

(No Model.)

J. F. GORDON.
KNITTING MACHINE.

No. 467,094.

Patented Jan. 12, 1892.

Fig. 1,

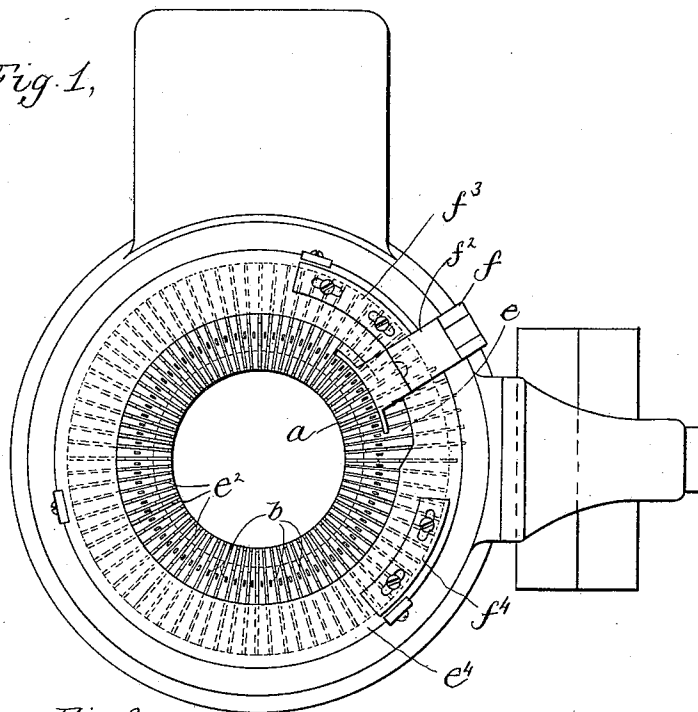


Fig. 2,

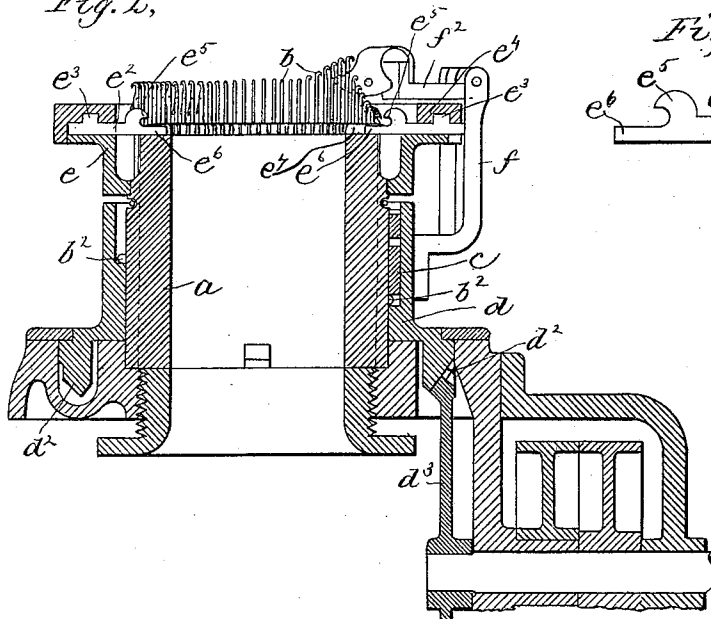
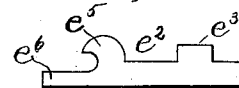


Fig. 3,



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UNITED STATES PATENT OFFICE.

JAMES F. GORDON, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE SHAW STOCKING COMPANY, OF SAME PLACE.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,094, dated January 12, 1892.

Application filed September 26, 1889, Serial No. 325,162. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. GORDON, of Lowell, county of Middlesex, State of Massachusetts, have invented an Improvement in Knitting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a knitting-machine, and is shown embodied in a machine having the same general principle of operation as that shown in Letters Patent No. 218,460, dated August 12, 1879, to which reference may be had. The said machine comprises a tubular or hollow needle-bed supporting needles which work in grooves parallel with the axis of said bed to perform the knitting in the usual manner, the knitted web passing down through the hollow bed. The machine also contains a series of radially-moving web-holders, which co-operate with the needles in knitting the web and are especially useful in starting the work on the needles and in knitting a "fashioned" web, the function of said web-holders being mainly to hold the edge of the web down while the needles are rising to take the yarn and also to strain the loop back on the shank of the needle or away from the latch side of the needle to insure the passage of the needle upward through the loop. In order to perform these functions, the web-holders have an inward and outward movement between the needles, working in a web-holder bed and being operated by a cam, which throws them radially inward as the adjacent needles are beginning to rise. The operative parts of said web-holder consist, mainly, of a hook or finger that extends over the edge of the web, and in order properly to guide the web-holder relatively to the web the web-holder is extended inward toward the center of the needle-bed beyond the hook portion that engages with the web. In said patent 218,460 the said inward extension of the web-holder passed beyond the inner surface of the needle-bed and was rounded off or made with a downwardly-curved tail-piece over which the web passed from the edge of the web where the knitting took place into the hollow needle-bed, and in said machine the downwardly-

curved web supporting or guiding surface of the web-holder was essential to the operation of the machine.

