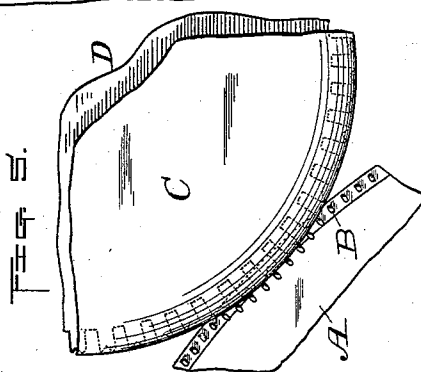
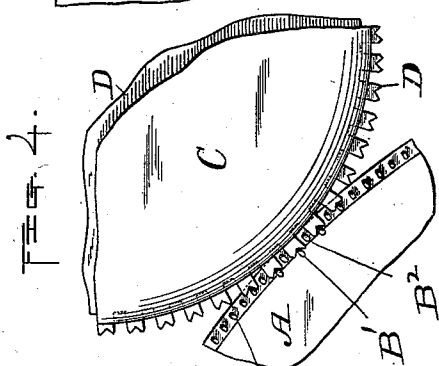
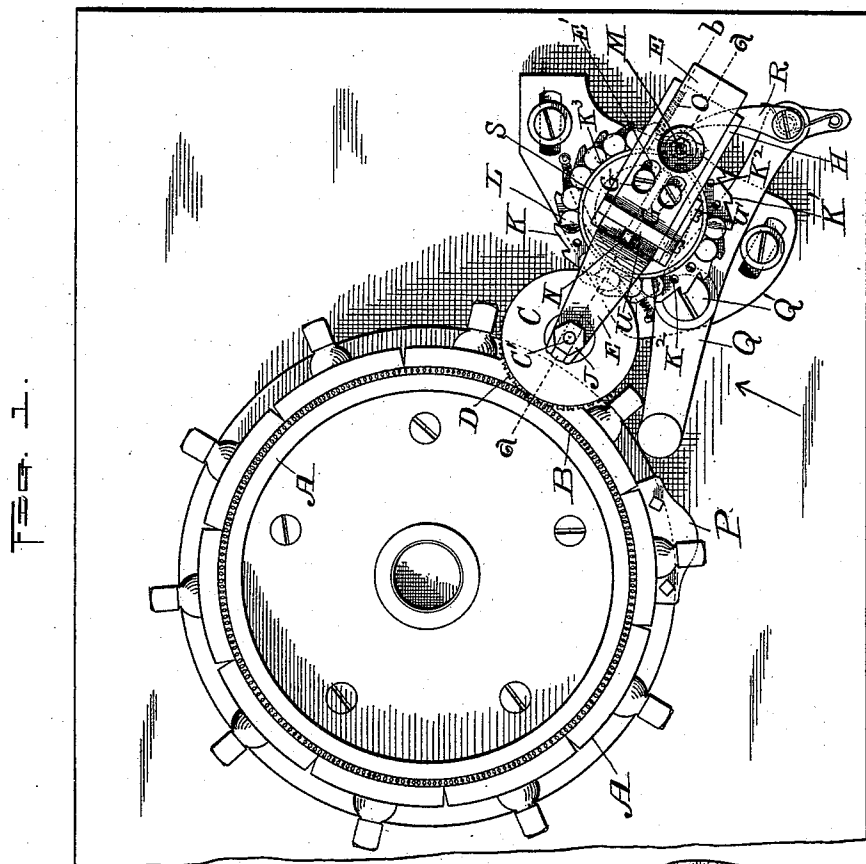


2 Sheets—Sheet 1.

CIRCULAR SPRING BEARD NEEDLE KNITTING MACHINE.

Patented Mar. 26, 1895.



Witnesses;

Inventor,

Walter B. Nourse.
Fred E. Buss.

Frank H. Gates.
By A. A. Barker. Att'y.

(No Model.)

