No. 803,612. PATENTED NOV. 7, 1905.

E. H. MARBLE.

CLOTH NAPPING MACHINE.

APPLICATION FILED FEB. 16, 1905.

2 SHEETS—SHEET 1.

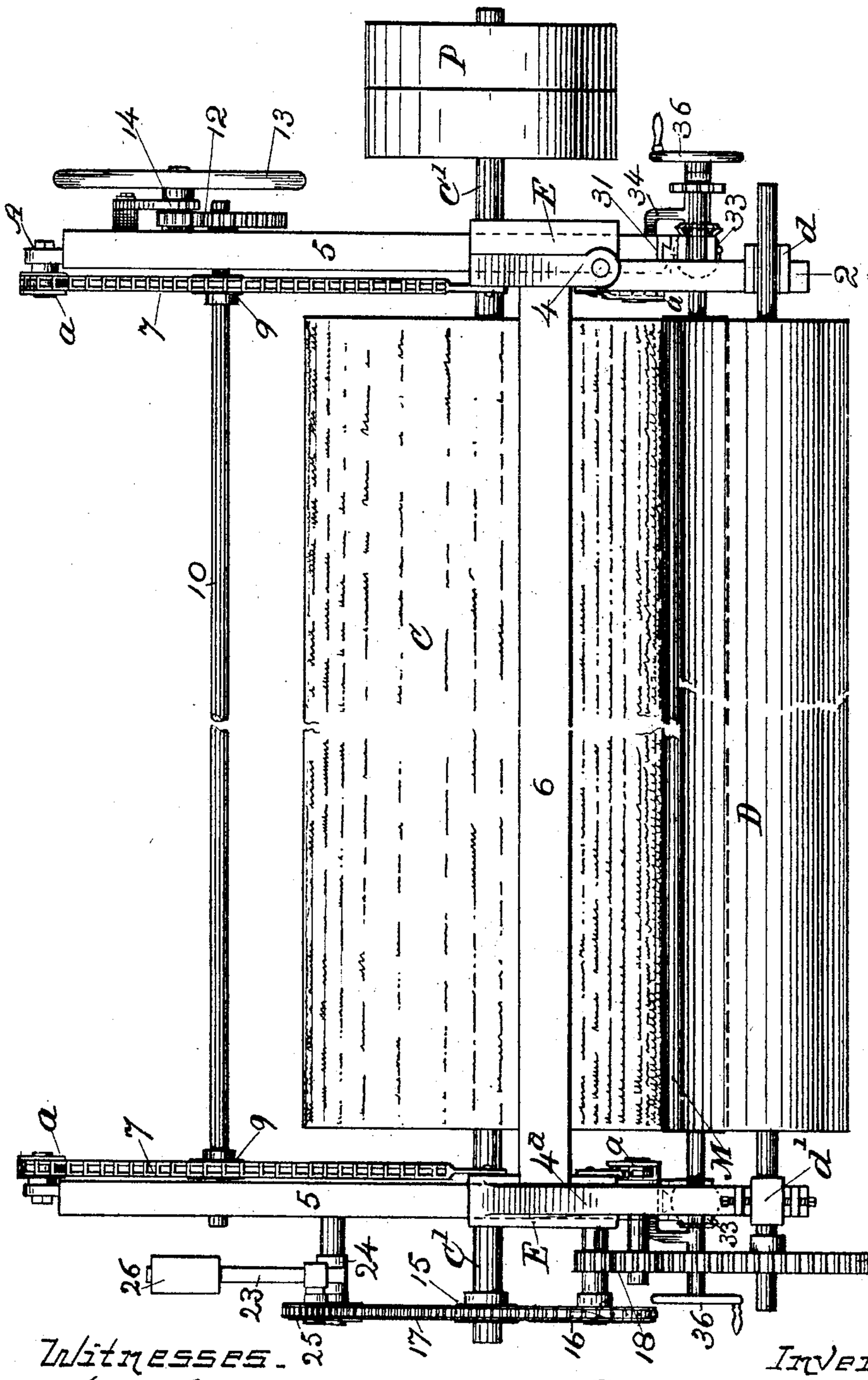

FIG. 1.

