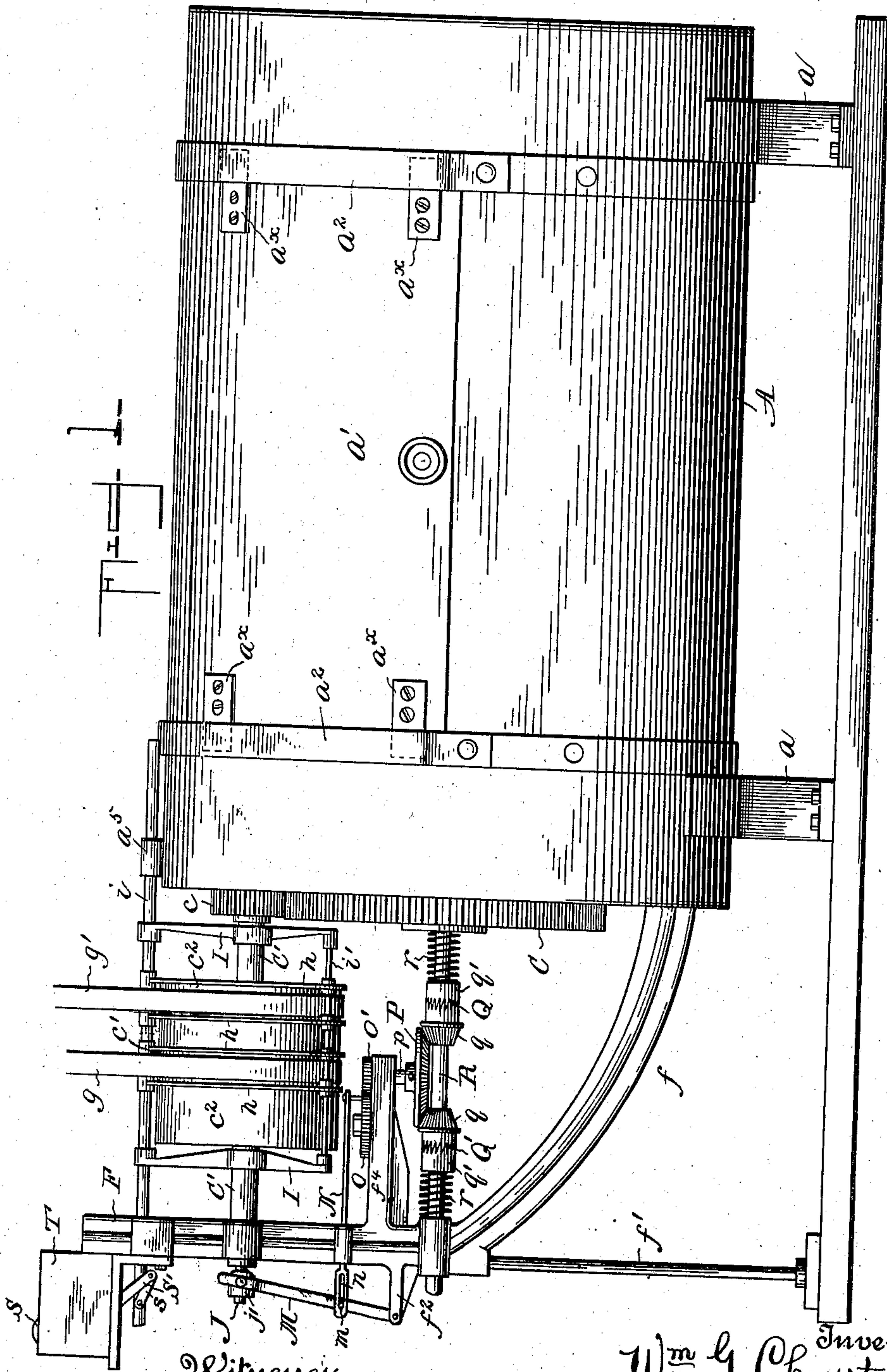


No. 858,573.

W. G. CHRYST.  
WASHING MACHINE.  
APPLICATION FILED SEPT. 11, 1905.

PATENTED JULY 2, 1907.

