

(No Model.)

2 Sheets—Sheet 1.

C. WOOD.
GIG MILL.

No. 536,678.

Patented Apr. 2, 1895.

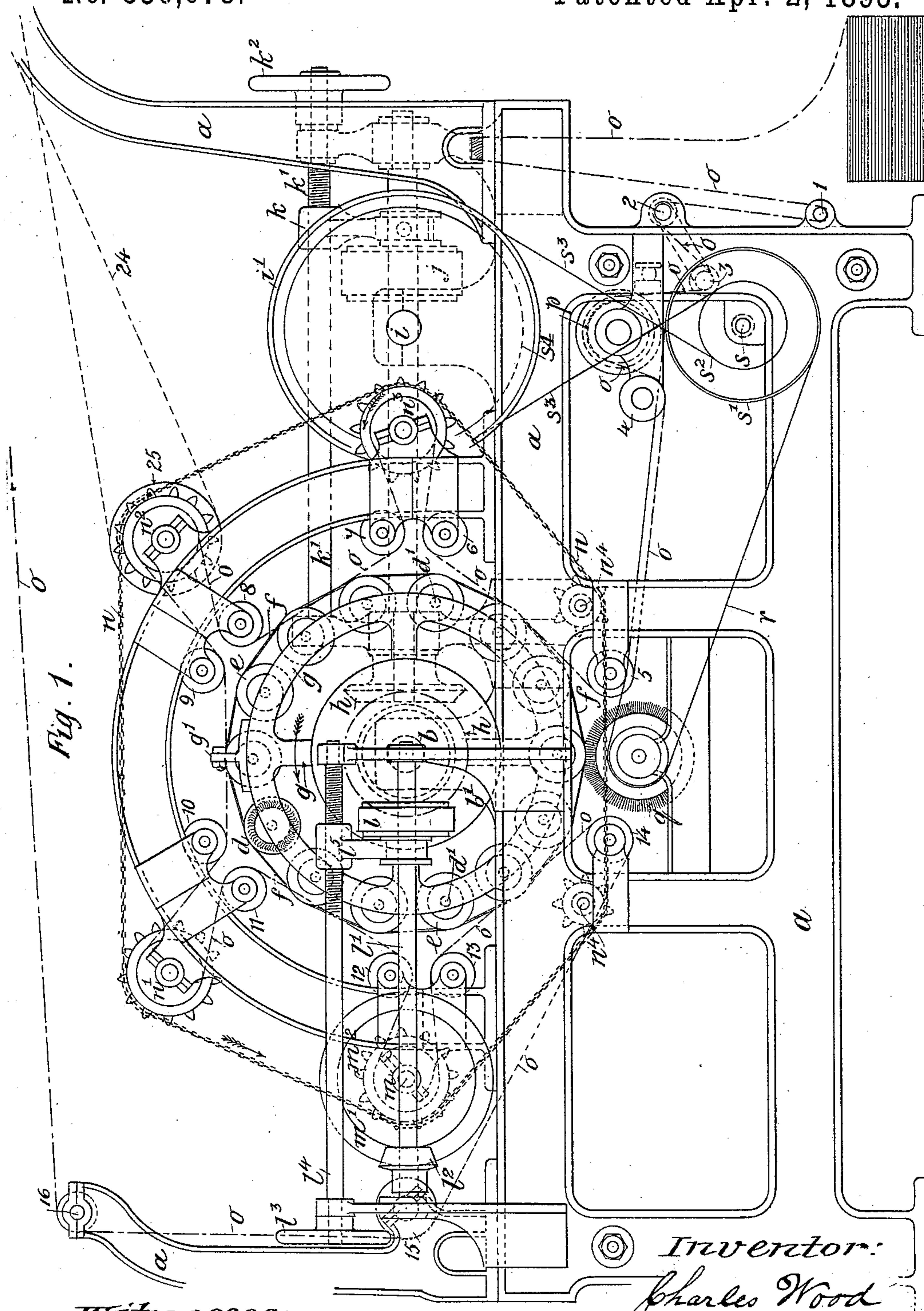


Fig. 1.

