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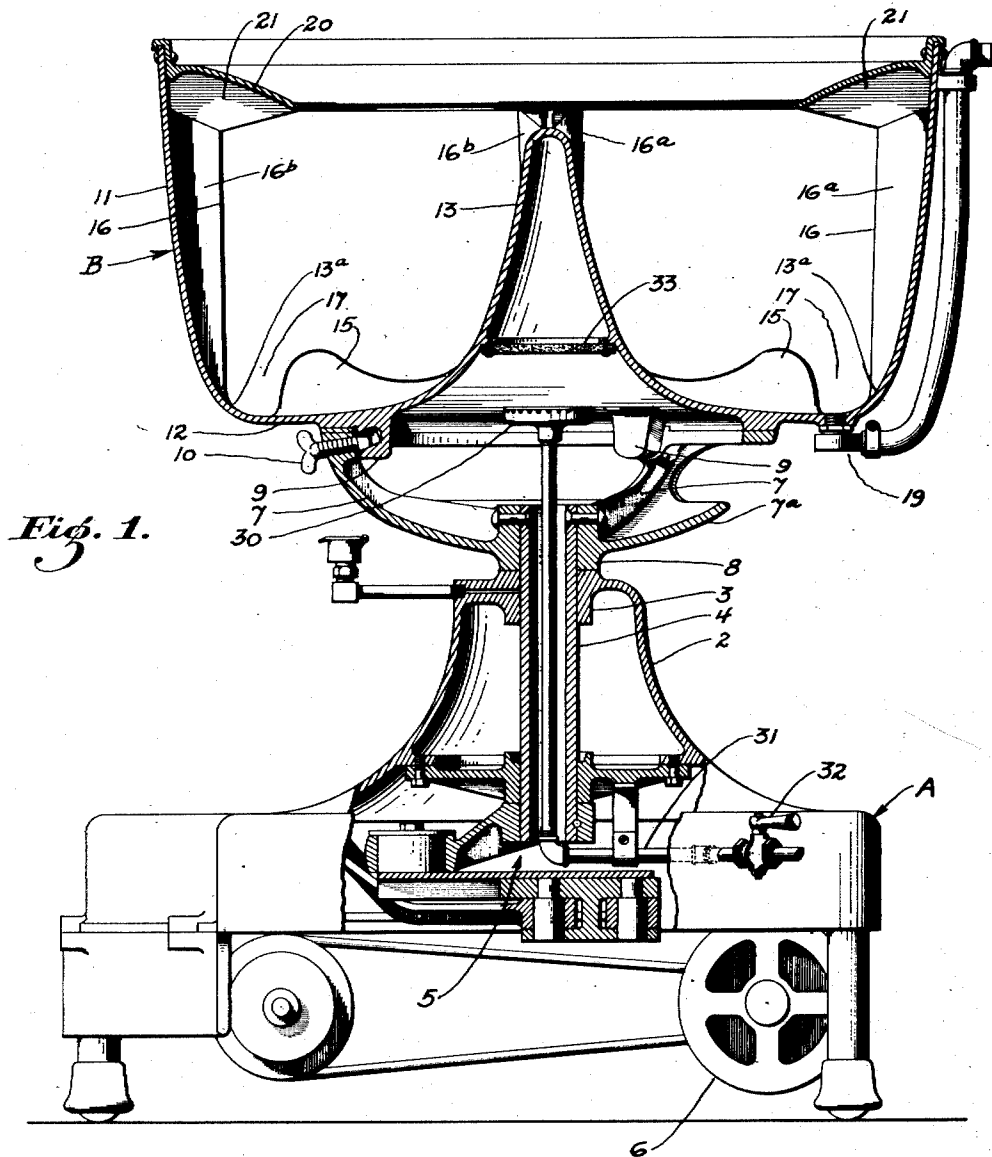
1,701,187

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WASHING MACHINE

Filed March 26, 1925

2 Sheets-Sheet 1



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Fig. 2.

