

No. 717,841.

PATENTED JAN. 6, 1903.

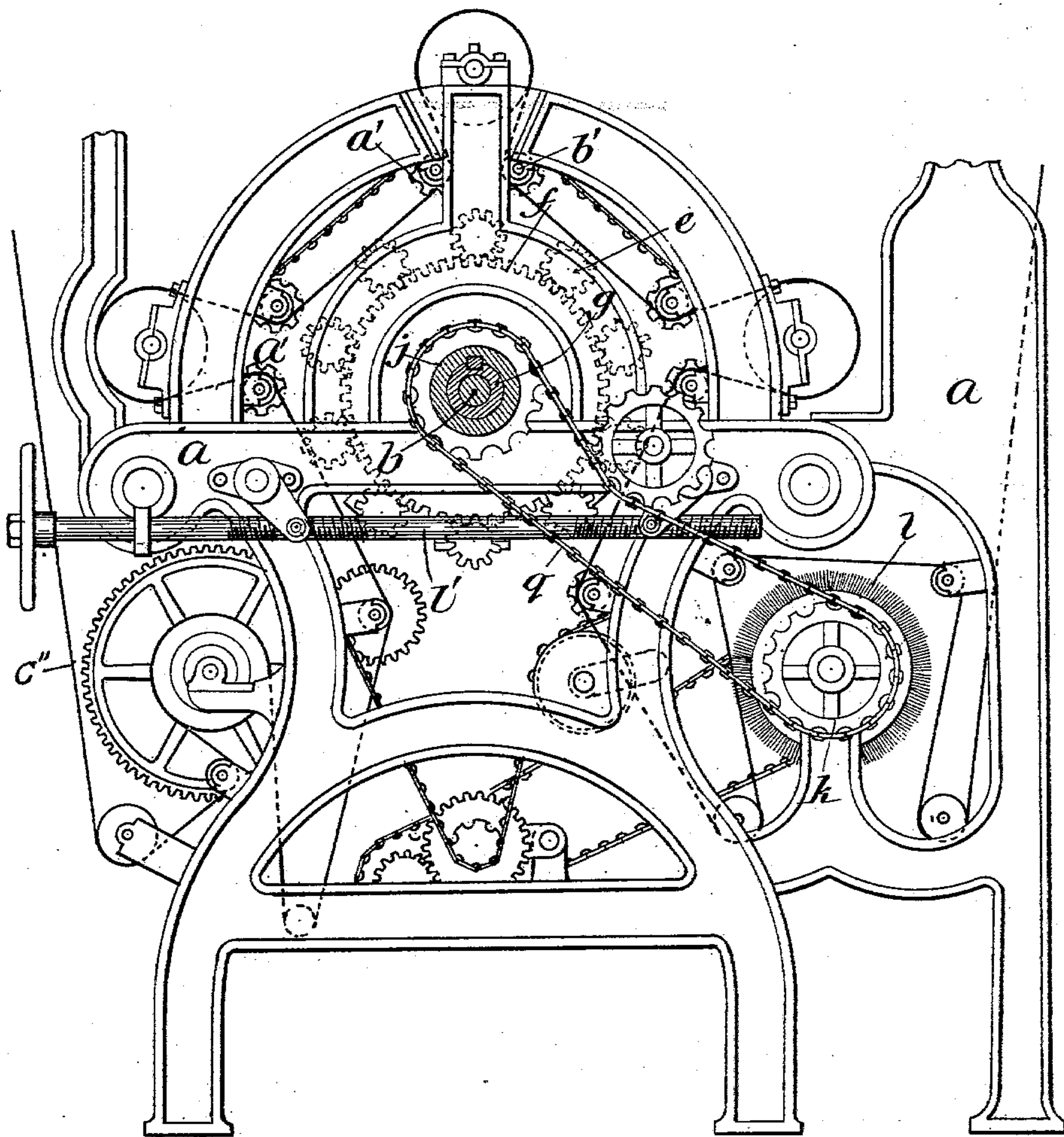
G. W. GREENE.  
NAPPING MACHINE.

APPLICATION FILED AUG. 30, 1894.

NO MODEL.

