March 6, 1951 G. H. WOTRING 2,544,374

DISHWASHING APPARATUS IMPELLER

Filed June 4, 1948

Fig. 1

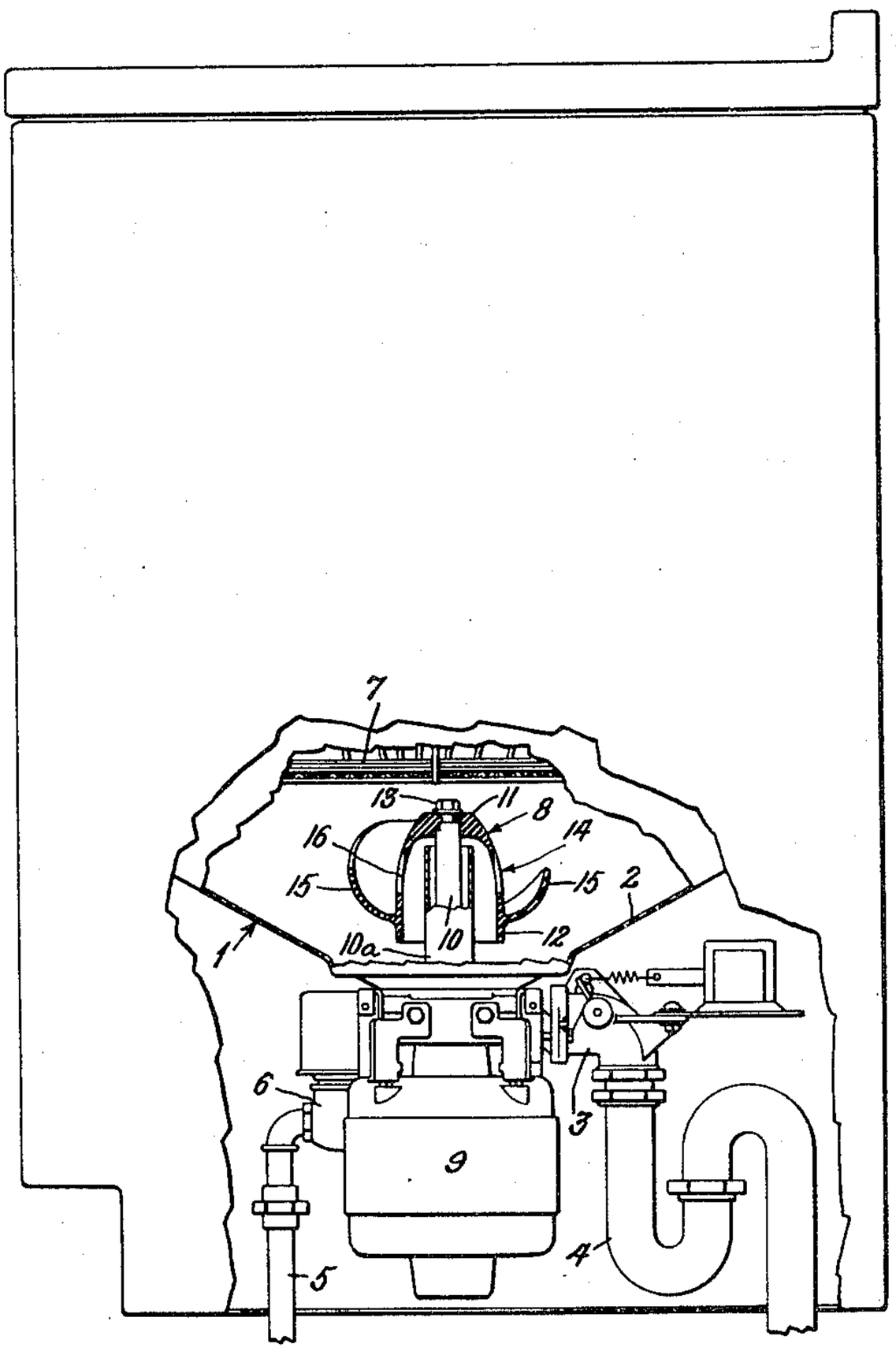
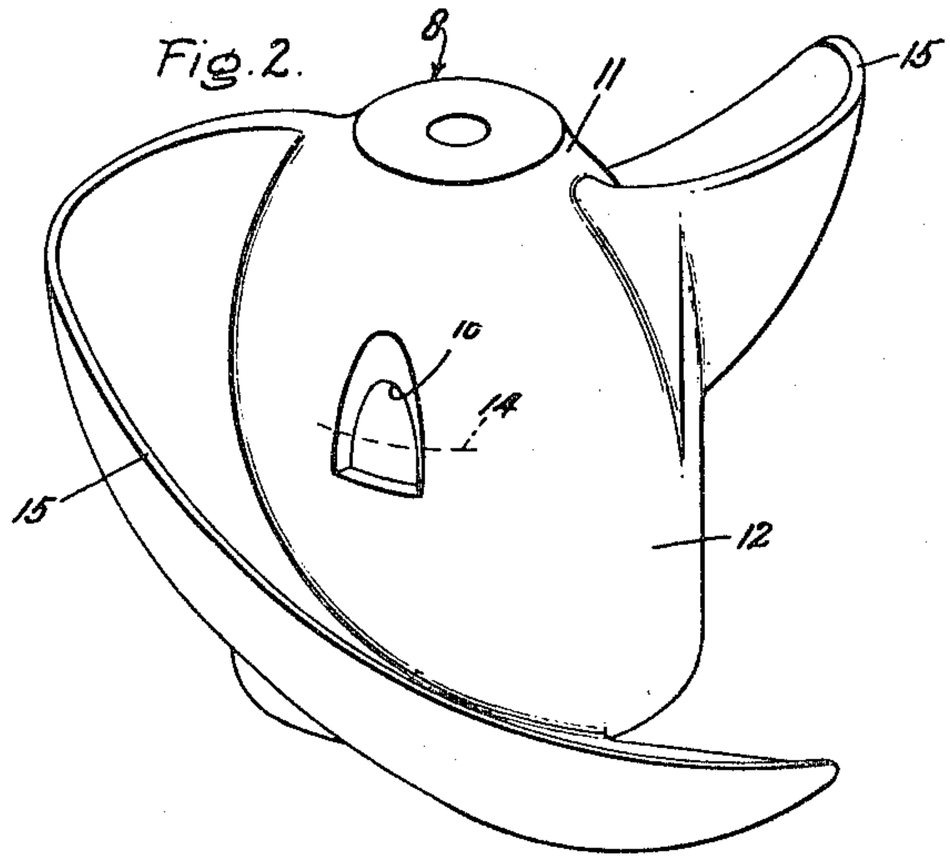


