No. 728,436. PATENTED MAY 19, 1903.

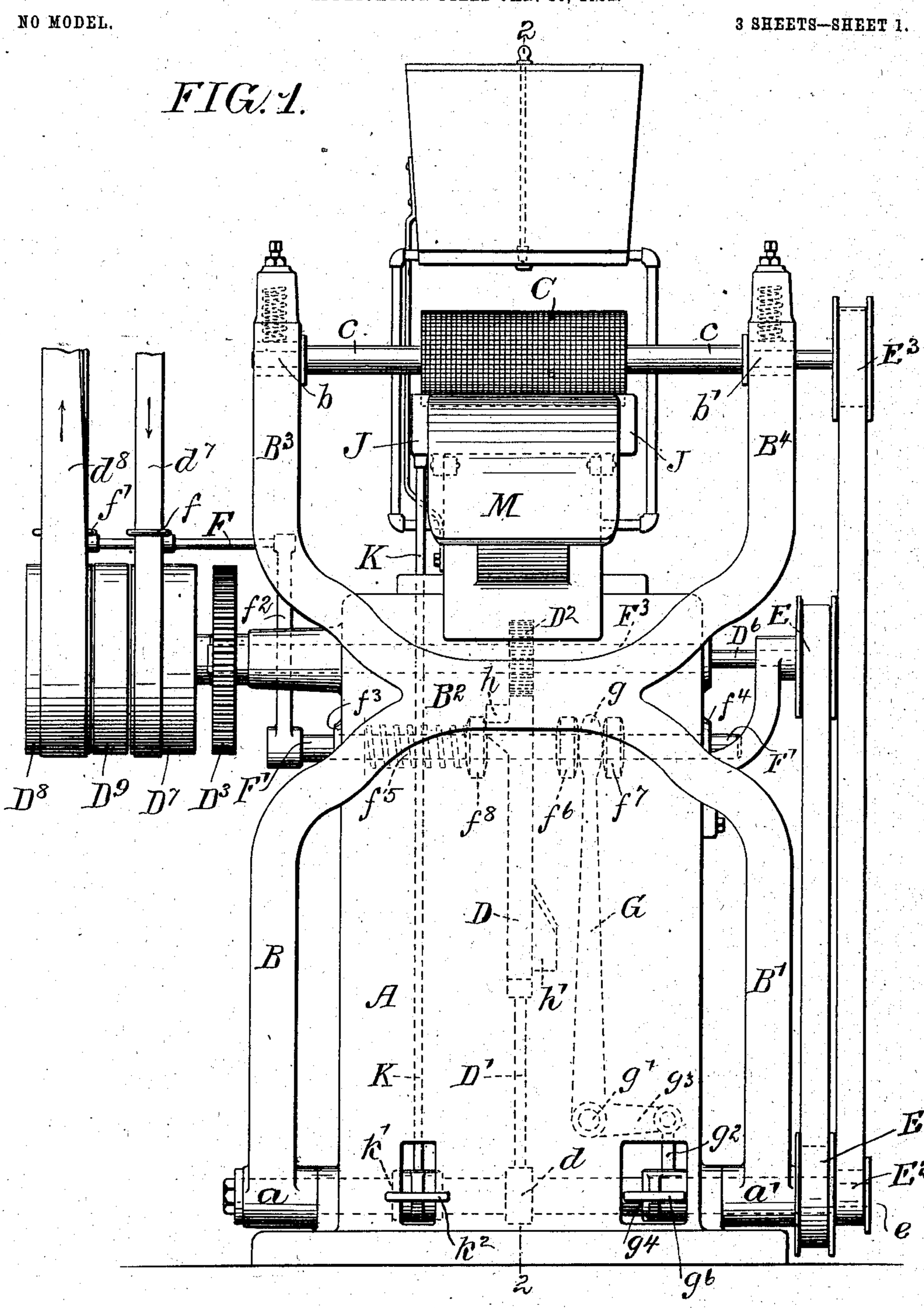
W. M. BARNES.

STARCHING MACHINE.

