

Jan. 2, 1923.

1,440,472

J. S. LAPHAM.
DISHWASHING MACHINE.
FILED MAR. 15, 1920.

4 SHEETS-SHEET 2

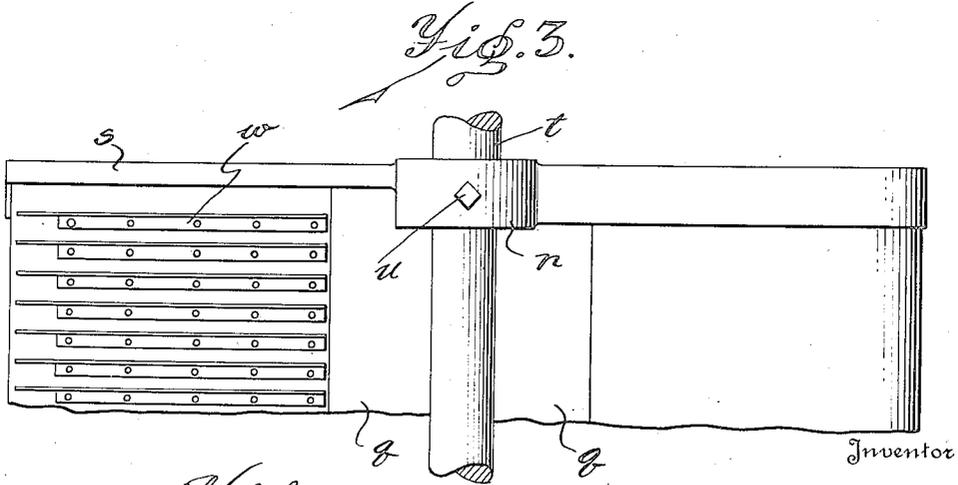
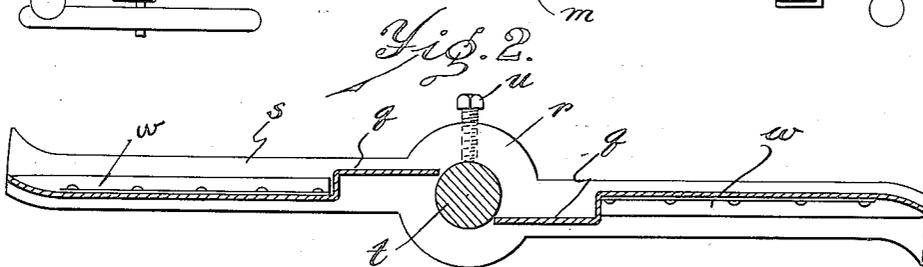
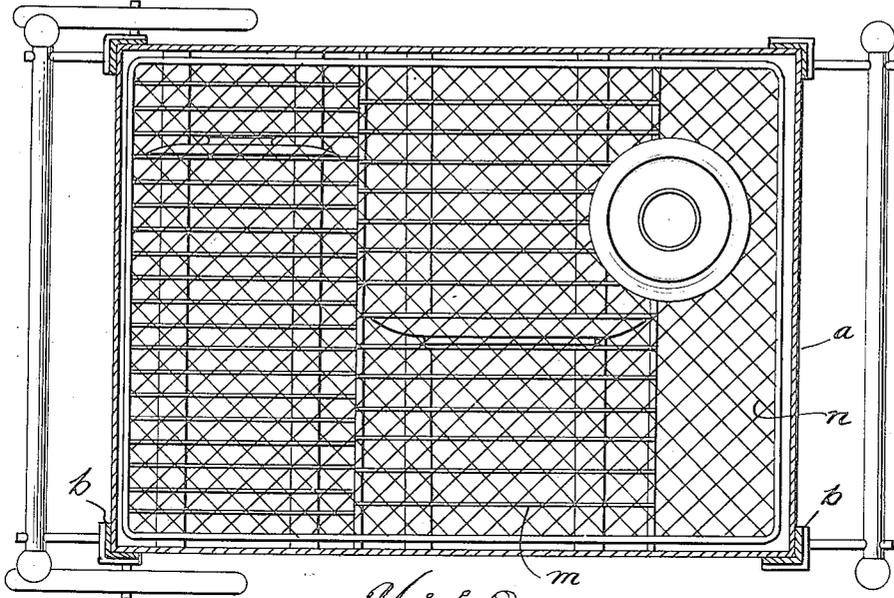


Fig. 4.

