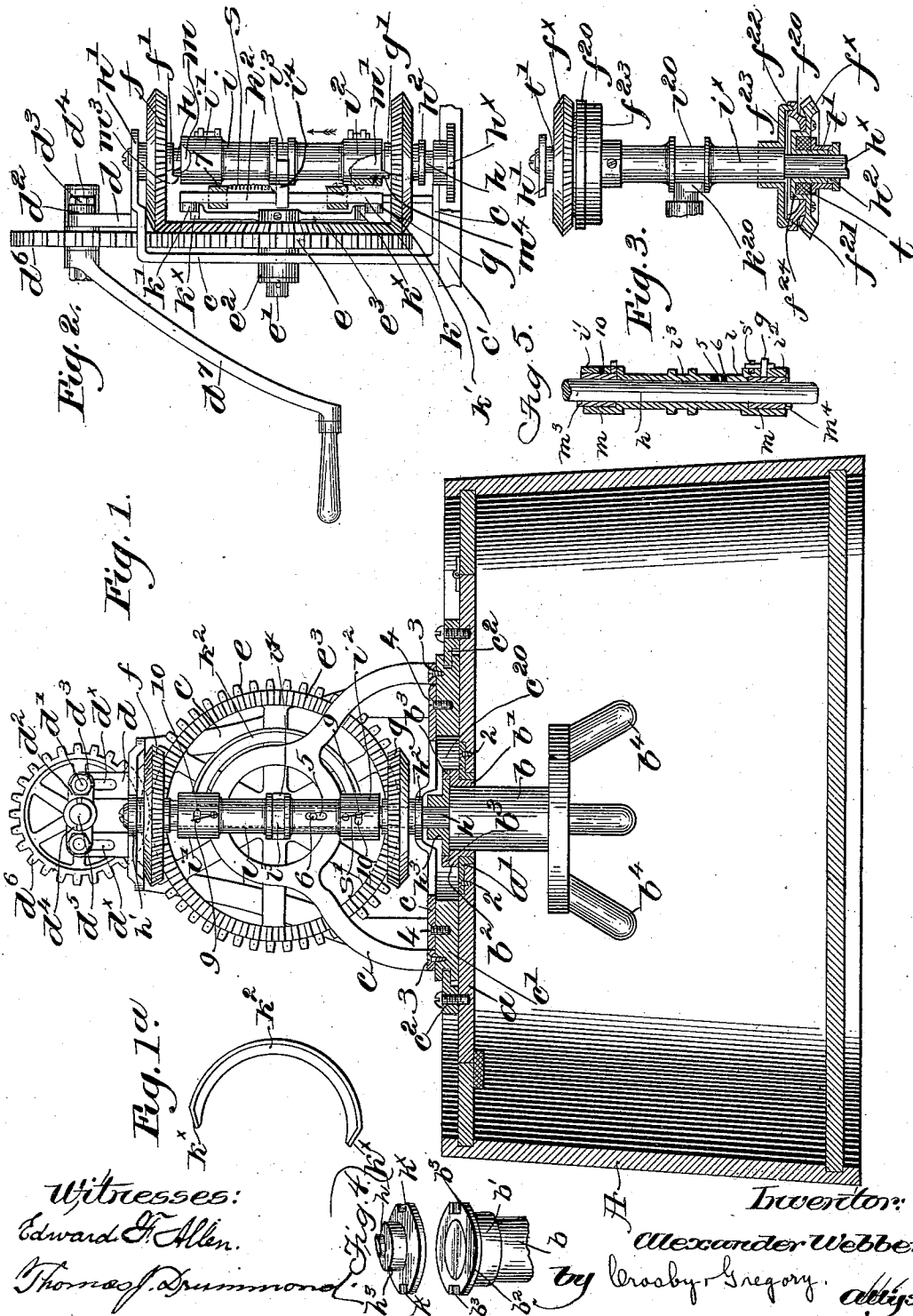


(No Model.)

A. WEBBER.
WASHING MACHINE.

No. 551,915.

Patented Dec. 24, 1895.



UNITED STATES PATENT OFFICE.

ALEXANDER WEBBER, OF BEVERLY, MASSACHUSETTS.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 551,915, dated December 24, 1895.