3 SHEETS—SHEET 1.



Witnesses:  
R. J. Beall  
W. S. Duall

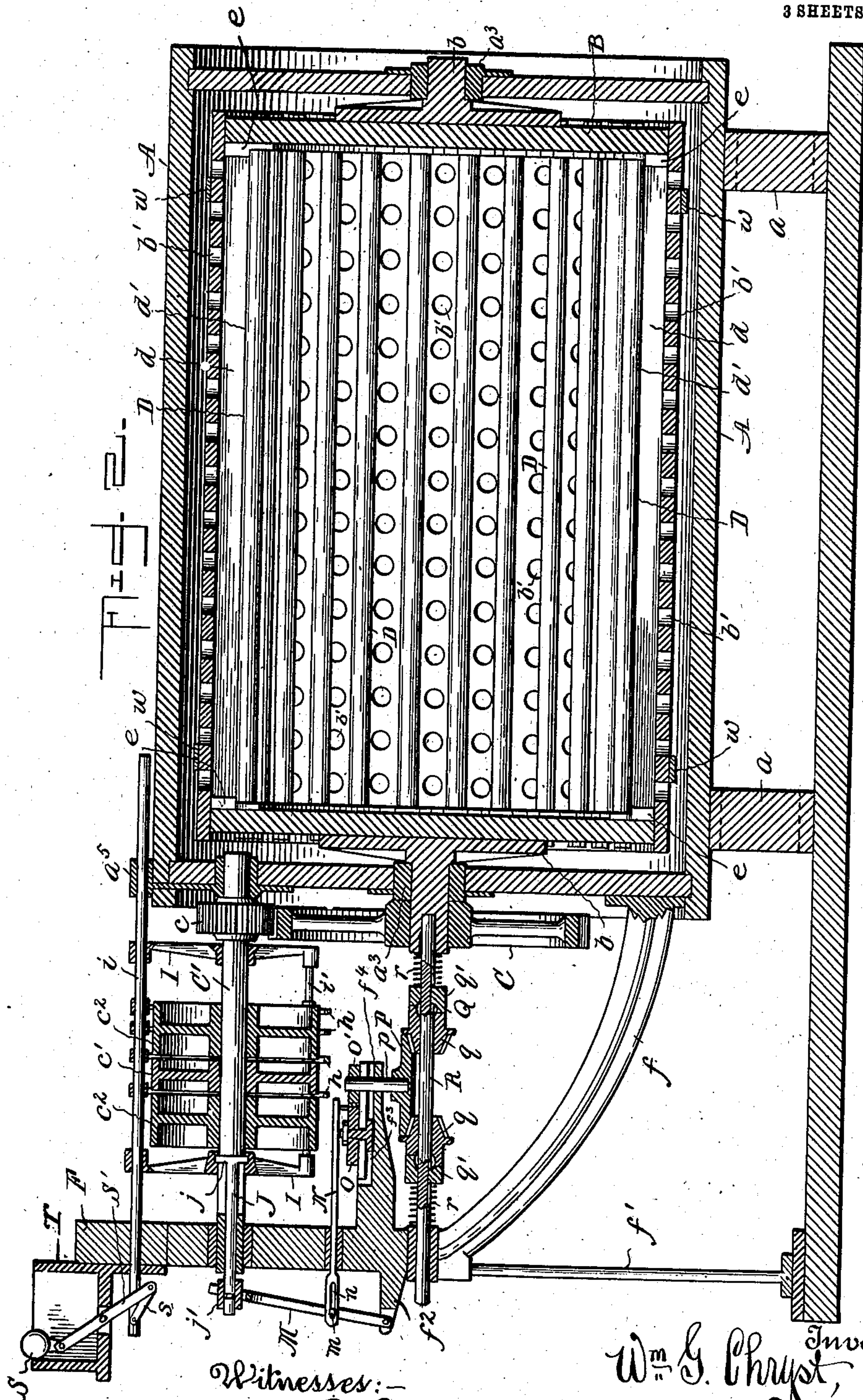
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Witnesses:—

