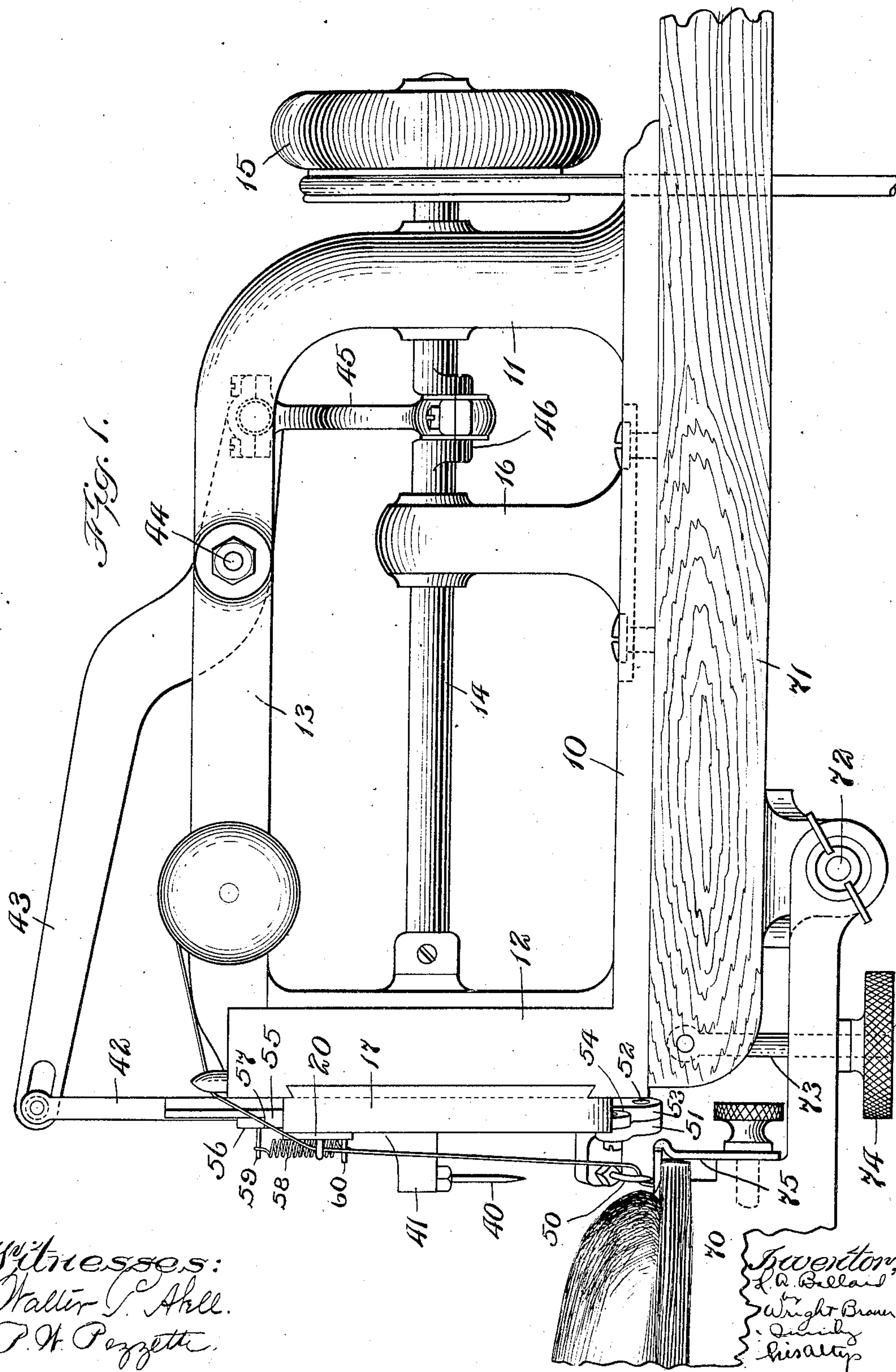


No. 790,997.

PATENTED MAY 30, 1905.

