

(No Model.)

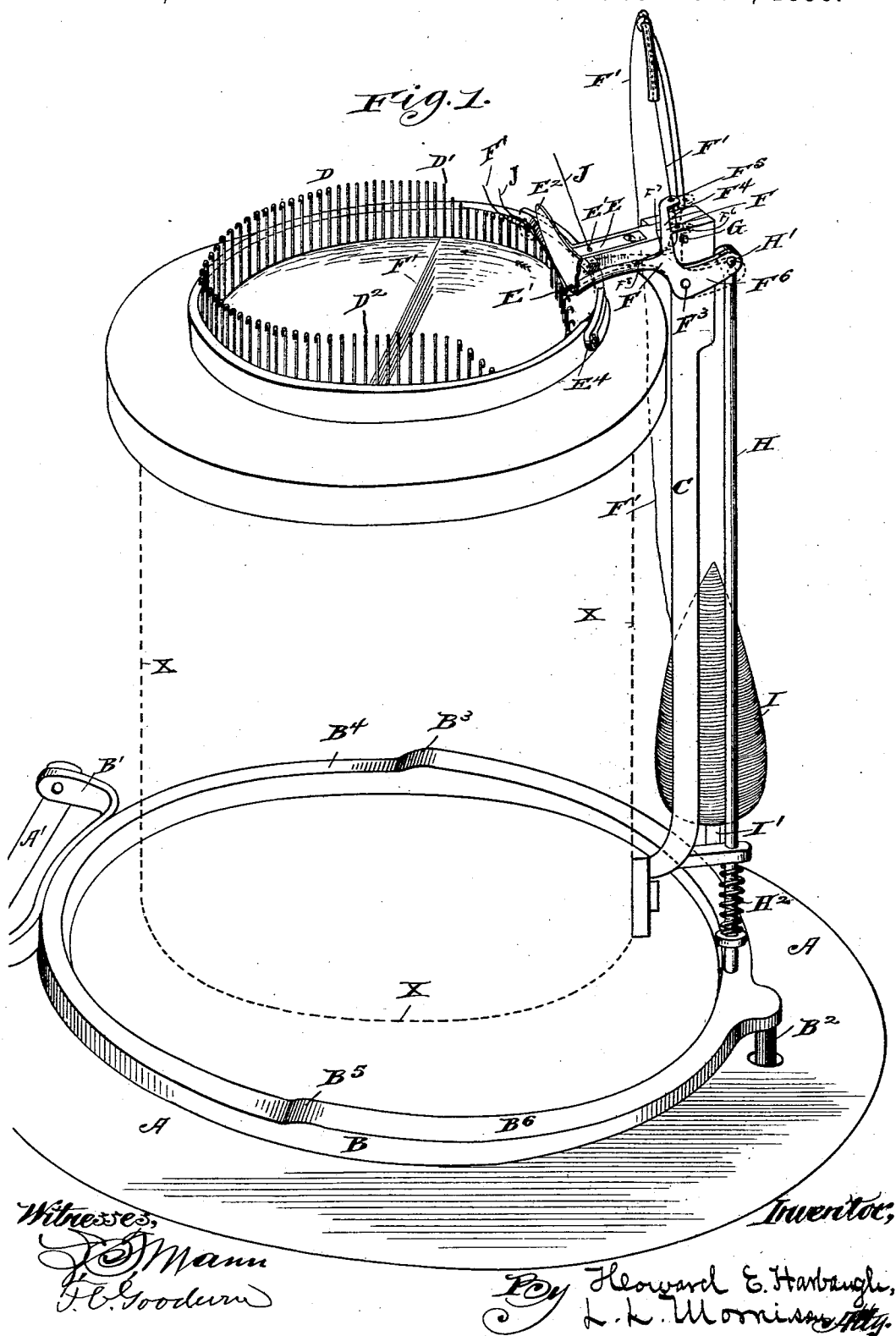
2 Sheets—Sheet 1.

H. E. HARBAUGH.

REINFORCING THREAD MECHANISM FOR KNITTING MACHINES.

