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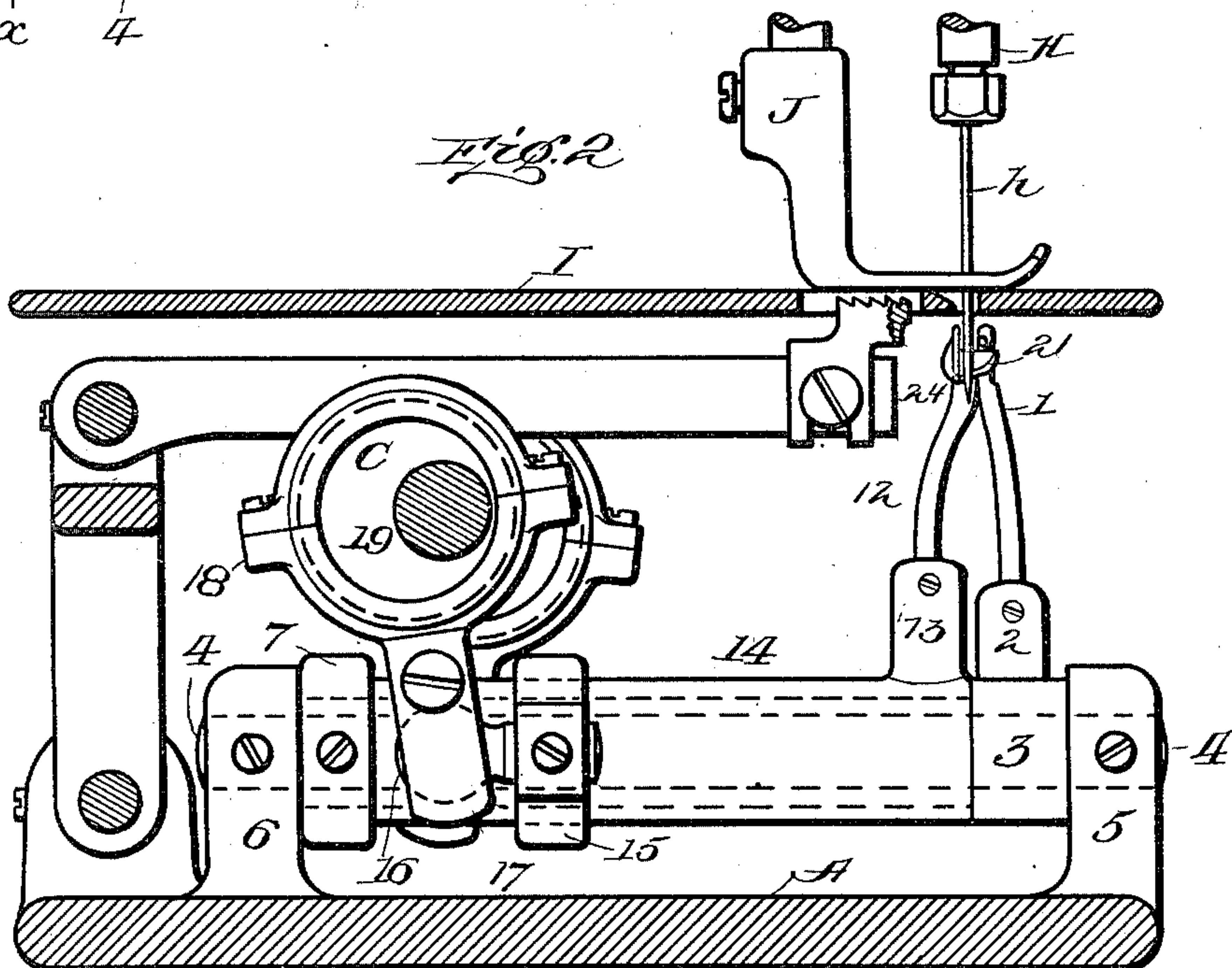
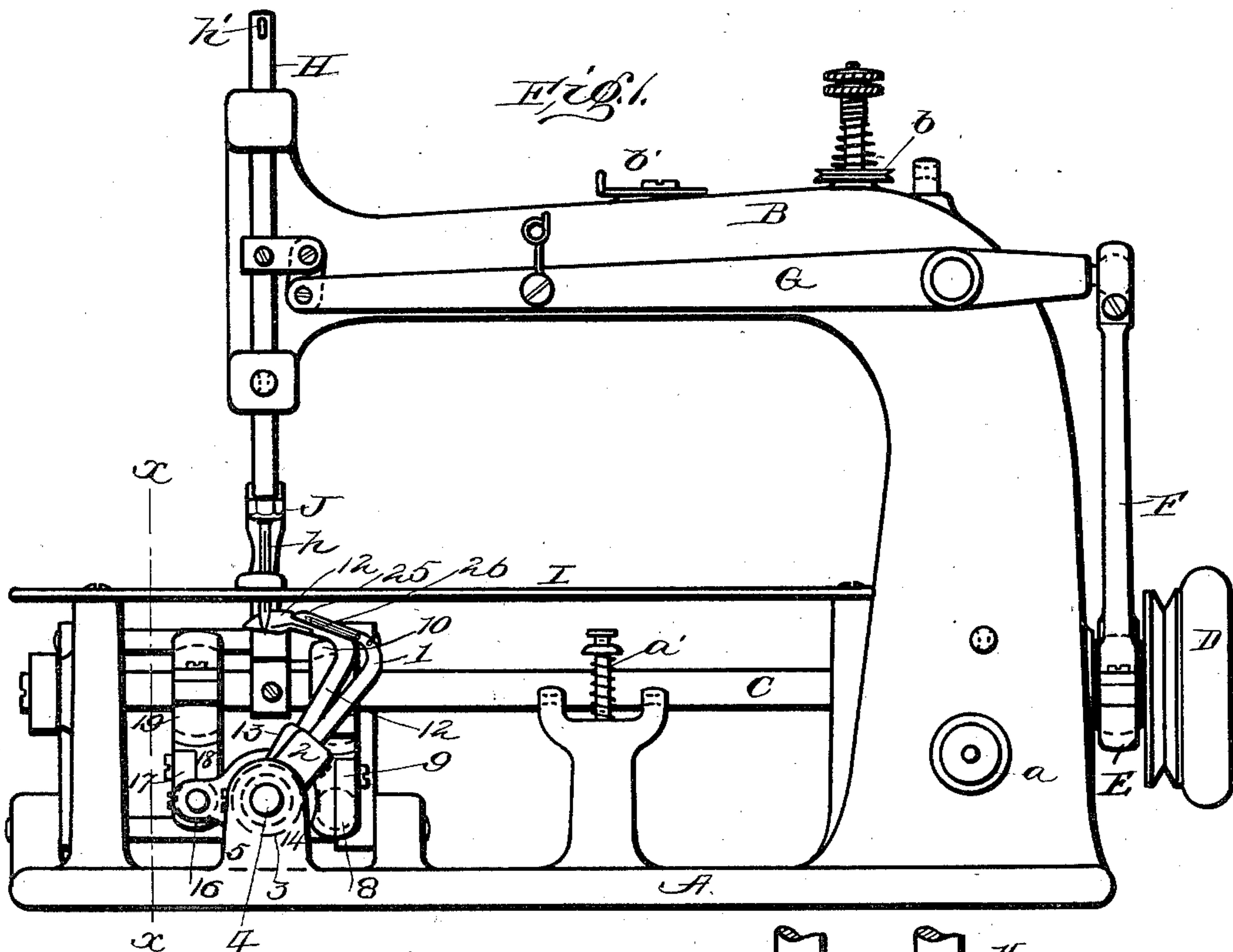
Patented June 6, 1899.

