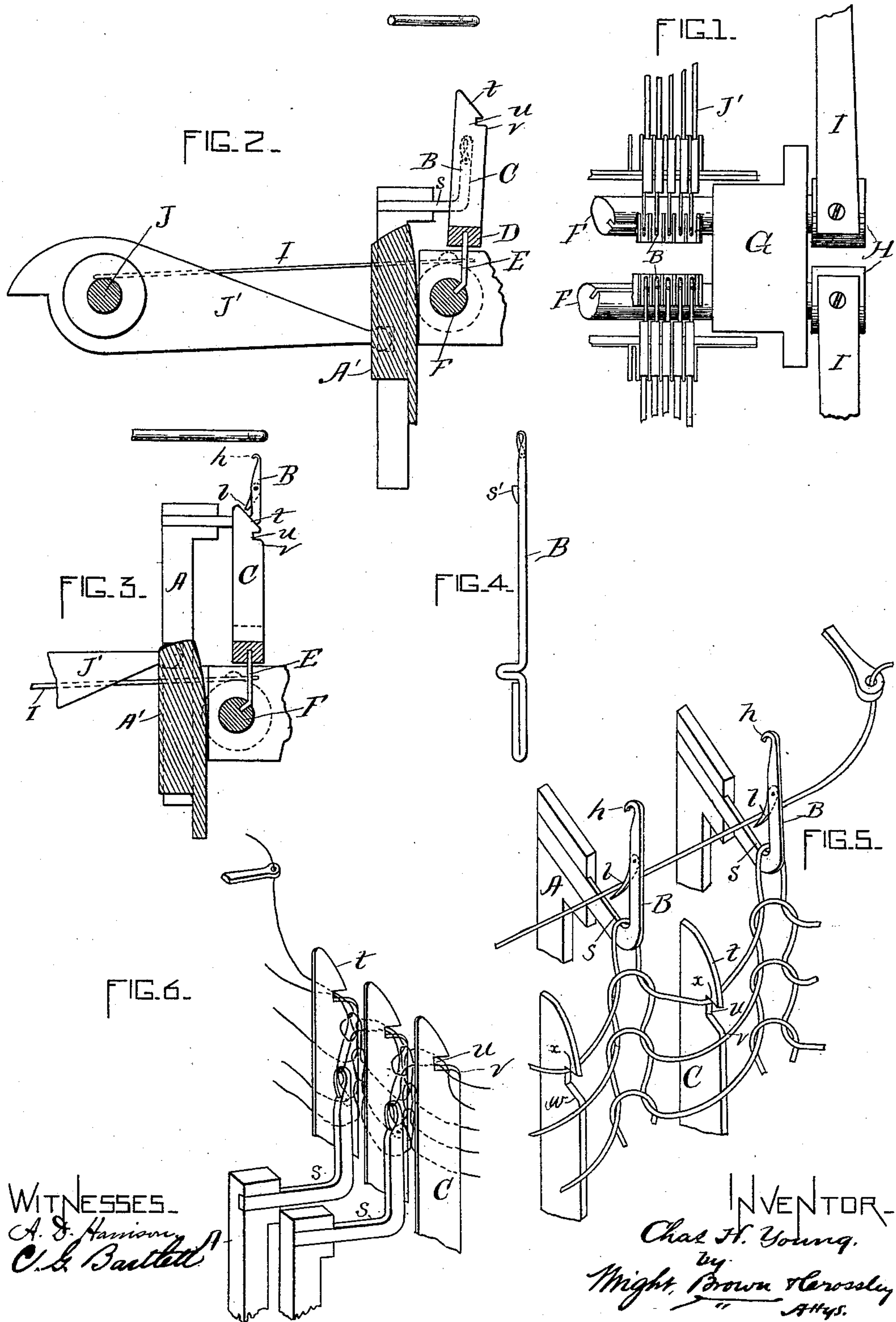


(No Model.)

C. H. YOUNG.
STRAIGHT KNITTING MACHINE.

No. 452,559.

Patented May 19, 1891.



WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES H. YOUNG, OF ROCKFORD, ILLINOIS.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,559, dated May 19, 1891.

Application filed May 23, 1890. Serial No. 352,831. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. YOUNG, of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Straight-Knitting Machines, of which the following is a specification.

It is the object of my invention to provide such improvements in knitting-machines as will facilitate the knitting of a very fine and elastic fabric by means of "latch-needles," so called.

My invention consists of a shouldered needle constructed and arranged to co-operate with a device for holding down the yarn against the shoulder, all as I will now proceed to describe and claim.

In the accompanying drawings, Figure 1 is a top view of a detached portion of a knitting-machine, showing my improvements. Fig. 2 is a detached side view showing, partly in section and in dotted lines, one of the knocking-over points, the spring for retaining the same in position, a needle in its supporting frame or comb, and its actuating-jack, the needle being shown in its depressed position and the knocking-over point slightly inclined forward as it normally stands. Fig. 3 is a view similar to that of Fig. 2, but showing the needle in its elevated position and the knocking-over point as drawn up to vertical position. Fig. 4 shows a modified form of the needle employed in the invention. Fig. 5 is an illustrative diagram showing in a somewhat exaggerated drawing the operation of the knocking-over points in conjunction with the needles when the needles are raised. Fig. 6 is a similar illustration, the opposite of that shown in Fig. 5, and showing the relations of the knocking-over points, fabric, and needles when the latter are depressed.

In one form of knitting mechanism in which the needle shown is employed it is mounted in a vertically-sliding bar or jack A, which is supported in a partitioned frame or comb A' and has a vertically-reciprocating movement imparted to it by jack-lever J', pivoted and supported on shaft J, as clearly represented in Fig. 2. Said jack-lever may be actuated for the purpose of imparting a reciprocating movement to the needle by mechanism such as is represented in another application filed

by me April 6, 1886, Serial No. 197,936, or by another suitable mechanism, which constitutes no part of my present invention, and is therefore not shown, the foregoing reference being deemed sufficient to a clear understanding of my invention herein set forth.