APPLICATION FILED JAN. 16, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

FIG. 1.



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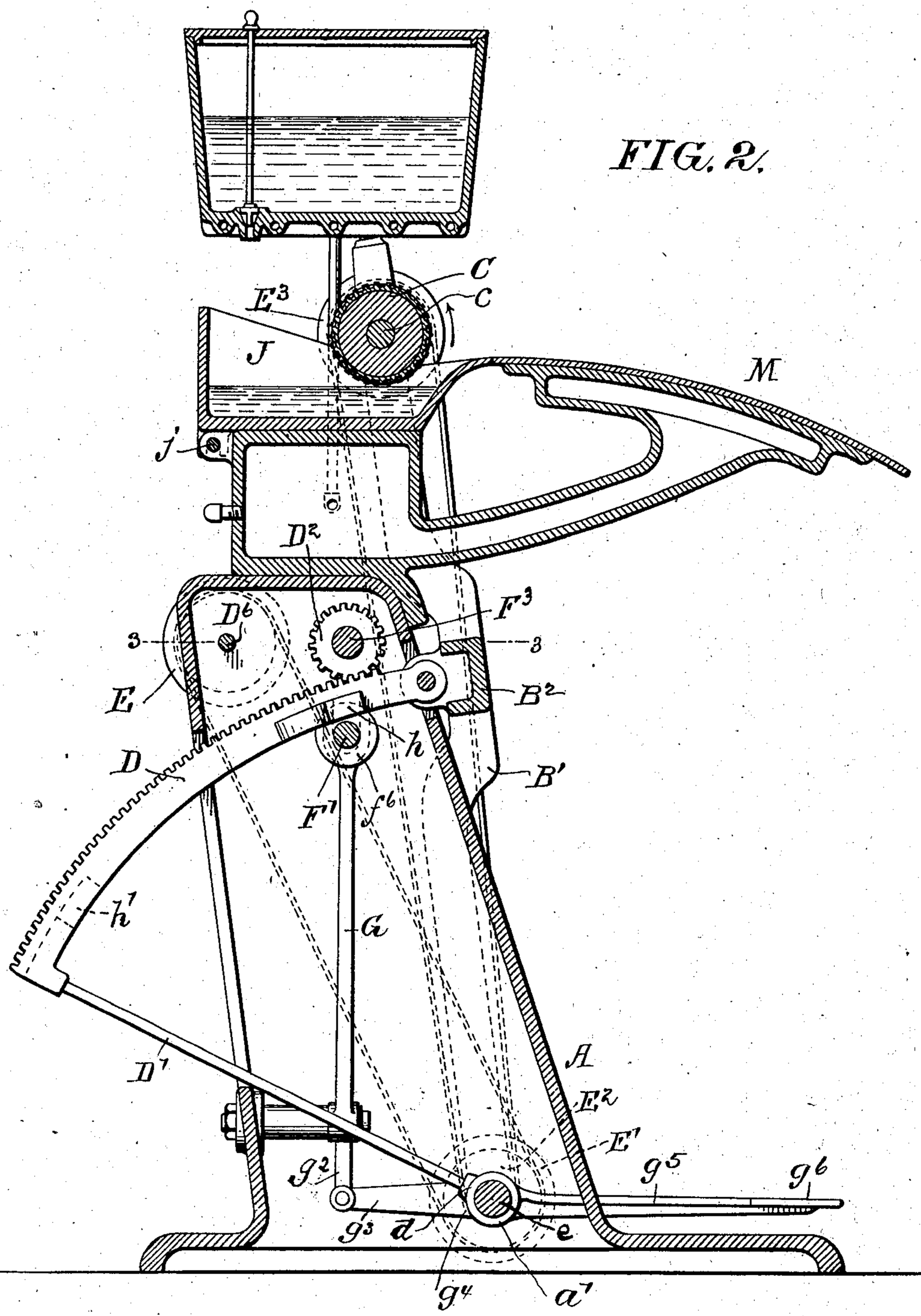
NO MODEL. 3 SHEETS—SHEET 2.

FIG. 2.