No. 563,231.

Patented June 30, 1896.



Witnesses,
J. J. Mann
J. C. Goodwin

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Fig. 2.

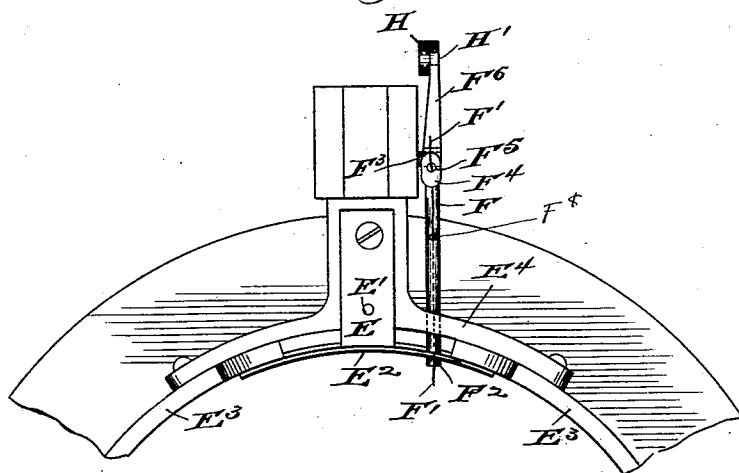
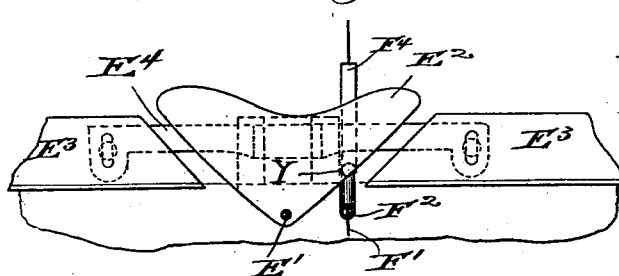


Fig. 3.



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UNITED STATES PATENT OFFICE.

HOWARD E. HARBAUGH, OF KENOSHA, WISCONSIN, ASSIGNOR TO THE
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REINFORCING-THREAD MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 563,231, dated June 30, 1896.

Application filed September 15, 1894. Serial No. 523,168. (No model.)

To all whom it may concern:

Be it known that I, HOWARD E. HARBAUGH, a citizen of the United States, residing in the city and county of Kenosha, in the State of Wisconsin, have invented certain new and useful Improvements in Reinforcing-Thread Mechanism for Knitting-Machines, of which the following is a specification.

My invention relates specifically to mechanism for automatically controlling yarn to reinforce the portions of the bottoms of stockings located between the heels and toes of the same by conducting it to and withdrawing it from the needles of knitting-machines at predetermined intervals; and it consists of certain new and useful features of construction and combination of parts hereinafter described, and specifically pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is an isometric view of my improvement connected with parts of a knitting-machine. Fig. 2 is a top plan view of parts thereof shown in Fig. 1. Fig. 3 is an elevation of the parts shown in Fig. 2.

Like letters of reference indicate corresponding parts throughout the several views.

A is the base-plate of a knitting-machine, which is shown in part only.

A' is a bracket secured to the base-plate A. B is a cam-ring hinged to the bracket A' by means of pivots B'—one whereof is not shown.

B² is a rod projecting downward through the base-plate A into contact with a pattern-wheel (not shown) which controls the movements of the cam-ring B.

C is a vertical standard rigidly connected with a rotatable cam-cylinder, which is not shown, but the position whereof is indicated by the dotted lines X.

D are needles arranged in a circular series.

E is the main yarn-carrier, connected with the standard C and having a yarnway E' extending therethrough.

E² E³ E⁴ are respectively needle-latch openers, a needle-latch-controlling segment-ring, and a double-armed bracket. These three parts do not relate to the herein-described invention and, with other devices, have been made the subject-matter of a separate appli-

cation, having Serial No. 523,167, for Letters Patent of the United States.

F is an independent yarn-carrier adapted to deliver yarn F' through its inner end F² to the series of needles D, and mounted below and to one side of the center of the main yarn-carrier E, on the horizontal pivot-bearing F³.

