

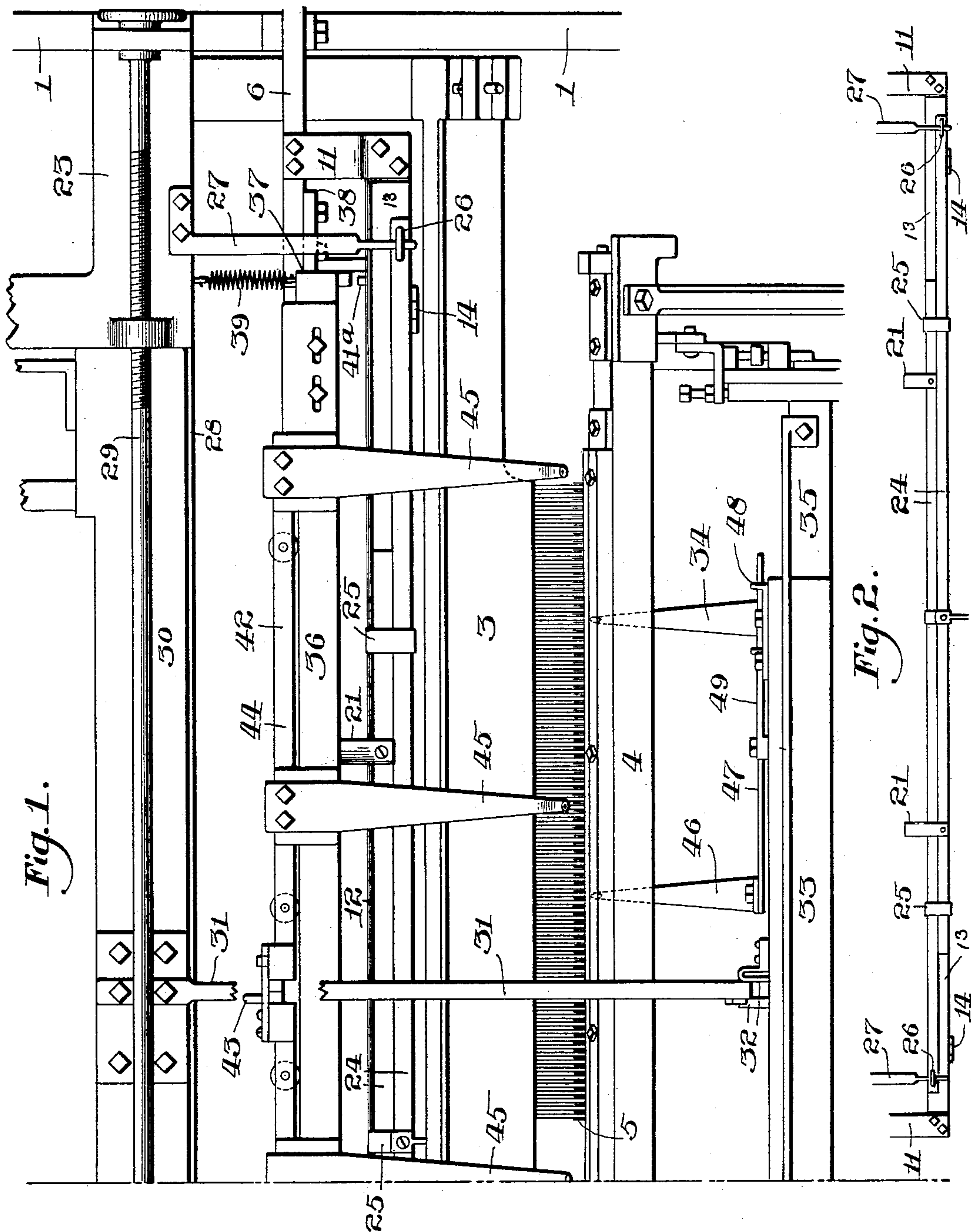
(No Model.)

3 Sheets—Sheet 1

F. RAVEN.
STRAIGHT KNITTING MACHINE.

No. 593,309.

Patented Nov. 9, 1897.



Witnesses.

Walter C. Pusey
A. V. Grouse

Inventor.

Freeman Raven,
per Joshua Pusey,
Attorney.