Inventor
By *Jared S. Lapham*
Stuart L. Barnes
Attorney

Jan. 2, 1923.

1,440,472

J. S. LAPHAM.
DISHWASHING MACHINE.
FILED MAR. 15, 1920.

4 SHEETS-SHEET 3

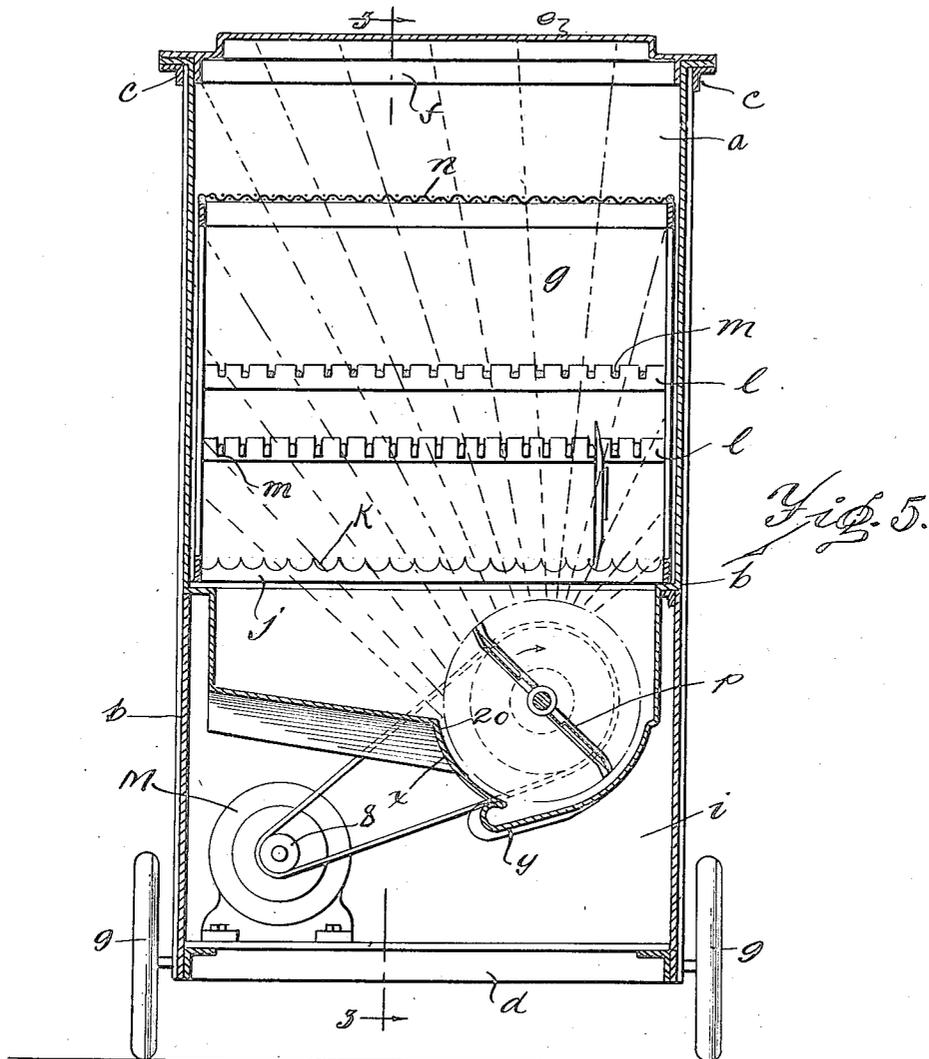


Fig. 5.

