

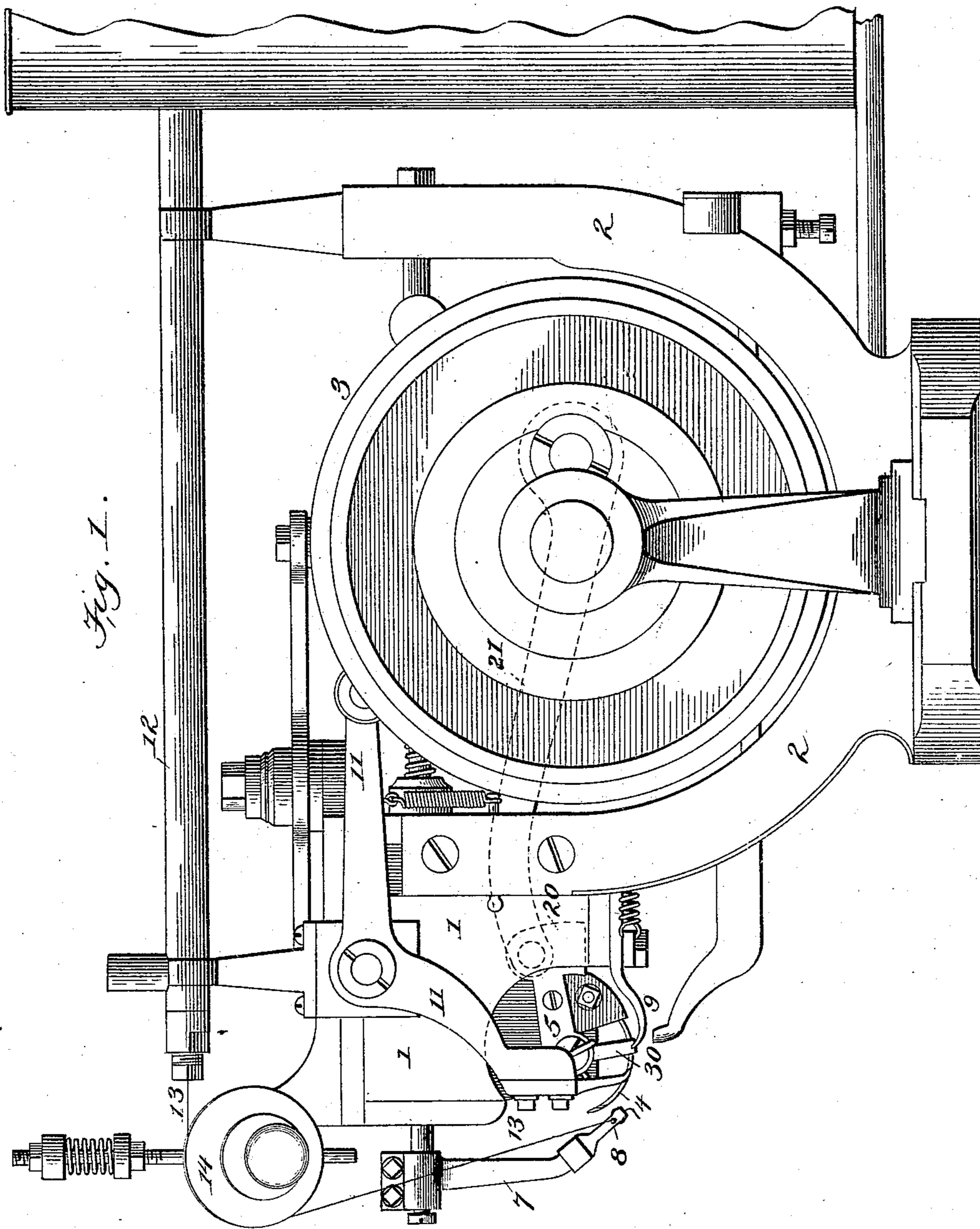
(No Model.)

2 Sheets—Sheet 1.

F. A. MILLS.
NEEDLE GUIDE FOR SEWING MACHINES.

No. 551,987.

