

P. DIEHL & M. HEMLEB.  
 MULTIPLE NEEDLE SEWING MACHINE.  
 APPLICATION FILED FEB. 24, 1908.

936,426.

Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

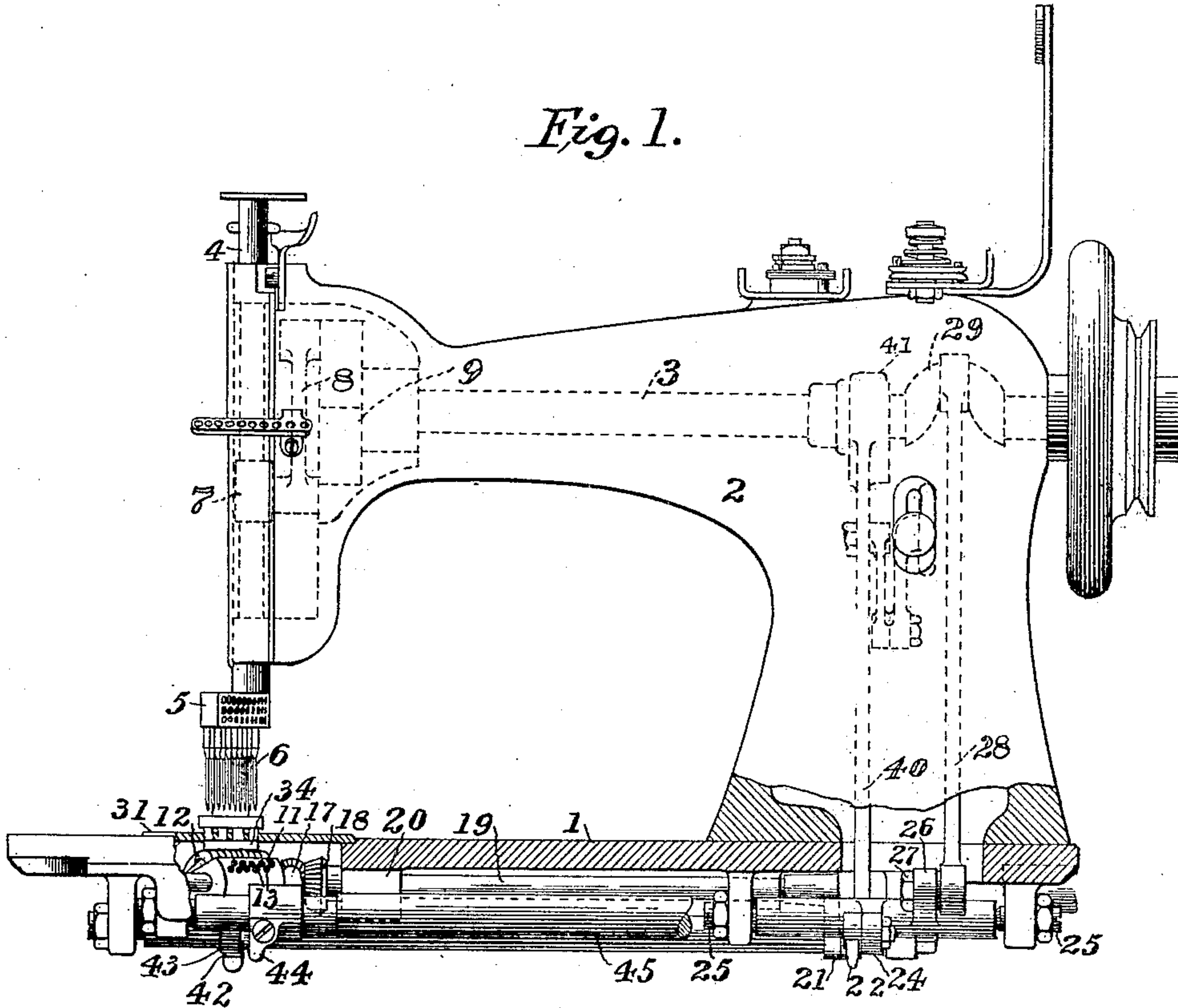
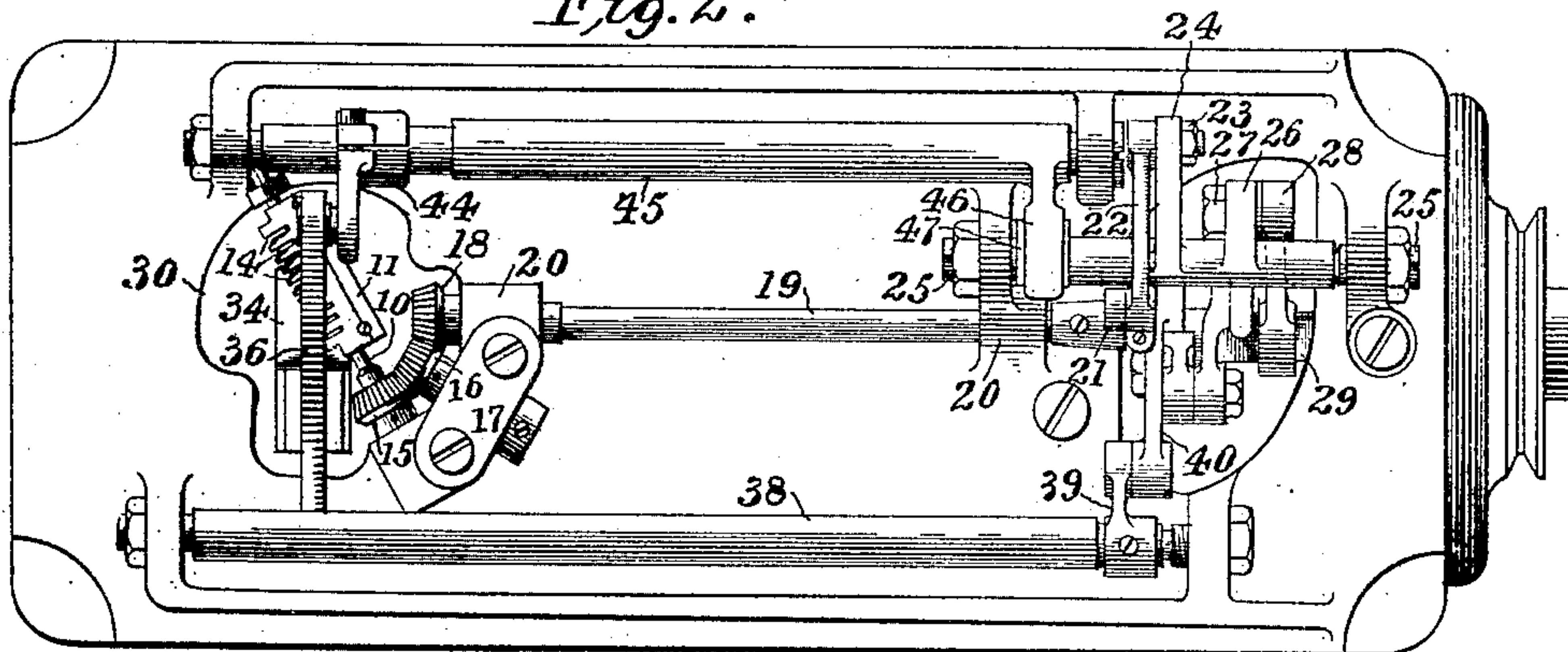