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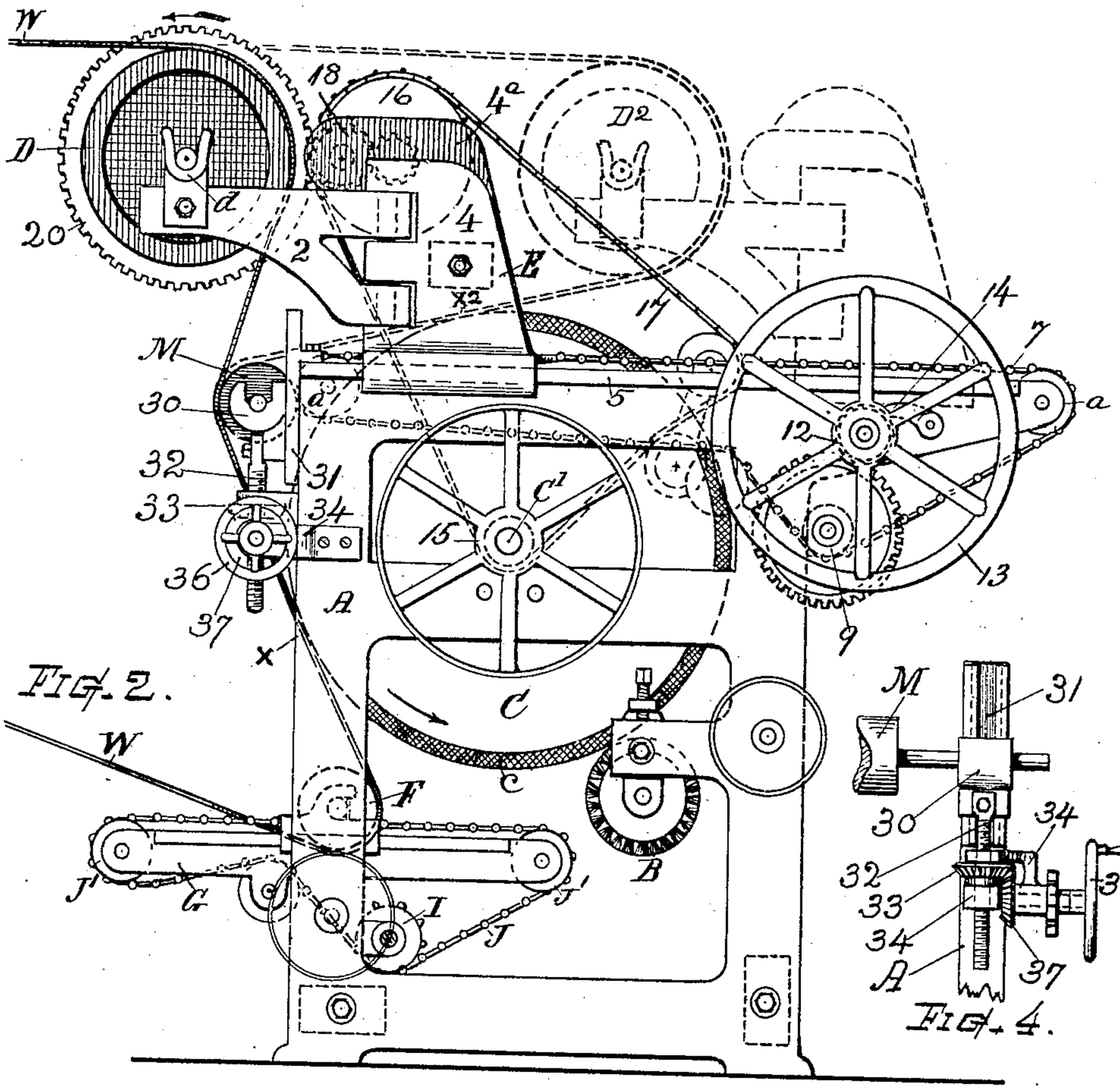

FIG. 2.

FIG. 4.

