(Model.) 4 Sheets—Sheet 1.

G. A. OLSON.

TUFTING ATTACHMENT FOR KNITTING MACHINES.

No. 342,126. Patented May 18, 1886.

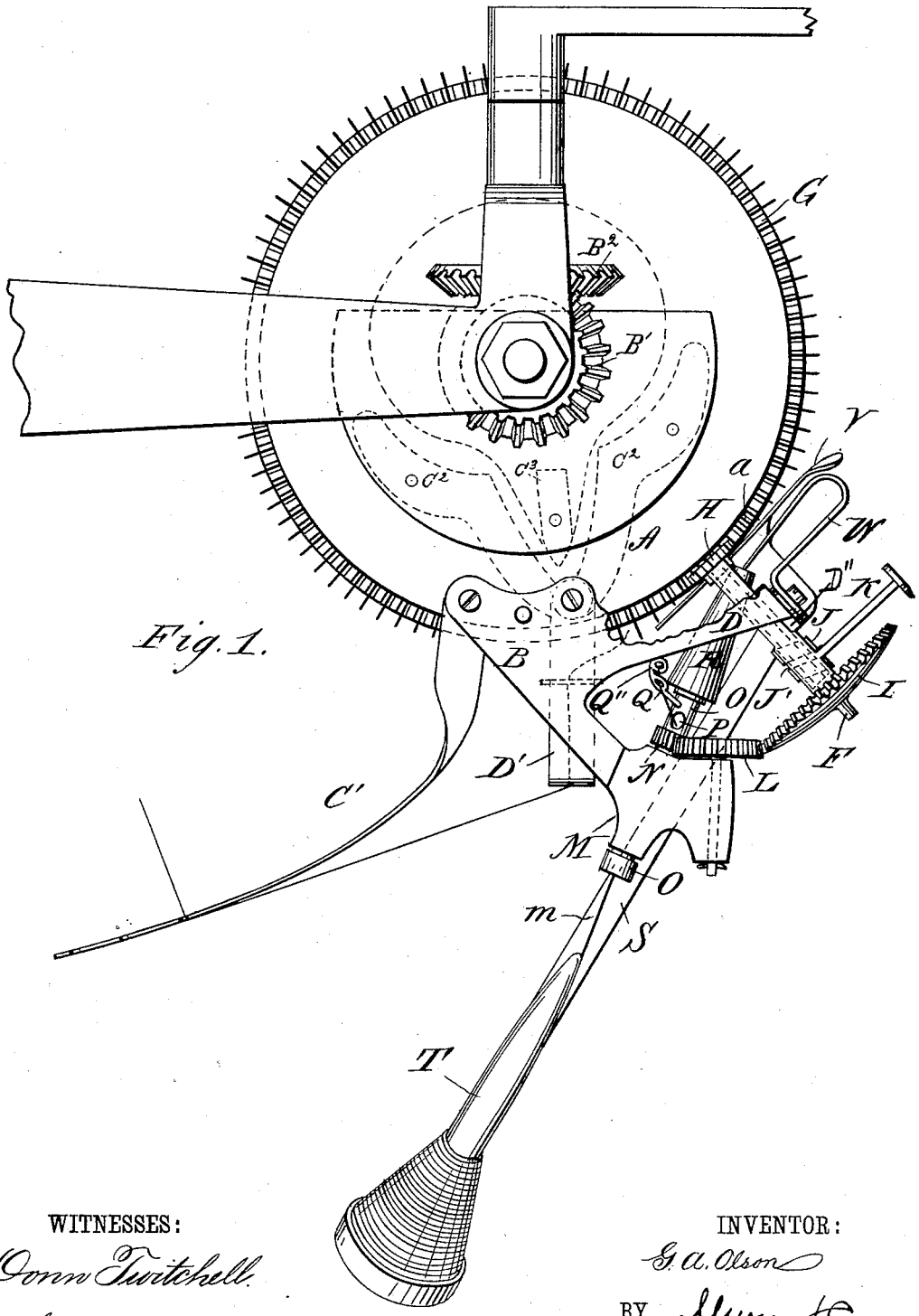

Fig. 1.

