

(No Model.)

4 Sheets—Sheet 1.

W. G. HANNA.
WASHING MACHINE.

No. 464,633.

Patented Dec. 8, 1891.

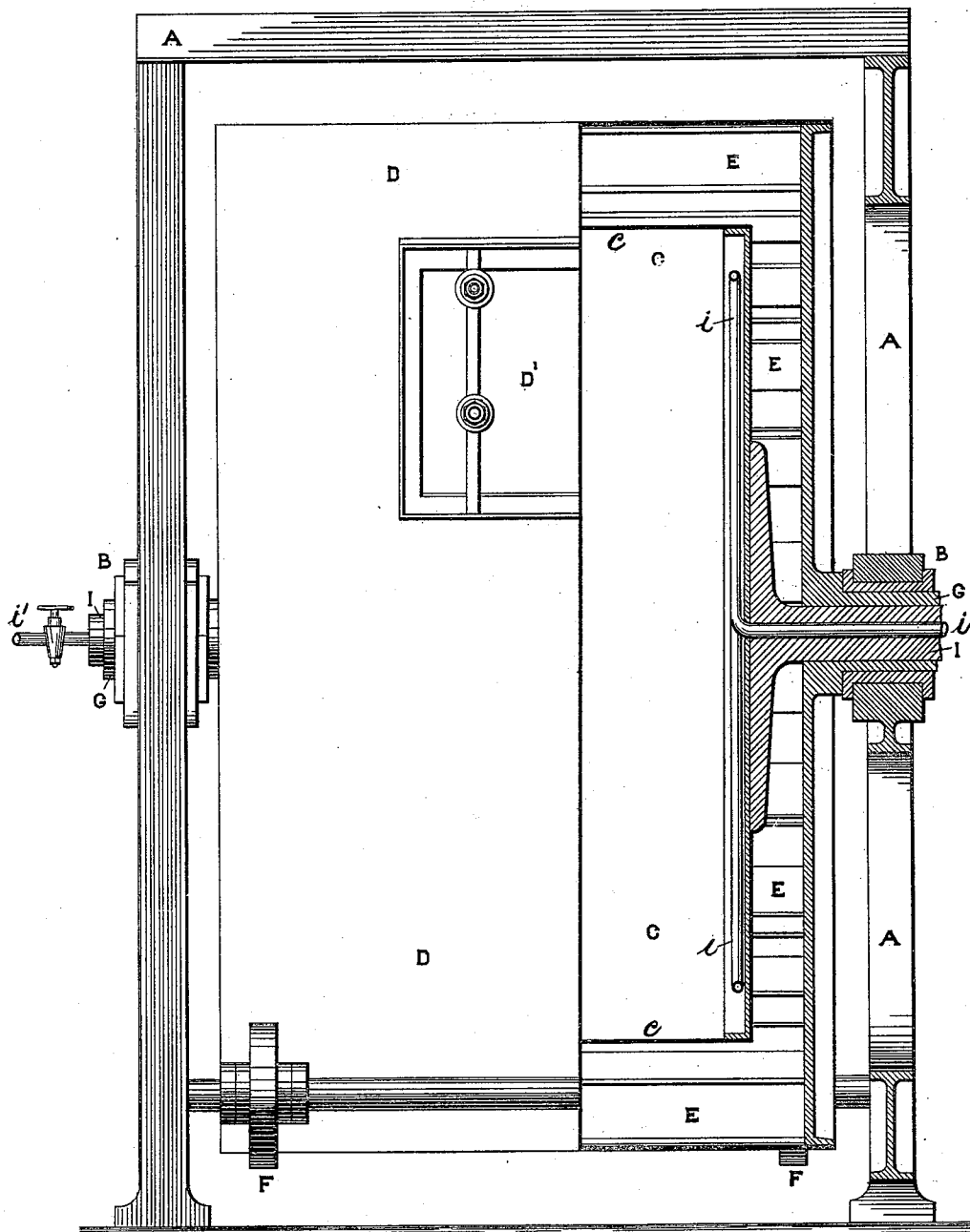


FIG. 1.

INVENTOR

WITNESSES
William H. Saylor
Chas. Overdale.

W. G. Hanna
by
Wm. P. Thompson & Co. Attys

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4 Sheets—Sheet 2.

