No. 626,312.

Patented June 6, 1899.

W. H. STEDMAN.

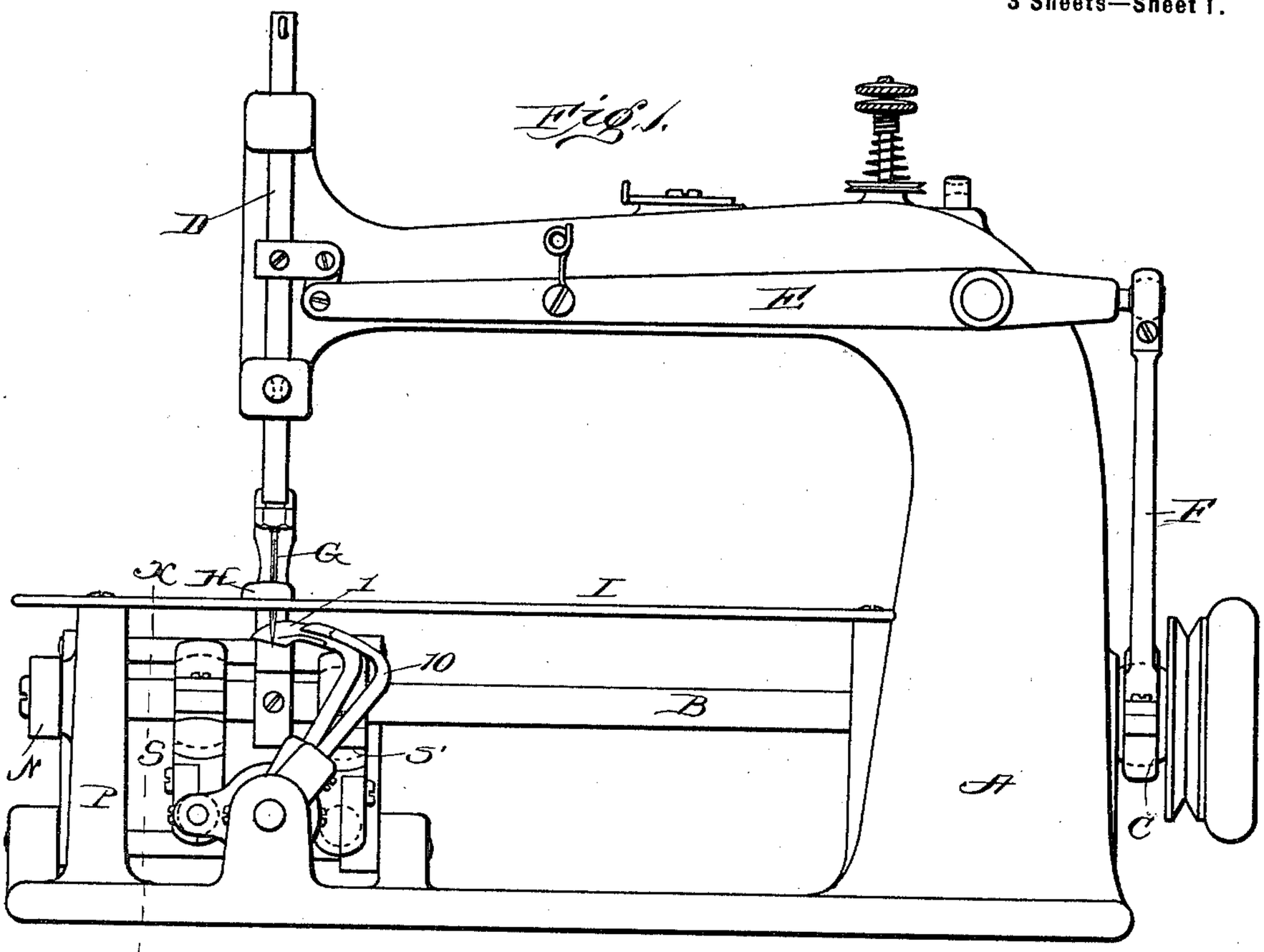
SEWING MACHINE.

(Application filed May 20, 1897.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



x

Fig. 2.

