

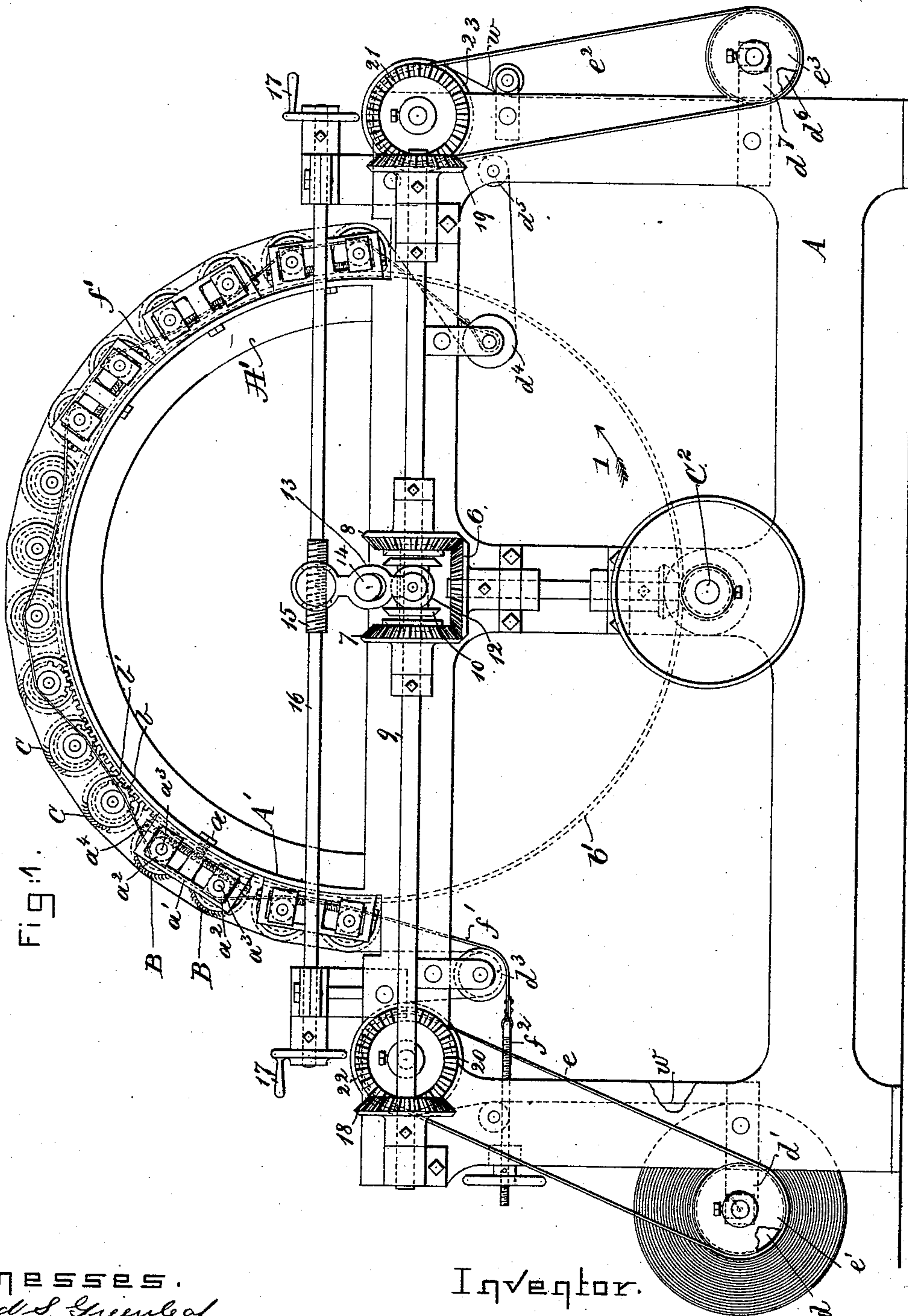
(No Model.)

3 Sheets—Sheet 1.

C. WOOD.  
CLOTH NAPPING MACHINE.

No. 459,354.

Patented Sept. 8, 1891.



Witnesses.  
Fried S. Friend of.  
Edward F. Allen.

Inventor.  
Charles Wood,  
by Leroy & Son, gory attys

(No Model.)

