

(No Model.)

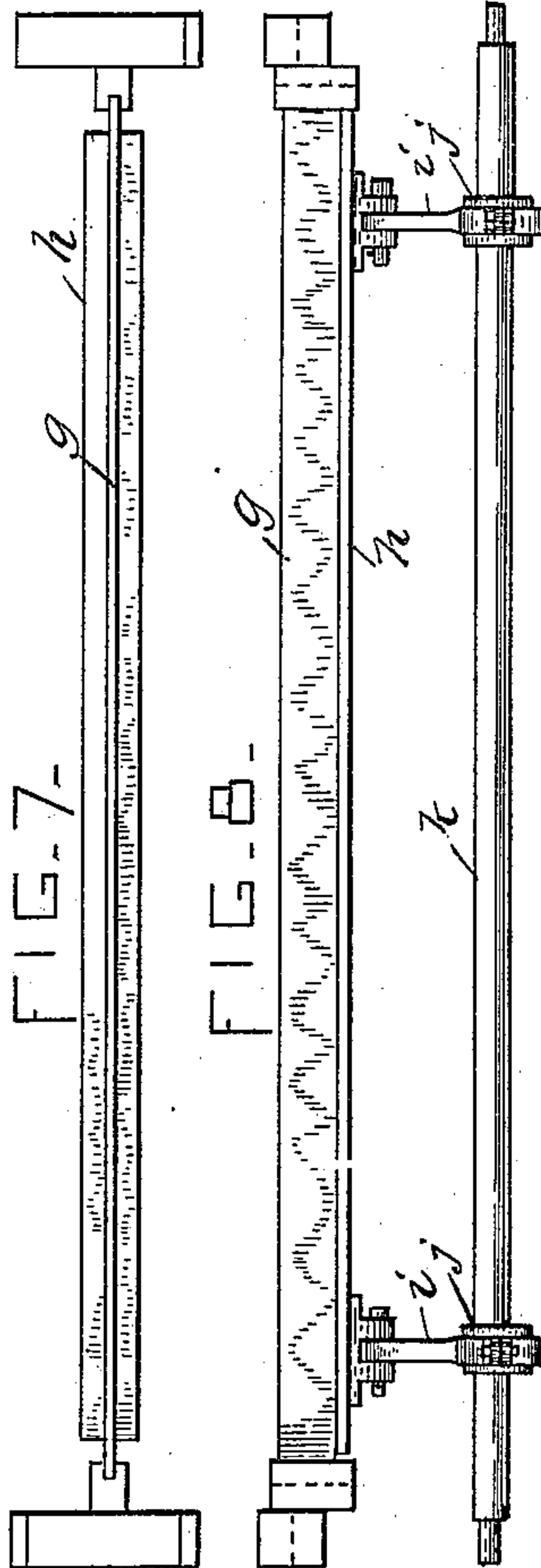
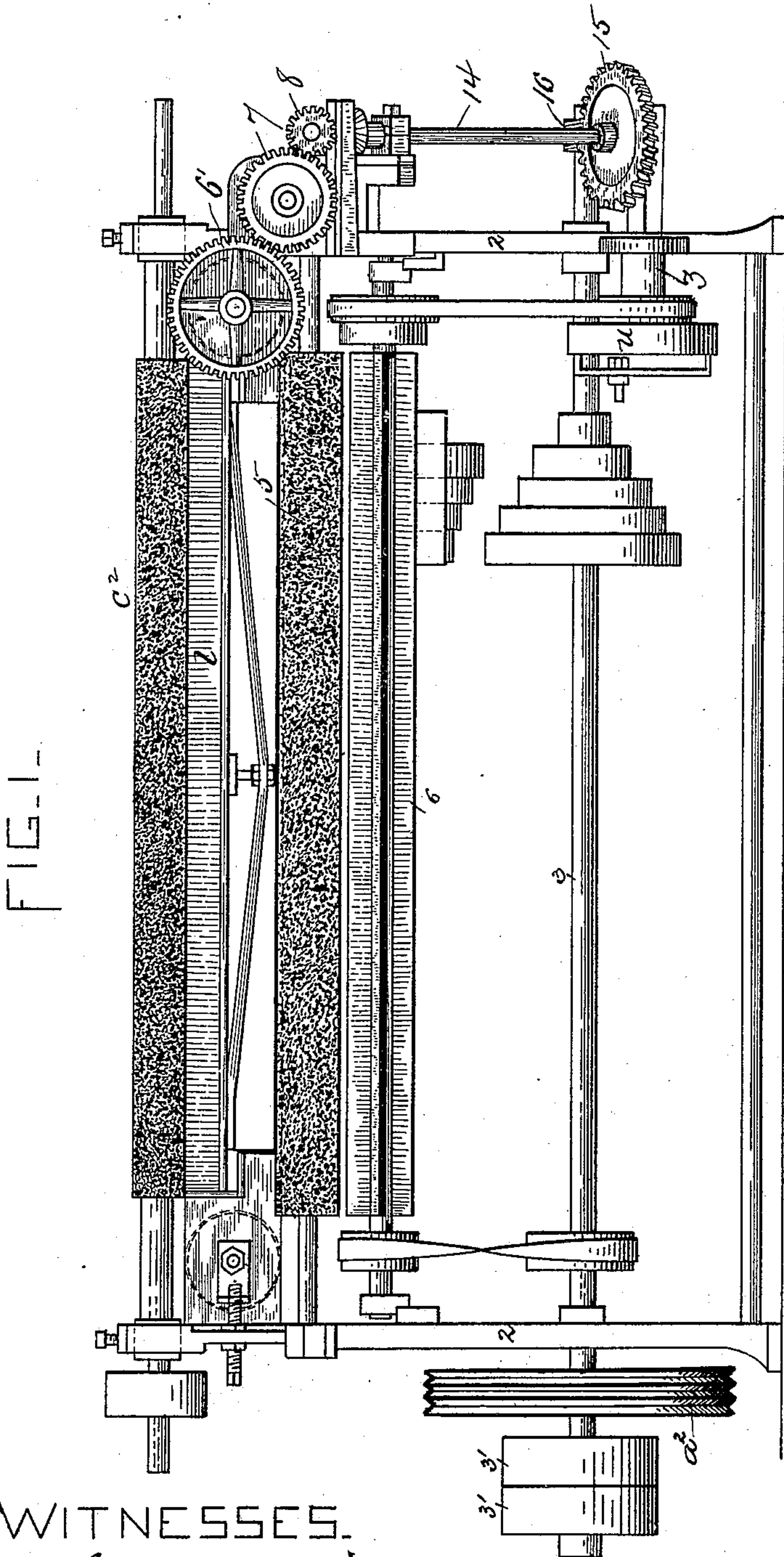
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C. H. BEHNISCH.