The present invention consists, mainly, in a novel construction of the web-holders and co-operating parts of the needle-bed or cylinder, whereby the web as it passes from the knitting-point into the hollow of the needle-bed is supported upon the upper edge of the cylinder instead of upon the inward extensions of the web-holders, which latter consequently do not require to be and are not provided with the downwardly-curved web supporting surface.

Figure 1 is a plan of a portion of a knitting-machine embodying this invention; Fig. 2, a longitudinal vertical section of the same, and Fig. 3 a side elevation of one of the web-holders.

The needle-bed *a* is tubular and open and unobstructed for the passage of the knitted web downward through it. The needles *b* work in longitudinal grooves upon the outside of said needle-bed, being provided with butts (indicated at *b*²) operated by a cam *c*, Fig. 2, carried by an annulus *d*, surrounding the lower portion of the needle-bed and provided with beveled gear-teeth at *d*², operated by a beveled gear *d*³, to which the actuating power is applied in any suitable or usual manner.

Around the top of the needle-bed, at the outside thereof, is supported the web-holder bed *e*, having radial grooves that receive the web-holders *e*², which are provided with lugs *e*³, to be operated by a cam *e*⁴, which is actuated by the needle-cam carrier *d*, the latter being provided with an arm *f*, extending up by the edge of the web-holder bed and provided with an inwardly-extending arm *f*², which engages adjustable projections *f*³ *f*⁴ (see Fig. 1) on the web-holder-cam ring. This arrangement provides lost motion between the needle-cam and the web-holder cam in reciprocating knitting, so that the needles and the web-holders are operated at the proper time with relation to one another. The said web-holders *e*² are provided with web-holding fingers *e*⁵ and inward extensions *e*⁶ below said fingers *e*⁵, the said extensions *e*⁶ lying beneath

the portion of the web near its edge, while the fingers e^5 are adapted to come above the edge of the web.

Just before the needle rises after it has drawn a loop the web-holder is moved inward to the position shown in the left-hand of Fig. 2, thus holding the edge of the web down and at the same time straining the loop back away from the open side of the hook of the needle, so that as the needle rises it cannot possibly pass out of the loop, and the overhanging finger of the web-holder prevents it from dragging the web up with it. When the yarn has been laid into the needle and the latter is moved down to draw the loop, the web-holder must be moved back, so as not to interfere with the drawing of the loop and so that the newly-formed edge of the web will again come at the front of the finger ready to be engaged thereby at the next inward movement of the web-holder preparatory for the next rise of the needle.

In order that the overhanging finger may come to the proper position with relation to the edge of the web, it is necessary that the inward extension e^6 of the web-holder should always remain beneath the web, and it is also necessary to prevent the said inward extension e^6 from catching upon and pulling the web as the web-holder makes its inward movement. Prior to this invention this latter result has been accomplished by making the end e^6 of the web-holder curved or rounded, so that it will slip along the surface of the web which rests upon the ends of the series of web-holders as it passes from the knitting-point into the hollow of the needle-bed.

In the present invention, on the other hand, the needle-bed is made of such thickness and the grooves or slots e^7 in the upper edge there-

of in which the web-holders travel are of such depth that the inner ends of the web-holders always remain outside of the inner surface of the needle-bed, as shown at the left hand of Fig. 2, and the web in passing from the web-holders is supported wholly upon the upper edge of the needle-bed, which constitutes, as it were, a guard or shield to prevent the extremities e^6 of the web-holders from catching upon the web in the inward movement of the web-holders, the upper surface of the needle-bed constituting the web-supporting surface instead of the inward extensions of the web-holders, as heretofore.

I claim—

The combination of the tubular needle-bed adapted to permit the free passage of the web down through it with a series of latched needles that reciprocate parallel with the axis of said bed, and web-holders that reciprocate radially between the needles, said web-holders being provided each with an overhanging finger, as e^5 , and an inward extension, as e^6 , that lies beneath the web, the needle-bed being provided with a web-supporting surface at the inside of the needles and extending beyond the extremities e^6 of the web-holders when in most advanced position toward the middle of the needle-bed, as described, whereby the inner extremities of the web-holders are prevented from engaging with the under surface of the web in the inward movement of the web-holders, substantially as described.

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

JAMES F. GORDON.

Witnesses:

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