

Feb. 4, 1941.

W. V. HEALEY

2,230,404

WASHING MACHINE

Filed May 31, 1938

2 Sheets-Sheet 1

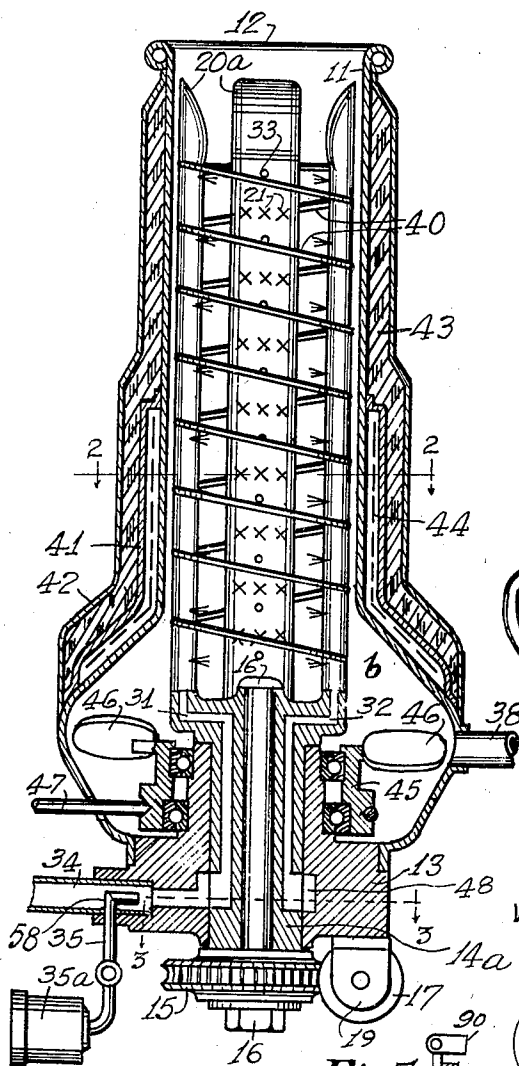


Fig. 1

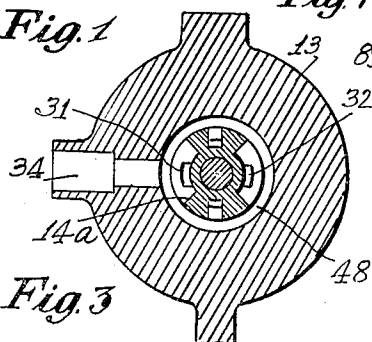


Fig. 3

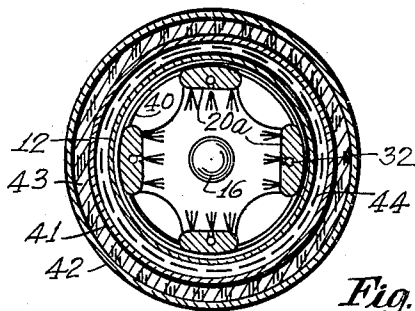


Fig. 2

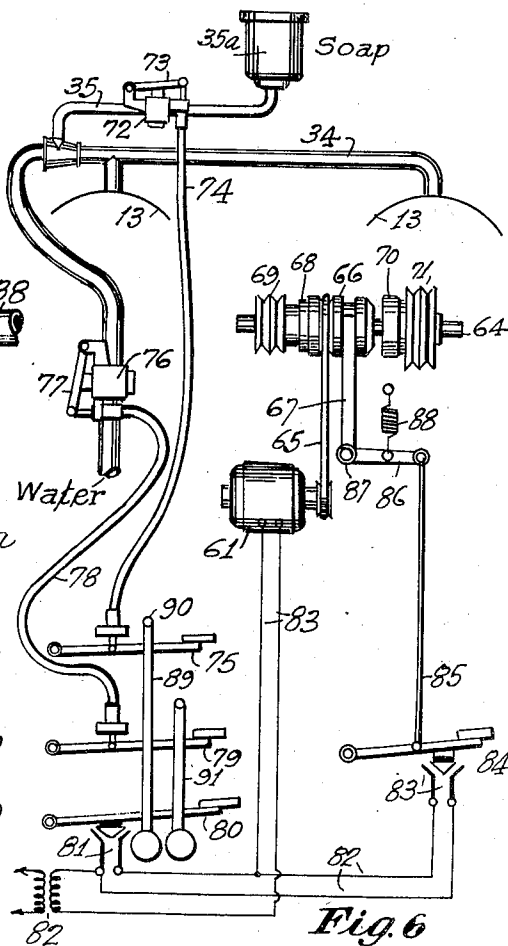


Fig. 6

INVENTOR.
William V. Healey,
BY *M. Loughridge*
ATTORNEY.

Feb. 4, 1941.