APPARATUS FOR BRUSHING UP DESIGNS ON FABRICS.

No. 397,064.

Patented Jan. 29, 1889.



WITNESSES.  
A. D. Harrison.  
W. C. Ramsay.

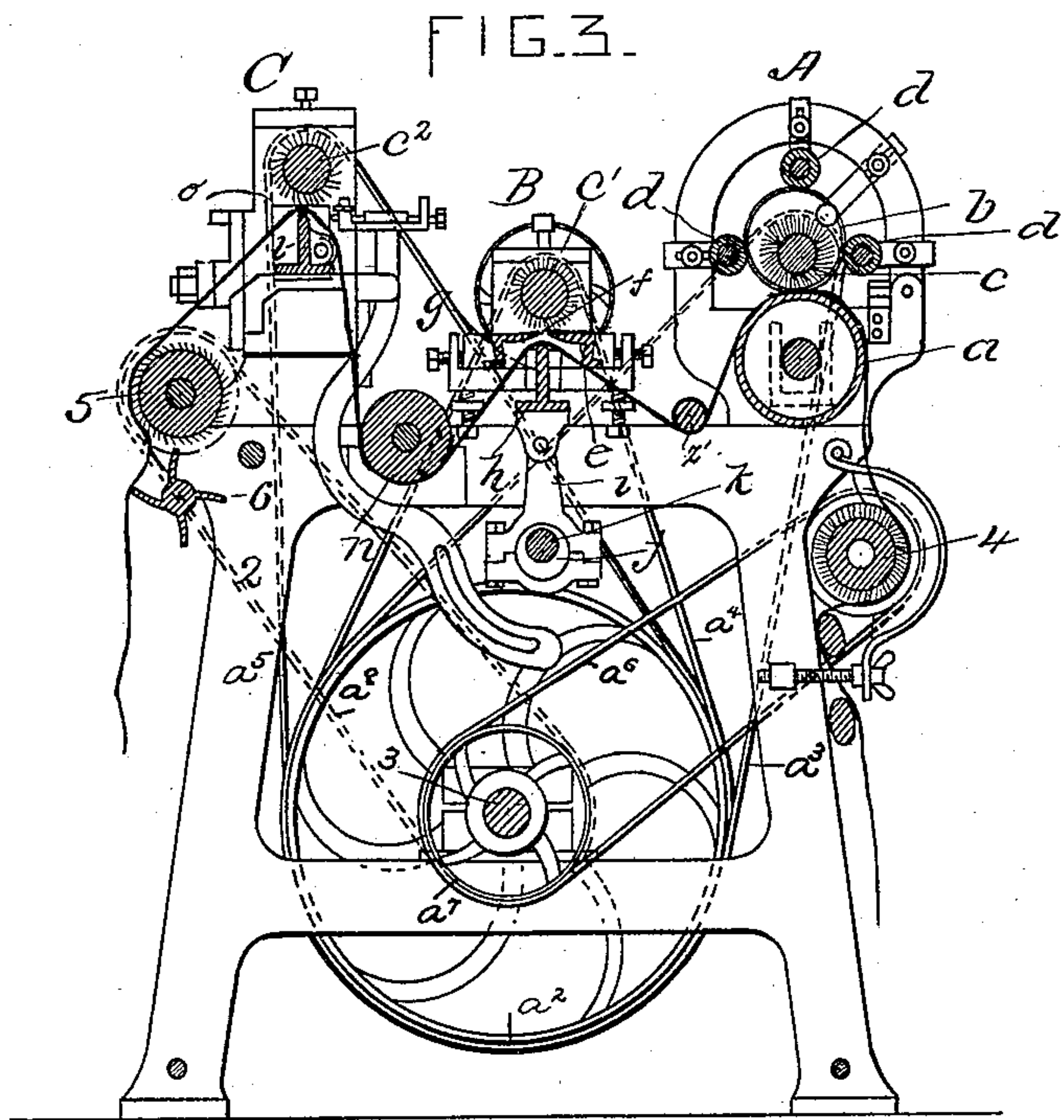
