No. 687,653. Patented Nov. 26, 1901.

M. RIVOLLIER.

MACHINE FOR CUTTING DESIGNS ON FABRICS.

(Application filed Aug. 9, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

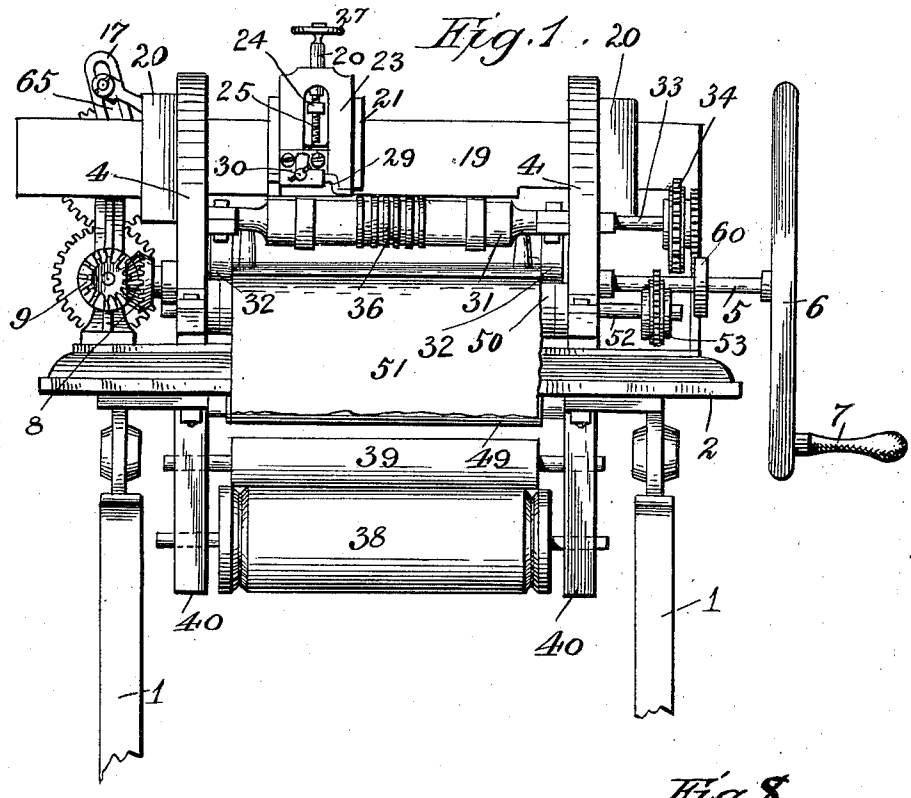


Fig. 8.

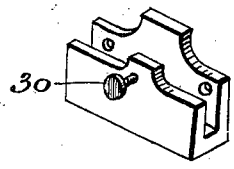


Fig. 6.

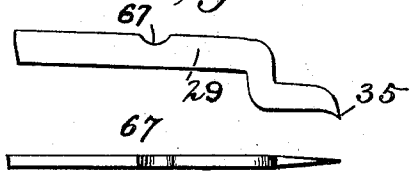


Fig. 7.