To the jack A the needle B is secured, as shown. This needle contains the usual features of a latch-needle—namely, the hook *h* and the pivoted latch *l*—and also contains an additional feature—namely, an offset or shoulder *s* immediately back of or below the latch. The term "shoulder" is here employed in its ordinary sense, and is meant to indicate a protuberance or projecting appendage upon the body, shank, or stem of the needle, and is formed, as represented in Figs. 1, 2, 3, 5, and 6, by bending the stem of the needle at substantially right angles to the portion upon which the latch is pivoted; or it may be constructed, as represented at *s'* in Fig. 4—viz., by forming a projecting appendage on the straight shank or stem of the needle. This last-named feature is an essential element of my present invention and by which I am enabled to utilize the upward or forward movement of the needle with advantageous results, as will be described.

I employ in combination with the needle a cast-off or knocking-over point C, a suitable number of which in practice are secured at proper intervals to a bar D, mounted upon a plate E, secured in a longitudinal slot in shaft F, which shaft (together with another of like construction and supporting in like manner another set of points) has its end bearings in boxes G, which are properly mounted on the frame of the machine. Upon the end of shaft F, which extends through box G, Fig. 1, is placed a collar H, which is secured thereon by a set-screw, and to collar H is secured one end of a spring I, the opposite end of which rests upon shaft J, which supports the jack-levers J', Fig. 2.

The knocking-over points are formed with an oblique edge *t*, a notch *u*, and a round front corner *v*. The oblique edge serves to facilitate the guiding of the yarn into the hook of the needle, and the notch serves to support the edge of the fabric over the rounded corner *v*. The back or lower side *w* of the notch serves when the point moves forward to cast

off or knock over the loop from the needle point or hook, and the upper side x of the notch serves to hold the thread or yarn against the upward movement of the needle, thus co-
 5 operating with the shoulder upon the needle to produce desirable results, as will be explained. The normal position of the point C is slightly inclined forward toward or past the
 10 hook of the needle, thereby keeping the yarn as it is guided between the oblique top edge of the knocking-over point and the needle up to the needle and within range of its hook and latch as it moves up and down; but when
 15 the point C is strained upon by the yarn carried up by the shoulder s' of the needle, as has been referred to, the point under such strain will yield backward slightly, being permitted
 20 so to do by the elasticity of spring I, which controls the rotary movement of the shaft F in that direction.

The needles employed are moved upward in unison, but are drawn down one after another in succession; and when so drawn down to form a succession of new stitches, and af-
 25 ter the last needle has been depressed, the points C are held in the position to which they were sprung back by the upward movement of the needles, as described, and illustrated in Fig. 5, by the downward strain of
 30 the hooks of the needles upon the loops just drawn into the fabric, as illustrated in Fig. 6, and are so held until the simultaneous upward movement of the needles takes place again, when as they start upward and relieve
 35 the strain upon the fabric, and consequently release the points, the reaction of spring I will then cause a lateral movement of the points, carrying them slightly forward into their in-
 40 clined normal position, and thereby causing them at the proper time to cast off or knock over the stitches upon the needles.

Latch-needles as heretofore constructed and operated in knitting-machines perform all
 45 their work while moving in one direction only—that is, while drawing upon the yarn with their hooks. The needle herein described performs all the work heretofore ac-
 50 complished by the latch-needle and in the same manner, and in addition thereto it, by means of the shoulder s , acts upon the loop
 of yarn as the needle moves upward or forward, drawing upon the same while it rests in the notch of the point C, and thereby
 55 moves the point laterally against the resistance of its spring I, thereby avoiding undue strain upon the yarn and securing a uniform tension in setting the stitch—that is, as the
 needles are successively depressed they accom-

plish what is commonly known as “sinking” the yarn by drawing it by means of their
 60 hooks h between the points C and over that part thereof forming the lower side of the notch u , and as the needles rise the loops are
 “divided” by drawing them upward by means
 65 of the shoulder on the needles, the yarn between the loops being held down by the part of the point C forming the upper side of the
 notch u . By these very simple means I am enabled to employ very tender yarns and se-
 70 cure an absolutely-accurate division of the loops, producing a closely-knitted fabric of very elastic quality such as has heretofore
 been mechanically produced only by means of much more complicated and expensive de-
 75 vices.

The operation of ordinary latch-needles and cast-offs in knitting-machines being old and well understood, a more detailed illustration and description of such knitting operations
 80 is not thought to be necessary to a clear understanding of my present invention, which is confined to the devices shown and is substantially as herein described.

I claim—

1. The combination of a knitting-machine
 85 needle provided with a shoulder with a knocking-over point provided with a notch, substantially as set forth.

2. The combination of a knitting-machine
 90 needle provided with a shoulder with a knocking-over point provided with a notch, and yielding means, as described, for supporting
 said knocking-over point, substantially as set forth.

3. The combination of the needle provided
 95 with an offset or shoulder, as described, and means for actuating the needle with a knocking-over point C, provided with a notch u , bar D, plate E, rock-shaft F, and spring I, constructed and arranged to operate substan-
 100 tially as and for the purpose set forth.

4. The combination, with the needles, the shanks of which are provided with outwardly-
 105 extending shoulders, of devices for holding down the yarn against the said shoulders to divide the loops as the said needles rise, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 6th day of
 110 July, A. D. 1889.

CHARLES H. YOUNG.

Witnesses:

ARTHUR W. CROSSLEY,
 A. D. HARRISON.