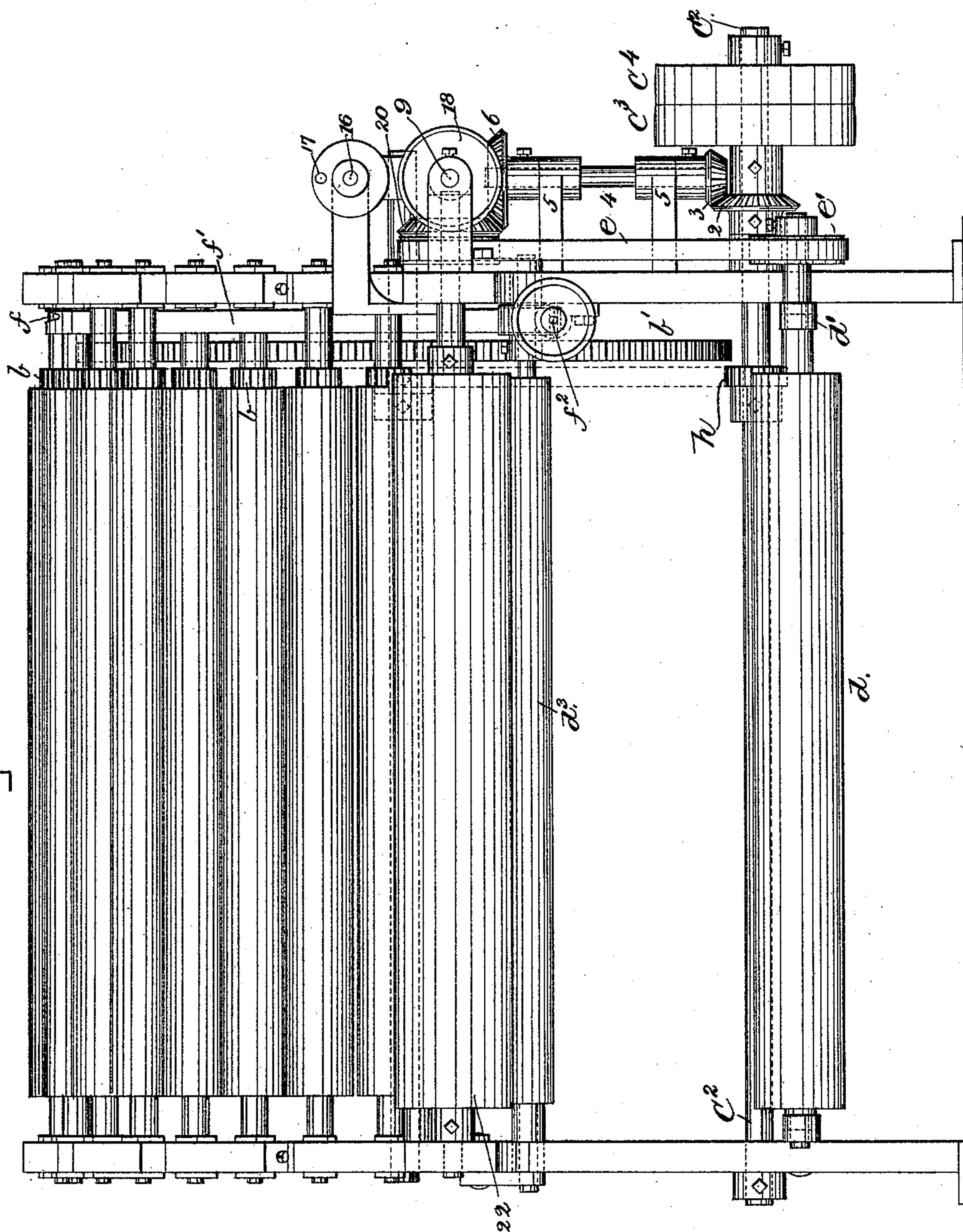
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Fig. 2.



