

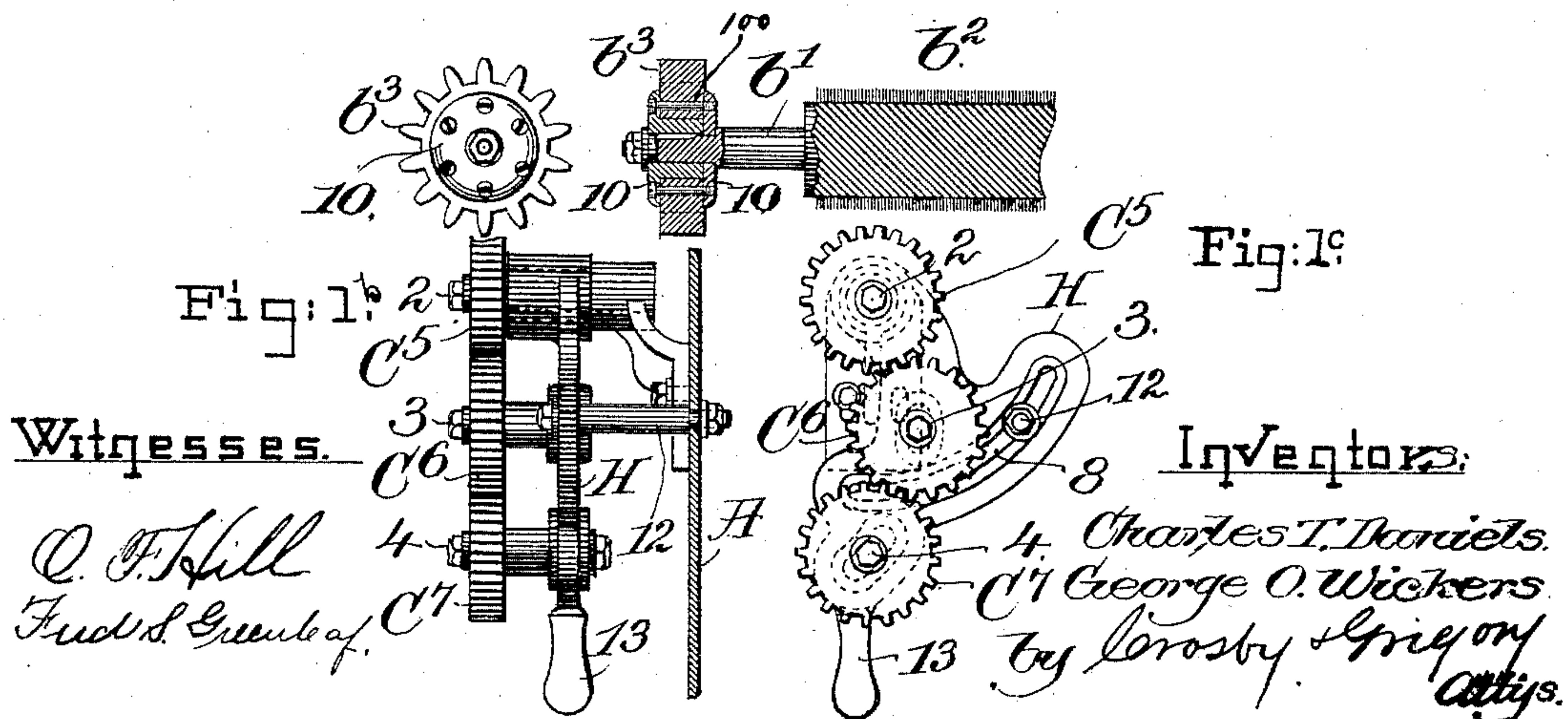
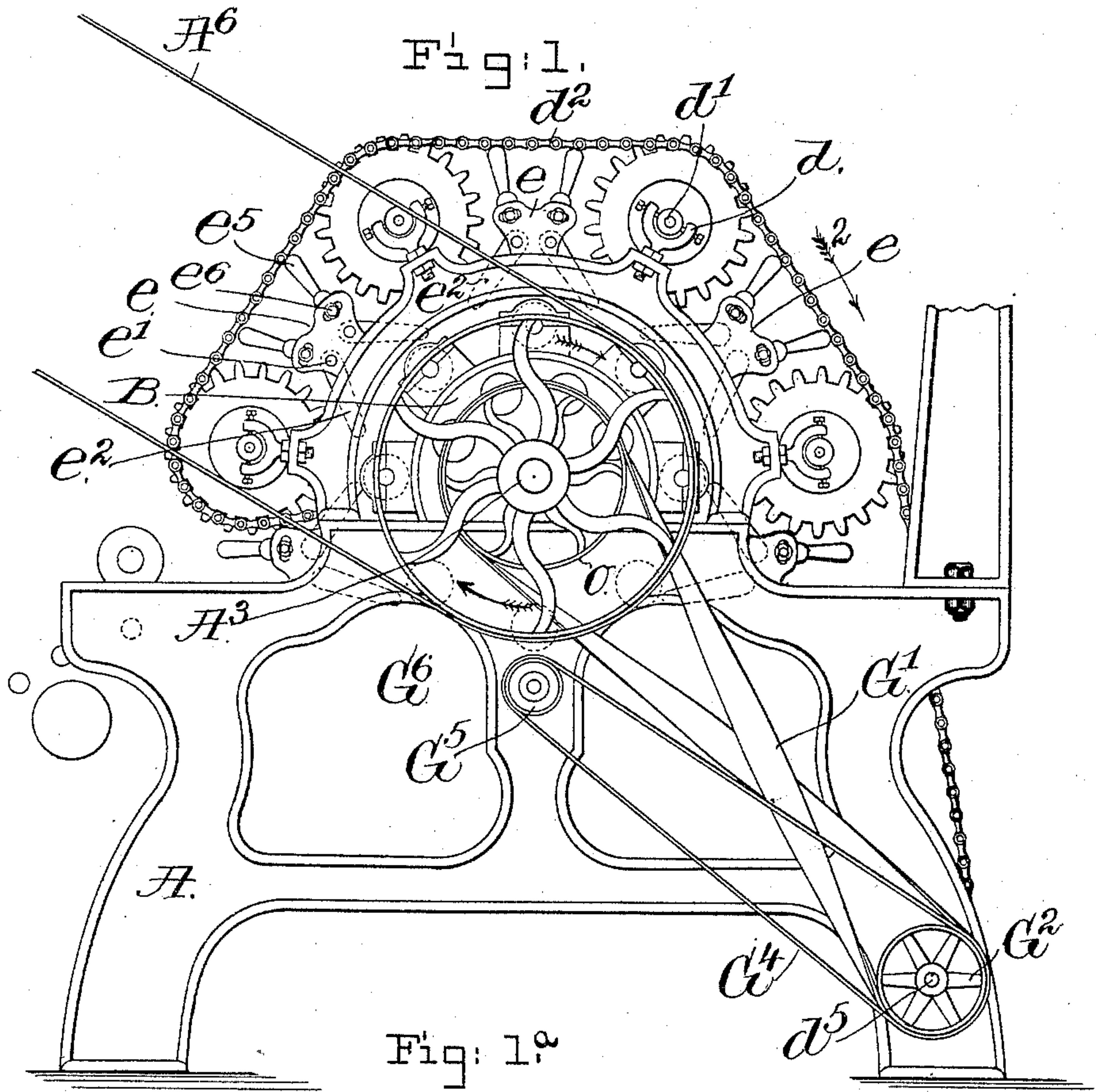
(No Model.)