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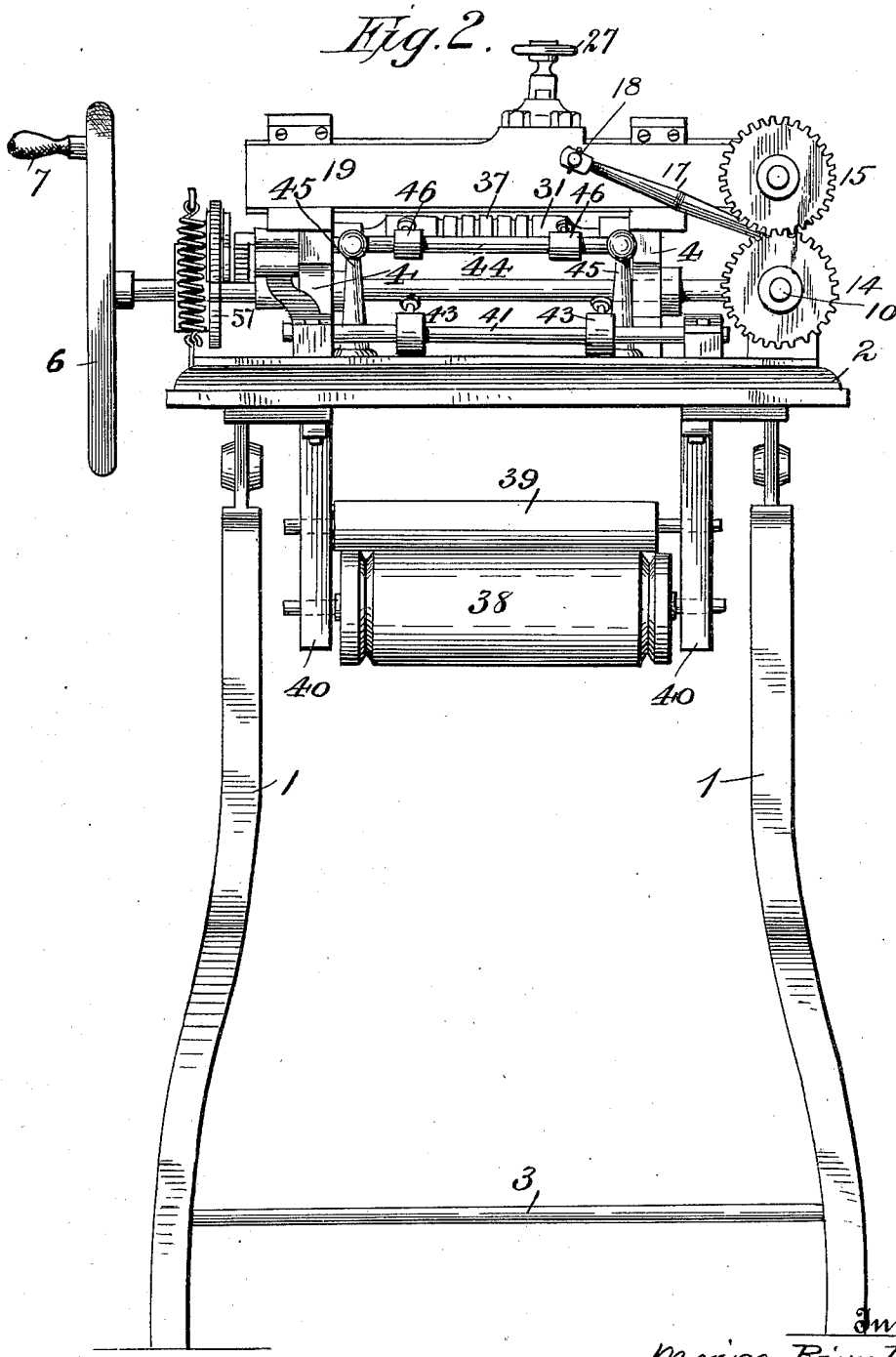
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Fig. 2.



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Fig. 3.

