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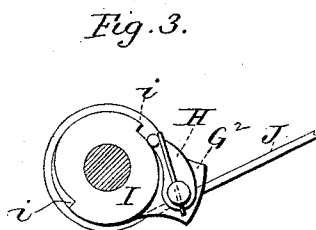
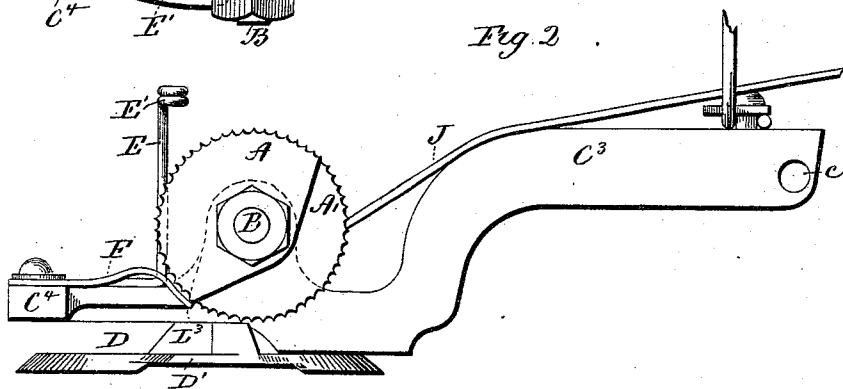
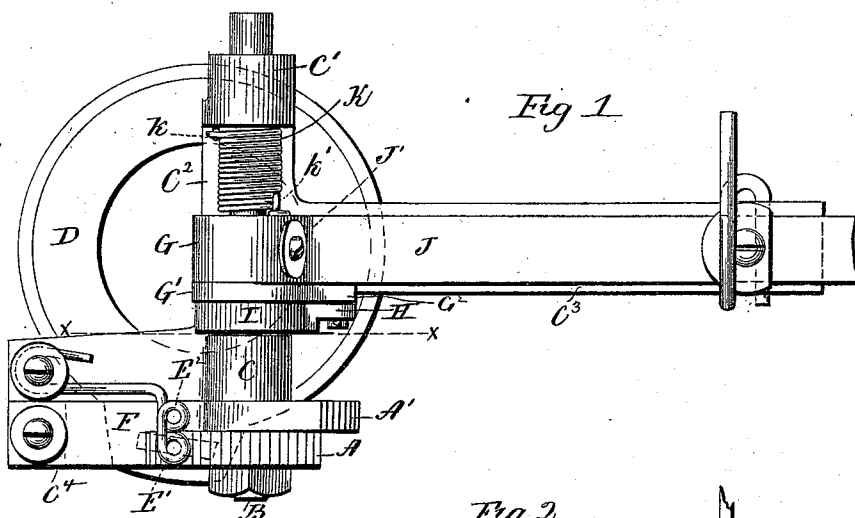
2 Sheets—Sheet 1.

J. D. HEMPHILL.

FEEDING ATTACHMENT FOR KNITTING MACHINES.

No. 532,957.

Patented Jan. 22, 1895.



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4

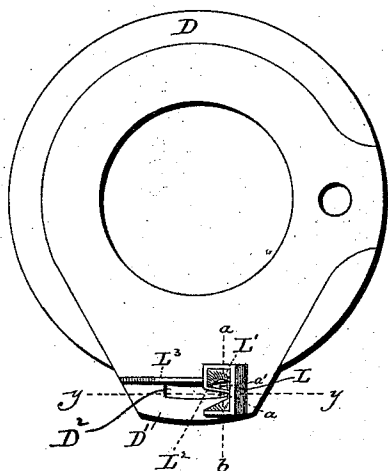


Fig. 5

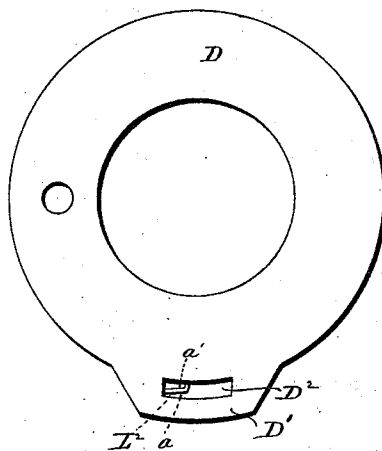


Fig. 6

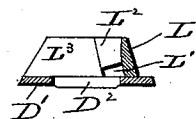
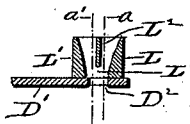


Fig. 7



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UNITED STATES PATENT OFFICE.

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FEEDING ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 532,957, dated January 22, 1895.

