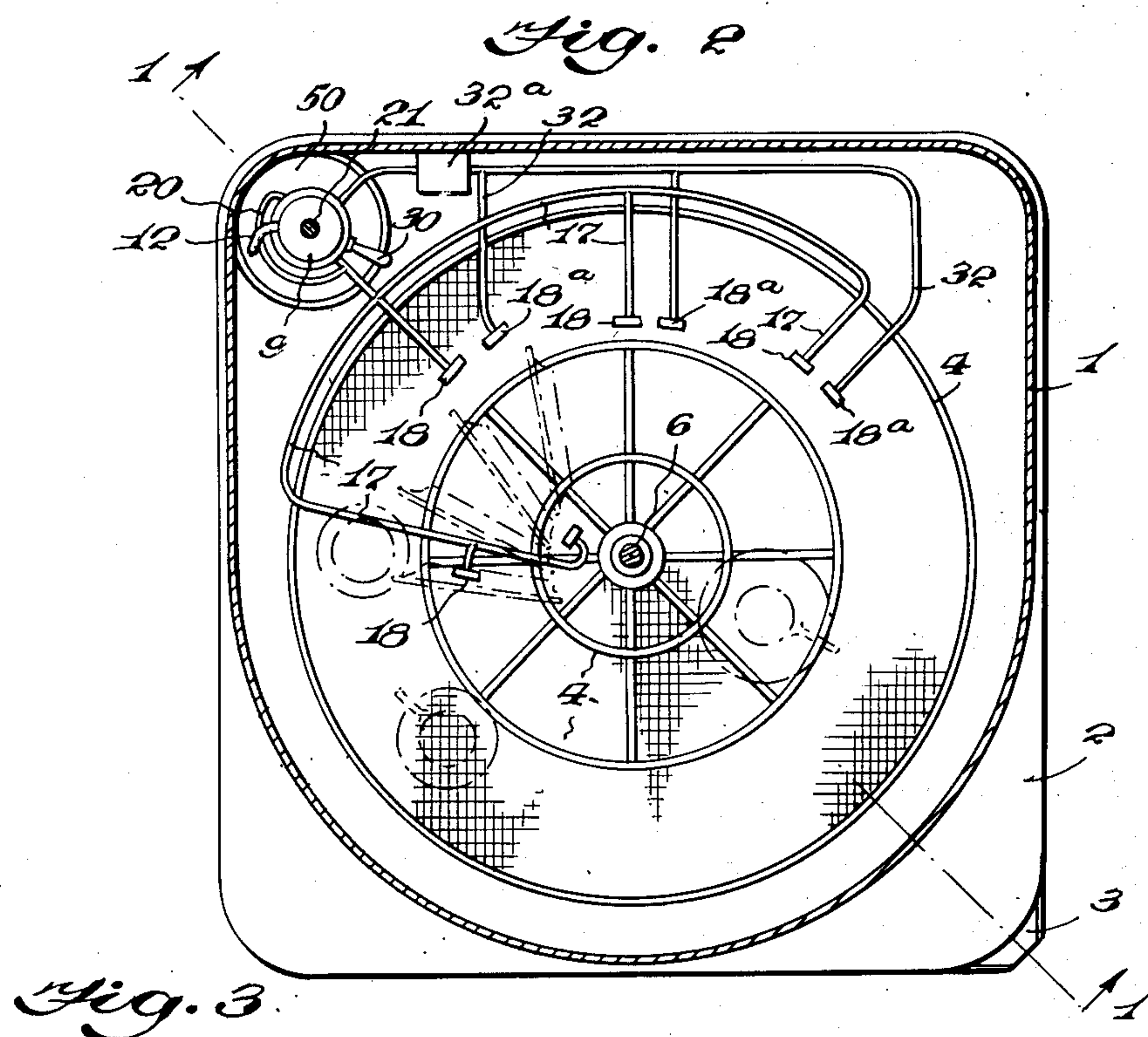
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Original Filed Nov. 22, 1938

2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

2,628,628

SPRAY CONTROL SYSTEM FOR DISH-WASHING MACHINES

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Original application November 22, 1938, Serial No. 241,833, now Patent No. 2,372,205, dated March 27, 1945. Divided and this application January 23, 1945, Serial No. 574,148. In Denmark November 26, 1937

7 Claims. (Cl. 134—146)

1

This invention relates to a dishwashing machine primarily for household use which has one or several liquid discharge openings, nozzles or groups of such through which cleansing fluid or rinsing water is discharged periodically under the pressure from a house water main. This application is a division of co-pending application Serial Number 241,833, filed November 22, 1938, now Patent No. 2,372,205.