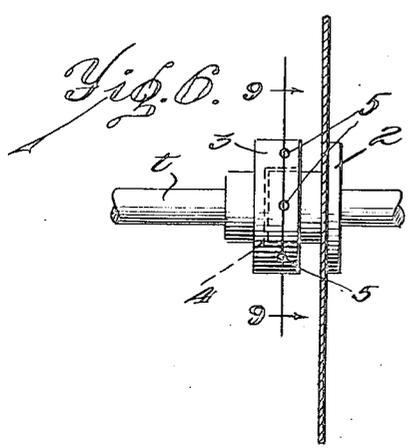


Fig. 6.

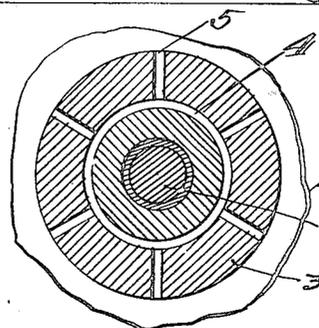


Fig. 7.

Inventor

By *Jared S. Lapham*
Straw & Barnes
Attorney

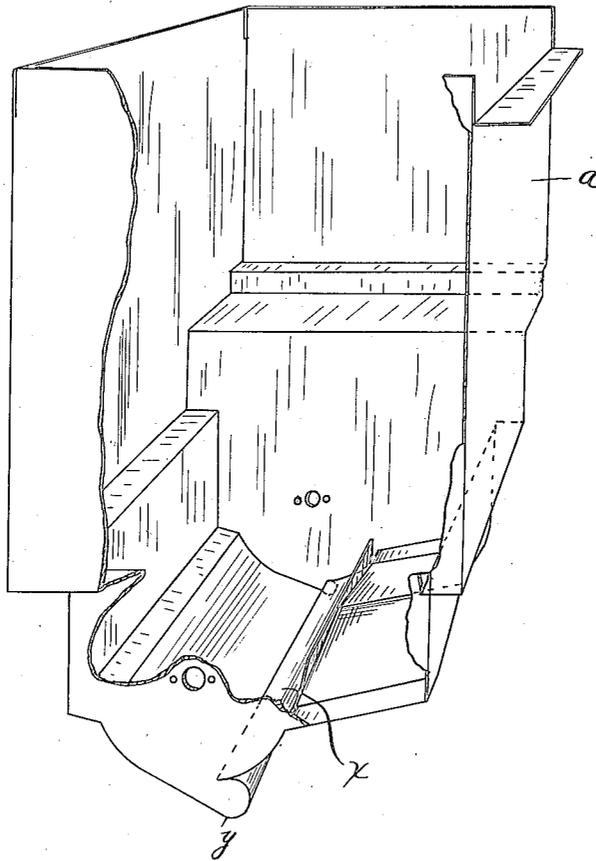
Jan. 2, 1923.

1,440,472

J. S. LAPHAM
DISHWASHING MACHINE.
FILED MAR. 15, 1920.

4 SHEETS-SHEET 4

Fig. 8



Inventor
Jared S. Lapham

33 *Wittmer & Albert Wittmer & Belknap.*

Attorneys

Patented Jan. 2, 1923.

1,440,472

UNITED STATES PATENT OFFICE.

JARED S. LAPHAM, OF NORTHVILLE, MICHIGAN, ASSIGNOR OF ONE-HALF TO JAMES T. McMAHON, OF TOLEDO, OHIO.

DISHWASHING MACHINE.

Application filed March 15, 1920. Serial No. 365,760.

To all whom it may concern:

Be it known that I, JARED S. LAPHAM, a citizen of the United States, residing at Northville, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Dishwashing Machines, of which the following is a specification.

This invention relates to dish washing machines, and has for its object a dish washing machine which employs a relatively small quantity of water and throws this water in a spray of high velocity directly against the dishes. The various dish and utensil racks are appropriately arranged in connection with the construction of the impeller to be directly in the path of this high velocity spray.