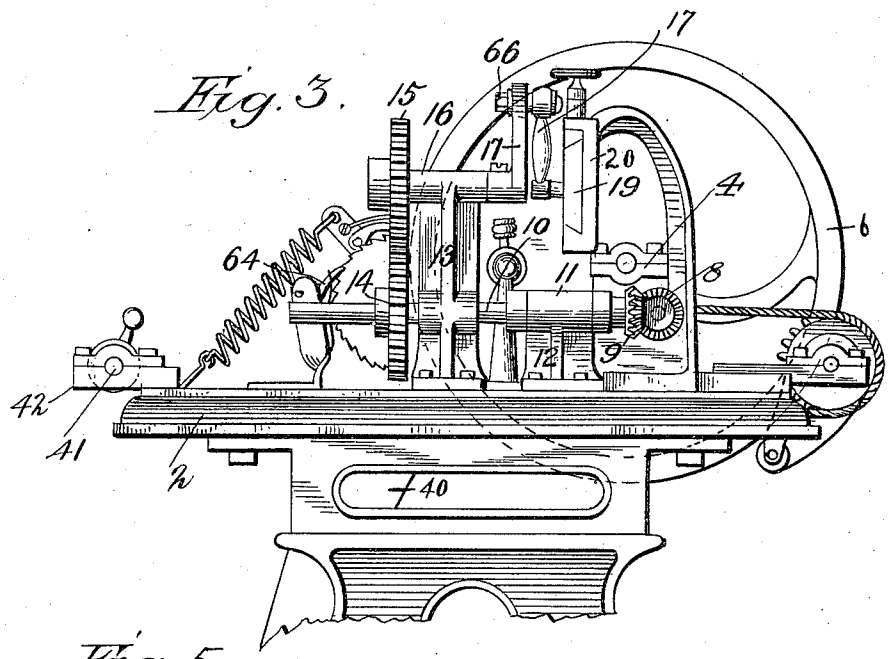
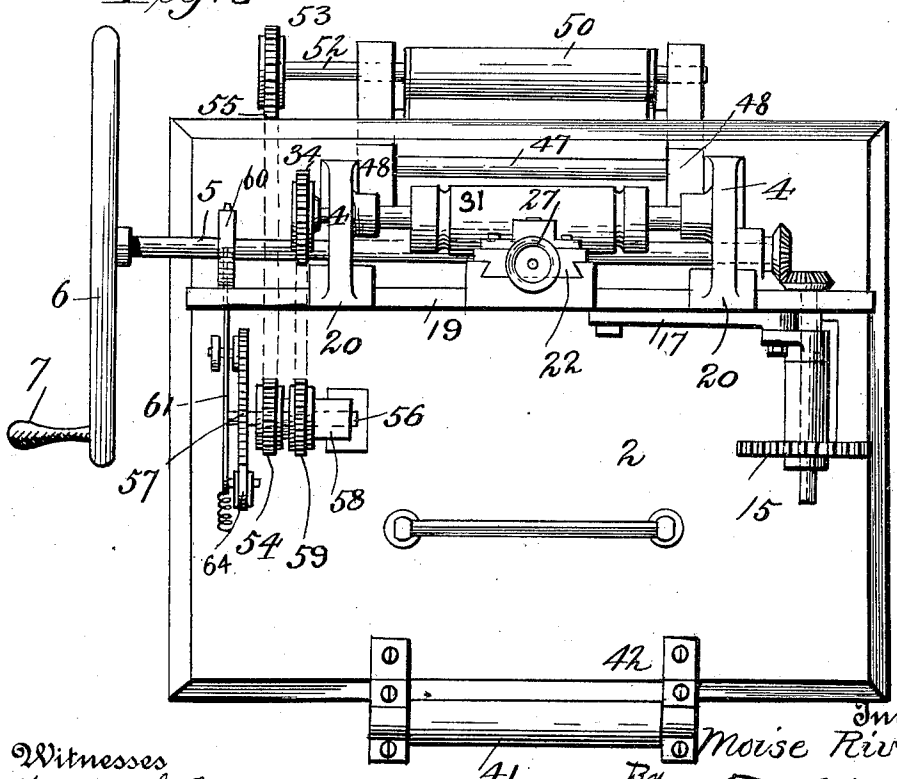