Application filed August 20, 1894. Serial No. 520,801. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WEBBER, of Beverly, county of Essex, State of Massachusetts, have invented an Improvement in Washing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

The primary object of this invention is to provide for the dismemberment of a washing-machine for convenience and economy in stowing and transportation. In accomplishing this object I provide in the interior of the tub a suitable stirring or agitating device which remains in position at all times, and I provide on top of the cover an operating mechanism for such stirring device, which operating mechanism may be bodily detached from the cover and disconnected from the stirring device as desired and be applied thereto as needed, with little trouble and by any unskilled person.

A further object of the invention is to provide an operating mechanism for the stirring device by which the said stirring device may be rotated first in one direction and then reversely by conversion of motion from a shaft having a continuous rotary motion in one direction. In accomplishing this object I use a peculiar combination and arrangement of gearing and clutches, the essential features of which will be described, and particularly pointed out in the claims.

Figure 1, partially in section and elevation, represents a washing-machine embodying my invention. Fig. 1^a is a detached view of the cam. Fig. 2 is a side view, partially broken out, of the operating mechanism detached; and Fig. 3 is a detail view, partly in section, of a modification of the actuating mechanism to be described. Fig. 4 is a detail of the flange-collar secured to the head of the stirrer-shaft. Fig. 5 is a vertical sectional view of the clutch member and collars taken on the line $\alpha' \alpha'$, Fig. 1, the actuating-shaft being broken and in elevation.

I have herein shown my invention as comprising a clothes tub or vat A, provided with a preferably hinged top or cover a , having an opening therein to receive an annular bear-

ing a' secured to the cover by suitable fastenings 2. The head of the rotatable stirrer-shaft b has secured thereto a collar b' to enter the bearing a' and provided with an annular flange b^2 to rest on the top of said bearing and be retained in operative position thereby, as shown in Fig. 1, said flange b^2 having one or more projections b^3 on its upper side (see Fig. 4) extending above the top of the stirrer-shaft, and suitable stirrers or blades b^4 are secured to the lower end of the shaft within the tub A.

The actuating mechanism for the stirrer-shaft is supported by a bracket-like stand c secured to a base-plate c' , preferably by screws 3, 4, the base-plate c' resting on the top or cover a when in operative position, retained thereon by turn-buttons c^2 adapted to engage recesses in the base, as herein shown, though it is obvious that any other suitable fastenings may be employed if desired. Ears d having longitudinal slots d^x therein are secured to or form a part of the top of the bracket c , through which slots threaded studs d' on a cross-head d^2 are extended, suitable set-nuts d^3 on said studs retaining the cross-head in adjusted position on said ears d , nearer to or farther from the top of the bracket c . The cross-head d^2 is provided with a boss or hub d^4 to form a bearing for a crank-shaft d^5 having mounted thereon a gear d^6 at the opposite side of the ears d , and held in place by an operating-handle d^7 , retained on the shaft by a set-nut d^8 . (Partly shown in Fig. 2.) A driving-gear e in mesh with the gear d^6 is mounted upon a stud e' supported in a suitable bearing, as e^2 , in the bracket c , as clearly shown in Fig. 2, and the gear e has on its inner face a bevel-gear e^3 in mesh with two smaller bevel-gears f and g , mounted to rotate loosely on a shaft h . (Shown in full and dotted lines, Fig. 1.) This shaft h has its bearings at h' and h^2 in the bracket c , and it is provided at its lower end with a coupling h^3 (shown as a casting) having notches or recesses h^x to receive the projections b^3 on the collar b' secured to the head of the stirrer-shaft b , to rotate the latter, the ends of the operating and stirrer shafts h and b preferably abutting, as shown in Fig. 1, when coupled together. In whichever direction the gear e^3 is rotated the smaller gears f and g will be

rotated, but in opposite directions, the said gears f and g forming parts of a clutch mechanism, to be described.