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

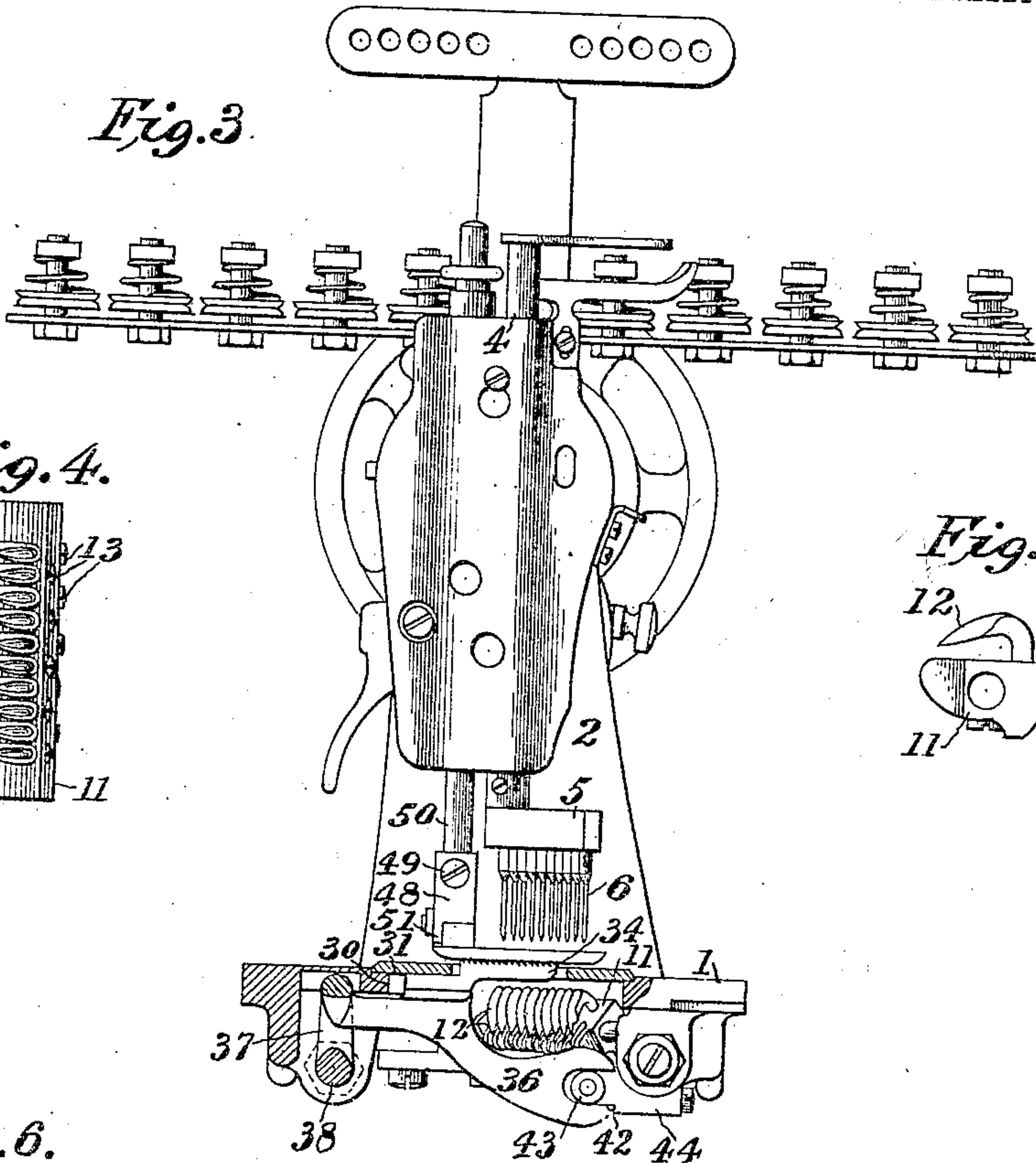


Fig. 4.