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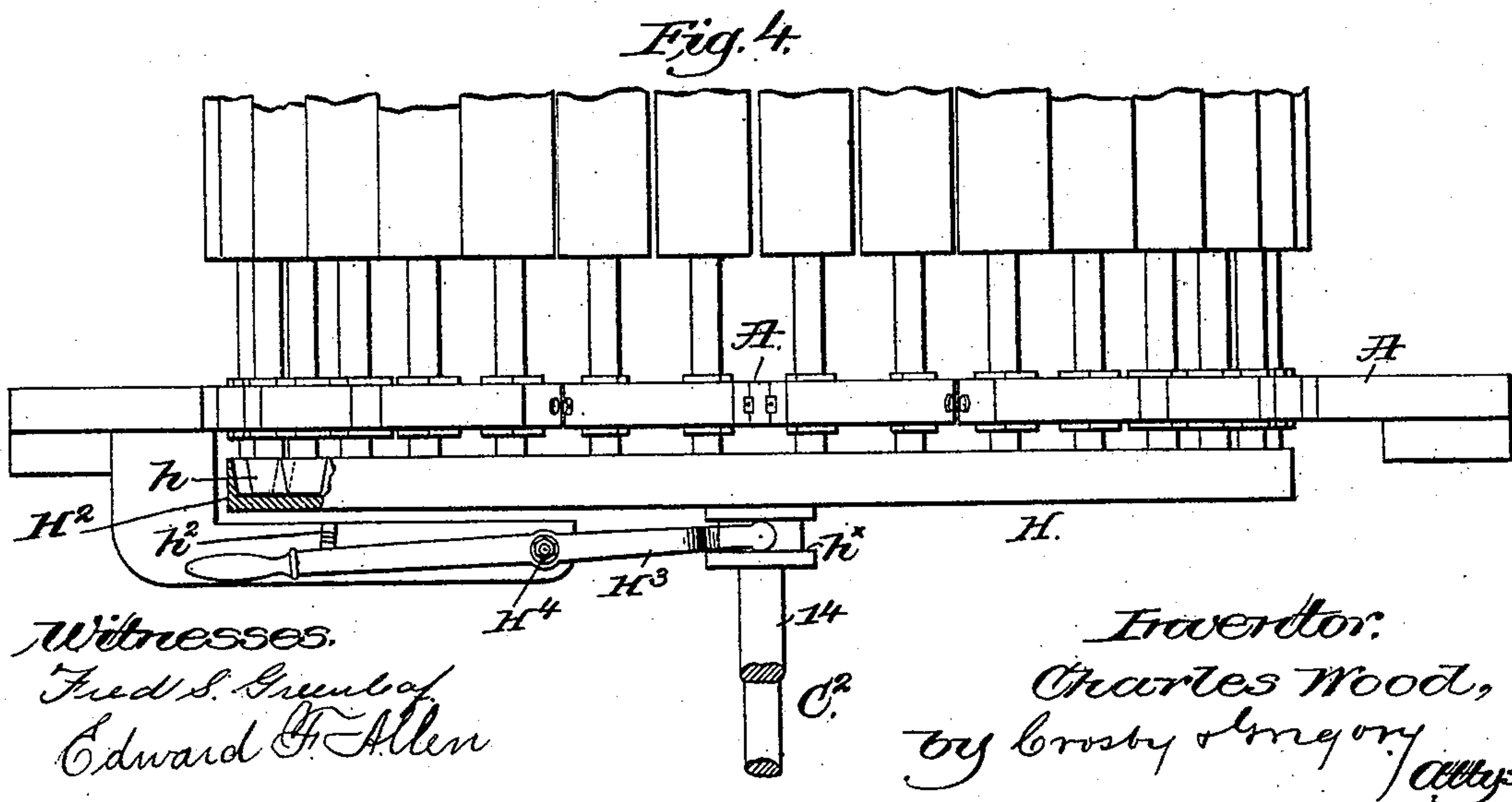
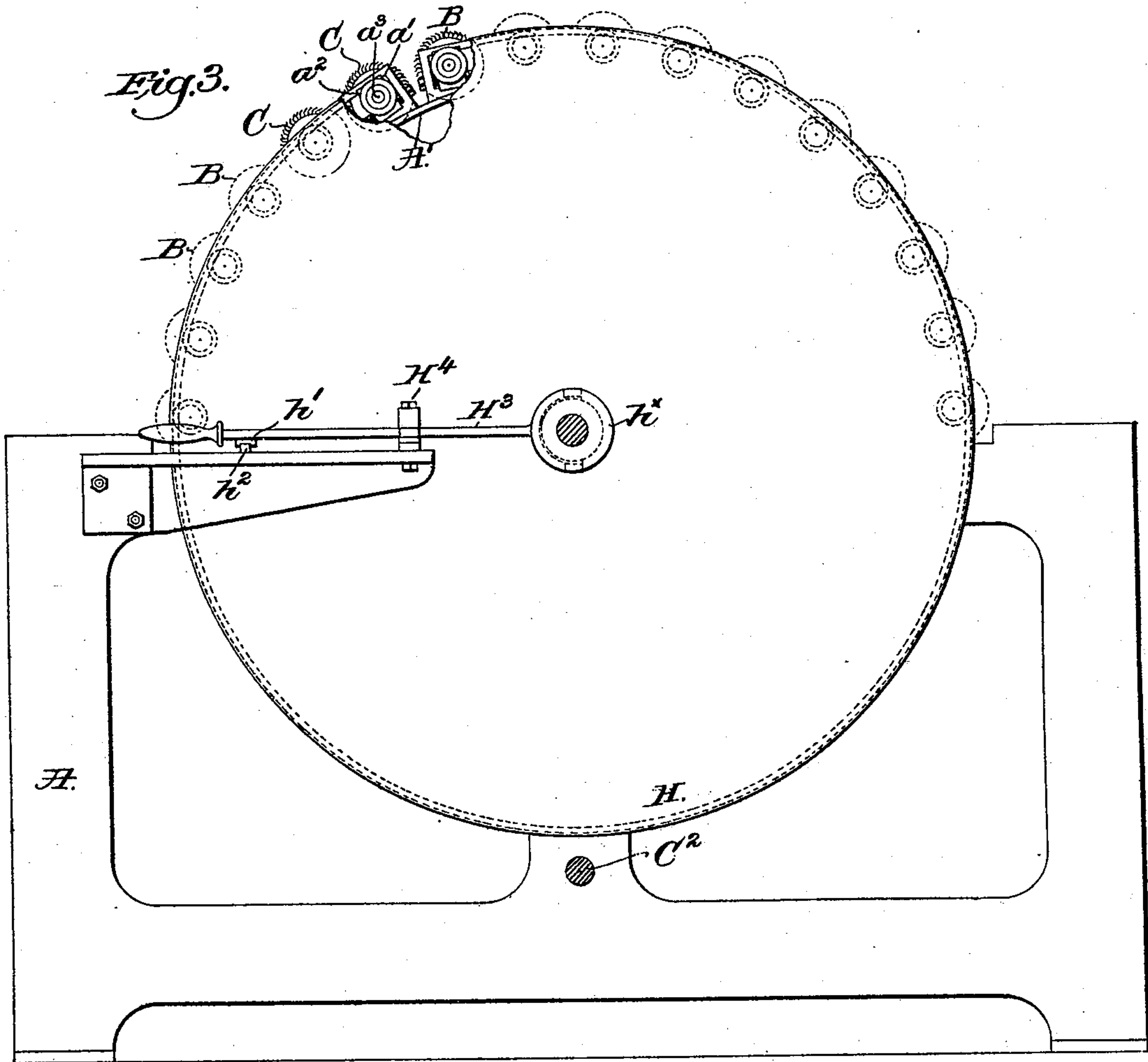
Inventor:  
*Charles Wood,*  
*by Crosby & Gregory*