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(Model.) 4 Sheets—Sheet 2.

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Fig. 2.

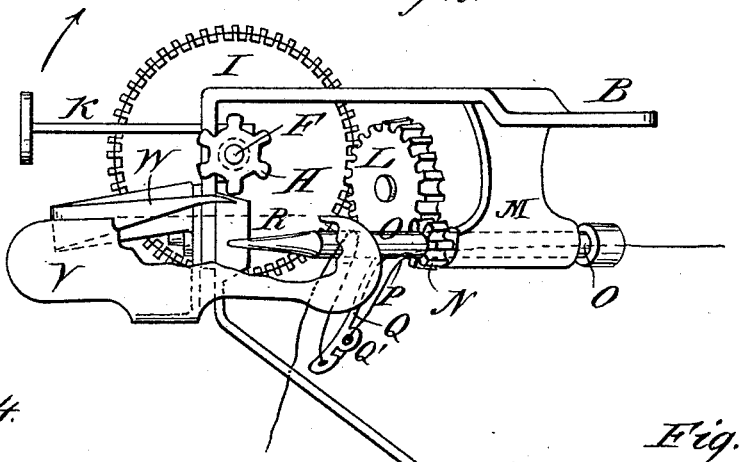


Fig. 4.

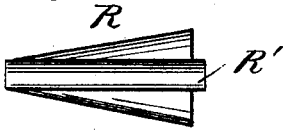
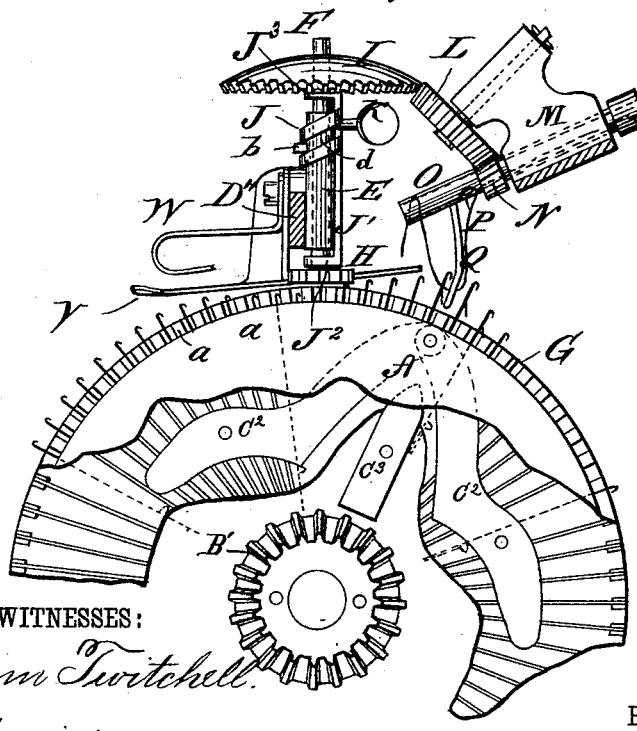


Fig. 5.

Fig. 3.



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TUFTING ATTACHMENT FOR KNITTING MACHINES.

