Aug. 7, 1928. 1,679,465

G. W. CONOVER

DISHWASHING MACHINE

Filed Jan. 24, 1920

Fig. 1.

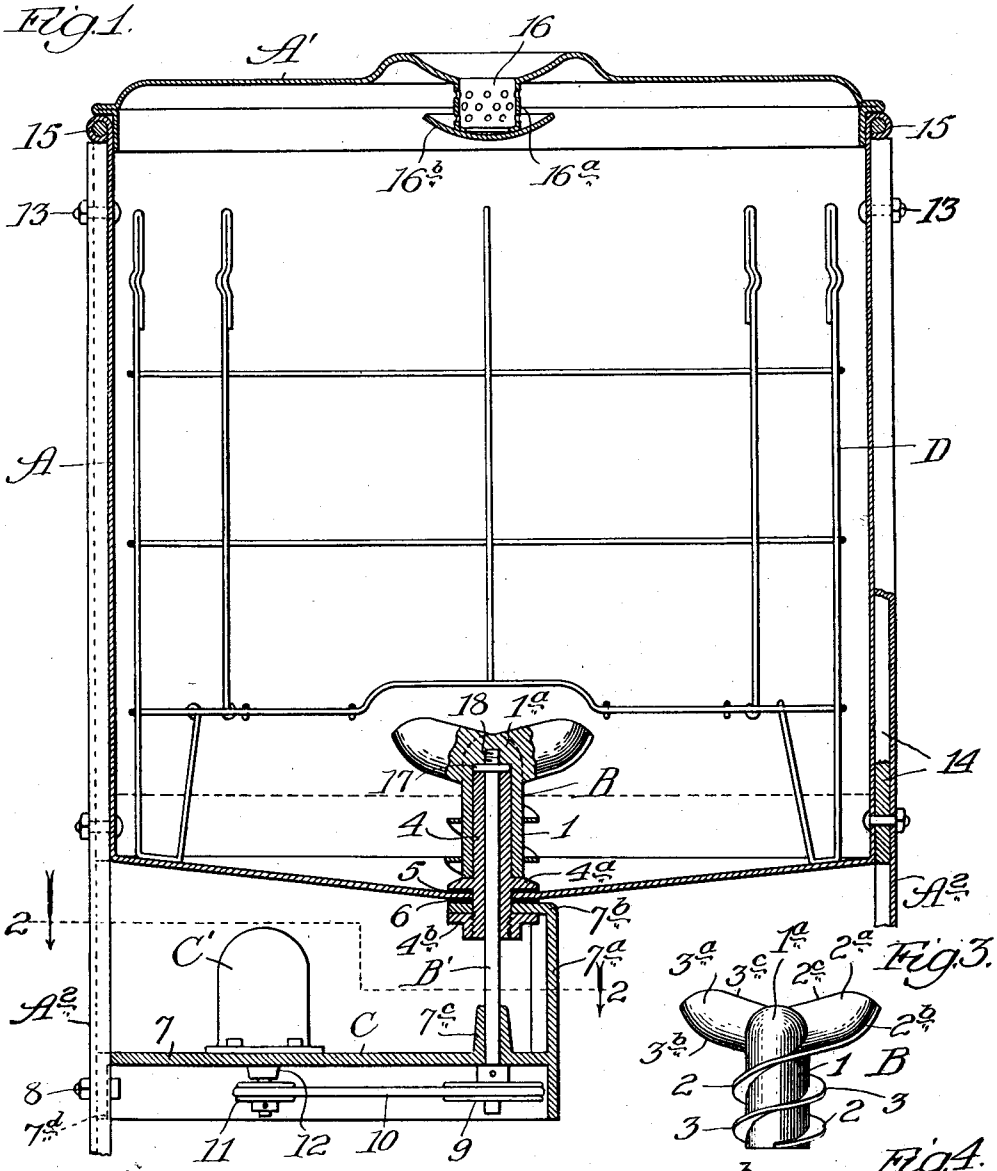


Fig. 3.

Fig. 2.