4 Sheets—Sheet 1.

C. T. DANIELS & G. O. WICKERS.
CLOTH NAPPING MACHINE.

No. 474,334.

Patented May 3, 1892.



(No Model.)

4 Sheets—Sheet 2.

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Fig. 2.

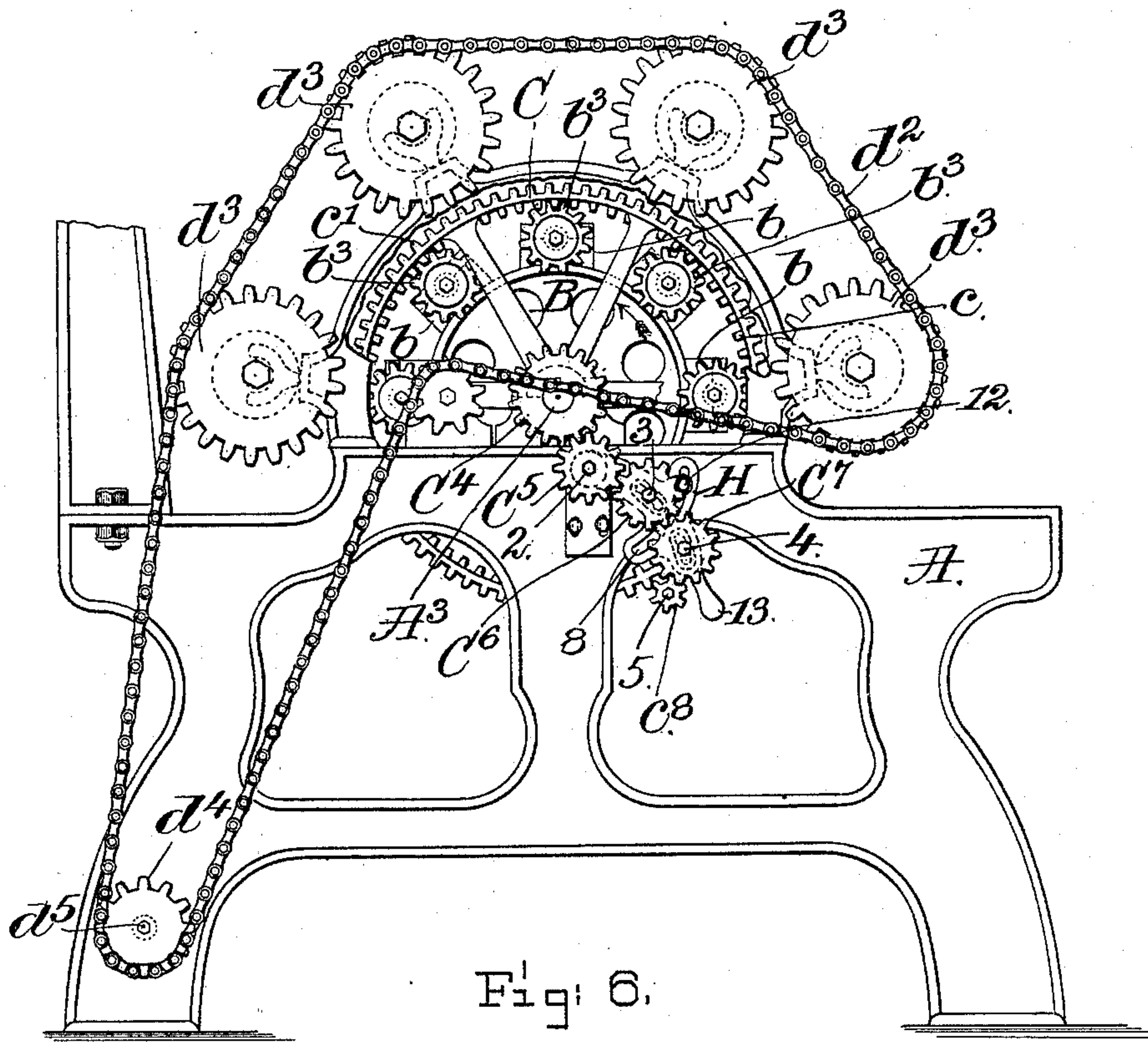
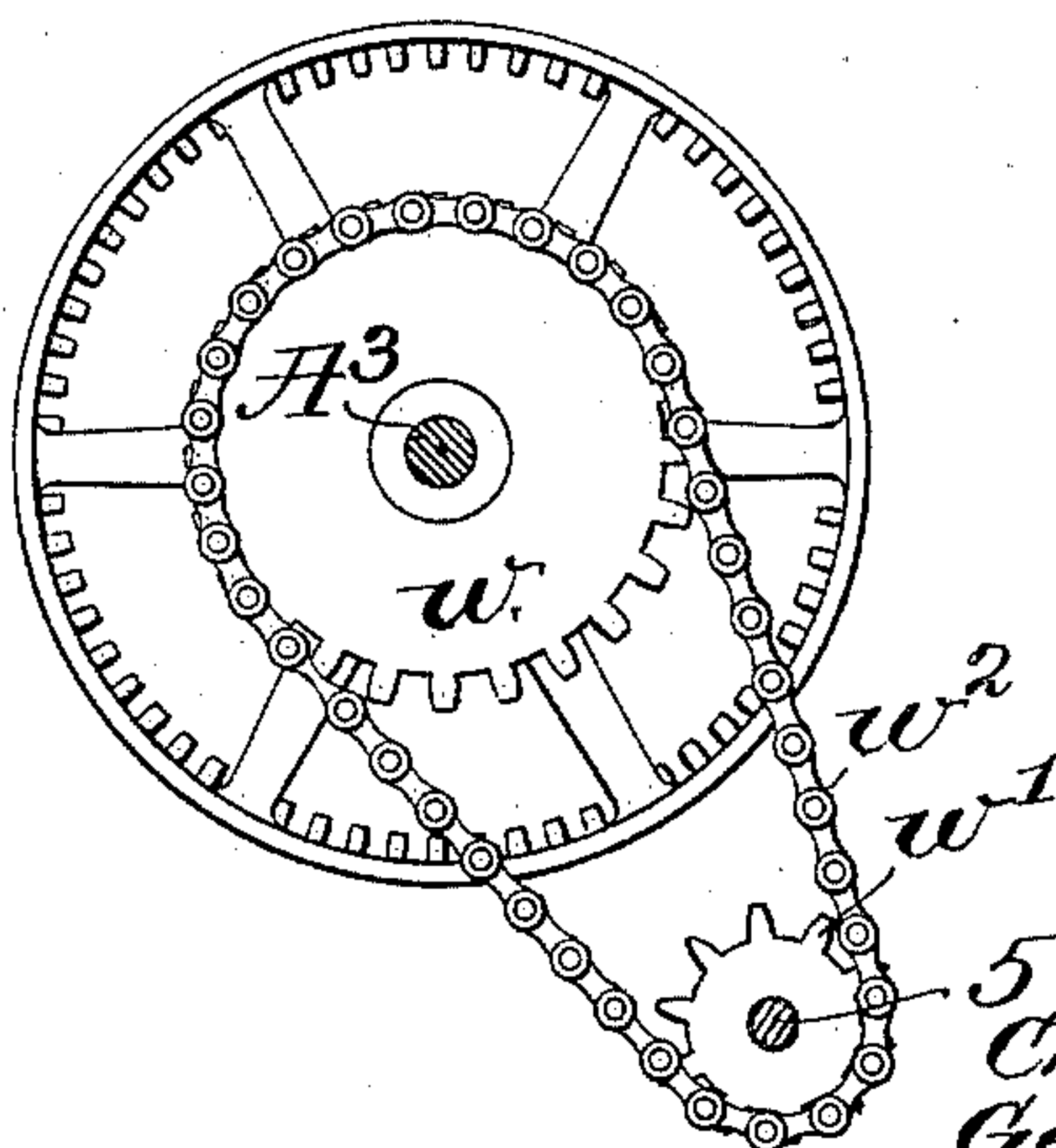


Fig. 6.



Witnesses,

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(No Model.)