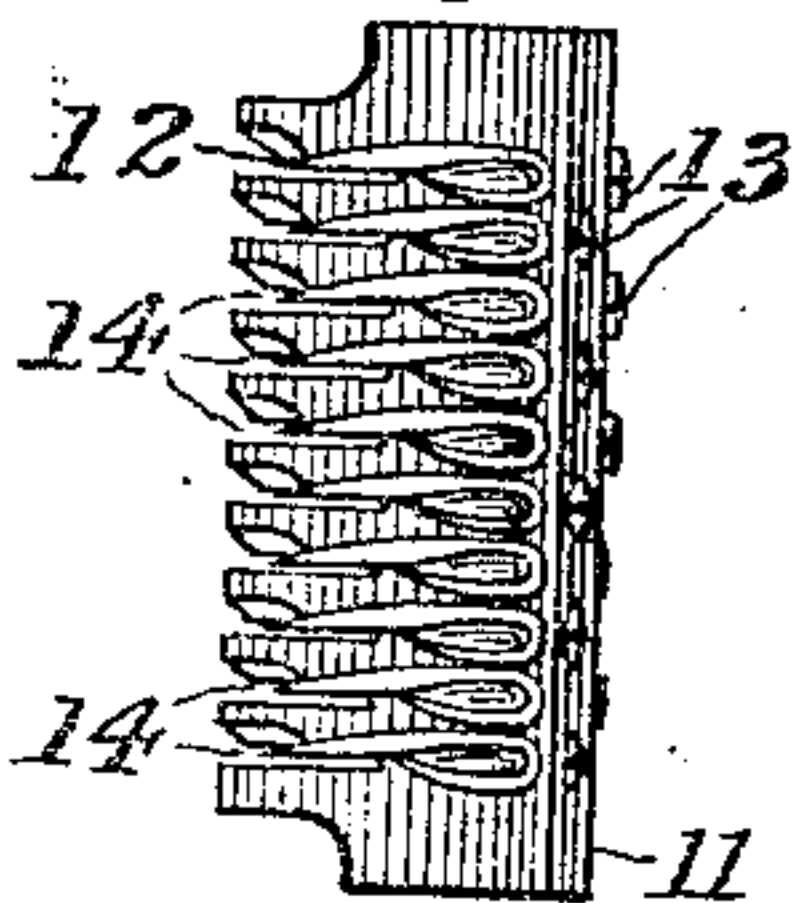


Fig. 5.

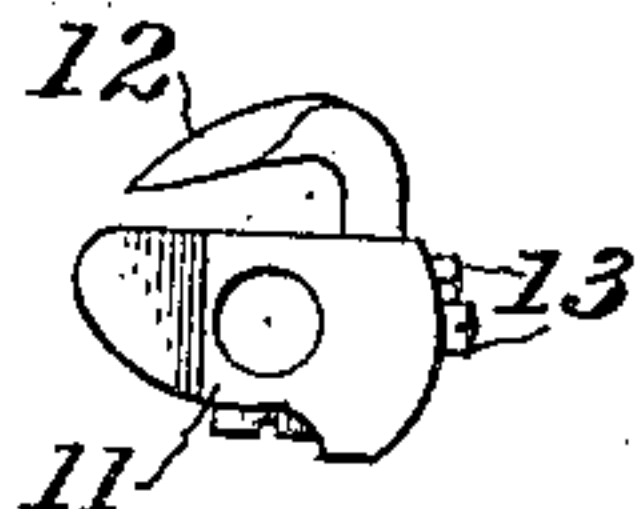


Fig. 6.