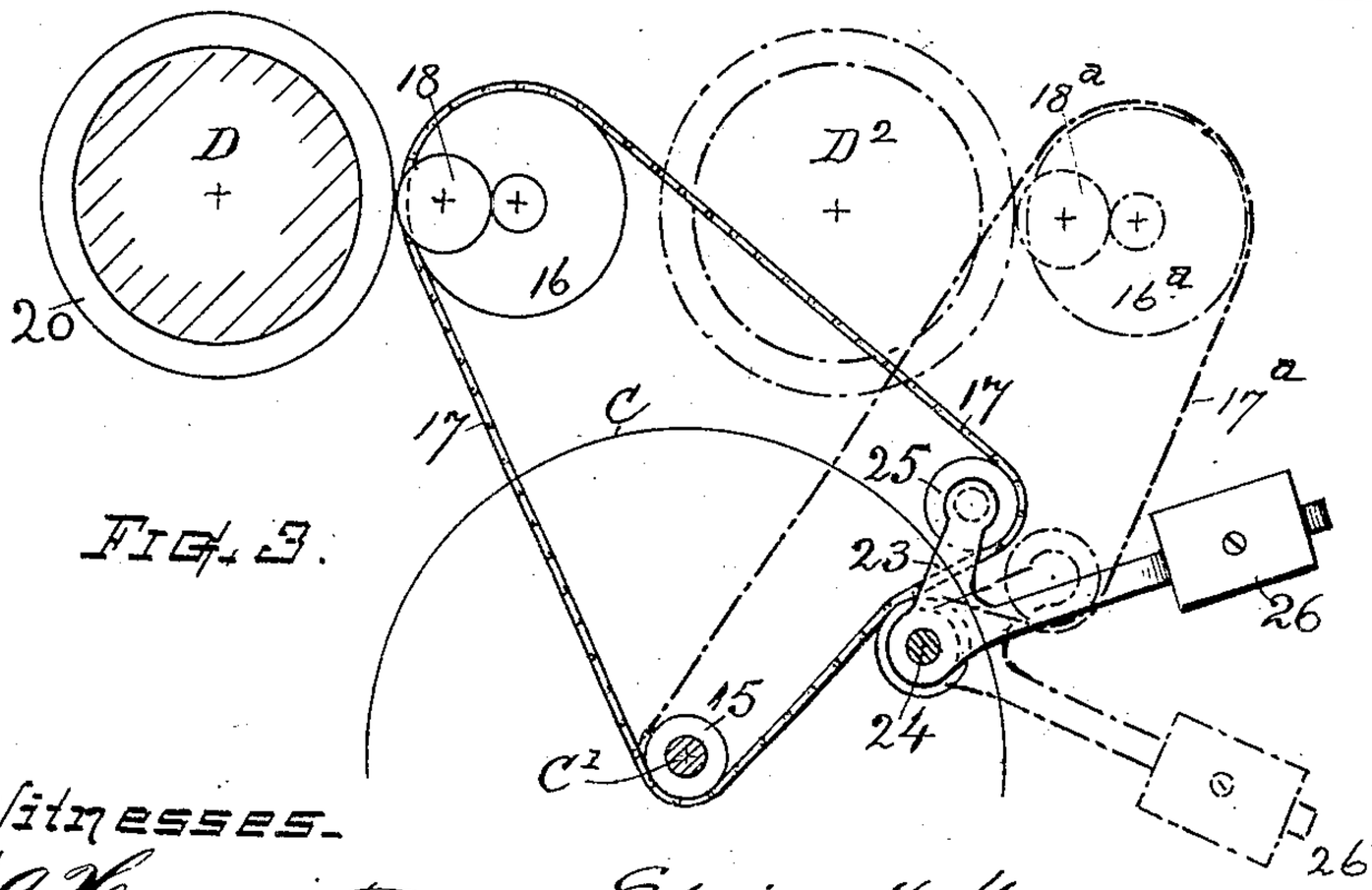

FIG. 3.

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UNITED STATES PATENT OFFICE.

EDWIN H. MARBLE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CURTIS & MARBLE MACHINE COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

CLOTH-NAPPING MACHINE.

No. 803,612. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed February 16, 1905. Serial No. 245,818.

