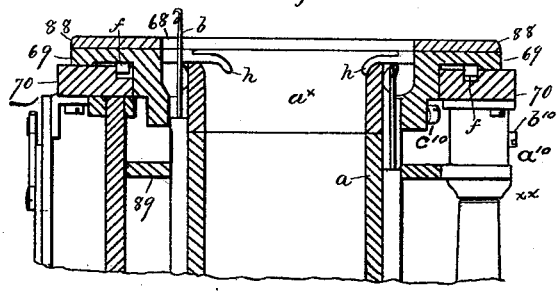
B. F. SHAW.

# Web-Holding Mechanism for Knitting-Machines.

**No. 218,460.** **Patented Aug. 12, 1879.**

*Fig. 1.*



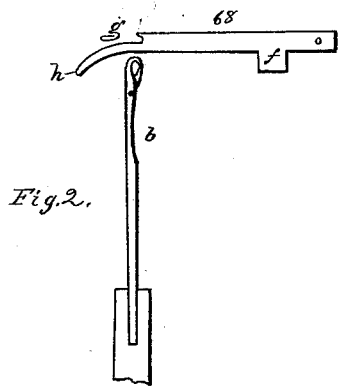
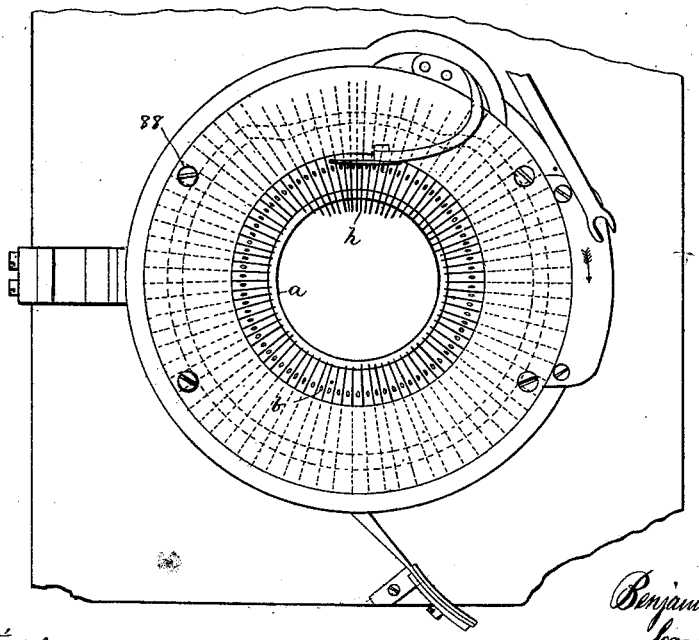




*Fig. 2.*

*Fig. 3.*




Witnesses.
H. J. Pratt.
L. C. Latimer.

Inventor
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# UNITED STATES PATENT OFFICE.

BENJAMIN F. SHAW, OF CAMBRIDGE, ASSIGNOR TO SHAW STOCKING COMPANY, OF LOWELL, MASSACHUSETTS.

## IMPROVEMENT IN WEB-HOLDING MECHANISMS FOR KNITTING-MACHINES.

Specification forming part of Letters Patent No. **218,460**, dated August 12, 1879; application filed May 2, 1877.

*To all whom it may concern:*

Be it known that I, BENJAMIN F. SHAW, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented Improvements in Web-Holding Mechanisms for Knitting-Machines, of which the following is a specification.

This invention relates to improvements in knitting-machines, and has especial reference to the combination, with a tubular or hollow needle-bed and a series of needles arranged therein, of a radially-grooved web-holder bed, a series of radially-sliding web-holders arranged in the said radial grooves, and a cam to move the web-holders, the latter having downwardly-projecting tail-pieces which always remain at the rear of the circular series of needles and act against the knitted web, but do not protrude into it, the said web-holders also having points, to operate as and for the purpose hereinafter more fully described.

Figure 1 represents, in section, a portion of the upper end of a knitting-machine cylinder, showing the web-holders and needles in their extreme positions; Fig. 2, a detail of a web-holder and needle, and Fig. 3 a top view of a knitting-machine cylinder provided with a radial series of web-holders.

A machine to which these web-holders are applied has been made the subject-matter of an application originally filed October 2, 1876, and renewed March 7, 1879, for United States Letters Patent. Reference may be had to such application. In this application and in that the same parts shown on the drawings are designated by like letters.

