No. 674,995. Patented May 28, 1901.

G. H. BISHOP.

STARCHING MACHINE.

(Application filed Feb. 4, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

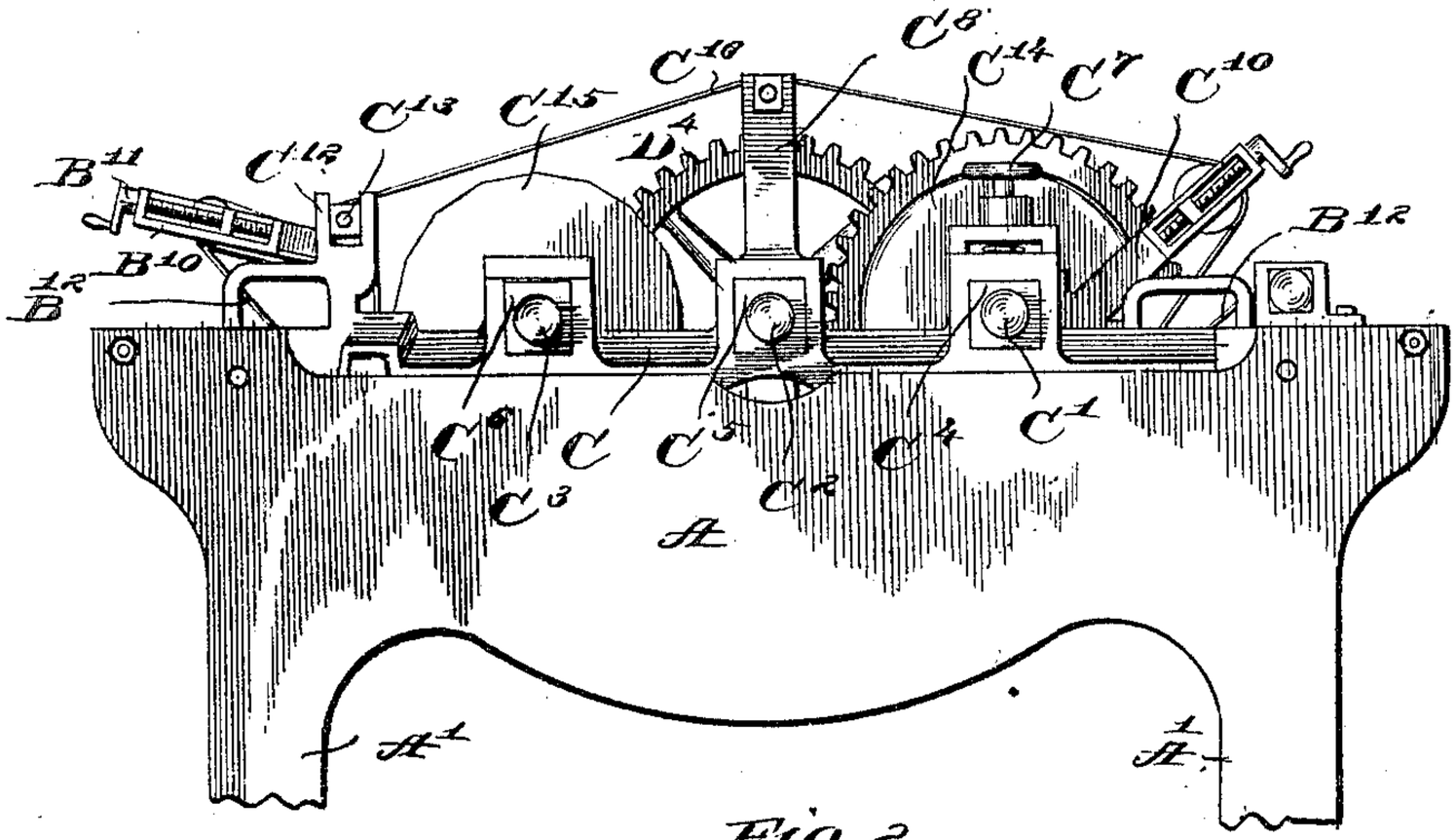

Fig. 2.