W. V. HEALEY

2,230,404

WASHING MACHINE

Filed May 31, 1938

2 Sheets-Sheet 2

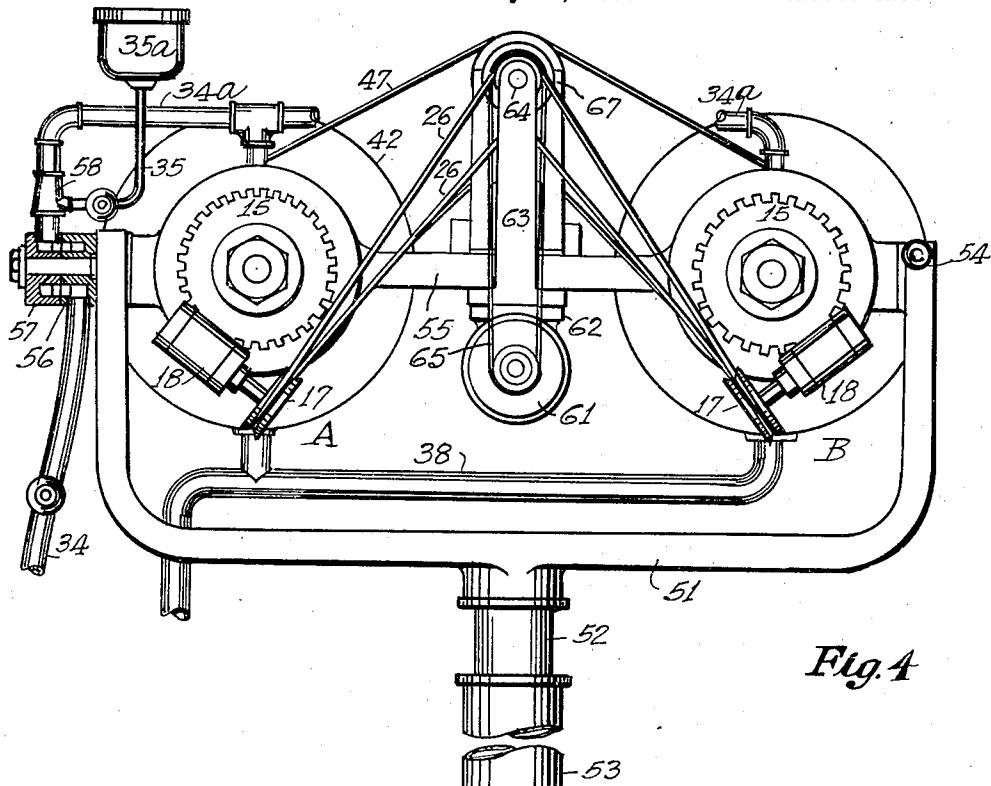


Fig. 4

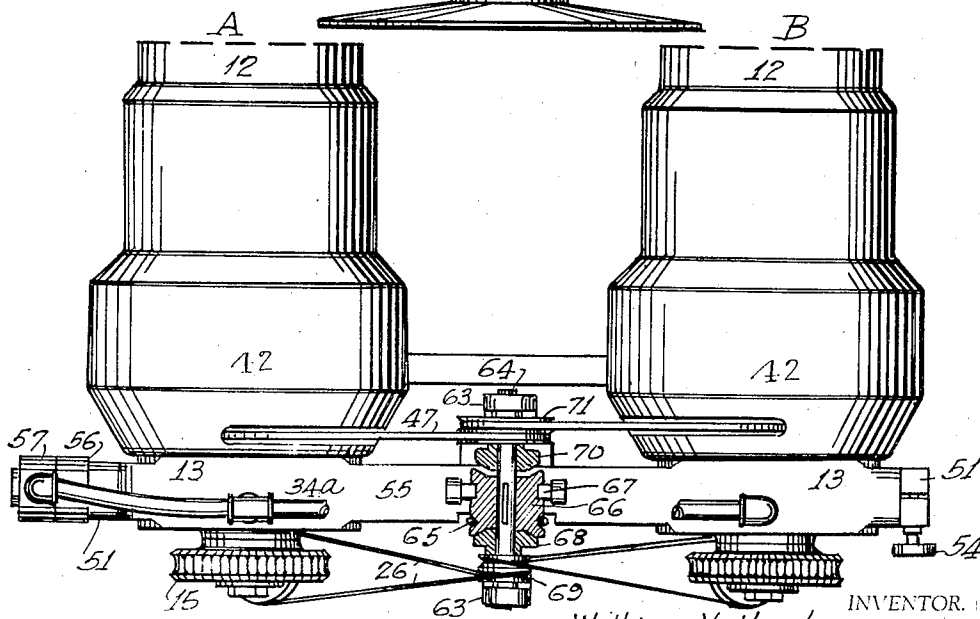


Fig. 5

INVENTOR.
William V. Healey,
BY *M. Houghridge*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,230,404

WASHING MACHINE

William V. Healey, New York, N. Y.

Application May 31, 1938, Serial No. 210,991

10 Claims. (Cl. 15—4)

This invention relates to a washing machine in which a rotating brush is used and liquid is supplied through the brush for cleaning the object. A particular application of the invention is to wash the hand or to wash the hand and the forearm. An object of the invention is to provide a washing machine with a rotating brush and a continuous supply of water and soap for operating on the object to be washed; another object of the invention is to provide a washing machine with a hollow brush and water supply in which the brush is continuously rotated; another object of the invention is to provide a washing machine with a rotating brush and a water supply therein, with means for draining off the water immediately after it has been used; another object of the invention is to provide a washing machine with a rotating brush and with means for supplying water under pressure thereto; another object of the invention is to provide a washing machine suitable for washing one or both hands, which is adjustably mounted to suit the user, and another object of the invention is to provide a washing machine operated by an electric motor and controlled by foot pedals.