4 Sheets—Sheet 3.

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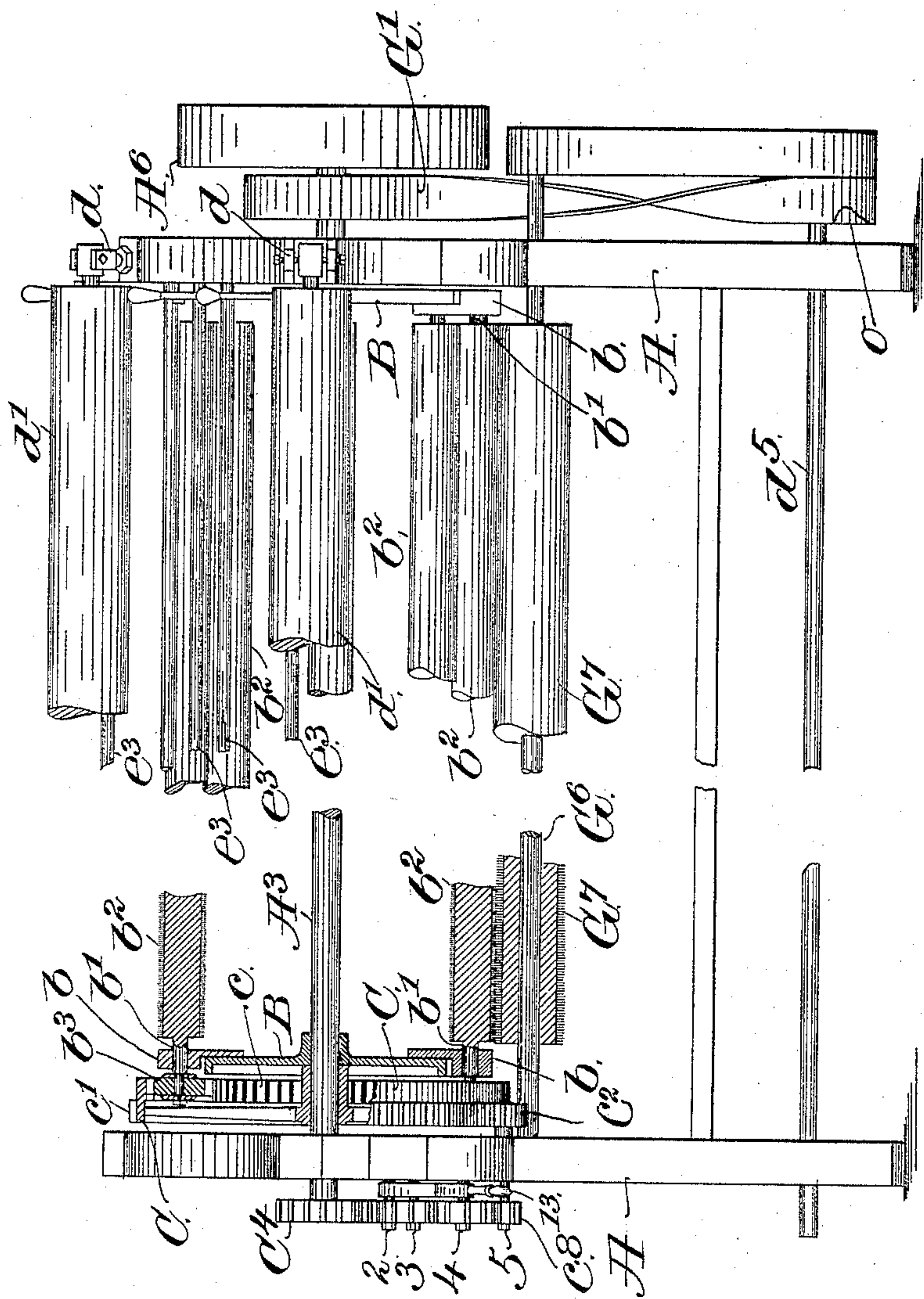


Fig. 3.

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Fig. 4.