W. H. STEDMAN.
SEWING MACHINE.

(Application filed May 20, 1897.)

No Model.)

2 Sheets—Sheet 1.



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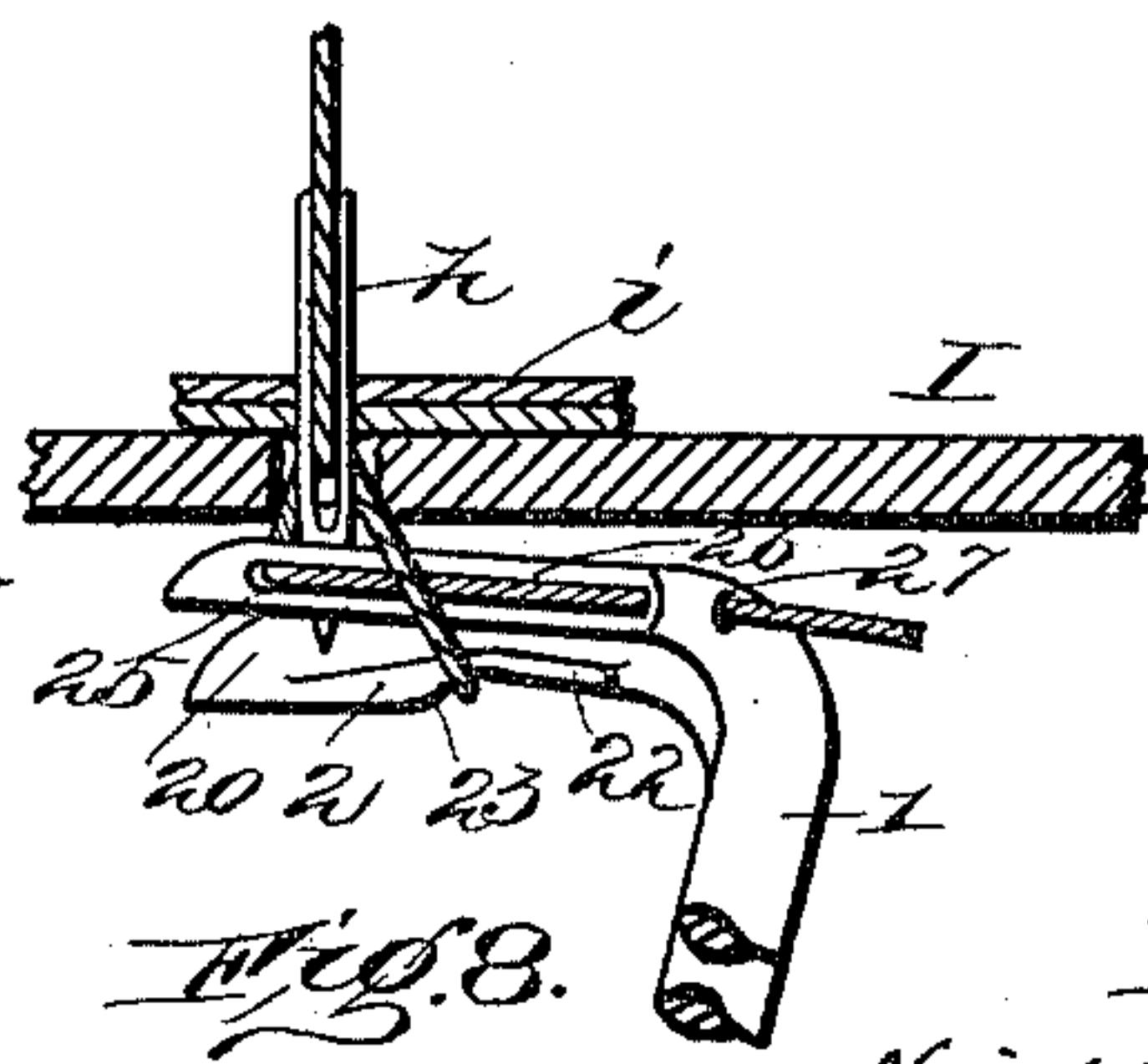
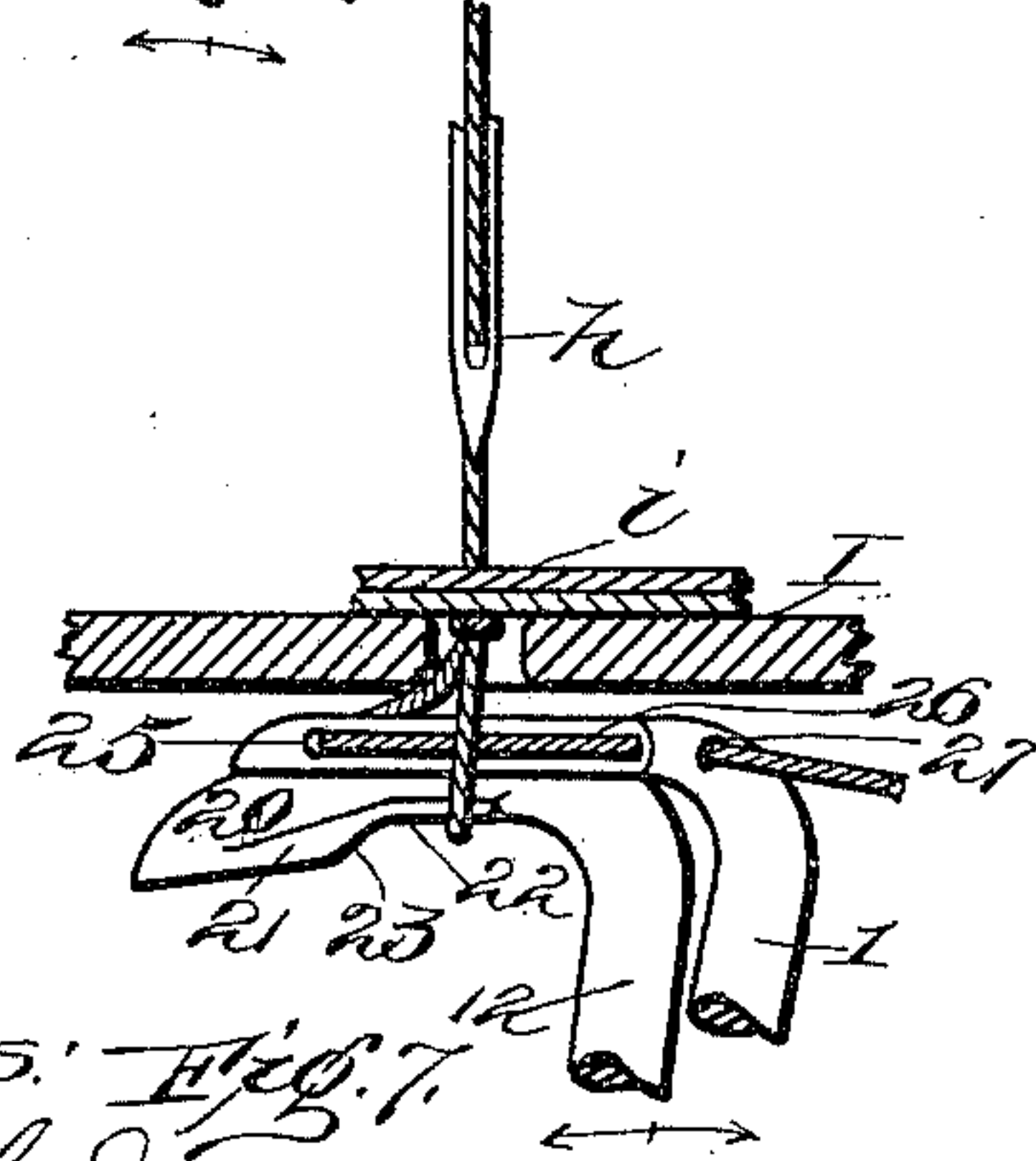