To all whom it may concern:

Be it known that I, EDWIN H. MARBLE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Cloth-Napping Machines, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention relates to an improved and novel construction in machines for napping endless felts, such as are employed on paper-making machines, and similar endless fabrics, which are generally of large dimension, heavy, and unwieldly to handle, the present invention being more especially designed as an improvement on the class of machines described in Letters Patent No. 486,115.

The prime objects of the present invention are to enhance the efficiency and convenience of this class of machines and to provide a construction and means whereby a second napping contact may be attained without the substitution or movement of intermediate contact-rolls and while affording ready facility for the convenient introduction and removal of the endless fabrics to and from the machine; also, to provide in a machine for the purpose specified a movable draft-roll-supporting carriage and means for operating the same whereby the position of the draft-roll can be readily shifted in relation to the napping-cylinder for purposes hereinafter explained.

Minor objects and special features of my invention are set forth in the following detailed description of the mechanism, the particular subject-matter claimed being hereinafter definitely specified.

In the accompanying drawings, Figure 1 represents a top plan view, and Fig. 2 an end elevation view, of a mechanism embodying my invention. Fig. 3 is a diagrammatic view showing the arrangement of the draft-roll-driving devices and automatic take-up therefor, and Fig. 4 is a front view of one of the bearing-adjusting means for the intermedial guide-roll.

It will be understood that such parts of the napping-machine as are not herein specifically described may be of the usual well-known or any suitable construction.

Referring to the drawings, A indicates the main frame; C, the napping-cylinder rotatable in bearings on said frame; B, the clearing-brush; D, the draft-roll or feed-drum supported in bearings *d d'*, one of which is upon a hinged bracket 2, that can be swung outward to permit of the endless felt or fabric being slipped onto or from the draft-roll, as heretofore practiced.

The fact that in the napping of endless fabrics the bearing at one end of the draft-roll must be detachable renders it necessary to arrange the parts of the napping-machine so that the fabric, which is usually large and unwieldly, can be properly handled. With this in view the draft-roll is placed so that it can be accessible and outside the line of the napping-cylinder.

An adjusting-guide or bottom contact-roll F is employed below the napping-cylinder C. Said contact-roll, its supporting-bracket G, and the means I and J for effecting the adjustment thereof are described in the prior Letters Patent above named, and being thus well known need not be herein described in detail. The web of endless fabric W passes around said bottom contact-roll F and over the draft-roll D, the outer loop of the endless fabric being supported by a suitable frame and guide-roller, (not shown,) as heretofore practiced.

The face of the napping-cylinder is provided or covered with suitable nap-raising devices *c*, usually teazels, arranged on rotating supporting-spindles; but any other efficient means may be employed if in any instance preferred.

As a feature of my invention, the draft-roll D, with its bracket 2, is mounted upon a shiftable supporting frame or carriage E, which is arranged to move backward and forward on guideways 5 at the top or upper part of the main frame. Said carriage preferably consists of two upright end stands 4 and 4^a, having suitably-formed feet for seating and sliding upon the guideways 5, the two stands being rigidly united across from one stand to the other by a tie-beam 6 or other suitable

frame structure, so that a parallel movement is effected when the carriage is traversed from one position to another.

The guideways 5 are preferably horizontal, or approximately so, and an adjusting means is combined with the carriage and main frame for moving the carriage E along the guideways and retaining the parts at the desired position. Such means in the present instance consists of chains 7, attached at their ends to the carriage-slides and each arranged around guide-sheaves *a*, and a sprocket-wheel 9, mounted on a cross-shaft 10, the latter being connected by suitable gearing 12 with a short shaft or sleeve provided with a hand-wheel 13 or means for effecting its rotation. A notched rim and pawl at 14 serves for retaining the parts in fixed relation when at any adjusted position.

By turning the hand-wheel the shaft and sprockets are rotated, causing a draft on the chains 7 and the resultant shifting of the carriage and draft-roll from forward to rearward position, or vice versa. If preferred in any instance, a screw mechanism or other efficient means can be employed for moving the carriage instead of the sprocket-and-chain mechanism shown.