4 SHEETS—SHEET 1.

*Fig: 1.*



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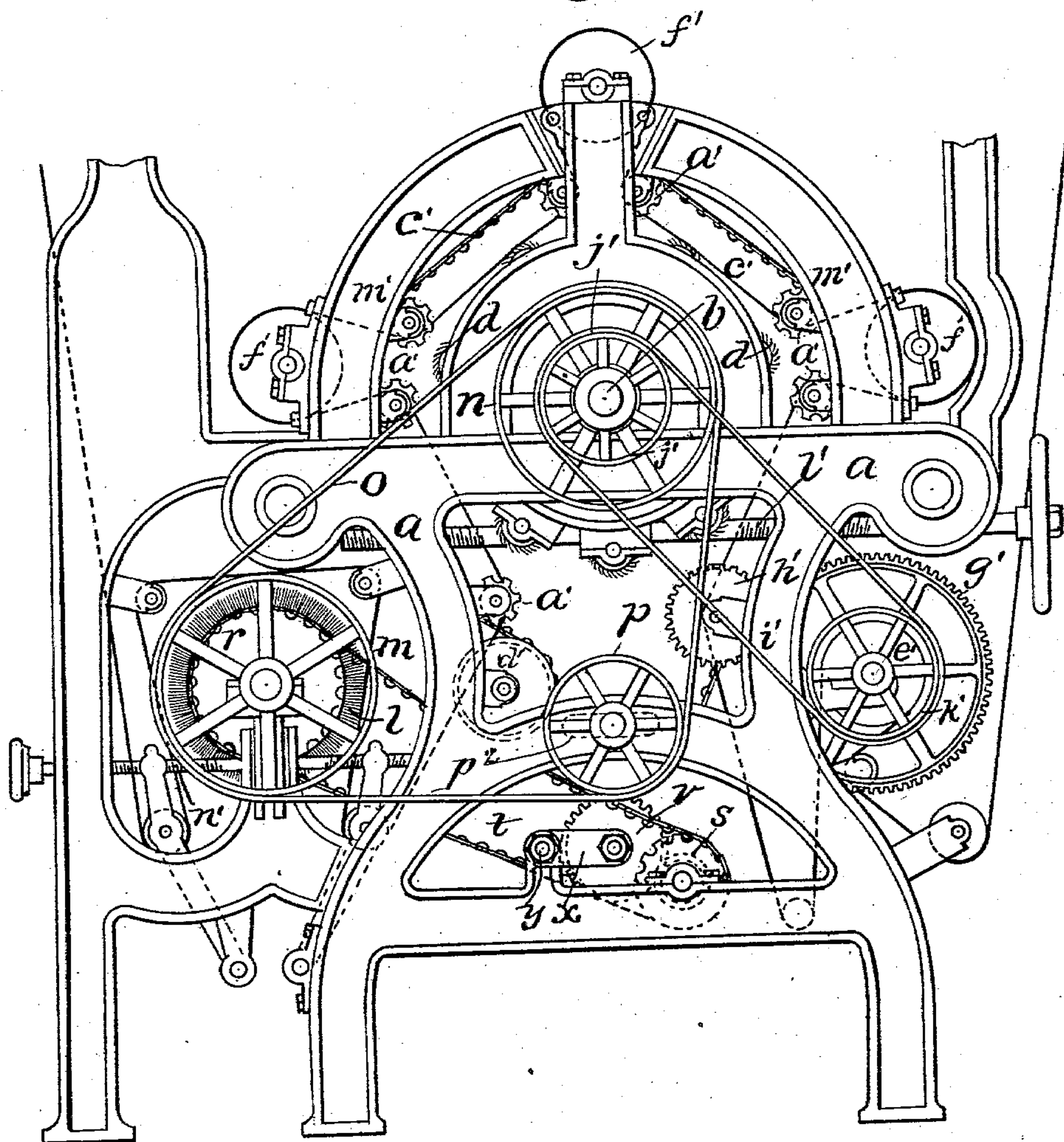
G. W. GREENE.  
NAPPING MACHINE.

APPLICATION FILED AUG. 30, 1894.

NO MODEL.