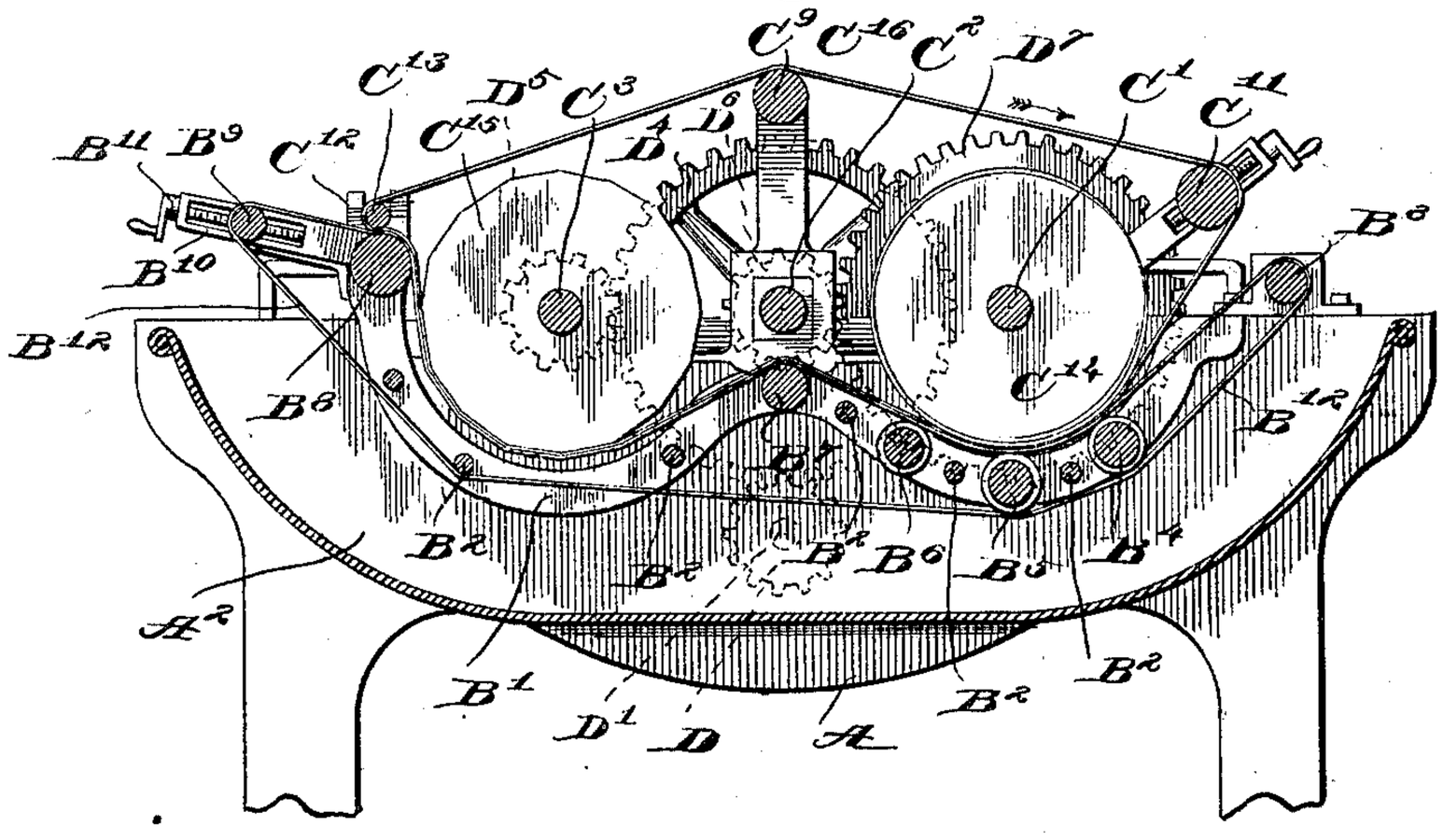

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Fig. 3.