H. A. BALLARD.
SHOE SEWING MACHINE.
APPLICATION FILED OCT. 31, 1902.

3 SHEETS—SHEET 1.

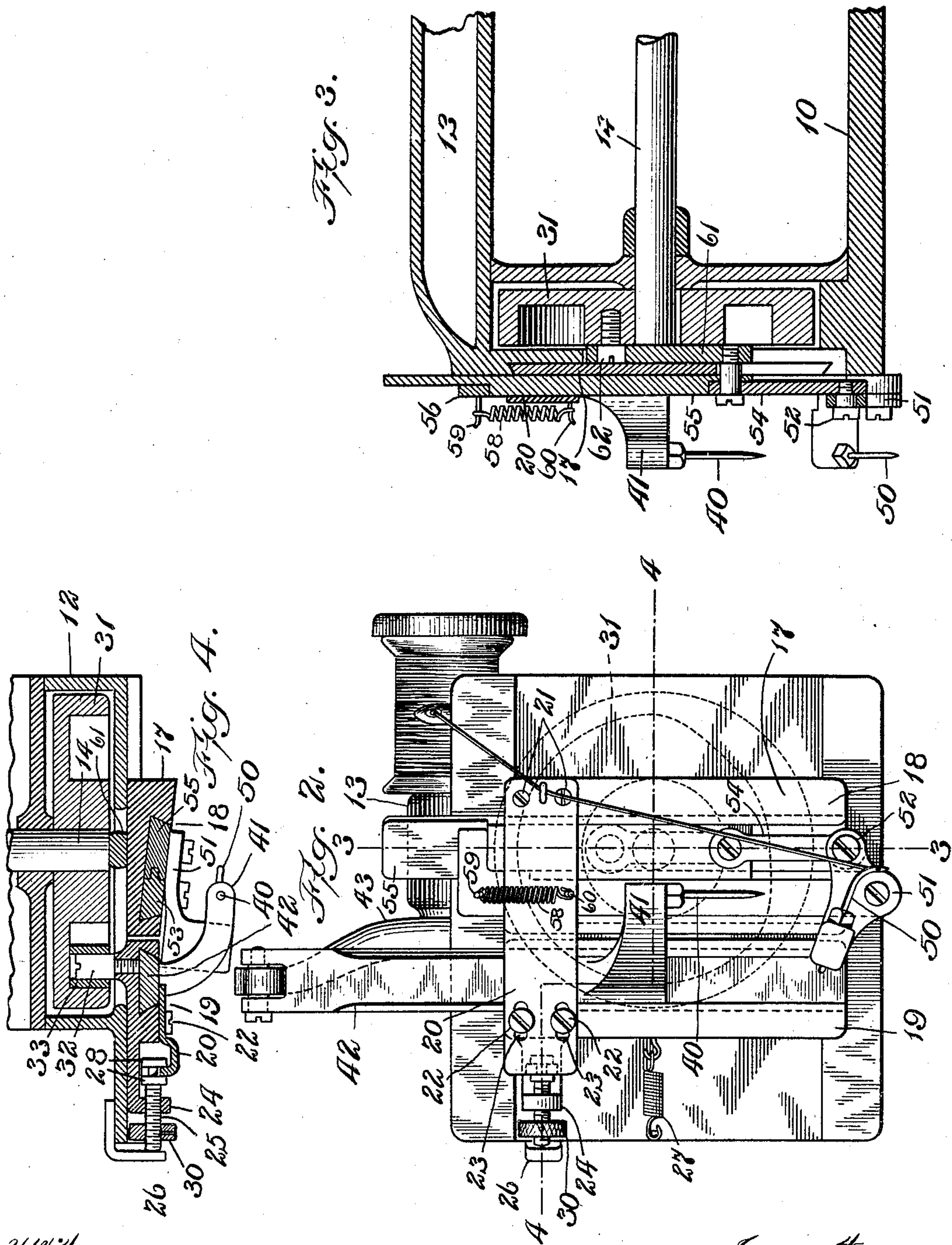


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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5.