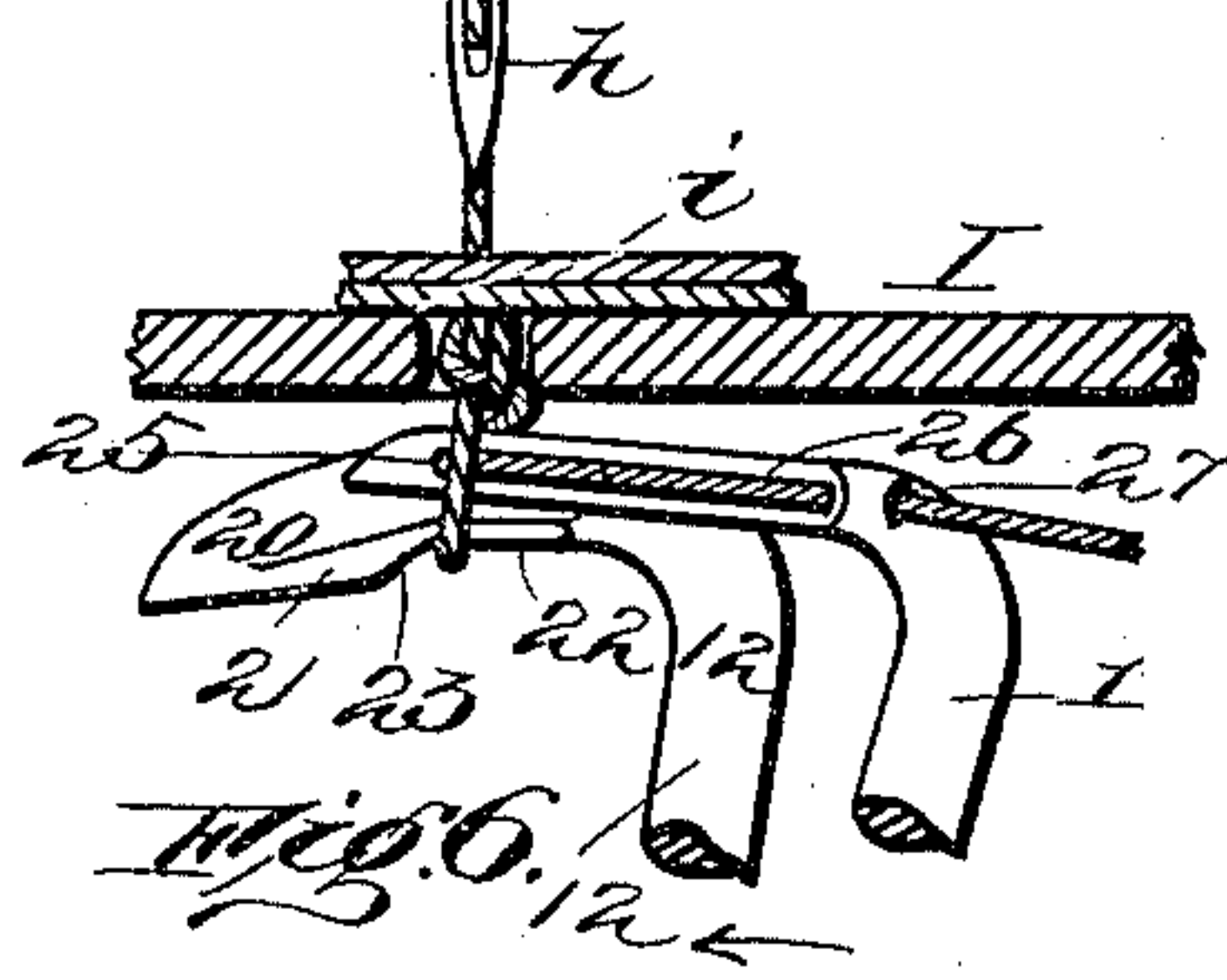
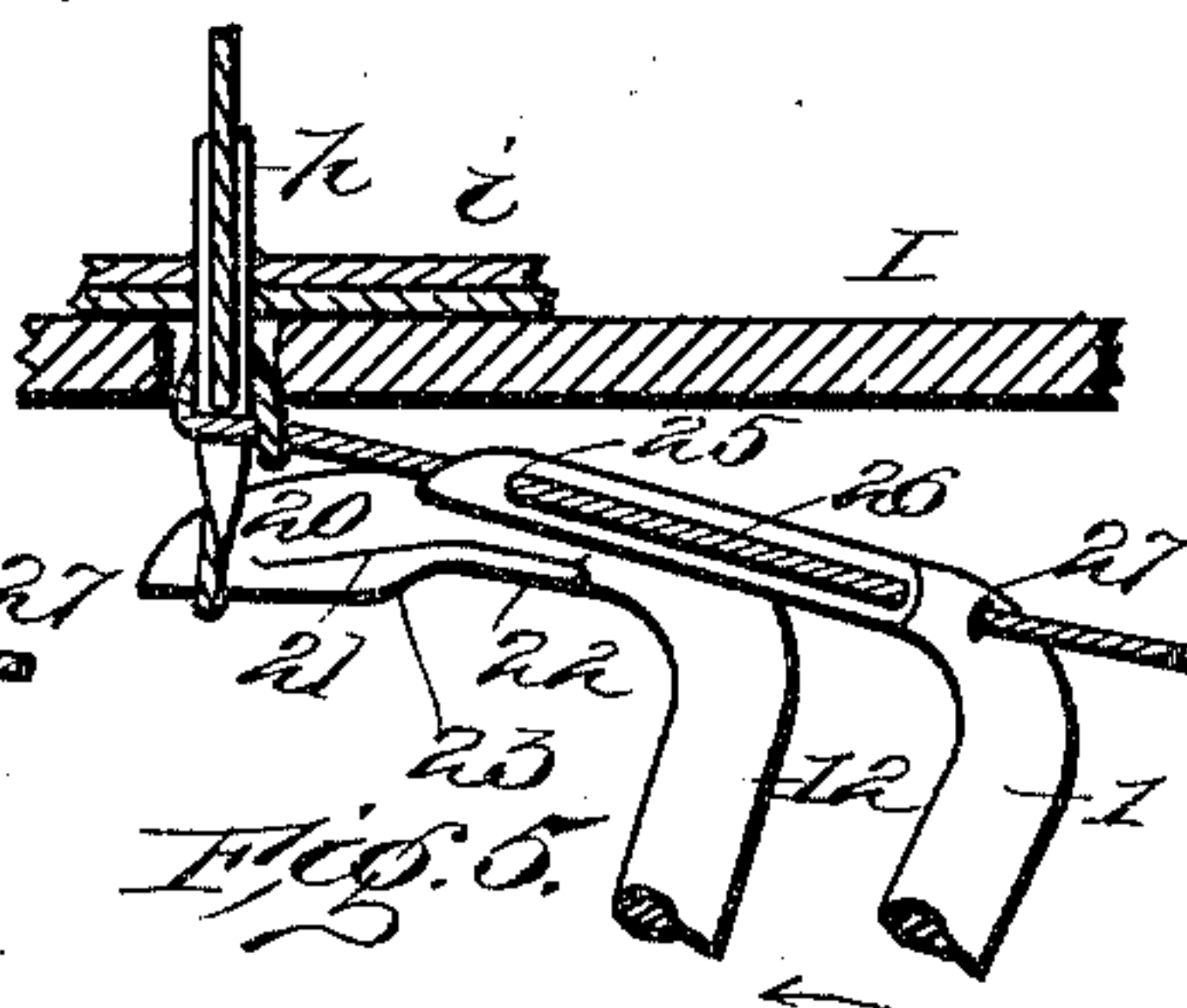
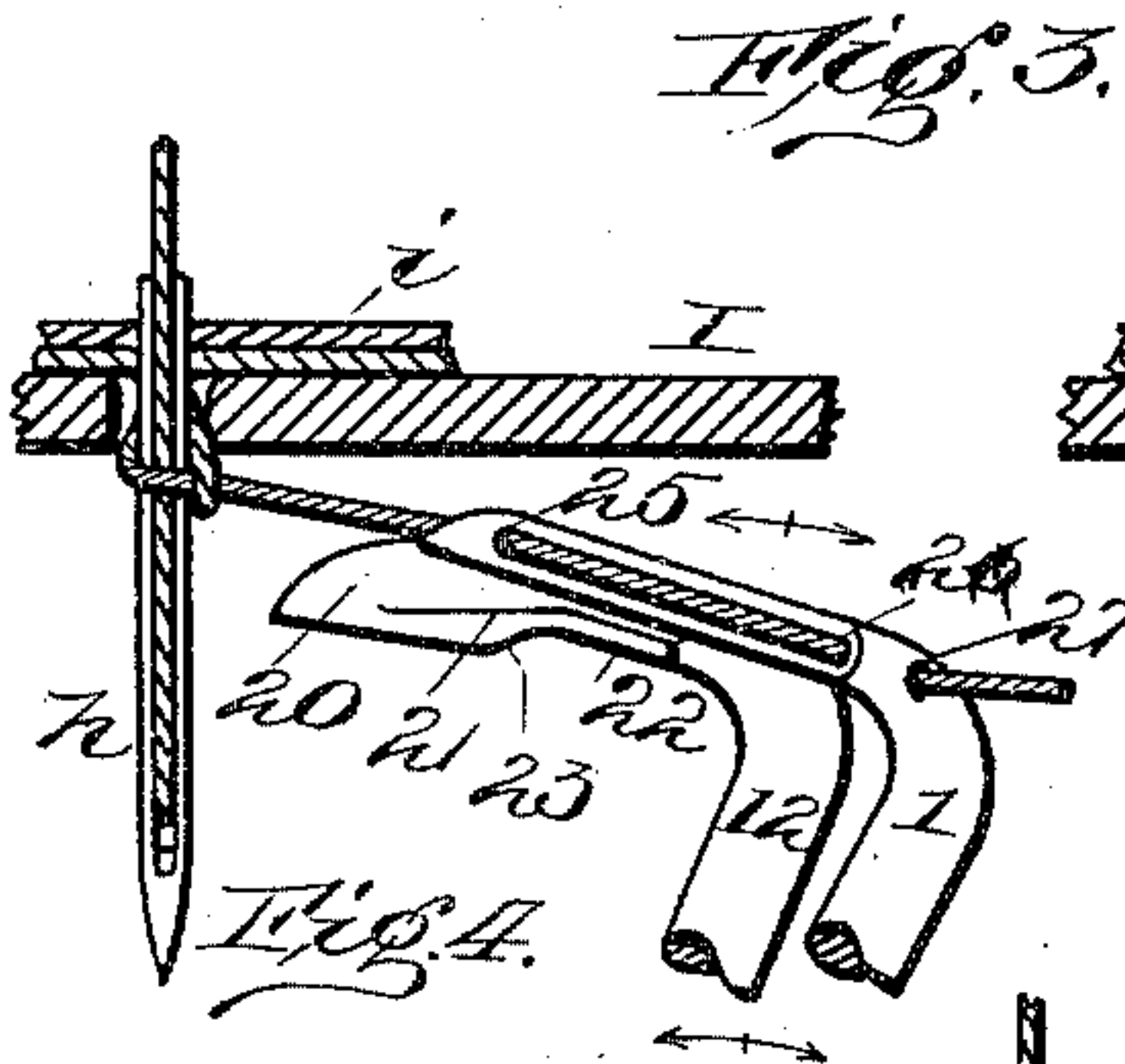