F⁴ is an arm projecting from the independent yarn-carrier F and having a threadway F⁵ therein, the function whereof will be hereinafter explained.

The thread F', after passing through the threadway F⁵, also passes through the threadways F⁶ F⁷ F⁸, in the independent yarn-carrier F, and thence outward through its inner end F² to the needles D, as already stated.

G is a projection on the standard C, the function whereof will also be explained hereinafter.

H is a rod pivot-jointed, by its upper end, at H', to a projecting arm F⁶ of the independent yarn-carrier F, and resting its lower end upon the cam-surface of the cam-ring B.

H² is a spring normally maintaining the lower end of the rod H in contact with the cam-ring B, while the latter is in the elevated position shown in Fig. 1.

I is a cop to supply yarn F' to the independent yarn-carrier F, mounted on a spindle I', which has a bearing (not shown) projecting from the rotatable cylinder (not shown) that supports and carries the standard C, the position of which said cylinder is indicated by the dotted lines X, as hereinbefore stated.

The operation of the mechanism is as follows: Fig. 1 represents the parts of my improvement and the knitting-machine in the proper relative positions to form the body of the foot of a stocking with a reinforced bottom extending from the heel to the toe thereof. The yarn J—which is being constantly knit—is knitting round and round as if to form the body of the foot of a stocking in the usual way. The yarn F' is also being simultaneously knit in with the yarn J to reinforce the bottom of the stocking. When the independent yarn-carrier F has traveled around—as indicated by the arrow—to the needle D', the rod H will have passed down the cam B³, on

the cam-ring B, to the lower portion B⁴ thereof, as a result of which operation the independent yarn-carrier F will assume the position indicated by dotted lines Y, Figs. 1 and 3, thereby elevating the yarn F' out of the reach of the needles until the independent yarn-carrier F has traveled around to the needle D², when the rod H will ascend the cam B⁵, on the cam-ring B, to the more elevated portion B⁶ thereof, whereupon the independent yarn-carrier F will descend to its original position with the yarn F'—which has passed across from the needle D' to the needle D², while the intervening needles were knitting the top of the foot of the stocking—and present said yarn F' to the needle D², which engages it and knits it in with the yarn J to reinforce the next course of stitches on the bottom of the stocking, until the yarn F' reaches the needle D', when the independent yarn-carrier F will again go backward and upward out of action, and its yarn F' will cross over from the needle D' to the needle D², while the yarn J is being knit by the needles from D' to D² to form the foot of the stocking. The pattern-wheel of the knitting-machine causes the rod B² and the cam-ring B to descend as the body of the foot of each stocking is finished, the result of which descent is to cause the arm F⁴ to press the yarn F' tightly against the projection G, which in turn will cause said yarn F' to break off between the inner end F² of the independent yarn-carrier and the needles of the machine. Immediately thereafter the machine knits the toe of the stocking and then starts in to

knit the leg of the next stocking. After the completion of the leg and heel of each stocking, the pattern-wheel restores the cam-ring B, and the parts controlled thereby, to their original positions, and the independent yarn-carrier F again presents the yarn F' to be knit in with the yarn J to reinforce the first course of stitches on the bottom of the stocking.

I claim—

1. In a knitting-machine, in combination, a series of needles, a hinged cam-ring, an independent yarn-carrier adapted to conduct yarn to and withdraw it from said needles at predetermined intervals, a pivot-bearing for said yarn-carrier, and a connection between said yarn-carrier and hinged cam-ring whereby the impulses of the latter are transmitted to the former, substantially as and for the purpose specified.

2. In a knitting-machine, in combination, a series of needles, a main yarn-carrier, an independent yarn-carrier, mounted below and at one side of the center of the main yarn-carrier, on a horizontal pivot-bearing, a hinged cam-ring for oscillating said independent yarn-carrier to cause it to present yarn to and withdraw it from said needles and a connection between the independent yarn-carrier and the cam-ring, substantially as and for the purpose specified.

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Witnesses:

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