Dec. 2, 1952 A. G. COLSTON 2,619,826

EMPTYING PUMP FOR WASHING MACHINES

Filed May 3, 1949

FIG. 1.

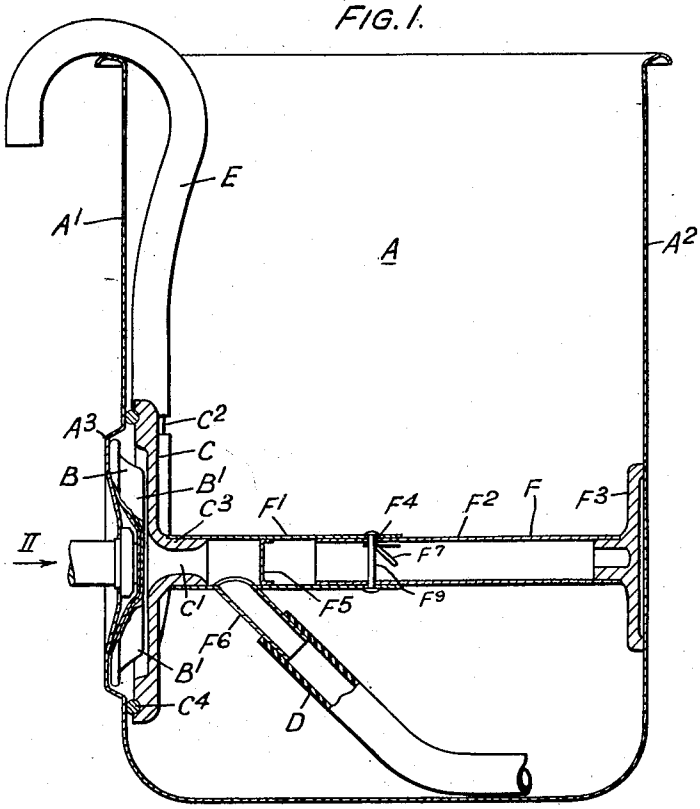
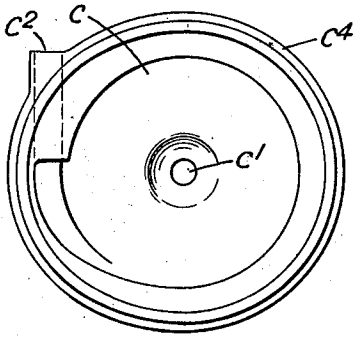


FIG. 2.



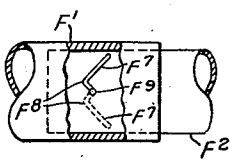


FIG. 3

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EMPTYING PUMP FOR WASHING MACHINES

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11 Claims. (Cl. 68—131)

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This invention relates to washing machines of the kind intended primarily for washing household clothes, fabrics and the like, and comprising a container or tub adapted to contain washing liquid, i. e. water with or without soap or other ingredients to assist washing, and an impeller within the container arranged to be rotated by suitable hand or power-driven driving mechanism so as to agitate the contents of the container.

The invention is particularly, though not exclusively, applicable to a washing machine as set forth in United States patent application No. 598,287, now Patent No. 2,478,188, issued August 9, 1949, which described a machine having a continuously rotating impeller, mounted in or adjacent to a side wall of the container where it will normally be submerged in the washing liquid, and comprising a disc, the whole periphery of which lies close to the side wall of the container. The exact form of the impeller may vary widely. For instance, it may be of the type described in this specification, having asymmetrical radial ribs in its operating surface, or alternatively may be of symmetrical type as described in British patent specifications Nos. 34,853 of 1946 or 5,430 of 1947, now British Patent Numbers 624,187, accepted May 30, 1949, and 624,191, accepted May 30, 1949, respectively, or of any other suitable design.

Thus according to the present invention, in a domestic washing machine of the type specified, means is provided for emptying the container of washing liquid comprising a casing in the form of a cap shaped to fit closely over the exposed face of the impeller and make a seal with the adjacent wall of the container round the impeller, and having an inlet near the middle of the casing communicating with the lower part of the container and an outlet from the peripheral portion of the casing communicating with an outlet pipe.