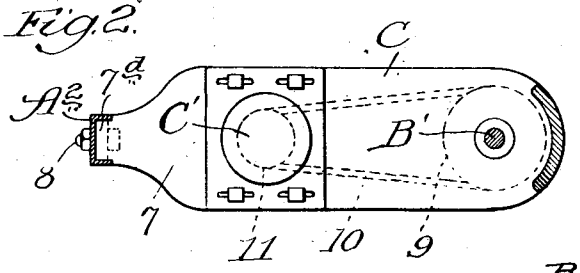
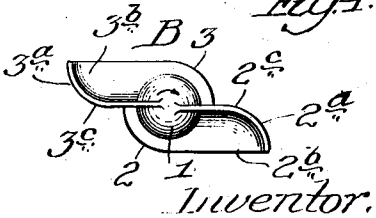


Fig. 4.



Inventor:
George W. Conover,
By Dyrenforth, Lee, Christy & Wiles,
Attys.

Patented Aug. 7, 1928. 1,679,465

UNITED STATES PATENT OFFICE.

GEORGE W. CONOVER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CONOVER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DISHWASHING MACHINE.

Application filed January 24, 1920. Serial No. 353,841.

This invention relates particularly to machines adapted for the purpose of washing dishes.

The primary object is to provide a machine of simple construction and moderate cost, which is thoroughly adapted to the purpose indicated.

The invention is illustrated in its preferred embodiment in the accompanying drawing, in which—

Fig. 1 represents a broken vertical sectional view of a dish-washing machine constructed in accordance with the invention; Fig. 2, a plan sectional view taken as indicated at line 2 of Fig. 1; Fig. 3, an elevational view of a water-propelling device employed; and Fig. 4 a plan view of the same.

In the embodiment illustrated, A represents a can or vessel, which affords a washing chamber, said vessel being provided with a removable top A′ and being supported on legs A^2; B, a water-propelling device disposed centrally in the lower portion of the vessel A and actuated through the medium of a vertical shaft B′ which extends through the bottom of the chamber A; and C a bracket in which the lower portion of the shaft B′ is journalled, and which supports an electric motor C′, whose shaft is belted, or otherwise geared, to the shaft B′.

In the vessel A is a dish rack D, shown composed of wires. This rack may be of any suitable construction and is intended to support the dishes in the space above the water-propelling device B, in such manner that the water can be caused to pass between and among the dishes and effectually wash them. The normal water level is indicated by dotted line in Fig. 1.

The water-propelling device is so designed as to elevate the water in the lower portion of the vessel at the central axis of the machine, through a comparatively small compass, throw the water upwardly and outwardly in sheets, cause the main body of the water to be deflected inwardly and upwardly from the dishes and sides of the vessel and to fall as a spray, the course of the water on any side of the propelling device pursuing roughly a figure 8 course.

The water-propelling device which is preferably employed for this purpose comprises a screw consisting of a sleeve 1 equipped with a pair of spiral blades 2 and 3 which terminate at their upper ends in short, dished deflectors 2^a and 3^a respectively. The pitch of the spiral vanes or threads 2 and 3 is such that the water will be elevated rapidly as the member is rotated. It will be noted that the short deflectors 2^a and 3^a constitute in effect, an upward extension of the spirals 2 and 3, but that these spirals are curved upwardly and toward the axis of the member, as indicated at 2^b and 3^b, so as to form a more acute angle with the axis. The portions of the spirals which project to form the short deflectors are also widened, as clearly shown in Fig. 4 and coalesce with vertical webs or flanges 2^c and 3^c, the formation being such that the deflectors are in effect concave.

The sleeve 1 of the member B has a closed upper end, as indicated at 1^a. The shaft B′ extends through a bearing which is fitted through the center perforation in the dished bottom of the vessel A. This bearing comprises a sleeve 4 which is provided near its lower end with a flange 4^a, and the lower end of the sleeve is threaded and equipped with a nut 4^b. The lower end of the sleeve 4 extends through the center perforation in the bottom of the vessel and is equipped with a gasket 5 and a washer 6 which embrace the upper and lower surfaces of the bottom of the vessel. Thus, the bearing is clampingly secured, in a water-tight manner, to the bottom of the vessel.