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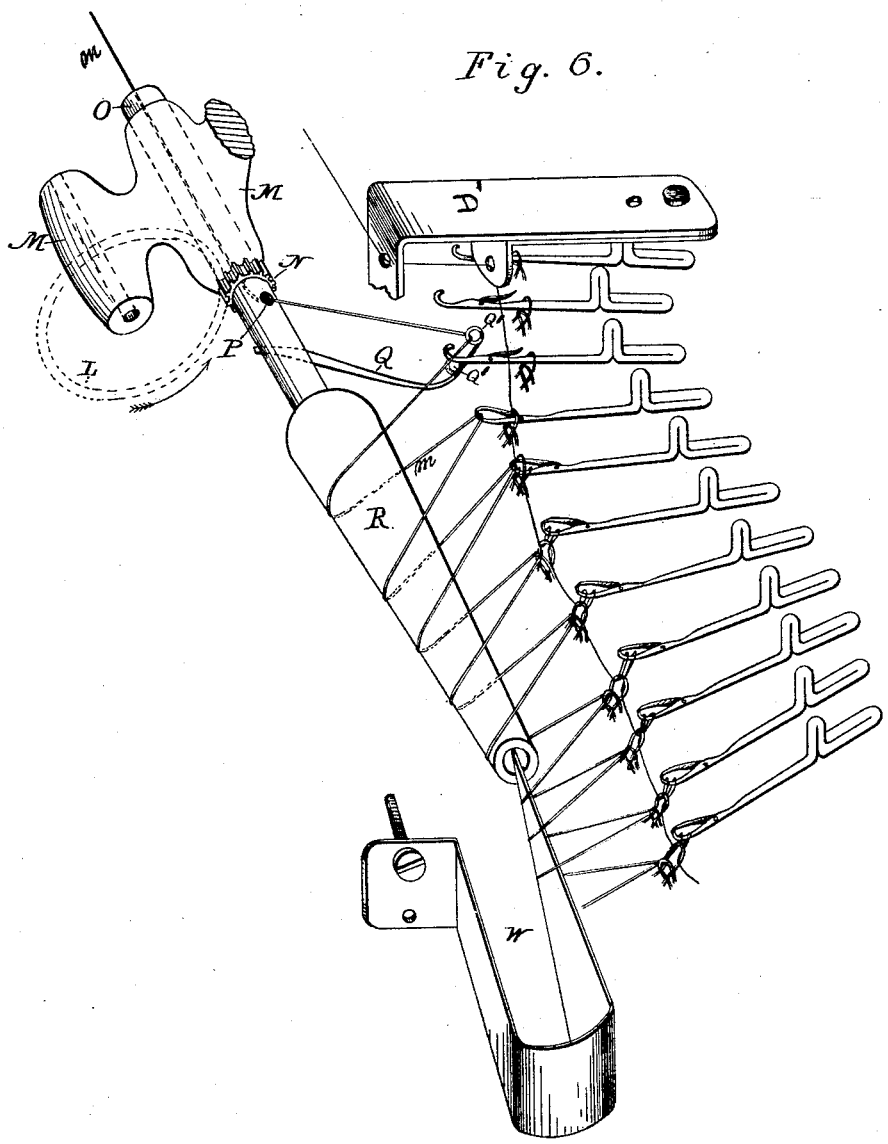
Fig. 6.



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TUFTING ATTACHMENT FOR KNITTING MACHINES.