Further objects of the invention are to provide a combined hand washing and drying machine having a rotating brush and water supply for washing purposes with a heating element and a fan for drying purposes; another object of the invention is to provide a hand washing machine with a rotating brush and water supply and with a fan and heating element, the fan being operated at a higher speed than the brush; another object of the invention is to provide a cylindrical form of washing machine having a heating element in the wall of the cylinder and a hollow brush in the cylinder with means for protecting objects operated on by the brush from the heating element; another object of the invention provides a pair of hand washing machines pivotally mounted and operated from a single motor, and another object of the invention is to provide a washing machine with a rotating brush and with a fan and with means for alternately operating the brush or the fan. Other objects of the invention will be more particularly understood from the following specification and the accompanying drawings, in which:

Fig. 1 is a longitudinal section, with the brush partly sectioned, of the washing machine adapted to both wash and dry the hands;

Fig. 2 is a cross section on line 6—6 of Fig. 1;

Fig. 3 is a cross section on line 7—7 of Fig. 1;

Fig. 4 is an end elevation of a pair of units

pivotally mounted on an adjustable stand and driven by a single motor;

Fig. 5 is a plan view, partially sectioned, of the structure in Fig. 4, and

Fig. 6 is a diagram showing one method of controlling the system by foot pedals;

Fig. 7 is a detail of the pedal arrangement shown in Fig. 6.