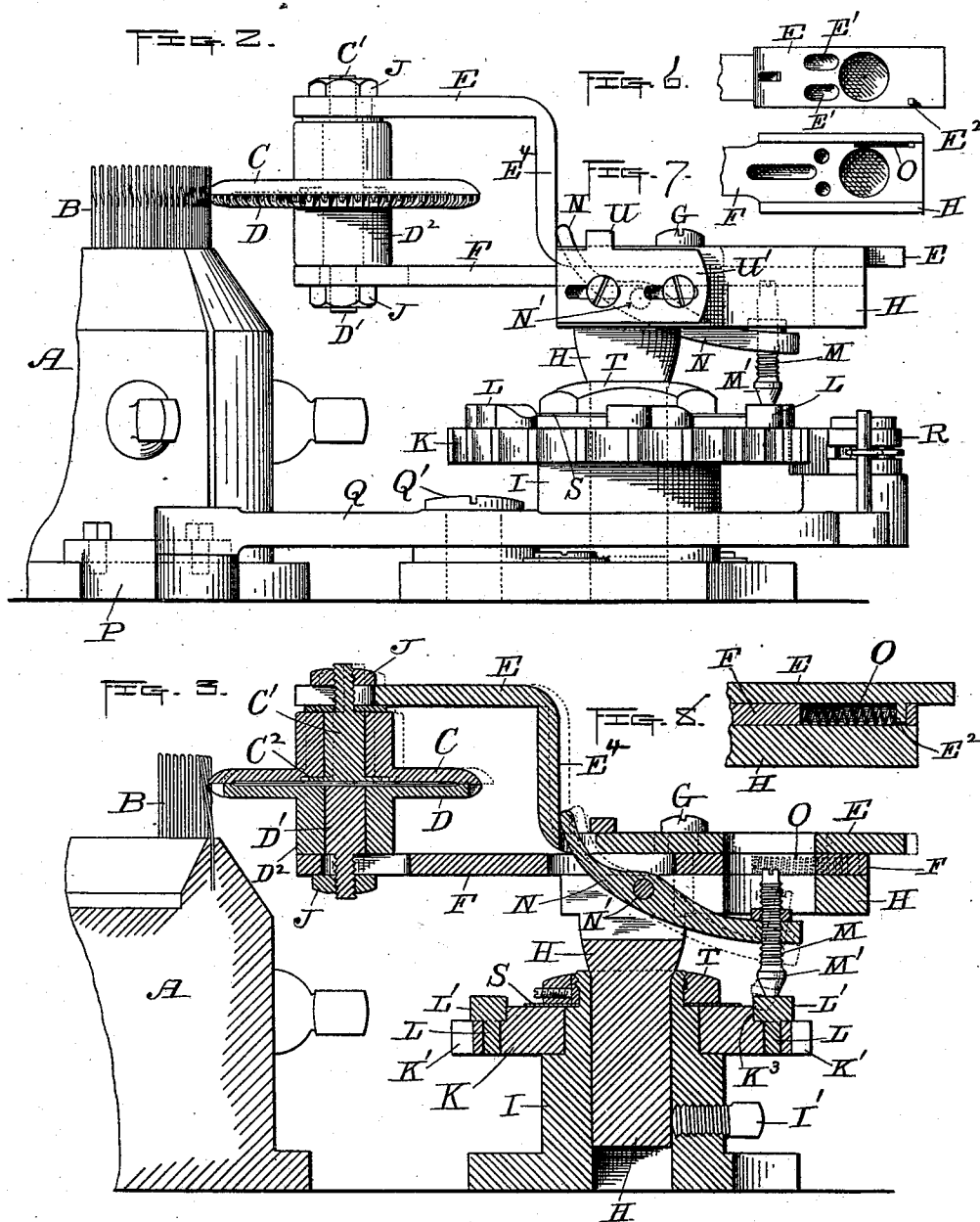
2 Sheets—Sheet 2.

F. H. GATES.

CIRCULAR SPRING BEARD NEEDLE KNITTING MACHINE.

No. 536,201.

Patented Mar. 26, 1895.



Witnesses,

Walter B. Nourse,

Fred E. Russ,

Inventor,

Frank H. Gates.

By A. A. Barker, Att'y

UNITED STATES PATENT OFFICE.

FRANK H. GATES, OF WARE, MASSACHUSETTS, ASSIGNOR TO THE OTIS COMPANY, OF SAME PLACE.

CIRCULAR SPRING-BEARD-NEEDLE KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,201, dated March 26, 1895.

Application filed November 5, 1894. Serial No. 527,855. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. GATES, of Ware, in the county of Hampshire and State of Massachusetts, have invented certain new and useful Improvements in Circular Spring-Beard-Needle Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents so much of a knitting machine as is necessary to illustrate my improvements applied thereto. Fig. 2 represents, upon an enlarged scale, a side view of my improved presser device herein described, and part of the knitting head of the machine, looking in the direction of the arrow, in Fig. 1. Fig. 3 is a central, vertical section through the parts shown in Fig. 1, taken at the point indicated by line *a a*, in said Fig. 1. Figs. 4 and 5 represent, upon a still larger scale, plan views of parts of the presser plates and knitting head with the plain and notched presser plates in the positions that they occupy in relation to the needles, in producing fancy and plain knitting, respectively, as will be hereinafter more fully explained. Figs. 6 and 7 represent bottom and top plan views, respectively, of parts of my improved presser device, also hereinafter more fully described, and Fig. 8 is an enlarged, vertical, longitudinal section, taken on line *b*, Fig. 1.