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NO MODEL. 3 SHEETS—SHEET 3.

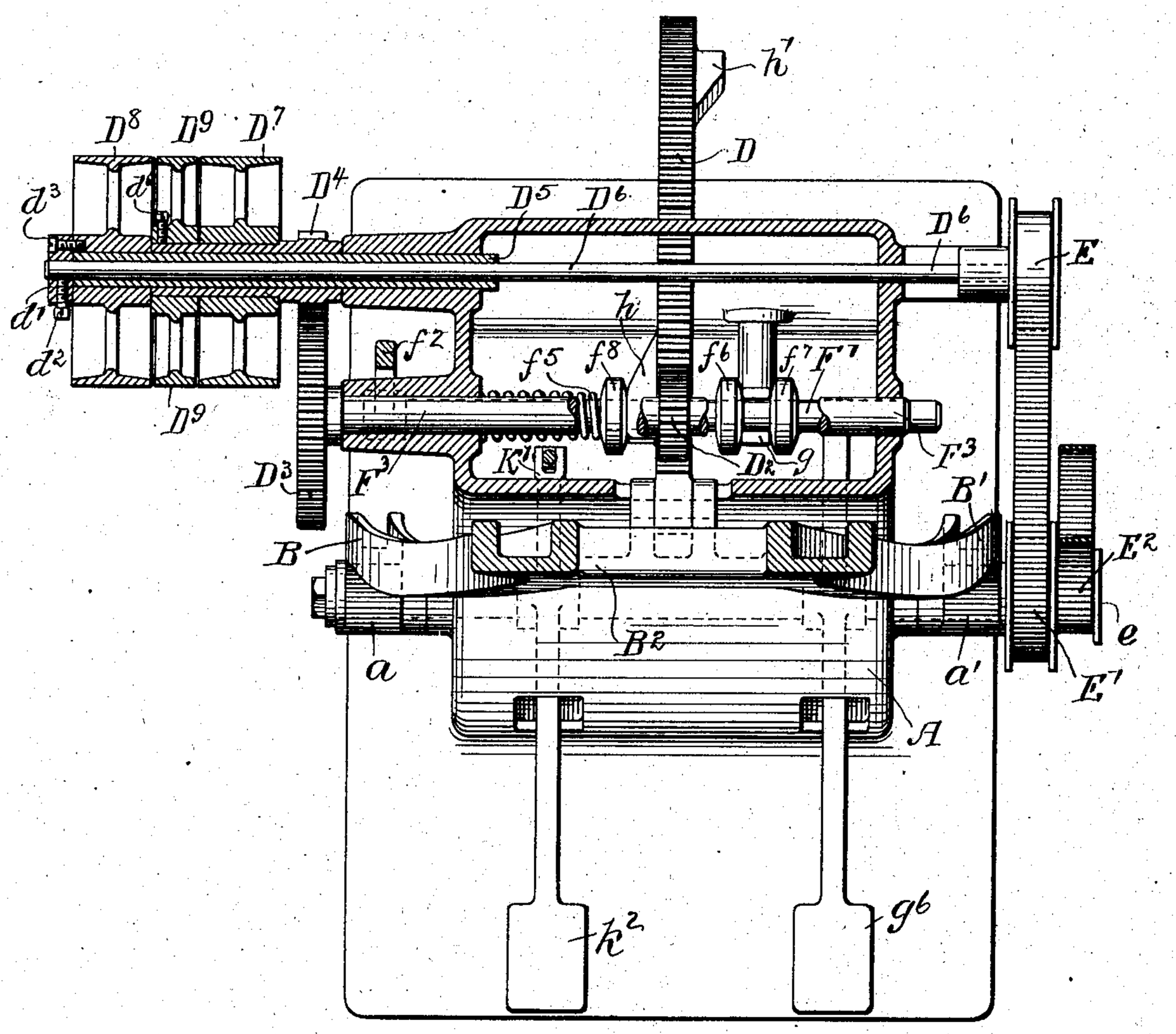

FIG. 3.

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No. 728,436. Patented May 19, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM M. BARNES, OF PHILADELPHIA, PENNSYLVANIA.

STARCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 728,436, dated May 19, 1903.

Application filed January 16, 1902. Serial No. 89,945. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. BARNES, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Starching-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists in certain improvements in starching-machines, and has for its object to produce an efficient and non-complicated machine.

I will first describe the embodiment of my invention shown in the accompanying drawings, in which it is shown as applied to a machine for starching bosoms of shirts, although it is not applicable alone to such specific machines.

In the drawings, Figure 1 is a front elevation. Fig. 2 is a vertical sectional view on line 2 2, Fig. 1. Fig. 3 is a horizontal sectional view on line 3 3, Fig. 2.

A is the frame of the machine. Pivotally secured to the frame at a a' in horizontal alinement with each other are the arms B B', connected by the cross-bar B^2. From this cross-bar B^2 project upwardly the portions B^3 B^4, having the bearings b b' for the shaft c, carrying the corrugated starching-roller C. Pivotally secured at one end to the cross-bar B^2 is the curved rack-bar D, which is pivotally secured at the other end to the main frame at the point d in horizontal alinement with the pivots of the arms B B' by means of the rod D'. Meshing with this rack-bar D is the pinion D^2. Upon the shaft of this pinion D^2 is the gear D^3, which meshes with the gear D^4, secured to the sleeve D^5, surrounding the shaft D^6. Upon this sleeve D^5 are loosely mounted the pulleys D^7 and D^8, and between the pulleys D^7 and D^8 is the pulley D^9, secured to the sleeve D^5 by the set-screw d^6. On the end of the shaft D^6 is the collar d', secured thereto by the set-screw d^2. From this collar projects a pin or set-screw d^3, which enters an orifice in the hub of the pulley D^8. This shaft D^6 has at the other end the grooved pulley E. From this pulley E a belt runs to and around the grooved pulley E' on the shaft e. On this same shaft e is the grooved pulley E^2. From this pulley E^2 a belt runs to and around the grooved pulley E^3 upon the shaft c of the starching-roller C. The shaft of the pulley E^3 is carried by the portions B^3 B^4 of the pivoted arms B B', the pivot of these arms being the shaft e. Upon the pulley D^7 is a straight belt d^7, leading from a source of power, and upon the pulley D^8 is a crossed belt d^8 from the source of power. F is a belt-shifter rod having the fork f surrounding belt d^7 and the fork f' surrounding belt d^8. This rod F is operated by the arm f^2, projecting from the shaft F' parallel with said rod F. This shaft F' is movable laterally in bearings f^3 f^4. Upon and surrounding the shaft F' are the lugs or projections f^6, f^7, and f^8. Between the lugs f^6 and f^7 is the bifurcated end g of a bell-crank lever G, pivoted at g' and having the short arm g^3. A link g^2 is connected at one end to short arm g^3 and at the other end to one end of the foot-lever g^5, which is pivotally connected midway to the portion g^4 of the shaft e. The spring f^5 normally tends to hold the cross-belt upon the pulley D^9 and the straight belt upon the idle pulley D^7. It is, however, in the position shown in Figs. 1 and 2—*i. e.*, the position with starching-roller in its rearward position—restrained from so acting by the lug f^8 resting against the inclined projection h upon the rack-bar D. When the operator presses the foot upon the end g^6 of the treadle, the rod G is operated so as to move the shaft F' against the spring f^5, moving the straight belt upon the pulley D^9. This causes the sleeve D^5 to rotate, rotating the pinion D^2 and swinging the rack-bar and the starching-roller forward upon the pivot-point. When the rack-bar has reached the limit of its forward movement, an inclined projection h' upon the rack-bar strikes the lug f^6, moving the shaft F' in the opposite direction, moving the straight belt from pulley D^9, and moving the cross-belt onto pulley D^9. This reverses the direction of rotation of the pinion D^2, causing the rack-bar and starching-roller to swing backward. When the starching-roller has reached its rearward position over the starching-box J, the inclined projection h upon the rack-bar strikes the lug f^8, moving and holding the shaft F' in the position shown in Figs. 1 and 2 when both belts are off the fixed pulley D^9. By this con-