3. Sheets—Sheet 2.

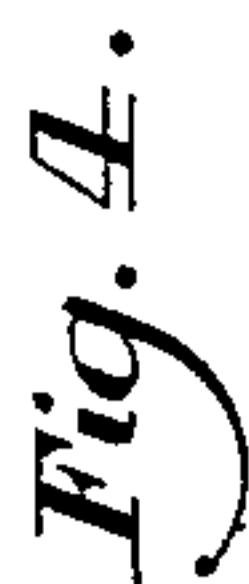
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Attorney.

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3 Sheets—Sheet 3.

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Fig. 5.

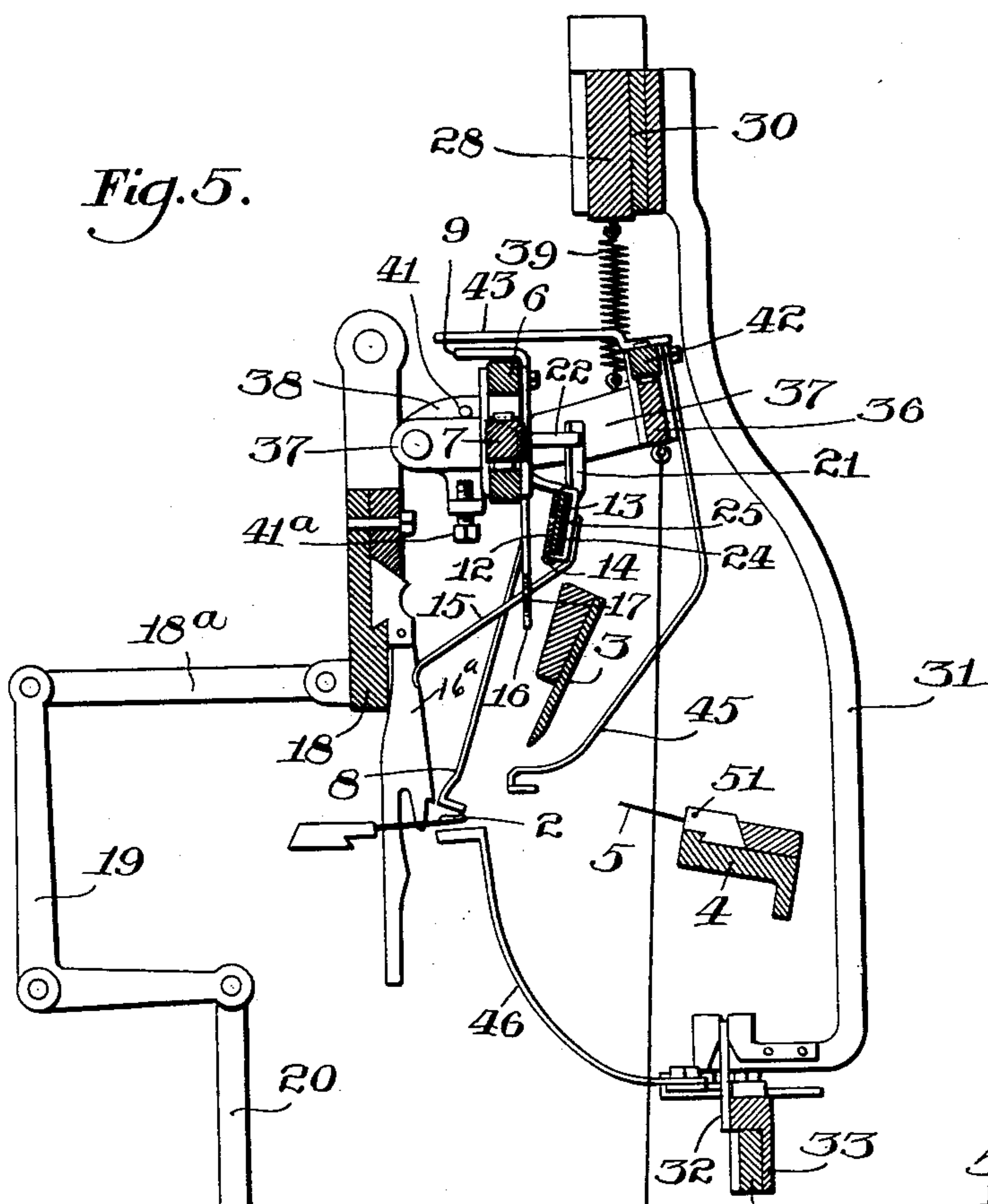


Fig. 6.