Fig. 5



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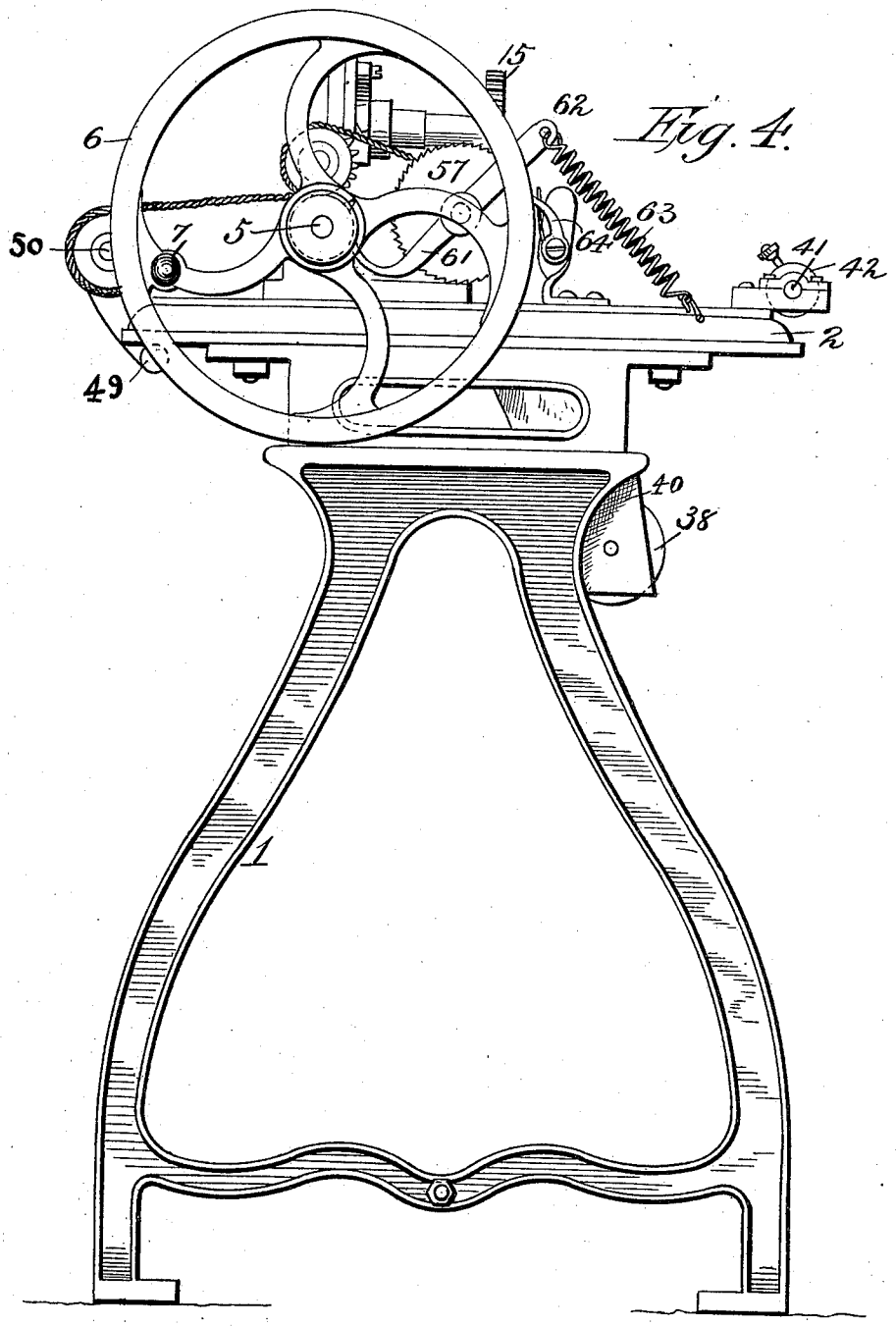
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(No Model.) 4 Sheets—Sheet 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

MOÏSE RIVOLLIER, OF EASTON, PENNSYLVANIA.

MACHINE FOR CUTTING DESIGNS ON FABRICS.

SPECIFICATION forming part of Letters Patent No. 687,653, dated November 26, 1901.