Witnesses:
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E. H. Sturtevant

Inventor:
Charles Wood
By *Quinard & R*
his Attorneys

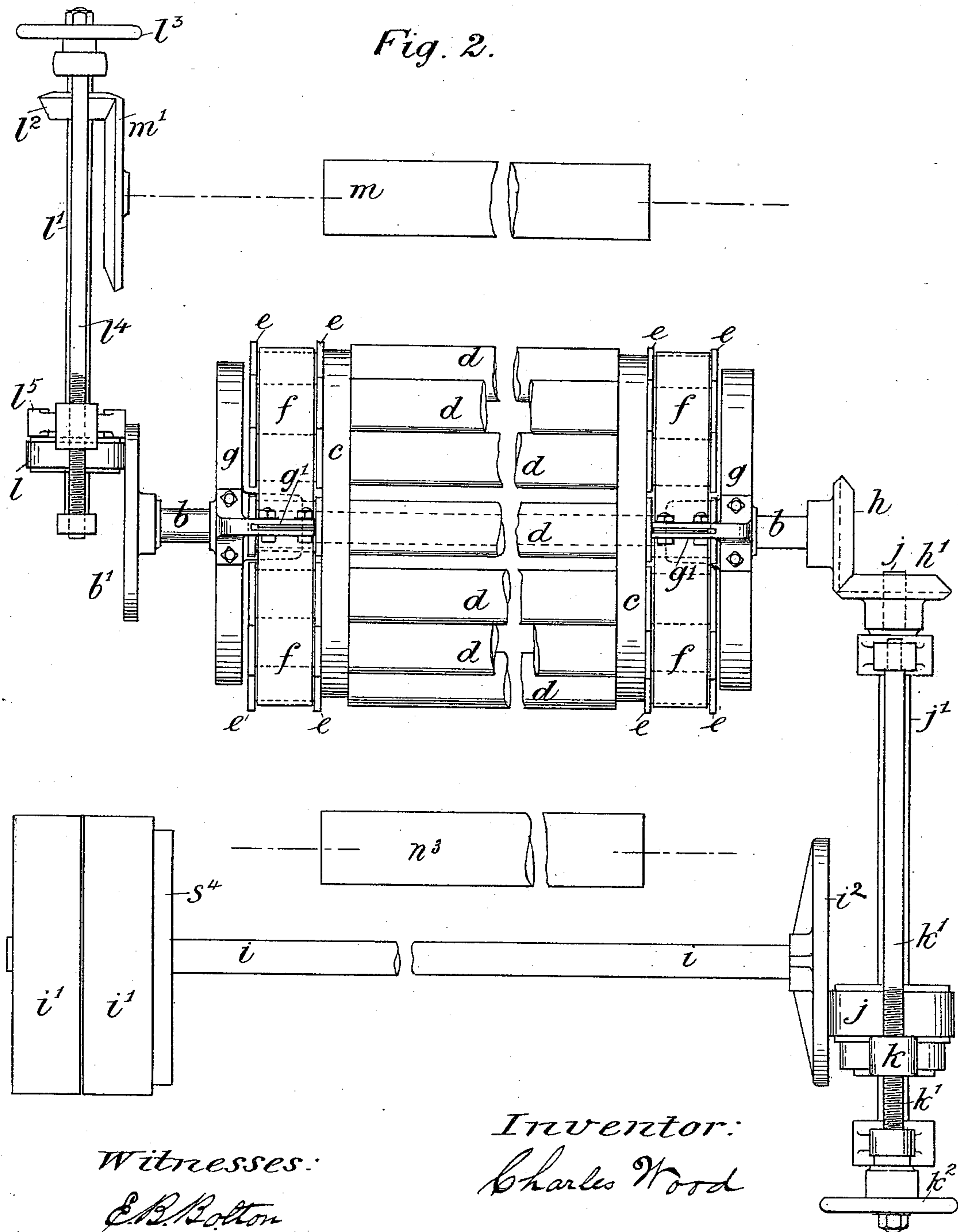
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Witnesses:

E. B. Bolton

E. H. Sturtevant

Inventor:

Charles Wood

By

Richard H. [Signature]

his Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES WOOD, OF HEATON-NORRIS, ENGLAND.

GIG-MILL.

SPECIFICATION forming part of Letters Patent No. 536,678, dated April 2, 1895.

Application filed June 2, 1894. Serial No. 513,255. (No model.) Patented in England April 5, 1894, No. 6,770, and in Belgium September 7, 1894, No. 111,700.

To all whom it may concern:

Be it known that I, CHARLES WOOD, a subject of the Queen of Great Britain, and a resident of Heaton-Norris, in the county of Lancaster, England, have invented certain new and useful Improvements in Gig-Mills, of which the following is a specification.

My invention, which is set forth in British Patent No. 6,770, dated April 5, 1894, and Belgian Patent No. 111,700, dated September 7, 1894, relates to that class of gig mills in which there is a revolving drum carrying a series of revolving napping rolls.

Prior to my invention it was usual to drive the napping rolls at different speeds by various arrangements of gearing, and to rotate the head or drum at a practically uniform speed, the rate of travel of the cloth having no essential relation to the rate of rotation of the drum or of the napping rolls. It has, therefore, been considered essential to employ counter-shafts and other driving devices, which it is the object of my present improvement to dispense with, and I effect this object by combining with the drum-head means for varying the speed thereof, and by employing means for varying the speed of the travel of the cloth in respect to the speed of rotation of the cylinder, and I also provide means for controlling and indicating the motion of the napping rolls, all as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1, is a side elevation of a gig mill fitted with my improvements. Fig. 2, is a sectional plan of Fig. 1.

