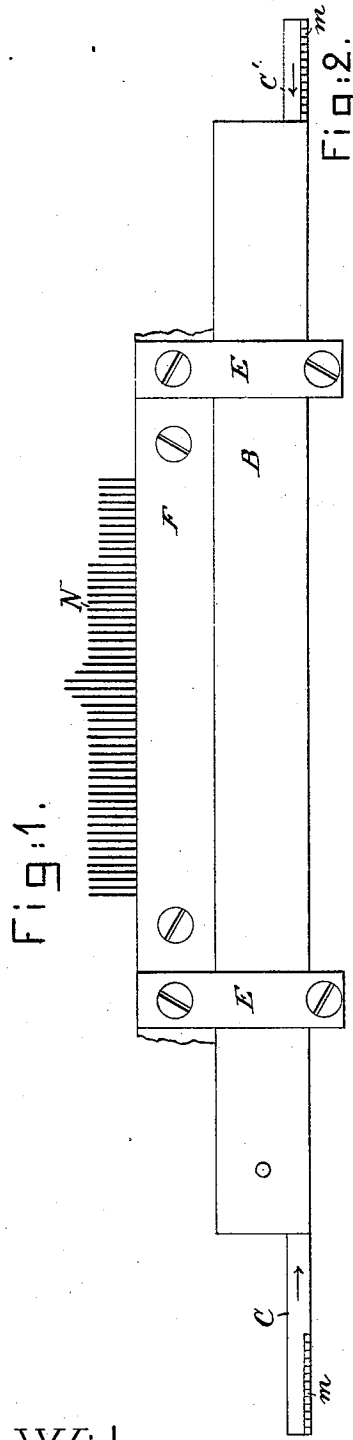
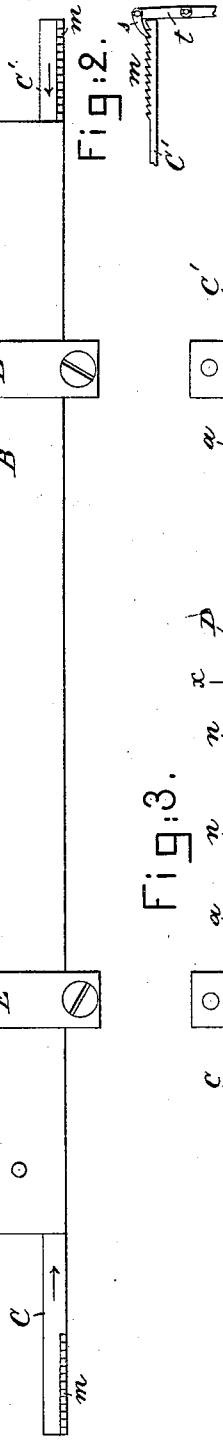
(No Model.)

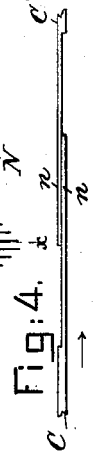
W. AIKEN.

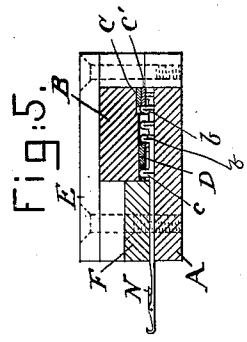
KNITTING MACHINE.

No. 253,652. Patented Feb. 14, 1882.









Witnesses.

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UNITED STATES PATENT OFFICE.

WALTER AIKEN, OF FRANKLIN FALLS, NEW HAMPSHIRE.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 253,652, dated February 14, 1882.

Application filed November 21, 1881. (No model.)

To all whom it may concern:

Be it known that I, WALTER AIKEN, of Franklin Falls, county of Merrimack, State of New Hampshire, have invented an Improvement in Knitting-Machines, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to knitting-machines employing a series of reciprocating latched needles, from a portion of which the loops are to be removed in the process of narrowing the fabric being knitted.

Heretofore the needles from which the loops have been removed to enable narrowing to be done have been pushed down or depressed at their front ends by a bar which bears on the bodies of the needles back of their latches, thus placing the bodies of said needles at the ends of the series of needles, and from which the loops have been removed, so low that the hooks of the said needles so depressed, but which are thereafter reciprocated in the regular manner, will not take yarn from the yarn-carrier—as, for instance, in United States Patent No. 214,743, heretofore granted to me, and in United States Patent No. 15,435, July 29, 1856. The continued reciprocation of these needles, from which the loops have been removed for narrowing, is objectionable, as they are in the way, and frequently cause bad work by catching the fabric already knit and sometimes the yarn from the yarn-carrier. The needles, in order that they may be depressed at their hooked ends into a lower plane without injury, necessitate peculiar constructions of needle beds and grooves. In this my invention the needles from which the loops have been removed in any usual way for narrowing the fabric are withdrawn or held back in their grooves, so that they do not reciprocate, as heretofore, after their yarn-loops have been removed. These narrowing-needles, or needles without loops, are held drawn back in their grooves for such a distance that their shanks are out of the range of the usual cam and their hooks of the yarn-carrier. To do this simply and effectually, and yet enable me to employ a common needle-bed having grooves of uniform width and depth, I have cut away the under side of the usual cam-bar sufficiently to receive the two narrowing cam-slides, they having grooves adapted to receive in them at proper times the auxiliary shanks of the needles, the latter, or jacks to which they are soldered, having main shanks to be engaged by the usual knitting-cam and auxiliary shanks to be caught and held by the narrowing cam-slides.