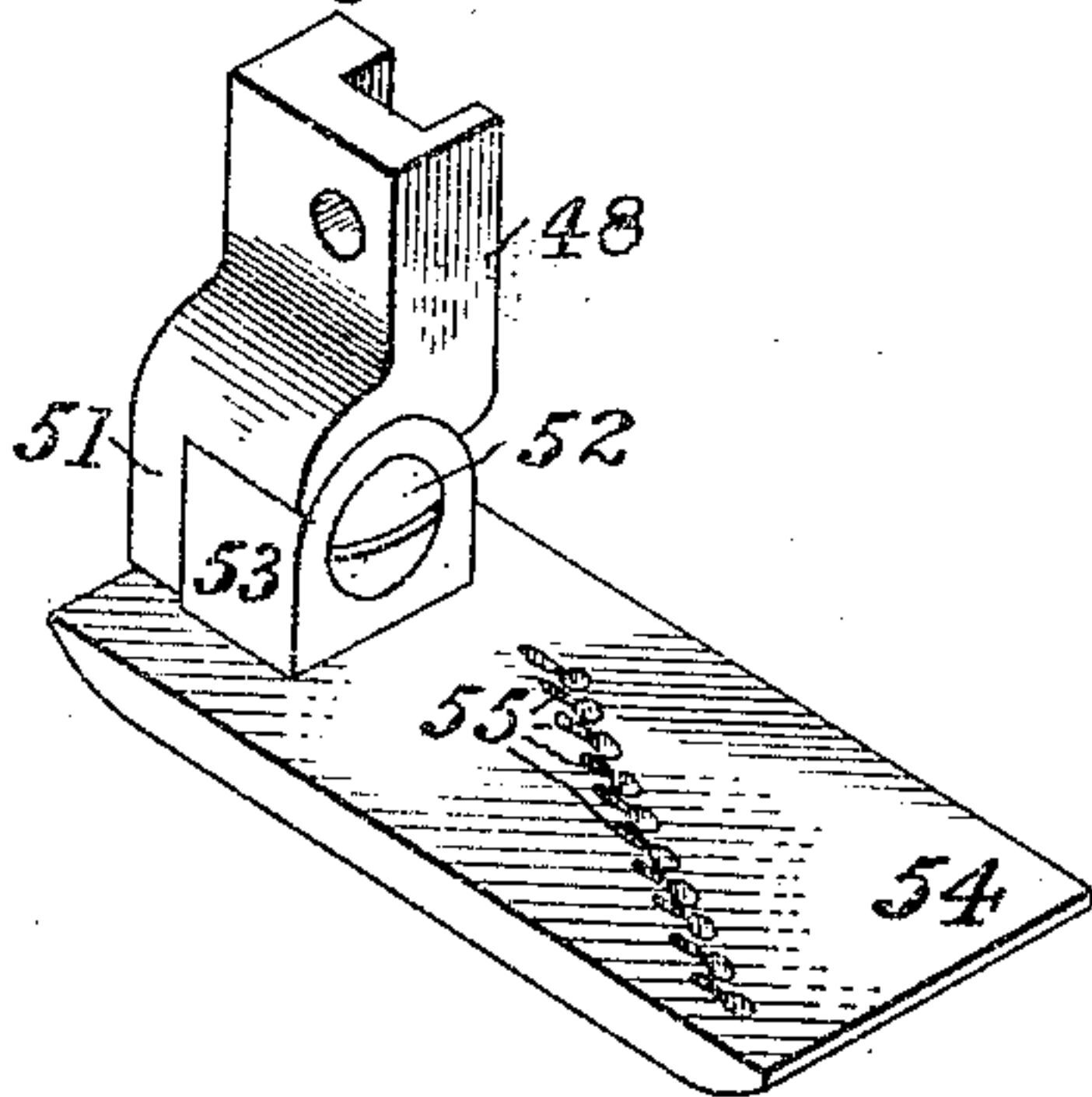


Fig. 7.

