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C. J. O. BERGSTRÖM

DISHWASHING MACHINE

Filed June 13, 1922

2 Sheets-Sheet 1

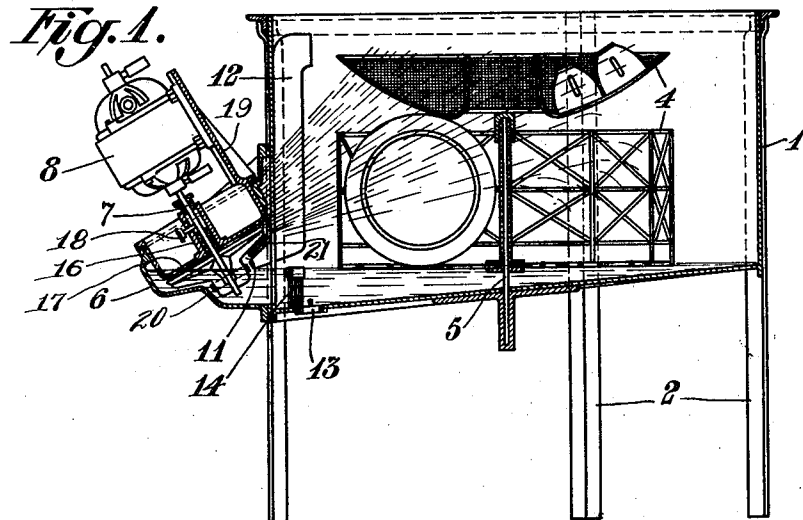


Fig. 2.

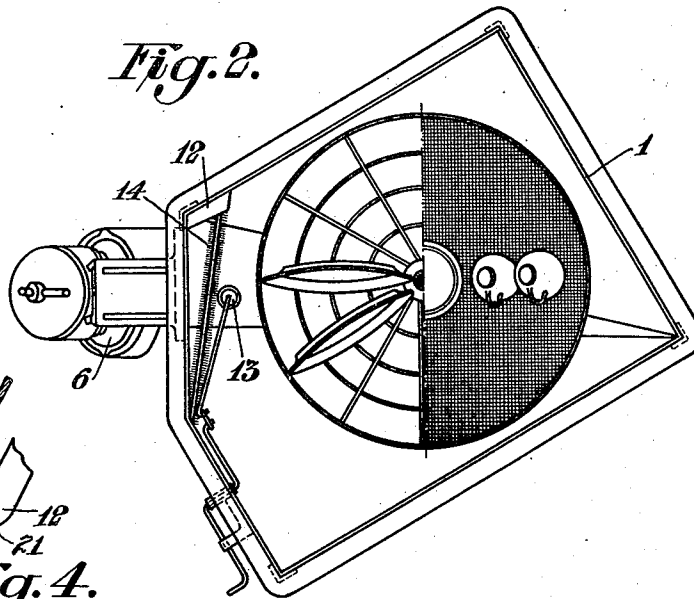


Fig. 3.

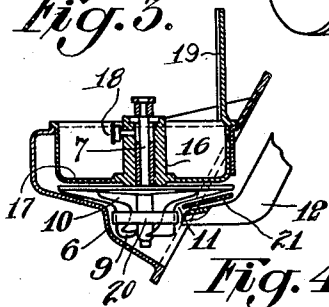
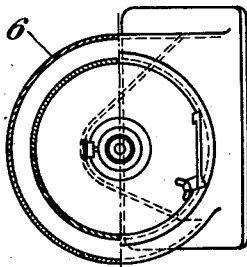


Fig. 4.



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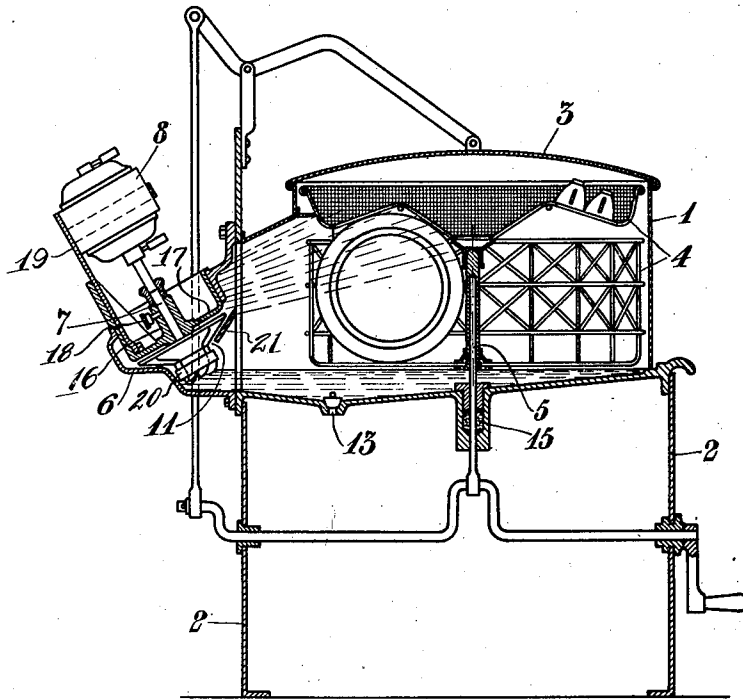
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Fig. 5.