The legs A^2 may be of any desired number (three legs will suffice). The bracket C comprises a radially disposed horizontal plate 7 having its outer end detachably secured, by a bolt 8, to one of the legs, and having its inner end equipped with an upwardly extending arm 7^a which is provided at its upper end with a flange 7^b. The flange 7^b is perforated and the lower end portion of the sleeve 4 extends through it, the flange 7^b being clamped between the nut 4^b and the washer 6. The shaft B′ extends through a bearing 7^c in the bracket and is equipped at its lower end with a pulley 9 which is connected, by belt 10, to a pulley 11 on the shaft of the electric motor C′. The motor is of the vertical type and has the lower end of its shaft projecting through a bearing 12 in the bracket 7.

In the illustration given, the legs A^2 comprise channel members whose upper portions embrace the sides of the vessel A and are secured thereto by bolts 13. The portions of the legs which embrace the sides of the vessel

have inserted in the channel members fillets, or bars 14. The upper ends of the legs abut against an external flange or bead 15 with which the upper edge of the vessel is equipped. The top A′ is removable and is equipped centrally with a vent device 16 comprising a perforated sleeve 16^a which depends into the vessel and is equipped with a deflector 16^b.

The outer end of the bracket 7 terminates in a down-turned lug or flange 7^d which fits in the channel of the leg and is secured to the leg by the bolt 8.

In the use of the improved machine, the dishes are placed in the wire rack D, preferably in such manner that some of the plates will be disposed vertically and in a circle at the outer portion of the basket, while other plates, saucers, etc., will be disposed radially within the outer circle, so that water can be thrown freely upwardly and outwardly between the dishes and will impinge against the outer circle of plates and against the vertical wall of the chamber A, and be reflected, largely, back over the dishes and caused to fall in sheets of spray among the dishes. By reason of the fact that the water-propelling device B is relatively of small diameter and adapted to lift the water at the center and propel it violently upwardly and outwardly, a circulation is created which serves most effectually to cleanse the dishes; and this result may be obtained in a dish-washing machine for ordinarily household purpose, by the use of a motor of a small fraction of a horse-power. The design is such that the water-propelling device may be rotated very rapidly, preferably at about 2000 revolutions per minute, thus elevating a small portion of the water at a time and causing it to be hurled violently in sheets between and among the dishes. Moreover, the principle of operation is such that the water thus hurled will not be driven laterally away from the center of the machine and caused to rise along the sides of the vessel, as is characteristic of machines heretofore known; but, to the contrary, the cleansing water will be lifted at the center so as to be largely free from the main body of the water and then hurled from a new altitude directly to the dishes, while the gravitative pressure of the main body of the water will be towards the central portion of the bottom of the vessel to fill the void created by elevating a small central portion of the body of the water by means of the screw-like action. This arrangement also enables heavy suds to be employed without obstructing the operation, and enables the machine to automatically clean itself, the machine being washed with the dishes.

The improved machine provides for the most economical expenditure of power and the most efficient cleansing action of the water which is moved by the propeller. Centrifugal force, of course, tends to hurl the water after it has been elevated by the screw towards the vertical wall of the vessel. The water is, however, elevated on an incline by the screw, and the centrifugal force is to an extent counteracted by the shape of the deflectors, so that the resultant force after the water leaves the deflectors is such as to insure the necessary upward throw of the water, together with the requisite spreading action to obtain the most effective washing action.

The propelling device B may be mounted upon the shaft B′ in any desired manner. In the illustration given, the shaft B′ is provided near its upper end with a collar or flange 17 which bears upon the upper end of the sleeve 4; and the tubular member 1 of the propeller B is journalled on the sleeve 4 and is secured to the shaft B′ by a threaded connection 18 between the upper end of the shaft and the wall 1^a. In other words, the wall 1^a is provided with a threaded socket which screws onto the upper end of the shaft B′. Thus, the member B rotates on the sleeve 4 as a journal. The construction is such as to effectually journal the shaft B′ and prevent leakage.