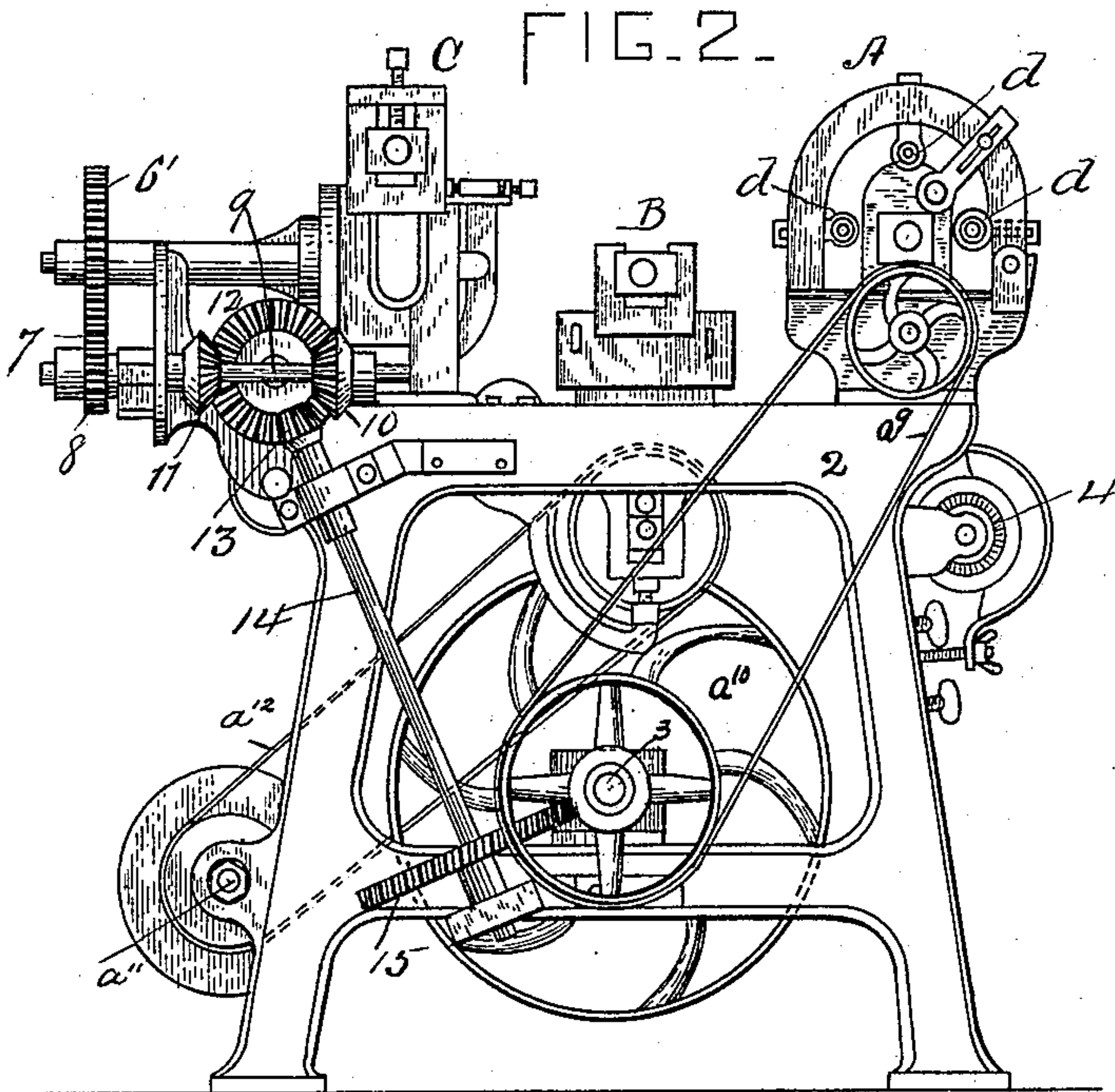
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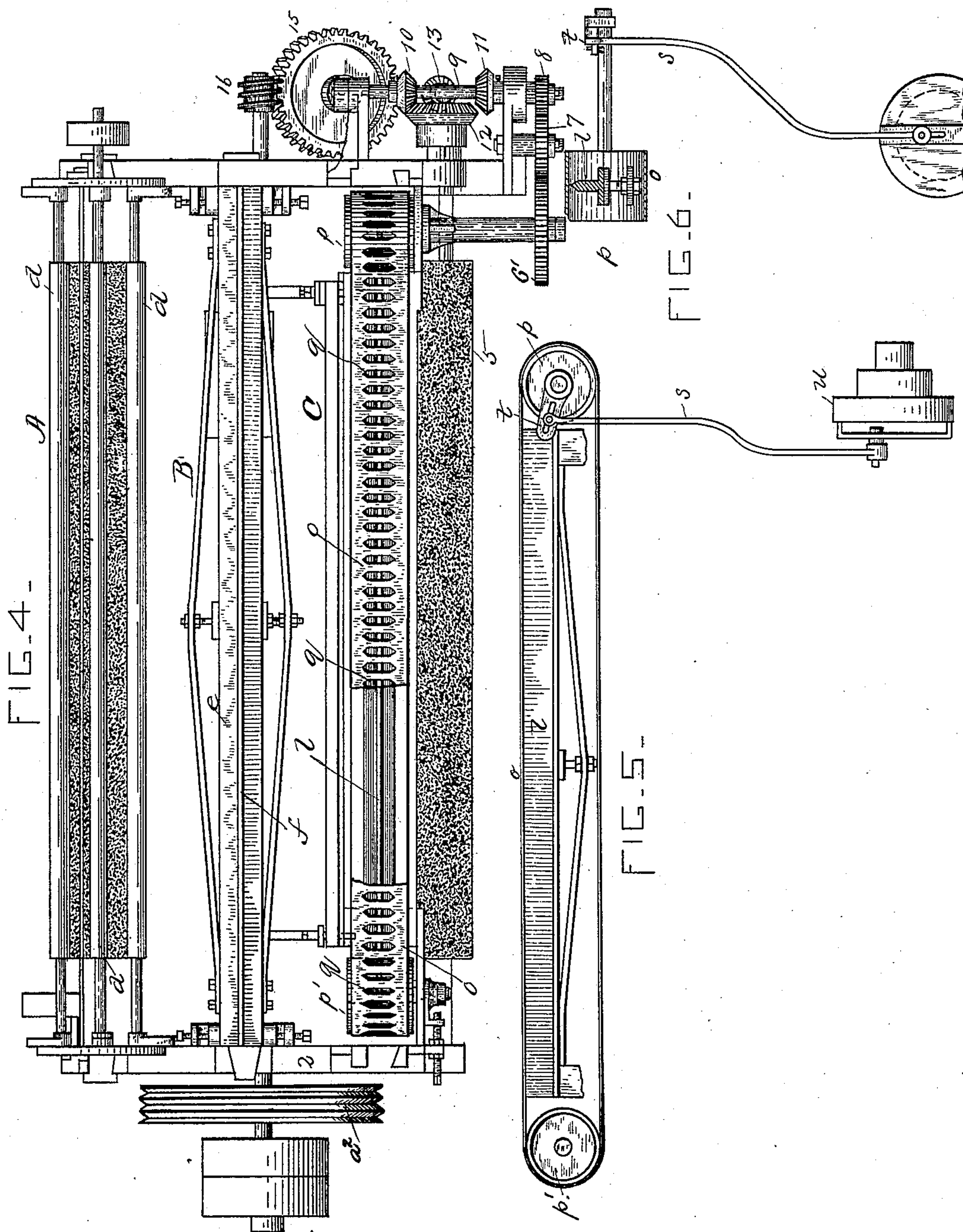
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FIG. 9.