Similar letters and numerals refer to similar parts throughout both views.

In the drawings, *a*, is the frame of the machine; *b*, the cylinder shaft on which are fixed a pair of disks *c*, constituting the drum-head which carries the napping rollers *d*, each with its proper card-clothing.

The machine may be single- or double-acting, that is, the napping rollers may have their teeth all pointed in the direction of the rotation of the drum, or they may point alternately in opposite directions.

Each of the napping rollers has at one or both ends of its axle *d'*, a pulley *e*, larger in diameter than the napping rolls and with the

series of pulleys at the end of the drum engages what I term a "ring" *f*, which may be constructed in different ways, but which as shown consists of a band which encircles the pulleys tightly enough to insure the rotation of each pulley whenever any movement is imparted to the band. The ring *f*, is connected by a bracket clamp *g'*, to a spider-wheel *g*, which is mounted loosely upon the cylinder shaft *d*, and in all cases where rollers are employed with teeth pointing in opposite directions (as in United States Patent No. 485,929), I prefer to employ separate rings and corresponding pulleys for the two sets of raising rollers, the pulleys and ring of one set being at one end of the drum, and the pulleys and ring of the other set at the opposite end of the drum.

Different means may be employed for driving the drum at different speeds. In the example illustrated by the drawings, the drum is driven by a pair of bevel gears *h*, *h'*, which are driven at varying speeds from the driving shaft *i*. Near one end of this shaft is a pair of fast and loose pulleys *i'*, and at the other end a friction disk *i²*, in contact with a friction bowl *j*, on a shaft *j'*, to which is secured the bevel gear *h'*, gearing with the bevel gear *h*, on the cylinder shaft *b*. A forked lever *k*, mounted on a screw *k'*, enters an annular recess in the boss of the bowl *j*, and by turning a hand-wheel *k²*, fixed on this screw, the position of the bowl *j*, can be adjusted relatively to the disk *i²*, and the speed of the cylinder shaft *b* and the disks *c*, can be varied and regulated as required.

The speed of the cloth should be varied according to the effect required. I, therefore, employ adjustable devices for this purpose. Thus, at one end of the cylinder shaft *b*, is secured a friction disk *b'*, which drives a friction bowl *l*, mounted upon a shaft *l'*, to which is secured a bevel gear *l²*, in gear with a bevel gear *m'*, secured to the axis of the cloth-drawing-through roller *m*. In order to regulate the speed of this roller *m*, a hand-wheel *l³*, fixed on a screwed shaft *l⁴*, is employed to move a forked lever *l⁵*, which engages with the boss of the friction bowl *l*, for the purpose of adjusting the position of the bowl relatively to the friction disk *b'*.

On the opposite end of the drawing-through roller m , is a toothed chain wheel m^2 (dotted lines, Fig. 1) from which a chain n , passes over chain wheels n', n^2, n^3 , and carrier wheels n^4 (see Fig. 1), for the purpose of driving the series of cloth-drawing rollers which are fixed upon the axles of the wheels n', n^2, n^3 .

The path of the fabric o , can be traced from the batch of cloth on the floor, under and over guide rollers 1, 2, 3, around a tension pulley p , under guide rollers 4 and 5, and thence onto one or more of the raising rollers d , over a guide roller 6, and the chain driven roller n^3 , thence under the guide rollers 7 and 8, around the chain driven roller n^2 , thence under the guide rollers 9 and 10, and around the chain driven roller n' , thence under the guide rollers 11 and 12, around the drawing-through roller m , under the guide rollers 13 and 14, and away around guide rollers 15, 16, to a drawing roller, and the usual plaiting down device (not shown) to the batch on the floor.

Below the cylinder is a brush — q — to clean the raising rollers d , which brush is driven by a belt from a pulley s' , on a stud s , on which is also fixed a pulley s^2 , driven by a belt s^3 , from a pulley s^4 , on the driving shaft i .

It will be seen that in the construction described, the speed of rotation of the drum may be varied so that it may be put in operation and maintained at any desired speed and varied from time to time, as required, and also that the speed at which the fabric is carried forward may be varied in relation to the speed of the drum, and I have found that by this means I am enabled to operate the machine with varying degrees of energy, according to the characters and conditions of the fabric or of different fabrics operated upon.

Heretofore, the napping rolls carried by the revolving head have been driven more or less positively by causing their pulleys to travel upon a fixed band, belt, ring, or track, so as to be rotated as they traveled upon said track, and thereby drive the napping rolls; or in other cases, the said ring, track or belt in contact with the said pulleys has also had a positive movement imparted to it, and to that extent has positively driven the said pulleys, the head in such case revolving at a uniform speed.