4 SHEETS—SHEET 2.

Fig. 2



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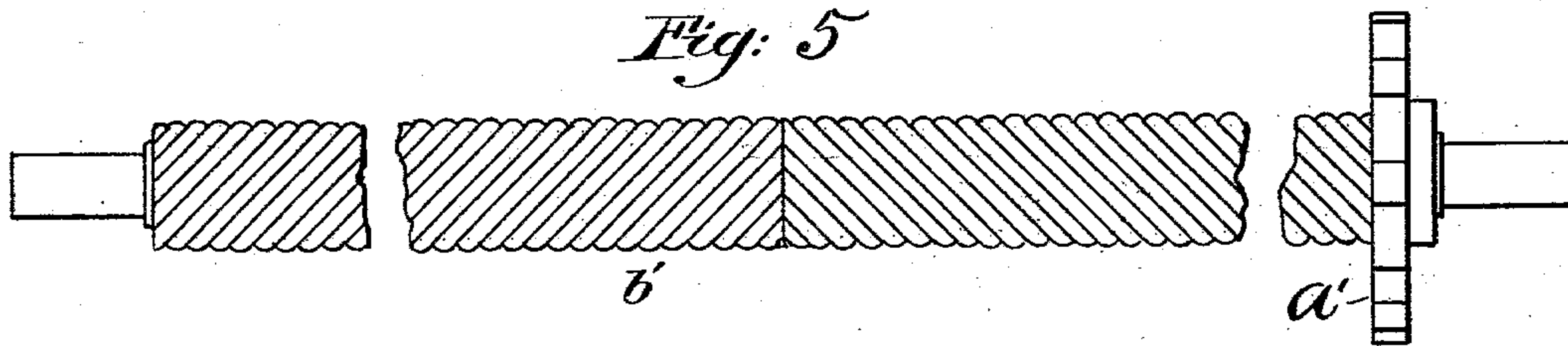
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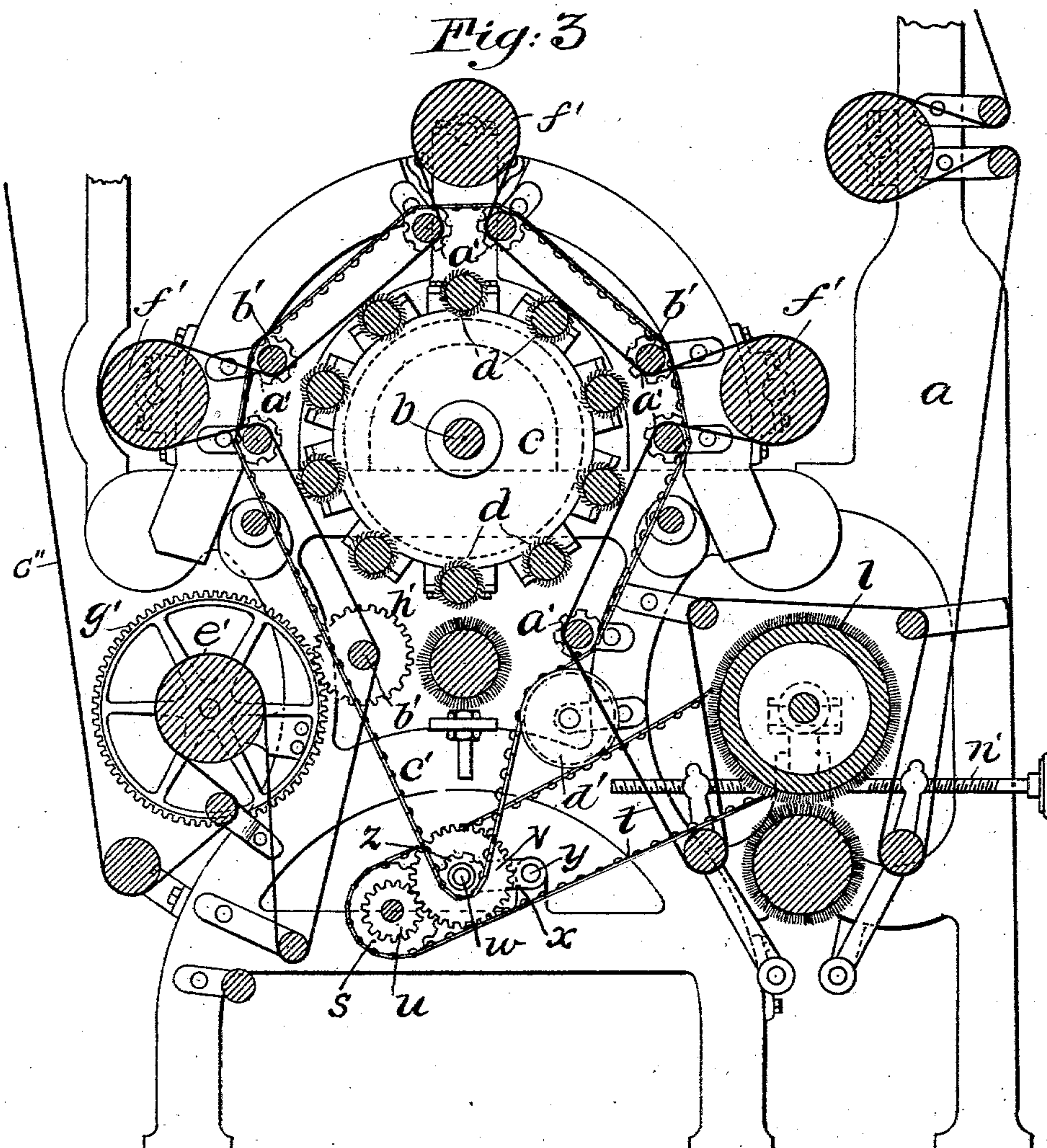
NO MODEL.