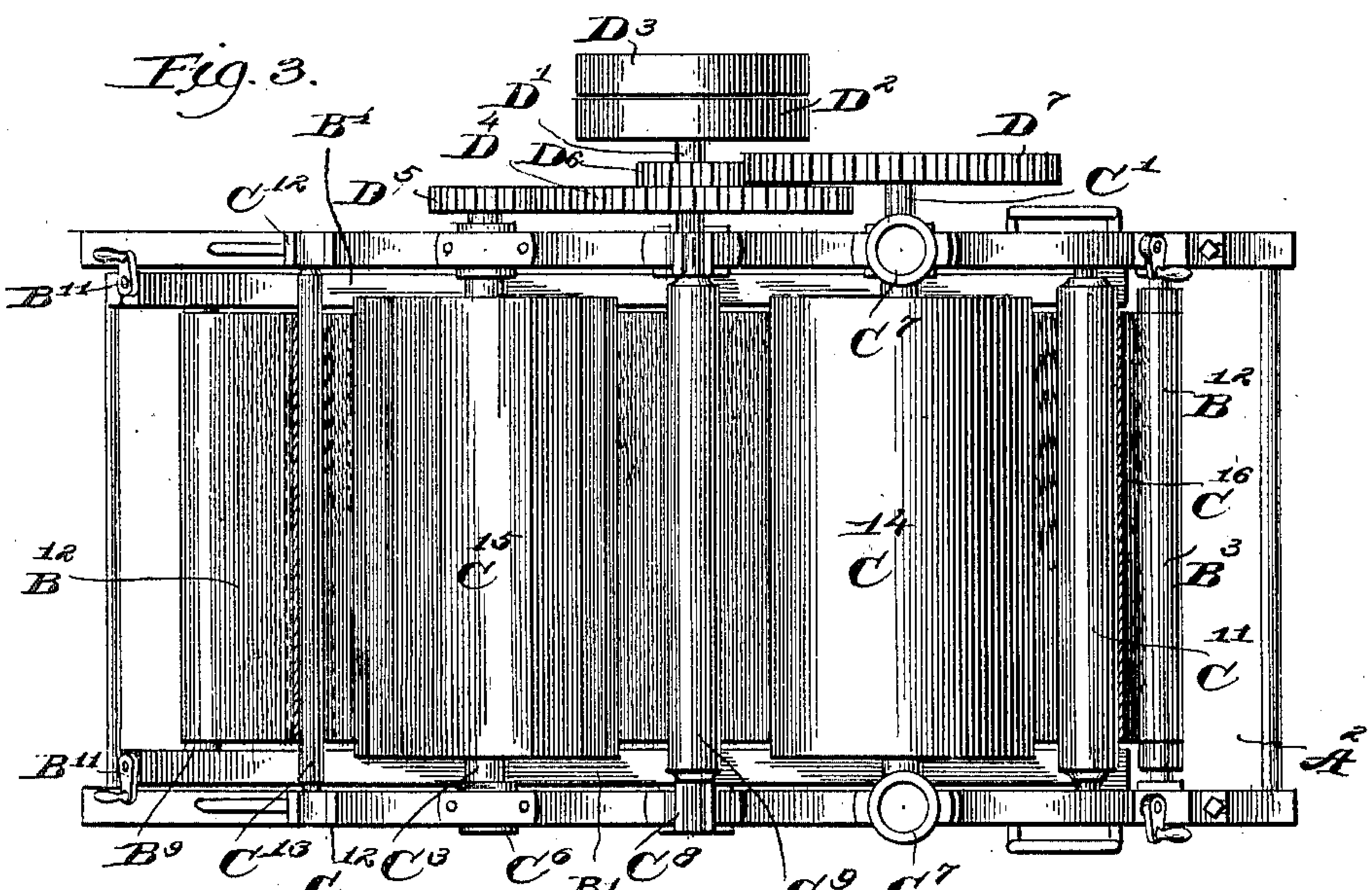


Fig. 4.