I have discovered that the requisite variations in the degrees of operating energy of the napping rolls may be secured by the use of the loose band, pulley or track f , encircling all of the pulleys and in frictional contact therewith, but which is not held stationary by attachment to the frame, or by any other connection, and further which is not driven by means of any driving appliances, but which is free to move in either direction, according as it is influenced by the rotation of the revolving drum and its pulleys, or by the rotation of the said pulleys imparted by the revolution of the napping rolls in contact with the cloth. As the said ring or its equivalent

is free to move in either direction, according to the influence brought to bear upon it, I have found that when the machine is first started and the drum-head revolves slowly, the action of the parts is such as to carry the said ring in a reverse direction to that in which the drum-head revolves, which indicates that the napping rolls are not acting with sufficient energy upon the fabric; but if the speed of the revolving drum-head is increased to a further extent, the ring will finally remain stationary, or slightly oscillate during the revolution of the said head, and this indicates that the napping rolls are acting with the maximum energy that the cloth will bear proportionate to the then speed of the revolving head and the speed of travel of the cloth.

If a different energy is required, the napping rolls may be caused to operate upon the fabric at such energy by varying the speed at which the fabric is carried through the machine, and then changing the speed of the revolution of the drum, until the ring is no longer carried in either direction, but remains practically stationary. Thus, if the head revolves at the rate of one hundred revolutions per minute, the ring being stationary, and a decreased energy is desired, an increase in the speed of the cloth is effected, when the desired result will follow, as the quicker the cloth travels, the less will be the energy of operating upon it. It will thus be seen that the ring acts as an indicator, and that by watching its operation, the operator can know when the napping rolls are operating with the maximum effect that the cloth will bear.

It will be evident that if the fabric were held stationary and did not travel through the machine, the napping rolls would be turned back at precisely the same speed at which their outer peripheries were carried forward by the rotation of the drum, and the ring would remain in a stationary position relative to the axis of the drum, or turn backward if the pulleys e , are larger in diameter than the rolls; but that when the fabric is carried forward, there is practically a decreased movement of rotation of each of the napping rolls, and there is, consequently, normally or at a slow rate of speed, a driving action upon the ring, which would carry it in a reverse direction to that in which the drum-head turns, but I have found that an acceleration in the speed of the drum-head increases the tendency to carry the ring in the direction of the drum-head, until gradually the movement before described as imparted by the fabric is overcome and the ring is brought to practically a stationary position, and consequently, to this extent acts as a drag to resist the backward motion of the napping rolls and increases the energy of action thereof. It, therefore, follows that by changing the speed of the feed of the fabric, these conditions are disturbed. After such change, there is then again a tendency of the ring to revolve, which will be overcome in proportion

as the speed of the drum is changed. Thus, by varying the speed of travel of the fabric and changing the speed of rotation of the drum, the napping rolls may be caused to operate upon the fabric at any desired degree of energy.

It will, of course, be evident that when the ring is supported, as above described, so as to turn freely, and is not driven positively, it engages the pulleys of the different napping rolls and serves to indicate when the speed of the head is in proper proportion to the travel of the cloth, but it does not control the rolls positively, as it would if held fixedly in place, or if driven positively from an outside source, although it so connects the rolls together that it insures the rotation and maintains the speed of those rolls which are not in contact with the fabric.

Although I have shown and described a spider-wheel *g*, connected by a clamp *g'*, to each ring *f*, as I prefer to employ such wheels as a convenient means for supporting the band or ring for indicating the action of the raising rolls *d*, upon the fabric, I wish it to be clearly understood that they do not form an essential feature of my invention, as they may be dispensed with, and suitable rings *f*, used alone to engage the pulleys of the napping rolls.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. In a cloth napping machine, a rotating drum-head carrying a series of rotating napping rolls, combined with means for varying

the speed of rotation of the head and means for varying the feed of the cloth independently of that of the drum head, substantially as described.

2. The combination in a cloth napping machine, of a rotating drum-head, a series of rotating napping rolls carried thereby, a series of pulleys on the roll shafts, and a loose ring engaging the said pulleys, substantially as set forth.

3. The combination in a cloth napping machine, of a rotating drum-head carrying a series of napping rolls having shafts provided with pulleys, a loose ring engaging the said pulleys, and means for varying the speed of rotation of the head, substantially as set forth.

4. In a napping machine, the combination of a revolving drum, a series of napping rolls carried thereby provided with shafts carrying pulleys, a ring engaging the said pulleys and supported to turn freely under the action thereof, substantially as described.

5. The combination in a napping machine, of a revolving drum, series of napping rolls carried thereby and provided with shafts carrying pulleys, a ring engaging the said pulleys supported to turn freely, and means for varying the speed of the drum, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHARLES WOOD.

Witnesses:

H. B. BARLOW,
S. W. GILLET.