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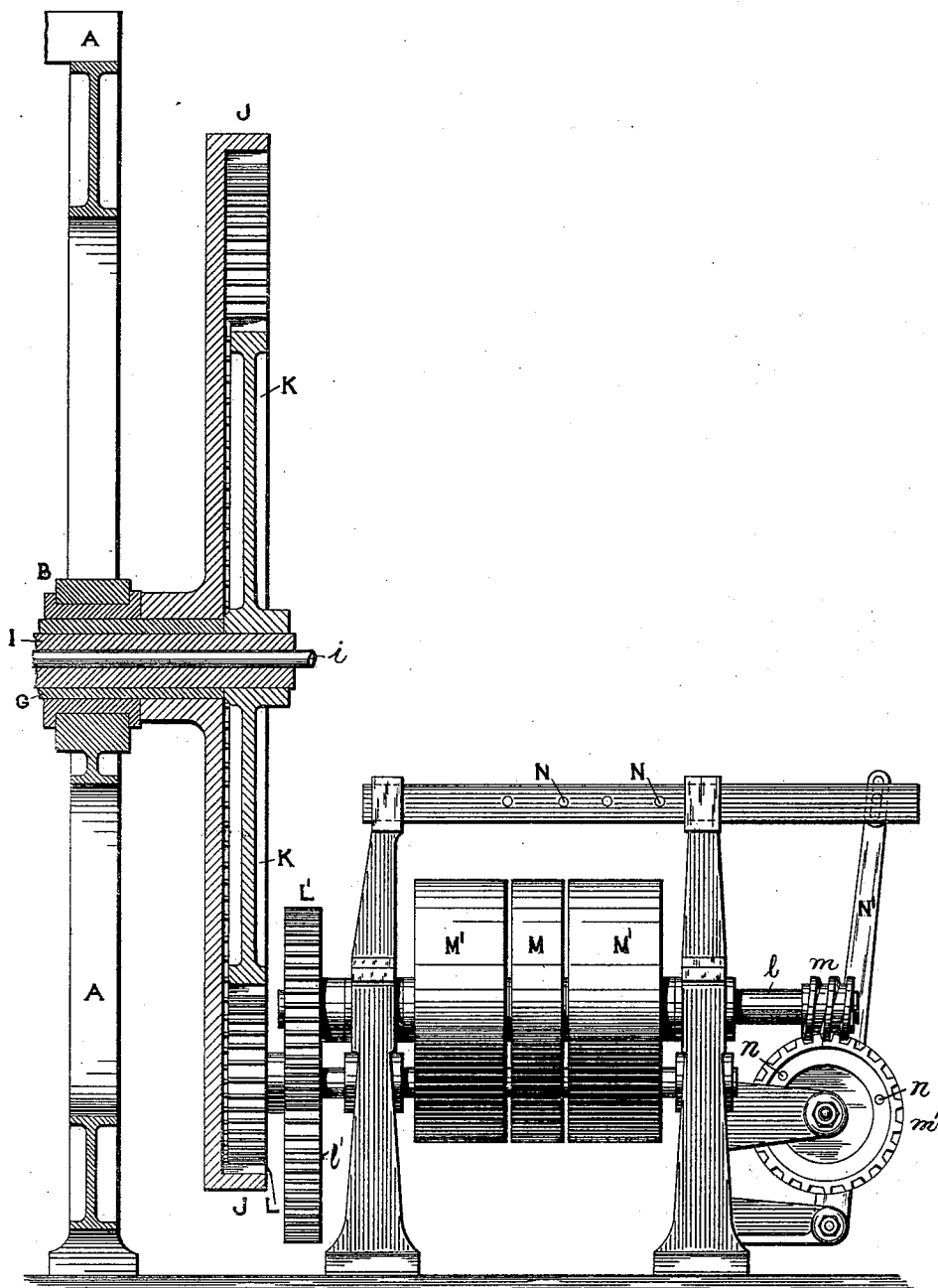


FIG. 2.

INVENTOR

WITNESSES
William H. Taylor
Chas. Overdale.