A sleeve i having enlarged extremities or ends i^1 and i^2 is mounted upon the operating-shaft h between the gears f and g , and is longitudinally movable thereon, but rotatable therewith by means of a slot 5 in one entered by a pin or projection 6 on the other. The sleeve i has an annular groove i^3 therein engaged by a yoke i^4 secured to a roll-carrier k longitudinally movable in bearings 7 in the bracket c (see Fig. 2) and provided with suitable rolls k^1 adapted to be engaged by a cam-surface k^2 suitably mounted to rotate with the gear e , the main portion of said cam being a circular arc, the extremities dropping toward the center, as at k^x . (Shown only in Figs. 2 and 1^a.) Rotation of the gear e causes first one roll k^1 and then the other to engage the portions k^x of the cam k^2 and then the circular portion to thereby reciprocate the carrier k , the latter through the connection with the sleeve i moving the latter longitudinally on the shaft h while rotating therewith. The portions k^x of the cam give the sleeve i a quick movement in one or the other direction, the circular or dwell portion of the cam maintaining the sleeve raised or lowered throughout its extent. A spring s connected to the roll-carrier or slide k and to the bracket serves to counter-balance the weight of the slide and the sleeve i .

Like collars or sleeves m and m' loosely surround the shaft h and are held inside the enlarged portions i^1 and i^2 of the sleeve i by pins 9 in one entering lateral slots 10 in the other, as clearly shown in Fig. 1, so that there is a slight amount of lost motion or play between the collars m and m' and the sleeve i , flat springs s' , fastened at one end to the sleeve and engaging the pins 9, tending to normally center the collars, as it were. The end of each collar projecting beyond the end of the sleeve i is cut partly away to leave portions m^3 m^4 respectively on each, having inclined or beveled ends, and the inner faces of the gears f and g have thereon curved projections or abutments f' and g' , inclined or beveled at the ends oppositely to the beveled ends of the portions m^3 and m^4 on the collars. As will be seen from Figs. 1 and 2, the abutments and the co-operating projecting portions of the collars when in engagement form complete rings.

When the sleeve i is in its extreme position on the shaft h , the end of one of the collars is in engagement with its co-operating abutment on the adjacent small gear f or g , the other collar being entirely out of engagement with its abutment, the throw of the cam k^2 being sufficient to cause such movement. Under such conditions the shaft h will, through the sleeve i , be rotated in the direction given to the adjacent small gear f or g , as the case may be, by the bevel-gear e^3 . Continued rotation of the driving-gear will turn the cam k^2 , and

when the portions k^x are in position to engage the rolls k^1 , to raise or lower the slide k , the latter will be quickly moved, and the sleeve i will be moved to carry one collar out of engagement with its abutment and move the other collar into engagement with its abutment.

Referring more particularly to Fig. 2, the sleeve i is shown as being moved in the direction of the arrow, the projection m^4 leaving the abutment g' and the projection m^3 being already in partial engagement with its abutment f' , and the projection m^4 will not entirely leave its abutment until the projection m^3 is almost in complete engagement with the abutment f' . When the engagement at the upper end of the sleeve i is complete, the shaft h will be rotated by the gear f in the opposite direction. As the stirrer-shaft b is coupled to the shaft h , it will consequently be rotated alternately in opposite directions so long as the driving-gear e is rotated.

Ordinarily the engagement of the clutch members simultaneously at each end of the sleeve i would cause binding, due to the opposite rotation given to the sleeve by the gears f and g , but I obviate this by the slight lost motion permitted each collar m' m^2 in its particular seat, due to the slot-and-pin connection described. This lost motion is very slight and almost imperceptible in the operation of the machine, being aided by the inclination given to the ends of the abutments and the co-operating parts of the adjacent collars. When one clutch is entirely disengaged from the co-operating member before the engagement of the other clutch with its co-operating member, there is an unavoidable jerk and jar in the operation, which becomes very disagreeable and tiresome to the operator.

From the foregoing description it will be obvious that the sleeve i and its collars constitute the movable member of a reversing-clutch, the abutments f' and g' on the gears f and g being the co-operating members, the cam k^2 actuating the said movable member and controlling the operation of the mechanism. The gear members f and g of the clutch mechanism are always rotating in the direction in which the actuating-shaft h is to be rotated, so that only the momentum of the stirrer-shaft has to be overcome in reversing its rotation, enabling light mechanism to be used and making the operation thereof easier.