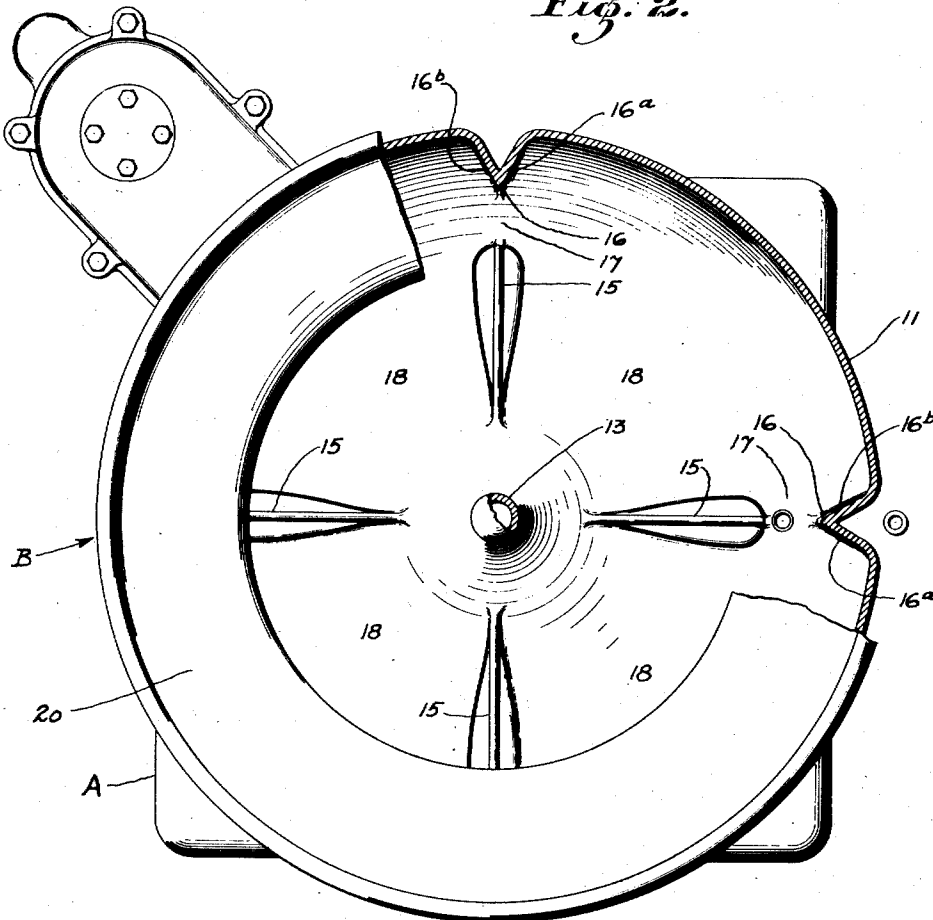
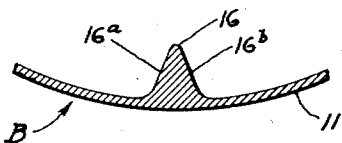


Fig. 3.



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UNITED STATES PATENT OFFICE.

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WASHING MACHINE.

Application filed March 26, 1925. Serial No. 18,441.

This invention relates to washing machines, and especially to that type in which an oscillating tub is employed.

The object of the present invention is to generally improve and simplify the construction and operation of machines of the character described; to provide a tub which is adapted to be mounted for oscillation about a vertical axis; to provide a mounting for the tub which permits removal thereof with relation to the said axis and a connecting driving mechanism; to provide a tub in which radially disposed vanes are formed to transmit motion to the water and clothing contained in the tub; to provide a double set of vanes, one set of vanes near the central axis of oscillation and another set on the inner peripheral surface of the tub; to provide vanes or means whereby a rotary circulation may be set up in the water in a direction outwardly along the bottom of the tub, and then upwardly along the inner surface, and then inwardly towards the center at the top thereof; to provide an upper annular deflector which prevents splashing and escape of water, thereby eliminating the use of a cover, and also permitting visible observation of the washing operation, and also permitting insertion and removal of clothing while the washing is proceeding; and further, to provide means for heating the water in the tub both when in operation and when stationary.

One form which the invention may assume is exemplified in the accompanying drawings, in which:

Fig. 1 is a central vertical section of the washing machine.

Fig. 2 is a plan view partly broken away.

Fig. 3 is a horizontal section of a portion of the tub showing a modified form of vane.

Referring to the drawings in detail and particularly to Fig. 1, A indicates a base member, the center portion of which is extended upwardly as indicated at 2 to form a bearing 3. Journalled in the bearing is a tubular shaft 4, and connecting with the lower end thereof is a variable stroke crank mechanism generally indicated at 5. This mechanism is driven by an electric motor 6. The variable stroke crank mechanism transmits an oscillating movement to the shaft 4, and also to a tub generally indicated at B.

This tub is supported by means of a plurality of radially disposed arms 7 which

form a part of a concave shaped disk 7^a and a collar 8. The collar is secured to the upper end of the shaft 4, and it rests on top of the journal member 3, thus releasing the shaft of the weight of the tub and the water and the clothing contained.