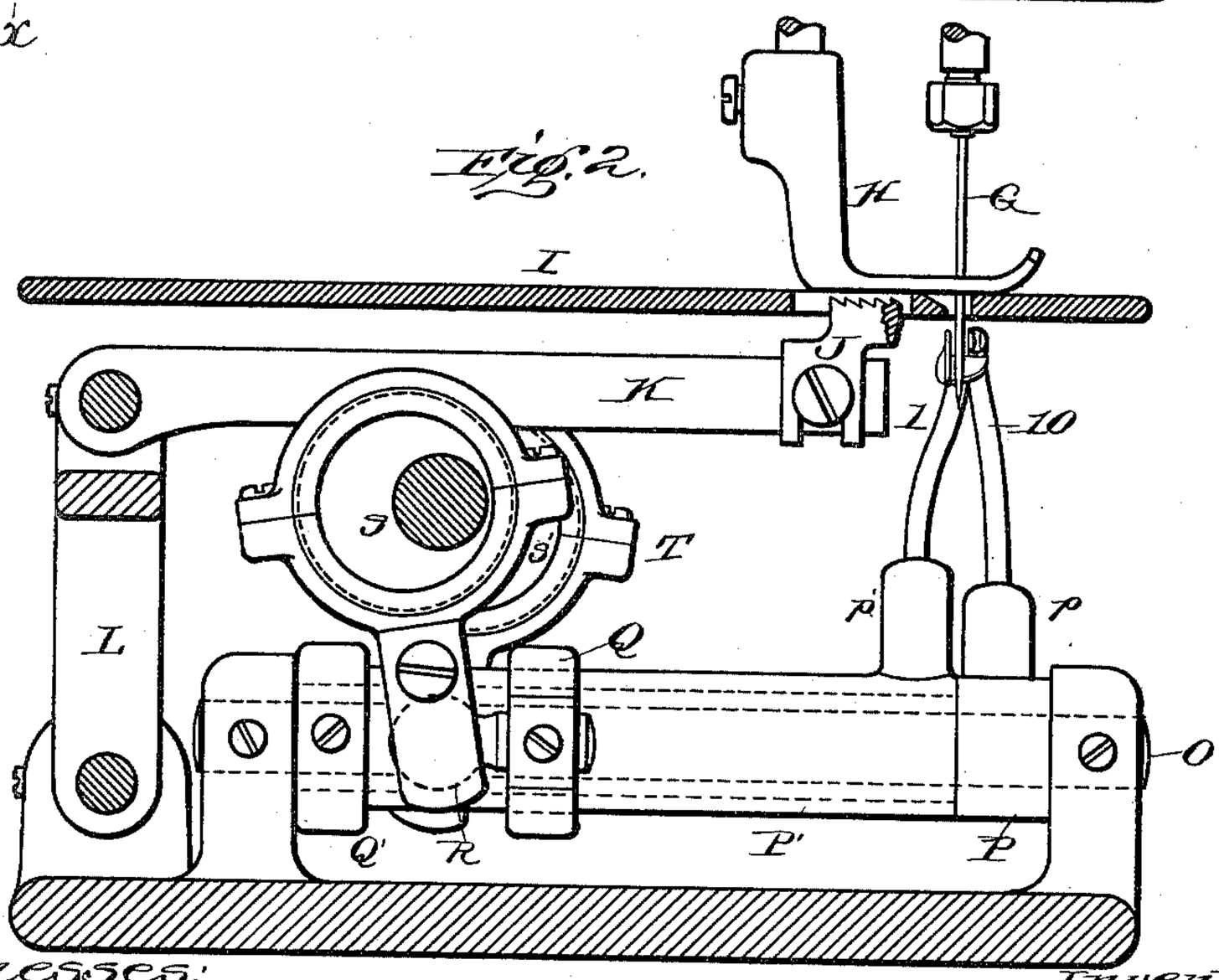


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Fig. 3.