struction the forward or backward movement and the extent thereof of the starching-roller between its extreme forward and backward positions is always under the control of the operator. When the foot presses the treadle, it swings forward. When the foot is released, it swings backward. Further, the movement in its extreme positions is automatically regulated. The starching-roller on my improved machine is only swinging when the operator desires it. Further, he can regulate the extent of swing, and thus adjust the amount of starching of the article to be starched, yet it is automatically prevented from going too far forward and is stopped in the position over the starch-box automatically when the operator removes the foot from the treadle.

The shaft D^6, which revolves the starching-roller C, is revolved by the pulley D^8. The belt d^8 is of width sufficient that when it is moved to the pulley D^9 it still remains partially upon pulley D^8, and thus the shaft D^6 and the roller C revolve at all times. Being driven by the cross-belt, the roller C revolves in the reverse direction to the forward swinging movement of the roller C, which more thoroughly and properly applies the starch to the garment.

The starch-box J is pivotally supported at the rear by hinges or pivots *j*. The front of the starch-box J is supported by the vertical rod K, which is connected to a crank K', pivoted on the portion *k'* of shaft *e* and having the foot-treadle k^2.

The starching-roller C is at the rear of its swinging movement when it is desired to apply starch to the roller C, and said roller is over the starch-box J. It can be elevated by applying the foot to the treadle, so that the starch is brought up to the roller, and the roller in revolving covers itself with starch. M is the table on which the garment in this machine, as shown a shirt, is placed and over which the starching-roller traverses. By this arrangement the operator has absolute control of the operation of the machine and the particular part of the garment to which it is applied and the quantity of starch applied to the roller. The machine is also automatically regulated to prevent an improper movement.

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

1. In a starching-machine, the combination of a swinging starching-roller, a reservoir containing starch, normally in line of movement of said roller but out of contact therewith, and means for relatively moving the roller and reservoir toward and away from each other to bring said roller into or out of contact with the starch in said reservoir.

2. In a starching-machine, in combination, a swinging starching-roller, a starching-reservoir containing starch normally in line of movement of said roller, but out of contact therewith, and means to move said starching-reservoir toward and away from said starching-roller to bring the starch in and out of contact with the roller.

3. In a starching-machine, in combination, a starching-reservoir hinged at one side, a starching-roller normally out of contact with the starch in said reservoir, and means to move the starching-reservoir on its hinge to bring the starching-roller in contact with the starch within the starch-reservoir.

4. In a starching-machine, in combination, a starching-reservoir hinged at one side, a rod supporting the opposite side of said reservoir, a starching-roller above said starching-reservoir, and means to elevate said starch-reservoir-supporting rod.

5. In a starching-machine, the combination of a constantly-driven shaft, a shaft driven alternately in different directions, a hinged arm carrying a revoluble corrugated starching-roller, power-transmitting mechanism between the first-mentioned shaft and the roller to revolve the same, and power-transmitting mechanism between the last-mentioned shaft and the hinged arm, to move the roller to and fro upon a table.

6. In a starching-machine, the combination of a constantly-driven shaft, a shaft driven alternately in different directions, a hinged arm carrying a revoluble corrugated starching-roller, power-transmitting mechanism between the first-mentioned shaft and a revolving part on the same axis as that about which the arm is hinged, and power-transmitting mechanism between said revolving part and the starching-roller.

7. The combination, in a starching-machine of a power-driven shaft, mechanism for reversing the rotation of said shaft, and a member parallel with said shaft and engaging said reversing mechanism and having an endwise movement to actuate the same, means tending to constantly move said member in one direction, a hinged arm carrying the starching-roller and driven by said shaft, a stop, as *h*, on said arm adapted to engage said endwise-movable member at one limit of the movement of the arm, and an actuator, as *h'*, on said arm adapted to engage and move said movable member at the other limit of movement of said arm, and an arm, as G, under the control of the operator adapted to engage and move said member.

