

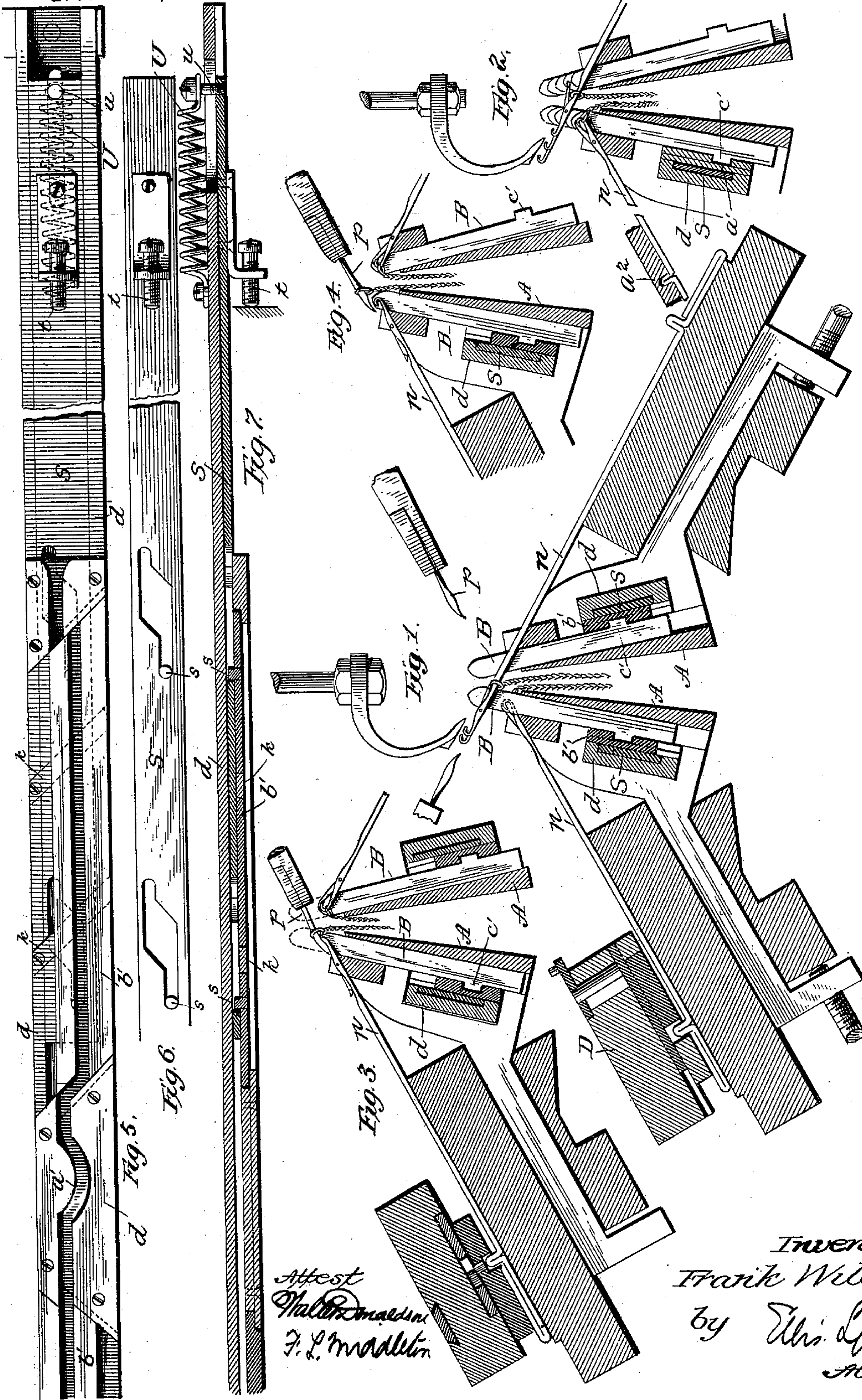
(No Model.)

3 Sheets—Sheet 1.

F. WILCOMB.
STRAIGHT KNITTING MACHINE.

Patented Aug. 6, 1889.

No. 408,560.



Attest
Thos. M. Madsen
J. L. Madsen

Inventor
Frank Wilcomb
by Ellis L. Mear
Atty.