My invention relates to machines for knitting fancy fabrics, and more particularly to an adjustable automatic presser device for applying a variable pressure upon the needles to produce different designs in the operation of knitting said fabrics as will be hereinafter more fully set forth.

To enable others skilled in the art to which my invention appertains to better understand the nature and purpose thereof, I will now proceed to describe it more in detail.

In the drawings, A represents the rotary head of a circular spring-beard knitting machine with all the operative attachments removed except my aforesaid automatic presser device. Said rotary head is provided with the usual circular series of spring-beard needles B with which the pressers C and D engage

in the operation of the machine. The improved mechanism combined with said pressers for supporting and operating the same constitutes my aforesaid invention.

The several parts composing said mechanism are constructed and arranged to operate as follows: The pressers C, D are as usual, made in the form of circular disks and are arranged horizontally one on top of the other,—the upper one C having a smooth periphery, and the lower one D, a notched or toothed periphery. They are fitted to turn on the studs C' and D' respectively, which are arranged vertically and in alignment. Both studs are adjustably secured to the outer ends of their supports,—the stud C' to a movable, angle-plate E fitted to slide longitudinally toward and from the needles B, and the studs D' to a stationary plate F,—both plates E and F being attached by means of bolts G G to the central, vertical, swivel-frame H, which is fitted to turn in the stationary stand I and held after adjustment by the set screw I'.

The angle-plate E is permitted to slide longitudinally as aforesaid by forming oblong openings or slots E' E', therein (see Fig. 6) where the bolts G, G pass through the same; and the studs C', D', are adjustably fastened to the movable angle-plate E, and stationary plate F, by forming threads on the outer ends of the studs; then passing said threaded ends through oblong openings or slots in the supporting plates and turning set-nuts J, J over the threaded ends against the outer sides of the supporting plates as is shown in Fig. 3 of the drawings. As the same result may be accomplished in various other ways, I do not limit myself to the method herein described and shown.

The bottom or notched presser D turns upon the stud D' with the bottom of its hub D² resting for support on the top of the plate F, and the upper or plain presser C is supported by a lateral flange or head C² on the lower end of the stud C' as is also shown in Fig. 3.

The bottom presser, D, is designed to force part of the needles B' forward out of line as is shown in Fig. 4, and the upper presser C to intermittently force forward the intermediate needles B² and said needles B' into curved

line as is shown in Fig. 5, to produce fancy and plain stitching in the operation of knitting;—fancy stitching being produced when said needles B' are pushed forward out of line as shown in Fig. 4, and plain stitching when all the needles are forced into a curved line as shown in said Fig. 5, the design required to be produced in the fabric being obtained by the intermittent changes from one to the other, as in other machines of this class. Said operation of the pressers and the result thereby produced, it will be understood, is common to all machines of this class employed for knitting fancy fabrics, the only difference in the action of the pressers on the needles in my device from other devices, being, that the pressure coming near the bottoms of the beards, close said beards; while in other devices in which the pressers strike the needles at the top, said beards are opened. After having adjusted the lower presser, D, to the right position for holding the needles as required, by loosening its holding nut J, it is fastened rigidly in said position. The upper presser, C, is moved forward and back with short, intermittent movements of varying duration, to conform to the design desired to be produced, by means of the pattern-wheel, K, fitted to turn on the stationary stand I,—through the series of removable pins, L, the vertical, adjustable bearing-screw M, and lever N, pivoted at N', to swivel-frame H,—said screw M, being fitted to turn in the outer end of lever N, and its foot, M', adapted to rest on the heads, L', of pins L, and the opposite end of lever N extending up through a vertical opening in plate F, and bearing on the plate E. In this instance it is arranged to pass up through an opening in said plate E, and bears on its vertical portion E⁴.

A constant back pressure is imparted to force plate E, and its attachments, back, when the forward pressure of the lever N is released, by means of a suitable spring connecting said plate E or its attachments with some stationary part. In this instance, I have shown said result as being accomplished by means of a spiral spring O, (see Figs. 3 and 8) fitted in a recess or slot formed in stationary plate F,—one end of which bears against said plate, and the other end against a pin or projection E², on the under side of plate E, (see Figs. 6 and 8) which extends down into the aforesaid slot in plate F, when the parts are fitted together for operation.

The pattern-wheel K, is provided with the usual notches or teeth, K', upon its periphery, and with the circular series of holes K² for the reception of removable pins L. Said wheel is, in practice, moved one notch forward at each revolution of the rotary-head A, by means of a cam, P, on said head,—through the lever, Q, pivoted at Q' to the base of stand I, and spring-pawl R, mounted on the outer end of said lever Q, and adapted to engage with the aforesaid notches or teeth, K', on pattern-wheel K. It is therefore obvious from

the foregoing description, that as the pattern-wheel is turned intermittently in the above manner, when the heads of pins L come in contact with the foot M' of screw M, the plate E, and in consequence, the plain presser C, is moved toward the needles B, by the lever N, as is indicated by full lines in Figs. 2 and 3; and when said foot passes by the pin-heads and comes to a space in the pattern-wheel where the pins are omitted, the screw, M, and outer end of lever N drop down by force of gravity; thus causing the inner end of said lever to bear backward upon the plate E, in connection with the spring O, forces said plate E and presser C away from the needles, as is shown in Fig. 1, and by dotted lines in Fig. 3.