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Charles Wood,  
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# UNITED STATES PATENT OFFICE.

CHARLES WOOD, OF BOSTON, ASSIGNOR OF TWO-THIRDS TO GEORGE HILL,  
OF NEWTON, MASSACHUSETTS.

## CLOTH-NAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,354, dated September 8, 1891.

Application filed November 4, 1890. Serial No. 370,347. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES WOOD, a subject of the Queen of Great Britain, residing at Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Cloth-Napping Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object the production of a novel machine by which to nap cloth.

In accordance with my invention the cloth is drawn through the napping-machine by feed-rolls and over a series of card-clothed or toothed napping-rolls mounted in stationary bearings arranged in the arc of a circle, the said napping-rolls having combined with them a friction device or drag to prevent their free rotation as the cloth is being drawn over them, the drag or friction put on the rolls so that their surface speed is less than the surface speed of the cloth, resulting in raising or working up the nap. The feed-rolls located at opposite ends of the machine may be rotated in one or the other direction, as may be desired, so that the cloth to be napped may be fed through the machine from one to the other end and back again for any number of times, the said cloth during such movements being drawn over the said series of napping-rolls. The friction device may be adjusted so as to exert greater or less friction on the napping-rolls, so that the force required to turn the said rolls (the force being the cloth) will be more or less, the greater the force required to overcome the friction and turn the rolls the more severe the action of the teeth upon the cloth, and vice versa. I have also provided each toothed napping-roll with a pinion, which may be engaged and rotated by a large gear when it is desired to grind the teeth of the rolls, the boxes in which the said rolls rotate being adjusted toward each other preparatory to the grinding operation, so that the teeth of the rolls of each pair of rolls are made to interlace or touch each other more or less, the action of one series of teeth upon the other grinding or sharpening the teeth.