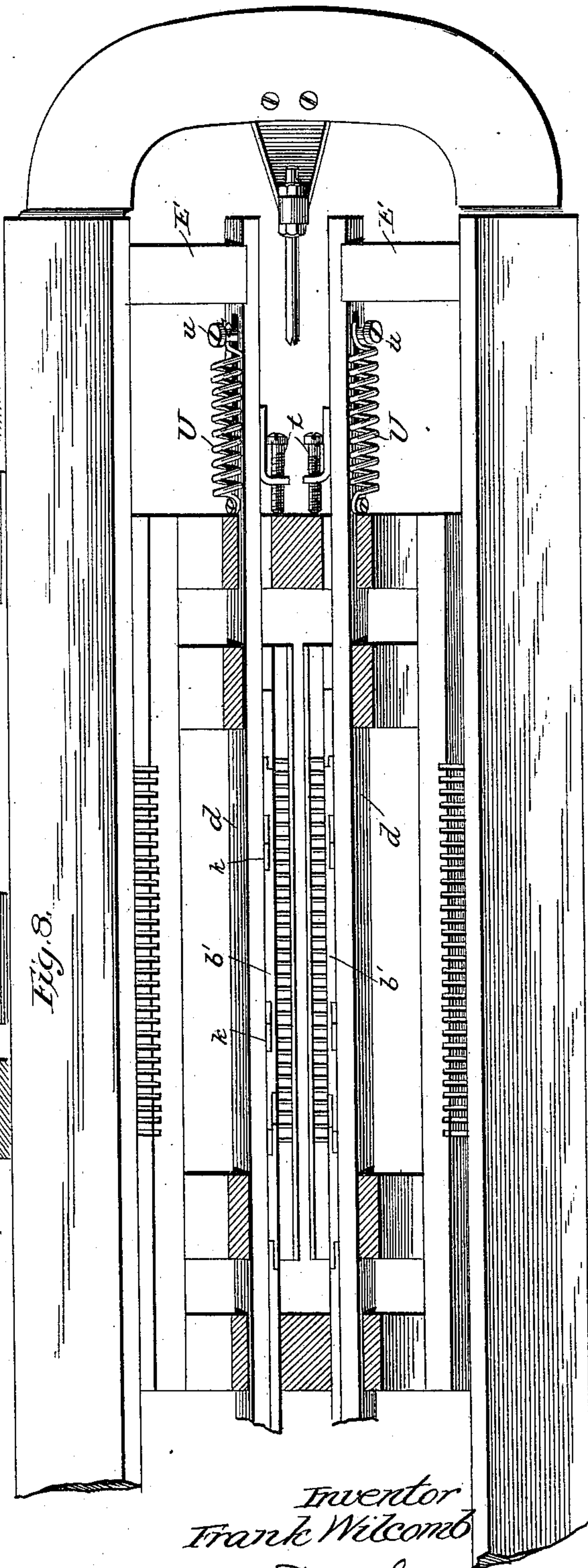
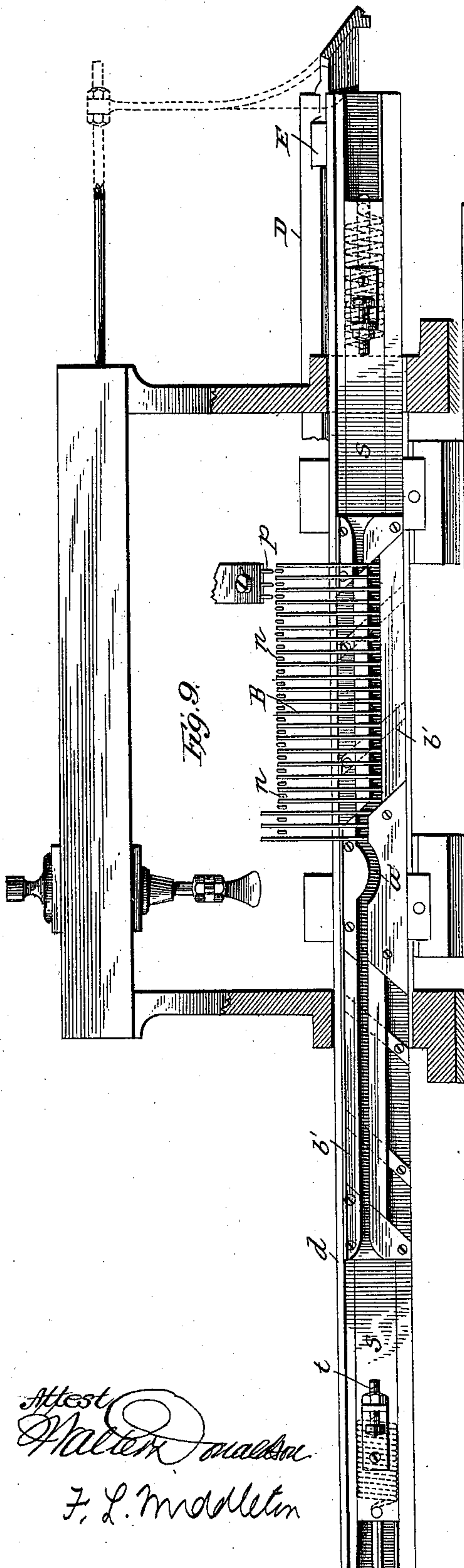
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3 Sheets—Sheet 2.