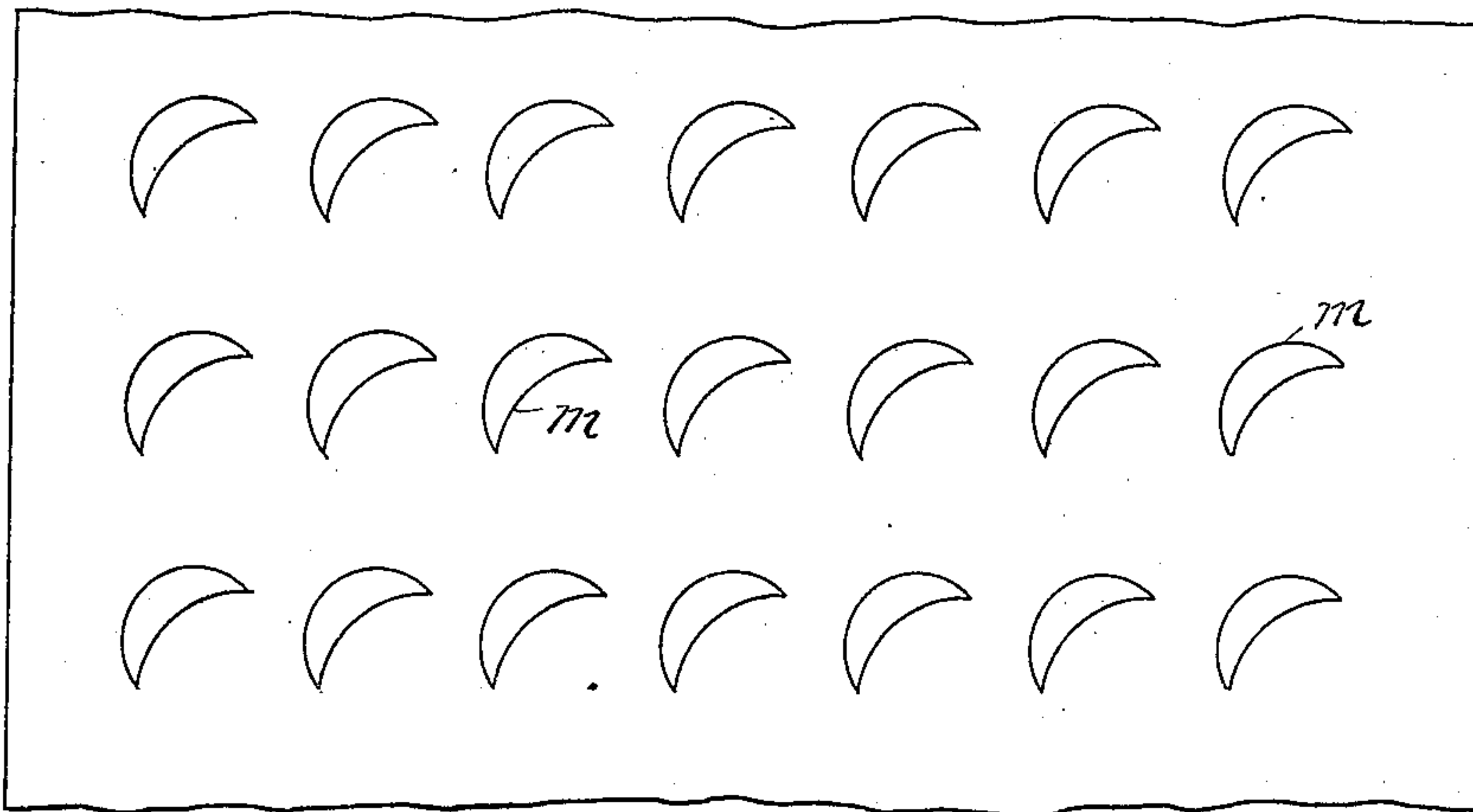


FIG. 10.