Provision is made for the return of the water on the side of the impeller in which the high velocity spray is thrown in such a manner as in no way to impair or retard the spray.

A special channel for collecting and drawing off solid particles is provided so that they will not be thrown up with the spray.

Suitable bearing collars calculated to protect the bearings from any water thrown thereon are also provided.

The machine is portable so that it may be moved up to the table for charging and after having performed its cleansing operations may be moved to the cupboard for the proper distribution of the dishes. These and other objects will be better understood when the detailed description has been given.

In the drawings,—

Fig. 1 is a vertical cross section of the machine taken on the line 3—3 of Fig. 5.

Fig. 2 is in effect a plan view of the machine but really a section on the line 4—4 of Fig. 1.

Fig. 3 is a cross section through the impeller.

Fig. 4 is a fragmentary plan view of the impeller.

Fig. 5 is a cross section of the machine taken on the line 7—7 of Fig. 1.

Fig. 6 is a detail of one of the bearings and its protecting collar.

Fig. 7 is a section through this bearing on the line 9—9 of Fig. 6.

Figure 8 is a sectional perspective view

of a portion of the casing of the machine and showing the bottom of the washing chamber.

The housing is made in the form of a sheet metal casing *a* which is reinforced at the corners by angle iron strips *b*. Along the top or rim of the housing angle iron strips *c* are used as reinforcements and stiffening elements. The angle iron strips *d* are also used to reinforce the bottom, as shown in Fig. 1. The top of the machine is spanned by a pair of hinged lids *e, e* which are hinged to the angle bar *c*. These lids are arranged to open upwardly into a vertical position so that they will drain back into the machine.

The housing is divided up into a washing or spraying chamber *g*, a scouring chamber *h* and a motor chamber *i*. The washing chamber is provided with suitable supports for holding the dishes. These are in the form of racks *j* which are provided with notches *k* to hold the dishes. The notched bars *l* are adapted to hold the hooked end rods *m* which form the upper support for the dishes which are calculated to be placed vertically in the racks to permit the spray to be thrown across the dishes into the upper portion of the chamber, where a wire mesh rack *n* supports bowls, pans, etc., which should be preferably placed in inverted position, as shown in Fig. 1.

Special attention has been paid to the arrangement of the bottom of the washing chamber and the construction and disposition of the impeller so as to throw an uninterrupted spray of maximum velocity and utilize a minimum amount of hot water. The advantages of such results in efficacy and economy are obvious.

Referring to Figure 5 it will be seen that the impeller *p* is arranged to rotate in a trough formed in the bottom portion of the casing of the washing chamber and that at one side of this trough a floor inclines from the center to the opposite ends of the impeller and also inclines from the side of the chamber towards the impeller trough. The object of this construction is to return all liquid to the impeller trough and also to direct the returning liquid to the ends of the impeller so as to avoid interference with the outgoing spray. A further object is to

avoid materially raising the level of the water in case too great a quantity is placed in the receptacle, this being accomplished by the large lateral extension over the inclined floor.

The impeller in cooperation with the construction just described is adapted to direct the spray with substantial uniformity throughout the entire volume of the washing chamber and to limit the throwing of the spray through only the required angle. The limiting of this angle is effected primarily by the shape of the trough, which has a portion X on the ascending side of the impeller blade concentric with the axis thereof. The blades of the impeller are also provided with curved lips which tend to retard the discharge of liquid therefrom and are further provided with a series of parallel fins which assist in the retarding action. In detail, the impeller is made up of blades, preferably two, formed of sheet metal blades *q* that are secured to arms *s* at the ends of the impeller. These arms are provided with hubs *r* which are secured to the impeller shaft *t* by the set-screw *u*. The propelling face of the blade is provided with a plurality of relatively deep fins *w* in the form of angle strips which may be riveted, welded or otherwise secured to the face of the blade plate. Also the blades are provided with the curved lips 20, before referred to.