4 SHEETS—SHEET 3.

*Fig: 5*



*Fig: 3*



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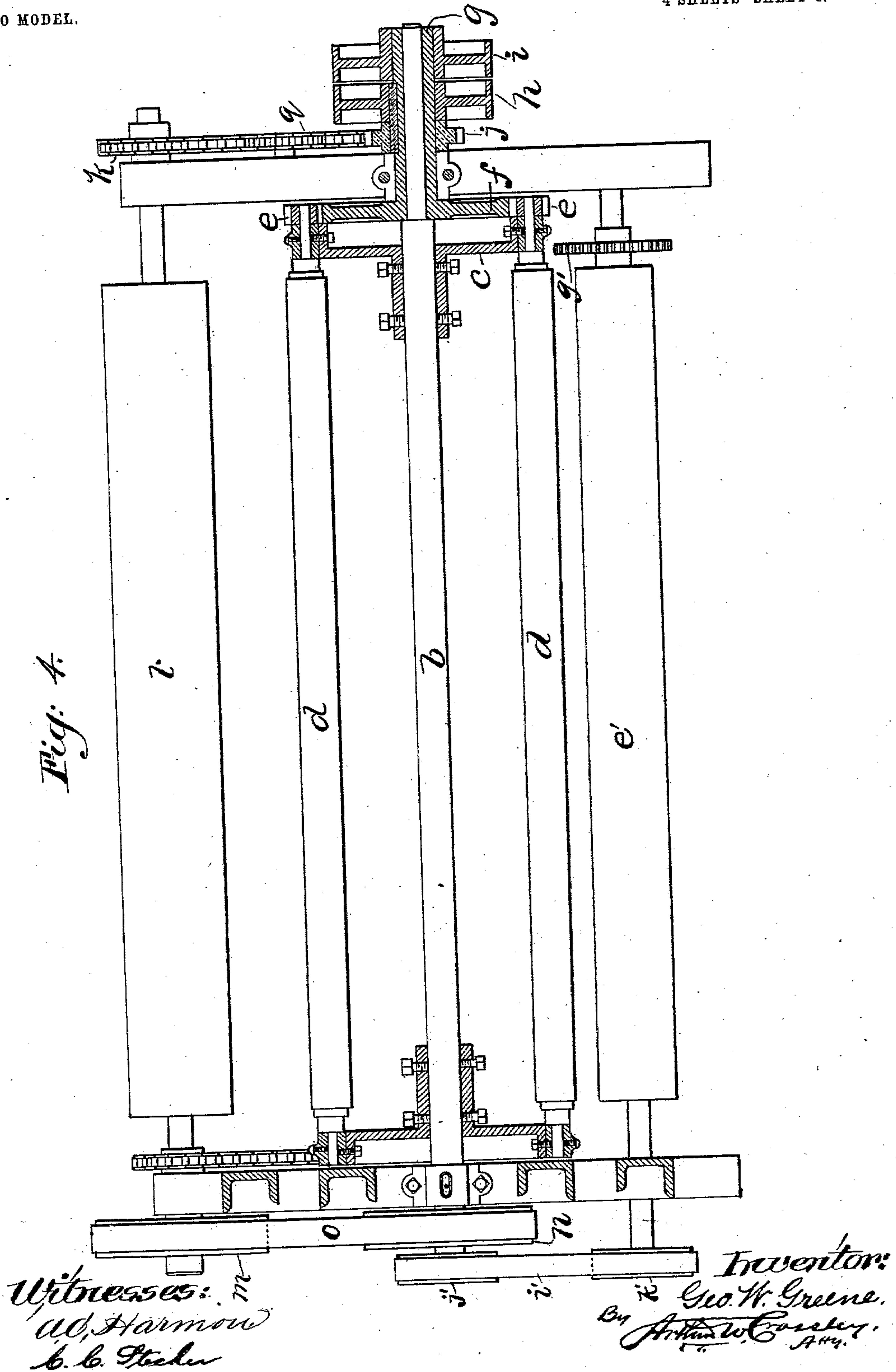
PATENTED JAN. 6, 1903.