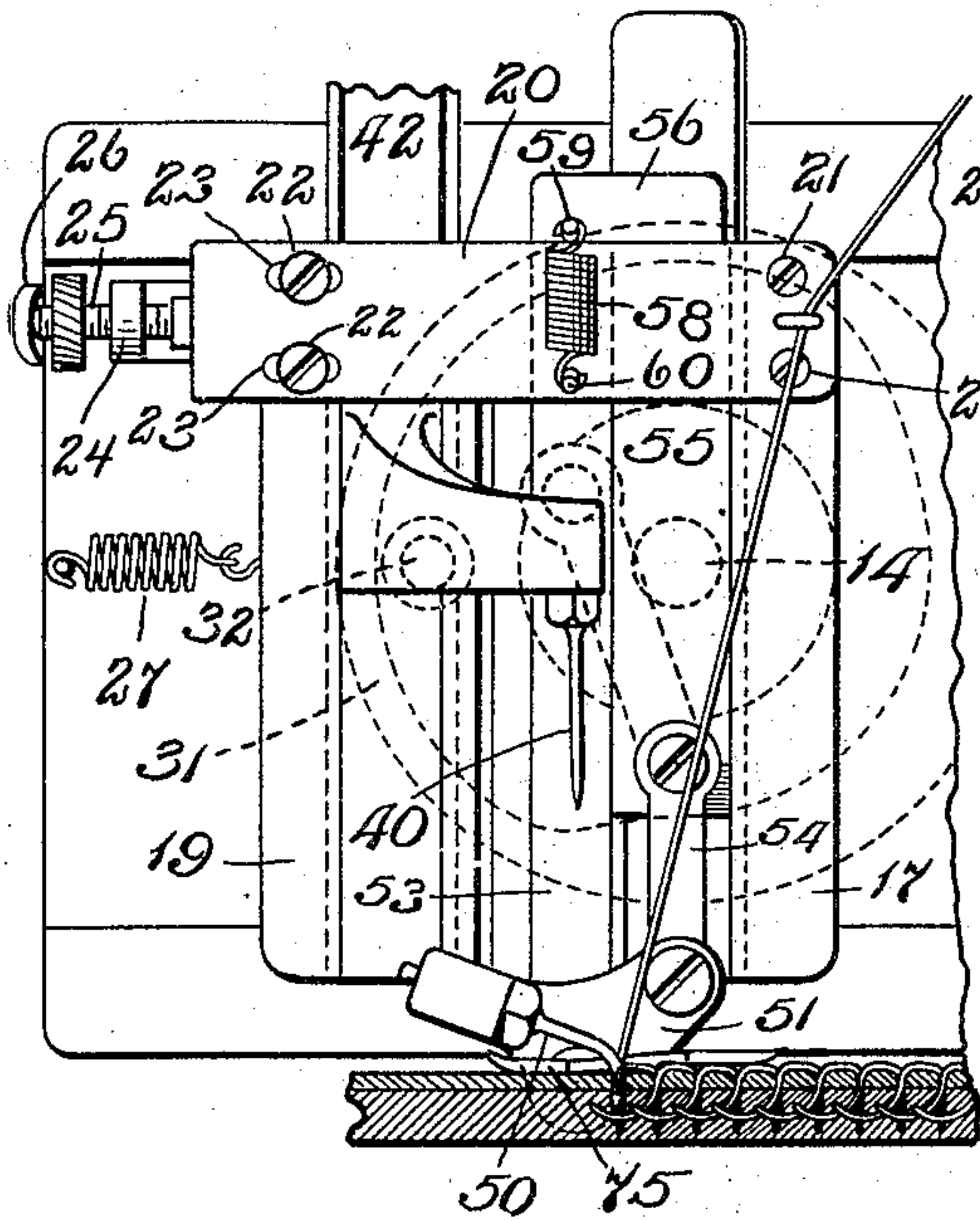


Fig. 6.

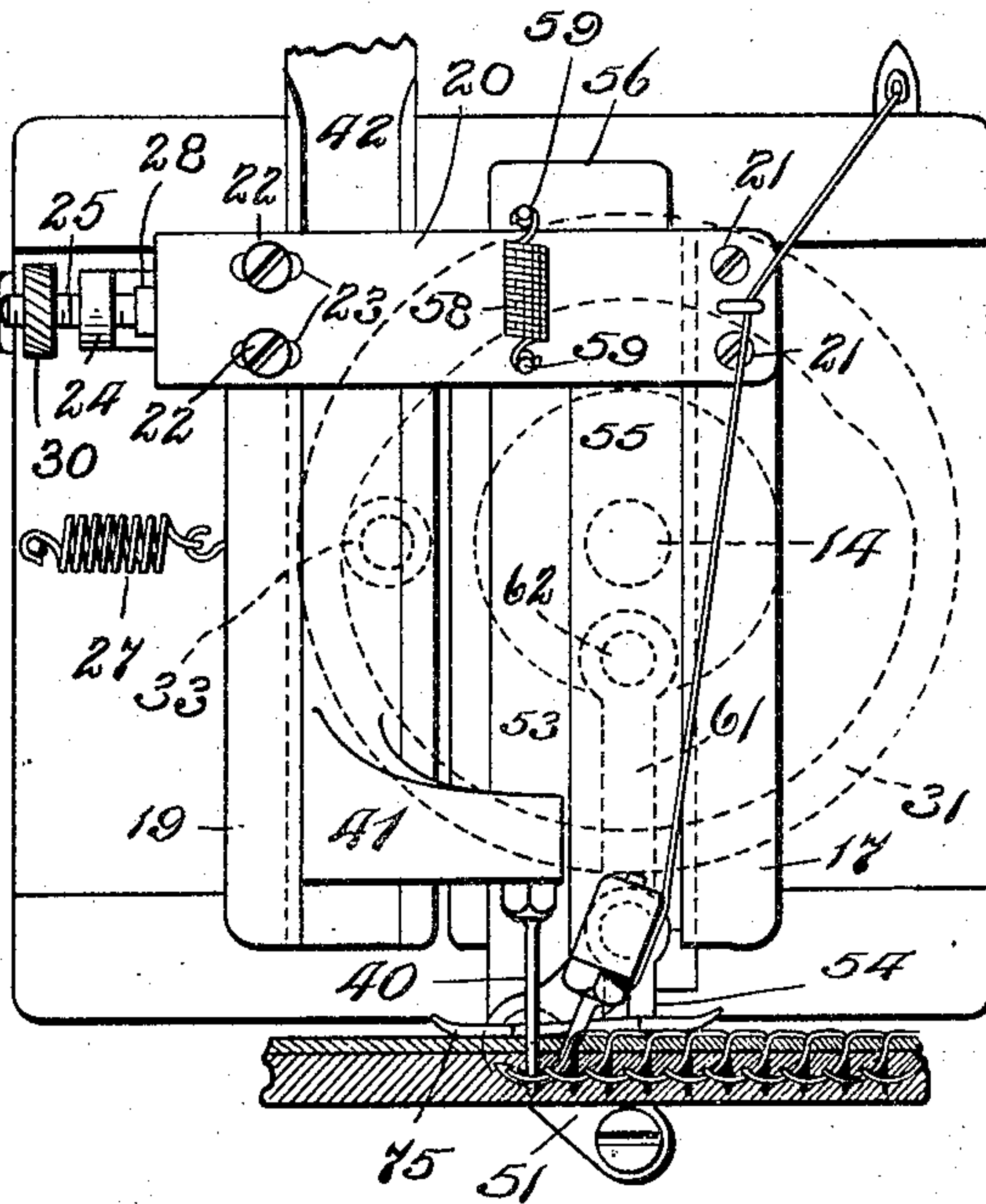


Fig. 7.