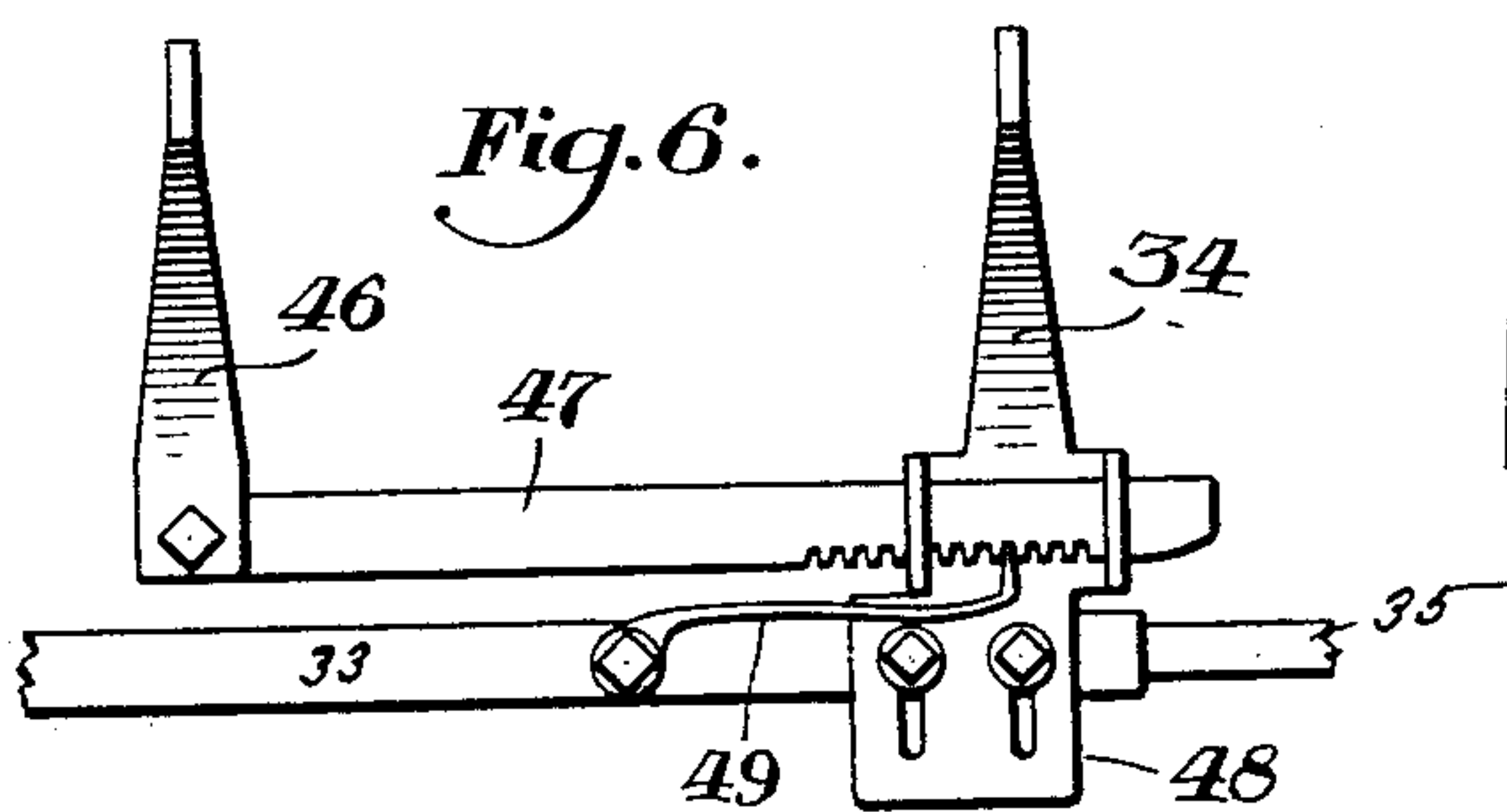


Fig. 7.