The draft-roll is driven from the main cylinder-shaft C′ by means of sprocket-wheels 15 and 16 and a chain 17, either direct or by interposed spur-gearing at 18, for reducing proportional speed, the gears being mounted on suitable axis-studs fixed on the carriage E, the gears meshing in train and with a gear 20, fixed on the end of the draft-roll axle. Any suitable kind of drive-belt may be used in lieu of a chain.

Combined with the drive-chain 17 I employ a take-up mechanism (see Fig. 3) comprising an angle-lever 23, fulcrumed on a stationary axis-pivot 24 and having one arm provided with a roll or sheave 25, that runs against the inner face of the chain 17, and its other arm provided with a counterweight 26, that acts to keep the chain taut and by swing of the lever 23 to accommodate any variation that may occur by reason of the shifting of the relative position of the draft-roll carriage and upper sprocket-wheel 16 in respect to the cylinder or drive-sprocket axis. This take-up is automatic in its action and maintains a uniform tension on the drive-chain 17 while shifting and at all positions of the draft-roll-carriage adjustment.

M indicates a directing-roll mounted in bearings 30, that are arranged to slide up and down on dovetailed guideways 31, attached to the upper front edges of the main frames A. Said bearings are each provided with a screw-threaded supporting-rod 32, that passes through a rotatable nut 33, mounted in a suitable bracket 34, fixed on the frame. A short shaft furnished with a hand-wheel or crank 36 is also mounted in the bracket and operatively connected with the nut by bevel-gears 37 for effecting upward and downward adjustment of the roll-bearing by rotation of the hand-wheel or crank, as desired. The roll M serves as an intermediate means for supporting and directing the fabric in the presentation of its surface to the napping-cylinder.

While a napping-machine with two or more contacts of the cloth against the napping-cylinder has been employed previous to the present invention, such contacts have been obtained by guide-rolls more or less adjustably arranged about the napping-cylinder and so positioned that the line of travel of the cloth from one guide-roll to the next is tangential to the cylinder-circle, the necessary draft roll or rolls being in all cases, so far as I am aware, located in a fixed position extraneous to the contact-making appliances and not making one of the contact elements.

In the operation the primary position of the draft-roll or drum D is forward of a vertical plane in line with the front of the napping-cylinder C, so that the releasing-bracket 2, bearing *d*, and end of the draft-roll may be conveniently accessible for putting on or taking off the loop of endless fabric, which is permitted by the swinging back of the pivoted bracket. When at such primary position or approximately the same, the draft-roll may serve as a contact-roll for running the fabric by a single napping contact either with or without the intermediate directing-roll M, which can be readily removed from its bearings or replaced, as desired.

By the improved construction herein shown and described the draft-roll D, having the loop of endless fabric arranged thereon, can be moved rearward bodily by means of the carriage and carriage-operating mechanism to a position over and beyond the napping-cylinder, substantially as indicated at D^2 by dotted lines on Figs. 2 and 3, thereby bringing the fabric into a second contact with the napping-cylinder at the upper part thereof or between the roll M and draft-roll (see dotted lines x^2, Fig. 2) without disturbing the first napping contact *x*, which occurs between the lower contact-roll F and the directing-roll M, the second contact being attained without the substitution or shifting of any intermediate contact-roll.

16^a 17^a, &c., show the shifted positions.

In case it is desired to vary or regulate the contacts or should the fabric be uneven in its structure, so that one edge is looser than the other, a slight adjustment of the directing-roll M can be readily effected for obviating the trouble or for altering the line of its travel to a slight degree by movement of one or both of the roll-bearings 30 up or down on its guideway 31 by rotation of the hand-wheel 36, which operates the gear-nut 33 on the screw 32.

When the napping operation has been completed, the draft-roll carriage can be returned

to its primary position at the front of the machine for the convenient removing of the endless fabric from the draft-roll.

I am aware that in practicing this invention some changes in form or details may be made by those who are skilled in the art without departing from the nature or scope of my invention as expressed in the claims. I do not wish, therefore, to be limited to the precise form or details here shown.