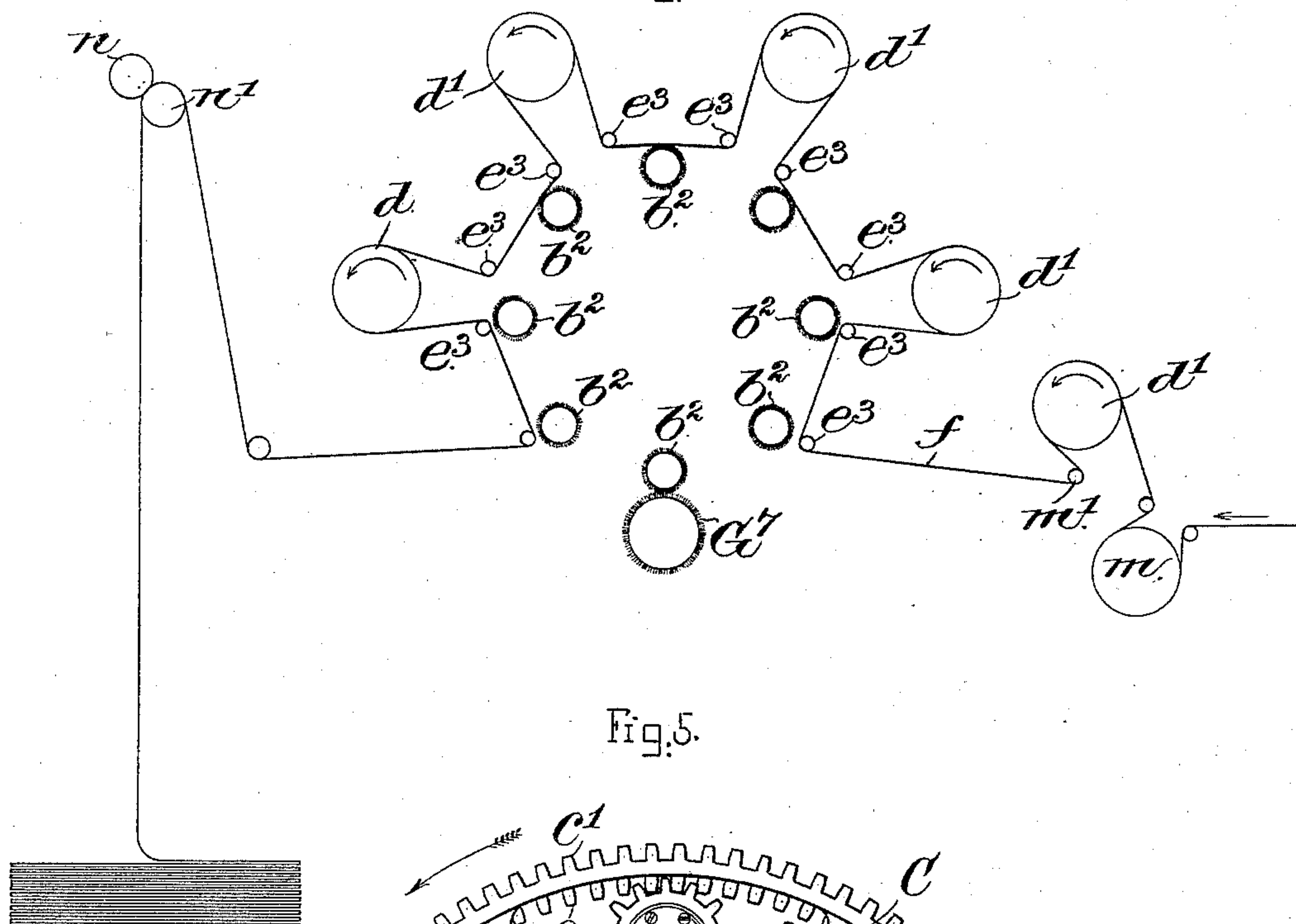
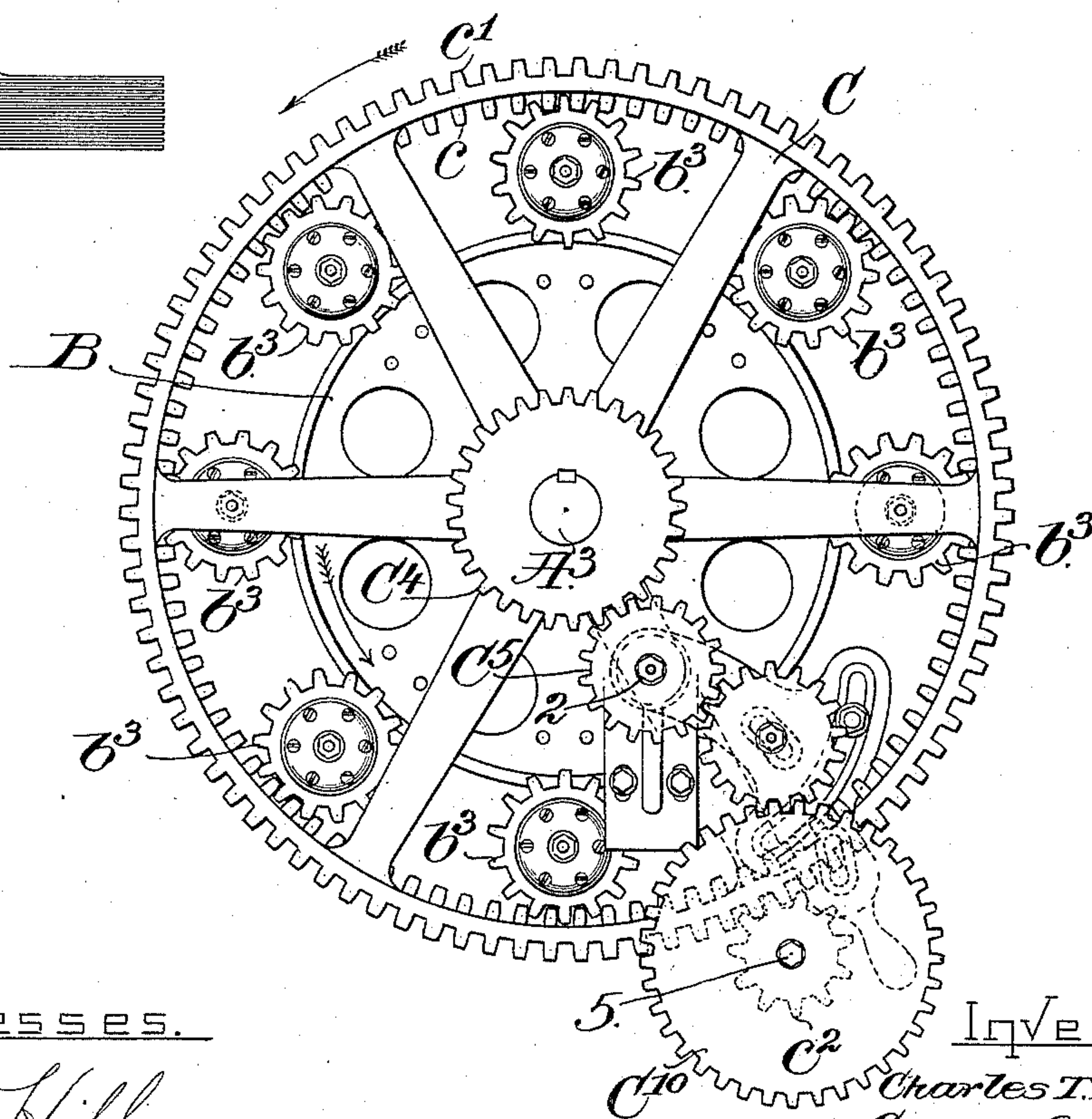