F. WILCOMB.
STRAIGHT KNITTING MACHINE.

No. 408,560.

Patented Aug. 6, 1889.



Attest
Walter D. Middleton
F. L. Middleton

Inventor
Frank Wilcomb
by Wm. L. Lyan
Atty.

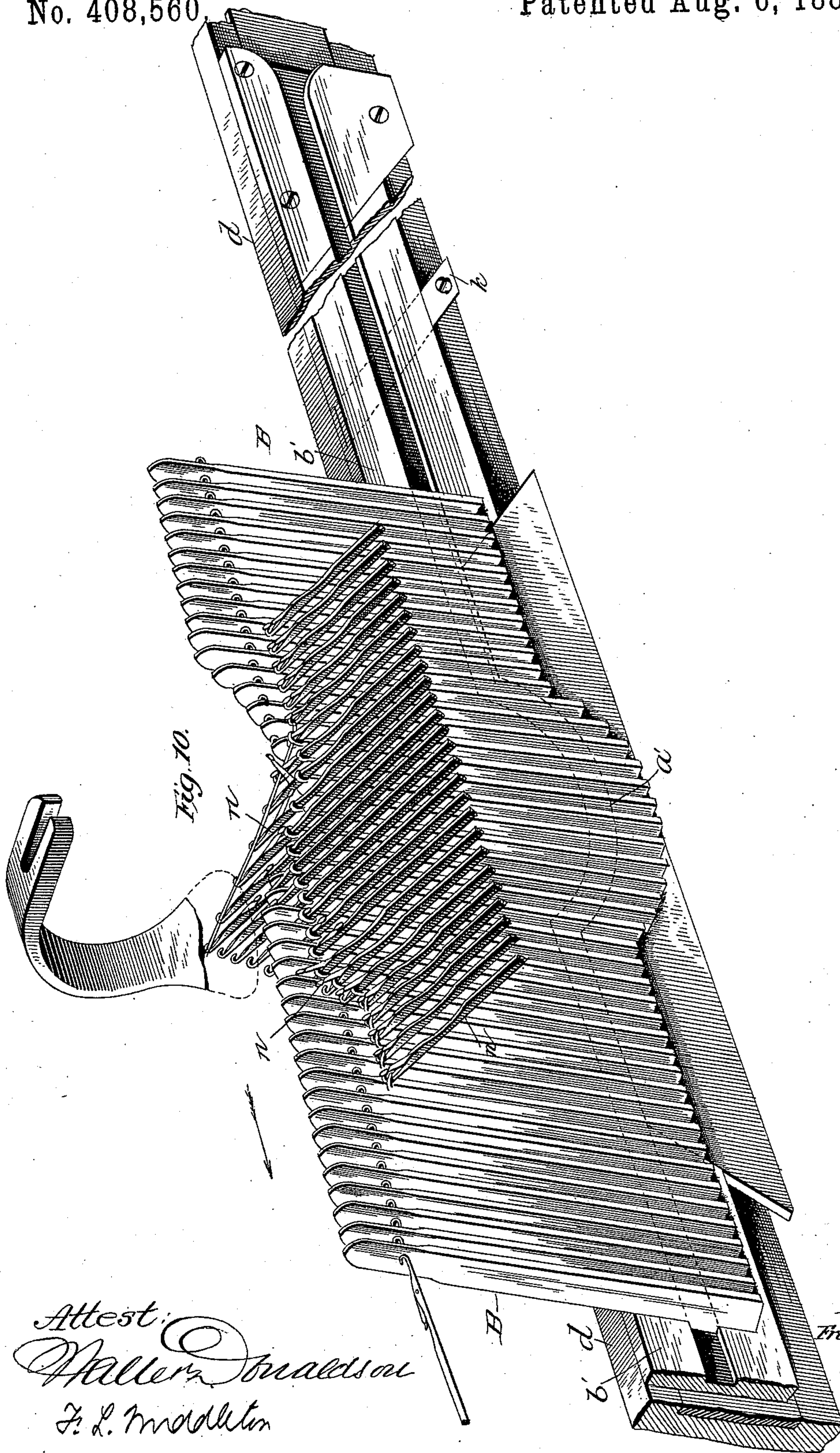
(No Model.)