Application filed August 9, 1900. Serial No. 26,369. (No model.)

To all whom it may concern:

Be it known that I, MOÏSE RIVOLLIER, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Design-Cutting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to cloth-finishing machines, and more particularly to that variety designed to so finish the surface of certain varieties of fabric that such surface will show any desired kind of configuration or design.

The object of my invention is to so treat the finished surface of certain varieties of fabric that the surface thereof will be cut in a manner which will leave the cut portion of the fabric in such position that the parts severed will rise above the uncut surface, and thereby locate and dispose the cut portion so that pleasing effects or designs will result, it being understood that any desired variety of design may be produced by simple adaptation of certain parts of the mechanism, as will be hereinafter set forth.

In the accompanying drawings, Figure 1 is a front elevation of my improved machine complete. Fig. 2 is a rear elevation thereof. Fig. 3 is a view taken from the left side of Fig. 1. Fig. 4 is a view of Fig. 1, taken from the right side thereof. Fig. 5 is a top plan view of the machine complete, showing a different design upon the design-roller from that presented in the other views. Fig. 6 is a detail side view of my improved cutting-knife. Fig. 7 is a top edge view thereof. Fig. 8 is a perspective view of the knife-socket.

For convenience in referring to the several details of my invention and their coöperating accessories numerals will be employed, the same numeral referring to corresponding parts throughout the several views.

My improved finishing-machine may be readily adapted for use in connection with fabric of any desired width, as upon ribbons of varying widths and also upon dress goods, &c., it being only necessary to properly adjust certain parts and form the same of sufficient size, it being obvious that in order to treat dress goods or fabric of similar widths it will be only necessary to make the design-roller and similar coöperating parts of greater length than would be required for treating ribbons and properly regulate the stroke of the knife. It will be further obvious that while I shall describe the construction of certain details which I deem necessary to exemplify or illustrate how my idea of treating the surface of ribbons and dress goods may be put into operation I desire to comprehend all substantial equivalents and substitutes as may be considered to fall fairly within the scope of my invention, inasmuch as the same result may be accomplished in a variety of ways, the means herein illustrated being but one of many ways whereby the surface of the fabric may be cut sufficiently to release a portion of the pile and permit the pile to stand outward at right angles to the body portion of the fabric, thereby producing a velvet effect or finish.

It is well known in the art that in certain varieties of woven fabric the surface may be so cut or scarified that a portion of the threads forming the fabric will be released and permitted to stand outward, and since I have provided means for cutting the surface at regular intervals I am enabled to produce upon the surface of the fabric any desired configuration or design, the character of the design being determined by certain parts of the mechanism coöperating with the knife, as will be hereinafter clearly set forth.

Referring to the drawings, 1 1 indicate standards or supporting-legs properly secured to the base-section or table 2, said legs being braced or reinforced in any preferred way, as by the rod 3. Upon the base or table portion 2 I erect the main standards 4, designed to form bearings for certain parts hereinafter specifically referred to. The main or driving shaft 5 is mounted in suitable bearings in the standard 4 and extends outward around the base 2 sufficiently to connect with the driving or governor wheel 6, provided with an operating-handle 7, as it is by means of said wheel that power is applied to the machine, it being understood that the machine may be properly connected with a suitable motor or operated manually, as preferred. The opposite end of the shaft 5 has fixedly secured thereto the transmitting-gear 8, designed to mesh with

the gear 9, secured to the shaft 10, mounted in suitable bearings 11, provided in the standard 12. The shaft 10 also extends through bearings provided in the standard 13 and has secured to its outer end the gear 14, designed to mesh with the gear 15, which latter is secured to the outer end of a shaft having bearings 16 in the upper end of the standard 13, while the inner end of said shaft is provided with the crank 17, pivotally connected to the piston or link 17.

The inner end of the piston 17 is pivotally connected to the lug or wrist-pin 18, attached to or forming an integral part of the reciprocating member or batten 19, which latter is supported in suitable bearings 20, provided in the upper end of a portion of the standards 4, said bearings being so constructed that said batten will freely reciprocate therein.