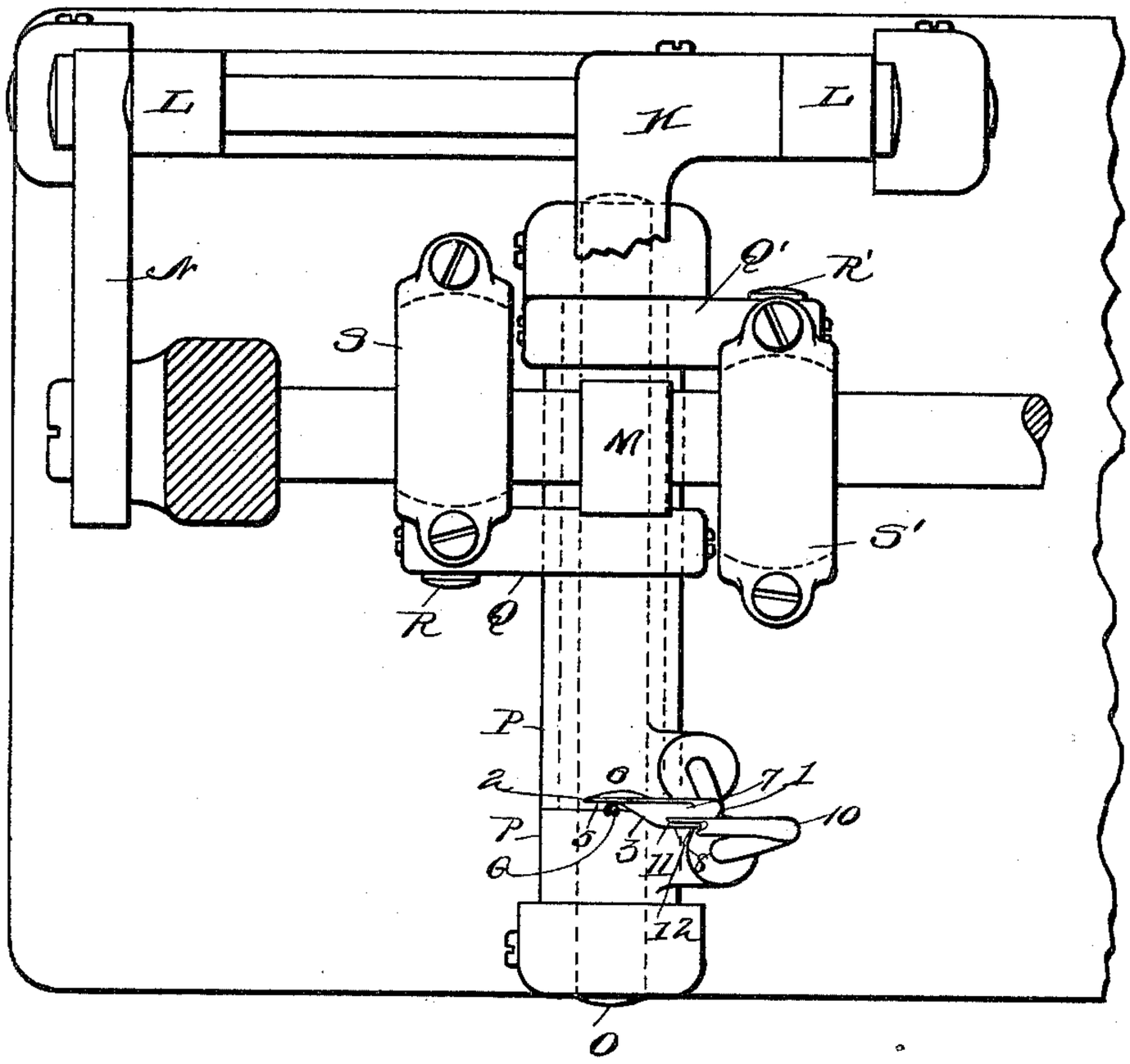

Fig. 4.

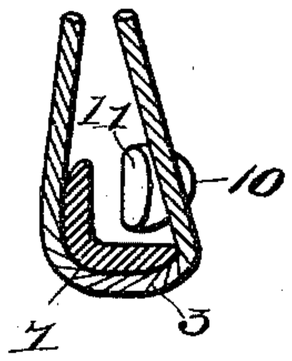

Fig. 5.

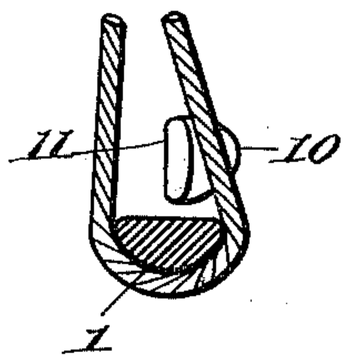

Fig. 6.