In operation, when an impeller blade rises out of the trough it dips up a thin sheet of liquid on its surface. Centrifugal force propels this sheet outward toward the lip where it breaks up and is discharged in drops until exhausted. The purpose of the closely spaced fins is to return this liquid within narrow radial channels of relatively high frictional resistance and thus retard its outward movement. Consequently, the impeller blade will throw a spray throughout a wider angle of distribution than a similar blade without fins. For example, water may be flirtd from the bristles of a shaving brush through a considerable arc whereas the same quantity of water would be promptly lost from the surfaces of a spoon or an article of a similar construction.

The exact proportion of the parts just described is dependent upon variable factors, such as size and dimensions of the washing chamber, the speed of rotation of the impeller shaft and other factors, but it will be understood that the more numerous the fins and the narrower the space between them, the more the discharge of the spray will be retarded. The most important factor is, however, the guarding face of the trough, which by excluding the direct backflow of liquid towards the impeller, avoids cutting off the out-thrown spray. It also causes the returning liquid to pass to the ends of the impeller, where it can enter the space between

the blades centrally or adjacent to the impeller shaft.

Now referring to Fig. 5 it will be seen that the bottom of the impeller trough *x* is stamped out to form what might be called a sub-trough *y* opening in a direction opposite to that of the rotation of the impeller. Roughly this trough is C shaped in cross section. Its purpose is to form a lodgment for particles such as the scrapings from the dishes that are driven around by the impellers and thrown out by centrifugal force. Here they will collect and be trapped instead of being churned up by the blade when it rises and thrown up with the spray to again lodge on the dishes. The trough enlarges and slopes downward as shown in Fig. 1 and a drain cock *z* is provided from which this accumulation may be removed.

Pans, skillets and articles of this kind which contain incrustations and substances that cannot be removed by the spray can be scoured by the scouring wheel or brush 1 located in the chamber *h*. This brush is carried on a continuation of the impeller shaft *t*. The location of the impeller at one side also brings the scouring wheel 1 at one side of the scouring wheel chamber, which is a matter of considerable importance as it gives appropriate space at one side in which to manipulate the utensils or other articles while undergoing scouring. This is nicely shown in Fig. 2. This scouring wheel may be easily removed and a buffing wheel substituted for the purpose of cleaning silver-ware, brass or similar articles.

It will be noted that the impeller shaft turns in bearings 2 that are secured in the end walls of the washing chamber. In order to protect the bearings and eliminate the water from them as much as possible, cup-shaped protecting collars 3 are provided. These have an annular spacing 4 (Figs. 6 and 7) about the outside of the bearing which space opens toward the end walls and away from the spray. Vent openings 5 open radially out from the annular spacing 4 and this impeller shaft being driven at a very high velocity will keep this bearing almost dry by reason of the water being thrown into the vents 5 and thrown out by the great centrifugal force. This I consider quite an important feature of this machine.

The end of the impeller shaft *t* is provided with a pulley wheel 6 adapted to receive a belt 7 which connects up with the pulley wheel 8 on the electric motor M contained in the motor chamber *i*.

Properly tired wheels 9 are suitably supported on the bottom of the housing to make the same portable and it is preferable to have one set of wheels large and non-swiveling while the other set of wheels is small and provided with suitable supports to support each wheel in swiveling or cast-

ering relation with respect to the machine proper. This enables the machine to be pushed and steered, the dishes may be collected at the table and put through the scouring and washing operation and the machine wheeled to the cupboard after they are dry.

The door 10 provides access to the scouring chamber while the door 11 provides access to the motor chamber. Handles 12 provide convenient means for pushing or drawing the machine about.

What I claim is:

1. In a dish washing machine, the combination of a washing chamber, means for holding the dishes or utensils therein, an impeller located within a trough at the bottom of the chamber and terminating short of the ends of said trough, said impeller being adapted to throw a spray against said dishes or utensils, and cooperating means having a portion thereof arranged concentric with the axis of said impeller for preventing the returning liquid from interfering with the outgoing spray.