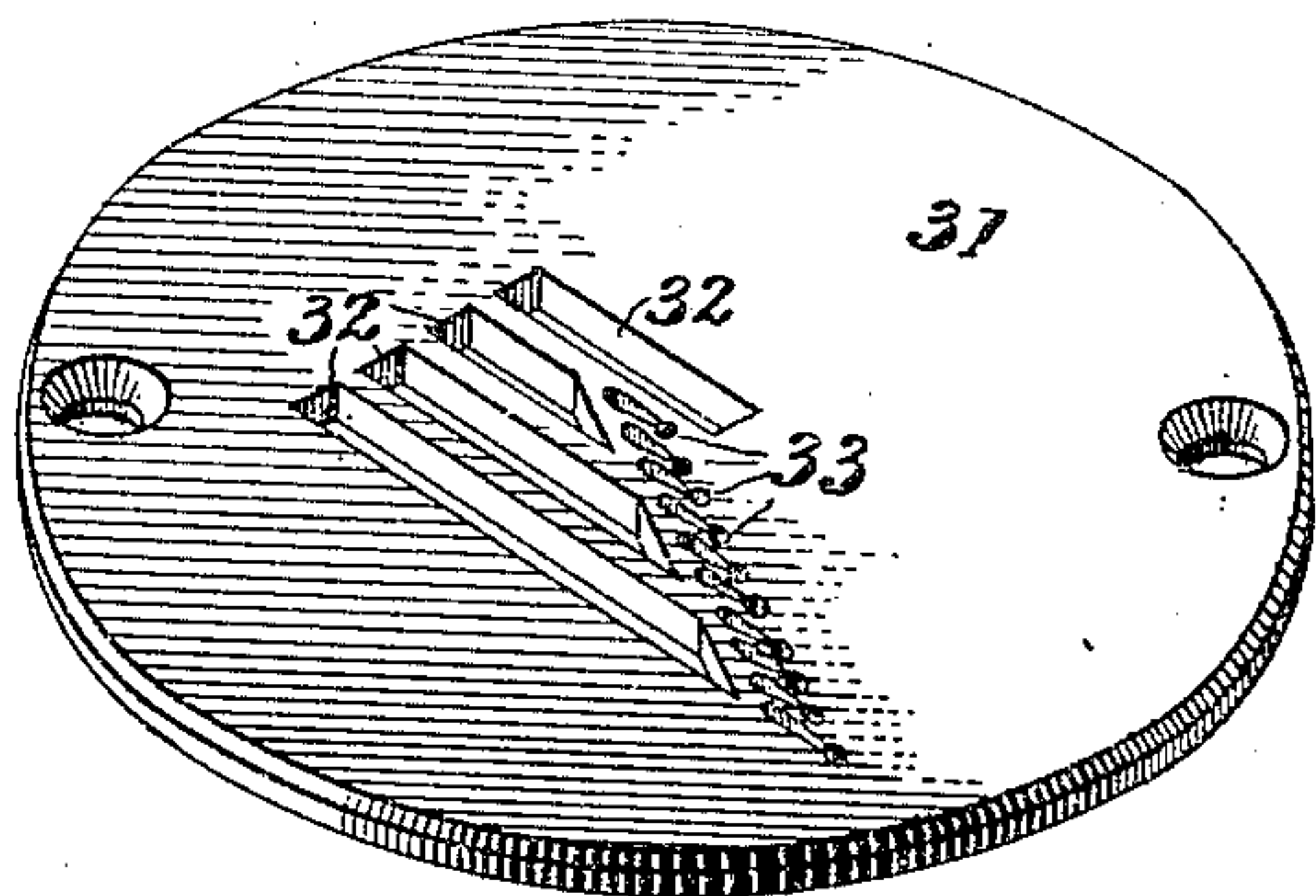
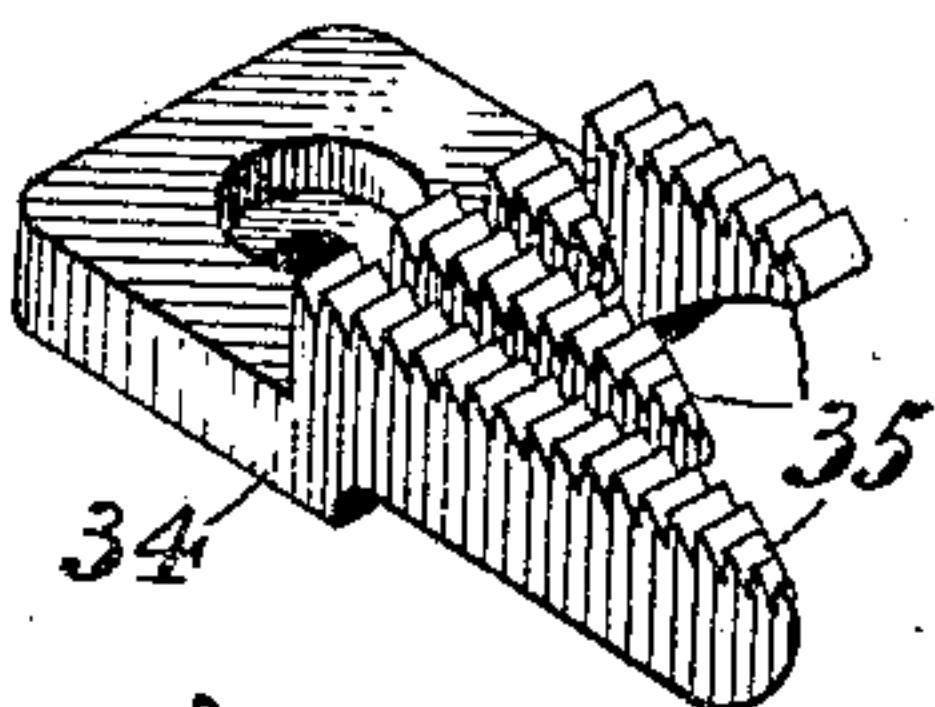