Fig. 2.



Inventor:
Gaylord H. Wotring
by Alfred T. Zobel
His Attorney

Patented Mar. 6, 1951 2,544,374

UNITED STATES PATENT OFFICE

2,544,374

DISHWASHING APPARATUS IMPELLER

Gaylord H. Wotring, Fairfield, Conn., assignor to General Electric Company, a corporation of New York

Application June 4, 1948, Serial No. 31,051

1 Claim. (Cl. 259—107)

1

This invention relates to impellers, more particularly to rotary liquid circulating impellers for mechanical dishwashing machines, and it has for its object the provision of an improved device of this character.

In a well-known type of dishwasher, the dishes and other utensils to be washed are placed in suitable open-work trays supported in a washing vat above an impeller arranged to rotate in the lower portion of the vat. This impeller is arranged when rotated to engage a relatively small quantity of washing liquid in the lower portion of the vat so as to hurl it upwardly and outwardly through the dish supporting racks with sufficient force to cleanse the dishes and utensils placed within the racks.

The impeller heretofore used in certain dishwashers of this character is provided with an acorn-shaped apron or skirt-like hub support having on its outer wall a plurality, usually two, of water circulating blades. The hub is positioned with its rounded, closed end uppermost and its skirt extending downwardly therefrom. Entering the hub from the bottom is the motor driven impeller driving shaft, which shaft extends up into the hub for driving connection with the upper closed end of the hub.

The side wall of the hub below the upper curved end portion is substantially straight and vertical, tapering but slightly as it progresses upwardly from its lower end, but toward its top it tapers in more rapidly so as to merge smoothly into the curved top.

I have found that when the impeller is rotating, the side wall thereof functions incidentally as a liquid pump which pumps liquid up into the hub to a level which is about the level where the curved top of the hub merges into the substantially straight side wall thereof. Some liquid is continuously circulated in this fashion and as a result food particles carried up with the liquid are deposited by centrifugal force at this level, the particles forming a ring of mud-like substance in the apron. This ring sticks to the impeller and gradually builds up in size and because it is in contact with the water in the washer constitutes an unsanitary condition.

In accordance with this invention, I provide in the apron an aperture located at a level such that the water pumped up inside the apron will flow freely through the aperture to the outside thereof. This water flows continuously and, hence, it will carry the food particles with it to the outside of the impeller rather than permit them to deposit on the impeller.