The casing may be held in position against a side wall of the container and enclosing the impeller by securing means braced against the opposite side wall of the container. Such securing means may comprise a telescopic strut mechanism, or alternatively a toggle-operated strut mechanism. Part of the strut may conveniently act as a communicating passage from an inlet pipe to the inlet of the casing.

In one particular construction the casing includes a coaxial spigot projecting from its outer surface and containing an eye which forms the inlet, and the strut has a tubular portion at one end adapted to fit over the spigot.

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The invention may be carried into practice in various ways, but one specific embodiment will now be described by way of example with reference to the accompanying drawings, in which

Figure 1 is a sectional elevation of the container of a domestic washing machine in which emptying means according to this embodiment has been fitted,

Figure 2 is an end elevation of the casing of the emptying means looking in the direction shown by the arrow II in Figure 1, and

Figure 3 is a fragmentary view partly in section drawn to an enlarged scale illustrating a camming mechanism for expanding a telescopic strut.

In this embodiment the invention is applied to a domestic washing machine comprising a tub or container A to contain the washing liquid and the clothes to be washed, having opposite vertical side walls A^1 and A^2, and an impeller B mounted as shown in Figure 1 with its axis roughly horizontal in a circular dish-like recess A^3 in the central portion of one vertical side wall A^1. The washing container A is provided with a washing impeller B like the impeller disclosed in United States Patent No. 2,478,188, issued August 9, 1949. The impeller B is in the form of a disc, one face of which is a surface of revolution close to the side wall A^1 of the container, and on the other face of which are a number of radial fingers or projections B^1 of smooth wave-like profile. The impeller is rotated electrically and the radial fingers act to circulate and disturb the washing liquid for the normal washing operation.

When it is required to empty the washing liquid from the container, the impeller B is enclosed by a detachable casing C in the form of a half pump-case, which fits closely round the impeller and cooperates with the recessed side wall A^1 to which it is pressed, so as to form a complete housing around the impeller and to convert the latter into a form of centrifugal pump. The casing has an inlet C^1 communicating with the lower part of the container through a flexible inlet pipe D so as to draw up liquid, and an outlet C^2 from which a flexible hose E carries the pump liquid out of the container to a suitable place such as a kitchen sink. The inlet C^1 is in the form of a central passage in a coaxial hub or tube C^3 projecting from the casing C. A sealing washer C^4 of rubber or other suitable elastic material lies in a groove in the casing C and serves as a seal between it and the side wall A^1.

The casing is secured in position by being braced against the side wall A^1 containing the

impeller by a telescopic strut F which bears against the opposite side wall A^2 of the container. The strut comprises two tubular pieces F^1 and F^2, arranged to telescope one within the other, of which the outer end of the piece F^1 fits over the hub C^3 of the casing while the outer end of the piece F^2 carries a disc-shaped end piece F^3 which serves to distribute the pressure of the strut on the side wall A^2.

The tubular pieces F^1 and F^2 of the strut F are united by a catch F^4, see Figure 3, of the over center toggle type providing for relative longitudinal movement of these pieces and serving to latch them in their expanded condition. The catch F^4 is a known type such as that illustrated in United States Patent No. 1,575,028, issued March 2, 1926. When the strut F is latched in expanded condition, the casing C is firmly seated against the wall A^1 and the end piece F^3 is braced against the opposite wall A^2. The tubular piece F^1 carries a pin F^9 which rides in cam slots F^7 in the portion of the tubular piece F^2 which is telescopically received in the piece F^1. The cam slots F^7 extend in opposite directions on opposite sides of the piece F^2 and have hooked end portions F^8 providing over center pockets receiving the pin F^9 for latching the strut in expanded condition. The strut F is expanded and contracted by manually rotating the pieces F^1 and F^2 relatively to each other. The sealing washer C^4 has sufficient resilience to permit the pin F^9 to be operated over center into the hooked end portions F^8 on the slots F^7.

The tubular piece F^1 has its end closed by a baffle wall F^5 and has a spout F^6 projecting from its side wall as shown in Figure 1. Onto the spout F^6 is fitted the inlet pipe D, so that the piece F^1 acts as a passage connecting the pipe D to the passage C^1 of the casing.

In operation, when it is required to empty the liquid in the container, the casing C is placed in position over the impeller B with the strut projecting from it towards the opposite wall A^2. The catch is then operated over its dead-centre so as to cause the telescopic strut to expand and brace the casing firmly in position against its wall A^1 by corresponding pressure against the opposite wall A^2.