G. W. GREENE.  
NAPPING MACHINE.

APPLICATION FILED AUG. 30, 1894.

4 SHEETS—SHEET 4.

NO MODEL.



# UNITED STATES PATENT OFFICE.

GEORGE W. GREENE, OF WOONSOCKET, RHODE ISLAND.

## NAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 717,841, dated January 6, 1903.

Application filed August 30, 1894. Serial No. 521,709. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. GREENE, of Woonsocket, in the county of Providence and State of Rhode Island, have invented certain  
5 new and useful Improvements in Napping-Machines, of which the following is a specification.

This invention has relation to that class of napping-machines in which rollers having  
10 metallic teeth are mounted upon and have bearings in the head of a drum and are so contrived that while they are revolved about the axis of the drum they are rotated upon their own axes in such manner that when  
15 the teeth of the rollers come into contact with the cloth carried through the machine they may pick up or lift out the fibers from the surface of the fabric into a nap. It is desirable in this class of machines that the rollers  
20 should be made to act with greater or less degrees of energy or napping effect upon the cloth, in accordance with circumstances, and this has generally been effected by varying the speed or retardation of the rollers or by  
25 varying the speed with which the cloth was carried through the machine or the force or energy with which the cloth bore upon the napping-rollers. It has been ascertained that if the napping-rollers are driven at a substantially  
30 unvarying speed upon their own axes and the speed of the drum is varied to suit circumstances much better results are obtainable than may be secured in any other way; and it is the object of the present invention to provide improvements whereby  
35 this desirable end may be secured.

It is also the object of the invention to provide improvements whereby the guide-rolls may be operated, so as not only to guide the  
40 cloth through the machine as usual, but at the same time keep it distended, so as that the napping-rollers may act thereon evenly and to the best advantage.

Reference is to be had to the annexed drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is the driving end  
50 of the machine, the drum-shaft and its immediate adjuncts being shown in section and

the pulleys removed. Fig. 2 is a view of the opposite end of the machine, the upper portions of the frame being broken away, as in Fig. 1. Fig. 3 is a vertical central sectional  
55 view of the machine as shown in Figs. 1 and 2. Fig. 4 is a sectional plan view of the cylinder and some of its adjuncts designed particularly to illustrate the manner in which the cylinder is differentially driven with respect  
60 to the napping-rollers. Fig. 5 is a detail view in plan, drawn to an enlarged scale, (parts being represented as broken out,) of one of the guiding rollers or rods employed in the machine.

In the drawings, *a* designates the frame of the machine, which may be of the form shown or of any other suited to the purpose. *b* is the cylinder-shaft, upon which are secured the heads *c*, in or upon the peripheries of which  
70 the napping-rollers *d* are journaled in such manner that while they may be revolved with the cylinder around its shaft they may turn independently on their own axes. The napping-rollers *d* are provided at one end (in the present instance at the driving end of the machine) with pinions *e*, which are engaged  
75 by a gear-wheel *f*, arranged to turn upon the cylinder-shaft *b* independent thereof. The gear-wheel *f* is provided with a sleeve *g*, which  
80 extends outward on the drum-shaft, and upon this sleeve the tight or driving pulley *h* is keyed, as is clearly shown in Fig. 4, while the loose pulley *i* is arranged to run freely thereon. It will now be seen that if power is ap-  
85 plied to the pulley *h*, so as to drive the same, the wheel *f* will be driven so as to rotate the napping-rollers on their own axes without affecting the cylinder. In order to effect a rotation of the cylinder, a sprocket-wheel *j* is  
90 keyed upon the sleeve *g* of the gear-wheel *f* and another sprocket-wheel *k* is fixed upon the shaft of the gigging-roller *l* at the driving end of the machine. At its opposite end the shaft of the gigging-roller is provided with a  
95 pulley *m*, over which and over a pulley *n* on the cylinder-shaft runs a belt *o*, the said belt also passing about a tightening-pulley *p*, which may be adjusted in any suitable way—as, for example, by adjusting the journal of  
100 the pulley in a slot *p*<sup>2</sup> (shown by dotted lines in Fig. 2)—to keep the belt *o* taut. A sprocket-