What I claim as my invention is—

1. In a napping-machine for endless felts and the like; the combination of a napping-cylinder, a draft-roll, and means for shifting said draft-roll bodily to a forward or rearward position in relation to the napping-cylinder, to afford a direct-draft contact with said draft-roll operative either at a first contact or for a second contact of the fabric with the face of the cylinder.

2. In a napping-machine, the combination of a napping-cylinder, a draft-roll, supports for said draft-roll, shiftable to bring said draft-roll to forward or rearward positions in relation to the cylinder, and means for operating said draft-roll at either position of its adjustment.

3. In a napping-machine for endless fabrics, comprising a napping-cylinder; a transferable draft-roll movable along a plane tangential to a circle that is concentric with the circle of the napping-cylinder, for locating said draft-roll to operate by direct-draft contact at different positions, so as to produce a final contact directly from said draft-roll, with either one, or two, contacts of the cloth fabric on the napping-cylinder.

4. In a napping-machine for endless fabrics, in combination with the napping-cylinder and draft-roll, a transversely-movable carriage having the draft-roll bearings and draft-roll mounted thereon, guideways for said carriage extending across the top of the machine-frame, means for effecting movement of said carriage along the guideways, and means for operating said draft-roll adjustable with the movement of the carriage, for the purpose set forth.

5. In a napping-machine, the combination of the napping-cylinder, the cylinder-supporting frame having guideways thereon, a carriage movable on said guideways, the draft-roll mounted in bearings supported upon said carriage, operating means for driving said draft-roll, drag-chains attached to said carriage, front and rear chain-guiding sheaves, a shaft provided with sprocket-wheels that respectively engage said chains, and a hand-wheel and connections for rotating said shaft.

6. In a napping-machine for endless fabrics, the combination, of a draft-contact roll, an adjustable support for its bearings, means for moving the same along a determined line to carry the draft-contact roll to a second contact position, an adjustably-supported directing-roll, an adjustably-supported bottom contact-roll, the napping-cylinder, and means for rotating said draft-contact roll in connection with the napping-cylinder.

7. In a napping-machine of the character described, the combination, of the napping-cylinder, the draft-roll, means for shifting said draft-roll for operation at a forward or rearward position in relation to the napping-cylinder, means for rotating said draft-roll from the cylinder-shaft, comprising suitable gearing, sprocket-wheels, and a drive-chain belt; and automatic take-up mechanism for maintaining uniform tension of said drive-chain belt when the position of the draft-roll is shifted.

8. In a napping-machine of the character described, the combination, with the napping-cylinder, its shaft provided with a sprocket-wheel, the movable draft-roll carriage, the draft-roll rotatable in bearings mounted on said carriage, and the draft-roll-actuating gear or sprocket; of the draft-roll-operating drive-chain, and a take-up device therefor, comprising a pivotally-fulcrumed angle-lever, one arm of said lever carrying a roll that acts against said drive-chain, its other arm controlled by a counterweight, substantially as set forth.

9. In a napping-machine for endless felts and the like, the combination, of a rotatable napping-cylinder, a transversely-adjustable bottom contact-roll; means for adjusting the position of said bottom contact-roll, an intermediate directing-roll, bearings for said directing-roll, adjustably supported in connection with the frame, an overhead draft-roll, a transversely-movable carriage having said draft-roll mounted in bearings thereon, guideways for said carriage along the top of the frame, and means for moving said carriage along the guideways to carry the draft-roll from a forward to a rearward position, and vice versa, in relation to the napping-cylinder.

10. In a napping-machine for endless felts and the like, the combination, with the napping-cylinder, its supporting end frames, the overhead draft-roll, the draft-roll carriage movable on guides upon said end frames, and a bottom contact-roll; of the removable directing-roll, bearings for said directing-roll movably mounted upon guides fixed on the front of said end frames, and means for separately moving each bearing, comprising a screw, a geared nut, and hand-actuated nut-operating gearing, whereby independent regulation and adjustment of the respective ends of said directing-roll is effected, all substantially as and for the purposes set forth.

Witness my hand this 11th day of February, 1905.

EDWIN H. MARBLE.

Witnesses:
CHAS. H. BURLEIGH,
ELLA P. BLENUS.