When the actuating mechanism is to be removed the buttons c^2 are moved, and the base c' can be lifted from the tub, carrying with it the said mechanism, said base having an opening c^{20} therein, through which the end of the shaft h and the coupling extend.

It is designed to have gears smaller than the gear d^5 to be substituted therefor on the shaft d^5 , the cross-head d^2 being adjusted on the ears d , as described, to conform to the smaller gear. By this arrangement the speed of the machine is reduced, but less power is

exerted by the operator, and so the power may be regulated in accordance with the strength of the operator.

Instead of the handle d^7 it is obvious that a pulley could be secured to the shaft d^5 and the mechanism driven by steam or other motive power.

In the modification shown in Fig. 4 the gears f^x have secured to their inner faces friction-rings f^{20} , provided with annular recesses f^{21} having slightly-flaring walls, to be engaged by correspondingly-shaped annular flanges f^{22} on disks f^{23} secured to the sleeve i^x , the sleeve being reciprocated on the shaft h^x by a cam k^{20} on the shaft of the driving-gear entering an annular space i^{20} in the sleeve. The hubs f^{24} of the gears f^x are shaped to receive at their outer sides a ring t , of rubber or suitable elastic material, held in place by a collar t' , the gears f^x being of course loose on the shaft h^x . Movement of the sleeve i^x brings one or the other of the friction-flanges f^{22} into engagement with its co-operating recess f^{21} in the friction-ring f^{20} , the elastic ring t permitting a slight give or yielding longitudinally of the gear f^x , it being understood that the gears f^x are always rotating in opposite directions, and the shaft h^x is rotated in one direction or another according to the gear whose friction-ring is engaged by one of the disks on the sleeve i^x .

By making the actuating mechanism readily detachable from the tub the machine is easily transported from place to place, and it can be stored in a smaller space, and if desired the actuating mechanism may be placed within the tub when not in use or when the apparatus is to be shipped.

I claim—

1. A washing machine comprising essentially a tub, a cover therefor, a stirrer shaft having its outer end substantially flush with the top of the cover, a stirrer arranged upon such shaft and suspended from the cover within said tub, and a half-coupling applied to the outer end of such shaft, combined with a stirrer-operating mechanism including a shaft having a half-coupling adapted to be immediately engaged with and disengaged from the half-coupling of the stirrer shaft, a bracket in which the whole of the stirrer-operating mechanism is supported, and having a base to rest upon the cover, and means to connect the said base and cover detachably and permit the bodily removal of the stirrer-operating mechanism, substantially as described.

2. In a washing machine, a stirrer-shaft, an actuating shaft, and a detachable coupling to connect them, combined with a driving gear adapted to be rotated in either direction, gears in mesh therewith and oppositely rotated thereby, a clutch member intermediate and adapted to cooperate with said gears alternately, connections between said member and the actuating shaft, whereby the latter is rotated with the member, and connections actuated by the driving gear and between it and the clutch member to move the latter into engagement with one gear before it is entirely disengaged from the other, substantially as described.

3. In a washing machine, a stirrer-shaft, combined with a driving gear, an actuating shaft, a clutch member longitudinally movable thereon and to rotate it, including two collars having slight rotative movement relative to the main portion of said member, two clutch members to cooperate with said collars respectively, and provided with gears in mesh with the driving gear and thereby rotated continuously in opposite directions, means to move the clutch member longitudinally to cooperate with the geared members alternately, one collar engaging its cooperating member before the other collar is disengaged from its member, and a detachable connection between the actuating and stirrer-shafts, substantially as described.

4. In a washing machine, the tub, and its stirrer-shaft, combined with a driving gear, an actuating shaft adapted to be connected to the stirrer-shaft, a clutch member movable on and to rotate the actuating shaft, loose collars carried by said member and having slight rotative movement relative thereto, gears in engagement with and rotated in opposite directions by the driving gear, an abutment on each of said gears to be engaged by the cooperating collar on the clutch member, and a cam on the driving gear to move the clutch member to cause the collars to engage one and then the other of the abutments on said gears, one collar engaging its abutment before complete disengagement of the other collar and abutment, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALEXANDER WEBBER.

Witnesses:

EMMA D. TRICKEY,
GERTRUDE MERRILL.