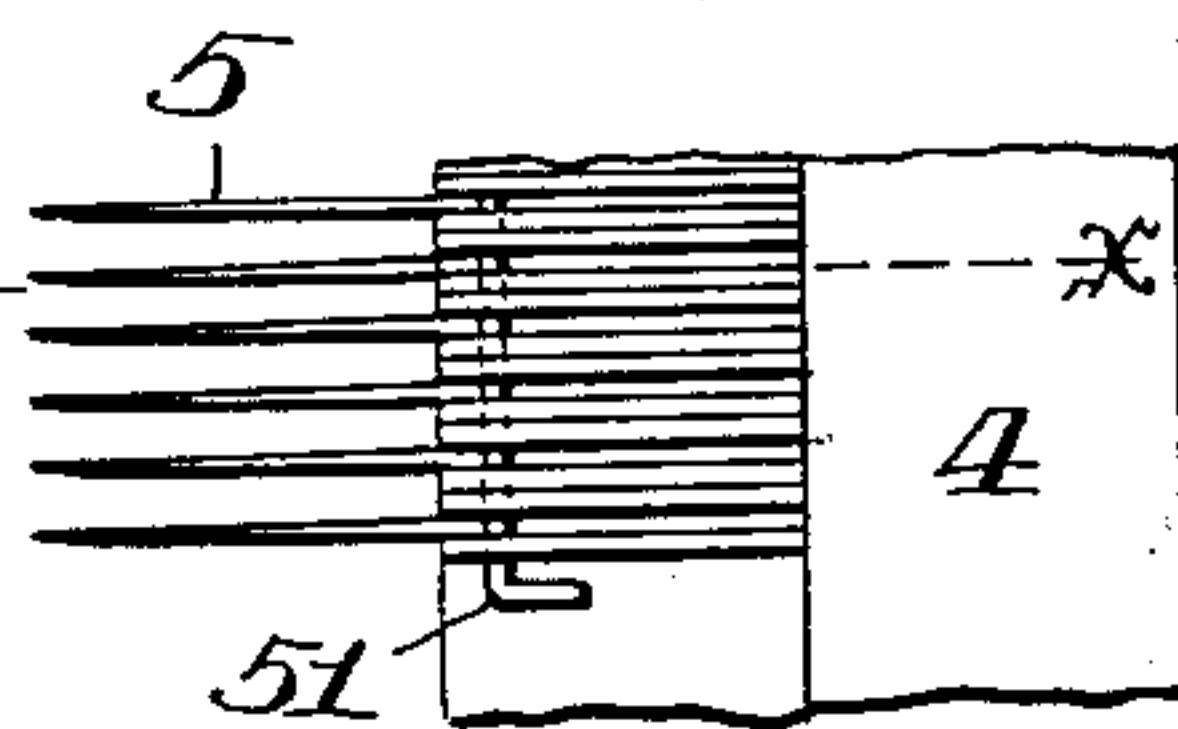
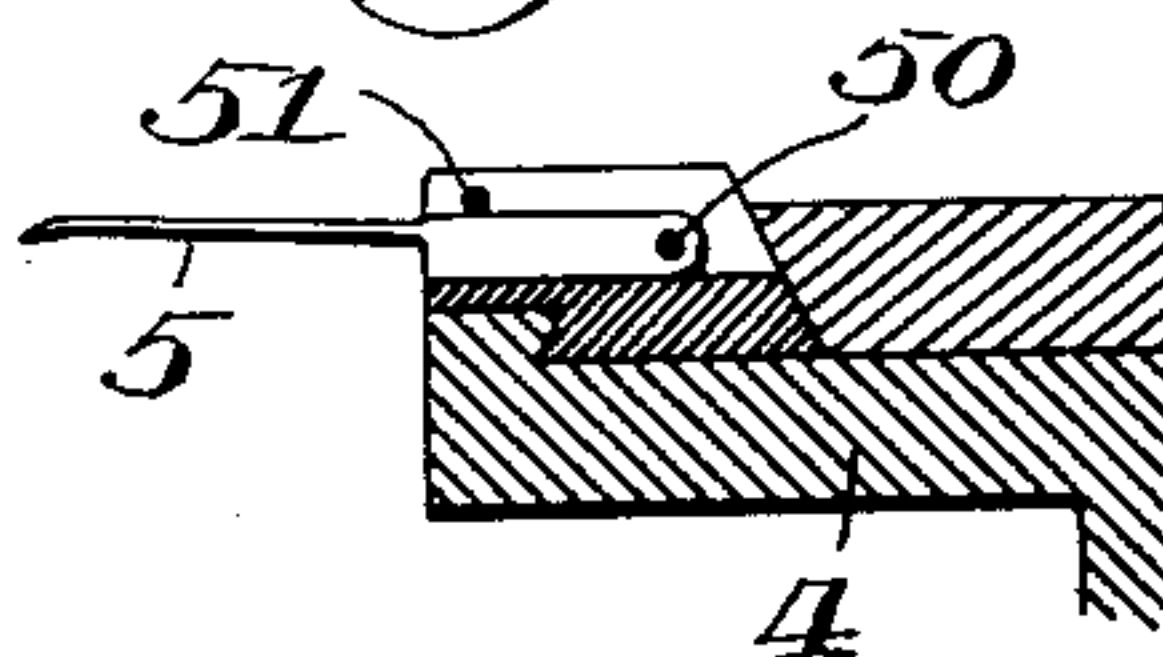


Fig. 8.