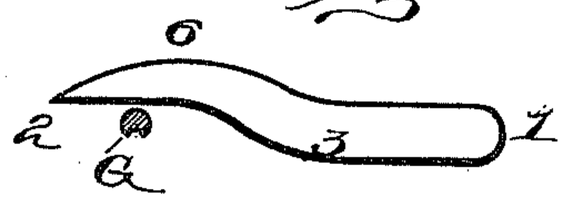

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Fig. 7.

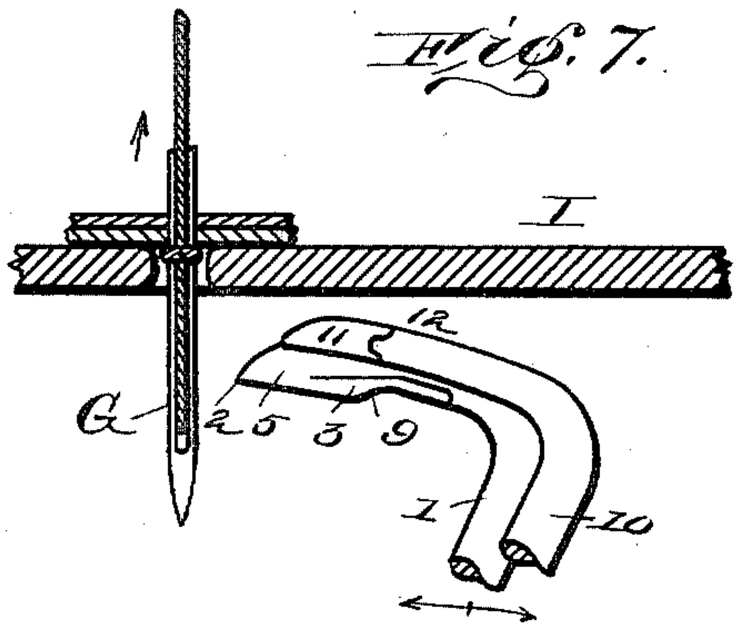


Fig. 8.

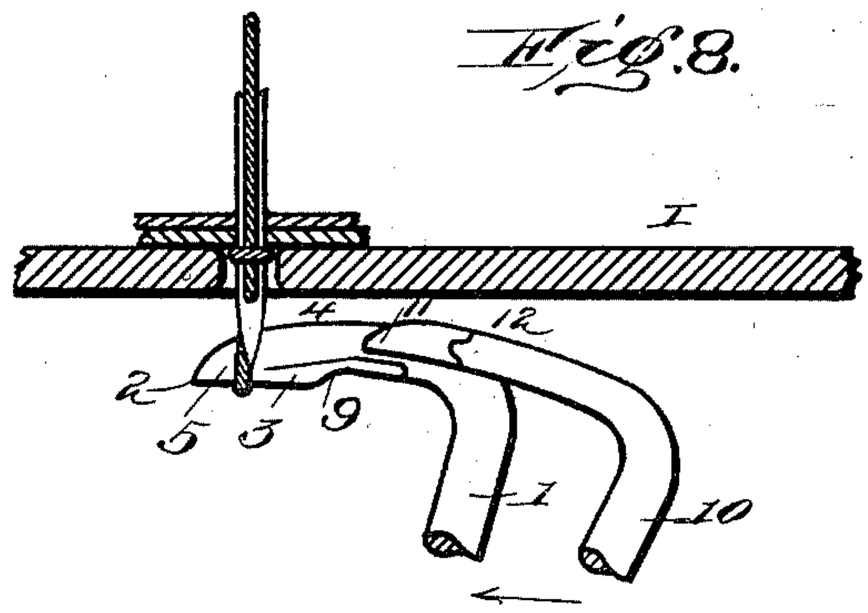


Fig. 9.

