

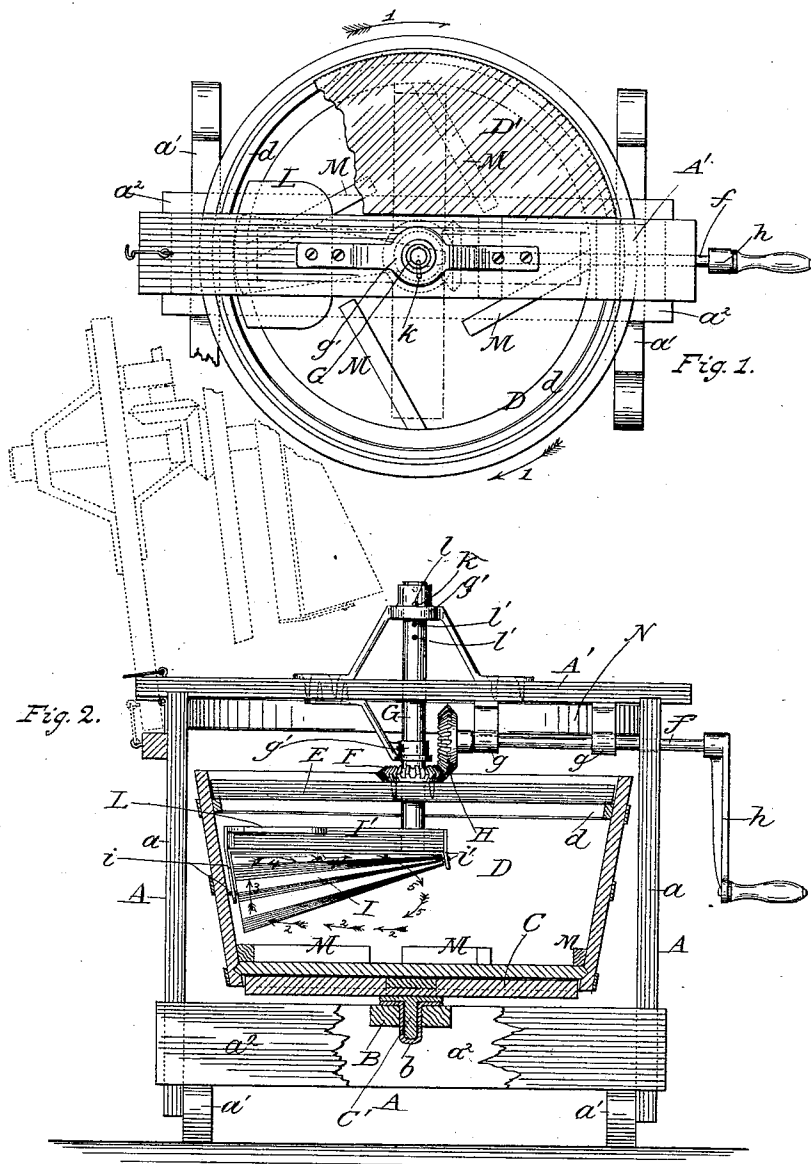
(No Model.)

2 Sheets—Sheet 1.

C. VAN DERZEE.
WASHING MACHINE.

No. 480,532.

Patented Aug. 9, 1892.



Witnesses.

Charles Seckin
T. Seckin Jr.

Cornelius Van Derzee,
Inventor.
by Alex. Selkirk.
Attorney.