The present invention comprises a rotating brush operated by a motor at a relatively low speed in the order of 30 R. P. M. This brush is mounted on a rotating stem, suitably connected with a driving motor and the stem is provided with one or more conduits connected with the water supply and these conduits extend into the body of the brush and through suitable apertures project a water stream upon the object to be washed. The brush is mounted within a cylindrical housing and a waste pipe is provided together with a sump for draining off the water as soon as it is used. In the preferred construction the brush itself is hollow and cylindrical in form, with the bristles pointing towards the center so that it scrubs the object to be washed, on all sides at the same time that the water is flowing thereon. The housing of the brush is preferably pivotally mounted so that its angle of inclination can be adjusted to suit the person using the machine, but the outer end of the cylindrical housing should be maintained at a higher level than the pivoted end to insure drainage in the proper direction.

Machines of this type are useful in hospitals where surgeons and others spend considerable time in washing the hands and the forearm. With this machine the hollow brush is large enough to accommodate the hand and the forearm which is rapidly cleaned by the action of the brush, thus saving time, water and soap. The machine is also arranged to provide a dryer in the form of heated air which is blown over the hand after the washing operation is completed. For this purpose the cylindrical wall of the machine is suitably insulated and is provided with a heating element in the form of an electric heating coil, a steam jacket or other means and located inside the cylinder is an air fan suitably connected with the operating motor to be operated to drive the heated air over the hand after it has been washed and without removing it from the machine. When the hollow type of brush is used, apertures are provided in the wall of the brush to permit the free flow of the heated air from the fan and in order to protect the hand

within the rotating brush, these apertures are suitably protected by a spiral coil of wire.

Both the hands may be washed at the same time by a pair of units suitably mounted on an adjustable stand and connected with the operating motor. In this arrangement the mechanism is controlled by the foot which may be used to operate the motor, provide the water supply and provide a soap supply, or any one of these, and, alternative to this, the foot pedal may be operated to change the machine from operating as a washer and instead to operate as a dryer in which the liquid supply is cut off and the fan and the heating element are brought into use.

In the drawings, 11 is the cylindrical housing having the opening 12 at the outer end and the inner end is mounted upon the frame 13 which supports the stem 14a of the brush 20a by suitable bearings. The outer end of the stem is provided with the worm wheel 15 which is operated by a worm enclosed in 18, Fig. 4, and mounted rigidly on the shaft of the belt wheel 17 in the bracket arm 19. The hollow, cylindrical form of brush 20a, with the stem 14a may be removed and replaced by means of bolt 16. The brush 20a is provided with the bristles 21 pointing inwardly and with the apertures 33 connecting to the liquid conduits 31 and 32 in the brush so that the object in the centre of the brush is subject of the scrubbing of the bristles and the water jets, projected through the apertures 33.

The machine in Fig. 1 provides a dryer as well as a washer and it is assumed in this machine that water is supplied under suitable pressure so that a pump for this purpose is not required. Liquid soap may be supplied from the container 35a, through pipe 35 to the nozzle 58 located in the water pipe 34 and to the annular water chamber 48 which connects with the water conduits in the stem 14a. The brush is cylindrical in form and is made of four projecting fingers enclosing a hollow space in the center of the machine, each finger is provided with bristles and with a water conduit as indicated in Fig. 2. In order to protect the hand and arm of the operator, the fingers 20a are surrounded by a spiral coil of wire 40 which acts as an effective screen for this purpose, while leaving an open space from the interior to the wall of the cylinder.

The cylinder 12 is provided with a jacket 41 enclosing a heating element 44, and with an outer jacket 42 enclosing the heat insulating medium 43. A fan 46 having the hub 45, is mounted by ball bearings on the frame 13 and is driven by the belt 47. This forces an air blast from the chamber b, along the wall heated by element 44 and through the spaces in the brush to dry the hand while it is in the machine after the washing is completed. Air enters chamber b through the aperture provided for belt 47.