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UNITED STATES PATENT OFFICE.

CARL JOHAN OSCAR BERGSTRÖM, OF EBBES BRUK, NEAR HUSKVARNA, SWEDEN.

DISHWASHING MACHINE.

Application filed June 13, 1922. Serial No. 568,004.

To all whom it may concern:

Be it known that I, CARL JOHAN OSCAR BERGSTRÖM, a subject of the King of Sweden, residing at Ebbes Bruk, near Huskvarna, Sweden, have invented a new and useful Improvement in Dishwashing Machines (for which I have made application in Sweden, Dec. 22, 1920, No. 5900/1920), of which the following is a specification.

The present invention relates to an improvement in such dish-washing machines which consist of a tank in which there is a cage or the like for receiving the dishes and which are provided with a device for spurt-
ing or throwing water on the dishes. The purpose of the invention is to produce a dish-washing machine of this kind which shall be capable of effecting a thorough washing of the dishes with a considerably smaller quantity of water and thus also with a less consumption of power than those heretofore required in similar machines, so that the machine may be used with advantage also in small establishments.

The invention is principally characterized by this that the device for spurting water on the dishes consists of a combined fan and pump, which is arranged in such manner that the pump draws water from the bottom of the tank to the fan, which communicates with an air inlet and thus draws in air by means of which it throws the water against the dishes. In this manner the result is attained that the water may be thrown against the dishes with the required great velocity and with a considerably smaller consumption of power than by the use of an ordinary pump which only pumps water, and in addition the air also aids in blowing the dishes clean. When the dishes have been washed in this manner the water is drained off, so that only air is blown against the dishes which in this manner will be dried in the course of a few minutes. The combined fan and pump may suitably be arranged in such manner relatively to the cage that the dishes placed in said cage are squirted with water in an inclined direction from below upwards. In this manner also deep bowls, such as cups and the like, which are placed in inverted position in the cage, may be washed clean without said bowls taking up water which would of course necessitate an increase of the quantity of circulating water.

In the accompanying drawings two em-

bodiments of the invention are illustrated by way of example. Fig. 1 shows a vertical section of a dish-washing machine according to the invention, and Fig. 2 shows a plan view of the same. Fig. 3 shows a section and Fig. 4 a top view, partly in section, of the combined fan and pump. Fig. 5 shows a slightly modified construction of the dish-washing machine in vertical section.

In the embodiments illustrated, 1 denotes the tank of the machine which is supported by the feet 2. The tank 1 may either be open at the top, as in the construction illustrated in Figs. 1 and 2, or provided with a lid 3, as shown in Fig. 5. In said tank there is provided a cage 4 for receiving the dishes. In the embodiments illustrated said cage consists of two portions, a lower portion for receiving plates and other large articles, and an upper portion for cups and the like. The cage is rotatably supported on a shaft 5 projecting from the bottom of the tank 1, so that said cage may be caused to rotate by the water which is thrown upon the dishes.

A casing 6 for the combined fan and pump is secured to one side of the tank 1, the interior of said casing being in open communication with the tank 1. In the embodiments illustrated the combined fan and pump is formed by a single bucket wheel which is secured to an inclined shaft 7. Said shaft 7 is journaled in bearings encircled by an upstanding sleeve 16 on a member 17 which is secured to and forms a lid of the casing 6. A grease cup 18 is threaded into said sleeve 16 and serves to supply lubricant to said shaft 7, which is driven by a small electric motor 8 which is secured to a plate 19 made integral with or attached to the member 17. The bucket wheel is provided with angular buckets or blades the legs 9 of which extending along the shaft 7, are bent forward in the direction of rotation at their lower ends so that the lower portion of the bucket wheel operates as a water raising wheel, whereas the other legs 10 of the buckets or blades, which extend radially, form the fan wheel. The bucket portions 9 are encircled by a cylindrical sleeve or ring 20 secured to said portions 9 and which acts to conduct the water raised by said bucket portions, upwards to the fan wheel blades 10. The lower portion of the bucket wheel, i. e. the bucket portions 9 and the encircling sleeve 20, thus forms a pump which raises