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES T. DANIELS AND GEORGE O. WICKERS, OF LAWRENCE,
MASSACHUSETTS.

CLOTH-NAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,334, dated May 3, 1892.

Application filed May 11, 1891. Serial No. 392,305. (No model.)

To all whom it may concern:

Be it known that we, CHARLES T. DANIELS and GEORGE O. WICKERS, both of Lawrence, county of Essex, State of Massachusetts, have

5 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.
10 This invention is an improvement in that class of napping-machines wherein a series of small card-clothed rollers have their journals in drum-heads fastened upon a shaft, the said shaft in practice being revolved in a forward
15 direction while the card-clothed rollers are revolved about their axes, usually at a faster speed and in a direction opposite that of the travel of the cloth through the machine. In this class of machines the forward movement
20 of the drum-heads or drum carrying the napping-rolls effects the napping of the goods, while the backward rotation of the separate rolls determines the quantity and quality of the nap raised upon the goods. The fine
25 sharp-pointed wires or teeth of the napping-rolls are so set into the leather or other foundation as to incline forward in the direction of revolution of the drum, and if the napping-rolls were held stationary on the drum the
30 teeth would tear the goods into shreds; but by rotating the napping-rolls in a direction opposite the travel of the drum and of the cloth through the machine, or by rotating them backwardly at a high velocity, the points
35 pick up or "tease" up the nap.

In this invention we have devised mechanism, which we shall hereinafter describe, for positively rotating the small napping-rolls carried by the rotating drum and for controlling the speed of rotation of the said napping-rolls. The arches on the main frame have
40 suitable bearing-stands to receive shafts of a series of feed-rolls arranged about the drum at suitable distances apart, they deriving their rotation, as herein represented, from a chain passed around suitable sprocket-wheels fast thereon. Between these bearing-stands and
45 upon the arches are other stands, which receive the journals of shafts having arms provided with cloth-depressing rolls or rods, which by their action upon the cloth keep

the same borne down in contact with the napping-rolls with more or less force, the cloth being removed from the path of the napping-rolls by elevating the said bearing-rolls. 55

In the form in which our invention is herein embodied the gear for rotating the napping-rolls in their bearings in the drum is a gear loose on the drum-shaft, but driven therefrom positively at a speed which may be
60 made more or less, according to the speed at which it may be desired to rotate the napping-rolls in their bearings as the drum is rotated. An internal-toothed gear is preferred for rotating the napping-rolls, as thereby better napping may be accomplished, for the
65 speed of rotation of the internal toothed gear to accomplish the same effect may be much less than should the said napping-rolls be rotated by peripheral teeth upon a gear, and
70 when the internal toothed gear is used the said gear will be moved usually in a direction opposite the rotation of the drum, while with the external toothed gear the rotation must be in the same direction as the drum,
75 in order to rotate the napping-rolls in the proper direction.

The speed of rotation of the napping-rolls for effective use must be very rapid, and with iron gears we could not get sufficient speed
80 without breaking so many gears as to render the use of the machine undesirable. To overcome this breakage we finally applied to the napping-rolls gears having teeth made of vulcanized fiber or leatheroid. 85

Figure 1 is a partial right-hand end view of a portion of a napping-machine embodying our invention; Fig. 1^a, a detail showing part of a napping-roll and its gear; Figs. 1^b and 1^c, details of speed-changing gearing; 90
Fig. 2, a left-hand end view of the arch, its stands and devices shown in Fig. 1 being omitted to more clearly show the drum, the pinions of the napping-rolls, and the gears for rotating the napping-rolls about their own
95 axes, and the speed-changing gears; Fig. 3, a view of the front or receiving side of the machine, broken out centrally, the carrying-rolls at the left of the machine, as well as the cloth-depressing rolls or rods, being broken away, 100
the drum and internal toothed gear at the left being also broken out, one of the napping-

roll gears being in section, the card clothing or teeth of the napping-rolls being but partially shown on the said napping-rolls. Fig. 4 is a diagram illustrating the path of the cloth through the machine; Fig. 5, an enlarged view of the wheel C, the pinions of the napping-rolls, and a modified form of speed-changing gear; and Fig. 6 is another modification.