Properly secured to the reciprocating member 19 is the bracket 21, having a dovetail vertically-disposed slot or guideway designed to receive the dovetail portion 22 of the knife-carrying member 23, a suitable stud 24 being secured to the bracket 21, designed to receive the threaded stem 25 of the knife-adjusting shaft 26, said shaft being operated by a suitable hand-wheel 27. A suitable extension or seat 28 is carried by the adjustable member 23, to which the knife 29 is removably secured by a suitable set-screw 30, as clearly shown.

Since the character of the configurations or design to be placed upon the fabric will be determined by the formation of the surface of the roller or base member over which the fabric is drawn, it becomes necessary to provide convenient means for moving the base member or roller in sympathy with the movement of the fabric as the latter is cut by the reciprocating knife 29, and with this end in view I mount immediately below the member 19 the roller 31, secured in suitable bearings in the standards or supports 32, one end of the shaft being reduced to constitute the shaft 33, which latter is provided with a suitable pulley or sprocket wheel 34, designed to be operatively connected to the source of power, as will be hereinafter set forth.

The peripheral face of the roller 31 is properly cut, molded, or otherwise shaped to provide any desired character of design which it may be desirable to show upon the surface of the fabric, and it is obvious that a series of circumferential and longitudinally-disposed grooves or ribs may be formed upon said surface or said surface may be so fashioned that pleasing designs in flowers, &c., may be shown thereon, and since the ribbon or other fabric to be treated is stretched tightly over said roller it is obvious that certain parts thereof will be held boldly exposed to view, while parts of the fabric extending over said grooves or the depressions in the roller will be drawn downward, and thus leave only the elevated portions of the fabric in position to be contacted by the cutting end 35 of the knife.

The cylinder or roller 31 will doubtless be found to be the preferable means for carrying the design, though it will be understood that the design to be imparted to the fabric may be formed upon a flat or preferably slightly-convex surface, (not shown,) it being understood that in the use of either the roller or the member having a flat or convex surface suitable devices may be employed to move said parts in sympathy with the travel of the fabric as the latter passes under the knife. I will therefore for convenience designate the roller or the member having a flat convex surface as a "base" member, which devices are equally useful in carrying a selected design, and thereby holding only certain portions of the fabric stretched across the same in an elevated condition ready for the knife to engage such elevated portions only.

In Fig. 1 I have shown certain circumferential ribs 36, while in Fig. 2 circumferential grooves 37 are provided, and it is obvious that any preferred character of ornamentation may be placed on the roller, the object being to hold the surface of the fabric designed to be operated upon by the knife slightly above the surface of the body of the roller proper, and it therefore follows in practice that only such elevated part of the fabric will be touched by the knife, the remaining portion being left in its original state.

In order to insure that the fabric, either in the form of ribbon or dress goods, will be properly drawn through the machine or so fed under the action of the knife that the knife will touch the elevated portions thereof in uniform parallel lines, I provide suitable feeding mechanism of any preferred character.

The dress goods or ribbon to be operated upon may be placed in a suitable receptacle, preferably located at the back part of the machine, when the end of the fabric is carried between the rollers 38 and 39, mounted in suitable brackets 40, depending from the under side of the base-section 2, and thence extended over the stationary shaft or guide 41, mounted in suitable brackets 42, secured to the contiguous edge of the base. Adjustable guides 43 are secured to the guiding-shaft 41 in order to properly direct the fabric through the machine. From the shaft 41 the fabric is extended under the shaft 44, which latter is also secured in position by standards 45, secured at a convenient point, suitable adjustable guides 46 being also provided and designed to serve a similar purpose subserved by the guides 43. The ribbon or other fabric is then extended over the roller 31, the peripheral face of which, as previously set forth, is provided with any suitable design which it is desirable to impart to the surface of the ribbon or fabric treated. From the design-roller 31 the fabric is extended under the guide 47, which latter is sustained in a horizontal plane by suitable standards 48, attached to the base 2. To insure that the rib-