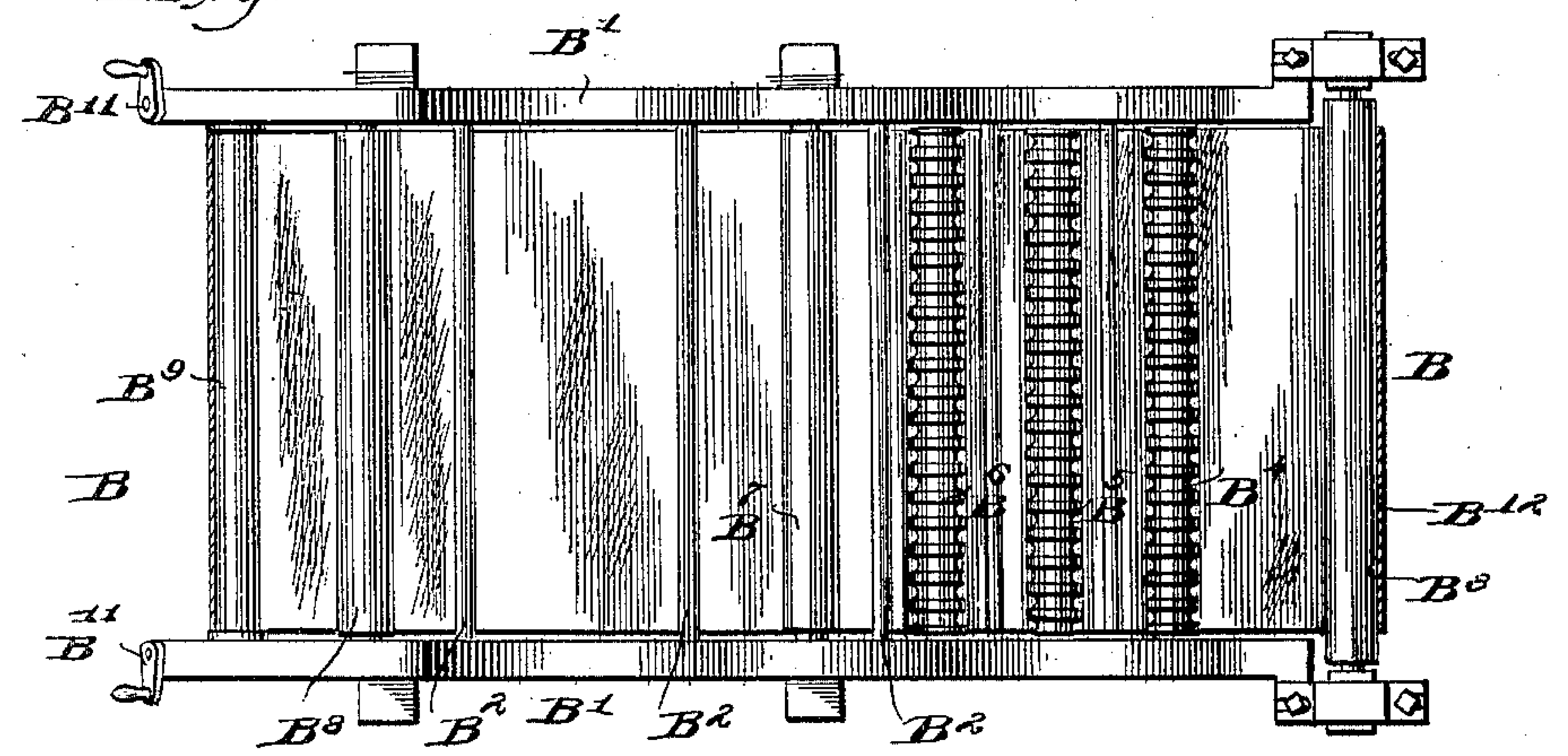
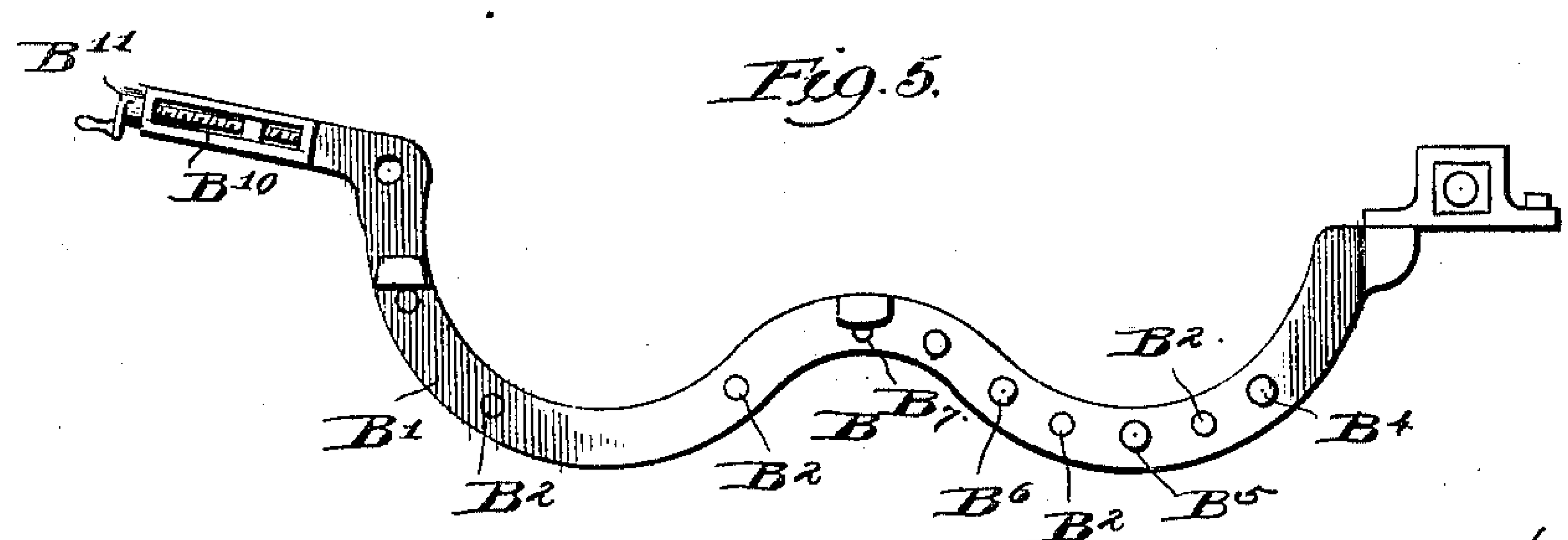


