Jan. 8, 1935. P. H. ENGEL 1,987,231

WASHING MACHINE

Filed Feb. 23, 1928 2 Sheets-Sheet 1

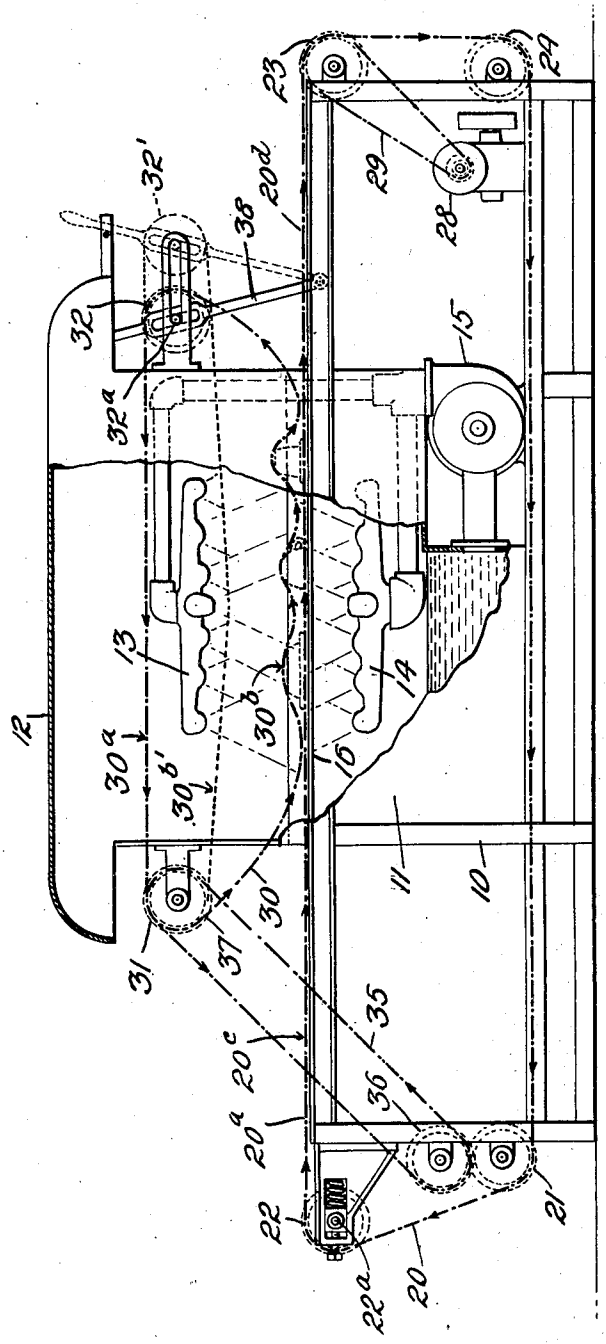


Fig. 1.

INVENTOR
Paul H Engel
BY
Robert W Byerly
ATTORNEY

Jan. 8, 1935. P. H. ENGEL 1,987,231

WASHING MACHINE

Filed Feb. 23, 1928 2 Sheets-Sheet 2

Fig. 2.