Application filed February 9, 1894. Serial No. 499,647. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA D. HEMPHILL, of Huntington, in the county of Fairfield and State of Connecticut, have invented a new
5 Improvement in Feeding Attachments for Knitting-Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear,
10 and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of one form which an attachment constructed in accordance with
15 my invention may assume; Fig. 2, a view thereof in side elevation; Fig. 3, a view in transverse section on the line $x-x$ of Fig. 1, showing the ratchet and pawl for rotating the shaft which carries the feed-cams; Fig. 4, a
20 detached plan view of the yarn-carrier, showing the fender with which it is provided; Fig. 5, a reverse plan view of the yarn-carrier; Fig. 6, a view in vertical section on the line $y-y$ of Fig. 4, showing the fender of the yarn-carrier; Fig. 7, a similar view on the line $a-b$
25 of the same figure.

My invention relates to an improved attachment for that class of machines for knitting stockings in which the leg and foot of the stocking are knit from one thread, and the
30 heel and toe of the stocking from another thread, usually different in color and heavier in weight, the object of my present invention being to provide a simple and reliable attachment for cutting in and cutting out the leg
35 and foot and heel and toe threads as required.

With these ends in view, my invention consists in an attachment having certain details of construction and combinations of parts as
40 will be hereinafter described and pointed out in the claims.

Inasmuch as machines of the character described are well known to those skilled in the art, I have thought it unnecessary to either
45 illustrate or describe the detailed construction of such a machine. I may say, however, that my improved attachment is well adapted for use in connection with such a machine as disclosed in my application filed January 31,
50 1893, serially numbered 460,431.

In carrying out my invention I employ two

segmental feed-cams A and A', located in parallel vertical planes, and mounted side by side but out of peripheral alignment, upon the outer end of a horizontal shaft B, jour-
55 naled in arms C and C' of a bracket C², formed at the forward end of a pivotal arm C³, which carries at its free outer end the annular yarn-carrier D, and which is constructed at its inner end with a horizontal pivot-hole c , re-
60 ceiving a pin by means of which it is pivotally attached to the machine-frame so that the carrier and attachment may be lifted up away from the needles and let down over the same as desired. The said carrier is se-
65 cured to the outer end of the arm so as to extend under the said segmental feed-cams. As herein shown, the peripheries of the said cams are toothed to adapt them to take hold of the threads which they are designed to
70 feed; but obviously they may be adapted to do that work by being roughened in any other way. Each of these cams has as shown a semi-circular operating surface; but if preferred I might reduce their surfaces in length by half,
75 and rotate the shaft by quarter instead of half turns. Directly in front of and above the said cams, I locate a yarn-guide E, having eyes E' and E², the former guiding the heel-and-toe thread a , and the latter guiding
80 the leg-and-foot thread a' . If desired, however, this arrangement may be reversed; nor do I limit myself to making the double yarn-guide as shown, for its particular construction is not material, so long as it is arranged
85 to guide the two threads in front of the said cams. Below the centers of the cams and in front of them, I locate a preferably yielding feed-plate F, the free inner end of which extends slightly under the cams so as to be
90 engaged by both of them, while its outer end is rigidly connected with an arm C⁴, formed integral with the bracket C², and extending forward therefrom. The shaft B is provided
95 between its bearings with a loose collar G, constructed with a flange G' formed with an arm G², which carries a spring-actuated pawl H, arranged to engage with a ratchet I, rigidly secured to the shaft, and having two shoulders
100 $i\ i$ located diametrically opposite each other. The shaft is intermittently rotated by half turns in one direction, by means of a

strap J, secured to the collar by means of a screw J', and passed forward over the collar and down under the same, and then rearward, its opposite end being connected with mechanism of any approved character for intermittently drawing upon it so as to rotate the shaft.

A spiral spring K, encircling the shaft, is connected at one end to a pin k projecting from the bearing C', and at its other end to a pin k' projecting inward from the collar G. This spring is qualified in tension to reversely rotate the collar, when the tension upon the strap is removed, for the purpose of winding the strap upon it, and bringing the pawl into position to be engaged with one of the shoulders of the ratchet again.

The yarn-carrier D before mentioned, is annular in form, and constructed at one edge with a projection D', containing an elongated eye D², through which both of the threads a and a' are passed. Upon the upper face of the projection D' and above the elongated eye D², I locate a fender, comprising a leaf L, the function of which is to keep the broken end of the heel-and-toe thread from getting beyond the range of the eye D²; a leaf L' for preventing the leg-and-foot thread from escaping inwardly away from the range of the said eye; a narrow leaf L² standing over the inner end of the said eye so as to give each thread the same chance thereat, but preventing them from being confounded with each other; and a long leaf L³ extending forward in line with the inner edge of the eye and preventing both ends of the yarn from being carried inward beyond the range of the same.

The leaf L² is cut away at its lower edge, as seen in Fig. 6, so that in case the end of the leg-and-foot thread is caught by and adheres to the long slack of the heel-and-toe thread while the heel-and-toe are being knitted, it may be drawn out under the said leaf L², and against the outer face of the leaf L³, and so follow the slack of the heel-and-toe thread as the same plays back and forth through the said fender eye. Then as the heel-and-toe thread is taut when broken off, it follows that at such time the leg-and-foot thread will be drawn down through the fender and eye in position to be fed and caught by the needles.