Fig. 5.



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GEORGE H. BISHOP, OF CHICAGO, ILLINOIS.

STARCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 674,995, dated May 28, 1901.

Application filed February 4, 1901. Serial No. 45,959. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BISHOP, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Starching-Machines, of which the following is a specification.

One object of this invention is the production of a starching-machine wherein the liquid starch is beaten into the fabric to be starched by means of a rapidly-revolving roller having a peripheral surface other than cylindrical in form.

A further object of this invention is the production of a starching-machine embodying certain other improvements to be more fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of a starching-machine embodying the features of my invention. Fig. 2 is a longitudinal central section through said starching-machine and its supporting-frame. Fig. 3 is a plan view of the starching-machine with a portion of the upper apron removed. Fig. 4 is a plan view, and Fig. 5 a side elevation, of the cradle removed from the starch-receptacle.

Like letters of reference indicate corresponding parts throughout the several views.

In the construction of this starcher I provide the body portion A, having the supporting-legs A′ therefor. The body portion has a receptacle A^2, which latter may be and in practice usually is made double to provide a steam-jacket (not shown) for keeping warm the liquid starch which it is intended to contain. A rigid cradle B is suspended within the starch-receptacle A^2. This cradle comprises the side bars B′, in double-loop form, the rods B^2, extending between said side bars for holding them rigidly together, the guide-rollers B^3, B^4, B^5, B^6, B^7, and B^8, rotatably mounted between the side bars B′, and the tension-roller B^9, at one extremity of the cradle, for keeping the endless apron, to be later described, at a proper tension. The bearings of this tension-roller are supported within the openings B^{10} and are capable of a longitudinal movement therein by means of the adjusting-screws B^{11}. Each end of the roller B^9 is provided with an adjusting-screw, so that either end may be moved independently of the other. An endless apron B^{12}, made of any suitable material, usually textile fabric, is mounted upon the guide-rollers B^3, B^4, B^5, B^6, B^7, and B^8 and the tension-roller B^9.

C is a frame adapted to rest upon the cradle B. It supports the rotatable shafts C′, C^2, and C^3, journaled in the bearings C^4, C^5, and C^6, respectively, on opposite sides of said frame C. Each of the bearings C^4 is vertically adjustable by means of the hand-wheel C^7, the stems of which hand-wheels are screw-threaded and pass through suitable screw-threaded openings in the frame C, an arrangement common in such constructions. The center of the frame C extends upward in the arms C^8, carrying between them the roller C^9 for supporting an endless apron to be later described herein. At one end of the frame C, between the arms C^{10}, an adjusting-roller C^{11} is rotatably mounted. A screw similar to that in the cradle B is provided at each end of said roller for adjusting its position relatively to the body of the frame C, thereby to regulate the tension upon the apron, to be later described. At the opposite end of frame C, in the bearings C^{12}, is rotatably mounted another roller C^{13}. A cylindrical driving-drum C^{14}, mounted upon the shaft C′, is adapted to lie adjacent to the guide-rollers B^4, B^5, and B^6 in the cradle B. A beater-drum C^{15}, having a peripheral surface other than cylindrical in form, is mounted upon the shaft C^3. In this instance I have made this drum with sixteen sides or faces. An endless apron C^{16}, of any suitable material, passes over the adjustable guide-roller C^{11}, thence downward, contacting the apron B^{12}, with which it passes underneath the drum C^{14}, and between said drum and the three guide-rollers B^4, B^5, and B^6, successively. Still traveling together the aprons C^{16} and B^{12} pass upward over the roller B^7 and thence downward to the beater-drum C^{15}, the under and rear sides of which are conformed to by both of said aprons for about one-third of the circumference thereof. Leaving the beater-drum, the aprons together pass over the roller B^8, but here separate, the apron C^{16} passing upward and over the rollers C^{13} and C^9 to the place of beginning.