In Fig. 4 a pair of similar units A and B are pivotally mounted in the frame 51 and may be locked in an adjusted position by the clamp screw 54. Frame 51 is supported by the stem 52 in the pedestal 53 and may be adjusted as to height and rotated as to position. Each unit is supported by a connecting frame 55 upon which the drive mechanism is mounted. The water supply may be obtained through a pivoted coupling on the axis of frame 55 through connects to the units A and B. The soap pipe 56 and 57, connecting to water pipe 34a which

35 connects to the water pipe through the nozzle 58.

Both units are operated by motor 61, secured at 62 to the connecting frame 55 which, through the up-standing arm 63, supports the drive shaft 64. The driving belt 65 connects motor 61 with clutch member 66, splined on shaft 64 and operated by clutch arm 67. When the clutch is in the position shown in Fig. 5 it engages member 68, connected with the pulley 69 and through the belts 26 drives the worm wheel and brush of each unit, while the pulley wheel 71 remains disclutched. When the clutch member 66 is moved to the reverse position, the member 68 is disengaged and the member 70 is engaged and is thereby driven with the pulley 71 and the belts 47 to operate the fan 46 in each unit. The clutch member 66 is arranged to alternately operate either the brush or the fan in each unit.

The operation of the system will be understood from Fig. 6 in which the soap pipe 35 is controlled by a valve 72 which is opened by depressing lever 73, connected by Bowden wire 74 with the foot pedal 75; also, the water supply is controlled by valve 76, operated by lever 77 which is connected by Bowden wire 78 with the foot pedal 79. The motor circuit is established by foot pedal 80 and contact 81 to transformer 82 and circuit 83 to motor 61. When the pedal 80 is depressed, the motor circuit is established to operate the brushes. When the pedal 79 is depressed, water is supplied to the system and when pedal 75 is depressed soap is supplied to the system. These pedals are cooperatively operated by the levers 89 and 91. When lever 89 is depressed it engages 75, 79 and 80 and operates the brushes, supplies the water and the soap at the same time. When lever 91 is depressed, it depresses 79 and 80 and supplies water while the brushes are operating.

The foot pedal 84 is located so that it may not be operated with pedal 75, 79 or 80. When this pedal is depressed it closes the motor circuit at 83', through conductors 82 and 83 and through the rod 85 and arm 86 it operates the clutch lever 67 pivoted at 87 to move the clutch 66 into engagement with 70 and operate the air fan. When pressure is released from the pedal 84 the spring 88 moves the clutch 66 back to the normal position to operate the brushes through the pulleys 69.

This invention admits of a variety of applications in addition to those shown which are comprehended within the scope of my invention.

It should be noted that the motor is mounted on the connecting frame close to the line of the pivotal center of the units so that they may be readily adjusted. The drive shaft is mounted above the units so that the driving belts for the fans are taken off above the center of the units and leakage through the belt opening is avoided.

The machine described is particularly adapted for washing the hands and the washing includes the subsequent drying. The hand is placed inside a hollow member which is driven at a slow rate and may be arranged to apply washing fluid and a scrubbing action to the hand. The hollow member is apertured so that the air blast from the fan in the housing is blown over the hand. Ordinary air has a drying effect when blown over the hand, but this effect is much increased if the air is heated. The hand within the hollow brush is protected from protruding to engage the housing where it might be in-

jured by the walls of the housing. The fan is located at one end of the housing and below the rotating brush so that it may safely be rotated at speed without the possibility of injury to the hand in the hollow brush.