I may add to the foregoing, that the elongated eye D² is of a length sufficient to permit the stitches to catch upon the needles. When the heel-and-toe yarn is being used it shifts from one end of the eye to the other.

I may also state that the several leaves of the fender are located at the inner end of the eye, inasmuch as the threads are always at that end when the change occurs. I do not limit myself, however, to making the fender in the manner described, as it may take any other form which will prevent the ends of the two threads from fouling.

Having described in detail the construction of my improved device, I will now proceed to

set forth the mode of its operation. When the leg is being knitted, the two feed cams will occupy the positions in which they are shown in Figs. 1 and 2 of the drawings, the feed-cam A' being virtually retired to allow the leg-and-foot thread to pass freely in front of it, while the feed-cam A is in position of readiness for starting the feeding of the heel-and-toe thread. Before the last course of stitches in the leg is completed, the tension upon the strap will be taken off or relieved, allowing the spiral spring K to rotate the collar backward, and so wind the strap upon the collar, and bring the pawl into position to engage with a shoulder of the ratchet. Then when the strap is placed under tension and drawn back again, the pawl engages with the ratchet and turns the shaft through a half rotation, and so reverses the positions of the feed-cams, the feed-cam A' moving forward into position to bind the leg-and-foot thread against the feed-plate, so that the said thread is broken by the tension placed upon it by the needles, and the feed-cam A moving downward so as to feed the end of the heel-and-toe thread bound between it and the feed plate, downward through the eye in the yarn-carrier into position to be caught by the needles and rearward so as to leave a free passage between it and the plate for the said thread, which, when once caught by the needles, is drawn down by them and knit into the stocking-heel. Then before the last course of stitches in the heel has been completed, the tension is taken off the strap to allow the spring to reverse the collar again, after which the strap is operated to turn the shaft a half rotation and restore the parts to the positions in which they are shown in Figs. 1 and 2, the heel-and-toe thread being thus broken off and the leg-and-foot thread fed in again for knitting the foot of the stocking. The same operations are repeated for cutting out the leg-and-foot thread and cutting in the heel-and-toe thread for knitting the toe.

It will be understood, of course, that the yarn-carrier is normally located close to the needles, so that the ends of the leg-and-foot and heel-and-toe threads are fed, so to speak, at short range by my improved attachment from a point above and close to the carrier.

I have spoken of my improved attachment as applied to machines for knitting stockings, but I not wish to be understood as limiting myself to its use in that capacity, as it is applicable to other knitting machines employing a plurality of threads, which are alternately cut in and cut out. I may, for instance, use it in those machines which knit striped fabrics.

It is obvious that in carrying out my invention and in different applications of it, changes from the particular construction herein shown and described may be made, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but hold myself

at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a knitting machine attachment for cutting in and cutting out independent threads, the combination with two feed-cams mounted side by side, but out of peripheral alignment, on a shaft, means for guiding the two threads in front of the respective cams, a feed-plate located close to the periphery of the said cams which presses the threads against the same, means for intermittently rotating the shaft to alternately bring one cam into play and retire the other, a yarn-carrier located below the cams and constructed with an eye through which the threads are passed, and a fender located upon the carrier above the said eye and arranged to prevent the ends of the threads from displacement and fouling, substantially as described.

2. In a knitting-machine attachment for cutting in and cutting out independent threads, the combination with two feed-cams mounted side by side but out of peripheral alignment, on a shaft, means for guiding the two threads in front of the respective cams, a feed-plate located close to the peripheries of the said cams which press the threads against the same, a ratchet rigidly secured to the shaft, a collar mounted loosely upon the shaft, and provided with a pawl for engagement with the ratchet,

a strap connected with the collar for rotating the same and so turning the shaft through the medium of the ratchet, and a spring encircling the shaft and connected with the collar for reversely rotating the same for re-engaging the pawl with the ratchet, substantially as described.

3. In a knitting machine attachment for cutting in and cutting out independent threads, the combination with a pivotal arm, of an annular yarn-carrier secured to the free end thereof, and constructed with an extension containing an eye through which the threads are fed to the needles, a horizontally arranged shaft mounted above the said yarn-carrier in brackets connected with the said arm, two feed-cams mounted side by side but out of peripheral alignment, on said shaft and located over the eye in the yarn-carrier, means for guiding the two threads in front of the respective cams, a yielding feed-plate located close to the peripheries of the said cams which presses the threads against the same, and means for intermittently rotating the shaft to alternately bring one cam into play and retire the other, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOSHUA D. HEMPHILL.

Witnesses:

H. Z. WINTERS,
WM. P. BACON.