Figure 1, in side elevation, represents one

form of cloth-napping machine embodying my invention, some of the roller-stands being omitted to show the friction device and pulleys against which it acts, the teeth of the gear  $b'$  and the teeth of the pinions on the rolls engaged by the gear being but partially shown, it being understood that like teeth will be made where the dotted circles are employed to show the circle of the gear or of the pinions, or, in other words, the gear and pinions will all be toothed in like manner all around. Fig. 2 is a left-hand end view; and Figs. 3 and 4 are modifications showing a different form of friction device, the cloth-feeding mechanism and grinding devices being entirely omitted.

The side frames A, suitably held together, have erected on them arches  $A'$ , to which by screws  $a$  are secured boxes  $a'$ , having spaces for the reception of the bearing-blocks  $a^2$  for the journals  $a^3$  of the pairs of card-clothed napping-rolls B B C C all alike, except that in practice the teeth of the pairs of rolls B point in different directions from the teeth of the pair of rolls C.

The frame-work has bearings for the main shaft  $C^2$ , having usual fast and loose pulleys  $C^3 C^4$ . The shaft  $C^2$  has a bevel-gear 2, which engages a bevel-gear 3 at the lower end of a short shaft 4, mounted in bearings 5 and provided at its upper end with a bevel-gear 6, which is always in gear with two bevel-gears 7 8 loose on the shaft 9, the inner or contiguous faces of the said gears having conical depressions or teeth to be engaged by the conical projections or teeth at opposite ends of a clutch-hub 10, feather-keyed on the shaft 9 and adapted to be moved thereon longitudinally to engage one or the other of the reversely-moving gears 7 8, according to the direction it is desired to rotate the shaft 9. The hub 10 has an annular groove, in which is placed a roller or other stud 12 at the lower end of a lever 13, having its pivot on the shaft 14, the upper end of the lever 13 being threaded to be engaged by the screw 15 on the hand-shaft 16, provided, as shown, at each end with hand wheels or cranks 17, the rotation of the shaft in one or the other direction moving the hub 10 longitudinally. The shaft 9 has at its opposite ends bevel-gears 18 19, which engage,



respectively, bevel-gears 20 21 on the feed-rolls 22 23, extending across the frame and having their journals mounted in bearings on the said frame. The cloth *w* to be napped or  
 5 gigned will be led, say, from the roll *d*, having its journals in bearings *d'*, over the feed-roll 22, under the guide-roll *d*<sup>3</sup>, over the series of napping-rolls B C, under the guide-rolls *d*<sup>4</sup> *d*<sup>5</sup>, over the feed-rolls 23, and down to the roll *d*<sup>6</sup>,  
 10 having its journals in bearings *d*<sup>7</sup>. The feed-roll 22 has a belt-receiving portion, over which is extended a belt *e*, which is also extended about a pulley *e'* on the shaft of the cloth-roll *d*, and the feed-roll 23 also has a like  
 15 belt-pulley, over which is extended a belt *e*<sup>2</sup>, the latter being also extended about a pulley *e*<sup>3</sup> on the shaft of the cloth-roll *d*<sup>6</sup>. By rotating the shaft 9 in one or the other direction the cloth may be drawn from one and wound  
 20 on the other of the cloth-rolls at will.

This invention is not limited to the exact construction of clutch devices for reversing the rotation of the shaft 9 at will, and instead I may use any other usual or equivalent mechanism.  
 25

As the napping of the cloth depends upon a difference in surface speed between the movement of the cloth derived from the feed-rolls and the surface speed of the napping-rolls, provision has to be made for producing  
 30 friction on the said napping-rolls to restrain their rotation, so that, notwithstanding their motion is derived from the cloth, they move at a slower surface speed.

One simple form of friction device is shown in Figs. 1 and 2. Referring to said figures it will be seen that the shafts of the napping-rolls are provided each with a small pulley or sheave *f*, against which is drawn by a strain-  
 40 ing device *f*<sup>2</sup> a band *f'* the said band being carried, preferably, under and over the said sheaves *f* in pairs, as shown in Fig. 1, the said band by its friction on the sheaves acting to retard the rotation of the rolls as the cloth is  
 45 being drawn from one to the other cloth-rolls, during which time some of the rolls act with the nap and others against the nap.