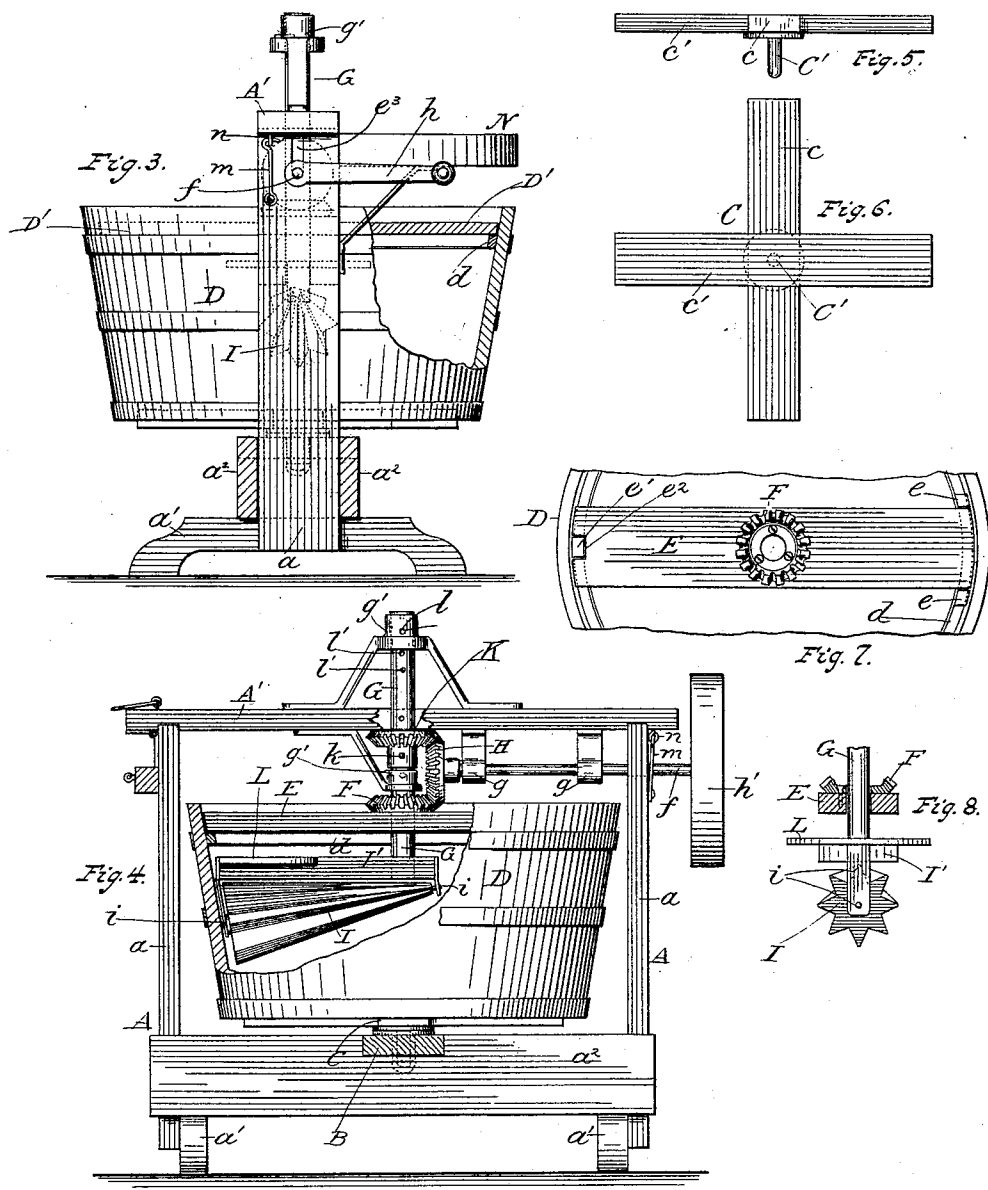
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Charles Perin
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Attorney.

UNITED STATES PATENT OFFICE.

CORNELIUS VAN DERZEE, OF ALBANY, NEW YORK, ASSIGNOR OF TWO-THIRDS TO DAVID H. MATHIAS AND JAMES H. SIMONSON, OF SAME PLACE.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,532, dated August 9, 1892.

Application filed November 23, 1891. Serial No. 412,887. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS VAN DERZEE, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Washing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in washing-machines; and it consists in the combinations of parts and devices hereinafter described, and specifically set forth in the claims.

The objects of my invention are, first, to produce a machine for washing clothes, fabrics, or fibers in which the water will be forced laterally in all directions from the center of a revolving water-tight tub through the clothes, fabrics, or fibers by centrifugal force and then be raised and returned to the center of the tub, all in a continuous manner; second, to provide means by which the clothes, fabrics, or fibers may have the washing-water forced laterally by centrifugal force in all directions through them and have all portions thereof successively compressed and released, and, lastly, to produce specific means by which my improvements may be embodied in washing-machines. I attain these objects by the means illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of a washing-machine embodying the improvements in this invention. Fig. 2 is a sectional elevation of the same. Fig. 3 is a side elevation of the same, with a part of the tub broken away. Fig. 4 is an elevation with part of the tub broken away and exposing the device for returning the water to the center of the tub and for compressing the materials being washed. Fig. 5 is a side elevation of the revolving platform. Fig. 6 is a plan view of the same. Fig. 7 is a plan view of a section of the tub and the tub-turning bar locked in place with the same. Fig. 8 is an end view of the compressing-roller and adjuncts of the same.