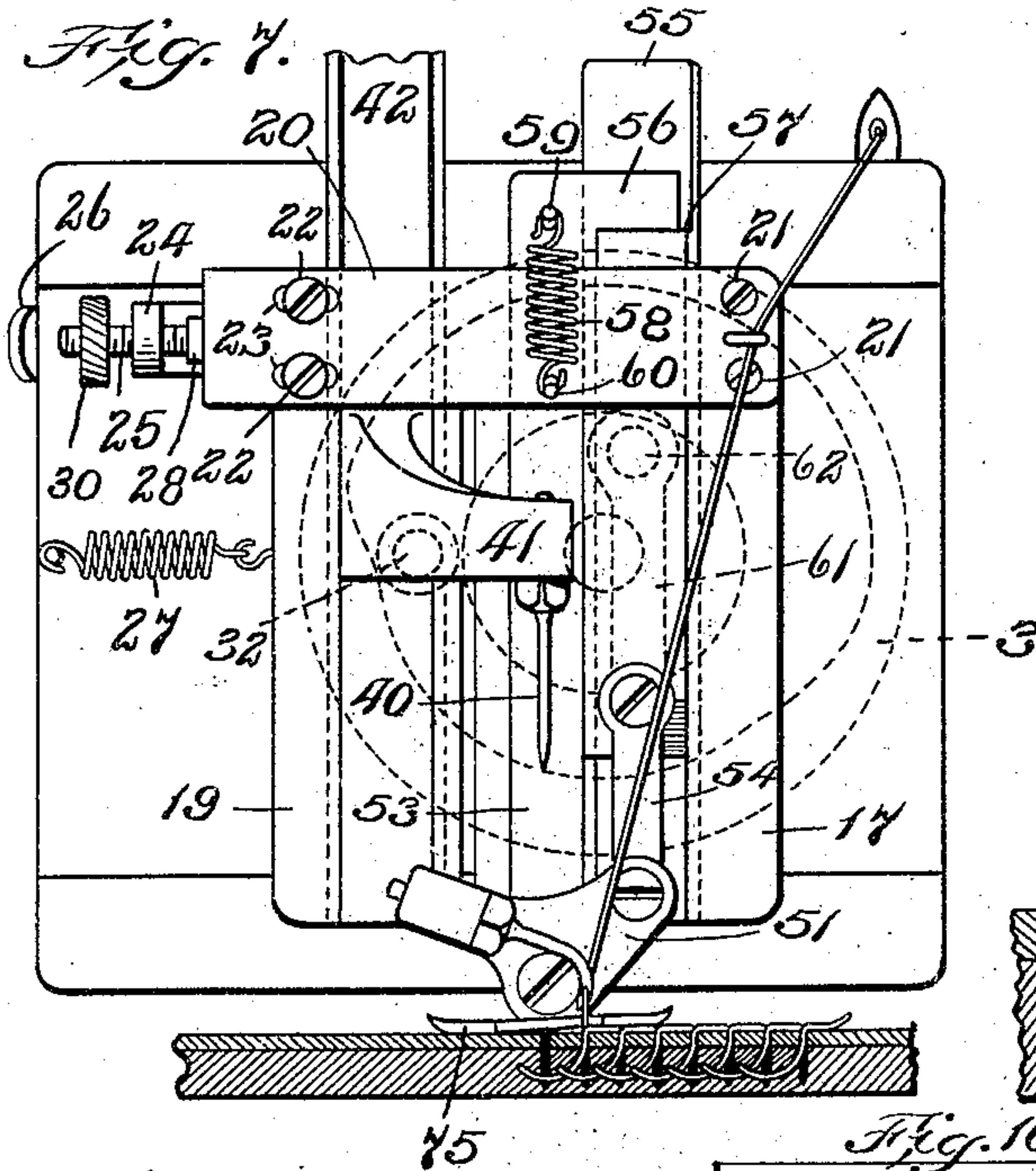


Fig. 9.