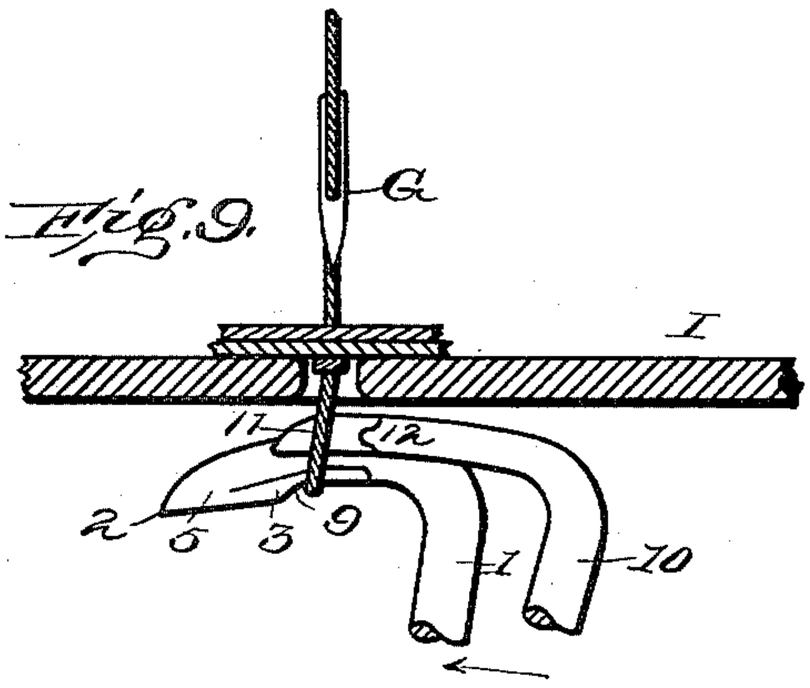


Fig. 10.

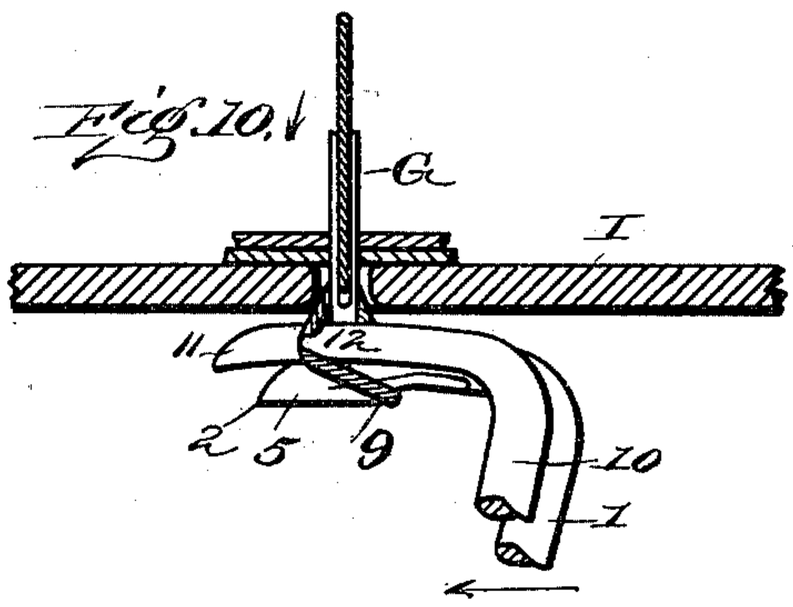


Fig. 11.

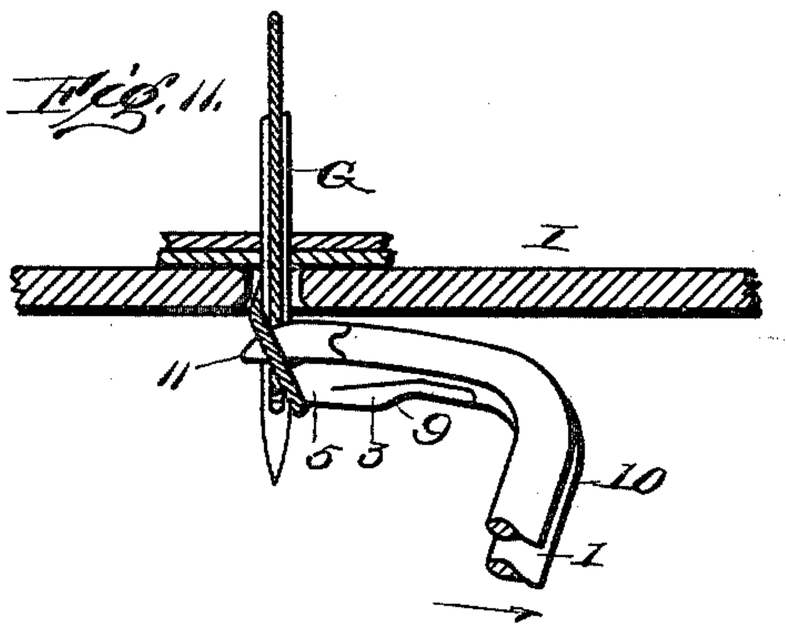
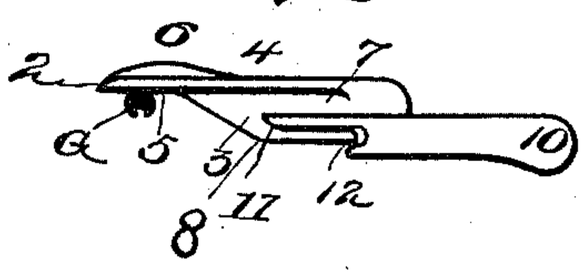