In practice, the weight of lever N, and its screw M is sufficient to force back the plate E and its presser while the parts are well oiled and work smoothly, but it is preferable to use a spring to insure the positive action thereof, as described. Said spring, therefore, not being an absolutely essential element to the construction, I reserve the right to use the same or not, as desired.

The pin-heads, L', are preferably made circular in cross-section, with one side cut away to fit against the vertical shoulder K³, on the pattern-wheel K, to prevent said pins from turning. They are also preferably beveled at one side of their top surfaces, where the foot M' of screw M comes in contact therewith, as shown in the drawings, to facilitate said foot passing up onto the tops thereof, as the pattern-wheel K is rotated in the operation of knitting. Said pattern-wheel may be held from turning too freely by interposing a thin disk S between the top surface thereof, and a holding-nut T, fitted over the same.

The length of the forward movements of the plate E and its presser C, may be regulated as desired, by turning the screw M up or down, in the outer end of the lever N to lengthen or shorten the movements of said lever N, as circumstances may require; and the backward movements of lever N may also be controlled by means of a bar or rod U extending transversely over the plate E from a plate U' secured to the side of swivel-frame H, which may be adjusted toward or from the inner end of said lever N,—suitable slots being formed therein where its fastening screws pass through to fasten it in position.

It will be observed, from the foregoing description, that my improved mechanism is very simple in construction and compactly arranged. It is also strong, durable, and not easily impaired by use.

I am aware that similar devices have been patented and are in use, for the same purpose, and I, therefore, limit my invention to substantially the construction herein set forth and shown.

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

1. In a knitting machine of the class herein named, the combination of the rotary head A and needles B; mounted in said rotary head, with the stationary stand I, the swivel-frame H, mounted in said stand, means for holding said frame from turning in the stand; the rotary notched presser D, mounted on the outer end of said swivel-frame; angle-plate E, fitted to slide longitudinally on the swivel-frame H; the rotary plain presser C, mounted on the outer end of said plate E, means for imparting a constant back pressure against plate E; the lever N, pivoted to said swivel-support, and engaging at its inner end with said angle-plate; the screw M, mounted in the outer end of said lever N, and whose foot is adapted to rest upon and travel over the rotary pattern-wheel K, and its pins L; said pattern-wheel fitted to turn on stand I; means for turning said pattern-wheel intermittently by connection with the head A; means for imparting friction to said wheel to prevent its turning too far, and pins L fitted in suitable openings in the pattern-wheel, and having one side cut away to prevent their turning in their openings, substantially as set forth and shown.

2. In a knitting machine of the class herein named, the combination of rotary head A, needles B the stationary support and rotary, notched presser D,—the needles being mounted in said head A and the presser D on said stationary support, with the movable plate E and rotary, plain presser C,—said plate E being fitted to slide longitudinally on said stationary support, and presser C mounted on plate E; lever N, pivoted to the stationary support and engaging at its inner end with said plate E; the rotary, pattern wheel

K; its pins L; the screw M, mounted in the outer end of said lever N, and whose foot is adapted to rest upon and travel over said rotary pattern wheel K and its pins L, substantially as and for the purpose set forth.

3. In a knitting machine of the class herein named, the combination of rotary head A, and needles B, mounted in said rotary head, with a rotary needle-presser, mounted on the end of a movable plate fitted to slide longitudinally on a suitable stationary support; said longitudinally operating plate, and stationary support; a vertically operating lever pivoted near its inner end to said stationary support, and adapted to engage at its inner end with the slide-plate to push said plate forward when the outer end of the lever is raised, and to draw back the plate in the opposite direction when said outer end of the lever is released and allowed to drop by force of gravity; a vertical screw, mounted in the outer end of said pivoted lever, and adapted to rest at its bottom end on the rotary pattern wheel and its pins, and said wheel and pins, substantially as and for the purpose set forth.

4. In a knitting-machine of the class herein named, the combination of the rotary pattern-wheel, having a circular series of vertical holes therein, and a vertical shoulder on its upper side a short distance from said holes toward the center of the pattern-wheel, with pins whose heads are made of circular form in cross-section, with one side cut away to fit said vertical shoulder, substantially as and for the purpose set forth.

FRANK H. GATES.

Witnesses:

W. N. STEELE,
E. B. NASH.