W. G. Hanna
by
Wm. B. Thompson & Co.
Attys

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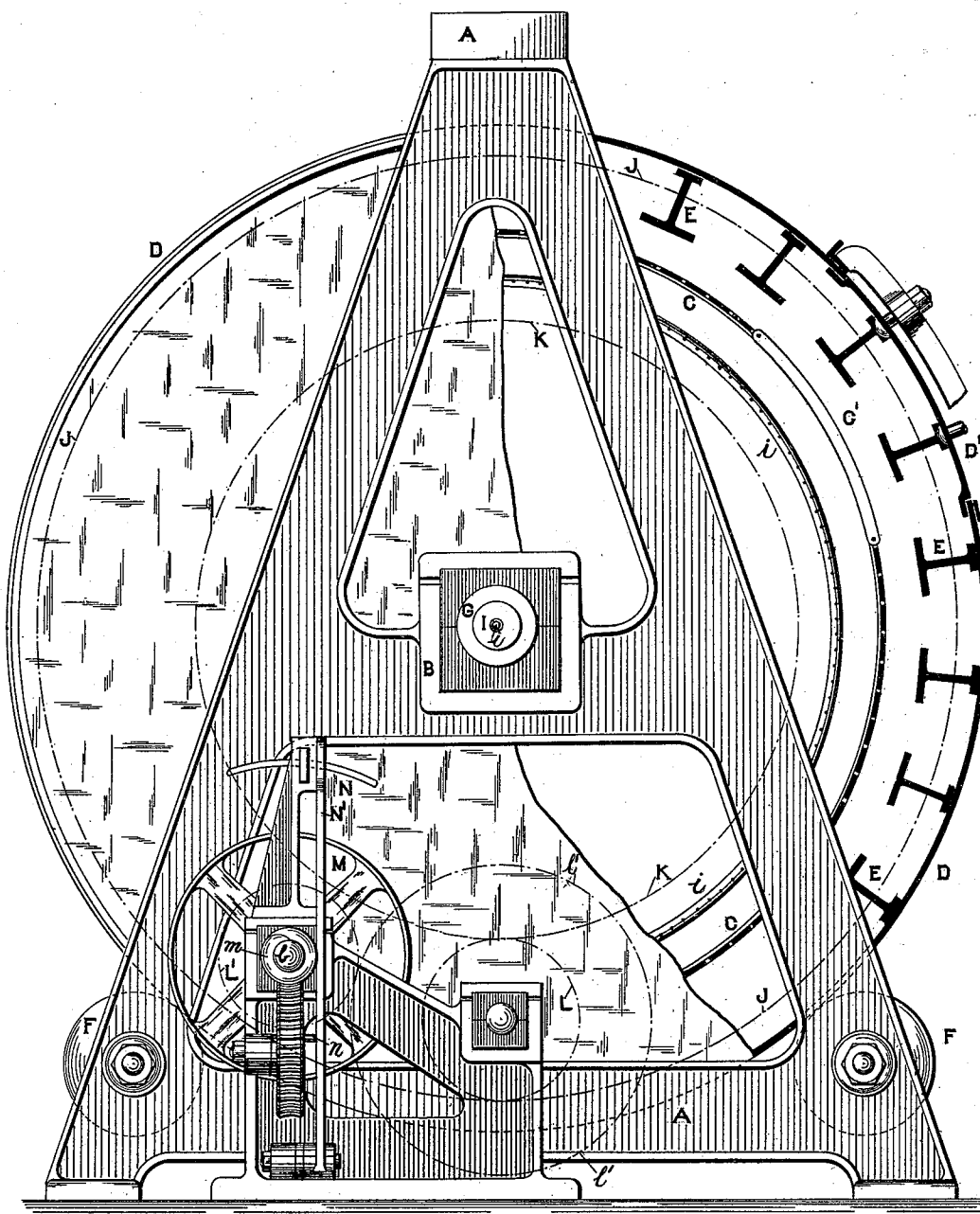


FIG. 3.

INVENTOR

WITNESSES

William H. Taylor
Chas. Overdall.

W. G. Hanna

by
Wm. P. Thompson
Attys

(No Model.)

