

(No Model.)

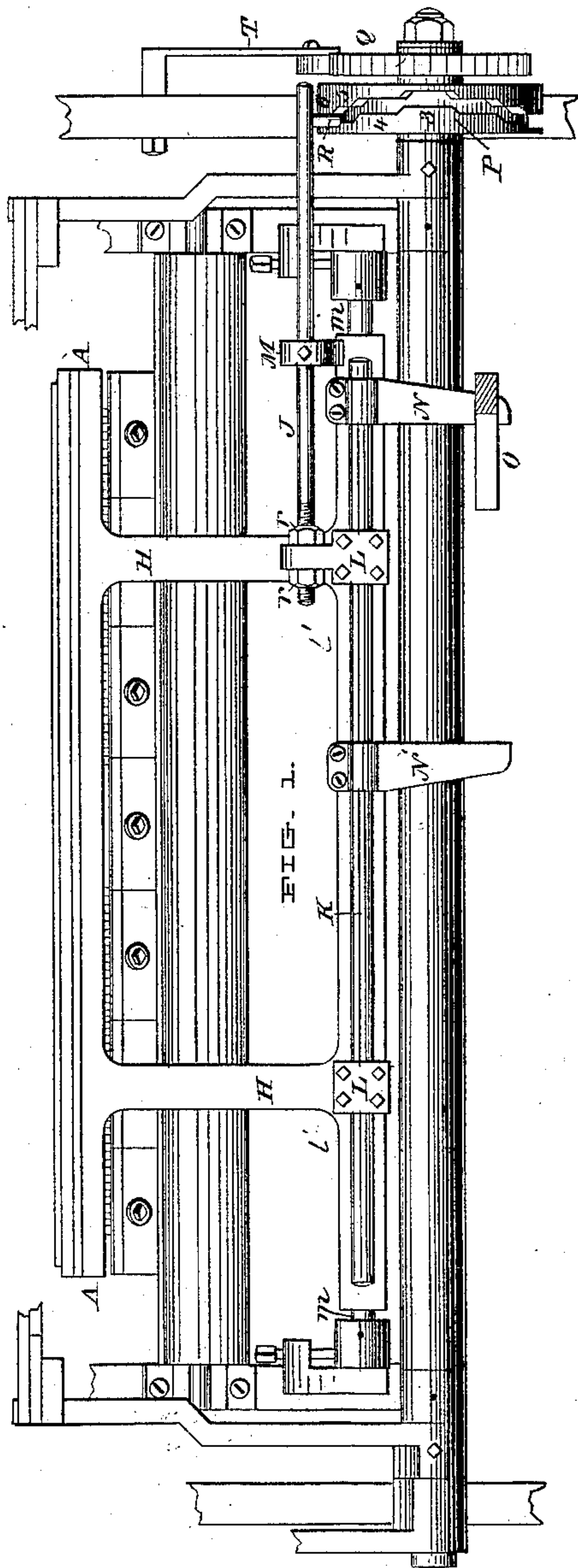
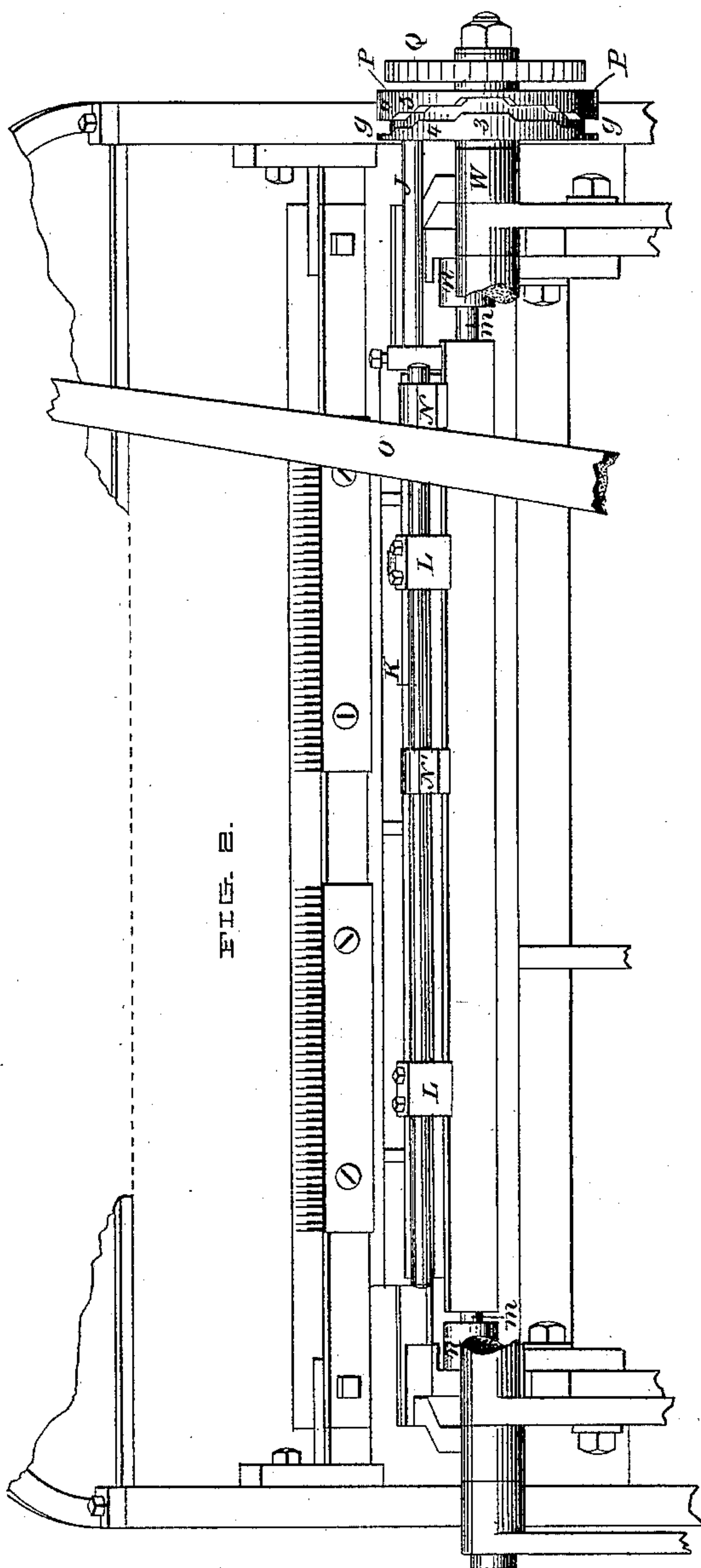
2 Sheets—Sheet 1.