The web-holders 68 are steel or metallic plates, each provided with a lug, *f*, a point, *g*, and a tail, *h*. These web-holders are fitted in radial grooves in an annular web-holder bed, 69, attached by set-screws to the upper part of the needle-bed, which, made tubular or as a cylinder, has its central part entirely open and unobstructed for the passage down and through it of the knitted web. The holder-bed is, in this instance, grooved upon its under side, to permit the lugs *f* to project far enough to be engaged by a cam, 70, at the upper end of a rotating cam-carrying frame, as described in my other application, such cam moving the web-holders radially. There is a web-holder to each space between the needles, and the acting surface of the cam 70, with its center in a radial line coincident with the apexes of the knitting-cams, as in my application referred to, is made sufficiently long to throw the web-holders in in advance of the rising needles, and hold them there until after the needles complete their descent. As the needles descend they draw the thread down over the holders, the holders being in the position with relation to the needles as shown at the left of Fig. 1, the partially-formed loops then resting back of the points *g*, the yarn connecting the series of loops last formed then being held by the points *g*, they preventing the web from rising or following the rising needles. The tails *h* of the web-holders, turned down as indicated, always remain at the rear of the needles, and being curved or blunt they do not penetrate or hold the web as it is moved over the ends of tails *h*, down through and out of the hollow and unobstructed needle bed or cylinder. Upon the retraction of a web-holder its point *g* will pass out from under the yarn just drawn over the web-holder, and the yarn, as it passes the point *g* of the web-holder, will be contracted upon the tail of the holder, in position to be caught by the point *g* as the web-holder is again advanced, the series of holders and points holding the web, as before described.

To start the work, the latches being open, it is only necessary to place the yarn in the yarn-guide, so that it will be taken by the needles. Upon the first revolution of the machine the yarn is drawn down over the longest portions of the web-holders. Upon the second revolution of the machine the partially-formed loops are held from rising by the points *g* of the web-holders; and on the third revolution of the machine the second row of partially-formed loops is held by the points *g*, and so on, so that the knitting proceeds without any unraveling. The web-holders are held in place by a top plate, 88. The ring 89 serves to hold the needles in position in their grooves.

The holder-bed 69 rests upon the cam 70, and is connected, by means of set-screws $c^{10}$,

(one of which is shown in Fig. 1,) with the top $a^{\times}$ of the needle-bed $a$, (which top serves as the knocking-over bar.) By means of these set-screws the needle-bed top $a^{\times}$ is adjustable in the holder-bed, as said holder-bed is adjusted in manner following. The cam 70 is supported upon sleeves $a^{10}$ at the top of standards parallel with the needle-bed, and the said sleeves are adjustable by means of set-screws $b^{10}$, to set the cam and holder-bed correspondingly with the adjustment of the needle-bed top $a^{\times}$. These adjustments effect the lengthening or shortening of the loops formed.

The web-holders, acting substantially as described, render unnecessary the employment of friction-rolls or equivalent mechanism usually employed to produce the necessary tension on and to take up the slack of the web; and these web-holders so acting are specially beneficial in connection with a machine for the production of a fashioned web, as described in my application referred to.

The shape of the groove in the cam 70 to receive the lugs $f$ of the web-holders is shown in Fig. 3 in dotted lines.

In reciprocatory knitting the web-holders should be advanced and drawn back as suddenly as practicable, while the needle should begin to rise as soon as possible after the web-holder has reached its extreme advanced position, and the web-holder should be drawn back as soon as possible after the needle has completed its descent.

By the use of a web-holder such as is herein described, the sooner the portions over which the loops are drawn and formed are moved outward away from the needles, so as to permit the said loop to pass beyond or back of the notched parts $g$ of the web-holders, the shorter will be the loops, and consequently the finer the knitting. To accomplish this movement of the web-holder at the desired time in the web-holder bed, the cam or incline for operating it outwardly is shaped and so placed with reference to a suitable needle-operating cam as to withdraw each web-holder as or about as the needle next to it completes its descent.

My machine herein shown is of that class wherein the needle and web-holder beds are each separate and separately grooved, and they do not revolve, and the knitted web passes from the needles downward toward their butts and through the hollow open center of the needle-cylinder of the machine.

The notch of my web-holder does not determine the length of loop of the knitted fabric.

I claim—

In a circular-knitting machine, a cylindrical, hollow, unobstructed needle-cylinder adapted to permit the free passage down through it of a knitted web and a series of latched needles, a separate web-holding bed provided with radial grooves, and a web-holder-operating cam, combined with longitudinally-reciprocating web-holders placed and made movable within the grooves of the web-holder bed, the said web-holders being provided with points $g$ and downwardly-curved tail-pieces $h$, adapted to remain always within and at the rear of the series of needles, and to press against but not penetrate the web as it is drawn over the said web-holders and out through the hollow cylinder, the cam to move the web-holders being shaped to operate as and for the purpose described.

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

BENJAMIN F. SHAW.

Witnesses:

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S. B. KIDDER.