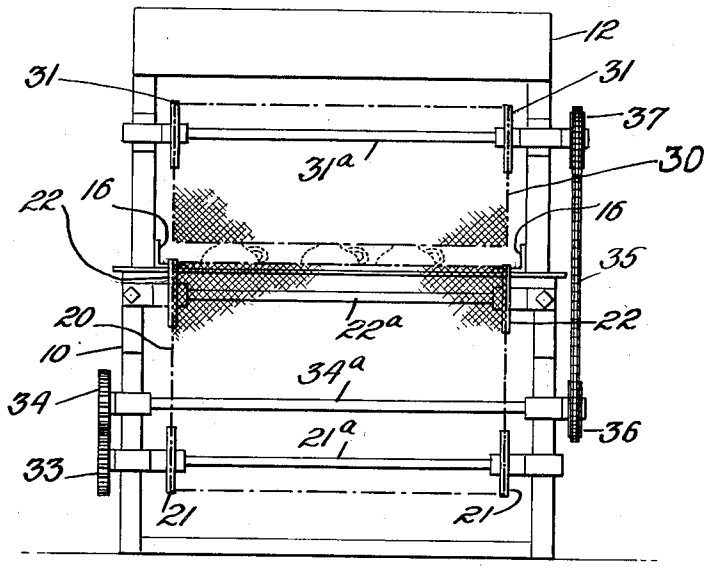
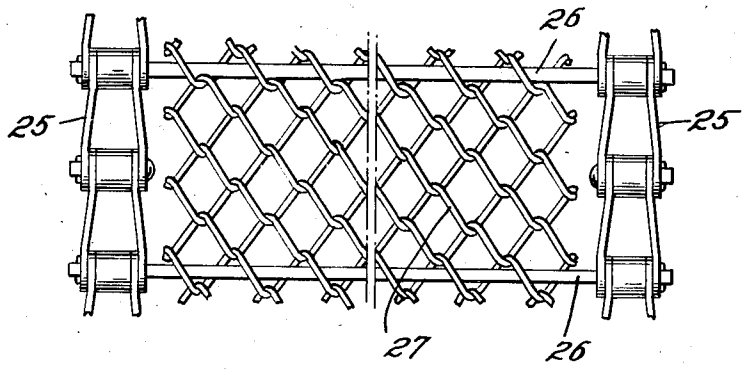


Fig. 3.



INVENTOR
BY Paul H. Engel
Robert W Byerly
ATTORNEY

Patented Jan. 8, 1935 1,987,231

UNITED STATES PATENT OFFICE

1,987,231

WASHING MACHINE

Paul H. Engel, Troy, Ohio, assignor to The Hobart Manufacturing Co., Troy, Ohio, a corporation of Ohio

Application February 23, 1928, Serial No. 256,334

11 Claims. (Cl. 141—9)

This invention relates to washing machines and, more especially, to machines for washing dishes or metal parts. The invention aims to provide for securely holding the articles to be washed during the washing operation.

The invention may be incorporated in a washing machine of the type having an elongated chamber or hood containing jets, sprays, splashers or other devices for projecting or throwing liquids against articles passed through the hood. When applied to such a machine, the invention may be incorporated in a pair of belts extending through the hood, one of which supports the articles to be washed and carries them through the hood, while the other, moving in the same direction at substantially the same speed, presses down upon the articles and holds them securely in position on the first belt. Both the belts are preferably of open construction so as to permit free passage of the washing or washing and rinsing fluids through them.

While the upper belt may, in certain cases, be made taut and pressed tightly against articles by means other than its own weight, a feature of the invention which has proved of great practical importance consists in making the upper belt slack and allowing it to rest upon the articles by its own weight. In this way, the upper belt serves to hold firmly in position articles of different shapes and different sizes arranged indiscriminately on the lower belt.

A further feature of the invention consists in providing means for drawing the upper belt up away from the lower belt, so that it may be out of the way when the nature of the articles being washed is such that their own weight holds them in proper position on the lower belt.

In order that the invention may be clearly understood, I will describe in detail a specific embodiment of it which is shown in the accompanying drawings, in which

Fig. 1 is a side elevation of a washing machine, with the wall of the hood partially broken away and with the belts and chains indicated diagrammatically;

Fig. 2 is a left end view of this washing machine; and

Fig. 3 is a detail showing the construction of the belts.

The machine shown in the drawings has a framework 10, in which is supported a casing 11, the lower portion of which contains a tank, and the upper portion of which provides a hood 12. Within the hood 12 are washing devices preferably throwing water both upwardly and downwardly.

For the sake of illustration, such washing devices have been indicated as rotary spray arms 13 and 14, with nozzles directed respectively downward and upward. A pump 15 draws a washing liquid from the tank at the bottom of the casing 11, and forces into and through the spray arms in the usual manner.