E. TIFFANY.

STRAIGHT KNITTING MACHINE FOR MAKING FIGURED KNIT GOODS.

No. 408,271.

Patented Aug. 6, 1889.



WITNESSES:

*J. M. a. Cloward*  
*E. H. Worthington*

INVENTOR:

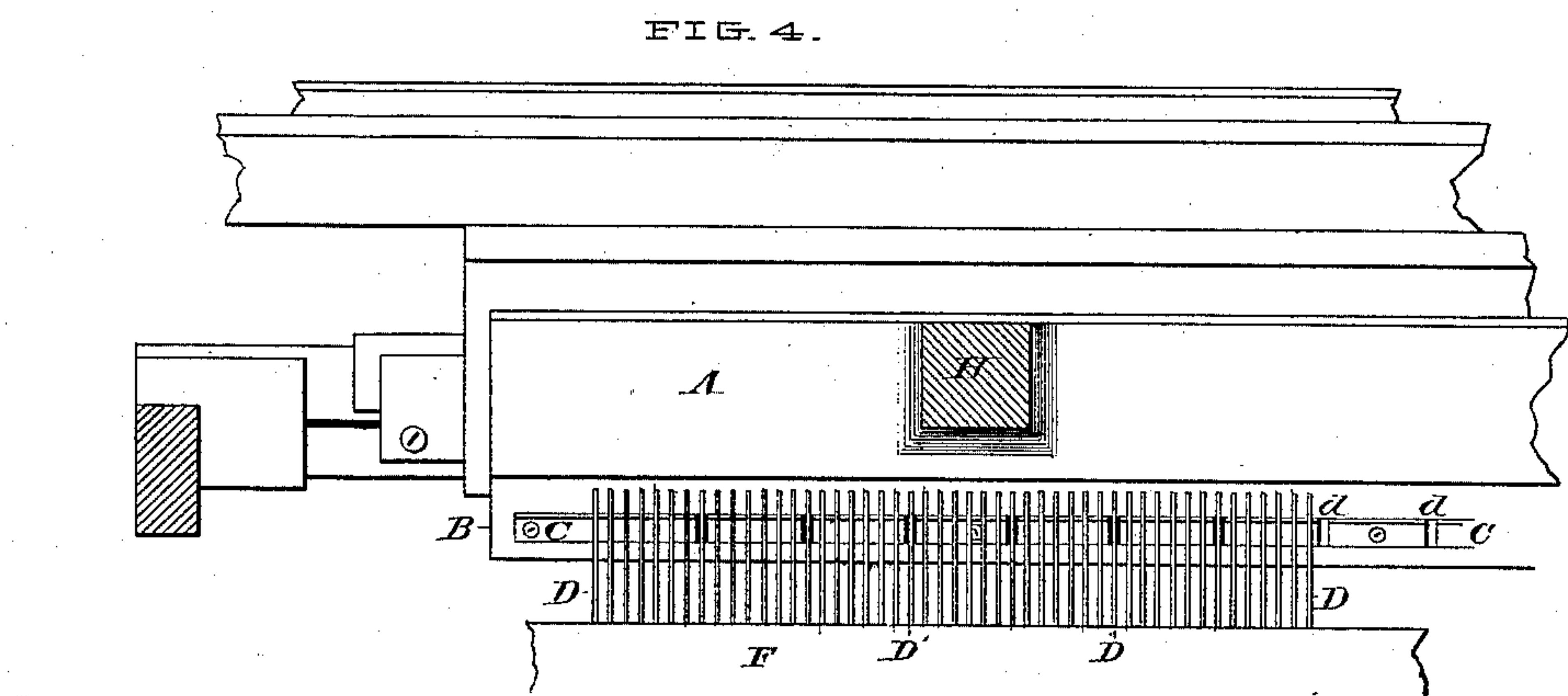
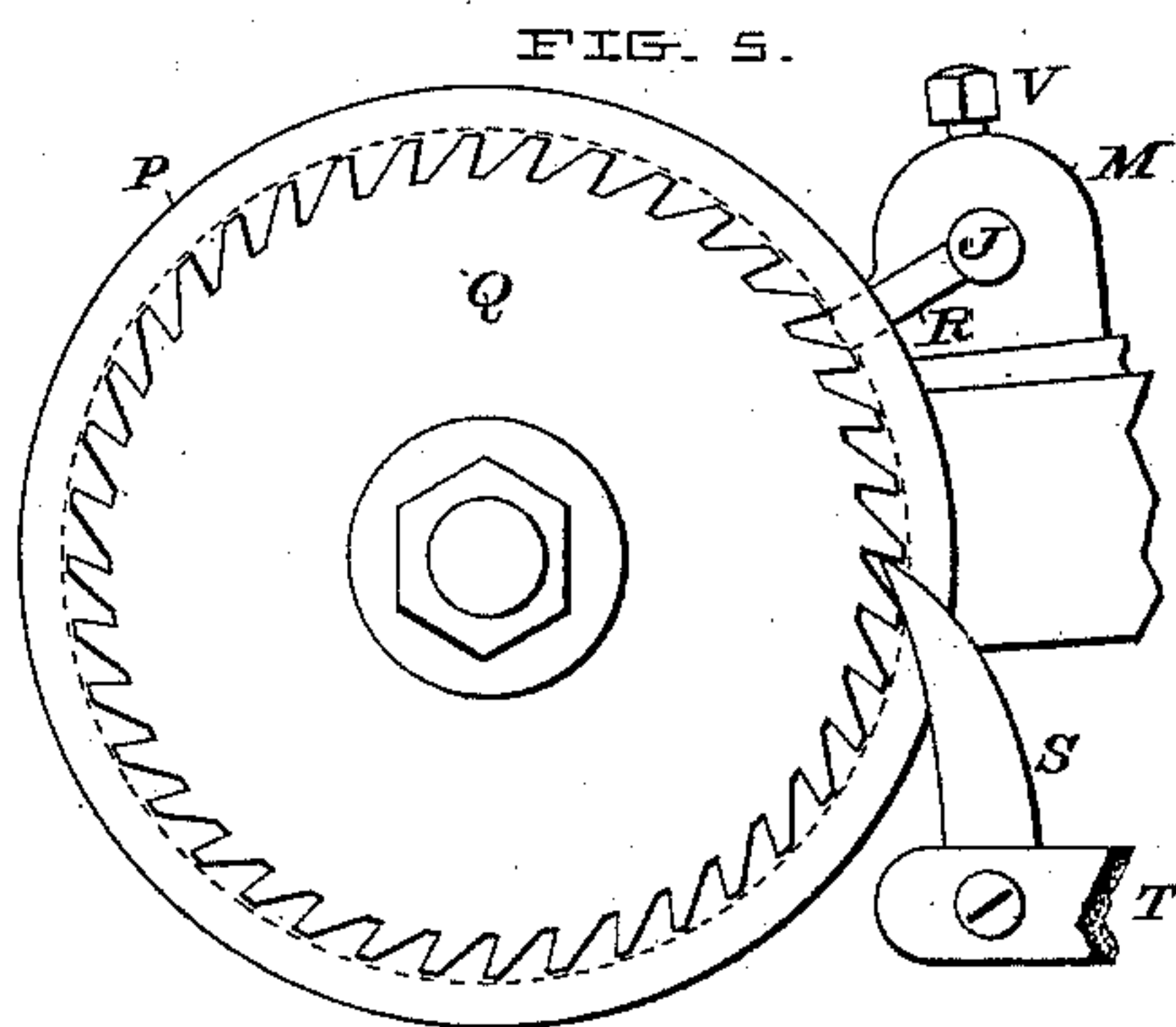