The same letters of reference indicate like parts throughout the several views.

In the drawings, A represents the frame of the machine, which may be made of wood or metal, or both combined. In the drawings this frame is shown to be composed of the end posts *a a*, horizontal base-pieces *a' a'*, supporting-pieces *a² a²*, secured to the posts *a*, and the horizontal gear-bar *A'*, hinged at one end to one of the end posts and having its opposite end provided with means for securing it with the opposite end post, so that it may at will be turned from a horizontal normal position (shown by full lines in Fig. 2) to a vertical one, as indicated by dotted lines in Fig. 2, so as to carry with it those parts of the machine which are designed to be removable at will from the tub.

B is a step-holding piece secured to the horizontal supporting-pieces *a² a²* at about their middle of length and provided with the metal step *b* for receiving the vertical pivot on which the tub or adjunct of the tub revolves.

C is the platform on which it is preferred the tub is seated when revolved. This platform is preferably made in the form of a cross by pieces *c c'* crossing each other at their middle of length and extending radially from the center of their rotation to a distance equal to half the diameter of the bottom of the tub within the circle of its chine, so that when the tub is seated on this platform it will be received within the chine with its bottom proper resting on said platform.

C' is a vertical shaft or pivot secured to the said platform from its lower side and working in the metal step *b*.

D is the tub, of any suitable dimensions and material, and is removable at will from the frame or from the platform C. Secured to the inner side of the tub, about one inch or more or less below its upper edge, is the inwardly-projected ledge *d*, preferably made of wood, and calculated to support the covers D' D' of the tub.

E is the tub-turning bar, which traverses the tub from side to side at ledge *d*, and is by its ends locked with the opposite sides of the tub, so that the latter will be revolved horizon-

tally with the said tub-turning bar. The locking of the said turning-bar with the walls of the tub may be accomplished by any suitable means, but preferably by means of the holding-stops *e e*, secured to the wall of the tub at one side for receiving between them one end of the said bar, and the holding-stop *e'* secured to the opposite side wall of the tub at a point preferably relatively at the middle of the width of the opposite end of the said bar for entering a corresponding form of notch *e²*, made in the end of the bar, as shown in Fig. 7. By this different arrangement of the holding-stops with the respective ends of the tub-turning bar an operator is prevented from wrongly placing the said bar in holding with the tub to be revolved by it.

F is a gear, secured to the tub-turning bar E at its center of revolution. This gear has a central bore which receives the vertical shaft G, the purpose of which will be hereinafter described.

H is a drive-gear for actuating gear F, and is mounted on the drive-shaft *f*, supported in suitable bearings *g g*, secured to the gear-bar A' from its lower side, so that when said bar is raised it will carry the shaft *f* and its connected gearing with it. This shaft *f* is arranged horizontally between the gear-bar A' and the tub-turning bar E, with its outer end portion loosely received within the slot *e³* made in the upper end of one of the posts *a* of the frame. This drive-shaft *f* may be revolved by a crank *h*, Figs. 1, 2, and 3, when the machine is to be used for family work, or by a band-wheel *h'*, Fig. 4, driven by steam or other convenient power when for factory or laundry use. The vertical shaft G extends from above the gear-bar A' downwardly in a line coincident with the axial line of the tub and its tub-turning bar, and is supported by suitable bracket-bearings *g' g'*, connected or secured to the said gear-bar in any suitable manner.

I is a fluted conical roller suitably supported from the lower end of shaft G. This roller, besides operating as a roller for compressing the material as it is brought beneath it, serves as a device for resisting the circular movement of the water with the tub and returning the water from the sides of the tub to its center. The said roller is preferably supported by bearings *ii'*, connected with pendent brackets, which are secured to the horizontal arm I'. Arm I' is secured by its inner end to the lower end of shaft G, which shaft may be stationary or be revolving in character. When the said shaft is stationary, the gear K, (shown to be secured in Fig. 4 to said shaft,) is omitted, as shown in Fig. 2, or is made to be loose on said shaft, as hereinafter explained, when the said shaft will be fixed from turning. To fix the said shaft from turning and adapt it to be adjusted in either direction vertically, a suitable pin or equivalent holding device *k* is passed through the hole *l* in bearing *g'*, and then through one of the series of holes *l'* in

the upper end portion of said shaft G. When the gear K is loosely applied to said shaft G, it may be fixed therewith by a pin similar to pin *k*, passing through the hub of said gear and the shaft G, at the same time the pin *k* is removed from holding the said shaft fixed from turning in the bearing *g'*.

