Nov. 13, 1928. 1,691,544

R. J. DOW

WASHING MACHINE

Filed June 11, 1926

Fig. 1.

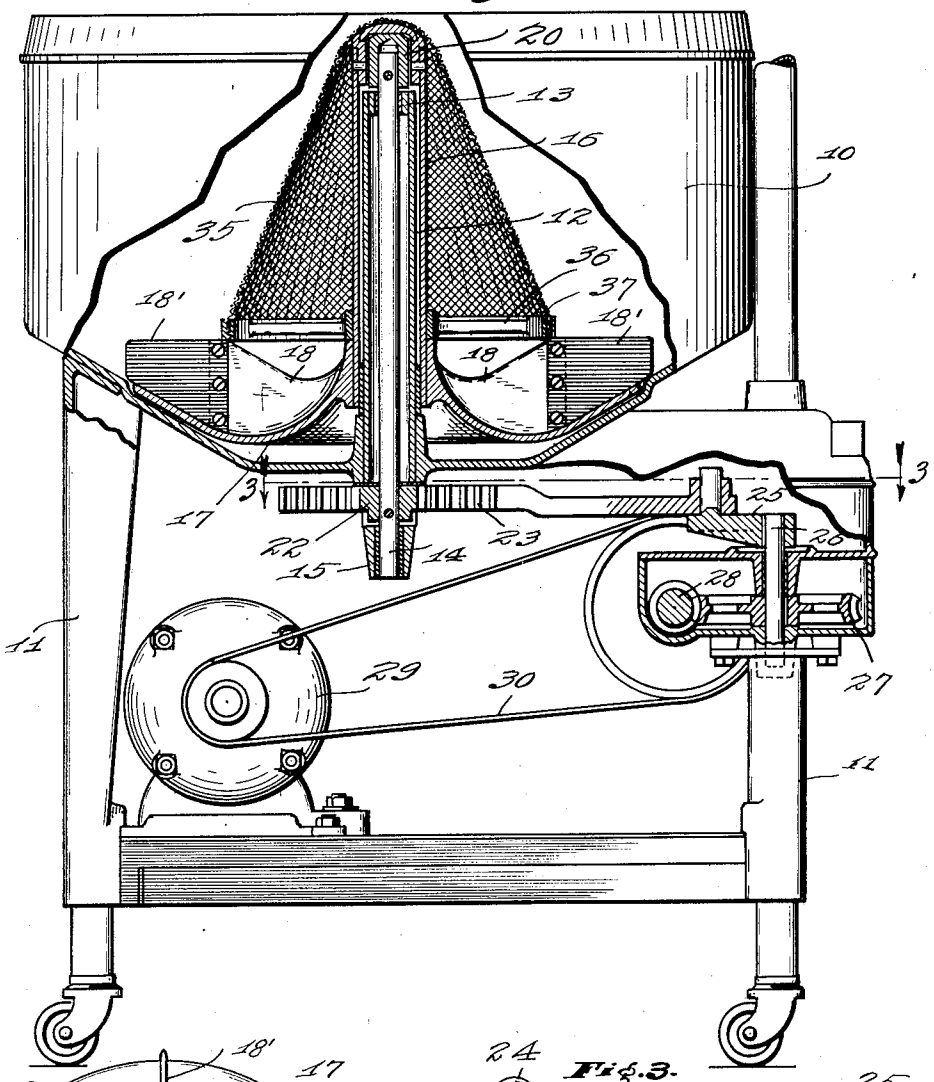


Fig. 2.

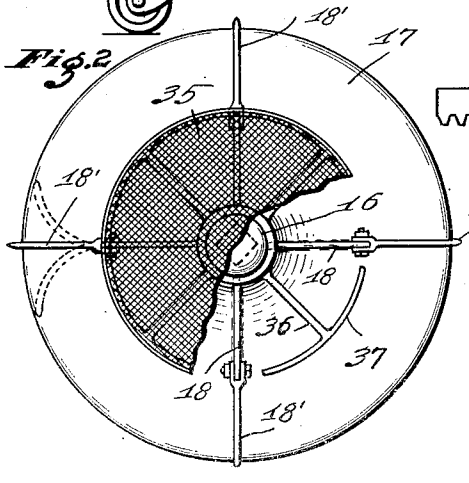
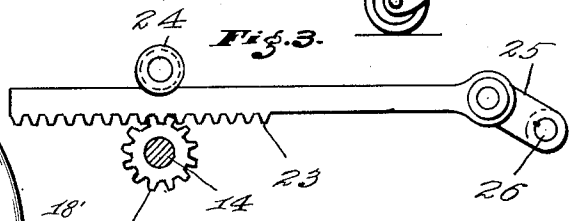


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT J. DOW, OF ST. PAUL, MINNESOTA.

WASHING MACHINE.

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My invention is concerned with washing machines of the type in which the tub contains an agitator having one or more fingers or blades, such agitator being oscillatible about a vertical axis in the tub to circulate the water in the tub by causing an outward flow along the bottom of the tub, an upward flow near the outside of the tub, an inward flow near the surface of the water, and a downward flow near the center of the tub.

It is the object of my invention to provide such a washing machine with an improved form of agitator which will cause a more vigorous water circulation and hence reduce the time necessary for washing clothes and increase the efficiency of washing. A further object of my invention is to prevent the clothes or other material being washed from bunching at the center of the agitator to impede the circulation of the water.

I accomplish the above objects by constructing the blades of my agitator so that they are flexible in the plane of their oscillation and will therefore bend as a result of the resistance offered by the water so that their outer ends will lag behind the remainder of the blades. To prevent bunching of material being washed at the center of the agitator, I provide a foraminous screen which will limit the inward movement of the material being washed without interfering materially with the circulation of the water in the tub.