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM H. STEDMAN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE MERROW MACHINE COMPANY, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 626,312, dated June 6, 1899.

Application filed May 20, 1897. Serial No. 637,440. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. STEDMAN, a citizen of the United States, residing in the city and county of Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

My improvements relate to single-chain sewing-machines, and have for their principal objects rapidity, durability, certainty of action, adjustability, and simplicity of mechanism.

My present invention consists in a novel form of looping mechanism comprising two coöperating instruments in addition to the eye-pointed needle for producing the chaining or stitching, each of said instruments reciprocating in but a single plane, as will be hereinafter explained.

Referring to the drawings which form a part of this specification and represent my preferred embodiment of this invention, Figure 1 is a front elevation of the machine. Fig. 2 is a sectional view of the lower portion of the left end of said machine on lines *x x x* of Fig. 1. Fig. 3 is a detached top view showing the loop-taker, the loop-carrier, and their operating and supporting mechanism, together with portions of the feeding apparatus. Fig. 4 is an enlarged sectional view of the loop-taker, the loop-carrier, and loop. Fig. 5 is an enlarged sectional view of a loop-taker of modified form, loop-carrier, and loop. Fig. 6 is an enlarged top view of a modified form of loop-taker with needle in section. Figs. 7, 8, 9, 10, 11, and 12 are diagrammatical views illustrating different stages of the stitch-forming operations.

Similar letters and numerals in the several figures indicate the same parts.

In illustrating the preferred form of embodiment of my present invention I have shown it specially adapted for application to and use in connection with the same general form of actuating mechanism as the double-chain machine of my application, Serial No. 637,439. Among the advantages gained by this special adaptation is economy of manufacture, in that the same forms of the principal elements of the machine are retained for both the single and double chain machines and without material alteration other than in the forming of the looping members the machine can be readily converted from single to double chain, and vice versa.

Referring first to the elements common to the two forms or varieties of machines mentioned above, A designates the frame; B, the driving-shaft; C, the needle-driving eccentric; D, the needle-bar; E, the needle-lever; F, the pitman connection; G, the needle; H, the presser-foot; I, the work-plate; J, the feed-dog; K, the feed-bar; L, the supporting-link for feed-bar; M, the lifting-cam; N, the pitman; O, the looper-supporting shaft fixed in bearings on the frame; P, the sleeve surrounding the looper-shaft and provided at one end with a radial socket or carrier *p*; P′, a second sleeve surrounding sleeve P and also provided with a radial socket or carrier *p′*; Q Q′, crank-arms attached to their respective sleeves P P′ in a manner to permit circumferential adjustment with relation thereto; R R′, spherical crank-pins adjustably and removably applied to the crank-arms Q Q′; S S′, spherical eccentrics on the main driving-shaft, and T T′ pitmen connecting the eccentrics and crank-pins.

All the foregoing elements are to be found in the machine of the double-chain application, and so far as my present invention is concerned they represent typical means for holding and feeding the fabric, for reciprocating the fabric-penetrating needle, and for communicating reciprocating movements to the two members of the looping mechanism—to wit, the loop-taker 1 and the loop-carrier 10. These two members are arranged to reciprocate transversely of the needle beneath the work-plate, the movements of each member being performed in a single plane, the path of one lying above and crossing that of the other.