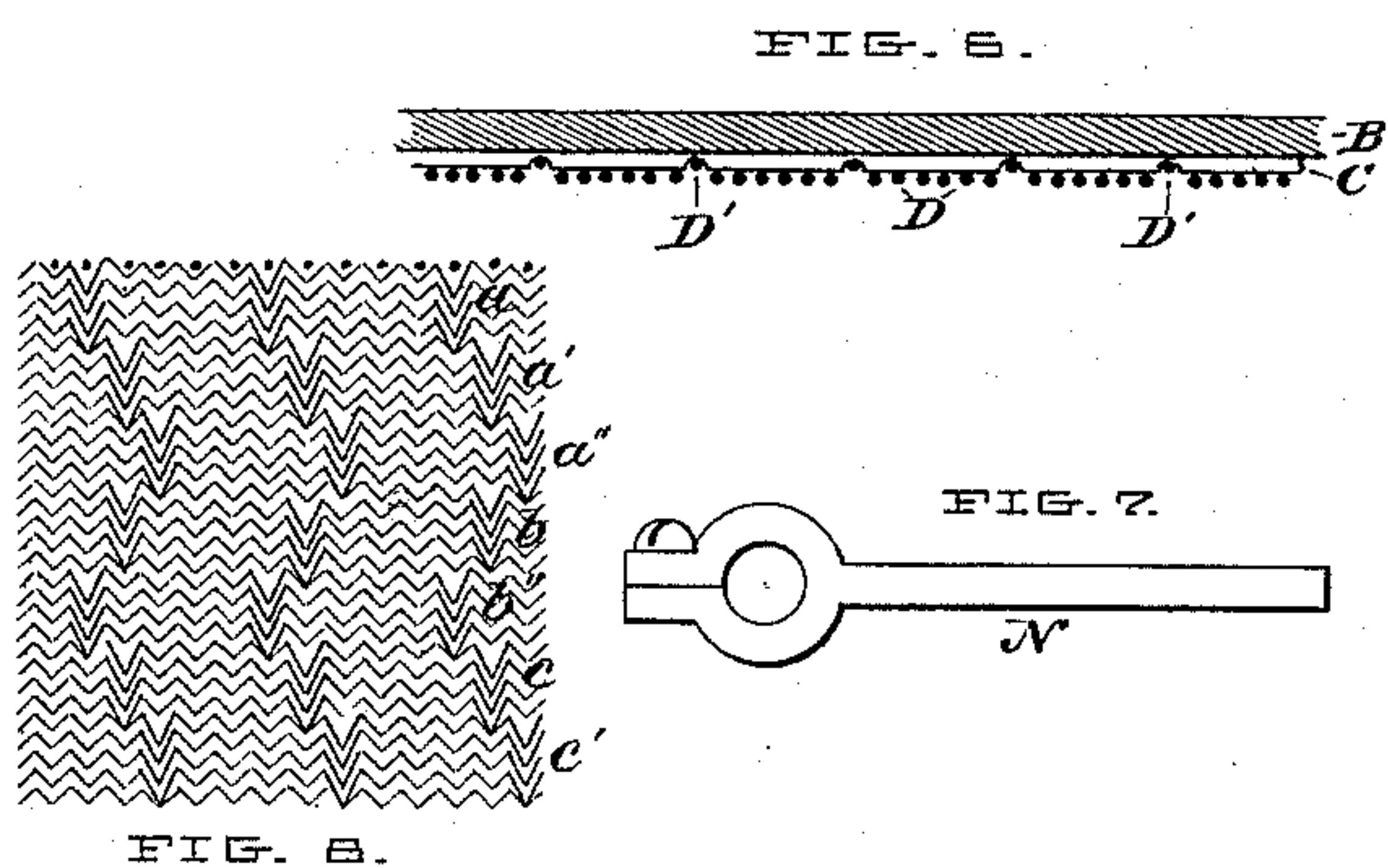
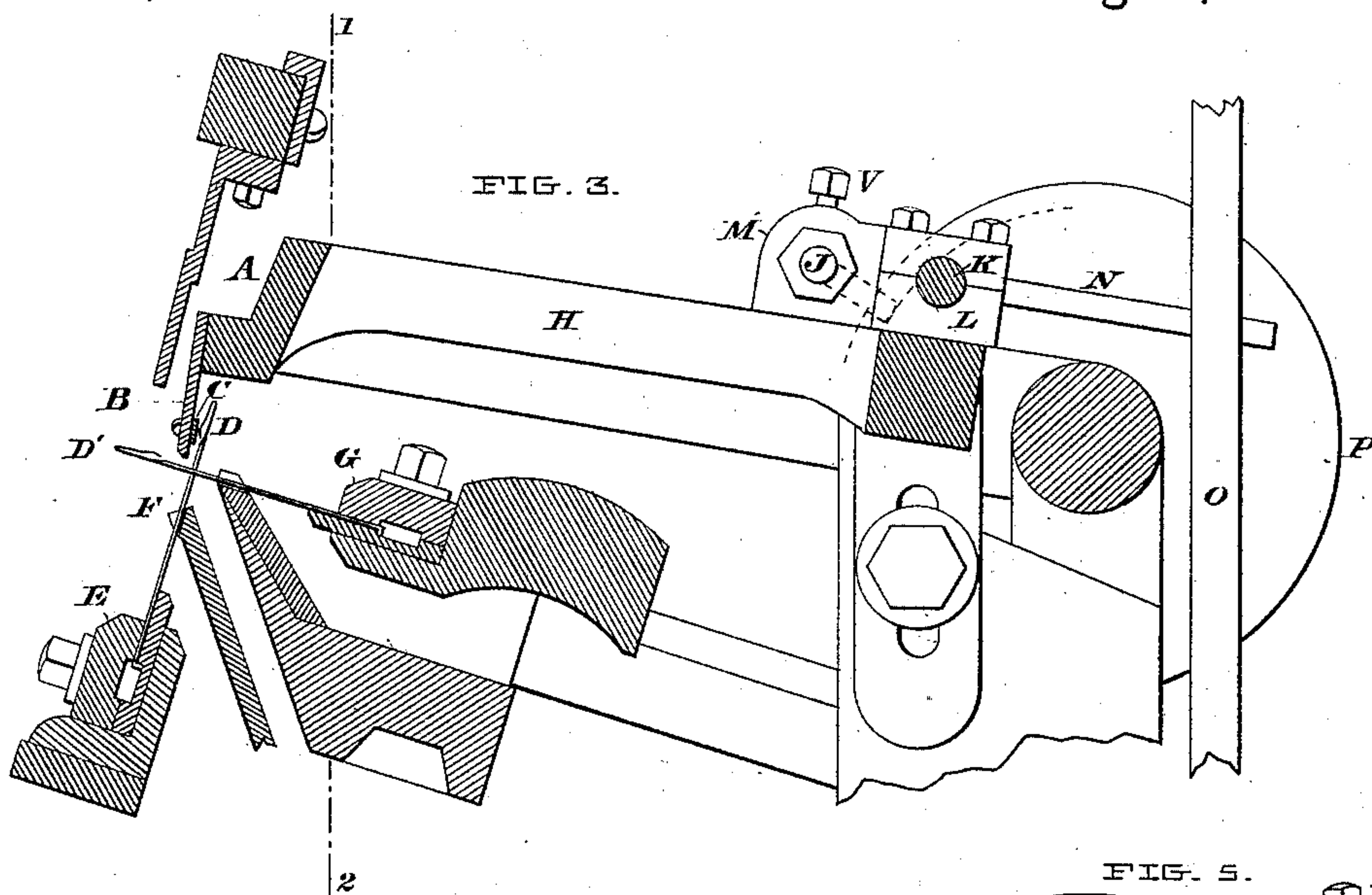
ELI TIFFANY,