Witnesses.

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UNITED STATES PATENT OFFICE.

FREEMAN RAVEN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
JAMES R. KENDRICK, OF SAME PLACE.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 593,309, dated November 9, 1897.

Application filed August 20, 1896. Serial No. 603,292. (No model.)

To all whom it may concern:

Be it known that I, FREEMAN RAVEN, a subject of the Queen of Great Britain and Ireland, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Straight-Knitting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to that class of straight-knitting machines whereby elastic weft fabrics are produced, having reference more especially to improvements in the machine set out in my Letters Patent of the United States No. 576,376, dated February 2, 1897, to which reference may be had.

These improvements comprehend simple and efficient means for clamping and releasing the rubber weft at or near the end of its traverse at predetermined intervals, and also simple and efficient means whereby may be produced simultaneously two narrow "heel-sections" in and during the knitting of each width of fabric, as will hereinafter appear.

In the annexed drawings, Figure 1 is a front elevation of a portion of a knitting-machine embodying my improvements, showing the supplemental weft and thread guides as applied. Fig. 2 is an elevation of the weft clamping and releasing devices. Fig. 3 is a plan of said clamping and releasing devices and the supplemental weft-guides and their supporting parts. Fig. 4 is an elevation of the clamping and releasing devices, the main weft-carrier, and adjuncts, illustrating in diagram the needles and points. Fig. 5 is a partial transverse vertical section of the machine, indicating the relative positions of the improvements. Fig. 6 is a plan of the main and supplemental thread-carriers and their connections. Fig. 7 is a plan of a portion of the point-bar, showing the pivoted points therein. Fig. 8 is a transverse section as on the line xx of Fig. 7.

The numeral 1 designates a part of the main frame; 2, the spring-hook needles; 3, the presser-bar; 4, the point-bearing bar, and 5 the points thereon.

6 is a longitudinal guide-frame fixed on the front of the machine, and 7 a carrier mount-

ed in said frame and provided with depending weft-guides 8, that lie directly above the needles. Connected to a lug 9 on this carrier is a cord 10, by means of which the carrier may be drawn from end to end of the machine. The guide frame and carrier are, excepting as hereinafter mentioned, identical with the like parts set out in my previous patent, the frame as therein described comprising a horizontally-disposed bar c , secured at its ends to the side walls of the main frame, and a lower parallel bar c' , whose ends are upturned and bolted to the upper bar, thus forming an intermediate space or guideway, and the carrier comprising two end heads d , which are slidingly fitted between the bars and are connected and held a suitable distance apart by means of a bar d' , carrying antifriction-rollers d^2 .

Depending from the bar c , at or near its respective ends, are brackets 11, to which are secured the ends of a horizontal bar 12, which lies forwardly of and slightly below the carrier 7. On the face of this fixed bar is a bar 13, that is hinged thereto on its lower edge, as at 14, so that it (the hinged bar) may be swung against and from the fixed bar in a manner to constitute a clamping and releasing member.

The rubber wefts on their way from the bobbins to the depending guides 8 on the carrier are drawn between the bars 12 13. When the carrier completes its stroke, the hinged bar is closed so as to clamp the interposed wefts. In the return stroke of the carrier that portion of each weft which has in the preceding stroke been carried beyond the needles is delivered thereto, whereupon the clamp-bar is opened to release the weft and permit its free passage to the guides. This operation of successively clamping and releasing the weft is repeated at the end of each stroke of the carrier, and thereby is avoided the otherwise free and useless delivery of weft and consequent formation of slack at the end of each stroke of the carrier.