A lower belt or conveyor 20 is mounted on the frame 10. This belt extends around pairs of sprockets 21, 22, 23, 24 carried by cross-shafts journaled on the frame 10. The belt 20 is of open construction and consists of a pair of chains 25 running over the pairs of sprockets and connected by cross-pieces 26 which extend through and carry an open mesh 27. The shaft 22*a* on which the sprockets 22 are mounted is adjustable in known manner for the purpose of tightening the belt 20.

The upper reach 20*a* of the belt 20 extends through the hood 12 between the wash arms 13 and 14. Supports 16 on the frame 10 lie under the chains 25 throughout the upper reach 20*a* of the belt 20 and thus maintain the upper reach of this belt horizontal both in the hood 12 and for some distance beyond each end of the hood. The belt 20 may be driven by any convenient known mechanism, such as a power-driven reducing gear 28 and a sprocket chain 29 extending from the reducing gear to a sprocket on the same shaft as the sprockets 23.

An upper belt 30 is provided to retain the articles to be washed securely in position on the upper reach 20*a* of the lower belt 20. The belt 30 may be similar in construction to the lower belt 20. It passes around pairs of sprockets 31, 32 normally located at the ends of the hood 12 and at some distance above the upper reach 20*a* of the lower belt. The belt 30 is considerably greater in length than twice the distance between the pairs of sprockets 31, 32 in the normal position of the sprockets, so that the lower reach 30*b* of the belt 30 is slack and may hang down and rest upon the middle portion of the upper reach 20*a* of the lower belt or upon articles carried by the upper reach of the lower belt.

The upper belt 30 is driven in such manner that its lower reach 30*b* is kept slack and moves in the same direction as the upper reach 20*a* of the lower belt 20 and at the same speed. Assuming that the lower belt 20 is driven in such direction that its upper reach 20*a* moves toward the right in Fig. 1, the upper belt 30 may be driven from the lower belt by mechanism illustrated in

Figs. 1 and 2. This mechanism includes a pair of gears 33, 34 of equal size and mounted respectively on the cross-shaft 21*a* which carries the sprockets 21 and an auxiliary cross-shaft 34*a*, and a sprocket chain 35 connecting a sprocket 36 on the shaft 34*a* with a sprocket 37 of equal size on the shaft 31*a* which carries the sprocket 31. It will be observed that this mechanism drives the sprockets 31 in an anti-clockwise direction (Fig. 1) so that the upper reach 30*a* of the belt 30 is held taut, while the lower reach 30*b* is slack and moves in the same direction as the upper reach 20*a* of the lower belt 20.

In the operation of the machine which has been described, the articles to be washed are placed upon the portion 20*c*, of the upper reach 20*a*, of the lower belt 20 and are carried by the lower belt into, through, and out of, the hood 12. As the articles enter the hood, the lower reach 30*b* of the upper belt 30 descends upon them, and, by its weight, holds them firmly in position on the lower belt during the washing operation. As the articles emerge from the hood, they move out of contact with the lower reach of the upper belt 30, which at this point is being drawn upward to the sprockets 32. The articles are, therefore, exposed on the portion 20*d* of the upper reach 20*a* of the lower chain so that they may easily be removed therefrom.

To provide for getting the lower reach 30*b* of the upper belt 30 out of the way when it is not needed, the shaft 32*a*, upon which the sprockets 32 are carried, is movably mounted in the upper ends of levers 38 which may be tipped and locked so as to hold the sprockets 32 in the position 32' indicated in dotted lines in Fig. 1. This tightens the lower reach 30*b* of the belt 30, bringing it to the position indicated at 30*b*' so that it is out of contact with the lower belt or articles placed upon the lower belt.

What I claim is:

1. In a washing machine, the combination with washing mechanism, of a horizontal support for the articles to be washed, flexible holding means resting by gravity on the articles on said support, and interconnected means for moving said holding means and said support in the same direction and at substantially the same speed through the washing mechanism.

2. In a washing machine having mechanism for forcibly projecting liquid, the combination of a horizontal conveyor for carrying the articles to be washed into, through and out of the path of the fluid projected by said mechanism, flexible means acting by gravity to hold down articles on the conveyor, and means for laying the holding means on articles on the conveyor before they enter the path of the liquid projected by said mechanism and for lifting it therefrom after they leave said path.