bon or other fabric will be drawn tightly in contact with the design-roller 31, it becomes necessary to securely engage the end of the roller as it leaves the machine or cutting members proper, and with this end in view I provide the rollers 49 and 50, the latter having its peripheral face covered with fine needle-points designed to engage the endless belting 51, formed of cloth. The roller 50 has one end 52 of its shaft extended, and mounted on said extended end is the sprocket 53, which is placed in coöperation with the sprocket 54 by a suitable sprocket-chain 55. The sprocket-wheel 54 is mounted upon the shaft 56, the outer end of which is provided with the ratchet-wheel 57, rigidly keyed thereto.

The shaft 56 is mounted in a suitable standard 58 and also carries the sprocket-wheel 59, which is placed in coöperation with the sprocket-wheel 34 by means of a suitable rope or chain extending into engagement therewith. It becomes desirable to move the ribbon in sympathy with the movement of the knife carried by the reciprocating member 19, and with this end in view the sprocket-wheels 33, 53, 54, and 59 are provided.

The driving-sprockets 54 and 59 are actuated by means of the ratchet-wheel 57, placed in coöperation with the driving-shaft 5 by means of the mutilated gear 60, keyed to said shaft and provided with a single tooth designed to contact with the actuating-lever 61, it being understood that said lever is movably secured in position upon the shaft 56 adjacent to the ratchet-wheel 57, as indicated in Fig. 4.

The lower end of the lever 61 is designed to be contacted by the single tooth upon the mutilated gear 60 at each revolution of the shaft 5, while the upper end 62 of said lever is connected with the spring 63, designed to hold the lower end of the lever normally in contact with said gear 60.

A suitable detent 64 is carried by the upper end of the lever 61, said detent being designed to successively engage all the teeth upon the ratchet-wheel 57, and it is therefore obvious that upon each revolution of the shaft 5 the upper end of the lever will be moved so as to cause the detent carried thereby to impart a slight movement to the ratchet-wheel 57 and incidentally move the sprockets 54 and 59, and thus drive the shafts in coöperation therewith, so as to slightly move the ribbon or other fabric at each reciprocation of the knife and placing a new or uncut portion thereof in position to be acted upon by the knife upon the next stroke thereof.

By the arrangement I have described it will be clear that the fabric acted upon by the knife is caused to travel through the machine in such a manner as to insure that the knife will make parallel cuts in the exposed surface thereof, each stroke of the knife being uniformly distant from the previous stroke, thus releasing a portion of the threads of the fabric and producing a pile of uniform length and of such configuration or shape as may be determined by the character of the design upon the roller 31.

By reference to Fig. 2 it will be observed that the reciprocating member 19 may be very cheaply adapted for its purpose by beveling the edges thereof and providing corresponding seats 20 for its reception. The crank 17 may, if preferred, be provided with a slot 65, adapted to receive the adjustable wrist-pin 66, whereby the stroke or movement of the member 19 may be easily regulated, thereby making it possible to limit the movement of the knife so that its travel will not extend throughout the entire length of the design-roller 31, as would be desirable where a narrow ribbon was operated upon.

I desire to employ any suitable means for holding the knife 29 in position, inasmuch as said knife may be held in its operative position in various ways.

In Fig. 6 I have shown the upper edge of the knife as being provided with a notch or recess 67, though a number of said notches may be provided if it should be desirable to adjust the knife longitudinally. The extreme point 35 of the knife is preferably curved downward, as shown in Fig. 6, thus presenting a keen razor-like edge to the exposed or elevated surface of the fabric.

Since the uncut portion of the fabric will remain in its original condition while that portion which is acted upon by the knife will rise upward, so as to produce a pile of velvet-like effect, a design of permanent character is produced.