R. J. Beall.

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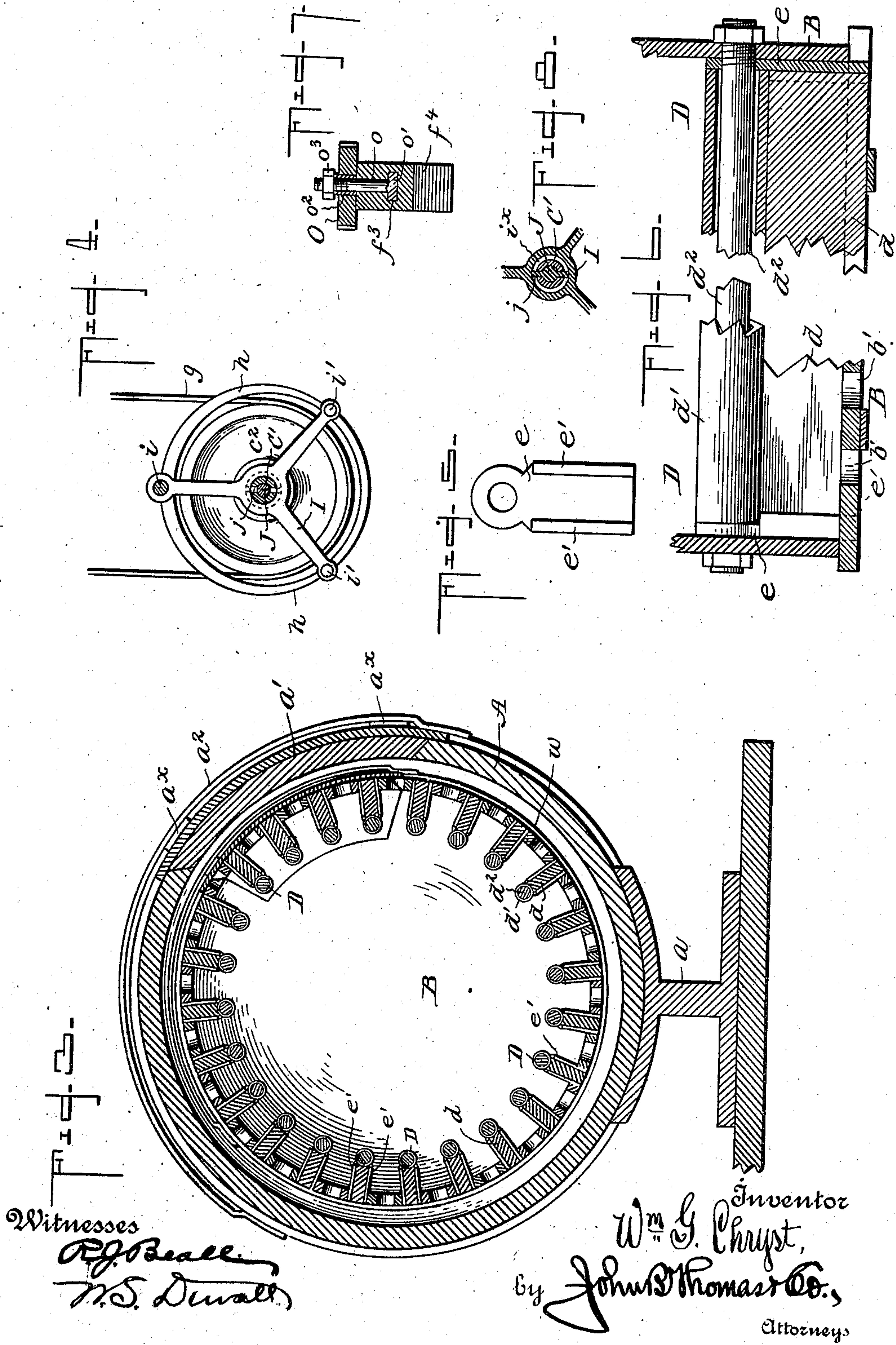


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3 SHEETS—SHEET 3.



