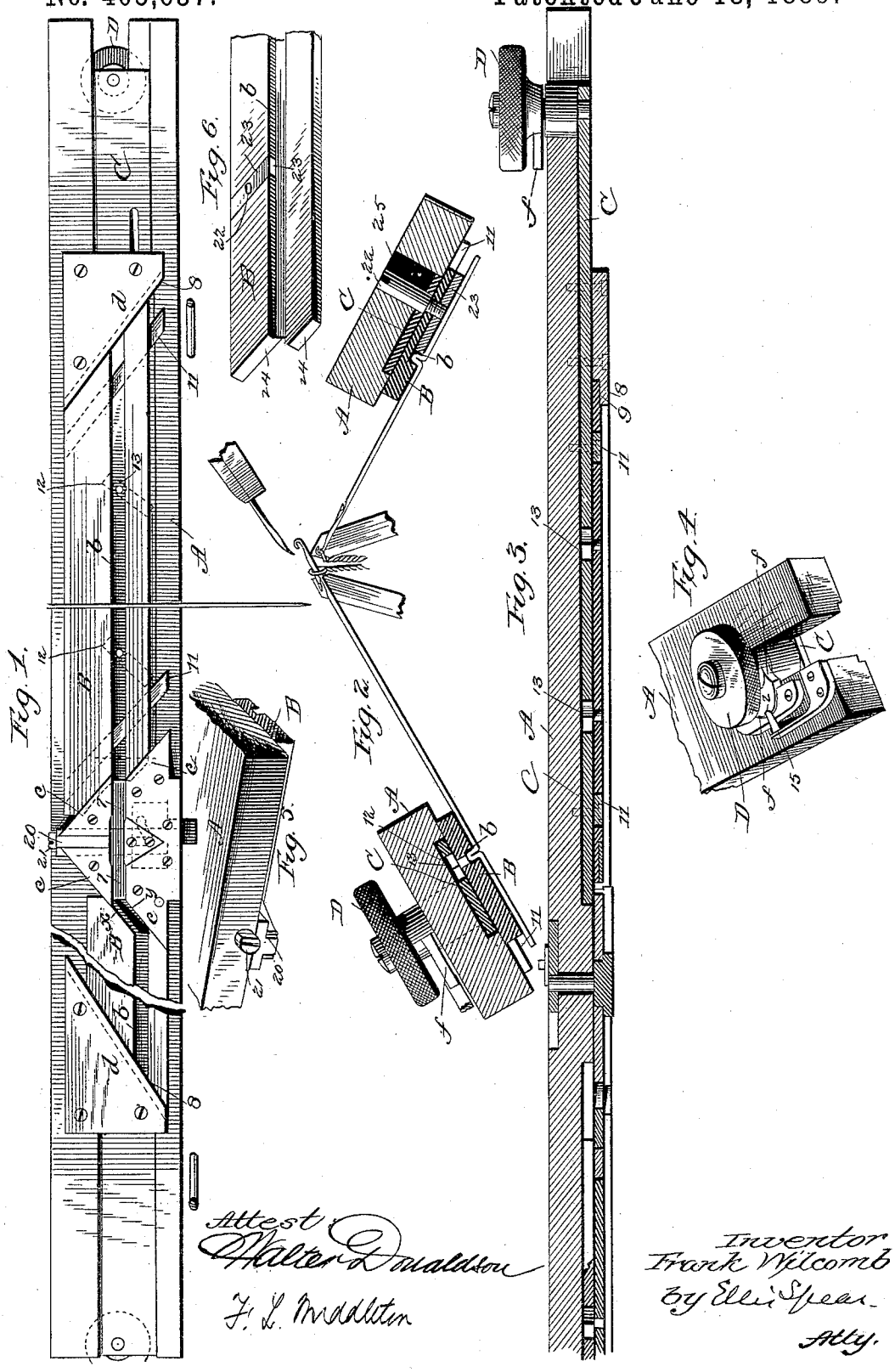
(No Model.)

F. WILCOMB.

STRAIGHT KNITTING MACHINE.

No. 405,637. Patented June 18, 1889.



Attest
Walter Donaldson
F. L. Middleton

Inventor
Frank Wilcomb
by Ellis Spear
Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

FRANK WILCOMB, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE WILCOMB MANUFACTURING COMPANY, OF SAN FRANCISCO, CALIFORNIA.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 405,637, dated June 18, 1889.