Fig. 8.



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# UNITED STATES PATENT OFFICE.

PHILIP DIEHL AND MARTIN HEMLEB, OF ELIZABETH, NEW JERSEY, ASSIGNORS TO  
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## MULTIPLE-NEEDLE SEWING-MACHINE.

936,426.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed February 24, 1908. Serial No. 417,423.

*To all whom it may concern:*

Be it known that we, PHILIP DIEHL and MARTIN HEMLEB, citizens of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Multiple-Needle Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in machines for producing simultaneously a plurality of closely spaced parallel seams, and more particularly to machines for applying to the material a plurality of lines of stitching in such close relation as to form practically a continuous ornamental band.

The invention has for its object to provide a construction in which as many parallel lines of stitching as may be desired are simultaneously applied to the material in closer spacing than the combined widths of the cooperating needles and loop-takers.

The invention is embodied in a machine having a reciprocating needle-bar with a multiple of needle-clamp carrying a plurality of needles arranged in a row at an inclination to the main-shaft from which the needle-bar derives its reciprocating movements, and a plurality of oscillating loop-takers having an axis of movement with an inclination to the main-shaft corresponding with that of said row of needles, and feeding mechanism acting in a direction inclined to that of said row of needles and to the axis of motion of said loop-takers.

The present machine is designed more particularly for applying bands of ornamental stitching to ladies belts, but is adapted for applying closely spaced parallel rows of stitching to many other articles, whether for ornamental or other purposes.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of a multiple needle machine embodying the present improvement, and Fig. 2 a bottom plan and Fig. 3 a front end view of the same. Fig. 4 is a plan view and Fig. 5 an end view of the multiple looper-carrier and loopers. Fig. 6 is a perspective view of the presser-foot, Fig. 7 a perspective view of the throat-plate, and Fig. 8 a similar view of the feed-dog.

The machine is constructed with the bed-plate 1 and bracket-arm 2 in which latter is journaled the main-shaft 3. In the forward

end of the bracket-arm is mounted a reciprocating needle-bar 4 carrying the multiple needle-clamp 5 in which are secured by usual means the series of thread-carrying needles 6. The needle-bar is connected by well-known means with the forward end of the main-shaft 3, shown in dotted lines in Fig. 1 comprising a collar 7 fixed upon the needle-bar and having a lateral stud embraced by one end of the pitman 8 whose opposite end embraces a crank-pin upon the crank-disk 9 upon the main-shaft. As will be observed, the multiple needle-clamp 5 is set at an inclination to the main-shaft 3, and the needles 6 are arranged in a row at a corresponding inclination to the main-shaft.

Beneath the bed-plate is mounted in suitable bearings the looper rock-shaft 10 carrying the multiple looper-carrier 11 and arranged at an inclination to the main-shaft corresponding with that of the row of needles 6, whereby the single chain-stitch loopers 12, secured in their respective sockets in the looper-carrier by means of the set-screws 13, are adapted to cooperate each with its respective needle in the production of stitches. The looper-carrier is provided with the usual needle-guiding slot 14 beneath the point of each looper to insure the proper control of the needle in presenting its loops for seizure by the looper.

The looper rock-shaft is shown herein provided with a bevel wheel 15 meshing with a similar idler gear 16 mounted upon a shaft journaled in the bearing 17, which idler in turn meshes with a bevel gear 18 fixed upon the forward end of an intermediate rock-shaft 19 journaled in bearings 20 beneath the bed-plate and provided at its rearward end with a crank-arm 21 through which it derives its rocking movements from the main-shaft by actuating mechanism substantially the same as that forming the subject of the United States Patent to P. Diehl and W. R. Houghton No. 579,223, dated March 23, 1897. As herein represented, the crank-arm 21 is connected with one end of a link 22 which is connected at the opposite end by means of a pin 23 with one arm 24 of a rocker mounted upon the bearing screws and having a second arm 26 connected by means of a screw-pin 27 with the lower end of a pitman-rod 28 whose opposite end embraces a crank 29 upon the main-shaft. As will be observed, through its train of con-



necting mechanism with the main-shaft, the rock-shaft 19 derives oscillating movements which are transmitted through the bevel gearing at its forward end to the looper rock-shaft and loopers 12.