Witnesses

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# UNITED STATES PATENT OFFICE.

WILLIAM G. CHRYST, OF PHILADELPHIA, PENNSYLVANIA.

## WASHING-MACHINE.

No. 858,573.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed September 11, 1905. Serial No. 277,991.

To all whom it may concern:

Be it known that I, WILLIAM G. CHRYST, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have  
5 invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to washing machines, and more particularly to that class which are provided with a cylindrical drum to which is imparted an oscillating rotary  
10 movement in washing the clothes or other articles placed in said drum.

The primary object of the invention is to so construct and arrange the operative parts of the machine as to subject the clothes or other articles which are placed in the drum to a regular action or agitation in forcing the water through them, and in such manner that the clothing will be thoroughly washed without becoming knotted or tangled.

20 With this principal object in view the invention consists in an improved form of driving mechanism in combination with an improved construction of drum, the latter having a series of ribs by which the clothes are rolled or agitated as the drum is revolved or rotated  
25 backward and forward.

Other objects and advantages of the invention will hereinafter appear, and the novel features specified and claimed.

In the drawings, which form a part of this specification:—Figure 1 is a side elevation of a washing machine constructed in accordance with my invention. Fig. 2 is a longitudinal vertical sectional view through the machine. Fig. 3 is a transverse sectional view through the drum and casing or tub. Fig. 4 is a detail in elevation  
30 of the driving pulleys and belt-shifting device. Fig. 5 is a detail view of one of the brackets which support the ribs or flights which are arranged in the drum. Fig. 6 is a side elevation and sectional view, showing the construction of the ribs or flights and manner of securing  
35 the same to the ends of the drum. Fig. 7 is a detail sectional view of the adjustable support for the removable gearwheel. Fig. 8 is a detail sectional view through the hub of the main spider, showing the connection of the shifting rod therewith.

45 Like letters and numerals of reference indicate like parts in all the views of the drawings.

Though the machine is primarily intended for washing clothes it will be obvious that the machine could be used also for the purpose of dyeing clothes or other fabrics, inasmuch as the action of the drum on the clothes or fabric is such as to subject the latter perfectly to the full effect of the water or liquid.

Referring to the drawings, A designates the tub or casing, which is preferably cylindrical in shape and supported upon suitable legs *a*. At one side the tub or casing is provided with a sliding door *a'*, by means of which

access may be had thereto, and in order to permit of a sliding movement of said door, bands *a*<sup>2</sup> are secured to the tub, and are engaged by plates *a*<sup>x</sup> on said door. Within the tub or casing, and journaled in the ends  
60 thereof, is a revoluble drum B, which is also cylindrical in shape, and said drum and tub are of such relative size as to leave a space between the same, as shown. The drum is journaled in the casing by means of gudgeons *b*, attached to the ends thereof and bearing in  
65 bearing-boxes *a*<sup>3</sup> let into the end walls of the tub or casing, one of said gudgeons being extended to receive a gearwheel C, by which latter motion is imparted to the drum through the intervention of the driving mechanism hereinafter described. 70

The drum B is cylindrical, as stated, and is provided with ends or heads so as to form a closed receptacle to which access may be had by a door similar to that of the tub or casing, and in order that the water in the tub may enter said drum the latter is provided with holes  
75 *b'*, hereinafter more particularly referred to. Located around the inner side of the drum is a continuous series of ribs or flights D, which are disposed longitudinally of the drum and are suitably spaced apart so as to engage the clothing and impart a rolling action thereto as the  
80 drum is revolved. The holes through the body of the drum are located between these ribs or flights, so that as the drum is revolved in the tub the water will be forced through the holes and directed in numerous fine streams upon the clothing. Each rib or flight consists  
85 of a longitudinal wooden strip *d*, resting against the iron hoops *w*, which encircle the body of the drum and provided at its outer edge with a metal wearing surface in the form of a tube *d'*, the latter being held in place by means of rods or bolts *d*<sup>2</sup>, which extend through said  
90 tubes and through the heads of the drum and are secured by the usual nuts (see Fig. 6). In order that these rods or bolts *d*<sup>2</sup> may serve to also hold the wooden strips of the ribs in place brackets *e* are provided (see  
95 Figs. 5 and 6), said brackets being secured to the heads of the drum and having companion flanges *e'* *e'* between which the aforesaid wooden strips are slid and held by the tubes bearing thereagainst. The brackets are extended to receive the ends of the tubes, and such extensions are apertured for the passage of the rods or bolts. 100  
By this particular construction of rib the life and durability of the same is very greatly increased, and in the event any of them should become worn or any part required to be renewed such rib can be readily removed for the purpose. It is intended of course that the tube  
105 be made of brass or galvanized metal so that it will not corrode and soil the clothing or other articles placed in the drum, and as the rod or bolt is inclosed entirely within the tube the former may be of iron, although I would prefer that the same be also galvanized. 110