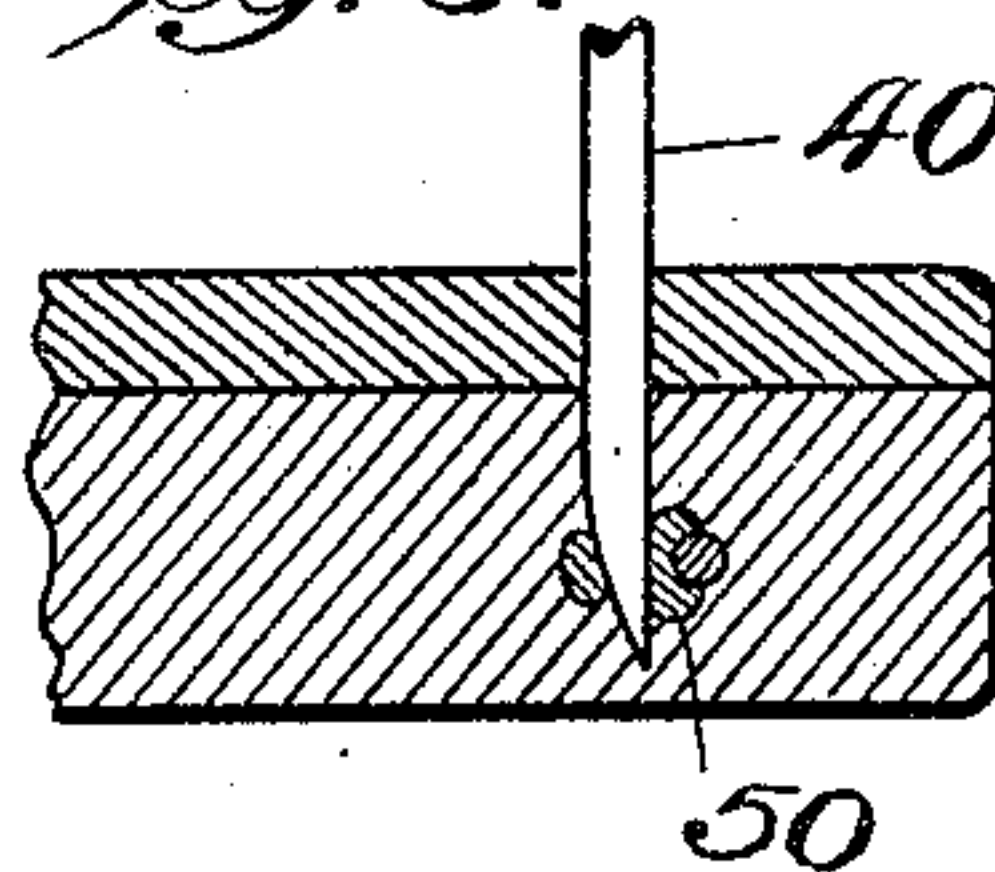


Fig. 8.