If the rinsing water nozzles collectively command only a cross section through the machine, or only one half of such a section, the machine is constructed with a rotating carrying frame for the utensils, passing during rotation through that zone in the machine which is commanded by the nozzles with full mechanical rinsing effect. The aforesaid zone need not constitute an integral surface.

The squirting with cleansing fluid is usually effected prior to the squirting with water, and for the squirting of the utensils with cleansing fluid a special system of nozzles is used, discharging finer jets seeing that the squirting of the utensils with cleansing fluid shall serve, in a major degree, as a kind of maceration of the impurities on the utensils.

As explained, the machine is of the kind, whose nozzles for rinsing water or cleansing fluid eject through the pressure from a house water main. The cleansing agent must therefore be introduced at a place in the pipe or pipes which connect the house water main with the nozzle or nozzles which are intended for the ejection of cleansing fluid. This is effected in that a supply device for a cleansing agent, for example soap in solid or fluid form is inserted in the said pipe or pipes.

Normally, the machine according to the invention is constructed so as to comprise both cleansing fluid nozzles and rinsing water nozzles.

In the drawings:

Fig. 1 is a vertical section on the line 1—1 of Fig. 2.

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section of the control means shown in elevation in Fig. 1.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 3.

Fig. 5 is a reduced scale side elevation of the actuating mechanism for the control means, the front elevation of which is shown in Fig. 1.

Fig. 6 is a fragmentary vertical section showing a modified form of control means.

The embodiment of the invention illustrated in the drawings has a chamber 1 on a base 2, and

2

is provided with a drain 3 and cover 1-a. The chamber 1 has suitable doors or shutters (not shown) which may be opened so that the dishes and utensils to be cleaned may be placed in the chamber, and then closed during the operation of the device. Suitable trays 4 for the dishes and holders 5 for the utensils are mounted on a rotatable vertical shaft 6 suitably journaled on the bottom 2 and in the top 1-a, the means for rotating which will be presently described. Suitably mounted in the chamber 1 is a vertical cylinder 7 in which is slidably mounted a plunger 8 having a head 9 and a main portion 10 having at its upper end a peripheral flange 10-a received in a peripheral collar 9-a of the head 9, so that the portion 10 is rotatable relative to the head 9. An axial bore 11 is provided in the portion 10 and communicates with a bore 11-a in the head 9 with which is connected a flexible pipe 12 connected with the house water main by any suitable means (not shown). The axial bore 11 connects with a transverse bore 13 opening at diametrically opposite sides of the plunger 8. The cylinder 7 is provided in its bottom 7-a with an inlet pipe 14 having a non-return valve 14-a and extending into a liquid receptacle 50. There is also provided in the bottom 7-a a bleed line 15 from the cylinder 7 discharging into the receptacle 50. The cylinder 7 is provided with ports 16 arranged in a single vertical plane. Pipes 17 connect these ports 16 with spray-heads 18 so disposed in the chamber 1 as to spray liquid upon the dishes and utensils on the trays 4 and holders 5. The cylinder 7 is also provided with ports 19 arranged in a vertical plane on the diametrically opposite side of the cylinder 7 from the ports 16, and vertically spaced to correspond with ports 16. Each port 19 is connected by a pipe 20 with the pipe 17 of its corresponding port 16. It is obvious from Fig. 4 that the liquid supplied through the bores 11 and 13 is delivered simultaneously from the ends of bore 13 through ports 16 and 19, and therefrom to pipes 17. The head 9 of plunger 8 is connected by means of a rod 21, a link 22 and a pin 23, with an arcuate rack 24 pivotally mounted on a support 25 on the top 1-a of the chamber 1. The rack 24 carries a lever 26 provided with a slidable weight 27, and meshes with a pinion 28 on a shaft 28-a suitably journaled on the top 1-a, and carrying a gear 29 meshing with a pinion 29-a on a shaft 29-b suitably journaled on the top 1-a, and connected by a suitable ratchet mechanism 29-c with a miter gear 29-d meshing with a gear 6-a on the upper end of the shaft 6,