Though the tub and its rotatable improved drum could be used with any form of driving mechanism



adapted to impart an oscillating rotary movement to the drum the perfect operation of the entire machine is dependent upon the improved driving mechanism which I shall now proceed to describe.

5 In order to support the driving mechanism I provide a vertical standard F, supported from the tub by a curved member *f* and braced by a rod or upright *f'*, the aforesaid standard having suitable bearings for the shafts hereinafter mentioned.

10 The gearwheel C which is carried by the drum B is in mesh with a pinion *c* on the driving-shaft C', the latter carrying, as usual, the fixed pulley *c'* and loose pulleys *c<sup>2</sup>* *c<sup>2</sup>* at opposite sides thereof, and over these pulleys pass the belts *g* and *g'* which are oppositely

15 driven so as to turn the driving-shaft C' in either direction, according to which belt is shifted on to the fixed pulley *c'*. The mechanism for shifting the belts includes the improvements in the driving mechanism of the machine. Encircling the pulleys are a series of

20 rings *h*, which engage the opposite edges of the belts *g* and *g'* and are adapted to be moved laterally so as to shift said belts on and off the fixed pulley. Said rings are connected at their upper portions to a rod *i*, and at two intermediate portions to rods *i'*, the former having

25 bearings in the standard F and bearing-box *a<sup>5</sup>*, while the latter are secured at their ends to spiders I which are loosely mounted on the driving-shaft C' and also connected to the upper rod *i*. To the outer spider is connected an operating rod J, which is slidable within

30 the driving-shaft C and provided with a cross-head *j* which projects through opposite slots in said shaft C' (see Figs. 2 and 4) and into an annular recess *i<sup>x</sup>* in the hub of the spider I (see Fig. 8). In this manner the ends of the cross-head rotate in the hub with the shaft

35 and as the cross-head and its rod are slidable in the shaft they are adapted to operate the spider.

Upon the outer end of the operating rod J is loosely mounted a sleeve *j'*, to which is connected a lever M, the said lever being fulcrumed at its lower end in an

40 arm *f<sup>2</sup>* projecting outward from the standard F. At an intermediate point the lever M is connected by pin and slot to a pitman-rod N slidably supported in the standard F and connected to the outer portion of a gear-wheel O, which latter is in mesh with a pinion O' connected

45 by a short shaft *p* to a bevel-wheel P in mesh with bevel-pinions *q* *q* on the ends of opposite clutches Q and Q', the latter being mounted on a horizontal shaft R connected to the gudgeon *b* of the drum so as to rotate with said drum. Each clutch comprises the member

50 having the bevel-pinion and a slidable member *q'*, the latter revolving with the shaft and slidable thereon, being held against the other clutch-member by means of the expansion springs *r*, as shown. By this arrangement when the drum is moved in one direction by the

55 driving-pulley one of the clutches will operate to turn the bevel-gearwheel P while the teeth of the other clutch escape each other, and the shaft of said bevel-gearwheel being geared to the gearwheel O the latter will operate the pitman and through the intervention