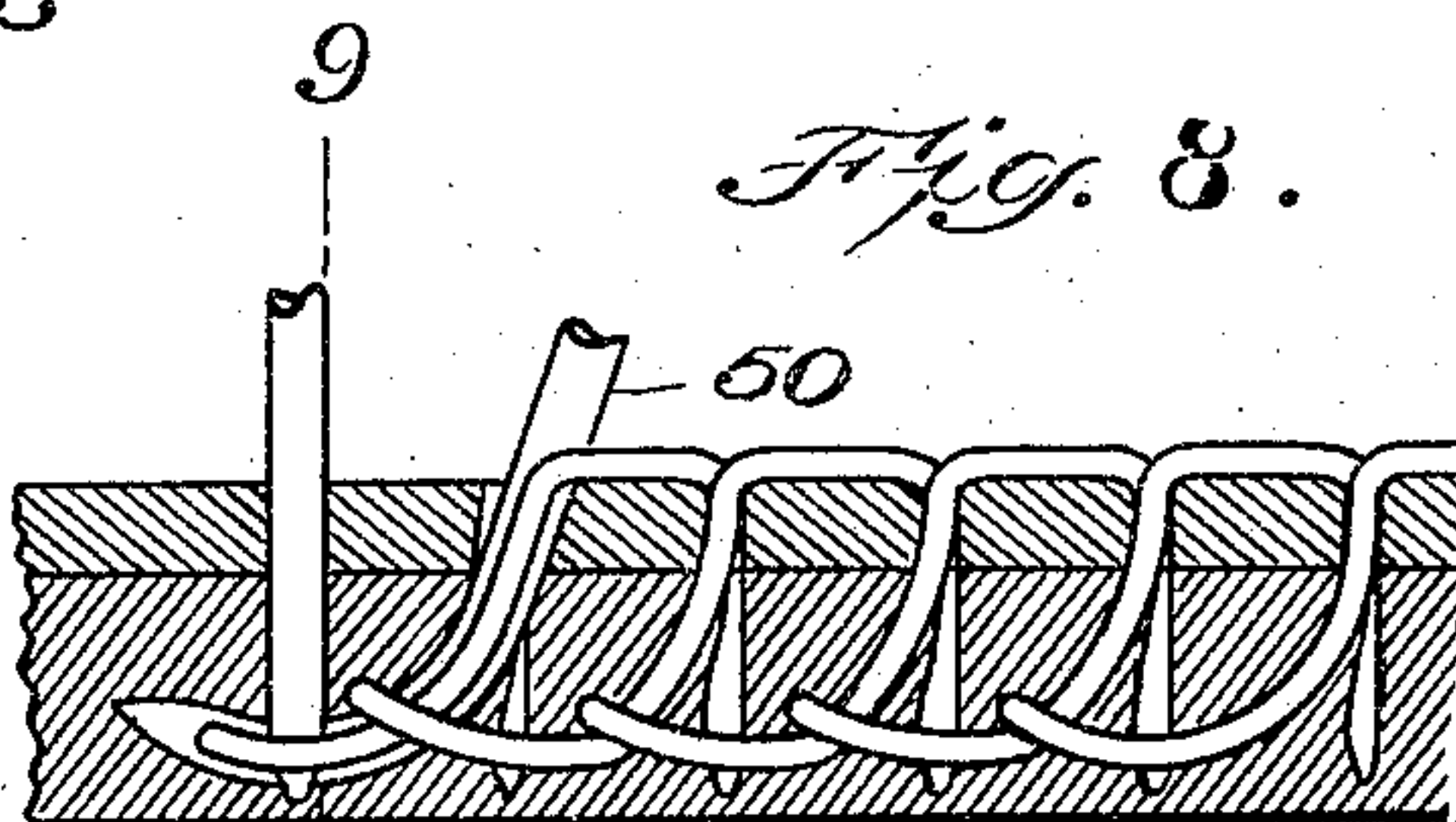
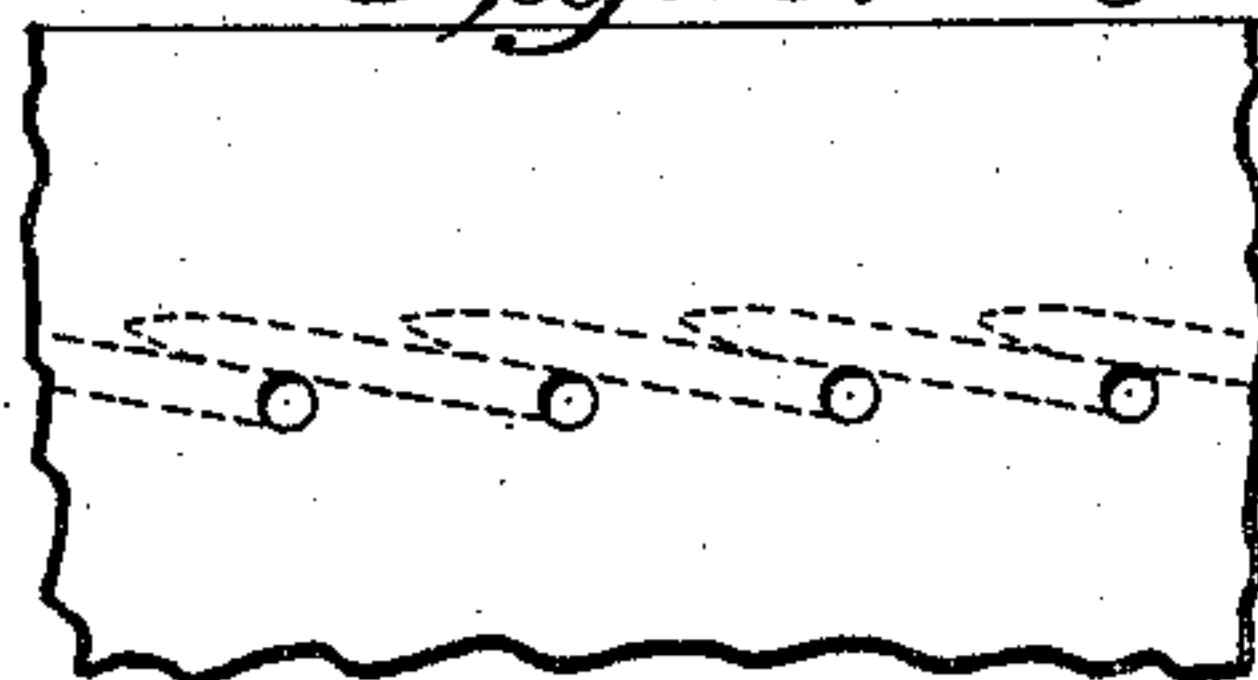


Fig. 10.



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UNITED STATES PATENT OFFICE.

HARRIE A. BALLARD, OF ASHLAND, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE BOYLSTON MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 790,997, dated May 30, 1905.

Application filed October 31, 1902. Serial No. 129,515.

To all whom it may concern:

Be it known that I, HARRIE A. BALLARD, of Ashland, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Shoe-Sewing Machines, of which the following is a specification.

In attaching a sole to a welted shoe it is customary to form a channel in the bottom of the sole near its edge to receive the seam, then to lay the flap down by suitable means, as by a rubstick, and to then subject the shoe to a leveling process to remove inequalities caused by the stitching.

This invention has for its object to obviate the necessity of these operations by the provision of a sewing-machine in which the sole may be attached to the welt by a seam, the stitches of which do not extend entirely through the sole.