We have omitted from the drawings some of the usual parts of cloth-napping machines, especially those for laying the cloth into a pile, because not of our invention.

The frame-work of the machine consists, essentially, of end pieces A A of suitable shape to support the bearings for the working parts, said ends being held together by suitable tie-rods.

The main shaft A³ of the machine, (see Fig. 1,) provided at one end with any usual or suitable driving pulley or pulleys to receive a belt A⁶, has heads attached thereto, the heads having suitable journal-boxes b, attached thereto in any usual manner, which receive the journals b' of the napping-rolls b², which in practice, as shown partially in Fig. 3, will be clothed with any usual card-clothing, the teeth being preferably sharp-pointed wires inclined forwardly in the direction of rotation of the heads and shaft A, constituting the main drum, the said drum being rotated in practice in the direction of the arrow 2, Figs. 1 and 2.

As herein represented, the journals of the card-clothed napping-rolls, any desired number of which may be used, have attached to them suitable pinions b³. We tried cast-metal gears for the ends of the napping-rolls, but could not run the machine practically or at high speed, because the gears would not last, so we made gears from vulcanized fiber, as shown in Fig. 1^a, holding the toothed part between washers 10 10 by suitable rivets 100, the gears being fastened on the napping-shaft firmly in suitable manner. Upon the shaft A³ at one side of one of the said heads B, as herein shown, we have placed loosely a gear C, it, as represented in Figs. 2, 3, and 5, having a series of internal teeth c and a series of external teeth c', the internal teeth being engaged by the pinions b³, the external teeth being engaged by a pinion c² on a short shaft 5, to be described. The main shaft A³, outside the frame-work and to the left in Fig. 3, has fast upon it a pinion C⁴, which, through a suitable train of intermediate gears, engages a pinion C⁸ upon and rotating the short shaft 5 referred to, causing the pinion c² to rotate the gear C.

As shown in Figs. 2 and 3, the pinion C⁴ engages an idle-wheel C⁵, mounted on a stud 2. The idle-wheel engages a second idle-wheel C⁶ on a stud 3, and wheel C⁶ in turn engages a third idle-wheel or pinion C⁷, mounted on a stud 4, the studs 3 and 4 being adjustably mounted in slots of a movable plate H, having its pivot upon the stud 2, the said plate

having a transverse slot 8, which is entered by a suitable bolt 12, (shown in Fig. 1^b), connected to the frame-work, the said bolt serving to keep the plate in any position in which it may be put by the operator moving the plate through the handle 13. By changing the gear or wheel C⁸ referred to for those of other sizes the speed of rotation of the shaft 5, and consequently of the loose gear C, may be made more or less.

In Fig. 5, representing some of the parts shown in Fig. 1 on an enlarged scale, instead of the small gear C⁸, we have substituted a large gear C¹⁰ and have omitted the gear C⁷, letting the gear or idle wheel C⁶ engage the said wheel C¹⁰. The movable adjustable arm and changeable gears constitute one form of speed-changing mechanism, and instead of the means shown for changing at times, as desired, the relative speed of the drum and gear C, we may use any other usual or suitable speed-changing mechanism or device.

In the plan shown in Fig. 5 the rotation of the gear C will be in such direction as to cause the napping-rolls to be rotated in the direction of rotation of the drum.

The speed-changing contrivance shown in Fig. 5 is illustrated to show the possibility, rather than the desirability, of rotating the napping-rolls in the direction of rotation of the drum.

In the plan shown in Figs. 1 and 2 the drum is rotated at one speed in the direction of the travel of the cloth, thus causing the napping-rolls to strike the cloth one after the other in quick succession. At the same time the said napping-rolls being rotated about their own axes have given to them a planetary motion, their rotation in their bearings in a direction opposite the direction of the travel of the cloth being at a speed more or less than the speed of the drum, that depending upon the speed imparted to the gear C.

The speed of rotation of the napping-rolls due to the gear C, with which they are engaged, determines the energy of the napping process, and this energy may be indefinitely increased beyond that effected when the internal gear is stationary by revolving the internal gear in the same direction with the drum.

Referring to Fig. 6, instead of the series of teeth c' on the gear C, we have attached to the said gear near its center a sprocket-wheel w, and have put a sprocket-pinion w' on the shaft 5 in place of the pinion c², and have connected the sprocket-wheel and pinion by a sprocket-chain w².

In all these plans the gear C is driven positively from the drum-shaft, so that when the machine is in motion and the relative speeds of rotation of the drum, napping-rolls, and gear C have once been determined said speed may be kept uniform.