3 Sheets—Sheet 3.

F. WILCOMB.
STRAIGHT KNITTING MACHINE.

No. 408,560

Patented Aug. 6, 1889.



Attest:
Walter Bradson
J. L. Middleton

Inventor
Frank Welcomb
By Wm. S. S. S.
Atty

UNITED STATES PATENT OFFICE.

FRANK WILCOMB, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE WILCOMB KNITTING MACHINE COMPANY, OF JERSEY CITY, NEW JERSEY.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,560, dated August 6, 1889.

Application filed November 10, 1888. Serial No. 290,464. (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.

My invention, hereinafter described, relates to straight latch-needle knitting-machines.

The object sought is to dispense with the weight used heretofore to draw down the goods as the knitting progresses and to substitute therefor a uniform positive pushing force to move back the loops as they are formed on the needles. The imperfection attending the operation of a weight upon the goods lies in the unavoidable lack of uniformity of action, especially in the case of fashioned fabrics, in which the greater strain is on one interior part, while the margins of the goods or the parts at or near the ends of the needle-rows are either only slightly acted on by the strain or wholly unaffected.

My invention consists of the combination, with a series of needles and sinkers acting together to form loops, of a second series of sinkers extending across the path of the needles to force back the loops thereon, and in making said sinkers movable to permit feeding of the yarn and transferring stitches, and in details of construction.

The various parts in which my invention is embodied and their connection with a straight latch knitting-machine—such as that of my Letters Patent of the United States granted October 12, 1886, and numbered 350,795—are shown in the accompanying drawings, in which—

Figure 1 represents a transverse section through the needle-beds and slide-bars and through the sinker-beds, and shows the stitch-cam in its relation to the thread-carrier. Fig. 2 is a detail section showing the position of the sinkers in forming stitches. Figs. 3 and 4 represent sections illustrating the position of the sinkers in transferring stitches. Fig. 5 shows an under side view of the slide-bar and shifting-cam for these sinkers. Fig. 6 is a

plan view of the operating-plates for the shifting-cam. Fig. 7 shows a longitudinal section of Fig. 5. Fig. 8 represents in plan the needle-bars and the slides which operate the sinkers connected therewith, the parts above being broken away. Fig. 9 shows a central section of Fig. 8 with the thread-carrier added thereto. Fig. 10 is a perspective view of the sinkers on one side with their slide-bar, fixed cam, and shifting-cam, illustrating the action of the parts.

In the drawings, A represents the sinker-beds on each side. They are supported, as heretofore, on the frame of the machine, and are formed to receive the sinkers B, which slide freely therein. On the back of each bed is supported a sinker-slide *d*. These slides are connected to arms E on the needle-slides D and move therewith. They carry each a fixed cam and a shifting-cam, which move the sinkers for the various operations of the other parts, all as hereinafter explained. The sinkers B lie in grooves open on the rear and have lugs *c'* on their rear edges, which project into the grooves in the fixed and shifting cams. The fixed cam *a'* is located in the central part of the slide and is opposite the switch-cam *a''*, Fig. 2, or a little behind it, so that it depresses the sinkers immediately after the needles *n* of those sinkers have taken the thread and when they are beginning to move back. The depression of the sinkers therefore follows the thread-guide, as shown in Fig. 10. An inspection of this figure will show that the sinkers stand normally higher in this machine than in those of this class heretofore made, and when at this height they lie across the path of the opposite needles and will push back the stitches on the needles as the needles advance; but if permitted to remain at this height (when the reversible thread-carrier shown is used) during the whole operation of the stitch-forming mechanism those on one side would obstruct the operation of the needles, as those on the opposite side would be between the thread and the needles receiving it. It is for this purpose that the sinkers are depressed as the stitch-cam