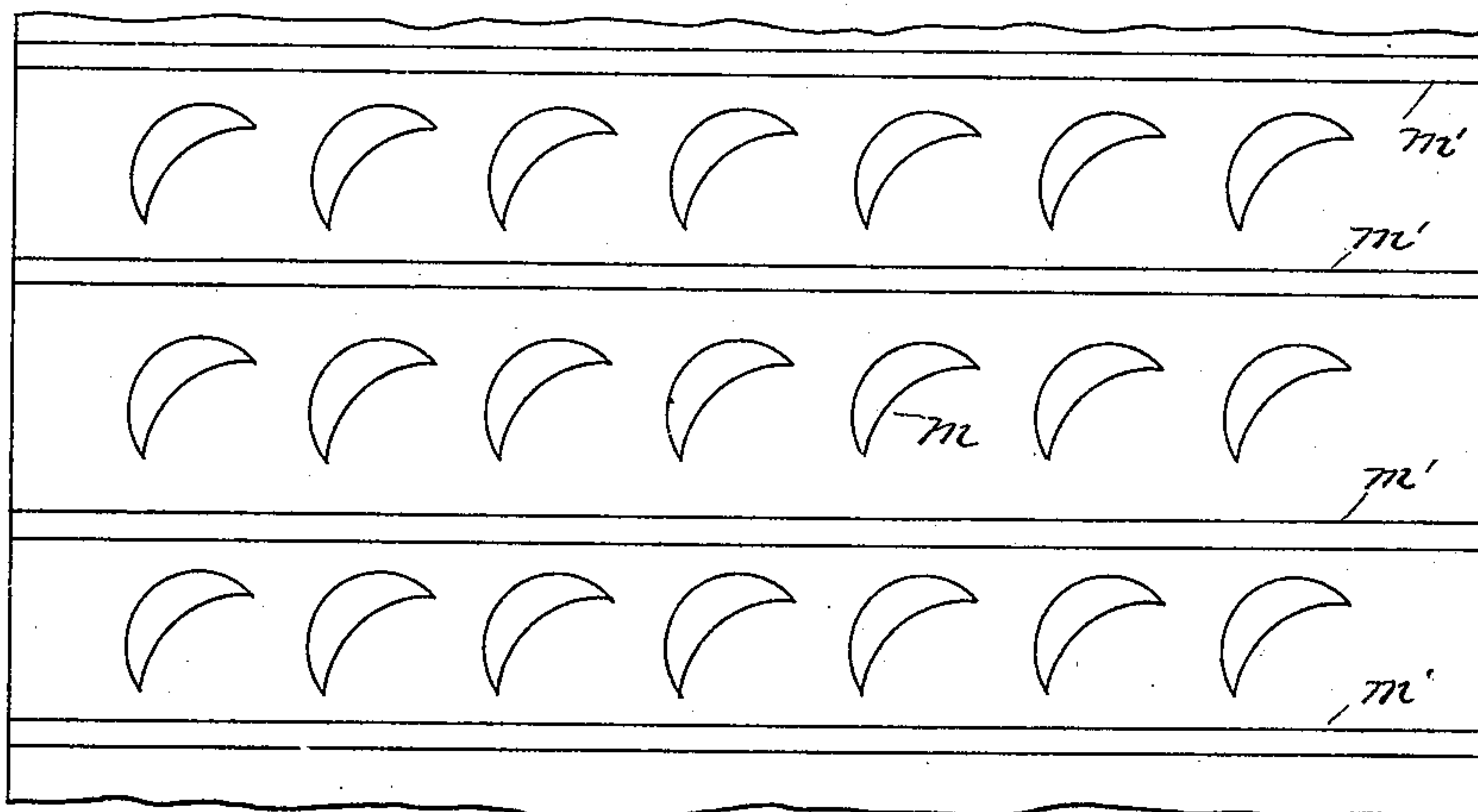