The bottom of the tub is provided with lugs, such as shown at 9. Screws 10 are carried by the arms 7, and a detachable connection is thus formed between the tub and the arms 7, which permit removal of the tub from time to time, as desired. The screws 10, arms 7, and lugs 9 also form a driving connection between the shaft and the tub, and an oscillating movement is therefore also transmitted to the tub.

The tub proper is preferably circular in shape. It consists of an annular continuous side wall 11, and a bottom section 12. The center portion of the bottom section is raised to form a cone shaped member as indicated at 13. This member forming a continuation of the bottom section, causes the bottom to assume a slope, as shown in Fig. 1, and a rounded portion 13^a forms a connection between the sloping bottom and the annular side wall 11.

Formed as an integral part of the bottom section 12 or ends secured thereto, are a plurality of radially disposed interspaced vanes 15, and formed in the inner surface of the annular side wall of the tub are a similar pair of vanes, as indicated at 16. It will be noted that the vanes 15 and 16 are separated with relation to each other, so that two sets of independent vanes are formed. A space 17 is thus formed between the outer ends of the vanes 15 and the lower ends of the vanes 16, this space forming a continuous communication or passage between the pockets 18 formed between the vanes. It will also be noted that the continuous passage 17 is positioned at the lowest point of the bottom section 12. This is also of importance, as it permits complete drainage of water from between the vanes 15 when the tub is to be emptied, any suitable drain connection being provided as indicated at 19.

The vanes 16 taper from the lower to the upper ends, and they are substantially vertically disposed. They form incline faces as indicated at 16^a and 16^b, which serve the function of deflecting the water, as will hereinafter be described.

Secured to the upper rim of the tub and on

the inner side thereof is an annular deflecting plate 20. This plate is also provided with vanes, as indicated at 21, and these vanes align with the vanes 15 and 16 and cooperate therewith. The deflecting plate 20 is turned inwardly and downwardly, and it also serves the function of deflecting the water in the tub, as will hereinafter be described.

- 10 The variable throw crank mechanism, together with the driving motor shown forms the subject matter of my copending application entitled Driving mechanism for washing machines, filed March 16, 1925, Serial No. 15,837. It is therefore thought unnecessary to enter into the detailed construction thereof. Suffice it to say that the variable stroke crank mechanism serves the function to transmit an oscillating movement to shaft 4, collar 8, arms 7, and the tub B secured and supported thereto, the oscillating movement together with the vanes 15, 16 and 21 being depended upon to impart motion and velocity to the water in the tub.
- 25 The operation will be as follows: The clothes to be washed, together with a suitable quantity of water and soap or any other suitable cleansing medium, are placed in the tub. The motor 6 is started and as it drives the variable crank mechanism 5, it can readily be seen that the oscillating movement will be transmitted to the tub. The vanes 15, 16 and 21 immediately set up a rotary motion of the water about a horizontal axis; that is, the vanes 15 tend to throw the water outwardly against the inner annular side of the tub. The vanes 16 receive the water, thus thrown outwardly, and guides it upwardly towards the vanes 21 and the deflecting plate 20. These last named vanes and plates in turn deflect the water inwardly and downwardly against the central cone extension 13, and thus in turn deflects the water downwardly between the vanes 15 and outwardly along the bottom section 12.

This rotary motion of the water takes place in each pocket 18, and as the pockets are all in communication with each other, due to the annular passage 17, it is obvious that the water is not only circulating from one washing pocket to another, but it is also rotating in each pocket. The motion of the water is also reversed with each oscillation and the clothing contained is thus subjected to the currents of water under considerable velocity which are travelling in different directions, the main direction being rotation about a horizontal axis, as previously stated.

The water placed in the tub may be heated if desired, or it may be heated after it is placed in the tub by means of a gas burner, such as shown at 30. This burner is fed by gas pipe 31 entering through the base and

extending upwardly through the hollow shaft 4, the amount of gas delivered being controlled by a valve 32. An asbestos deflecting plate 33 is secured in the cone extension 13, and this drives the heat outwardly and under the bottom of the tub.

In actual practice it has been found that if the water in the tub is heated, considerable sweating takes place under the bottom of the tub when the burner is first started. Any sweating which will occur in the present instance drop downwardly and will collect in the concave shaped disk 7^a forming a part of the collar 8 and the arms 7. This disk also becomes warmer due to the reflected heat in the burner 30, and any water thus collected is gradually evaporated. The burner may be in operation when the tub is standing stationary, and it may also be heating the water when the machine is in operation.

The annular deflecting plate 20 is an important feature of the present invention as it first cooperates with the vanes 15, 16 and 21 to maintain a rotary circulation of the water. Secondly, it prevents splashing and escape of water when the machine is in operation. It eliminates the necessity of a cover. It permits visible observation of the washing operation, and it permits insertion and removal of clothes as washing proceeds.