As has been pointed out, the improved machine operates upon the principle of elevating centrally a small volume of water from the bottom of the vessel and hurling it violently among the dishes. Because the quantity of water thus hurled at any given instant is small, it may be hurled at high speed among the dishes without danger of breaking or dislodging the dishes, and the cleansing action is highly efficient. Heretofore dish-washing machines have operated upon the opposite principle of moving a comparatively large body of water at a comparatively low rate of speed. In the use of the present invention, a very high speed must be employed to secure the desired result, and such high speed is obtained by rotating the water-propelling device at a speed well above 1000 revolutions per minute, and preferably attaining a rotation of about 2000 revolutions per minute. It is a matter of economy, also, in the manufacture and operation that the desired result can be obtained with the use of an electric motor of very small horse power.

It may be added that the principle of operation employed, namely that of elevating water in small volume from the bottom of the vessel to a height above the pool-level and then dashing the water as elevated into a spray and hurling it violently in the manner stated results in continuous cleansing of the interior of the vessel. Moreover, the whole interior design, including the lifting and spraying propeller, is conducive to sanitary conditions, simplicity of construc-

tion, and effectiveness and economy in operation.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is:

1. In a dish-washing machine, the combination of a vessel, a central vertical shaft extending through the bottom thereof and provided with a suitable bearing, means connected with the lower end of and serving to rotate said shaft, and a water-elevating and spreading device carried by the upper end of said shaft and comprising a screw for elevating the water centrally and a deflector constituting a continuation of said screw and adapted to further elevate and spread the water.

2. In a dish-washing machine, the combination of a vessel, a central vertical shaft journalled in the bottom of said vessel, means connected with the lower end of and serving to rotate said shaft, and an unenclosed water-propelling device mounted on the upper end of said shaft and comprising a cylindrical member equipped with a pair of spiral vanes which terminate in short deflectors.

3. In a dish-washing machine, the combination of a vessel, a central vertical shaft journalled in the bottom of said vessel, means connected with the lower end of and serving to rotate said shaft, and an unenclosed water-propelling device mounted on the upper end of said shaft and comprising a cylindrical member equipped with a pair of spiral vanes which terminate in short concave deflectors.

4. In a dish-washing machine, the combination of a vessel having its bottom provided with a perforation, a tubular bearing extending through the bottom of said vessel and clampingly secured thereto, a shaft extending through said tubular bearing, means connected with the lower end of and serving to actuate said shaft, and an unenclosed water-propelling device comprising a screw journalled on said tubular bearing and equipped at its upper portion with an inclined deflector, the upper portion of said water-propelling device being secured to the upper end of said shaft.

5. In a dish-washing machine, the combination of a vessel having its bottom provided with a central perforation, legs supporting said vessel, a bracket connected with one of said legs and having an upwardly extending arm equipped at its upper end with a flange provided with a perforation registering with said central perforation, a tubular bearing having its lower end extending through said perforations and having a flange above the bottom of the vessel, a nut securing said parts together, a shaft having its upper portion journalled in said tubular bearing and its lower portion journalled in said bracket, a water elevating and spreading device journalled on said tubular bearing and secured to said shaft, and a motor mounted on said bracket and having a shaft geared to said first-named shaft.

6. In a dish-washing machine, the combination of a vessel having a bottom wall provided with a central perforation, a vertical bearing sleeve clampingly secured to the bottom wall at said perforation and having its upper end extending above the normal water-line, a shaft extending through said sleeve, means connected with the lower end of said shaft for rotating the shaft, and an unenclosed water-propelling device having a tubular member journalled on said sleeve and secured at its upper end to the upper end of said shaft, said water-propelling device having its tubular portion equipped with a spiral vane for elevating the water and having a distributing deflector constituting a continuation of said spiral vane disposed substantially above the normal water level.

7. As an article of manufacture, an impeller having a cylindrical portion provided with a screw thread, and having also a deflecting element, of a greater pitch than said screw thread, disposed beyond said screw thread and adapted to receive and deflect water delivered from the thread of said screw.

8. As an article of manufacture, an impeller having a pair of screw threads and terminal deflectors for said screw threads, said deflectors being wider than said screw threads.

9. As an article of manufacture, an impeller having a cylindrical portion provided with a pair of screw threads, and having also deflecting elements, of greater pitch than said screw threads, disposed beyond said screw threads and adapted to receive and deflect water delivered from the space between the threads of said pair.

GEORGE W. CONOVER.