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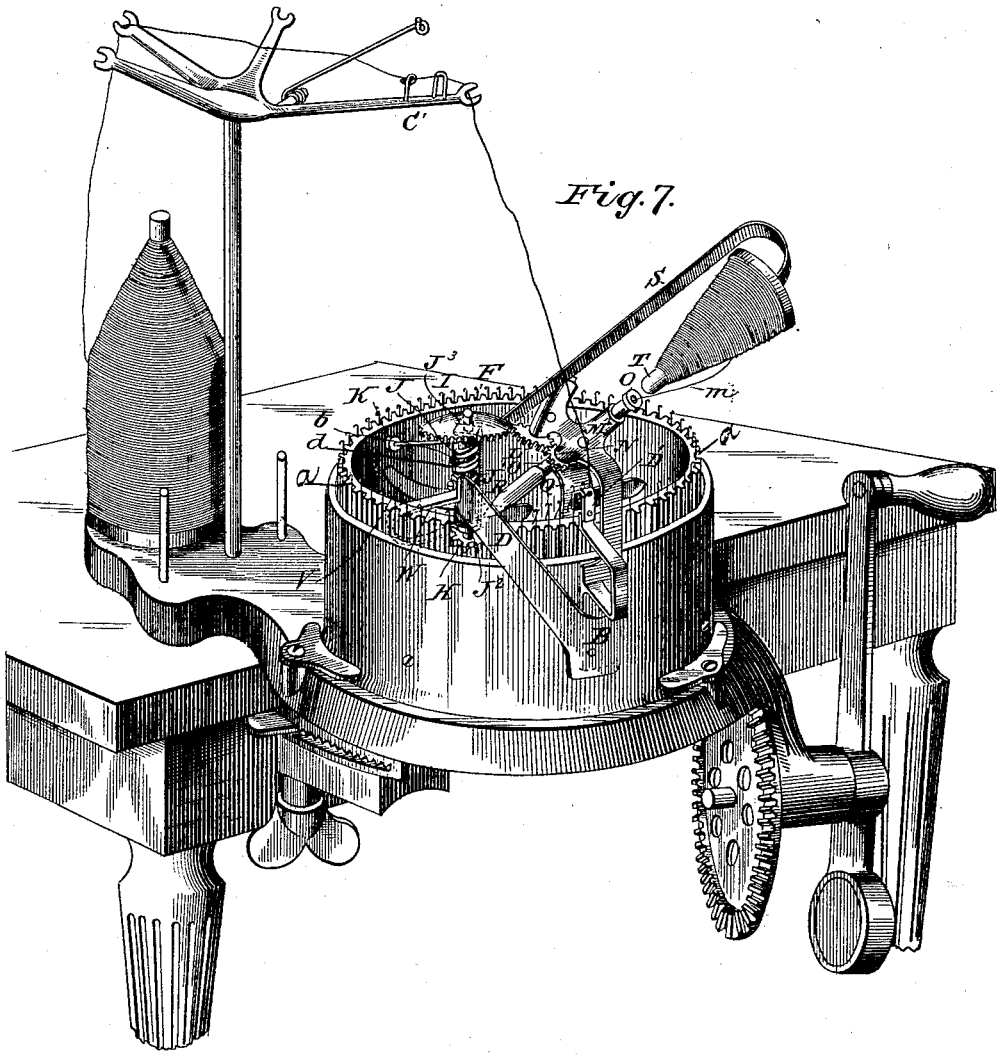
Fig. 7.



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UNITED STATES PATENT OFFICE.

GUSTAV A. OLSON, OF ALBERT LEA, MINNESOTA.

TUFTING ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 342,126, dated May 18, 1886.

Application filed June 4, 1884. Serial No. 133,798. (Model.)

To all whom it may concern:

Be it known that I, GUSTAV A. OLSON, of Albert Lea, in the county of Freeborn and State of Minnesota, have invented a new and Improved Trimming or Tufting Attachment for Knitting-Machines, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved attachment for knitting-machines, whereby ruching or tufted work can be produced, the loops of the ruching or tufted work being made of any desired length.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a circular knitting-machine, such as the "Twombly Family Knitting-Machine," provided with my improved tufting attachment, parts being broken out, upon which machine Letters Patent were granted August 12, 1873, said patent being numbered 141,836. Fig. 2 is an inside face view of the attachment, parts being broken out. Fig. 3 is a plan view of the same, parts being shown in section and others broken out. Fig. 4 is a longitudinal sectional view of one of the cones or drums. Fig. 5 is a longitudinal elevation of another construction of the cone or drum. Fig. 6 is a view showing the formation of the stitch-loops. Fig. 7 is a perspective view of a knitting-machine with upright needles, showing the application of my invention thereto.

On the revolving top plate, A, of the machine the casting B is held by screws, which screws also hold the yarn guides C′ and D′ on the plate A. From the casting B an arm, D, projects. The outer free end of the arm D is bent down at right angles to its horizontal portion, as at D″, Figs. 1 and 3. Upon the right-angled portion D″ of the said arm D a sleeve, E, is held, in which a spindle, F, revolves, which spindle is provided at the end toward the fixed circular needle-plate G with a pinion, H, which engages with the notches *a* or needle-grooves of the circular needle-plate G, whereby the spindle F will be revolved when the circular cam-plate A is revolved.