A driving-pinion D is mounted upon a short shaft D′, the outer end of which shaft

carries the tight and the loose pulley D^2 and D^3, respectively. The pinion D meshes with the gear-wheel D^4, mounted upon the shaft C^2, and this gear-wheel in turn meshes with the pinion D^5, rigidly fixed on the outer end of the shaft C^3. The shaft C^2 is also provided with the pinion D^6. This pinion meshes with a gear-wheel D^7, fixed on the outer end of the shaft C'. It will thus be seen that the speed of the driving-pulley D^2 is "geared up" in the beater-drum C^{15} and "geared down" in the driving-drum C^{14}.

The endless aprons B^{12} and C^{16} travel at the same rate of speed and are in contact and run over the same rollers from and including the roller B^4 and the driving-drum C^{14} to the guide-rollers B^8 and C^{18}. The driving-drum C^{14} is adjustable with reference to the rollers B^4, B^5, and B^6, so that the aprons are held tightly between said rollers and are driven by said driving-drum. The rollers B^4, B^5, and B^6 are grooved more thoroughly to knead the starch into the fabric being passed through the machine between the aprons B^{12} and C^{16}.

In operation the article to be starched is fed into the machine between the two aprons B^{12} and C^{16} and is carried between said aprons downward into the starch-receptacle A^2. This receptacle is filled with liquid starch, either hot or cold, as desired. In passing through the receptacle A^2 beneath the surface of the starch the article is thoroughly saturated with the liquid as it passes between the driving-drum C^{14} and the grooved rollers B^4, B^5, and B^6. The article to be starched is carried between the endless aprons over the guide-roller B^7, and from thence the endless aprons B^{12} and C^{16} pass beneath the rapidly-revolving beater-drum C^{15}. Owing to the irregular form of this drum it beats or forces the liquid starch through the apron C^{16} into the fabric of the article to be starched, and as the speed of rotation of said beater-drum is considerably greater than that of the passing aprons B^{12} and C^{16} it makes a large number of revolutions while a given point in the apron is passing said drum.

The frame C may be tilted upward at its forward end in order to provide easy access to the interior of the starch-receptacle A^2. The tension upon the aprons is regulated in the usual manner by turning the adjustment-screws therefor. The vertical position of the shaft C' is adjusted by means of the hand-wheels C^7.

I claim as my invention—

1. In a starching-machine, in combination, a starch-receptacle; two endless aprons; supporting-rollers for said aprons; a driving-drum for revolving said aprons; a beater-drum of a form other than round adapted to be rapidly rotated in contact with one of said aprons; and means for driving said beater-drum at a high rate of rotation.

2. In a starching-machine, in combination, a starch-receptacle; two endless aprons; supporting-rollers for said aprons; a driving-drum adjacent to certain of said supporting-rollers, for revolving said aprons; a beater-drum mounted so that both of said aprons run over its periphery, which beater-drum is of a form other than round and is adapted to be rapidly rotated in contact with one of said aprons; and means for driving said beater-drum at a high rate of rotation.

3. In a starching-machine, in combination, a starch-receptacle; a cradle within said receptacle; guide-rollers rotatably mounted within said cradle; an endless apron on said guide-rollers; an endless apron lying in contact with said first-mentioned apron; a driving-drum for revolving said aprons; a beater-drum of a form other than round, adapted to be rapidly rotated in contact with one of said aprons; and means for rotating said driving-drum, and for driving said beater-drum at a high rate of rotation.

4. In a starching-machine, in combination, a body portion having a starch-receptacle; supporting-legs for said body portion; a cradle within said starch-receptacle; guide-rollers rotatably mounted within said cradle; an apron mounted on said guide-rollers; a roller for regulating the tension of said apron; a frame mounted upon said cradle; a driving-drum rotatably mounted in said frame; a beater-drum of a form other than round, also rotatably mounted in said frame; guide-rollers rotatably mounted in the frame; an apron extending around said driving-drum, said beater-drum, and said guide-rollers; a roller for regulating the tension of said last-mentioned apron; and means for rotating said driving-drum, for rotating both of said aprons, and for driving said beater-drum at a high rate of rotation.

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