While in narrow gage machines it is possible to employ loop-takers having paths of oscillation upon an axis disposed longitudinally of the bed-plate and therefore at an inclination to the row of needles arranged at an inclination to the direction of feed, this is not practicable for wide-gage machines, for the reason that the looper points must be set in a helical line corresponding to the inclined arrangement of the needles. Where the spacing of the needles at opposite ends of the row is long, the distance of the points of the loopers in such a helical line from the surface of the work-plate would vary to a considerable degree, and hence the action of the extreme loop-taking members would be effected under different conditions than those of the intermediate loop-taking members, and their action would be correspondingly uncertain. By arranging the loop-takers to oscillate upon an axis parallel with the line of the needle-eyes, the points of said loop-takers may be arranged in a straight line parallel with a line extending through the needle-eyes, whereby the loop-takers of the entire series are enabled to cooperate with their respective needles under precisely the same conditions throughout, thus insuring uniformity and certainty of action of the entire group, irrespective of the number and spacing of the stitch-forming members, and the gage of the series in which they are embraced. By the present improvement the scope of the machine is very materially increased.

The bed-plate is provided above the looper-carrier with an opening 30 over which is secured the usual throat-plate 31 formed with the parallel feed-apertures 32 and with the row of elongated needle-holes 33 arranged at an inclination with said feed apertures. It will be observed that the ends of the feed-apertures rearward of the needle-holes are inclined correspondingly with the arrangement of the needle-holes and that the feed-aperture beyond the last needle-hole is longer than the adjacent feed aperture and is of rectangular shape.

The feed-dog 34 is provided with a number of feeding surfaces 35 corresponding in arrangement and general shape with the feed apertures 32, the feed-dog being secured upon the usual feed-bar 36 pivotally connected at its rearward end with the upwardly projecting arms 37 of the feed-rock-shaft 38 whose rearward end carries a lateral crank-arm 39 pivotally connected with the lower end of the link-bar 40 having at its upper end the yoke 41 embracing the usual feed-actuating eccentric upon the

main-shaft, and hung from a movable fulcrum as represented in the said Patent No. 579,223.

The feed-bar 36 is provided at its end extended beneath the feed-dog with a slot 42 embracing the roller-stud 43 carried by an arm 44 fixed upon the forward end of the feed-lifting rock-shaft 45 having at its opposite end a yoke 46 embracing the feed-lifting cam 47 upon the looper-actuating rocker.

As will be observed by reference to Figs. 2, 6 and 7, the row of needles and the axis of movement of the loopers are arranged at an inclination to the main-shaft of about sixty degrees, and with the direction of feed, which is at right angles to the main-shaft, of about thirty degrees, whereby the spacing apart of the parallel seams produced by said needles in conjunction with the loopers is only one-half the distance apart of the needles and loopers in the direction of the axis of operation of the loopers.

As will be seen by reference to Figs. 3 and 6, the presser-foot comprises the usual shank 48 secured by means of the fastening screw 49 to the lower end of the presser-bar 50, having a depending ear 51 with square shoulders at the bottom. Attached to said depending ear of the presser-foot shank by means of the screw-stud 52 is a lug 53 projecting from the top of the rectangular foot-plate 54 extending forwardly from said lug and provided with the inclined row of elongated needle apertures 55 and extending backwardly beneath the ear 51 of the presser-foot shank which is slightly spaced above the same to permit of a slight rocking motion of the foot-plate upon the pivotal stud 52 to enable it to accommodate itself to the work. This tilting action of the presser-foot is desirable in multiple machines wherein the extreme needles are widely spaced, in order to provide uniformity of action upon the material passing beneath the presser-foot.

By reason of the large inclination of the row of needles to the direction of feed, and the desirability of having the feed-dog engage the work as close as practicable to the needles, it is evident that with the feed-dog having feeding surfaces of the same gage and in alinement with the row of needles, that adjacent to the advance needle at the end of the row is necessarily very short and much less effective in operation than that at the other side of the feed-dog, and it has therefore been found advisable to employ an additional feeding surface upon the feed-dog beyond the foremost needle, and of a greater length than the adjacent feeding surface so as to extend in advance of said foremost needle and effectively engage the goods close to the latter for producing a uniformity of feeding action upon the work. The



throat-plate 31 is therefore provided with its row of inclined needle-holes and parallel feed-apertures disposed in accordance with the relative arrangement of the needles and the feeding surfaces of the feed-dog.

Having thus set forth the nature of the invention, what we claim herein is:—

1. A multiple sewing machine comprising a frame, a main-shaft journaled therein, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles carried thereby and arranged in a row inclined to the main-shaft, a plurality of loop-takers adapted to oscillate upon a common axis having an inclination to the main-shaft corresponding with that of said row of needles and each adapted to cooperate with one of said needles in the production of stitches, the points of the loopers being arranged in a substantially straight line parallel with their axis of motion, means for imparting oscillating movements to said loop-takers, and feeding mechanism acting in a direction inclined to said row of needles and to the axis of motion of said loop-takers.