In machines for family use one roller I will in most cases be found to be sufficient, yet in large machines two or more similar rollers, arranged about at equal distances apart, may be employed, in which case arms I' will be used in number corresponding with the number of rollers to be employed. When two of said rollers are to be employed, the piece forming the arm I' may be extended across the tub from side to side and each half portion form an arm for supporting the said rollers, in which case the inner ends of the rollers will terminate a little short of the center of the shaft G. As such arms and rollers would be only duplications of those shown a more particular description is unnecessary.

L is a water-guard, arranged above the roller I, and neighboring the outer end portion of the same, for preventing the water in the tub from rising above the roller when dashed against the same. This guard may be made of any suitable material and be supported from the arm I' at near its outer half portion of length.

M M are stops secured to the upper side of the bottom of the tub for holding the material to be washed and to prevent their moving in relation to the tub. The said stops are each arranged at an angle to lines which may be drawn radially from the axial line of rotation of the tub, and they only serve to hold the clothes from being revolved within the tub.

N is a rail or bar for holding a wringing-machine conveniently near the tub, which rail may be secured by any means to the upper ends of the side posts *a a* of the frame and on a plane a little above the plane of the upper edge of the tub.

The manner in which the parts of this machine operates is as follows: The clothes, fabrics, or fibrous substances to be washed are placed within the tub with a suitable quantity of washing-water, preferably hot. When the pieces to be washed are small, this may be done when the half-covers D' D' (shown in Fig. 3 by full and dotted lines) are removed from the tub; but when the pieces to be operated with are large the said covers are to be removed, and also the gear-bar A' will be turned up from position of full lines in Fig. 2 to that of dotted lines in the same figure, when the tub-turning bar E, shaft G, gears, and drive-shaft, revolving roller, and its adjuncts will be carried up and away from the chamber of the tub to allow the materials to be washed to be about evenly arranged within the tub. After a sufficient quantity of clothes or other materials have been introduced with a suitable quantity of washing-water into the tub the gear-bar A', with all

the parts and devices carried by it, will be turned back and down from dotted lines, Fig. 2, to that of full lines in the same figure and be in their required places for operation, when the said gear-bar A' will have its free end secured from rising, preferably by a hook *m* and staple *n*, Fig. 3. The covers D' D' will then be put in place to exclude air from outside, having contact with the heated washing-water within, and also to prevent the suds from rising and overflowing the tub. The driving-shaft *f* will then be revolved, and if the vertical shaft G is held stationary and the gear K is allowed to revolve loosely on the said shaft G, the arm I' will also be stationary, while the fluted roller I will be free to be revolved by the action of the water, and the substances being washed, being forced against the fins or ridges of the said roller; but if said shaft G be allowed to revolve and the gear K be fixed to it, so as to revolve it at the same time the tub is being revolved, the arm I', with the roller I and guard L, will be revolved in one direction while the tub and its contents will be revolved in the reverse direction. When the tub D is revolved with sufficient rapidity, say, in direction of arrow 1 in Fig. 1, and shaft G is stationary, the centrifugal force developed operates to throw the water from the central portion of the tub toward the side walls of the same with great force, and as the substances to be washed are between the axis and the side walls of the tub the water is forced with great rapidity to pass radially in all directions from the center of the tub through the substances being washed to the sides of the tub, when the sides of tub, stopping a further radial movement of the water, will cause the water to become heaped up at said sides. This heaped-up water at the side walls of the tub would be revolved simultaneously with the tub without effecting a washing of the substances were the water not returned to the center of the tub; but with a device for checking or resisting the circular movement of the heaped-up water and returning the same to the center of the tub after being thrown rapidly by centrifugal force through the substances the washing of the same may be rapidly effected.