The end frames or arches A⁶ will in practice have mounted upon them suitable stands d, having bearings, as shown in Fig. 1 and at

the right only in Fig. 3, for the journals of the gearing or feed-rolls d' , Fig. 1 showing four such rolls, they being located in practice at any desired distance apart. The rolls d' feed the cloth through the machine, and they derive their rotation, as herein represented, (see Figs. 1 and 2,) from a chain d^2 , passed around a suitable sprocket-wheel d^3 , fast on the shaft of each roll, the said chain deriving its motion from a sprocket-wheel d^4 on a shaft d^5 , (see Fig. 2,) the said shaft having upon it at its opposite end (see Fig. 3) a pulley o , about which is extended a belt G' , extended from a pulley o' on the shaft A^2 . The shaft d^5 has a second pulley G^2 , which by belt G^4 on a pulley G^5 , fast on a shaft G^6 , rotates the clearer or stripper roll, which in its rotation clears or strips the napping-rolls. Between these gearing or feed-rolls the arches have suitable stands e for rock-shafts e' , having arms e^2 , which support cloth-depressing rolls or rods e^3 , which act upon the cloth in pairs, substantially as represented in the diagram Fig. 4, to keep the said cloth f pressed down upon the card-clothed napping-rolls b^2 , the said rock-shafts e' having handles e^5 , by which when moved the depressors may be raised or lowered, they moving toward or from the napping-rolls in a circular path eccentric to the surface of said rolls, more or less of the surface of each roll acting on the cloth, as desired, devices shown as bolts being employed to adjustably lock the said handles with the stands e .

The cloth to be napped will come to the machine from a pile or any other source, and will be led under a guide-roll m over the first feed-roll d' , then under a guide-bar m' , thence under the depressing rolls or bars e^3 over the second feed-roll d' , again under bars e^3 over the third feed-roll, and so on, the cloth being brought in contact with the napping-rolls between each pair of bars e^3 .

The napped cloth may be delivered from the machine in any customary manner, we having shown in Fig. 4 a pair of rolls $n n'$, between which the cloth is taken away from the machine.

We claim—

1. In a napping-machine, the following instrumentalities, viz: a rotating drum, a series of napping-rolls having their journals mounted in bearings carried by the said drum and provided with a series of toothed pinions, combined with a loose gear having its teeth engaged by the teeth of the pinions mounted on the napping-rolls, and gearing between the said drum-shaft and the said toothed gear, whereby, while the said drum is rotated, carrying with it the napping-rolls, the latter are positively rotated about their own axes by the engagement of the roll-pinions with the said loose gear, substantially as described.

2. A napping-machine containing the following instrumentalities, viz: a rotating drum, a series of napping-rolls having their journals mounted in bearings in the said drum, a series

of pinions fast upon the journals of the napping-rolls, a loose gear mounted loosely on the shaft of the said drum, and speed-changing gearing to rotate the said gear positively and cause the napping-rolls, the pinions of which are engaged by the said gear, to be rotated about their own axes at a faster or slower speed, substantially as described.

3. In a napping-machine, the rotating drum having bearings for the journals of the napping-rolls, a series of card-clothed napping-rolls having each a pinion, a gear loosely mounted upon the shaft of the drum and having internal and external teeth, and a positively-driven gear, combined with speed-changing gearing located between the said positively-driven gear and the said loose gear, whereby the speed of rotation of the said loose gear may be made more or less, as compared with the rotation of the drum, to thereby effect the positive rotation of the napping-rolls at a predetermined speed, thus enabling the napping to be done uniformly, substantially as described.

4. In a napping-machine, a rotating drum provided with a series of card-clothed napping-rolls, a series of feed-rolls surrounding the said drum, a series of rock-shafts, independent adjustable depressing-bars, rolls or rods carried thereby between the said feed-rolls and arranged in pairs, one upon each side of the napping-rolls, and to depress the cloth more or less toward the said napping-rolls, said rods moving toward and from said rolls in a curved path eccentric to the surface thereof, substantially as described.

5. In a cloth-napping machine, the rotating cylinder provided with a series of card-clothed rolls and a surrounding series of feed-rolls, combined with a series of rock-shafts having arms, cloth-depressing rolls or rods carried by said arms, handles to rock said shafts to adjust the rods, and with locking devices to confine the said handles in adjusted position, substantially as described.

6. In a napping-machine, a rotating drum, a series of card-clothed napping-rolls carried thereby and having pinions provided with non-metallic teeth, an independent gear loose upon the shaft of the drum carrying the napping-rolls and having teeth engaging the pinions of the napping-rolls, combined with a train of gearing driven by or from the drum-shaft and adapted to engage and rotate the said loose gear in the desired direction at the desired speed, substantially as described.

7. A napping-machine containing the following instrumentalities, viz: a drum, a series of napping-rolls carried by and having their bearings on the said drum, a gear fast on the shaft of the said drum, means to engage the said napping-rolls, removable change-gearing intermediate said means, and the gear fast on the drum-shaft to positively actuate said means engaging the napping-rolls and rotate the said rolls on their axes as the drum is rotated, an idle-gear intermediate the said

change-gear and the said gear on said drum-shaft, and means to adjust said idle-gear to mesh correctly with said change-gear, substantially as described.

5 8. In a napping-machine, a rotating drum, a series of card-clothed napping-rolls carried thereby and provided with pinions having non-metallic teeth, combined with a gear engaging a series of the said gears and actuating them during the rotation of the drum,
10 substantially as described.

9. In a napping-machine, the rotating drum having bearings for the journals of the napping-rolls, a series of card-clothed napping-rolls, means to rotate said rolls about their
15 own axes, and speed-changing gearing com-

prising a series of intermeshing, removable, and idle gears intermediate said means for rotating the napping-rolls and the main shaft of the drum, whereby when the drum is rotated carrying the said rolls they may be rotated about their own axes at a faster or slower speed in the desired direction, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES T. DANIELS.

GEORGE O. WICKERS.

Witnesses:

JAMES HAWARTH,

OSCAR M. GODFREY.