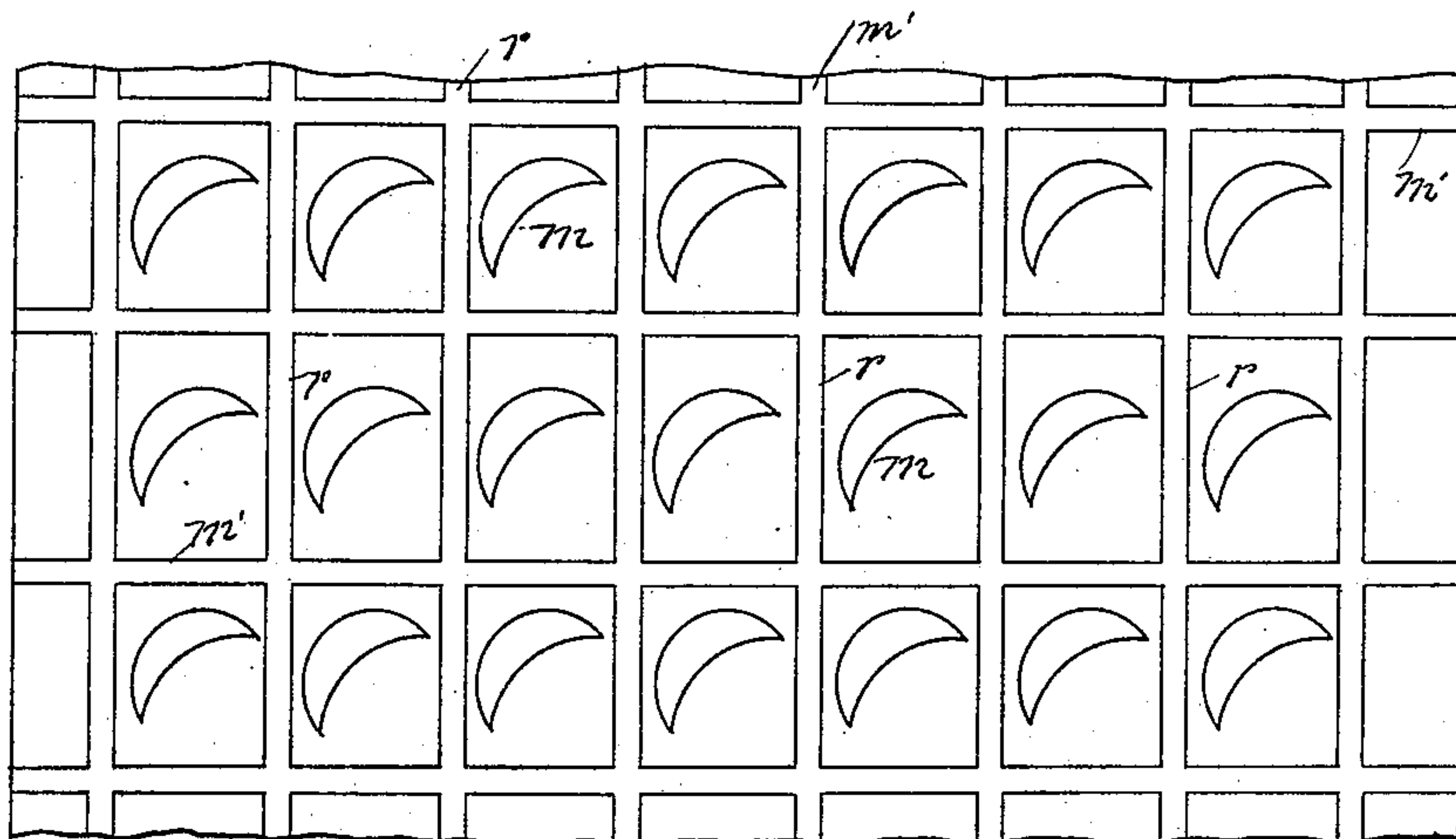


FIG. 11.