3. In a washing machine, the combination of a carrying belt having a taut horizontal upper reach for carrying articles to be washed, a holding belt located above the carrying belt with its lower reach sufficiently slack to lie loosely on articles carried on the upper reach of the carrying belt, means so connecting the two belts that the lower reach of the holding belt moves in the same direction and at substantially the same speed as the upper reach of the carrying belt, and washing mechanism for washing articles while confined between adjacent reaches of the belts.

4. In a washing machine, the combination of a horizontal open support for the articles to be washed, means for projecting a washing liquid upwardly against articles on the support, and a flexible slack open mesh screen resting by gravity on the articles on the support to resist the tendency of the washing liquid to raise the articles from the support.

5. In a washing machine, the combination of a horizontal conveyor for articles to be washed, two pulleys located a substantial distance above the horizontal plane of the conveyor, an open belt passing around said pulleys and having a length materially greater than twice the distance between them, means for driving one of the said pulleys in such direction that the upper reach of the belt is taut while the lower reach of the belt is sufficiently slack to lie loosely on articles carried on the conveyor and moves in the same direction as the conveyor, and washing mechanism for washing articles while confined between adjacent reaches of the conveyor and belt.

6. In a washing machine, having a conveyor for the articles to be washed, two pulleys located above the conveyor, an open belt passing around said pulleys and having a length materially greater than twice the distance between them, means for driving one of said pulleys in such direction that the upper reach of the belt is taut while the lower reach of the belt is slack, rests on the conveyor and moves in the same direction as the conveyor, and means for tightening the belt so as to draw its lower reach out of contact with the conveyor.

7. In a washing machine, the combination of an endless open mesh conveyor belt having a taut upper reach for carrying articles to be washed, and an open mesh holding belt located above the middle portion of the upper reach of the conveyor belt and so slack that its lower reach lies loosely upon articles carried by and within the middle portion of the upper reach of the conveyor belt, pulleys for the conveyor belt, and pulleys for the holding belt all of which holding belt pulleys are located materially above all of the pulleys for the conveyor belt, means for driving the belts in the same direction and at substantially the same speed, and washing mechanism for projecting washing fluid through the open mesh belts to wash articles while confined between adjacent reaches of the conveyor belt and holding belt.

8. In a washing machine, the combination of a conveyor for articles to be washed, a holding belt located above the middle portion of the conveyor and so slack that its lower reach rests upon the middle portion of the conveyor, and means adapted to project liquid against articles on the conveyor and located between the upper and lower reaches of the holding belt, pulleys for the conveyor belt, and pulleys for the holding belt all of which holding belt pulleys are located materially above all the pulleys for the conveyor belt.

9. In a machine of the character described, a casing, a lower endless main conveyor having its upper run operating through the casing, an upper hold down endless conveyor having its lower run operating through the casing and disposed above and adjacent the upper run of the main conveyor and cooperating therewith to confine articles supported upon the upper run of said main conveyor, when the lower run of said upper conveyor is lowered into operative position, means for raising said lower run of the upper conveyor into inoperative position, and means for projecting liquid onto the articles.

10. In a machine of the character described, a lower endless conveyor, an upper endless conveyor having its lower run slack and disposed in prox-

imity to the upper run of the lower conveyor when in operative position, means for projecting a washing solution onto articles confined between the adjacent runs of the conveyors, and means for lowering and raising the lower run of the upper conveyor into and out of operative position.

11. In a machine of the character described, a lower endless conveyor having its upper run disposed in a substantially horizontal position, means for holding said upper run against downward movement under the load of articles supported thereon, an upper endless conveyor having a depending lower run with sufficient slack to lie loosely over articles upon the upper run of the lower conveyor and to hold said articles in position on the upper run of said lower conveyor by the weight of the lower run of the upper conveyor while avoiding objectionable tensioning thereof, and means for projecting a washing solution onto such articles.

PAUL H. ENGEL.