2

For a more complete understanding of this invention, reference should be had to the accompanying drawing in which Fig. 1 is a side elevation of a dishwashing machine provided with an impeller arranged in accordance with this invention; and Fig. 2 is a perspective view of the impeller drawn to a larger scale than is Fig. 1.

Referring to the drawing, this invention has been shown as applied to dishwashing apparatus provided with an upright washing vat 1. This vat is provided with a bottom wall 2 which tapers downwardly toward the central vertical axis of the vat to provide a sump within which the washing liquid will collect. The bottom wall is provided with a drain valve 3 which empties into a drain pipe 4. Clean washing water is supplied from a conduit 5 which is controlled by water inlet valve 6. A suitable open-work dish supporting tray 7 is provided in the vat above the bottom wall 2.

In the lower portion of the vat below the tray 7 is a rotary liquid circulating impeller 8 arranged to rotate on an axis substantially coaxial with the central vertical axis of the vat. This impeller is operated by means of an electric motor 9 mounted below the bottom wall of the vat and having a shaft 10 extending up into the vat through a suitable fixed upright tube 10*a*.

The impeller 8 has an acorn-shaped skirt hub support element comprising a top 11 and a side wall 12. The closed top 11 is secured to the upper end of the shaft 10 by means of a nut 13, it being understood that the shaft and the section 11 will have a driving connection between them as by means of a suitable key (not shown). The upper curved end 11 of the support merges into the side wall 12 at about the point indicated by the numeral 14, the side wall below this being a cylinder with a substantially vertical wall, the upper part of the side wall, however, tapering in somewhat to merge smoothly into the top wall, as shown. The support encloses the upper ends of the shaft 10 and tube 10*a*.

Mounted on the outside of the hub apron are liquid circulating blades 15 which begin slightly above the bottoms of the hub as shown. When the impeller rotates said blades engage the water in the sump and hurl it upwardly and outwardly through the rack 7. The water gravitates back down the side walls to the bottom 2, where it is again engaged by the blades and again is hurled upwardly and outwardly through the rack. This process continues so that while the machine is functioning there is a very low level of water in the bottom of the vat, this level being consider-

ably below the normal free liquid in the vat when the impeller is not operating, but, of course, submerges the bottom of the blades and the hub.

Preferably, the support 11, 12 and the blades 15 will be formed integrally together and preferably they will be made from a suitable phenol condensation product.

When the impeller is rotating, the inner surface of the cylindrical section 12 functions as a centrifugal pump, and thereby causes the water in the bottom of the vat to move upwardly in the impeller. The liquid stream thus pumped upwardly by the impeller carries with it food soil particles. And with the impellers heretofore used these particles collected in a mud-like ring on the impeller, and constitute a source of contamination, as explained before.

In order to prevent the deposit of these particles entrained in the upwardly moving water, I provide a pair of apertures 16 located in the area 14 of the hub apron where the top and bottom wall sections 11 and 12 merge. In other words, they overlie the area where the food soil ring would accumulate in their absence. Therefore, the water which is pumped up inside of the impeller is thrown outwardly through these openings with centrifugal force; the stream as it moves through the openings carrying with it the food particles entrained in it. In this way I obviate the deposit of the entrained food particles.

While I have shown and described a particular embodiment of my invention, it will occur to those skilled in the art that various changes and modifications may be made without departing from my invention, and I, therefore, aim in the appended claim to cover all such changes and modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

In a dishwashing apparatus having a vat for receiving dishes and a sump for a quantity of washing liquid to be circulated forcefully over said dishes, a liquid impeller mounted for rotation in the sump portion of said vat, said impeller including a vertically disposed substantially cylindrical hub an open end of which projects into said sump and having inner wall means which operate as a pump drawing washing liquid upwardly along said inner wall means when the impeller is being rapidly rotated, blades on the exterior of said hub for picking up liquid in said sump and distributing said liquid throughout the vat, said hub wall having at least one aperture at a level above the said impeller blades and at a height to which the liquid will be drawn upwardly within said hub by the pumping action thereof, said aperture providing for the flow of liquid from said hub into the liquid mass being circulated by said blades, and means for effecting said rapid rotation of said impeller.

GAYLORD H. WOTRING.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,231,987	Bickford	July 3, 1917
1,847,484	Juengst et al.	Mar. 1, 1932
2,194,342	Walker	Mar. 19, 1940
2,249,562	Kirby	July 15, 1941

FOREIGN PATENTS

Number	Country	Date
40,035	Switzerland	May 3, 1907