2. In a dish washing machine, the combination of a washing chamber, means for holding the dishes or utensils therein, an impeller located within a trough at the bottom of the chamber, a shield substantially concentric with the axis of the impeller for preventing the return of liquid into the path of the spray, said shield terminating to provide channels to the ends of the trough for the passage of the returning liquid thereto.

3. In a dish washing machine, the combination of a washing chamber, means for supporting dishes or utensils therein, an impeller trough in the bottom of the washing chamber, an impeller rotatably supported in the impeller trough, a collecting sub-trough communicating with said impeller trough, comprising a channel having an opening in a direction opposite to the direction of rotation of the impeller to catch and trap solid particles thrown out by the impeller and inclined towards one end, and drainage means at the lower end of said sub-trough for removing the sediment therefrom.

4. In a dish washing machine, the combination of a washing chamber, means for holding dishes and utensils therein, an impeller located at the bottom of the chamber and adapted to throw water upon said dishes and utensils, and means for directing the returning water in opposite directions to the ends of the impeller.

5. In a dish washing machine, the combination of a washing chamber, means for supporting dishes and utensils therein, an impeller at the bottom of the washing chamber at one side, and a floor at the other side of the chamber divided at the center to return the water at the ends of the impeller.

6. In a dish washing machine, the com-

ination of a washing chamber, an impeller located in the bottom thereof, and a collecting trough for catching solid particles comprising a channelled trough closely adjacent to the impeller wheel and opening opposite to the direction of rotation of the impeller to catch and trap particles thrown out by centrifugal force by the impeller.

7. In a dish-washing machine, the combination of a washing chamber, an impeller well at the bottom of said chamber, a floor at one side of the impeller well divided at the center and sloping toward each end, and a lip dividing the said impeller well from the said floor and serving to prevent a too early discharge of the spray on the ascent of the impeller and to prevent the water returned by said sloping floor from entering the impeller wells except at the ends.

8. In a dish washing machine, the combination of a washing chamber, means for holding the dishes or utensils therein, an impeller located at the bottom of said chamber and a shield on the ascending side of the impeller for limiting the angle through which the spray is thrown and for preventing the returning liquid from interfering with said spray.

9. In a dish washing machine, the combination of a washing chamber, means for holding dishes and utensils therein, a shaft journaled in suitable bearings in the ends of said chamber, an impeller secured to said shaft and adapted to throw water upon said dishes and utensils, and means for returning part of the water to the ends of said impeller.

10. An impeller blade provided with a discharge lip and having a series of closely spaced perpendicular fins forming narrow channels extending in a radial direction to the said discharge lip.

11. A dish washing machine, comprising a container, means for supporting dishes and utensils therein, a trough in the bottom of said container, an impeller materially shorter than said trough and rotatable therein, and means for preventing the return of liquid to the discharge side of said trough except at the ends beyond the impeller.

12. In a dish washing machine, the combination of a washing chamber, means for holding dishes and utensils therein, a trough in the bottom of said chamber, an impeller in said trough adapted to throw a spray upon said dishes and utensils, and means for directing the returning liquid to said trough without interfering with the spray thrown by said impeller.

13. In a dish washing machine, the combination of a cabinet having a dish washing chamber provided with an inclined bottom, means for supporting dishes in said chamber, a trough in the bottom of said chamber, an impeller in said trough adapted to throw

a spray upon said dishes, a portion of said
trough cooperating with the inclined bottom
of said chamber to direct the returning
liquid to said trough without interfering
5 with the spray thrown by said impeller.

14. In a dish washing machine, the com-
bination of a washing chamber, having an
inclined bottom, means for holding dishes
and utensils in said chamber, a trough in

the bottom of said chamber, an impeller in 10
said trough adapted to throw a spray upon
said dishes and utensils, and means cooperat-
ing with said inclined bottom for directing
the returning liquid to said trough without
interfering with the spray thrown by said 15
impeller.

In testimony whereof I affix my signature.
JARED S. LAPHAM.