the foregoing elements constituting the means for rotating the shaft 6 above referred to. The main portion 10 of the plunger 8 is provided with a handle 30 by which the portion 10 can be rotated about its axis so that by moving the portion 10 through 90° from its position in which the ends of the bore 13 are aligned with the ports 16 and 19, the portion 10 is so positioned that one end of the bore 13 is aligned with the ports 31 in the cylinder 7 which are arranged in a vertical plane. These ports 31 are connected by pipes 32 with spray-heads 18-a. Each pipe 32 is provided with a receptacle 32-a for a suitable cleansing agent.

In the modified form of control means illustrated in Fig. 6, the main portion 10 of the plunger 8 is provided with a second transverse bore 33 so related to the bores 11 and 13 that the two bores 13 and 33 register with two adjacent ports 16 and two adjacent ports 19, so that liquid can be supplied simultaneously to the two outlet ports.

From the foregoing description of the details of structure of the device, its use and operation will be obvious. When the dishes and utensils have been placed on the trays 4 and holders 5, as illustrated in Fig. 1, the portion 10 of the plunger 8 is manipulated by the handle 30 so that the bore 13 is brought into alignment with the ports 31, and the doors of the chamber 1 are closed. The weight 27 is then lifted, thereby raising the plunger 8, through its associated operating mechanism. During this movement upwardly of the plunger 8, the shaft 6 is at rest by reason of the ratchet 20-c. Water under pressure from the house water main is then admitted through pipe 12 to the bores 11 and 13. The weight 27, being released, moves lever 26 downwardly, thereby depressing the plunger 8. As the bore 13 is brought successively into register with the ports 31, water passes through pipes 32 and containers 32-a thereby supplying a liquid cleansing agent from the containers 32-a to the spray-heads 18-a to be sprayed upon the dishes and utensils. During the downward movement of the plunger 8, the shaft 6 is rotated by its associated driving mechanism, so that the dishes and utensils are brought within the spraying range of the spray-heads 18-a. It is to be noted that when the plunger 8 is raised water is drawn from the receptacle 50, through the pipe 14 into the cylinder 7. When the plunger 8 descends, this water drawn from the receptacle 50 cannot return thereto through the pipe 14, due to its non-return valve 14-a, but escapes from cylinder 7 through the bleed line 15, to return to the receptacle 50, thus insuring a slow and uniform downward movement of the plunger 8.

When the plunger 8 has returned to its normal position at the bottom of the cylinder 7, the water supply is cut off, the doors are opened, and the portion 10 of the plunger 8 is manipulated by the handle 30 so that bore 13 is brought into alignment with ports 16 and 19. The doors are closed and the above described series of steps are repeated. With the last mentioned adjustment of the portion 10 of the plunger 8, clean water is supplied to the spray-heads 18 to rinse the dishes and utensils which may then be removed from the device.

What is claimed is:

1. In a dishwashing machine for operation in connection with water from a water duct under pressure, the combination of a chamber for receiving the dishes to be washed; a movable frame

in said chamber for supporting the dishes; a series of nozzles for spraying liquid under the pressure of said water duct onto the dishes supported on said frame; a cylinder provided with a plurality of outlet openings; pipes connecting said openings with said nozzles, respectively; a plunger slidable in said cylinder, and having a conduit therein provided with a discharge outlet through the outer face of said plunger, the cylinder outlet openings and the said discharge outlet being so disposed that the conduit in the plunger is brought into communication with the said pipes successively, as the plunger slides in the cylinder; means for supplying to said conduit the liquid under pressure of said water duct; means independent of the water pressure for sliding the plunger in the cylinder, and means driven by said plunger-sliding means for moving said frame relative to said nozzles.