BY *Franklin Scott*, ATTORNEY

(No Model.)

2 Sheets—Sheet 2.

E. TIFFANY.  
STRAIGHT KNITTING MACHINE FOR MAKING FIGURED KNIT GOODS.  
No. 408,271. Patented Aug. 6, 1889.



WITNESSES:

*J. M. & Cloward*  
*E. H. Huntington*

INVENTOR:

ELI TIFFANY,  
BY *Franklin Scott* ATTORNEY.



# UNITED STATES PATENT OFFICE.

ELI TIFFANY, OF BENNINGTON, VERMONT.

STRAIGHT-KNITTING MACHINE FOR MAKING FIGURED KNIT GOODS.

SPECIFICATION forming part of Letters Patent No. 408,271, dated August 6, 1889.

Application filed November 6, 1888. Serial No. 290,070. (No model.)

*To all whom it may concern:*

Be it known that I, ELI TIFFANY, of Bennington, county of Bennington, and State of Vermont, have invented certain Improve-  
5 ments in Straight-Knitting Machines for Making Figured Knit Goods, of which the following description, in connection with the accompanying two sheets of drawings, constitutes a specification.

10 This invention relates to special mechanism used in connection with straight-knitting machines for producing designs in the body of the fabric by introducing a different kind of stitch from that of the main body of the fabric  
15 and arranging the order and grouping of such stitches into a design after a preconceived pattern.

The drawings fully elucidate my invention, wherein I show in Figure 1 a plan view of a  
20 part of my apparatus as applied to a machine for knitting a flat web. Fig. 2 exhibits a rear elevation of my improvements. Fig. 3 shows a vertical transverse section taken midway through the middle portion of my machine.  
25 Fig. 4 shows a rear view of the presser-bar and its attachments for controlling the action of the needles upon which the design is formed. Fig. 5 is an end view of a part of the pattern apparatus. Fig. 6 is a longitudinal  
30 horizontal section through the presser-bar and across the vertical set of needles. Fig. 7 is a detail view of one of the dogs attached to the slide-rod K, against which the draw-lever O strikes. Fig. 8 is a detail of one style  
35 of fabric, showing one arrangement of design.

It is well known that in straight-knitting machines employing two sets of needles which produce ribbed work a peculiar style of surface may be produced by suspending the  
40 action of the presser-bar on one set of needles until two or more stitches are accumulated on such needles and then casting them off together.

This invention has for its object to produce  
45 designs in knit fabrics by utilizing this fact by means of devices which will act upon a defined or limited number of needles simultaneously or successively, and which will bring into or throw out of action any needle  
50 or needles for any predetermined number of courses or stitches. To effect this object I

employ the following agencies. The action of straight-knitting machines which employ two sets of spring-needles arranged to cross each other at or nearly at a right angle, having  
55 their barbs acted on by a single presser-bar is well understood.