The clamp-bar is held temporarily in the closed position by means of a suitable latch device, which in this instance comprises a rearwardly-declining rod 15 on said bar (said rod being affixed to a bracket 25, below de-

scribed) and a spring-rod 16, depending from the lower frame-bar, which latter rod is provided with an offset 17, with which the rod 15 engages when the clamp-bar is closed. This bar is closed to clamp the weft during the forward movement of the usual swinging jack-frame 18 when the carrier has completed its traverse, the cross-bar of the jack-frame at that time abutting against the rod 15. This jack-frame carries the jacks 18^a and is connected by means of a link with one arm of a bell-crank lever 19, the other arm thereof being connected by means of a link 20 with a treadle (not shown) or other appropriate actuating means.

Suitably disposed on the clamp-bar toward its respective ends are vertical projections 21, preferably beveled, while on the carrier-bar *d'* near its respective ends are outwardly-projecting studs 22, which are so located in respect to the projections that in the return stroke of the carrier the rearward stud will abut against the projection 21 in its path and thereby force open and unlatch the clamp-bar, thus releasing the weft and permitting its free passage to the needles during the remainder of the stroke, at the completion of which the clamp-bar will be closed, as above described, so as to clamp the weft preparatory to a succeeding stroke.

As the stroke of the thread-carrier, below referred to, is from time to time decreased or increased in length to meet the requirements of the varying widths of fabric, it is requisite that the positions of the studs on the clamp-bar be adjusted in respect to the row of needles in operation, so that the bar shall be opened by the weft-carrier at the proper intervals. To this end the studs 21 are adjustably mounted on the clamp-bar and are appropriately connected with the usual end stops 23, that determine the throw of the thread-carriers, whereby the studs are adjusted by and with said stops. In the present instance the studs 21 are affixed to strips 24 24, respectively, which strips are applied longitudinally against the face of the clamp-bar and retained thereon by brackets 25, that are fixed to the edges of said bar and so arranged that the strips may be independently moved lengthwise of the bar. On the outer end of each of the strips is a perforated lug 26, through which extends a rod 27, depending from the overlying end stop, whereby when said stop is adjusted the strip and, perforce, the stud thereon are correspondingly moved on the clamp-bar.

The end stops are mounted on the respective ends of a longitudinally-disposed bar 28 on the forward part of the main frame and are adjusted lengthwise thereon by a screw-rod 29 or other suitable means. On this bar intermediate the stops is a reciprocative slide-plate 30, which may be reciprocated mechanically or manually, as desired, the traverse thereof being determined by the stops in the usual manner.

Depending from the slide-plate is an arm 31, that extends between suitably-disposed lugs 32 on a reciprocative carrier 33, to which are affixed the vertical thread-guides 34, so that during the reciprocation of the plate the said carrier and guides are correspondingly impelled. The carrier is mounted on a frame 35, which is longitudinally and vertically movable at predetermined intervals, the construction and arrangement of the parts being such that during the traverse of the carrier it is in the elevated position and the thread-guide eyes lie above the shanks of the needles, so that the threads are properly introduced to the latter; but at the end of each stroke of the carrier it is depressed, so as to drop the guide-eyes, with their respective threads, between and below the needles. As the frame and carrier may be actuated either manually or mechanically, as desired, and as mechanism for operating the same is fully set out in my aforementioned patent, it has not been deemed necessary to show or describe herein means to this end.

In the knitting of stocking-blanks on machines of the character under consideration there are produced at the lower end of each blank two heel-sections, which are subsequently sewed together to constitute the heel portion of the stocking. Heretofore it has been necessary to knit these sections singly but in order to enable the same to be knit simultaneously I provide the following construction: 36 is a horizontal bar affixed to forwardly-extending rock-arms 37, which are pivoted to brackets 38 on the guide-frame 6, above referred to. The bar is held normally elevated by means of a spring 39, which is secured to one of said rock-arms and to the fixed overlying bar 28 on the main frame. This bar is connected by a cord 40 or other means with a suitable treadle (not shown) by the depression of which the operator may lower the bar at will. One of the brackets 38 is provided with an upper fixed stop 41 and a lower screw-stop 41^a, between which the adjacent rock-arm 37 extends, which stops thus determine the movement of the bar 36.