draws back the needles to form the loops. It is also necessary that the sinkers should be depressed at the points where and the times when the transfer of stitches is made by the points *p*. This is effected by means of the sinker-shifting cam *b'*. This in its construction and operation is substantially the same as the shifting-cam shown in an application filed by me in the United States Patent Office on the 29th day of February, 1888, Serial No. 265,725. The cam has a straight groove for the lugs *c'* of the sinkers and moves in oblique guideways *k k* on the sinker slide-bars. The ends are inclined and parallel with the guideways. One of these shifting-cams is located on each side of the fixed cam, the ends of which have a corresponding incline. The inclined end of the movable shifting-cam is cut away above the groove, so as to form a continuous path, as explained in the said application. The grooves therein hold the lugs of the sinkers of both ends of the rows, and when the cams are in their uppermost position the sinkers are raised and lie across the path of the opposite needles, and when the cams are moved down the sinkers are depressed, this being required only when a transfer of stitches occurs. The shifting-cams of the sinkers are operated by a cam-slide *S*, which has slots, as shown in Fig. 6. Each slot has two inclines—one for elevating and the other for depressing the sinkers. Each has also an elongated horizontal surface between the inclines, which allows the sinkers to remain down during the operation of transferring. The shifting-cams are connected to the cam-slides by means of pins *s*, set in the shifting-cams and projecting into the slots in the slides. The cam-slides are moved in one direction by means of springs and adjustable studs *t* on the slides, which at a certain point in their movement strike on the frame, as shown in Figs. 8 and 9, and arrest the movement of the cam-slide, while the outer parts move on, extending the springs, and on the return-stroke of the machine the springs retract the cam-slide in the opposite direction.

The construction is shown in detail in Figs. 5, 6, and 7. The studs *t* are fixed to ears on the faces of the cam-slides, and pins *u*, set in these slides, project through the slides *d* of the sinkers. To these pins are attached the springs *U*, which at their other ends are connected to the sinker-slides. The slot through which the pin extends is equal to or greater than the length of the slot in the cam-slide.

In Figs. 5, 6, and 7 the sinker-slide is at the limit of its left-hand movement and the sinkers are down. On its return toward the right the stud leaves its bearing on the frame and the springs retract, forcing the cam-slide to the left and causing the horizontal portion of the slot to pass under the pin of the shifting-cam, and, finally, the incline to act thereupon. When this takes place the shifting-cam is raised, and with it the sinkers, and these con-

tinue up throughout the rest of the movement of the slide-bars, until, on their return, the studs *t* again meet their bearings on the frame. The shifting-cams and sinkers, therefore, are down only when the slides are at or near the end of the stroke. At this time the transfer-points operate upon the loops. The action of these points is illustrated in Fig. 3, and the position of the sinkers is there shown in full lines, the raised position being indicated in dotted lines. The mechanism for operating the transfer-points is such as that shown in my patent, No. 350,795.

The sinkers are raised during the operation of knitting sufficiently to act on the loops which are on the needles and to keep them pushed back the whole length of the rows. The position of the pushed-back loops and of the fabric is shown in Fig. 1. With this construction of the parts the fabric moves down and the loops are kept back on the needles uniformly and without the aid of a weight.

I claim—

1. In combination, the row of needles, operating means and a row of sinkers therefor, a second row of sinkers arranged opposite the first, said sinkers being movable across the path of the needles, each of said second sinkers being in position across the path of the opposite needle to force back the loop thereon as said needle moves forward, and means for moving the sinkers, substantially as described.

2. In combination, a row of needles, operating means and a row of sinkers therefor, a second row of sinkers arranged opposite and normally across the path of the needles and in position to force back the loops thereon, said sinkers being movable, and means for moving them, substantially as described.

3. In combination, a row of needles, the stitch-cam, a row of sinkers therefor, a second row of sinkers arranged opposite the first, said sinkers being movable across the path of the needles, each of said sinkers being in position to force back the loops on the opposite needles as said needles move forward to take the thread, and means for moving said sinkers from across the path of the needles, consisting of a slide-bar and a fixed cam *a'*, substantially as described.

4. In combination, two rows of needles, operating means and two rows of sinkers for forming loops, the sinkers on each side being movable across the path of the opposite needles for forcing back the stitches thereon as they move forward, and means for operating the sinker, substantially as described.

5. In combination, a row of needles, operating means and a row of sinkers therefor, a second row of sinkers extending across the path of the needles to force back the loops thereon, stitch-transferring mechanism, and means for moving the second row of sinkers, substantially as described.

6. In combination with the needles and

stitch-cam of a knitting-machine, and with
the mechanism for transferring stitches on
said needles, vertically-movable sinkers, a
slide-bar therefor, a fixed cam on the slide-
5 bar and a shifting cam or cams also on the
slide-bar, and means for operating these parts,
all substantially as described.

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

FRANK WILCOMB.

Witnesses:

DANIEL MCNIVEN,
MILLARD F. MUNROE.