2. A multiple sewing machine comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles carried thereby and arranged in a row inclined to the main-shaft, a plurality of loop-takers adapted to oscillate upon a common axis having the same inclination to the main-shaft as said row of needles and each adapted to cooperate with one of the latter in the production of stitches, the points of the loopers being arranged in a substantially straight line parallel with their axis of motion, and means connected with said main-shaft for imparting the oscillating movements to said loop-takers.

3. A multiple sewing machine comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles carried thereby and arranged in a row inclined to the main-shaft, a plurality of loop-takers adapted to oscillate upon a common axis having the same inclination to the main-shaft as said row of needles and each adapted to cooperate with one of the latter in the production of stitches, the points of the loopers being arranged in a substantially straight line parallel with their axis of motion, means connected with said main-shaft for imparting the oscillating movements to said loop-takers, and feeding mechanism acting in a direction at right angles to said main-shaft.

4. A multiple sewing machine comprising

a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles secured therein and arranged in a row inclined to the main-shaft, a multiple looper-carrier having an axis of oscillation inclined to the main-shaft similarly to said row of needles and provided with a plurality of loopers each adapted to cooperate with one of said needles in the production of stitches, the points of the loopers being arranged in a substantially straight line parallel with their axis of motion, means connected with the main-shaft for imparting oscillating movements to said looper-carrier, and feeding mechanism acting in a direction inclined to said row of needles and the axis of motion of said looper-carrier.

5. A multiple sewing machine comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles secured therein and arranged in a row inclined to the main-shaft, a multiple looper-carrier having an axis of oscillation inclined to the main-shaft similarly to said row of needles and provided with a plurality of loopers each adapted to cooperate with one of said needles in the production of stitches, a rock-shaft journaled beneath the bed-plate and having an operative connection with the main-shaft from which it derives its operative movements, bevel gearing connecting the adjacent ends of said rock-shaft and the looper-carrier, and feeding mechanism acting in a direction inclined to said row of needles and the axis of motion of said looper-carrier.

6. A multiple sewing machine comprising a frame, a main-shaft journaled therein, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles carried thereby and arranged in a row inclined to the main-shaft, a plurality of loop-takers adapted to oscillate upon a common axis having an inclination to the main-shaft corresponding with that of said row of needles and each adapted to cooperate with one of said needles in the production of stitches, means for imparting oscillating movements to said loop-takers, a throat-plate formed with a row of needle-holes corresponding in inclination with said needles and having a plurality of parallel feed-apertures directed toward and in angular relation with said row of needle-holes but with their adjacent ends parallel therewith, and an additional feed aperture arranged beyond one of the extreme needle-holes and extending forwardly of the same.



feeding mechanism comprising a feed-dog having a plurality of parallel feeding surfaces conforming in shape and arrangement with the feed apertures in said throat-plate, and means for actuating said feeding mechanism.

7. A multiple sewing machine comprising a frame, a main-shaft journaled therein, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles carried thereby and arranged in a row inclined to the main-shaft, a plurality of loop-takers adapted to oscillate in parallel planes upon a common axis having an inclination to the main-shaft corresponding with that of said row of needles and each adapted to cooperate with one of said needles in the production of stitches, means for imparting oscillating movements to said loop-takers, and feeding mechanism acting in a direction inclined to said row of needles and to the axis of motion of said loop-takers.

8. A multiple sewing machine comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles carried thereby and arranged in a row inclined to the main-shaft, a plurality of loop-takers adapted to oscillate upon a common axis having the same inclination to the main-shaft as said row of needles and each adapted to cooperate with one of the latter in the production

of stitches, an inclined shaft from which the loopers derive their movements, and an intermediate shaft parallel with the main-shaft and connected with and actuated by the latter and having an operative connection with the looper-actuating shaft.

9. A multiple sewing machine comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a reciprocating needle-bar, operative connections between said main-shaft and needle-bar, a multiple needle-clamp and a plurality of needles secured therein and arranged in a row inclined to the main-shaft, a multiple looper-carrier having an axis of oscillation inclined to the main-shaft similarly to said row of needles and provided with a plurality of loopers each adapted to cooperate with one of said needles in the production of stitches, a rock-shaft journaled beneath the bed-plate and having an operative connection with the main-shaft from which it derives its movements, an operative connection intermediate the adjacent ends of said rock-shaft and the looper-carrier, and feeding mechanism acting in a direction inclined to said row of needles and the axis of motion of said looper-carrier.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

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MARTIN HEMLEB.

Witnesses:

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H. A. KORNEMANN, J.