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# UNITED STATES PATENT OFFICE.

CARL HERMANN BEHNISCH, OF LUCKENWALDE, PRUSSIA, GERMANY, ASSIGNOR OF ONE-HALF TO CHARLES SCHREBLER, OF METHUEN, MASSACHUSETTS.

## APPARATUS FOR BRUSHING UP DESIGNS ON FABRICS.

SPECIFICATION forming part of Letters Patent No. 397,064, dated January 29, 1889.

Application filed August 30, 1888. Serial No. 284,119. (No model.) Patented in England May 13, 1887, No. 7,024.

*To all whom it may concern:*

Be it known that I, CARL HERMANN BEHNISCH, of Luckenwalde, in the Kingdom of Prussia, Germany, have invented a new and useful Improvement in Apparatus for Brushing up Designs on Fabrics, (which invention has been patented to me in Great Britain by Letters Patent of said country, No. 7,024, dated May 13, 1887,) of which invention the following is a specification.

This invention relates to the art of ornamenting fabrics by shearing figures in the nap on the face of the goods; and it consists in means for teasing or brushing up the filaments forming the nap into the desired pattern or design, so that the goods may be passed through a cloth-shearing machine of common construction and have such brushed or teased portions of the nap cut or sheared off.

It is the object of my invention to produce a machine which shall be capable of producing every variety of pattern or design which it may be desired to form on the goods, and as such invention it embraces three groups of devices which may be employed successively upon the same piece of fabric, or, if desired, each may be employed independently of and without the others.

My invention will first be described in connection with the accompanying drawings, forming a part of this specification, and then pointed out in the claim.

Of the drawings, Figure 1 is a rear elevation of the machine. Fig. 2 is an end elevation. Fig. 3 is a cross-section. Fig. 4 is a plan, omitting the cylinder *b* and brush *c*<sup>2</sup>, but showing the brush *c*. Fig. 5 is a view of a modified form of means for operating the longitudinally-striping pattern, so as to form longitudinal waved or serpentine lines on the goods. Fig. 6 is an end view, partly in section, of the means shown in Fig. 5. Fig. 7 is a plan of part of the cross-striping mechanism. Fig. 8 is a front view of the same. Fig. 9 is a representation of a pattern that may be produced upon the fabric by the first group of devices. Fig. 10 is a representation of the pattern that may be produced on the fabric by passing through the first and second

groups of devices, and Fig. 11 represents a pattern that may be produced on the fabric by passing it successively through the several groups of devices.

The same letters of reference designate the same parts in all of the views.

In the drawings, 2 designates the frame of the machine, which is adapted to support the various parts, and in which is journaled the main driving-shaft 3, provided with fast and loose pulleys 3' 3', receiving motion from any prime motor, and from which, by means of belts or gearing, or both, the various operative parts of the machine are driven. I have shown a band-pulley, *a*<sup>2</sup>, on shaft 3, having three belt-grooves, from which grooves bands *a*<sup>3</sup>, *a*<sup>4</sup>, and *a*<sup>5</sup> extend, respectively, to the pulleys on the shafts of brushes *c*, *c*<sup>1</sup>, and *c*<sup>2</sup>. The roll 4 may be driven by band or belt *a*<sup>6</sup>, extending thence from pulley *a*<sup>1</sup> on the shaft 3, and the draft-roll 5 may also be driven from said pulley *a*<sup>1</sup> by a belt, *a*<sup>8</sup>, (shown in dotted lines.) The roll *a* may be driven by belt *a*<sup>9</sup> from the pulley *a*<sup>10</sup> on shaft 3. A counter-shaft, *a*<sup>11</sup>, may be driven from the main shaft 3 and this counter-shaft be belted (by belt *a*<sup>12</sup>) to the shaft *k*. The rolls *n* and *z*<sup>1</sup> may be driven by friction of the cloth; but other usual forms of motion-transmitting mediums may be employed.

The several groups of devices before mentioned are lettered A, B, and C. The group A is constructed and arranged to produce figures or character-designs upon the goods, the group B for producing cross-stripes, and the group C for producing longitudinal, diagonal, or waved stripes.