For the purpose of adapting the looping instruments to the special form of driving and carrying mechanism shown each is provided with a pointed operating-section arranged to traverse in a substantially horizontal plane beneath the work-plate and a shank extending therefrom at an angle, so that it may be secured to its socket or carrier *p* or *p′* in a manner to permit both lateral and radial adjustment. The office of the loop-taker 1 is

to enter the loop of needle-thread on one side of the needle, and as the latter is withdrawn through the fabric spread or divert one side of the loop and hold it in position to be entered by the loop-carrier and to assist in opening out the loop and holding it in position for the needle to enter it when it descends again through the fabric. With these ends in view the loop-taker is furnished with an entering point 2, so related to the plane of movement of the loop-taker that it will pass close to one side of the needle above the eye therein, and a laterally-tapering section 3 in rear of the point for diverting the side of the loop nearest the needle into or beyond the path of the loop-carrier.

In the preferred form the loop-taker is furnished with a narrow vertical blade 4, pointed at one end and flattened, as at 5, on the side nearest the needle for a short distance in rear of the point, while on the opposite side it is provided with an enlargement 6. In rear of the flattened section 5 and on the same side the lower margin of the blade 4 is extended laterally to form a tapering fin or flange 7, whose edge or operating-face 3 recedes gradually from the flattened section until attaining its full dimensions, as at 8, at which point the cross-section is approximately as shown in Fig. 4. A thread-detaining shoulder 9 is also provided on the under surface of the blade 4. This shoulder is not designed to prevent the escape of the loop from the loop-taker as the latter is withdrawn, but merely to retard and delay the escape of the loop, acting as a drag rather than a hook to assist in positioning the loop without permitting its ultimate escape, while the loop-taker continues in motion in the same direction. The enlargement 6 on the side is designed to assist in obtaining an increased supply of thread by passing into the loop when the thread is slack and by distending the loop gaining a fullness of loop nearly or quite sufficient to permit of the easy passage of the tapering section 3. It also acts to fill the loop and control in a measure its position as the loop-taker is withdrawn from the loop.

Although preferred, it is not essential that the loop-taker should be furnished with a vertical blade 4 and lateral flange 7, as it may be used to advantage in the form illustrated in Figs. 5 and 6, where the tapering section 3, instead of being in the form of a flange or fin projected from the blade or body portion, constitutes one edge of the body, the latter being flattened horizontally, as in Fig. 5, instead of vertically, as in Fig. 4.

The office of the loop-carrier is to enter the loop while on the loop-taker and, passing beyond the path of the needle, spread the loop so that the needle may enter it. For this purpose the loop-carrier 10 is furnished with an entering point 11 and shoulder or hook 12 for engaging and carrying the loop, and it is arranged to traverse in a path overlying the tapering section 3 of the loop-taker, so that when the latter has deflected the loop across the path of the needle the loop-carrier will enter the loop and carry the thread forward to open and spread the loop beneath the descending needle. The reciprocating motions of the loop-taker and the loop-carrier are properly timed relatively to each other and that of the needle, so as to cause the loop-taker to precede the loop-carrier and enter the loop of needle-thread as the needle rises, the spreading section 3 passing beneath the point of the ascending needle, and the loop-carrier following the loop-taker enters the loop and continues its forward motion after the loop-taker has begun its return motion, so as to spread the loop, the latter extending from the hook 12 on the loop-carrier to the detaining-shoulder 9 on the loop-taker. The loop-carrier now reverses its motion and, following the loop-taker, presents the loop in expanded form beneath the needle, the latter passing down between the ends of the loop-taker and loop-carrier.

The operation will be more readily understood by reference to Figs. 7 to 11, inclusive. Let it be supposed that the needle has been properly threaded and the operation of seaming has been interrupted with the vertical needle at or near its lowest position, at which time the loop-taker and the loop-carrier will stand approximately as shown in Fig. 7. Upon starting the machine in motion the needle will rise and the loop-taker advance toward and on one side of the needle, the point of the loop-taker entering between the needle and its thread and receiving the loop formed by the ascent of the needle, approximately as represented in Fig. 8. While this is taking place, the loop-carrier remains practically at rest. As the needle continues to rise the loop-taker advances through the loop, expanding or diverting one side of the loop into the path of the loop-carrier, which latter now advances and enters the loop, as indicated in Fig. 9. At this stage the needle-thread loop is around both the loop-taker and the loop-carrier, the former having arrived at or near the limit of its forward movement, so as to pass its detaining-shoulder 9 through the loop while the loop-carrier is still advancing. Continuing the operation, the parts assume approximately the positions indicated in Fig. 10, the fabric having been fed or advanced and the needle moving down through the fabric. At this stage of the operation the loop-carrier is advancing on one side of and beyond the needle carrying the thread in its hook, while the loop-taker is moving in the opposite direction or retreating on the other side of the needle, the thread engaging shoulder 12. Thus the loop is spread or opened beneath the point of the needle, the latter passing down between the loop-taker and the loop-carrier. The needle continues to descend through the loop and at the same time the loop-taker and the loop-carrier continue to retreat, withdrawing from the loop and