chain  $q$  connects the sprocket-wheels  $j$  &  $k$ , so that the rotation of the driving-pulley  $h$  will through the medium of the sprocket-chain  $q$  and its sprocket-wheels rotate the gig-roller  $l$ , and the pulleys and belt heretofore described at the opposite end of the machine will act to rotate the cylinder. It will now appear obvious that as the means for rotating the cylinder are intermediate of, connected with, and operated from the means for rotating the napping-rollers by making the pulleys  $m$  and  $n$  (constituting a part of the said intermediate means for rotating the cylinder) changeable, so as to vary their sizes, the speed at which the cylinder is driven may be varied without varying the speed of the means for operating the napping-rollers or the speed of the latter on their own axes.

Napping of cloth is effected in machines of the character described by equipping the napping-rollers with suitable metallic teeth, imparting to the said rollers a planetary motion—that is, a motion or movement in an orbit. The construction and arrangement are usually such that the napping-rollers will be carried forward, as it were, by the cylinder and the teeth thereof caused to strike into the cloth where they come into contact therewith. The rotation of the rollers in the reverse direction will cause the teeth to lift or draw out fibers from the threads into a nap. When it becomes necessary to vary the napping energy of the rollers upon the cloth in machines as now commonly constructed, the speed at which the rollers are rotated on their own axes is varied. This not only causes the teeth of the said rollers to strike into the cloth with varying energy, but to pull or lift out the fibers with corresponding energy. This operation, particularly when the rollers are operating quite energetically, is not productive of the best results. By my improvements the napping-rollers can be adjusted as to speed, so as to lift or pull out the fibers from the threads of the cloth as desired, and the speed of the cylinder regulated to suit the character of the cloth being acted upon. This mode of operation of the machine has been found to be productive of much better results than that first described as practiced on machines as now commonly used. Furthermore, by providing means for varying the speed of the cylinder instead of changing the speed of the napping-rollers a delicate adjustment of the energy with which the napping-rollers operate may be secured, for the reason that the speed of the cylinder can be considerably varied without more than appreciably varying the energy with which the napping-rollers act upon the cloth, whereas it is difficult to adjust the speed of the napping-rollers to any extent without quite materially affecting the napping energy with which they operate, and, besides, the machine is rendered materially simpler in construction and mode of operation than machines now employed for a simi-

lar purpose. In order to keep the cloth distended laterally or properly stretched widthwise and rendered smooth and without wrinkles when it is presented to the napping-rollers to be acted upon by them, (a thing essential to the perfect napping of the cloth,) important improvements forming a part of this invention have been devised by me and will next be described.

On the gig or brushing roller  $l$  there is keyed or otherwise affixed a sprocket-wheel  $r$ , around which and around a sprocket-wheel  $s$ , turning on a stud connected with the frame, passes a sprocket-chain  $t$ . Compounded or connected with the sprocket-wheel  $s$  is a pinion  $u$ , which meshes with a gear-wheel  $v$ , turning on a stud  $w$  on the free end of an arm  $x$ , pivoted upon the frame at  $y$ , so that the gear-wheel  $v$  will be held in mesh with the pinion  $u$  by gravity. Compounded or otherwise connected with the gear-wheel  $v$  is a sprocket-wheel  $z$ , about which and about sprocket-wheels  $a'$  on the ends of the guide rolls or rods  $b'$  there passes a sprocket-chain  $c'$ , so that the guide rolls or rods may be driven. This is of very great importance, since it not only provides for carrying the cloth through the machine, but furnishes as well means adapted to be so constructed and arranged as to keep the cloth distended and smooth. In order to accomplish this, I corrugate, groove, or otherwise form the guide-rollers with uneven lines running spirally around the surface of the guide-rollers from their center toward their ends in opposite directions, as is shown in Fig. 5, and as the guide-rollers are independently driven and may be, and in practice in fact are, driven faster than the cloth is moved it follows that they will act to distend the cloth and free it from wrinkles.