The cone shaped member 13 is also an important feature, as it helps to form the inclined bottom 12. It assists in driving the water during its circular rotation. It forms an annular washing chamber within the tub, and it furthermore prevents tangling of the clothing by preventing the clothing from collecting in the center portion of the tub.

The separation of the vanes 15 and 16 by forming the annular passage 17 is also important, as it permits circulation of water from one pocket to another, and it also permits complete drainage when the water is to be removed. It may further be stated that it is of importance, as it permits a small amount of water to be placed in the tub when comparatively few articles of clothing are to be washed. That is, a small quantity of water has a tendency to work back and forth between the pockets and the washing action is obtained by the reversed movement of such water in the passage 17. When a larger volume of water is placed in the tub, rotary circulation takes place, as previously explained, in conjunction with a transfer of water from one pocket to another. This rotary motion is the ideal motion, as it always insures submersion and changing of position of the clothing being washed, thus exposing each article to the different water currents and velocities imparted thereto.

While the vanes 16 are illustrated in one

form in Figs. 1 and 2, it is obvious that they may assume the shape shown in Fig. 3.

While I have shown the preferred form of my invention as now known to me, I wish it understood that various changes may be made in its construction without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a washing machine, a circular tub mounted for oscillation about a vertical axis, a vertically disposed cone shaped member in the center of the tub and forming a part of the bottom thereof, said cone shaped member forming an annular washing chamber within the tub adapted to receive water and clothes to be washed, a plurality of radially disposed interspaced vanes formed in the bottom of the tub, a plurality of radially disposed interspaced vanes formed in the inner side of the tub and vertically disposed, said vanes and the first named vanes dividing the annular washing chamber into a plurality of pockets, and said first and last named vanes being separated so that a communicating annular passage is formed between the pockets.

2. In a washing machine, a circular tub mounted for oscillation about a vertical axis, a vertically disposed cone shaped member in the center of the tub and forming a part of the bottom thereof, said cone shaped member forming an annular washing chamber within the tub adapted to receive water and clothes to be washed, a plurality of radially disposed interspaced vanes formed in the bottom of the tub, a plurality of radially disposed interspaced vanes formed in the inner side of the tub and vertically disposed, said vanes and the first named vanes dividing the annular washing chamber into a plurality of pockets, said first and last named vanes being separated so that a communicating annular passage is formed between the pockets, and an annular deflecting plate secured interior of the tub adjacent the upper end thereof.

3. In a washing machine, a circular tub mounted for oscillation about a vertical axis, a vertically disposed cone shaped member in the center of the tub and forming a part of the bottom thereof, said cone shaped member forming an annular washing chamber

within the tub adapted to receive water and clothes to be washed, a plurality of radially disposed interspaced vanes formed in the bottom of the tub, a plurality of radially disposed interspaced vanes formed in the inner side of the tub and vertically disposed, said vanes and the first named vanes dividing the annular washing chamber into a plurality of pockets, said first and last named vanes being separated so that a communicating annular passage is formed between the pockets, and an annular deflecting plate secured interior of the tub adjacent the upper end thereof, and vanes formed on the lower side of said plate and in alignment with said first and last named vanes.

4. In a washing machine, a cylindrical shaped tub comprising a bottom section and an annular substantially vertically disposed side wall, a plurality of vanes radially disposed in the bottom of the tub and vertically positioned, said vanes increasing in vertical height and area towards their outer ends, and a plurality of interspaced vertically disposed vanes on the inner surface of the side wall, said vanes increasing in area towards their upper ends, the outer ends of the first-named vanes and the lower ends of the second-named vanes being separated.

5. In a washing machine, a cylindrical shaped tub comprising a bottom section and an annular substantially vertically disposed side wall, a plurality of vanes radially disposed in the bottom of the tub and vertically positioned, said vanes increasing in vertical height and area towards their outer ends, a plurality of interspaced vertically disposed vanes on the inner surface of the side wall, said vanes increasing in area towards their upper ends, the outer ends of the first-named vanes and the lower ends of the second-named vanes being separated, and an annular deflecting plate disposed above the second-named vanes.

6. In a washing machine, a cylindrical shaped tub comprising a bottom section and an annular substantially vertically disposed side wall, a plurality of vanes radially disposed in the bottom of the tub, a plurality of interspaced vanes on the inner surface of the side wall, an annular deflecting plate in the upper part of the tub, and vanes formed on the lower face of said plate and in alignment with the first and last named vanes.

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