Figure 1 represents in top view a sufficient portion of a knitting-machine to, in connection with my patent referred to, illustrate my present invention. Fig. 2 is a detail of the outer end of the narrowing cam-slide and a pawl and lever to move it; Fig. 3, an under-side view of the parts shown in Fig. 1 as it would appear if the usual grooved needle-bed in which the needles are held and slide was transparent; Fig. 4, a detail of the side lapped ends of the narrowing cam-slides; and Fig. 5 is a cross section of Fig. 3 on the dotted line *x x*.

In Fig. 3 the narrowing cam-slide at the left is shown as completely withdrawn and the one at the right as fully moved in, as it will be to hold the needles from which loops have been removed, the said figure thus showing the two extreme positions of the narrowing cam-slides; but in operation the said cam-slides will not be at the same time in the two positions shown.

The cam-bar B, provided with the usual needle-operating cam D, will in practice be reciprocated longitudinally in the frame-work of the machine above the usual needle-holding bed A, substantially as in my United States Patent No. 214,743, hereinbefore referred to. The cam-bar B will be held down in place by cross-pieces E, extended across it and secured to the usual frame-work of the machine. The needles N will be held down in their grooves in the bed A by means of a cap, F, all as usual.

The under side of the cam-plate below the heel of cam D is suitably cut away or grooved from end to end to receive narrowing cam-slides C C′, each provided with a suitable cam-groove, *a*, into which the auxiliary shanks *b* of the needles N are made to pass at the proper time as the narrowing cam-slides are moved longitudinally independently of the cam-bar B.

Each narrowing cam-slide has a series of ratchet-teeth, *m*, at its upper side, and may be moved forward or in the direction of the

arrows thereon intermittingly at the proper times by a suitable pawl, *s*, carried by a lever, *t*, which in practice will be vibrated by a cam, such as marked *u* in my patent referred to. The said patent, by like letters *s t*, shows a pawl and lever for moving the slides which depress and hold down the front ends of the needles while they are being reciprocated. Each needle N has a main shank, *c*, and an auxiliary shank, *b*. When the needle at the ends of the series of needles are to operate for knitting the narrowing cam-slides will be moved so far outward, as at the left of Fig. 3, that their cam-grooves *a* will rest outside the series of needles; but the forward or inner ends of the slides will lie one on the other, as in Fig. 4. When both cam-slides are in the position of cam-slide C the auxiliary shanks *b* will rest against the edges of the parts *n* of the slides, which will keep the main shanks *c* of the double-shanked needles in proper position to be engaged and reciprocated by the knitting-cam D as the cam-bar is moved longitudinally.

The narrowing-slide C C′ will be reciprocated intermittingly in the direction of the arrows thereon when it is desired to hold stationary certain of the needles at the ends of the series of needles N, their yarn-loops having been removed to other needles for narrowing the fabric being knitted, and as they are so moved and brought gradually into the position of the cam-slide C′, Fig. 3, by pawls and levers, as shown in my said patent, the auxiliary shanks *b* of the double-shanked needles are made to enter the grooves *a*, where they are retained, while the cam-bar continues to reciprocate above the needle-bed A, upon which, under the said cam-bar B, the cam-slides are made to move. The needles, the shanks *b* of which enter grooves *a*, do not reciprocate, but remain at rest beside the other needles, which are moved by cam D. These narrowing cam-slides which are so moved independently of the cam-bar B will be moved when the shanks of the needles to be engaged by them are not in line with the cam D, or, better, when the cam-bar B is at one or the other extreme of its reciprocating movement.

The grooves *a* of the narrowing-slides will gradually receive into them the auxiliary shanks of only those needles at each end of the series of needles from which the loops have been removed, and which are to be thereafter held at rest or out of range of the knitting-cam D and the usual yarn-carrier, not necessary to be herein shown, as it is common to my said patent and to others before it.

In the drawings, Fig. 3, I have shown some of the needles at the right as drawn back by the narrowing cam-slide C′.

Instead of making the shanks *b c* directly as parts of the wire from which the needles N are made, I may, it is obvious, attach the bodies of the needles to their jacks having double projections to serve as shanks.

I claim—

The cam-bar provided at its under side with the knitting-cam, combined with the narrowing-slides C C′, fitted to slide under the said cam-bar as described, or between it and the needle-bed, and with the needle-bed and the series of needles provided with main and auxiliary shanks or projections, whereby some of the said needles may be held back and at rest in the grooves of the needle-bed during the reciprocation of the cam-bar, substantially as and for the purpose described.

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

WALTER AIKEN.

Witnesses:
G. W. GREGORY,
BERNICE J. NOYES.