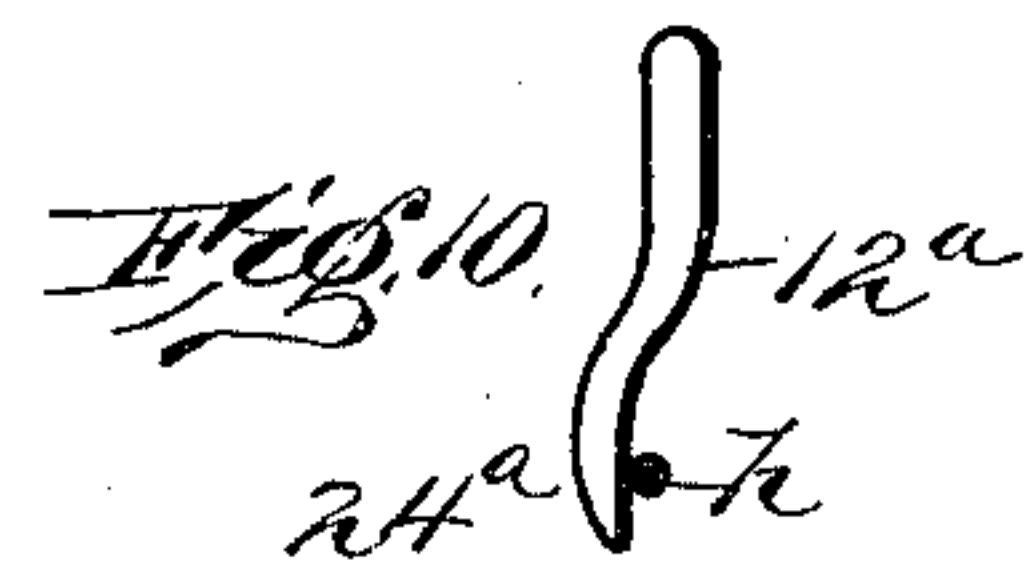
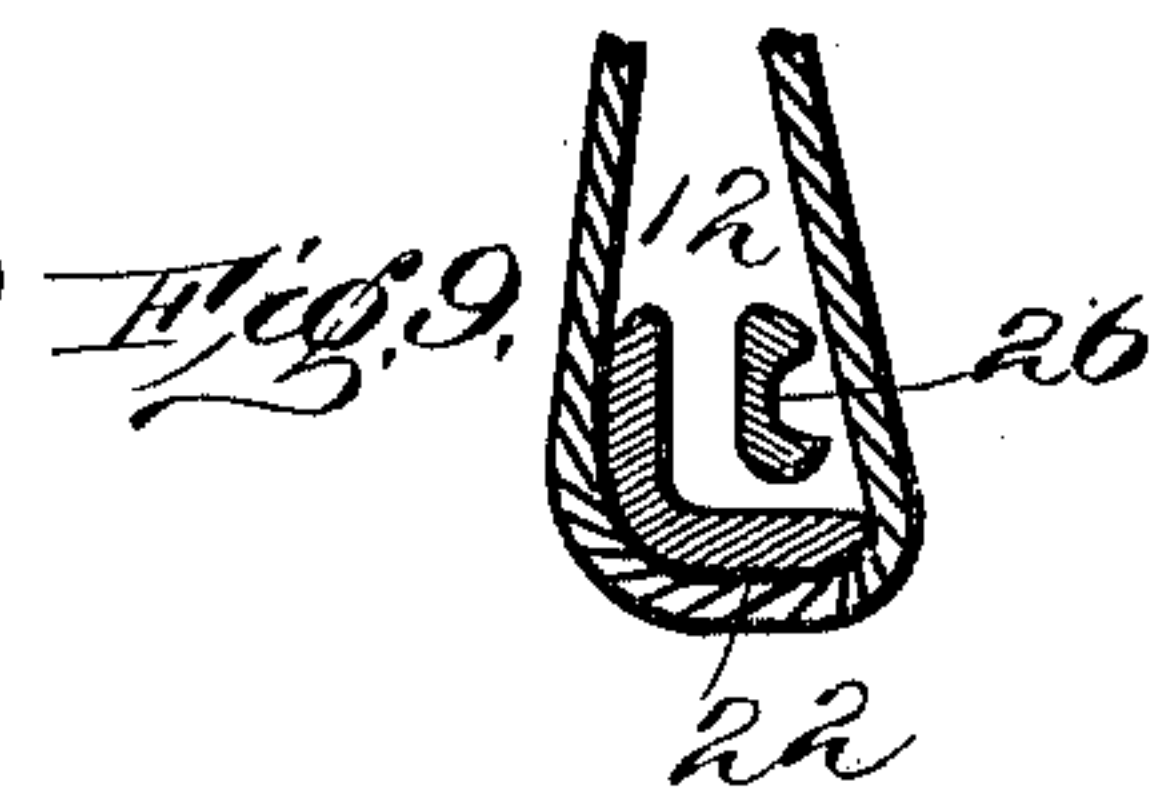
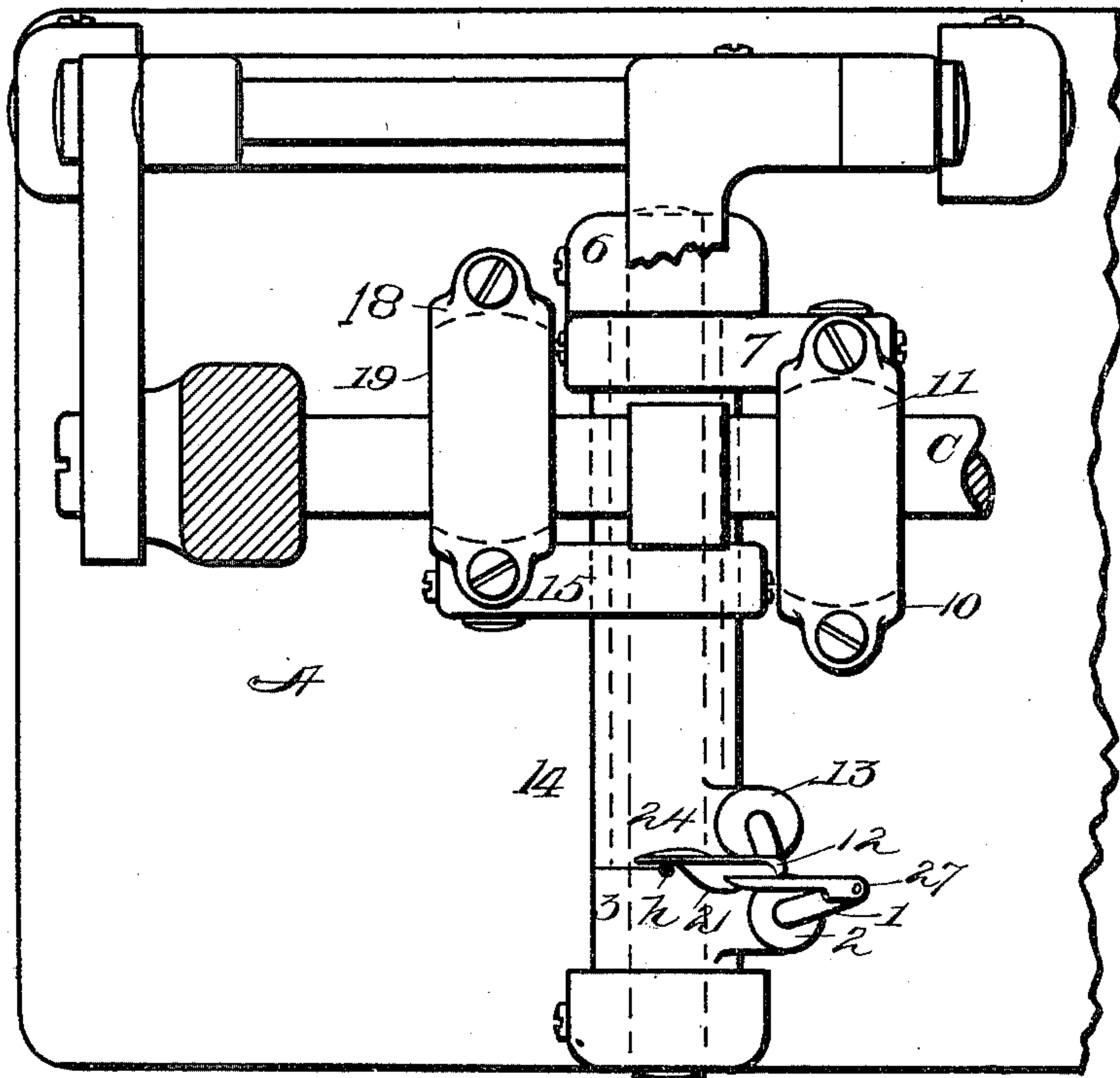
W. H. STEDMAN.