shedding it onto the needle, as indicated in Fig. 11, thus completing one complete cycle of operation.

It is of course understood that the usual take-ups and tensions may be employed.

Although in the present embodiment I have shown the loop-taker and loop-carrier oscillating in curved paths and about the same center, it is by no means essential that such should be the case, for, as is obvious, these parts might oscillate about independent centers or reciprocate in straight instead of curved paths; nor is it necessary that the loop-taker and loop-carrier should both be operated from the same side of the needle or that they should approach the needle from the right side, as shown in the drawings, rather than from the front, rear, or left side, the only essential conditions being that the two should move on opposite sides of the needle to take and deliver the loop and that their paths should be so related that the loop-taker will spread or divert the loop into the path of the loop-carrier. It will be observed that the loop-taker and loop-carrier are independently adjusted both laterally and longitudinally of their working sections, thus permitting the proper timing of their movements both for forming the stitches and controlling the positions of the thread and size of the loop.

While I have illustrated my new looping mechanism as applied in connection with a single eye-pointed needle, it is obvious it may be employed in connection with existing types of machines provided with a plurality of needles and a common looping mechanism or a looping mechanism for each needle.

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

1. In a sewing-machine such as described, and in combination with its reciprocating thread-carrying needle, a loop-taker and a loop-carrier reciprocating on relatively opposite sides of and in a direction transverse to the needle's line of reciprocation, said loop-taker being provided with a point for entering between the needle and its thread, a deflecting-surface next the needle for extending the loop into the path of the loop-carrier, and a thread-detaining shoulder serving as a drag on the loop, while the loop-carrier is provided with a loop-entering point or end and a hook or shoulder in rear thereof for engaging the loop on the loop-taker and spreading said loop beneath the needle; substantially as described.

2. In a sewing-machine such as described, the combination with the reciprocating thread-carrying needle, of the reciprocating loop-taker provided with the entering end or point, the thread-diverting surface projecting toward the needle, the thread-detaining shoulder on its lower surface and an enlargement on the side remote from the needle, and the reciprocating loop-carrier provided with an entering point and loop-carrying hook, said loop-carrier and loop-taker reciprocating in parallel planes and on relatively opposite sides of the needle's path; substantially as described.

3. In a sewing-machine, such as described, the combination with the reciprocating thread-carrying needle, of the loop-taker 1, with its flattened point, enlargement 6, flange 7, and shoulder 9, and the loop-carrier 10, with its point and shoulder or hook 12, said parts being arranged for operation substantially as described.

4. In a sewing-machine such as described, the combination with the reciprocating thread-carrying needle, of the loop-taker 1 and the reciprocating loop-carrier 10, both of said last-named implements being arranged to reciprocate transversely of the needle's path and actuating devices provided with means for effecting independent adjustment in a direction laterally of the needle; substantially as described.

5. In a sewing-machine, such as described, the combination with the reciprocating thread-carrying needle, the driving-shaft, the two rock shafts or sleeves and the eccentrics and connections for communicating motion to said sleeves, of the loop-taker and the loop-carrier each provided with a horizontally-moving, operating portion and a shank extending at an angle therefrom for attachment to its rock shaft or sleeve; substantially as described.

6. In a sewing-machine such as described, the combination with the vertically-reciprocating thread-carrying needle, of the horizontally-reciprocating loop-taker with its flattened point, tapering flange in rear of said point and thread-detaining shoulder 9, and the horizontally-reciprocating loop-carrier with its point and hook, said loop-carrier having its path of movement above and substantially parallel with that of the loop-taker; substantially as described.

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