4 Sheets—Sheet 4.

W. G. HANNA.
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FIG. 5.

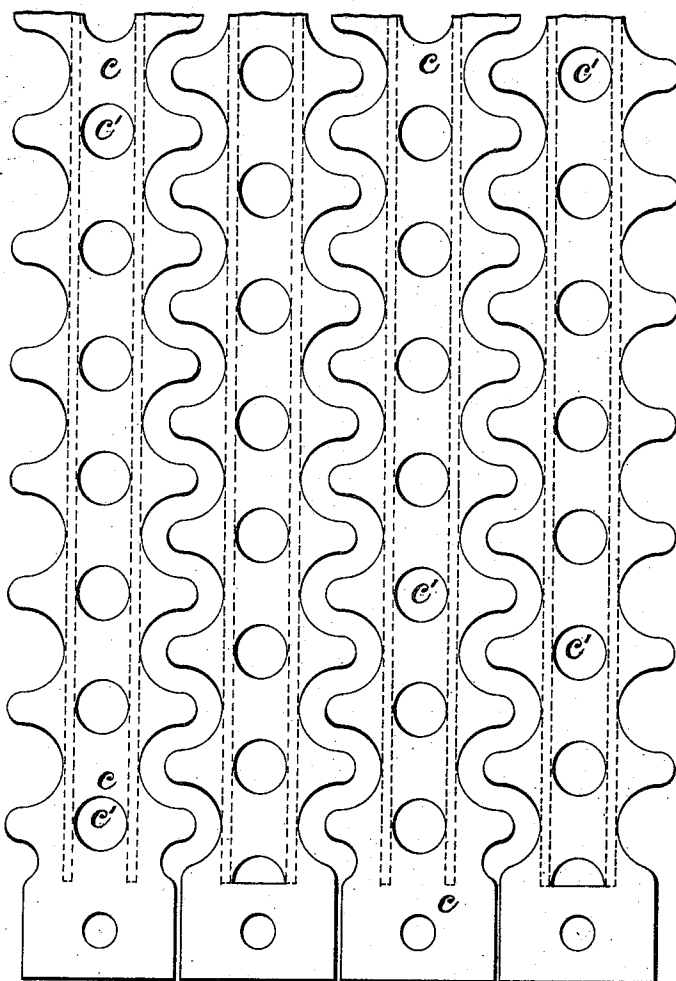


FIG. 4.

WITNESSES

William H. Taylor
Chas. Overdale.

INVENTOR

W. G. Hanna
by
Wm. P. Thompson
Attys

UNITED STATES PATENT OFFICE.

WILLIAM G. HANNA, OF BELFAST, IRELAND.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,633, dated December 8, 1891.

Application filed November 3, 1890. Serial No. 370,211. (No model.) Patented in England November 18, 1889, No. 18,382.

To all whom it may concern:

Be it known that I, WILLIAM GEORGE HANNA, of Belfast, in the county of Antrim, Ireland, a subject of the Queen of England, have invented a new and useful Machine for Washing Clothes or other Articles, (for which I have obtained a patent in Great Britain, No. 18,382, bearing date November 18, 1889,) of which the following is a specification.

The invention relates to that class of mechanical washing-machines in which a rotating cylinder is provided to receive the articles or clothes to be washed. Hitherto these machines have been usually constructed with a single rotating cylinder, into which the clothes are placed, or with two cylinders, an inner rotating one into which the clothes are placed, formed with bars or lags between which the water can pass, and an outer stationary one to hold and retain the water or other washing-liquor.

This invention consists, essentially, in constructing the apparatus with an outer rotating casing to contain the wash-liquor, and an inner rotating perforated hollow cylinder or cage to receive the clothes, one caused to rotate in a direction opposite to the other, so as to set up strong opposing currents of the washing-liquor and force the same from the space between the outer and inner cylinders into the interior of the inner hollow perforated cylinder or cage upon the fabrics to be washed; in the form of the bars which form the casing of the inner cylinder; in the combination with the outer cylinder of flanged ribs or buckets which raise the water as the cylinder rotates; in the combination with the two cylinders of a perforated annular pipe through which steam is injected, and in mechanism for actuating the two cylinders which causes them to rotate alternately first in one direction and then in the other, the rotation of the two cylinders being always in opposite directions.

The invention will be fully described with reference to the accompanying drawings.

Figure 1 is a side elevation, partly in section; Fig. 2, a side elevation of the actuating mechanism; Fig. 3, an end elevation, partly in section; Fig. 4, an enlarged elevation of the bars forming the periphery of the inner

cylinder, drawn to an enlarged scale; Fig. 5, a transverse sectional elevation of the bars shown in Fig. 4.