SEWING MACHINE.

(Application filed May 20, 1897.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

WILLIAM H. STEDMAN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE
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SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 626,311, dated June 6, 1899.

Application filed May 20, 1897. Serial No. 637,439. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. STEDMAN, of Hartford, in the county of Hartford and State of Connecticut, have invented certain
5 new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to improvements in the looping or stitch-forming mechanism of double-thread chain-stitch sewing-machines,
15 and has for its principal objects the production of a looping mechanism combining the elements of rapidity, durability, certainty of action, and simplicity together with a wide range of adjustability.

20 Sewing-machines of the class referred to are usually furnished with a fabric-penetrating needle and a looper carrying the second or other thread, said looper being reciprocated in two directions on intersecting lines passing
25 on one side of the needle to enter the loop of thread carried thereby and shifting to the opposite side of the needle, presenting a loop of the second thread in position to be penetrated by the needle. These more or less complex motions in different planes or in lines
30 which are not planes involve mechanical difficulties and are detrimental to speed and durability.

According to my present invention I make
35 use of two instruments in addition to the needle, each of said instruments being arranged to reciprocate in but a single plane, the one performing its excursions in a plane on one side the needle to enter the loop of needle-thread and locate its position, while the other,
40 carrying the under thread, performs its excursions in a plane intersecting the loop on the first-named instrument and extending on the opposite side of the needle to carry a loop of under thread through the loop of needle-thread and present it in position to be entered
45 by the needle as the latter passes through the fabric.

In illustrating the preferred embodiment
50 of my invention I have shown it in its sim-

plest adaptation—that is, in connection with a vertically-reciprocating eye-pointed needle; but inasmuch as the improvements have relation solely to the looping mechanism it is obvious that the latter can be substituted
55 for corresponding parts of the underlooping mechanism found in various styles and kinds of sewing-machines.

In the accompanying drawings, Figure 1 is a front elevation of the machine. Fig. 2 is
60 a sectional view on the line *xx*, Fig. 1, showing the looper mechanism. Fig. 3 is a plan view of the looper mechanism. Figs. 4, 5, 6, 7, and 8 are diagrammatic views illustrating different stages of the stitch-forming operation. Fig. 9 is a sectional view, on an enlarged scale, of the loop-taker and second-thread carrier, showing a loop of needle-thread on the loop-taker. Fig. 10 is a top
70 view of a modified form of the loop-taker. Fig. 11 is a sectional view, on an enlarged scale, through the modified loop-taker and second-thread carrier, a loop of needle-thread being shown on the loop-taker.

Similar letters and numerals indicate like
75 parts in the several figures.