2. In a dishwashing machine for operation in connection with water from a water duct under pressure, the combination of a chamber for receiving the dishes to be washed; a movable frame in said chamber for supporting the dishes; two series of nozzles for spraying liquid under pressure of said water duct onto the dishes supported on said frame; a cylinder provided with two series of outlet openings; a series of pipes connecting the openings of one series with the nozzles of one series, respectively; a second series of pipes connecting the openings of the other series with the nozzles of the other series, respectively; a plunger mounted co-axially in said cylinder for rotation about and sliding movement along the common axis, and provided with a conduit having a discharge outlet through the outer face of said plunger, the two series of outlet openings and the said discharge outlet being so disposed that the conduit in the plunger is brought into communication successively with the pipes of one series as the plunger slides in the cylinder, when the plunger has been rotated about its axis to one adjusted position, and into communication successively with the pipes of the other series, when rotated to another adjusted position; means for supplying to said conduit the liquid under pressure of the water duct; means to manually rotate said plunger about its axis; and gravity-operated means for sliding said plunger in the cylinder and for simultaneously moving said frame relative to said nozzles.

3. In a dishwashing machine for operation in connection with water from a water duct under pressure, the combination of a chamber for receiving the dishes to be washed; a rotating frame in said chamber for supporting the dishes; a series of nozzles for periodically spraying liquid under pressure of said water duct; a liquid control device controlling the supply of liquid to said nozzles, said device being constituted at least in part by a first member and a second member axially movable relative to the first, one of said members having at least one outlet opening; means for supplying liquid to said opening, under the pressure of the water duct, the other member having a plurality of distributing openings; pipes connecting the distributing openings with different nozzles, the distributing openings being brought into communication with the outlet opening or openings in succession during relative movement of said second member, whereby for each spraying period only certain of said nozzles are rendered operative and substantially the full force of the pressure in the water duct is utilized for the nozzle spray; and control means inter-

5

posed between the liquid control device and the rotating frame, said control means including a rack operatively connected with said liquid control device so as to be moved by the relative movement of the said second member of said liquid control device, and a toothed wheel meshing with said rack and operatively connected to said rotating frame.

4. In a dishwashing machine for operation in connection with water from a water duct under pressure, the combination of a chamber for receiving the dishes to be washed; a rotating frame in said chamber for supporting the dishes; a series of nozzles for periodically spraying liquid under pressure of said water duct; a liquid control device controlling the supply of liquid to said nozzles, said device being constituted at least in part by a first member and a second member axially movable relative to the first, one of said members having at least one outlet opening; means for supplying liquid to said opening, under the pressure of the water duct, the other member having a plurality of distributing openings; pipes connecting the distributing openings with different nozzles, the distributing openings being brought into communication with the outlet opening or openings in succession during relative movement of said members, whereby for each spraying period only certain of said nozzles are rendered operative and substantially the full force of the pressure in the water duct is utilized for the nozzle spray; a toothed sector pivotally mounted on said chamber; means for imparting the axial movement of the second member to said sector; and a toothed wheel journaled on said chamber and meshing with said sector, said wheel being operatively connected to the rotating frame.

5. In a dish washing machine according to claim 1 wherein fluid means are provided for damping the action of said slidable plunger during the sliding of said plunger and the movement of said frame.

6. In a dish washing machine according to claim 2 wherein fluid means are provided for damping the action of said gravity-operated means during the sliding of said plunger and movement of said frame.

7. In a dishwashing machine for operation in connection with water from a water duct under

6

pressure, the combination of a chamber for receiving the dishes to be washed; a movable frame for supporting the dishes; a series of nozzles for periodically spraying liquid under pressure of said water duct; a liquid control device controlling the supply of liquid to said nozzles, said device being constituted at least in part by a first and a second member, said first member being movable relative to the second in an axial direction, one of said members having at least one outlet opening; means for supplying liquid to said opening under the pressure of the water duct, the other member having a plurality of distributing openings; pipes connecting the distributing openings with different nozzles, the distributing openings being brought into communication with the outlet opening or openings in succession during said relative movement of the first member, whereby for each spraying period only certain of said nozzles are rendered operative and substantially the full force of the pressure in the water duct is utilized for the nozzle spray; means independent of the water pressure for producing the relative motion in one direction of said first member of the liquid control device, and means actuated by said first member of the liquid control device for moving the frame in relation to said nozzles.

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