The particular embodiment of the invention which is illustrated upon the drawings and which is hereinafter described is so arranged as to form a chain-stitch, each loop passing through the adjacent or preceding loop at a point located between the upper and under faces of the work.

On the accompanying drawings, Figure 1 represents an elevation of one embodiment of the invention. Fig. 2 represents a front elevation of the head of the machine. Fig. 3 represents a section on the line 3 3 of Fig. 2. Fig. 4 represents a section on the line 4 4 of Fig. 2. Figs. 5, 6, and 7 represent different positions of the sewing mechanism. Fig. 8 represents an enlarged view of the same. Fig. 9 represents a section therethrough on the line 9 9 of Fig. 8. Fig. 10 is a plan view of a fragment of a sole, showing the awl-holes and overlapping needle-holes.

The simplest form of the machine is shown, some of the parts being illustrated conventionally.

The machine is provided with a frame having a base 10, uprights 11 and 12, and the top 13. In the uprights is journaled a driving-shaft 14, equipped with the usual belt-wheel 15. The shaft further takes bearing in a sup-

porting-bracket 16 to stiffen it. The front upright 12 is provided with a wide groove, the walls of which are undercut to receive a dovetailed tongue on a laterally-movable slide 17, the movement of which effects the feed of the work, which will be subsequently described. The said slide is formed in two parts movable laterally toward and from each other, being indicated, respectively, at 18 and 19. They are connected by a cross-brace 20, attached by screws 21 to the part 18 and by screws 22, passing through slots 23, to the part 19. The portion 19 of the slide is provided with a lug 24, through which a screw 25 passes, the end of the screw being held against a stop 26, attached to the upright 12, by a spring 27. The screw 25 is provided at its head end with two collars 28, between which the end of the cross-brace extends, as shown in Fig. 4. Pinned to the screw is a milled head or collar 30, so that by rotating said screw the two parts of the slide may be adjusted relatively to each other and the slide as a whole adjusted relatively to the stop 26, the spring 27 serving at all times to draw the slide bodily to the left to effect the engagement of the end of the screw 25 with the said stop. For moving the slide a path-cam 31 is employed. The upright 12 is hollow and is formed in two parts, as indicated in Fig. 3, so as to form a housing for the cam which is secured upon the end of the shaft 14. The portion 19 of the slide has a rearwardly-projecting pin 32, on the head of which is a roll 33, lying in the groove of the cam 31. The said groove is wider than the roll, so as to permit of the adjustment of the slide, as hereinbefore stated. It will be apparent that the rotation of the cam effects a reciprocation of the slide, the length of which depends upon the adjustment of the screw 25 with relation to the stop 26. Each part of slide forms a guideway. The slide as a whole serves as a guide for the awl, the needle, and the carriers therefor.

The awl is indicated at 40. It is straight, as shown, and is secured in a forwardly and

laterally projecting lug 41 on a carrier 42. Said carrier consists of an upright bar or slide adapted to be reciprocated vertically in a slide-way formed in the portion 19 of the slide 17.

5 The upper end of the awl-carrier has a pin-and-slot connection with a lever 43, fulcrumed upon a stud 44, projecting laterally from the top 13 of the frame. The rear end of the lever is connected by a pitman 45 with a crank
10 46 on the shaft 14. The stud 44 is adapted to permit the vertical oscillation of the lever 43 and also to permit a lateral oscillation thereof, being preferably spherical in shape and extending into a spherical socket in the lever.
15 This is a common method of fulcruming a lever in which these movements are desirable and is therefore not illustrated in detail. The vertical oscillation of the lever 43 effects a reciprocation of the awl-carrier and the awl to
20 cause the awl to be forced into the work to a predetermined extent, but not entirely through it.

The needle is indicated at 50. Its operative portion is curved, as shown, in the arc of a
25 circle. It is attached to a substantially triangular carrier 51, fulcrumed by a stud 52 to the lower end of a slide 53, placed in a slide-way formed in the portion 18 of the slide 17. The said needle-carrier is adapted to be moved
30 bodily vertically and also to be oscillated about the axis of the stud 52, the curve of the needle 50 being the arc of a circle described about the said stud. The needle-carrier is connected by a link 54 with a second slide 55,
35 parallel to that at 53, and also movable in a guideway in the portion 18 of the slide 17. The upper end of the slide 53 is provided with a lug 56, which is adapted to rest upon a shoulder 57 upon the slide 55, so that during
40 a portion of the upward movement of the slide 55 the slide 53 will be carried with it. A spring 58 connects a pin 59 on the slide 53 with a pin 60 on the cross-brace 20, so that when the slide 55 is moved downward the
45 slide 53 descends with it until the pin 59 rests upon the top of the brace 20. The movement of the slide 55 therefore effects a movement of the slide 53.

The slide 55 is connected on its rear side
50 by a link or pitman 61 with a crank-pin 62 on the cam 31, so that the rotation of the shaft 14 effects a reciprocation of the slide 55 and also of the slide 53 and causes the needle-carrier to be moved bodily toward and from
55 the work, as will be explained, and to be swung about the stud 52.