To obtain the best results, I construct the machine so that there shall be a rotary cloth-spreading guide-roll on each side of each line or point of contact of the cloth with the napping devices in order to perfectly spread the cloth at such lines or points and permit the napping-rollers to act evenly and uniformly thereon. This important function is not accomplished where the guide-rolls are not constructed as cloth-spreading rolls and rotated as described.

$d'$  is a guiding-pulley, of which there may be any necessary number, to guide the sprocket-chain  $c'$  in such course as to make it engage such of the sprocket-wheels  $a'$  as may be desired.

In the operation of the machine the cylinder will be moved so as to revolve the napping-rollers forward in a direction contrary to the movement of the cloth, while the said napping-rollers will be rotated on their axes backward. The effect of this will be to cause the teeth of the napping-rollers to strike into the cloth and, catching the fibers, raise or pull the same out into a nap on the face of the fabric. It will be understood that by

varying the speed at which the cylinder is driven the degree of energy with which the napping-rollers act upon the fabric will likewise be varied.

5 The feeding-in roll *e'* and carrying-rolls *f'* will be rotated in any suitable or well-known way. In some cases I may equip the machine so as that the feeding-in roll and the first following guide-roll may move in unison. One  
10 way of accomplishing this is by means of a gear *g'* on the shaft of the feeding-in roll *e'*, which meshes with and drives a pinion *h'* on the shaft of the first following guide-roll *b'*, the gear *g'* and feeding-in roll *e'* being driven  
15 by means of a belt *i'*, passing about pulleys *j'* and *k'*, respectively, on the cylinder-shaft and the shaft of the feeding-in roller. In this case the feeding-in means will be operated in exact unison with the drum.

20 *c''* indicates the line of the cloth. *l'* is a screw-rod for adjusting the arches *m'*, in which certain of the rotary guide-rolls are journaled, and *n'* is a screw-rod for adjusting certain of the guide-rollers with respect to the  
25 gigging or brushing roller *l*. These and some other parts which form no part of the present invention and the operation of which does not modify the present improvements have not been described in detail herein, such de-  
30 scription being considered unnecessary.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it  
35 may be made or all of the modes of its use, it is declared that what is claimed is—

1. A napping-machine comprising in its construction a rotary cylinder, rotary and rev-  
40 oluble napping-rollers, rotary cloth-feeding-in and carrying rolls, rotary guide-rolls and means for operating the latter at a greater speed than the cloth is moved, the rotary guide-rolls being provided with uneven sur-

faces running spirally therearound from the center outward in opposite directions. 45

2. A napping-machine comprising in its construction a rotary cylinder, rotary and rev-  
oluble napping-rollers, rotary carrying and  
cloth-spreading guide-rolls, the rotary feed-  
ing-in roll, and gearing connecting the feed- 50  
ing-in roll with the first following rotary  
guide-roll, whereby the last-mentioned rolls  
are moved in unison.

3. In a napping-machine, the combination,  
with operative napping-rollers, of rotary car- 55  
rying-rolls, rotary cloth-spreading guide-  
rolls, and means for rotating the guide-rolls  
at a greater surface speed than the carrying-  
rolls.

4. In a cloth-napping machine, in combi- 60  
nation, the rotary cylinder, the napping-roll-  
ers carried thereby, driving mechanism  
whereby the said rollers are rotated in their  
bearings carried by the cylinder, and motion-  
transmitting connections intermediate said 65  
driving mechanism and the cylinder for ro-  
tating the latter, said connections having pro-  
visions to enable the rate of speed transmit-  
ted to the cylinder to be altered at will, to  
vary the napping action. 70

5. In a cloth-napping machine, in combi-  
nation, the rotary cylinder, the napping-roll-  
ers, driving mechanism whereby the said  
rollers are rotated in their bearings carried  
by the cylinder, and driving connections for 75  
the cylinder having provisions to enable the  
speed of the latter to be varied at will, to  
modify the napping action.

In testimony whereof I have signed my  
name to this specification, in the presence of 80  
two subscribing witnesses, this 24th day of  
July, A. D. 1894.

GEORGE W. GREENE.

Witnesses:

JAMES A. LEE,  
WILLIAM TITTER.