8. In a starching-machine, in combination, a table adapted to support the garment to be starched, a starching-roller supported so as to be adapted to swing to and fro over said table, idle pulleys, a cross-belt upon one pulley and a straight belt upon the other, a driving-pulley, connections between said driving-pulley and the roller-support, belt-shifting devices, a spring normally holding one belt upon the active pulley and the other belt upon its idle pulley, belt-shifting mechanism under the control of the operator adapted when operated by the operator to move said belts against the action of said spring.

9. In a starching-machine, in combination, a table adapted to support the garment to be starched, a starching-roller supported so as to be adapted to swing to and fro over said table, idle pulleys, a cross-belt for one pulley and a straight belt for the other, a driving-pulley, and connections between said driving-pulley and the roller-support, belt-shifting devices, a spring normally holding the cross-belt on its active pulley, belt-shifting mechanism adapted when operated by the operator to move said belts and bring the cross-belt upon its idle pulley and the straight belt upon the active pulley.

10. In a starching-machine, in combination, a table adapted to support the garment to be starched, a starching-roller supported so as to be adapted to swing to and fro over said table, idle pulleys, a cross-belt upon one pulley and a straight belt upon the other, a driving-pulley, and connections between said driving-pulley and the roller-support, belt-shifting devices, a spring normally holding one belt upon the active pulley and the other belt upon its idle pulley, belt-shifting mechanism under the control of the operator adapted when operated by the operator to move said belts against the action of said spring, and devices, at the limit of movement of the roller in one direction, adapted automatically to throw both belts out of operation.

11. In a starching-machine, in combination, a table adapted to support the garment to be starched, a starching-roller supported so as to be adapted to swing to and fro over said table, idle pulleys, a cross-belt upon one pulley and a straight belt upon the other, and a driving-pulley, and connections between said driving-pulley and the roller-support, belt-shifting devices, a spring normally holding the cross-belt on the active pulley, belt-shifting mechanism adapted when operated by the operator to move said belts and bring the cross-belt upon its idle pulley and the straight belt upon the active pulley, and devices, at the limit of movement of the roller in one direction, adapted automatically to throw both belts out of operation.

12. In a starching-machine, in combination, a pivoted frame, a starching-roller carried by said frame, a rack-bar pivoted to said frame in line with said starching-roller-frame pivot-point, a pinion operating said rack, a pulley for driving said pinion, loose pulleys on opposite sides of said driving-pulley, a straight and a cross belt, means under the control of the operator to control the position of the belts with reference to the driving-pulley, a shaft upon which the cross-belt idle pulley is secured, and connections between said shaft and the shaft of the starching-roller, the cross-belt being of such width and such position that when it is shifted to the driving-pulley it still remains in contact with said cross-belt idle pulley.

13. In a starching-machine, in combination, a pivoted frame, a starching-roller carried by said frame, a rack-bar pivoted to said frame in line with said starching-roller-frame pivot-point, a pinion operating said rack, a pulley for driving said pinion, loose pulleys on opposite sides of said driving-pulley, a straight and a cross belt, means under the control of the operator to control the position of the belts with reference to the driving-pulley, a shaft upon which the cross-belt idle pulley is secured, a pulley upon said shaft, a pulley pivotally supported in line with the pivot-point of the starching-roller frame, a belt connecting said pulleys, a third pulley pivotally secured in line with said last-mentioned pulley, a pulley on the shaft of the starching-roller, and a belt connecting said last-mentioned pulleys.

14. In a starching-machine, the combination with the starching-roller and its shaft, of the driving-pulley and its shaft and the idle pulley loose on the driving-pulley shaft, a shaft to which said idle pulley is connected and rotating connections between said last-mentioned shaft and the starching-roller shaft, a belt normally upon the idle pulley and means to shift said belt to the driving-pulley, the width and position of said belt being such that when it is shifted to the driving-pulley it still maintains contact with the idle pulley.

In testimony of which invention I have hereunto set my hand at Philadelphia on this 10th day of January, 1902.

WILLIAM M. BARNES.

Witnesses:
M. F. ELLIS,
M. M. HAMILTON.