On the framing A in bearings or journals B are mounted an inner hollow perforated cylinder or cage C, and an outer casing or cylinder D, each capable of rotation about their axes, the rotation of one being in the opposite direction to that of the other when they are in operation. The inner cylinder C is constructed in the form of a cage of a number of rods or bars *c* of metal. The metallic bars *c* have a number of holes *c'* formed in each, and are formed with corrugated or undulated edges, the depression on one corresponding with the projection on the other, to present a sinuous space or passage between each pair to admit of the water or washing-liquor. The outer casing or cylinder D is constructed in the form of a close drum of either wood or metal to contain the wash-liquor, and has affixed on its inner surface a series of flanged ribs or buckets E. The flanged ribs or buckets E are placed parallel to the axis of the cylinder, and are formed of H or other suitable shape in cross-section, preferably in metal. Openings C' D' are made through the two cylinders, through which the clothes or other articles are deposited in the inner hollow perforated cylinder or cage. The outer cylinder is supported on the anti-friction rollers F and by the hollow shaft G in the bearings B and the inner cylinder by the hollow shaft I in the center of the shaft G. Through the center of the hollow shaft I water and steam is admitted to the interior of the cylinders.

Through the center of the shaft I is passed a small pipe or tube *i*, formed into a ring inside the end of the inner cylinder. The annular part of the pipe *i* is perforated, and through it a fine spray of steam or water may be injected onto the goods in the inner cylinder for the purposes of disinfecting or softening them.

On the hollow shaft G of the outer cylinder is keyed or affixed an internal toothed wheel J, and on the hollow shaft I of the inner cylinder is keyed or affixed an external toothed wheel K of less diameter than the wheel J. Rotary motion is communicated through these wheels to the two cylinders

from the wheel L, which gears with both, and consequently turns the cylinders in opposite directions.

The spur-wheel L receives motion through the intermediate pinion *l'* from the wheel L' on the driving-pulley shaft *l*, which is alternately driven first in one direction and then in the reverse direction by two belts or straps on the pulleys M M', of which M is fast to the shaft and M' is loose upon it. The reversing is effected by means of the worm *m* and worm-wheel *m'*, in the face of which are inserted two pins *n*, of which first one and then the other comes in contact with the lever N', moving it and the strap-forks N, thereby throwing the straps alternately onto the fast pulley M.

When the apparatus is in operation, the wash-liquor is placed in the outer casing or cylinder D and the clothes or articles to be washed are placed in the inner hollow perforated cylinder or cage C and the openings C' D' are closed and secured. The apparatus is then set in motion and the cylinders caused to rotate in opposite directions. Steam is then blown in through the perforations in the annular part of the pipe *i*, and then water may be admitted either by means of an injector through the same pipe or through the pipe *i'* at the opposite side of the machine. The rotary movement of the cylinders in opposite directions causes strong contrary currents of water to flow through them. The flanged ribs or buckets E, attached to the internal surface of the outer cylinder D carry up with them a considerable quantity of water, which is continually showered over and through the other cylinder and the articles contained in it as it finds its way through the perforations in and sinuous passages between the rods or bars which form its periphery. The passage of the flanged ribs or buckets through the water or liquor, in which the lower port of the inner hollow perforated cyl-

inder or cage is immersed, agitates it greatly and gives it a strong cleansing power upon the goods, and much better and quicker work is done than when a single rotating cylinder alone is used or than when an inner cylinder revolves inside an outer stationary cylinder or casing.

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

1. A washing-machine constructed with an outer rotating casing D, which contains the wash-liquor and is provided with buckets E to lift, discharge, and force the water, in combination with an inner perforated hollow cylinder C, into which the clothes are placed and which rotates in a direction opposite to that of the casing D, substantially as described.

2. In a washing-machine provided with two cylinders, an outer casing or cylinder D to receive and hold the wash-liquor, which rotates in one direction, and an inner perforated hollow cylinder C to receive the clothes, which rotates in the opposite direction, substantially as described.

3. In a washing-machine provided with two cylinders, an outer casing D to receive and hold the wash-liquor, which rotates in one direction, an inner perforated hollow cylinder C to receive the clothes, which rotates in the opposite direction, an annular perforated pipe affixed thereto which admits a supply of steam, a hollow shaft G, through which water and steam are admitted, and internal buckets E, which lift and splash the water as the cylinders rotate, substantially as described.

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

W. G. HANNA.

Witnesses:

WILLIAM H. TAYLOR,
CHARLES OVENDALE.