In Figs. 3 and 4 I have shown a modified form of friction device consisting, essentially,  
 50 of a large circular plate H, having a laterally-projecting lip or flange H<sup>2</sup>, provided with a beveled surface which engages the conical pulleys or hubs *h* of the napping-rolls, the hub *h*<sup>x</sup> of the said plate being engaged by a  
 55 lever H<sup>3</sup>, pivoted at H<sup>4</sup> and having a dog *h'* to engage a ratchet or other locking-plate *h*<sup>2</sup> to hold the lever in the position it may be put by the operator, for by moving the lever the friction or drag on the rolls may be ad-  
 60 justed at will. The bearing-blocks *a*<sup>2</sup> receive through them a right-and-left screw *a*<sup>4</sup>, rotation of which in one or the other direction causes the rolls of the same pair to approach or to recede from each other. The drawings  
 65 show the rolls in proper relation to each other for napping the cloth; but if the teeth become dull, then the screws will be rotated and the

blocks be moved toward each other until their teeth slightly interlace, and thereafter by rotating the rolls by the engagement of  
 70 pinions *b* thereon by the teeth of the large toothed wheel *b'* then being rotated, as will be described, the teeth may be ground. The shaft C<sup>2</sup> has a pinion *h* fast thereon. The  
 75 toothed gear *b'* is loose on the shaft 14, and when the cloth is being napped occupies the full-line position, Fig. 2, and the teeth do not engage the pinions *b*; but when the rolls are to be rotated to grind the teeth by rubbing them against each other, then the gear  
 80 *b'* is moved longitudinally into the dotted-line position, Fig. 2, and into engagement with the pinions *h* and *b*. The toothed gear *b'* may be moved longitudinally on the shaft 14 by devices similar to those shown in Figs.  
 85 3 and 4 for moving the plate H, such mechanism, however, not being shown in Figs. 1 and 2 to avoid confusion.

As previously stated, the teeth of the pairs of rolls B and C are arranged to point in op-  
 90 posite directions, and when the rolls are to be ground they are ground in pairs. For instance, if the rolls B B are to be ground, each pair of rolls B will be so adjusted, one with relation to the other, that their teeth will  
 95 come in contact, and then by rotating the toothed plate or wheel *b'* in direction of arrow 1, Fig. 1, the said rolls will be rotated while their teeth are in contact and the rolls C C will be rotated, but their teeth, not being  
 100 in contact with each other, will not be ground. Now to grind the teeth of the rolls C C the rolls B B will be adjusted so that their teeth will not be in contact, and the boxes of the  
 105 rolls B B will be adjusted so as to bring the teeth of the rolls C C in contact, and then the toothed gear or toothed plate *b'* will be rotated in a direction the reverse of the arrow 1 until the teeth of the rolls C C have been  
 110 ground. The teeth of the napping-rolls are supposed to be diamond-pointed. The method herein described for grinding these diamond-pointed teeth by letting the teeth  
 115 of one roll be interlaced somewhat with the other, and then running the rolls having like teeth in the same direction, is made the subject-matter of another application, Serial No. 370,346.

I claim—

1. A cloth-napping machine containing the  
 120 following instrumentalities, viz: a series of napping-rolls arranged in the arc of a circle, feeding mechanism to draw the cloth over the said rolls, the said napping-rolls being  
 125 provided with projecting conical hubs, and a plate movable toward and from said hubs and having thereon a laterally-projecting beveled flange to engage said hubs to act upon and produce friction upon said rolls so  
 130 that they rotate at a surface speed slower than the surface speed of the cloth-feeding mechanism, and means to move said plate and retain it in adjusted position, substantially as described.



2. A series of napping-rolls, feed-rolls 22 and 23 at opposite sides the said series of napping-rolls, and the shaft 9 and gearing between it and the said feed-rolls, combined 5 with reversing mechanism, whereby the said shaft 9 may be rotated in one or the other direction at will, substantially as described.

3. A series of napping-rolls, feed-rolls 22 23 at opposite sides the said series of napping- 10 rolls, and the shaft 9 and gearing between it and the said feed-rolls, combined with reversing mechanism, whereby the said shaft 9 may be rotated in one or the other direction at will and with the cloth-rolls and belts  $e e^2$  15 to rotate them in unison with the feeding-rolls, substantially as described.

4. The napping-rolls arranged in pairs and provided with toothed pinions  $b$ , the bearing-blocks  $a^2$ , and means to adjust them toward and from each other, combined with the 20 toothed wheel or plate, means to move it longitudinally to contact with said toothed pinions, and means to rotate it and the said rolls while their teeth are in mesh, substantially 25 as described.

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

CHARLES WOOD.

Witnesses:

GEO. W. GREGORY,  
EMMA J. BENNETT.