the water to the upper portion of the bucket wheel, namely the blade portions 10 which form a fan combined with said pump. The air inlet to said fan wheel is located at 11, that is to say at the point where the axial and radial portions of the buckets or blades meet, and consists of a clearance space or opening between the surface of the water in the tank and the lower edge of a partition or web 21 in the casing 6, which web 21, together with a portion of the wall of said casing 6, form a lower wall of a casing for the fan wheel, the upper wall of such casing being formed by the member 17.

The tank 1 and the casing 6 are intended to be filled with water only to the level shown in Figs. 1 and 5, that is to say to such height that the lower portion of the bucket wheel, i. e. the pump wheel, operates in the water, whereas the upper portion of the bucket wheel, i. e. the fan wheel, operates in air. When the motor 8 is started the pump wheel will raise water to the fan wheel, which draws in air through the space or opening 11 and compresses such air in the fan wheel casing formed by the member 17 and the casing 6 and web 21, and by means of the air compressed throws the water against the dishes with such velocity that the cage 4 begins to rotate on the shaft 5. In this manner water will be thrown on all sides of the dishes which will thus be thoroughly cleaned. As shown in Figs. 1 and 5, the pump, the fan and the motor are placed in such inclined position that the water is thrown in an inclined direction upwards against the dishes in the cage 4. The water being thus thrown on the dishes in an inclined direction from below upwards it is possible also to wash cups and similar deep bowls, which are placed in the cage 4 in inverted position, which entails the advantage that no water remains in the cups, but all water will immediately flow to the bottom of the tank, again to be raised by the pump wheel. In this manner the quantity of water required in the machine is decreased.

In order to prevent the fan wheel from also operating in water, if by oversight the tank 1 is filled to a higher level than that intended, it is suitable to place the air inlet to the fan in communication with a separate air inlet tube 12 which extends upwards to the upper portion of the tank 1, and the lower end of which opens just opposite the air inlet 11 of the fan casing. In this manner it is secured that the fan wheel will always draw in air even if the water level in the tank stands higher than the air inlet 11 to the fan. In this manner overloading of the motor 8 is also avoided.

The tank 1 is provided in the usual manner with a bottom drain 13 which may be closed by means of a valve and which serves

for draining the water when the dishes have been washed. When the water has been drained only air is blown against the dishes which will thus rapidly dry. In the tank 1 there is provided a brush 14 for collecting particles of food and the like.

In the construction shown in Fig. 5, the shaft 5 which supports the cage 4, is capable of moving in vertical direction through a packing box 15 in the bottom of the tank 1, and is connected by means of a lever and link mechanism with the lid 3, so that said lid will be automatically opened when the dishes have been washed and the cage with the dishes are lowered, so that said cage comes to rest on the bottom of the tank.

I claim:

1. In a dish-washing machine, the combination of a tank, a cage in said tank for receiving the dishes, and a combined fan and pump, including a casing provided with an air inlet to said fan, said pump being adapted to raise water from the bottom of said tank to said fan, and said fan being adapted to draw air through said inlet and by means of such air to throw the water against the dishes in said cage, for the purpose of obtaining an efficient washing of the dishes with the smallest possible quantity of water.

2. A dish-washing machine as claimed in claim 1, in which the combined fan and pump is placed near the bottom and at one side of the tank and in an inclined position so that it will throw water in an inclined direction upwards in the tank.

3. In a dish-washing machine, the combination of a tank, a cage in said tank for receiving the dishes, and a combined fan and pump, including a casing provided with an air inlet to said fan, said pump being adapted to raise water from the bottom of said tank to said fan, and said fan being adapted to draw air through said inlet and by means of such air to throw the water against the dishes in said cage, said combined fan and pump consisting of a single bucket wheel having a shaft and angular buckets secured to said shaft, the legs of said buckets extending along said shaft having their lower ends bent forward in the direction of rotation so as to be capable of raising water, and the other legs of said buckets extending radially forming a fan wheel, the air inlet to said fan being located at the point where said axial and radial legs of the buckets meet.

4. A dish-washing machine as claimed in claim 3, in which an air inlet tube communicates with the air inlet to the fan and extends to the upper portion of the tank, for the purpose that the fan wheel shall be capable of drawing in air also if the water level in the tank is above the air inlet to the fan.

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