On the sleeve E a sleeve, J, is held, which is provided with a spiral slot, *d*, through which a pin, *b*, projects from the sleeve E. The sleeve J is secured to a plate, J′, provided at its inner end with a bend, J^2, resting against the pinion H, and at its outer end with a similar bend, J^3, resting against the pinion I, each bend having an aperture through which the spindle F passes, in such a manner that the said sleeve J can revolve on the sleeve E, and the spindle F is compelled to move longitudinally with the said plate J′. An arm or rod, K, is secured on the sleeve J and projects from the same.

On the outer end of the spindle F a cog-wheel, I, is mounted, which engages with a cog-wheel, L, mounted on a spindle journaled in the upwardly-projecting part of a V-shaped or like arm, M, of the casting B. The cog-wheel L engages with a pinion, N, mounted on a tubular spindle, O, journaled in the bottom part of the V-shaped arm M. Directly in front of the pinion N the tubular shaft O is provided with an aperture, P, and in front of the aperture with an arm, Q, provided on its free end with two thread loops or eyes, Q′. In front of the arm Q a cone or drum, R, is mounted on the tubular shaft O, the said cone having a longitudinal central tubular stem, R′, in which the end of the tubular shaft fits. The taper of the cone can be varied as much as desired, and, if desired, the cone can be arranged in such a manner that a spindle projecting from its butt or wider end can be passed into the end of the tubular shaft O in place of the tubular shaft passing into the tubular spindle of the cone. Cones of different diameters are shown in Figs. 1 and 2.

An arm, S, projects downward from the right-angled portion D″ of the arm D, and on the end of the arm S a spool or spindle, T, is held.

W is a U-shaped knife, secured at its butt-end on the right-angled portion D″ of the arm D and having its point projecting into the tapering end of the cone R, the knife being tapered toward the free end, which is at the center of the end of the cone R. A guard, V, is provided adjacent to the knife W, to prevent the loops from catching on the end of the cone R when knitting back and forth.

B′ is a beveled gear-wheel, which is fixed horizontally on the lower end of the cam-plate-actuating shaft, and which wheel gears with a

correspondingly-beveled gear-wheel, B^2, secured upon the shaft, (not shown,) by the turning of which latter the cam-plate A is revolved.

Upon the under side of the cam-plate A are the cams C^2 C^3 C^3, by the action of which, as the cam-plate A is revolved, the needles are projected and retracted in effecting the knitting operation.

In Fig. 7, wherein my improvement or attachment is arranged for operation in connection with a vertical or upright knitting-machine, the supporting bracket or casting B is secured to the side of the cylinder of the said machine, as is also the arm M, said casting and arm being, as shown, so constructed that the operative parts overhang the needle-cylinder, while the pinion H of the shaft (the latter now occupying a vertical position) is adapted to gear with upright grooves or notches *a* of the needle-cylinder.

The operation is as follows: The thread *m* on the spindle T is passed through the tubular shaft O and through the aperture P in the same, and then through the loops or eyes Q′ in the arm or thread-carrier Q. The thread is then wound around the drum or cone R and placed on the needles, as shown in Fig. 6, by which it is knit into the fabric. The circular needle-plate G revolves the spindle F by means of the pinion H, and from the spindle F the tubular shaft O is revolved by means of the cog-wheels I, L, and N, whereby the arm Q is revolved, and thus the thread *m* is carried around in a circle and placed on the needles and wound on the cone R, on which it slides from the butt-end toward the thinner end. As the loops formed on the cone R by the arm Q throwing the thread into the needle-hooks and carrying the thread around the cone slide off the thinner end of the cone, they are taken up by the needles and incorporated with the knit fabric, thus forming tufted work. In fleece-work a single strand loosely twisted is used for yarn, and the point of the knife W is adjusted to the center of the cone R, so that the loops will be cut as they slide off the cone. If fleece-work is not to be made, the knife W must be so adjusted that it cannot cut the loops, which, as will be seen by reference to Fig. 6, is readily accomplished by simply loosening the securing-screw of the knife, which will permit the placing or arranging of the knife in a position out of alignment with the cone R or shaft O, as shown in Fig. 2, when, by again tightening the screw, the knife will be retained in such latter position. If the attachment is to be put out of gear, the sleeve J is turned, by means of the rod K, in such a manner as to move the said sleeve toward the outer end of the sleeve E, whereby the spindle F will be shifted so as to carry the pinion back away from engagement with the circular needle-plate G.