Application filed February 29, 1888. Serial No. 265,725. (No model.)

To all whom it may concern:

Be it known that I, FRANK WILCOMB, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Straight-Knitting Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention which is the subject of the following specification has been made by me for the purpose of providing means for operating the needles of a knitting-machine forward beyond the sinkers or backward into normal position independently of the movement of the needles in the operation of knitting, the backward and forward movements contemplated in this invention being designed to expose the needles and render them accessible, when the work is to be mended or a partially-knitted fabric is to be placed thereon, or when the fashioning of the work is to be done either by hand or automatically, as contemplated by me in United States Patent granted me October 12, 1886, No. 350,795.

The improvement hereinafter described also provides for the easy movement of the needles and their ready manipulation and for the ready removal of defective needles without disarranging or removing any of the operating parts of the machine.

I have shown my invention in connection with a straight latch-needle knitting-machine, but it is not necessarily confined thereto.

The main feature of the invention consists of a novel construction of switch-cam, whereby the groove for the needle-heels is maintained of uniform width throughout without regard to the relative positions of the movable and fixed parts of the cam.

It also consists in mechanism for moving the cam and in mechanism for moving the needles, all as hereinafter more fully explained.

The accompanying drawings show the form in which I have embodied my invention.

Figure 1 is a bottom view of the slide-bar, my improved device being shown in place thereupon. Fig. 2 is a transverse section through the slide-bars and cam-plate, showing the upper ends of the sinker-bars and two needles. Fig. 3 is a longitudinal section of Fig. 1. Fig. 4 is a perspective view of the hand-operating device. Figs. 5 and 6 are detail views of means by which needles may be removed from the slide-bar.

The ordinary slide-bar of straight latch-needle knitting-machines is shown at A, and this stands for any suitable support for my improved cam B. This movable cam is shown on both sides of a fixed part, and the longitudinal groove for the needle-heels in the cams is shown at *b b*, and those of the fixed part are shown at 7 7 on each side of the ordinary V-cam. These grooves are of the same width, and are always in connection with each other, either in direct line, as shown on the right of the V-cam in Fig. 1, or obliquely, as shown on the left.

The cams B are moved by means of a slide-plate C, which lies in a recess in the under side of the slide-bar and above the cams B. These cams move obliquely across the face of the slide-bar, being guided by ways 11, which are fixed to the under face of the slide-bar and fit into grooves in the upper face of the cams. When lateral pressure is put upon the cams, their ways direct them accurately and obliquely to one side, according to the inclination of the ways. The cams are held in place by their rabbeted ends 9 extending under like rabbets 8 on the slide-bar; but the connections may be by bevels, or in any other way which will hold the parts snugly in sliding connection. Motion laterally is imparted to the cams by means of the slide C through grooves or slots 12, cut therein at right angles to the ways 11. Pins set in the cams carry blocks 13, which fit in the grooves or slots 12, and when the plate C is moved the slots or grooves therein give a wedging action upon the cams through the blocks and pins and force these cams laterally and with ease. The ends of the cams are in lines parallel to these lateral lines of movement on the slide-bar. This keeps them in bearing-connection with the plates *d* at their ends; but on the inner ends, which abut upon the cam containing the fixed part of the needle-path, a special provision is made for the purpose indicated above, for preserving uniformity of width in the needle-groove. For this purpose the inclined

ends of the cams above and below the needle path or groove *b* are in different though parallel planes. The part below the needle-path (looking at Fig. 1) is in advance of the part above a distance about equal to the width of the groove *b*. The abutting edges *c c* of the fixed part are also each in two different vertical planes, and are reversely arranged to correspond to the inclined ends of the cams. As these inclined ends are in lines parallel with the guides 11, the ends of the cam move in contact with the inclines *c c;* but as the cam advances an inclined groove opens out, connecting the straight parts of the groove in the fixed and movable parts, in length corresponding to the amount of advance of the cam. Thus the groove in which the needle-heels move is always of the same width, the needles are accurately guided, and there can be no wabbling. This inclined portion of the groove is represented between the lines *x y*, Fig. 1. The heels of the needles being of less depth than the depth of the grooves, the rabbets on the cams do not tend to lessen the width of the grooves in the movement of the cams. The inclination of the groove also renders the movement of the needles easy in changing their position, and they are held accurately when confined in the groove of the switch-cam and the bar is reciprocating across the rows of needles.