For the purpose of furnishing a comprehensive illustration of one form in which my present invention has been practically embodied I have shown it as applied to a sewing-machine of ordinary construction, but having the
80 new looping mechanism substituted for the old. In said machine A is the bed; B, the gooseneck; C, the main shift; D, the driving-pulley; E, the eccentric for driving the needle-bar; F, the eccentric connection; G, the needle-lever; H, the needle-bar; I, the work-plate; J, the presser-foot; *h*, the fabric-penetrating needle; *a b*, tensions; *b' g h'*, take-up eyes for needle-thread; *a*, take-up spring
90 for under thread. All the foregoing-enumerated parts being in general form and action similar to corresponding parts in common use in sewing-machines, further explanation is unnecessary.

The improved looper mechanism includes
95 as its principal elements a loop-taker 12 and an under-thread carrier 1, both located beneath the work-plate and each reciprocating in a single plane, the path of the loop-taker
100

12 lying to one side of the needle and that of the under-thread carrier 1 lying on the opposite side of the needle and intersecting the path of the loop-taker, the arrangement being such that the loop-taker during its forward motion toward the needle will pass in close proximity to the ascending needle, between the latter and its thread, entering and spreading the loop of needle-thread across the path of the under-thread carrier, which latter is advanced through the needle-thread loop held by the loop-taker and, passing on the opposite side of the path of the needle, carries its under thread into position to be engaged by the needle during its next descent through the fabric.

The transfer of the needle-thread loop from the side of the needle on which it is taken by the loop-taker into the path of the under-thread carrier, the latter moving in a plane on the side of the needle opposite to the loop-taker, is effected by the loop-taker alone, the latter being so shaped that it will operate upon the loop of needle-thread to spread or divert it laterally.

So far as the entering or pointed end of the loop-taker is concerned it is only necessary that it shall be of suitable form to enter the loop at the side of the needle as the latter ascends in a manner common in loopers in general use.

It is after the loop-taker 12 has entered the loop of needle-thread that it is caused to divert the loop into the path of the under-thread carrier 1, and this is accomplished by a lateral extension of the looper on the side nearest the needle sufficient in amount to effect a spreading or diversion of the loop of needle-thread in advance of the under-thread carrier, so that the latter while moving in a single plane on the side of the needle opposite to the loop-taker and in such proximity to the needle as to present the under thread thereto will surely enter and pass into the loop of needle-thread. In its preferred form for this purpose the loop-taker is provided with a flat narrow blade 20, lying substantially parallel with the needle, and a lateral extension or web 21, beginning just in rear of the point and increasing on a gradual incline in curve from the plane surface 20 (see Fig. 3) until attaining its full dimensions, as at 22, at or near which point the cross-section will be approximately as illustrated in Fig. 9.

The under face or edge of the loop-taker is provided with a slight shoulder 23, which acts as a drag on the thread during a part of the backward motion of the loop-taker; but said shoulder is not so pronounced nor sufficiently abrupt to act as a hook in retaining the loop. On the contrary, while delaying slightly, it freely permits the final escape of the loop when the loop-taker is sufficiently retracted. The loop-taker is also preferably furnished with a slight swell or enlargement 24 on the side away from the needle, between the point and the apex of the incline 21, the purpose of

which is to obtain an increased supply of needle-thread while the latter is loose in the form of a loop at the side of the needle beneath the work-plate and fabric, thus securing a fullness of loop nearly or quite sufficient to permit the easy passage of the incline 21 through said loop. This enlargement 24 also acts to fill the needle-thread loop, and thus controls its position while the loop-taker is being withdrawn from the loop.

It is not essential, although desirable, that the loop-taker should be provided with a laterally-projecting web 21 to effect the diversion of the needle-thread loop, for a similar result can be obtained by bending or curving the loop-taker bodily, so that the portion in rear of the point will occupy a position to one side of the needle and in line with the under-thread carrier, as indicated in Fig. 10.

The operating end or horizontal portion of the under-thread carrier 1 is formed with an eye 25 near its point, a groove 26 along its front side running rearwardly to another eye 27 for the passage of the under thread.

The loop-taker 12, whether reciprocating in a curved or right line, has its motions in a single plane on one side of the needle's line or path of reciprocation below the fabric, with the loop-diverting portion 21 moving in a path intersecting or crossing that of the needle, while the under-thread carrier's plane of reciprocation is on the opposite side of the needle and coincides with or intersects the plane of movement of the loop-diverting portion 21 of the loop-taker 12, whereby said lower-thread carrier is caused to penetrate the loop of needle-thread borne by the loop-taker. It is obvious that it is immaterial to the operation of these looping devices whether the loop-taker and lower-thread carrier move in straight or curved paths, or from the same or opposite sides of the needle, so long as their motions are performed in planes and do away with sidewise or shogging motions in addition to their longitudinal reciprocating movements; but I prefer to operate both instruments from the same side and to mount them upon rocking supports, so that they will move in curved paths, as by this arrangement a simple and effective driving mechanism can readily be supplied and ample provision made for adjustment.

The preferred form and arrangement of driving mechanism are illustrated in the drawings, wherein 4 is a stationary rod disposed transversely of and below the plane of its main shaft C, said rod being suitably held at its ends in supports 5 6. A tubular rock-shaft or sleeve 3, mounted upon rod 4, is furnished at one end with an arm 2, provided with a socket and set-screw or equivalent holder for the shank of lower-thread carrier 1. To the opposite end of sleeve 3 is adjustably attached an arm 7, bearing a ball 8, which latter is received in a socket 9 at the lower end of eccentric connection 10, the upper end of said connection engaging a spherical eccentric 11 on

the main shaft C. Loop-taker 12 is in like manner adjustably attached to an arm 13 on a second tubular rock-shaft or sleeve 14, the latter taking its bearing upon the periphery of sleeve 3 and being furnished with an adjustable lever or arm 15, bearing ball 16, engaging socket 17 in the lower end of eccentric connection 18, the upper end whereof encircles the spherical eccentric 19 on main shaft C.

While it is obvious that separate supports might be provided for the sleeves 3 and 14, there are some advantages secured by mounting one sleeve on the other and supporting them upon a single rod, the number of parts being reduced, the arrangement more compact, and the lubrication simpler and more effective, all of which are desirable features in a high-speed machine of this kind. Ample provision is thus made for adjusting the loop-taker and lower-thread carrier with respect to each other and the needle. Thus both radial and lateral adjustments may be made at the point of attachment to the sleeves, while the position of each instrument with reference to its driving-eccentric can be varied by turning the arms 7 or 15 on the sleeves.