It is to be distinctly understood that separate threads are used—one or more threads or strands for the usual knit fabric—and a separate thread for the tufted work, the usual threads passing through the thread-guides C′ and D′, and the threads for the tufted work passing through tubular shaft O. As stated above, cones R of different diameters can be used according to the size of the loops or tufts desired. The loops can be arranged to be in each course of knitting, or they can be arranged to be in alternate courses, or several blank courses can be left between the courses in which the loops are formed. If loops have been formed on one course and the looping attachment is disengaged in the manner described, a few blank courses will be knit, and then if the looping attachment is thrown in gear loops will be formed in the following courses, and so on.

It will, of course, be understood that my invention, although herein shown as applied to the Twombly machine, is equally applicable to the Aiken machine, patented July 8, 1856, which patent is No. 15,314, which has also radially-arranged needles, and also to the Branson, Tuttle, and other machines having upright or vertically-arranged needles, such machines, for example, as those upon which Letters Patent were granted June 18, 1872, No. 127,954, and April 14, 1874, No. 149,813.

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

1. The combination, with a needle-holder, the needles, cam-support, cams for operating the needles, and means for revolving the cam-support, of a tubular shaft, means for revolving the same from the needle-holder, an arm held on the said tubular shaft and provided at its free end with eyes through which the thread can be passed, a cone on the said tubular shaft, and a knife, substantially as herein shown and described.

2. The combination, with a needle-plate, the needles, the cam-plate and cams for operating the needles, and means for revolving the cam-plate, of a tubular shaft, an arm held on the same and provided with eyes at its free end through which the thread is passed, means for revolving the said tubular shaft from the needle-plate, a cone on the tubular shaft, a knife at one end of the cone, and the guard V, adjoining the knife, substantially as herein shown and described.

3. The combination, with a needle-plate, the needles, the cam-plate and cams for operating the needles, and means for revolving the cam-plate, of a tubular shaft having a pin and an aperture, and also having an arm provided at its free end with eyes through which the thread can be passed, means for revolving the said shaft from the needle-plate, devices, substantially as described, for throwing the said shaft into or out of engagement with the needle-plate, and a cone on the said tubular shaft, substantially as herein shown and described.

4. The combination, with a needle-plate provided with notches or grooves, the needles, the cam-plate and cams for operating the nee-

dles, and means for revolving the cam-plate, of a tubular shaft provided with an arm having eyes through which thread can be passed, a cone on the said shaft, a pinion, N, on the shaft, a cog-wheel, L, engaging with the pinion N, a cog-wheel, I, engaging with the cog-wheel L, the spindle F, provided with the pinion H, engaging with the notches or grooves of the plate carrying the needles, substantially as herein shown and described.

5. The combination, with the needles, a needle-plate, the cam-plate and cams for operating the needles, and means for revolving the cam-plate, of the tubular shaft O, having the pinion N, the cog-wheel L, the cog-wheel I, the spindle F, the sleeve E, the pinion H on the inner end of the spindle F, the sleeve J, surrounding the sleeve E and adapted to turn and slide on the same, which sleeve J is provided with a spiral slot, *d*, the pin *b*, projecting from the sleeve E through the slot *d*, and of a rod, K, substantially as herein shown and described.

6. The combination, with the needles, a needle-plate, the cam-plate and cams for operating the needles, and means for revolving the cam-plate, of the casting B, having arms D and M, the tubular shaft O, a cone held on the same, the arm Q on the shaft O, the pinion N on the shaft O, the cog-wheel L, the spindle F, the cog-wheel I, mounted on the spindle F, the sleeve E, the pinion H, means for moving the spindle F in the direction of its length, and a knife, W, held on the arm D, substantially as herein shown and described.

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Witnesses:
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