The impeller is then rotated electrically and acts together with the casing C as a centrifugal pump to empty the liquid from the container.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination with a domestic washing machine of the type comprising a container adapted to contain washing liquid, a disc-like impeller mounted adjacent to a side wall of the container where it will normally be submerged in the washing liquid, and driving means to rotate the impeller so as to agitate the contents of the container, of means to empty the container of washing liquid comprising a casing in the form of a cap shaped to fit closely over the exposed face of the impeller and make a seal with the adjacent wall of the container round the impeller, an inlet near the middle of the casing to communicate with the lower part of the container, an outlet from the peripheral portion of the casing, and an outlet pipe leading from the said outlet.

2. The combination with a domestic washing machine of the type comprising a container adapted to contain washing liquid, a disc-like impeller mounted adjacent to a side wall of the container where it will normally be submerged in the washing liquid, and driving means to rotate the impeller so as to agitate the contents of the container, of means to empty the container of washing liquid comprising a casing in the form of a cap shaped to fit closely over the exposed face of the impeller and make a seal with the adjacent wall of the container round the impeller, an inlet near the middle of the casing to communicate with the lower part of the container, an outlet from the peripheral portion of the casing, an outlet pipe leading from the said outlet, and securing means designed to be braced against the opposite side wall of the container to hold the casing in position enclosing the impeller.

3. Apparatus as claimed in claim 2 in which the said securing means comprises a toggle-operated collapsible strut designed to be braced against the opposite side wall of the container to hold the casing in position enclosing the impeller.

4. Apparatus as claimed in claim 2 including a telescopic collapsible strut designed to be braced against the opposite side wall of the container to hold the casing in position enclosing the impeller.

5. Apparatus as claimed in claim 4 including an over-centre locking mechanism by which the said telescopic strut can be extended and locked in the extended and braced position, the said locking mechanism comprising one or more cam surfaces on one part of the telescopic strut, one or more co-operating cam followers engaging said cam surfaces and carried by another part of the telescopic strut, and a stop to limit the travel of the said cam followers when past the dead-centre position where the strut is fully extended.

6. Apparatus as claimed in claim 5 including an inlet pipe, and a generally tubular part of the strut which acts as a communicating passage between the inlet pipe and the inlet of the casing.

7. A device for forming a pump housing around a washing machine impeller mounted adjacent a wall of a washing machine container, comprising, a casing having a peripheral sealing portion extending therefrom in one direction adapted to engage and seal against a wall of a washing machine container around an impeller, said casing being formed with a fluid inlet passageway and a fluid discharge passageway, a collapsible strut secured to said casing and extending therefrom oppositely to said sealing portion adapted to bear against a wall of a washing machine container to secure said casing around an impeller, and said strut including locking means for securing said strut in rigid condition.

8. A device for forming a pump housing around a washing machine impeller mounted adjacent a wall of a washing machine container, comprising, a casing having a peripheral sealing portion extending therefrom in one direction adapted to engage and seal against a wall of a washing machine container around an impeller, said casing being formed with a fluid inlet passgeway and a fluid discharge passageway, a pair of telescopically engaged parts forming a collapsible strut secured to said casing and extending therefrom oppositely to said sealing portion adapted to bear against a wall of a washing machine container to secure said casing around an impeller, and means for latching said telescopically engaged parts in fixed relation to each other.

9. A device as claimed in claim 8 in which said latching means is of the over center type by which the telescopically engaged parts of said

strut may be extended and latched, said latching means comprising one or more cam surfaces on one part of the telescopic strut, one or more co-operating cam followers on another part of the telescopic strut engaging said cam surfaces, and a stop to limit the travel of the said cam followers when past the dead center-position where the strut is fully extended.

10. A device as claimed in claim 9 including an inlet pipe, and a tubular part of said strut connected to said inlet pipe and the inlet passageway in the casing to form a communicating passage therebetween.

11. A device as claimed in claim 10 in which said casing includes a central hub projecting from the

outer face of said casing and forming the wall of said inlet passageway and said tubular part of said strut fits about said hub.

ARCHIBALD GODFRAY COLSTON.

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