In this invention, as the tub and its contents are being revolved, the water thrown in direction of arrow 2 in Fig. 2 through the material or substances by centrifugal force becomes heaped up in direction of arrow 3 at the side walls of the tub, and will be carried with considerable force against the resisting device carried by the arm I', which in this case is the roller I. This resisting device checks the circular movement of the heaped-up water, and turns the same in direction of arrow 4.

In this invention the fins or ridges of the roller I in their portions neighboring the side wall of the tub operates as the resisting device, and the hollows between these fins or ridges form gutters through which the water

will be conducted in direction of arrow 4 from the sides of the tub to its center and on a plane above the line of water and upper surfaces of the substances being washed, when it will fall in direction of arrow 5, central in the tub and in the charge of the substances operated upon. The revolving of the tub being continued, this water being returned in a continuous manner to the center of the tub is as continuously thrown in direction of arrows 2, through the substances, and then upwardly in direction of arrow 3, when by the operation of the resisting device and gutters in the same, this water will be forced in direction of arrows 4 to the center of the tub and then in direction of arrows 5 to a discharge into the center of the charge until the revolving of the tub is stopped.

The roller I, besides operating as a device for resisting the circular movement of the water and returning the same from the sides of the revolving tub, operates by its fins to compress the substances which are carried by the tub to beneath it. The stops M, secured to the bottom of the tub, operate to prevent the substances on them shifting within the tub, and also prevents the same from lying down close on the bottom of the tub. In a machine having the fluted roller I operating as a device for returning the water from the sides of the revolving tub to the center of the charge the force of the water carried by the tub about its axis of rotation and heaped up at its sides, operates against the sides of fins of said roller to revolve the same in contact with the substances through which the water is being rapidly forced in direction of arrow 2, and the said fins revolving in contact with said substances squeeze or compress such substances, as all their portions are successively brought beneath said roller, and force the water in a measure out of such substances as may be beneath said roller, and then release successively all portions from such compression for allowing rapid passage of a full measure of water through such portions to be followed by subsequent compressions, as before. When shaft G is revolved by the operations of the gear H on gear K, simultaneously with the revolving of the tub and its contents, but in the reverse direction, the same action of the roller will be had on the water and the substances in the charge, the only difference being that of a greater force of resistance is given to the water by the roller and a more rapid return of the water to the center of the charge is effected. By these improvements a charge of clothes, fabrics, or fibrous substances may be thoroughly washed in from two to four minutes, and when washed these articles or substances will be taken out and run through a wringing-machine (not shown) secured on the rail N, when the water squeezed from the material will be returned to the tub, while the articles may be permitted to drop into a basket or other receptacle on the floor. The wash-

water may be drawn from the tub at will through a suitable outlet provided in the tub and closed by a stopper.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a washing-machine, the combination, with a stationary frame and a tub supported by a vertical pivot from said frame, of the tub-turning bar E, provided with the central gear F, driven by a gear carried by the drive-shaft *f*, vertical shaft G, conical fluted roller I, guard L, carried by the lower end of said vertical shaft, and the bar A', supporting said shaft, all substantially as and for the purposes set forth.

2. In a washing-machine, the combination, with the frame A, supporting the central step-bearing *b*, and a horizontally-revolving tub, of the platform C, supported by a vertical shaft from the said step-bearing and received between the circle of the chine of the lower or bottom end of the said tub, gear-bar A', hinged by one of its ends to the upper end of the frame with provision for securing at will its opposite end also with said frame, of the tub-turning bar E, secured with the upper end of the tub, a vertical shaft G, supported cen-

trally in said tub-turning bar, horizontal arm I', conical fluted roller I, and water-guard L, and the gear mechanism F and H, actuated by a drive-shaft, all substantially as and for the purposes set forth.

3. In a washing-machine, the combination, with a frame, a horizontally-revolving tub supported from said frame, the removable gear-bar A', vertical shaft G, which is fixed from moving endwise, tub-turning bar E, engaging with the side walls of the tub, radial arm I', fixed to the lower end of the said vertical shaft, and the conical fluted roller I, which is supported from the said radial arm, of the gear F, secured to the said tub-turning bar and concentric with the said vertical shaft, drive-gear H, and drive-shaft *f*, supported in bearings secured to the said gear-bar with provision for revolving the same, substantially as and for the purposes set forth.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

CORNELIUS VAN DERZEE.

Witnesses:

ALEX. SELKIRK,
CHARLES SELKIRK.