Preparatory to the knitting of the heel-sections of the stocking-blank the operator disengages the cord 10 from the weft-carrier 7, mounts upon the bar 36 a supplemental carrier 42, and connects said cord with a stud 43 on the latter, so that the same may be reciprocated on the bar. This supplemental carrier comprises a bar 44, provided with anti-friction-rollers and with depending inwardly-extending weft-guides 45, which are arranged in pairs, one pair near each end of the machine. When the bar 36 is depressed as stated, the weft-guides lie directly above the needles, and thus in their traverse deliver the respective wefts thereto. As these guides obviously require separate coacting thread-guides, there is employed, in addition to the usual thread-guide 34 at each end of the carrier 33, an attachable thread-guide 46, which com-

prises in this instance a bar 47, toothed on its outer edge at one end and provided at its opposite end with the guide-arm 46. The toothed end of the bar is fitted to a bracket 48 at the lower end of the thread-guide 34 on the carrier, there being provided a suitably-arranged spring-dog 49, that may be engaged with the teeth in the bar, so as to lock the same and, perforce, the guide thereon in any desired position of adjustment in respect to the main thread-guide.

As the inner supplemental weft-guide does not clear the needles at each end of its stroke, it is necessary to throw certain of the points out of action in order to prevent their striking said guide. This is effected by pivoting such points to their butts, as indicated at 50, so that preparatory to the knitting of the heel-sections the points may be swung up out of operative position. These points are held in action by means of a rod 51, extending through the butts and bearing against the upper sides of the points, as shown in Figs. 7 and 8.

I claim as my invention—

1. In a knitting-machine, the combination, with the needles, the reciprocative weft-carrier, and its supporting and operating parts, of the longitudinally-arranged stationary bar adjacent to the path traversed by said carrier, a bar hingedly connected with said stationary bar, means for temporarily closing said hinged bar and means for opening the same at predetermined intervals, substantially as described.

2. In a knitting-machine, the combination, with the needles, the reciprocative weft-carrier, and its supporting and operating parts, of the longitudinally-arranged bar adjacent to the path traversed by said carrier, a bar hingedly connected with said former bar, means for temporarily closing said hinged bar, an adjustable projection thereon, and means on the carrier coacting with said projection, to open the hinged bar at predetermined intervals, substantially as described.

3. In a knitting-machine, the combination, with the needles, the reciprocative weft-carrier, and its supporting and operating parts, of the longitudinally-arranged bar adjacent to the path traversed by said carrier, a bar hingedly connected with said former bar, means for temporarily closing said hinged bar, a projection adjustable lengthwise of said latter bar, means for adjusting said projection, and means on the carrier coacting with said projection to open the hinged bar at predetermined intervals, substantially as described.

4. In a knitting-machine, the combination, with the needles, the reciprocative weft-carrier, and its supporting and operating parts, of the longitudinally-arranged bar adjacent

to the path traversed by said carrier, a bar hingedly connected with said former bar, means for temporarily closing said hinged bar, longitudinally-movable strips on said latter bar provided with projections or abutments, and means on the carrier coacting with said projections or abutments to open the hinged bar at predetermined intervals, substantially as described.

5. In a knitting-machine, the combination, with the needles, the jack-frame, and its jacks, of the weft clamping and releasing bars, means whereby the same are closed by the jack-frame in its forward movement, means for temporarily maintaining said bars closed, and means for opening said bars during the stroke of the carrier, substantially as described.

6. In a knitting-machine, the combination, with the needles, the reciprocative weft and thread carriers, and means for varying the strokes of the thread-carrier, of the weft clamping and releasing bars, one of the members thereof being fixed and the other movable, means for temporarily closing the movable bar, adjustable projections or abutments on said latter bar, devices carrying said projections or abutments, connections between said devices and the said means for varying the strokes of the thread-carrier, and means on the weft-carrier coacting with said projections or abutments to open the movable bar at predetermined intervals, substantially as described.

7. In a knitting-machine, the combination, with the needles, the jacks, the points, and the thread-carrier, of the supplemental weft-carrier, the movable supporting-bar therefor, and means for raising and lowering said bar, together with the supplemental thread-guide, and means for attaching it to the thread-carrier, substantially as described.

8. The combination with the thread-carrier, of a supplemental thread-guide mounted thereon and provided with a rack-bar, and a dog on said carrier adapted to engage the teeth in said bar and thereby hold the supplemental thread-guide in positions of adjustment, substantially as described.

9. In a knitting-machine, the combination, with the needles, the jacks, and the supplemental weft and thread carriers, of the point-bearing bar, and the pivoted points thereon, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

FREEMAN RAVEN.

Witnesses:

JOHN R. NOLAN,
ANDREW V. GROUPE.