The accompanying drawing illustrates my invention: Fig 1 is a central vertical section through a washing machine equipped with my improved form of agitator; Fig 2 is a plan view of the agitator; and Fig. 3 is a section on the line 3—3 of Fig. 1.

The washing machine to which my invention may be applied comprises a tub 10 supported on suitable legs 11. Mounted in the center of the bottom of the tub 10 and extending vertically upward therefrom is a tubular bearing support 12 the upper end of which contains a bearing 13 for a shaft 14 which extends through the tube 12 and below the lower end thereof. Below the bottom of the tub 10, there is mounted a bearing 15 for the lower end of the shaft 14.

Operatively connected to the upper end of the shaft 14 is a sleeve 16 which extends downward and surrounds the bearing support 12. At its lower end, the sleeve 16 is rigidly connected to a bowl 17 which is provided with one or more water-agitating blades or fingers 18. Preferably, the sleeve 16 is removably mounted on the upper end of the shaft 14 in order that the complete agitator comprising the sleeve 16, bowl 17, and blades 18 may be removed when desired. This result may easily be accomplished by securing to the upper end of the shaft 16 a square cap 20 which enters a similarly shaped recess in the end of the sleeve 16.

Some suitable means is provided for oscillating the shaft 14 and the agitator which it carries. As shown in the drawings, the shaft 14 is provided at its lower end with a pinion 22 which is engaged by a reciprocable rack 23, such rack being held in contact with the pinion 22 by means of a rotatable guide roller 24. The rack 23 is attached at one end to a crank 25 which is rigid with a rotatable shaft 26. The shaft 26 carries a worm gear 27 meshing with a worm 28 which may conveniently be driven from a motor 29 by means of a belt 30. It will be evident that as the rack 23 is reciprocated by the crank 25 it will oscillate the shaft 14. The roller 24 is spaced far enough from the gear 22 to permit the necessary angular movement of the rack 23.

The blades 18 in accordance with my invention, are flexible in their plane of oscillation so that the outer end of each blade may lag behind the remainder of the blade when the agitator is oscillated. As a result, the blade presents to the water in the tub a working face which is inclined and which tends directly to force outward the water with which it is in contact. This construction produces a more vigorous circulation than does one in which the blades 18 are rigid; as with rigid blades 18, the water in the tub is forced outward only by centrifugal force.

Various forms of flexible blades 18 may be used, but I prefer to construct them so that they have outer ends 18′ of rubber or some similar material which may bend as indicated in the dotted lines in Fig. 2. Desirably, the flexible blade-ends 18′ overhang slightly the rim of the bowl 17 when they are in their respective radial positions in order that when bent they will be substantially flush with the rim of the bowl.

To prevent bunching of the material being washed around the sleeve 16, I mount on the agitator a foraminous screen 35

which may conveniently be conical in form and extend from the top of the sleeve 16 to the tops of the blades 18.

I have found that it is in most cases desirable to make the screen 35 so that its bottom diameter is approximately one-third the diameter of the tub. This screen is spaced from the sleeve 16 and limits the inward movement of material being washed while permitting the inward flow of water through the screen. The lower end of the screen 35 may be reinforced by means of a spider 36 having an outer ring 37 to which the lower end of the screen 35 is secured.

I claim as my invention:

1. In a washing machine having a tub, an agitator oscillatible about a vertical axis in said tub, and means for oscillating said agitator, said agitator including a bowl portion adjacent to the bottom of said tub and one or more water-agitating blades which are flexible in the plane of their oscillation.

2. In a washing machine having a tub, an agitator oscillatible about a vertical axis in said tub, and means for oscillating said agitator, said agitator including one or more water-agitating blades which are flexible in the plane of their oscillation, said blades extending radially outward a considerable distance beyond any support, whereby they may take a position oblique to their direction of motion and exert on water in the tub a force having a considerable outward component.

3. The combination set forth in claim 2 with the addition of a foraminous screen carried by said agitator for limiting the inward movement of material being washed.

4. The combination set forth in claim 2 with the addition of a foraminous screen for limiting the inward movement of material being washed.

5. In combination with a washing machine having a tub, an agitator having one or more water-agitating blades and oscillatible about a vertical axis in said tub, and means for oscillating said agitator, a foraminous screen carried by said agitator for limiting the inward movement of material being washed.

6. In combination with a washing machine having a tub, an agitator having one or more water-agitating blades and oscillatible about a vertical axis in said tub to produce a circulation of water in the tub outward along the bottom of the tub, upward along the sides of the tub, and inward adjacent the upper surface of the body of the water, and means for oscillating said agitator, a foraminous screen for limiting the inward movement of material being washed.

7. In combination with a washing machine having a tub, an agitator having one or more water-agitating blades and oscillatible about a vertical axis in said tub to produce a circulation of water in the tub outward along the bottom of the tub, upward along the sides of the tub, and inward adjacent the upper surface of the body of the water, and means for oscillating said agitator, a foraminous screen for limiting the inward movement of material being washed, said foraminous screen being located wholly above said blades.

8. In combination with a washing machine having a tub, an agitator having one or more water-agitating blades and oscillatible about a vertical axis in said tub to produce a circulation of water in the tub outward along the bottom of the tub, upward along the sides of the tub, and inward adjacent the upper surface of the body of the water, and means for oscillating said agitator, a foraminous screen for limiting the inward movement of material being washed, said blades projecting outwardly beyond said foraminous screen.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 9th day of June, A. D. one thousand nine hundred and twenty-six.

ROBERT J. DOW.