The slide-plate C is provided with means for operating it back and forth, consisting of a stud set in the end of the plate and having a milled head D. The stud moves in a slot in the slide-bar, as shown in Figs. 1, 3, and 4.

When the knitting-machine is running and the knitting is being carried on without fashioning, it is of course necessary that the switch-cam be securely held in normal position to the slide-bar A, in order that as said bar moves the switch-cam will move properly with it, as though fixed rigidly to it, and thus act upon the needles. For this purpose the sliding plate C, which is employed to operate the switch-cam diagonally of the slide-bar A, is provided with a stud which projects up through an opening in the end of the bar A. This stud carries a thumb-wheel D, which has formed with its hub a flange or plate *f*. The plate projects over the upper surface of the bar A on one side. It has a notch *z*, Fig. 4, into which is adapted to fit a spring-detent 15, which is secured to the bar A. The switch-cam is held in normal and fixed position relatively to the slide-bar A, when the detent is in engagement with the notch, through the plate *f*, the stud, and the slide-plate C; and in the reciprocation of the bar, while the machine is running, the switch-cam will be held in proper place, and thus the needles will be properly acted upon. When it is desired that the switch-cam be moved in its relation to the slide-bar to effect the forward and backward movement of the needles independently of the knitting action for exposing them, or in fashioning, it is only necessary to give the thumb-wheel D a partial turn and disengage the notch from the detent, and then the sliding plate can be moved either forward or backward and the switch-cam properly shifted.

To allow the operator to withdraw any needle, a removable key 20 is fitted into a lateral groove opening from the groove 7, or that of the switch-cam, as in Fig. 6, to the edge. The key is held by the head of a screw 21, cut down on one side to allow the key to pass without removing the screw entirely.

If the key is in the switch-cam, the seat is preferably cut at an angle parallel to the inclined end of the cam, and is held by a screw 22, Fig. 2, set in a slot cut transversely in the slide-bar.

The key 23 is shown in Figs. 2 and 6, from the latter of which it will be seen that it extends from the groove in the switch-cam to the edge thereof and parallel with the inclined end 24, Fig. 6. By making the key-seat inclined the needles can be more readily removed by giving the bar a slight longitudinal movement. The needle which is in engagement therewith will be forced out by contact with the inclined side of the seat. The slide-bar is slotted at 25 to receive the holding-screw 22, the slot being provided to allow the switch-cam to shift laterally across the bar. When needles are to be removed, the screw 22 is taken out, and the key 23 is then withdrawn from its seat, and by moving the bar so as to bring the open seat in line with any needle said needles may be withdrawn through the opening. I have shown the switch-cam and the various details of construction and operating parts on both sides of the central needle-paths 7 7; but as these switch-cams, details of construction, and operating parts are similar in all respects on both sides the foregoing description, which applies to one set particularly, will answer for both.

I claim as my invention—

1. In combination, the slide-bar, a fixed part of the needle-path having the inclined edge, the inclined guides, the cam movable on the inclined guides having a longitudinal groove and formed with its end adjacent to the fixed part of the needle-path also inclined, and mechanism for moving the movable cam, substantially as described.

2. In combination, the slide-bar, a fixed part of the needle-path having the inclined edge, the inclined guides, the cam movable on the inclined guides having a longitudinal groove and formed with its end adjacent to the fixed part of the needle-path also inclined, the parts of said inclined end above and below the needle-path being in different but parallel planes, and mechanism for moving the movable cam, substantially as described.

3. In combination, the slide-bar, the fixed part of the cam of a knitting-machine having a needle-path 7 7 and inclined edges, the parts of which above and below the needle-path are in different but parallel planes, and cams B B, having longitudinal grooves *b* and inclined

ends corresponding to the edges of the fixed part, and means for moving the cams B, all substantially as described.

4. In combination with the slide-bar A and the switch-cam, the slide C, and stud D, a segmental notched plate *f*, fixed to the stud D and projecting over the upper surface of the bar A on one side of its slot, and a spring-detent arranged to hold the slide-plate C and cam in normal position in relation to the slide-bar A, all as set forth.

5. In combination, the slide-bar, a movable cam, inclined guides therefor, and a key located in an inclined groove formed in the movable cam, substantially as described.

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

FRANK WILCOMB.

Witnesses:
GEO. L. BARNES,
GEO. R. WILSON.