This machine is not to be considered solely as a hand washing machine. It can be applied to the washing and drying of light objects and objects that are inserted from a support at the outer end. In general it comprises a cylindrical housing open at one end and in which a hollow washing unit is rotatably mounted and is supplied with a washing fluid, the object to be washed being placed in the washing unit. In addition, an air fan is provided for blowing air through the washing unit, and the fan may be operated alternately with the rotating washing unit. Heated air may be supplied by the fan for drying the object after the washing operation, or the fan may be used to drive away dust. These features may be embodied, in whole or in part, in a variety of washing machines, as well as in the particular form used to illustrate the invention.

Having described my invention, I claim:

1. A washing machine for washing hands comprising a cylindrical housing, a brush rotatable in said housing, a conduit connected with a liquid supply embodied in said brush, a heating element in the walls of said housing and a fan in one end of said housing mounted on the same axis as said brush for blowing air from said heated walls over the object being washed.

2. A combined washing and drying machine for washing hands comprising a cylindrical housing for receiving the article to be washer, a brush rotatable in the center of said housing, a conduit for a liquid supply embodied in said brush, a fan in said housing rotating about the same axis as said brush, a motor and a clutch, means for driving said brush through said clutch and independent means for driving said fan through said clutch and means for operating said clutch to change from one drive to the other.

3. A combined washing and drying machine comprising a cylindrical housing, a brush rotatable in said housing having a central aperture to receive the article to be washed, a conduit connected with a liquid supply embodied in said brush, a heating element in the wall of said housing, and surrounding said housing, a fan in said housing arranged to blow air from the heated walls through said brush and means for driving said brush and said fan.

4. A combined washing and drying machine comprising a housing, a rotatable brush in said housing, a conduit connected with a liquid supply embodied in said brush, a heating element in the walls of said housing, a fan for blowing heated air from the heated walls element through said brush, means for driving said brush and means for driving said fan, and means for controlling the brush drive and liquid supply, and means for controlling said heating element and fan drive.

5. A combined washing and drying machine

for washing hands, comprising a housing, a rotatable brush in said housing having a conduit connected with a liquid supply, a heating element surrounding the walls of said housing, a fan mounted on the axis of said brush for blowing air through said housing, a drive shaft with a clutch thereon, means connecting said clutch with said brush and independent means connecting said clutch with said fan, and means for operating said clutch to drive the brush or to drive the fan.

6. A washing machine comprising a frame, a pair of housings mounted in spaced relation on said frame, each housing having a rotatable brush and a conduit leading to a liquid supply for each brush, a common drive shaft located between said housings and means operatively connecting each brush with said drive shaft.

7. A combined washing and drying machine comprising a frame, a pair of housings mounted in spaced relation on said frame, each housing having a rotatable brush, a conduit for a liquid supply embodied in said brush, a heating element and a fan for each housing, a common drive shaft, means operatively connecting said drive shaft with said brushes, other means operatively connecting said drive shaft with said fans, and control means for the drive of the brushes, and for the liquid supply, and other control means for the drive of the fans.

8. A combined washing and drying machine for washing hands comprising a cylindrical housing having a rotatable brush, a conduit for a liquid supply in said brush, a heating element in the wall of said housing and a fan for blowing air from the heating element through the housing, a foot pedal for controlling the operation of said brush and liquid supply and a second foot pedal for controlling the operation of said fan.

9. A washing machine for washing hands comprising a cylindrical housing having an open and a closed end, mounted to be inclined with the open end pointing upwards, a rotatable hollow brush in said cylinder open at the upper end to receive the hand and having apertures in its side walls and a stem mounted in the closed end of said cylinder by which it is rotated, a fan mounted in said cylinder at the closed end for blowing an air blast through said brush, and means including the walls of the brush for confining the hand within said hollow brush.

10. A combined washing and drying machine comprising a cylindrical housing with a heating element in its walls, a rotatable brush in said housing rotating close to the wall of the housing and having a central aperture for the article to be washed and having openings in its walls connecting the central aperture with the cylinder, a fan at the end of said cylinder mounted on the same axis as said brush for blowing air from the heated walls upon the article being washed, means for driving said brush and means for driving said fan at a higher speed than said brush.

WILLIAM V. HEALEY.