The fabric entering the machine passes over a roll, 4, and is drawn through by a draft-roll, 5, at the other end of the machine, over which the goods under treatment also pass, the armed roll 6 being a beater-roll to beat the fabric out of the teeth of the draft-roll. From roll 4 the fabric first passes through the group of devices A, entering over a felt-covered roll, *a*, upon which roll rests a slowly-revolving sheet-metal cylinder, *b*, having patterns or figures cut out therefrom—for example, as indicated in Fig. 9. This cylinder *b* may be re-



volved by frictional contact with the cloth. Within the cylinder *b*, and of smaller diameter than the latter, is a rapidly-rotating brush or carding cylinder, *c*, operating on the cylinder *b* at the point where the fabric passes between it and roll *a*, and operating to raise or brush the nap of the fabric in a direction opposite to that of its grain through openings or figures corresponding to *m* in Fig. 9, cut in the cylinder *b*, producing a brushed or teaseled pattern in the nap of the goods corresponding to the pattern formed in said last-mentioned cylinder. *d d d* are three slender rollers journaled in suitable bearings and operating on the surface of cylinder *b* to guide the same and hold it down upon the cloth. From the group of devices A the fabric may be led around the guide-roll *z'* to the group B, consisting of a bed, *e*, provided with a narrow slot, *f*, over which rotates a brush or card cylinder, *c'*, similar to brush or cylinder *c*, and under which is a vertically-reciprocating blade, *g*, operating through slot *f* and against cylinder *c'*. Blade *g* is supported on a base or bar, *h*, pivoted to the upper end of straps *i*, the lower ends of which surround and are actuated by eccentrics *j* on a rotary shaft, *k*. The fabric in its treatment by the group of mechanism D passes over the blade *g*, by which it is intermittently raised into contact with brush or roller *c'*, operating through slot *f* of bed *e*, and so having the nap raised in transverse stripes thereacross, as designated by *m'* in Fig. 10. From the group of mechanism B the fabric may pass under the roll *n*, up over a stationary blade, *l*, of group C, and thence down over draft-roll 5. *o*, Fig. 4, designates a sheet-metal band passing over pulleys *p p'*, arranged at the ends of blade *l*, and so that the band may extend around, above, and below said blade. *q* designates slots formed in band *o* and extending transversely thereof, though longitudinally with relation to the fabric passing over blade *l*. *c<sup>2</sup>* designates a brush rotating above band *o*, and serving to brush the nap of the fabric through the slots *q* of band *o*, and so to form longitudinal stripes *r* in the nap, as shown in Fig. 11.

As has been stated hereinbefore, any one of the group of devices may be used independently of the others, or any two may be used without the other.

In case it is desired to form diagonal stripes on the goods the fabric will be passed through group C alone, and in this case the band *o* will be slowly carried around pulleys *p p'*, so as to change the position of the slots in said band with respect to the edges of the fabric. Pulley *p* is driven through the medium of a gear, 6', on its shaft engaging an idler, 7, which meshes with a gear, 8, on horizontal shaft 9, on which are splined two bevel-gears, 10 11, one on each side of a bevel-gear, 12, arranged to turn on a stud on the frame 2, which gear 12 is operated by a bevel-pinion, 13, on the upper end of shaft 14, the lower end of which is provided with a worm-gear, 15, engaging a

worm, 16, on main shaft 3. If now bevel-gear 10 should be brought into engagement with gear 12, the band *o* on pulleys *p p'* will be carried around in one direction; but if said gear 10 be thrown out of engagement with gear 12, and gear 11 be brought to mesh therewith, the band will be moved in the opposite direction, forming the diagonal stripes across the goods in the opposite direction, and if both gears 10 11 be thrown or moved out of engagement with gear 12 the band *o* will stand still, and, as stated, longitudinal stripes will be formed in the nap of the goods.

In case it is desired to form serpentine lines in the nap of the goods both wheels 10 11 will be disengaged from gear 12, and a pitman, *s*, will be connected at its upper end with a crank-arm, *t*, on the shaft of pulley *p*, or, it may be, with a wrist-pin on the face of gear 6', and at its lower end with a wrist-pin on a rotary disk, *u*, so that pulley *p* will be rotated first in one direction and then the other, moving pattern-band *o* correspondingly, and effecting through the medium of brush or cylinder *c<sup>2</sup>* the raising of the nap in serpentine or zig-zag lines on the face of the goods, as will be readily understood without further description.

When the nap of the fabric which is raised by my invention, as hereinbefore set forth, is cut off by means of a shearing-machine, the cloth may then be finished, and the designs will appear on the face of the goods as bare stripes or figures indented into the material.

Having thus described my invention, what I claim is—

A machine for teasing or brushing up designs or figures in the nap on the face of fabrics, consisting of the combination of a frame, drawing and guide rolls mounted therein, a roll, *a*, over which the fabric is passed, a sheet-metal pattern-cylinder arranged above said roll, and a brush or card cylinder arranged within the pattern-cylinder to make one part of a given design—for example, figures—a slotted bed, a brush or card cylinder arranged above said bed, and a blade arranged beneath the bed, and over which blade the cloth is passed, and means to reciprocate said blade vertically to form another part of the design—say stripes—and a pattern-band and means to move it, a brush or card cylinder arranged above said band, and a stationary blade below said band, and over which the fabric is passed to complete the design—say by the addition of stripes running in a different direction from those first named—and suitable means to rotate the brush or card cylinders and rolls, substantially as set forth.

This specification signed by me this 5th day of April, 1888.

CARL HERMANN BEHNISCH.

Witnesses:

CARL T. BURRHARDT,  
CHARLES SCHREBLER.