60 of the lever M and shaft J will operate the belt-shifting device to throw the belt *g* (Fig. 1) off the fixed pulley *c'* on to its loose pulley *c<sup>2</sup>* and shift the belt *g'* on to said fixed pulley, and this of course will result in the rotation of the drum being reversed and a consequent re-

verse movement of the bevel-gearwheel P, which latter 65 will, through the gearing hereinbefore mentioned, shift the belt-shifting mechanism to again reverse the motion of the machine. In this way the rotatable drum is given an oscillating rotary motion, that is, a certain number of revolutions in one direction and reversed to 70 give the same number of revolutions in the other direction, the number of revolutions being determined by the size of the gearwheel O to which the pitman is connected, and in order to change the number of revolutions given to the drum this gearwheel is removable for 75 the purpose of substituting therefor a larger or smaller one, as hereinafter set forth.

The operating mechanism for the belt-shifter moves the latter to a certain extent, and beyond this point said belt-shifting device is moved by means of the weight S, 80 connected to the rod *i* by means of the lever S' and link *s*. By means of this weight device the belts will be shifted on to the fixed pulley when the belt-shifting mechanism has moved them to a certain extent, and said weights perform this function when the belt-shifter is operated in either direction. 85

To provide for changing the size of gearwheel O the shaft *o* upon which it is mounted is slidably mounted in the supporting-arm *f<sup>1</sup>*, and clamped by a sleeve *o<sup>2</sup>* and nut *o<sup>3</sup>*, the lower end *o'* of the shaft being extended or 90 flanged at opposite sides to fit in a corresponding recess, *f<sup>3</sup>*, in the aforesaid arm. The gearwheel is held upon the laterally adjustable shaft by means of the nut *o<sup>3</sup>*.

The operation of the machine will be readily understood from the foregoing description, in connection 95 with the accompanying drawings, inasmuch as one of the belts *g* *g'* being shifted on to the fixed pulley *c'* the shaft C' will be turned and the pinion *c* thereon being in mesh with the gearwheel O on the washing drum B will turn the latter to agitate the clothes or roll them in one 100 direction, and the said drum being geared directly to the bevel-wheel P the latter through its connections with the belt-shifter will operate the latter to shift the belts so that the other drive-belt will be moved on to 105 the fixed pulley resulting in the direction of rotation of the drum being reversed, and this reverse motion of the drum will also reverse the rotation of the gearwheel P and consequently again shift the belts. In this way the drum is revolved first in one direction and then in the 110 other, or in other words given what may be termed an oscillating rotary motion. It will be noted that the connections are such that the oscillating rotary motion will be even and regular, that is the drum will be turned in either direction the same number of revolutions, inasmuch as the connections between the drum and belt 115 shifter are positive. This of course will give a regular action or agitation to the clothes contained in the drum, so that they will be rolled and unrolled evenly as the drum is oscillated, thereby preventing the clothes from becoming knotted and tangled. 120

The construction and arrangement of the washing machine elements are all simple, and after being properly adjusted the operation is entirely automatic to impart to the drum the regular oscillating rotary motion hereinbefore explained. 125

Having described my invention, what I claim is:

1. In a washing machine, the combination, of a drum, ribs secured to the inner side of the body thereof, said



ribs comprising a wooden strip next the drum, a metal tube at the outer edge of the strip, and a bolt holding the tube in place.

5 2. In a washing machine, the combination with the drum, of a rib therefor comprising a wooden strip next the drum, a bracket supporting said strip having parallel flanges between which the strip fits, a metal tube bearing against the brackets and the outer edge of the wooden strip, and a bolt passed through the tube, brackets and heads of the drum and adapted to secure the strip, brackets and tube to said drum, substantially as shown and described.

10 3. In a washing machine, the combination with the outer casing suitably supported and provided with bearings in its ends, of an inner rotatable drum journaled in said

bearings and having holes in the outer or cylindrical portion thereof, said holes being arranged in longitudinal series spaced apart, and ribs secured to the inner side of the drum between the series of holes and each comprising a wooden strip next the drum, a metal tube at the outer edge of the strip, and a bolt passed through the heads of the drum and the tube to hold the latter in place, substantially as shown and described. 15 20

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

WILLIAM G. CHRYST.

Witnesses:

U. H. SOUDER,

J. C. EHLERS.