In order to produce a stitch or course of stitches of the desired kind, which are known as "royal rib," and are made by the opera-  
60 tion known as "mispressing" one set of needles, I construct that part of the presser-bar which acts on one set of needles with vertical slots or notches opposite certain needles as fancy or design may dictate, and impart  
65 to such slotted presser certain longitudinal movements at certain predetermined intervals, so that by mispressing in this way in connection with the aforesaid longitudinal movements a great variety of designs may  
70 be produced.

To understand my means for carrying out my invention, reference is made to Fig. 3. The needle-bars are shown at E and G, and the needles at D and D'. B is the presser-  
75 bar attached to the frame A H, and this frame is arranged to swing on journal-bearings *m m*, Figs. 1 and 2, and slide longitudinally in boxes or bearings *n n*. The sliding rod or bar K is attached to frame A H, and  
80 is adapted to slide in the boxes L L. These boxes are provided with set-screws L', so that the degree of friction of the bar K as it slips therein may be regulated. Two brackets N and N' are firmly attached to bar K, one on  
85 each side of the lever O, which throws the yarn-carrier, which is not shown.

The limits and frequency of longitudinal movement of the presser-bar are determined by a pattern-wheel P, in the periphery of  
90 which is the zigzag or other irregular groove *g g*, in which the lug R of arm J works. Arm J is attached to frame A H, and may be adjusted by means of jam-nuts *r r*. The grooved pattern-wheel P is connected with  
95 the ratchet-wheel Q and moves concurrently therewith, being impelled by the pawl S on lever T. This pawl takes its motion from any convenient operative part of the machine. The offsets of the pattern-groove  
100 correspond with the spaces between centers of needles, and the circumferential length of



each offset or step corresponds with a definite number of courses of stitches in the knitting. In producing the design the latitudinal and longitudinal features of the design will depend on the design of this pattern-wheel or of some equivalent device which will produce the desired movements at the desired intervals of space.

The extent and number of needles to be influenced or controlled by the last-described mechanism is determined by the slots  $d d$  in the back side of the presser-bar B C, as shown in Figs. 3, 4, and 6. In this case I have shown a slatted strip C, attached to the back side of the main presser-bar B, which is capable of removal and replacement by one of different design. In the side of this bar next to the needles the slots  $d d$  are cut at any desired interval or space, and into such slots the needles enter as the bar is pressed back toward them, as shown at D' D' in Fig. 6. The barbs of none of the needles entering slots  $d d$  are acted on by the normal action of the presser-bar in knitting until the presser-bar frame is moved a step, so as to bring such needles under the normal action of the presser-bar between the slots when the accumulated or "royal rib" stitches will be cast off by the action of the knock-over bar F.

It is obvious that the character of the design will depend on the number and arrangement of the notches  $d d$ , in connection with the movements and intervals of movement of the frame A H.

The action of the machine will be understood by an examination of the fabric shown in Fig. 8. It will be seen that the design-stitch is formed on every fifth needle. There-

fore the slots  $d d$  are five needles apart. It also appears that four courses are knit with the presser-bar in a constant position, and that then it is shifted to the right one needle-space to form the section of the design marked  $a'$ . From the last-named facts I deduce that the intervals 3 4 5 6 seen on the pattern-wheel are four stitches long and the offset from step to step equivalent to one needle-space.

The hereinbefore-described invention is applicable to such machines as those described in patent issued to me May 1, 1860, No. 28,133.

Hence I claim as my invention—

1. The bar C, provided with slots  $d d$ , in combination with a presser-bar and two sets of knitting-needles, arranged to operate substantially in the manner described, and for the purposes set forth.

2. The combination, in a straight-rib-knitting machine, of two sets of needles arranged to co-operate transversely, a presser-bar for pressing the barbs of both sets of needles, provided with a series of notches upon that part of its pressing-edge which in action bears against the upper set of needles, and a pattern mechanism, substantially as shown, for imparting to the bar containing said notches a predetermined intermittent reciprocatory movement, substantially in the manner described, and for the purpose set forth.

In testimony whereof I have hereto subscribed my name, at Bennington, Vermont, this 8th day of September, A. D. 1888.

ELI TIFFANY.

In presence of—

FRANKLIN SCOTT,  
PHEBE E. TIFFANY.