It will of course be understood that the usual or any approved tensions and take-ups are or may be employed, likewise a fabric-feeding mechanism, and that instead of a straight reciprocating needle other forms of needle and needle-driving mechanism adapted for the purpose may be utilized. Hence as to these matters the forms shown in the drawings are merely illustrative and not of the essence of the present invention, which has to do mainly with the looping devices and mechanism.

The operation of the looping devices in their preferred form will be readily understood by reference to Figs. 4 to 11, inclusive. Let it be assumed that the needle and under-thread carrier have been properly threaded and that the seaming operation has been arrested with the needle at or near its lowest position. The parts will then occupy relative positions approximately as shown in Fig. 4. The machine being started up, the needle ascends, the loop-taker advances and is followed by the under-thread carrier until the parts reach positions approximately as shown in Fig. 5, the loop of needle-thread having been entered by and retained upon the point of the loop-taker. As the needle is withdrawn from the fabric the loop-taker advances through the loop of needle-thread, expanding the latter and diverting it laterally in front of the under-thread carrier, which latter advancing at the same time protrudes its point through the loop of needle-thread, as indicated in Fig. 6. At this stage the loop-taker has passed its shoulder 23 beyond the thread, and the loop surrounds both the loop-taker and the under-thread carrier, Figs. 9 and 11. The loop-taker occupies a position slightly in advance of the under-thread carrier, so that when the needle arrives at or near the extreme of its upward motion and

the loop-taker is at or near its most advanced position the parts will assume approximately the positions represented in Fig. 7. The needle now begins to descend and the loop-taker to withdraw, followed shortly by the under-thread carrier; but during this backward motion of the loop-taker the needle-thread loop encounters shoulder 23, which drags sufficiently to divert the loop from the path of the descending needle, the latter passing down between the loop-taker near its point and the inner side of the under-thread carrier in rear of its eye 25, thereby being caused to enter between the loop of needle-thread and that portion of the under thread extending from the fabric or the previous stitch to the eye of the under-thread carrier, Fig. 8, so that as the loop-taker and under-thread carrier by their continued rearward motion are withdrawn entirely from the needle-thread loop a loop of under thread will be cast upon the needle, Fig. 4, preliminary to the next advance of the loop-taker. (See Fig. 5.)

It will be observed that there is an interval between the point or blade 20 of the loop-taker and the inner side of the under-thread carrier for the passage of the needle, and that this interval can be increased or diminished by adjustment to suit needles of various sizes, and, further, that this interval is bridged in rear of the point of entrance of the needle between the loop-taker and the under-thread carrier by the lateral extension or web 21 of the loop-taker, thus insuring the entrance of the under-thread carrier into the loop of needle-thread and of the needle into the loop of under thread.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a double-thread chain-stitch sewing-machine, the combination with the needle of a looping mechanism comprising a loop-taker and an under-thread carrier, each reciprocating in a single plane, and on relatively opposite sides of the path of the needle, said loop-taker being provided with a loop-diverting surface extending into the plane of motion of the under-thread carrier for diverting the loop of needle-thread into the path of the under-thread carrier; substantially as described.

2. In a sewing-machine such as described, the combination with a reciprocating eye-pointed fabric-penetrating needle, a reciprocating loop-taker movable in a plane on one side the needle and provided with a lateral extension or loop-diverter intersecting the path of the needle, and an under-thread carrier reciprocating in a plane on the opposite side of the needle and intersecting the plane of movement of the loop-taker, whereby the loop-taker is caused to enter the loop of needle-thread and divert it into the path of the under-thread carrier and the latter entering the loop of needle-thread delivers a loop of its thread to the needle; substantially as described.

3. In a sewing-machine such as described, the combination with a reciprocating thread-carrying needle, of a loop-taker reciprocating in a single plane, substantially parallel with and to one side of the needle when beneath the fabric, said loop-taker being furnished with a loop-diverting surface extending laterally across the path of the needle, and an under-thread carrier reciprocating in a single plane on the side of the needle opposite the loop-taker, the path of the said thread-carrier intersecting the plane of movement of the loop-diverting surface of the loop-taker; substantially as described.

4. In a sewing-machine such as described, the combination with a reciprocating thread-carrying needle, of a loop-taker and an under-thread carrier reciprocating in parallel planes transversely of the axis of the needle and on opposite sides thereof, said loop-taker being provided with a loop-detaining shoulder and a loop-diverter or lateral extension operating to divert the needle-thread loop from the side nearest the loop-taker into the path of the under-thread carrier; substantially as described.

5. In a sewing-machine such as described, the combination with the reciprocating needle, of the loop-taker reciprocating on one side of the needle and provided with the blade, a lateral extension or loop-diverting surface and a loop-detaining shoulder and the under-thread carrier reciprocating on the opposite side of the needle, said under-thread carrier moving in a path above the loop-diverting surface of the loop-taker, to enter the loop of needle-thread and deliver its thread to the needle.

6. In a sewing-machine such as described the combination with a reciprocating thread-carrying needle, of the loop-taker and under-thread carrier, mounted to reciprocate in parallel planes upon a common axis, the loop-taker moving on one side of the needle and the under-thread carrier on the opposite side thereof; substantially as described.

7. In a sewing-machine such as described, the combination with the reciprocating thread-carrying needle, of the laterally and radially adjustable loop-taker supported to reciprocate in a single plane at one side of the needle and provided with a loop-deflecting surface in rear of its entering end, and the laterally and radially adjustable under-thread carrier likewise supported to reciprocate in a single plane on the side of the needle opposite to the loop-taker; substantially as described.

8. In a sewing-machine such as described the combination with the needle and main shaft, of the loop-taker and eye-pointed under-thread carrier, each pivotally supported to reciprocate in a single plane about an axis lying transversely to the main shaft, with connecting mechanism for transmitting motion from the main shaft to the said loop-taker and thread-carrier; substantially as described.

9. In a sewing-machine such as described, the combination with the needle and main shaft, of the loop-taker and under-thread carrier each secured to a separate rock-shaft supported and operating beneath the work-plate, two eccentrics on the main shaft and adjustable driving connections intermediate each rock-shaft and its eccentric; substantially as described.

10. In a sewing-machine such as described the combination with the needle, of the looper mechanism, the same comprising the two sleeves or hollow rock-shafts arranged one within the other and supported upon a central rod or axis, a driving-eccentric connected to each sleeve for rocking the latter, the loop-taker supported radially on one sleeve and the under-thread carrier similarly supported on the other sleeve; substantially as described.

WILLIAM H. STEDMAN.

Witnesses:

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