My improved design-cutting mechanism is of such simple though reliable character that large quantities of ribbon or other fabric may be readily treated, thereby limiting the cost of the finished article to a minimum point.

It is thought from the foregoing description, considered in connection with the accompanying drawings, that the construction and operation of my improved design-cutting machine for fabrics of various kinds will be fully understood, and further reference to the parts is therefore deemed unnecessary.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for forming a design upon the surface of a fabric, the combination of a suitable frame; a roller mounted in said frame and provided with a design upon its peripheral face; means to tightly draw the fabric to be acted upon into engagement with the roller and additional means to simultaneously move the cloth and roller, and a reciprocating cutting blade or blades adapted to engage only the portions of the fabric elevated by said design leaving the other portions untouched whereby a configuration will be cut in the cloth corresponding to the design upon said roller, all substantially as specified and for the purpose set forth.

2. In a machine of the character specified, a base member or support provided with raised and depressed portions; means to stretch the fabric to be acted upon tightly across said base member whereby the design on the member will cause the contacted portions of the fabric to be elevated leaving the other portions depressed; a cutting device and means to reciprocate the same across the fabric and in engagement only with the raised portions thereof and additional means to simultaneously move the cloth and base member, all substantially as specified and for the purpose set forth.

3. In a machine of the character specified, a suitable frame; a base member having a design upon its surface; means to tightly stretch the fabric and hold the same in contact with the design whereby the design on the base member will contact and elevate portions thereof directly in contact with the design; a cutting device reciprocatingly mounted in said frame and means to so direct the same that its line of travel will extend over the fabric and contact with and cut only the portions of the cloth elevated by the design, all substantially as specified and for the purpose set forth.

4. In a machine of the character specified, a base member provided with raised and depressed portions; means adapted to move the fabric and hold it tightly in engagement with the base member; a cutting blade or blades; means to adjust the same, and additional means to reciprocate the blades whereby the same will contact in parallel lines with the raised portions of the fabric and produce a design on its surface corresponding to the design on the base member, all substantially as specified and for the purpose set forth.

5. A design-cutting machine for fabrics comprising a roller provided with raised and depressed portions; means to hold the fabric tightly in engagement with the roller and additional means to feed the fabric through the machine, in combination with a knife adjustably secured in position with respect to the design on the roller and an actuating-arm connected with the knife and coöperating with the feeding mechanism whereby only the elevated portions of the fabric will be cut as it travels under the knife, thereby producing a design on the fabric corresponding to the design on said roller, all substantially as specified and for the purpose set forth.

6. In a machine of the character specified, a base member having a design raised upon its surface; a supporting-frame for said member and suitable coöperating mechanism adapted to stretch a fabric tightly across said base member and simultaneously move the fabric and member; a suitable reciprocating cutting device and means to move the same into engagement with only the parts of the fabric elevated by the design on the base member whereby a design will be cut on the surface of the cloth corresponding to the design on the base, all substantially as specified and for the purpose set forth.

7. The herein-described design-cutting machine for fabrics comprising a suitable frame; a roller having a peripheral design mounted on said frame; suitable fabric-feeding mechanism adapted to hold the fabric tightly in engagement with the design-roller, in combination with a reciprocating member operatively connected with said feeding mechanism and a knife adjustably secured to said reciprocating member, all substantially as specified and for the purpose set forth.

8. In a machine adapted to cut a design upon the surface of woven fabric, a suitable frame; a movable base member having a design upon its surface; feeding mechanism for the fabric adapted to stretch it tightly over the base member whereby only the elevated portions of the design will elevate contiguous portions of the fabric; a suitable cutting device and means to adjust and reciprocate the same whereby the knife will cut only those portions of the cloth elevated by the design on the base member and produce a design upon the surface of the cloth corresponding to the design on the base member all substantially as specified and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MOÏSE RIVOLLIER.

Witnesses:

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THEOPHILE VILLARD.