By reference to Fig. 4 it will be observed that the bottom-wall slideway for the two
60 sides 53 55 is at an angle to the plane of the front of the head, and hence the pivot 52 for the needle-carrier is laterally inclined. The purpose of this is to cause the needle to traverse a path longitudinal of but slightly inclined relatively to the line of feed of the
65 work, as shown in Fig. 10, so that the needle

may enter the perforation made by the awl, but will be out of alinement with the awl when the latter makes the next succeeding perforation.

The work is supported by a work-rest 70, 70 which is shown conventionally as adjustably secured to the table 71, upon which the frame rests. The said rest is fulcrumed on a pivot 72 and is adapted to be adjusted vertically by a threaded rod 73 and a milled nut 74. The 75 rest is provided with a spring presser-foot and gage 75, which is adapted to take over the sole of the shoe, as indicated in Fig. 1. The spring presser-foot 75 bears upon the top of the work with sufficient pressure to hold it against ac- 80cidental movement except when the work is moved positively by the awl, as will be explained.

The operation of the machine is as follows, assuming that the parts are in the position 85 shown in Fig. 2 or 7: At this time the awl-carrier and the needle-carrier are raised to their upper extremes of movement. The crank-pin 62 is at the upper end of its throw, and the point of the needle is directly over the perforation in the work previously made by the awl. As the shaft 14 rotates to the left or in a direction opposite to the movement of the hands of a watch the slide 55 is carried down-
ward, the slide 53 moving downward with it 95 until the pin 59 rests upon the top of the brace 20. The downward movement of the needle-carrier and the needle causes the end of the needle to extend in the perforation in the work. The continued downward move- 100ment of the slide 55 causes the needle-carrier to be rocked about its axis of movement, and the needle is therefore swung in a circular path, as shown in Fig. 8. The thread, which is passed through the eye of the needle, is car- 105ried in a loop into the curved aperture formed by the needle. The awl then descends, perforating the work for the next stitch, and its end passes into the loop between the thread and the needle, as shown in Fig. 9. While 110the awl and the needle are in the work the slide 17 is moved laterally to feed the work to the right. The needle-carrier is oscillated to bring the needle back to the position shown in Fig. 5, and the awl-carrier is lifted. The 115slide 17 is then again moved to the left, and the needle descends, as described. Each loop formed by the needle is passed through the preceding loop, as indicated in Fig. 8, to form a chain-stitch. 120

So far as I am aware I am the first to have provided a sewing mechanism in which the needle is first moved rectilinearly and then in a curvilinear path and am also the first to have 125formed a seam the stitches of which are engaged between the surfaces of the work, so that no part of the stitch occurs on the under side of the work as it is presented to the sewing mechanism.

Having thus explained the nature of the 130

invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all the modes of its use, I declare that what I claim is—

1. A sewing-machine having stitch-forming mechanism comprising a curved needle, means for imparting to said needle a rectilinear movement and a curvilinear movement whereby said needle is caused to enter the work in a straight line and then to penetrate the same in a curved line, and means cooperating with said needle to form a stitch.

2. A sewing-machine having stitch-forming mechanism comprising a curved needle, means for moving said needle rectilinearly toward the work to cause the point thereof to enter the work, means for moving the needle in the work below the face thereof in a curved line, and means cooperating with said needle to form a stitch.

3. A sewing-machine having stitch-forming mechanism adapted to form a series of interlocked stitches in the work, said stitches being visible on only one side of the work and of which the interlocked portions are concealed within the work, said mechanism comprising a needle adapted to penetrate only one side of the work and to insert the stitches into the work, an awl adapted to enter the work and each new stitch therein to hold it, means for actuating said needle to insert the stitches into the work, and means for causing said awl to operate as described.

4. A sewing-machine having stitch-forming mechanism adapted to form a series of interlocked stitches in the work, said mechanism

comprising a needle adapted to insert loops of thread successively into the work so that each loop passes through the preceding loop while the latter is in the work, an awl adapted to enter each new loop while it is in the work to prevent it from being withdrawn by the needle, instrumentalities for actuating said needle as described, and instrumentalities for actuating said awl as described.

5. A sewing-machine having stitch-forming mechanism comprising an awl adapted to partially penetrate the work and to feed the work, a needle adapted to enter each hole previously made by the awl and to partially penetrate the work, means for actuating said awl, and means for actuating said needle to cooperate with said awl in inserting in one side of the work a series of stitches, and in interlocking the inserted portions of said stitches one with another while said portions are in the work.

6. A sewing-machine comprising feeding mechanism and stitch-forming mechanisms having a curved needle, means for causing said curved needle to penetrate the work in lines longitudinal of the direction of feed to lay the loop in the work, an awl, and means for causing said awl to penetrate the work and engage the loop carried thereinto by the needle so as to retain said loop in the work when the needle is withdrawn.

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

HARRIE A. BALLARD.

Witnesses:

M. B. MAY,

C. C. STECHER.