Patented Dec. 24, 1895.



WITNESSES:

Edwin L. Bradford
W. G. Stearns, Jr.

INVENTOR

Francis A. Mills

BY

Johnson & Johnson
ATTORNEYS.

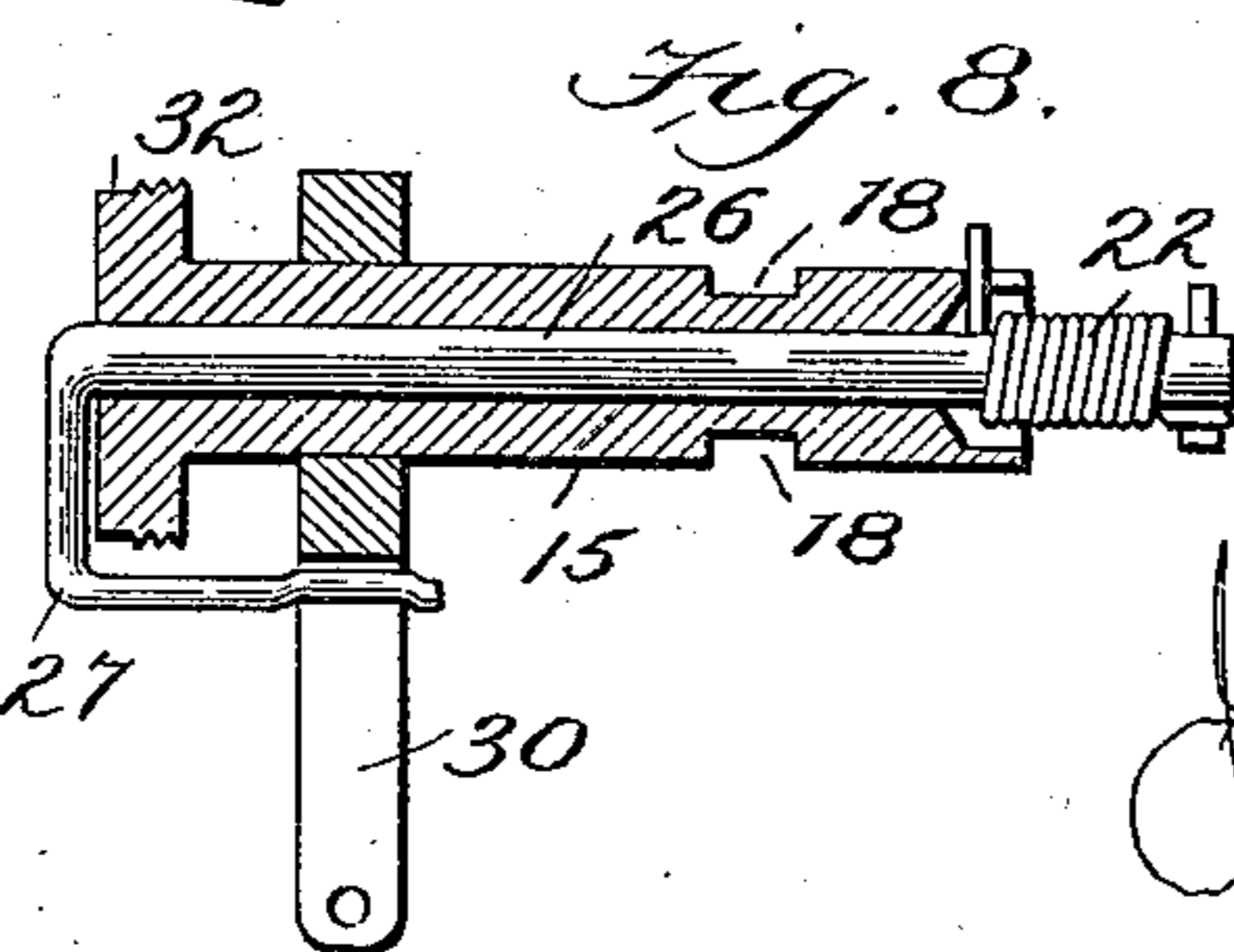
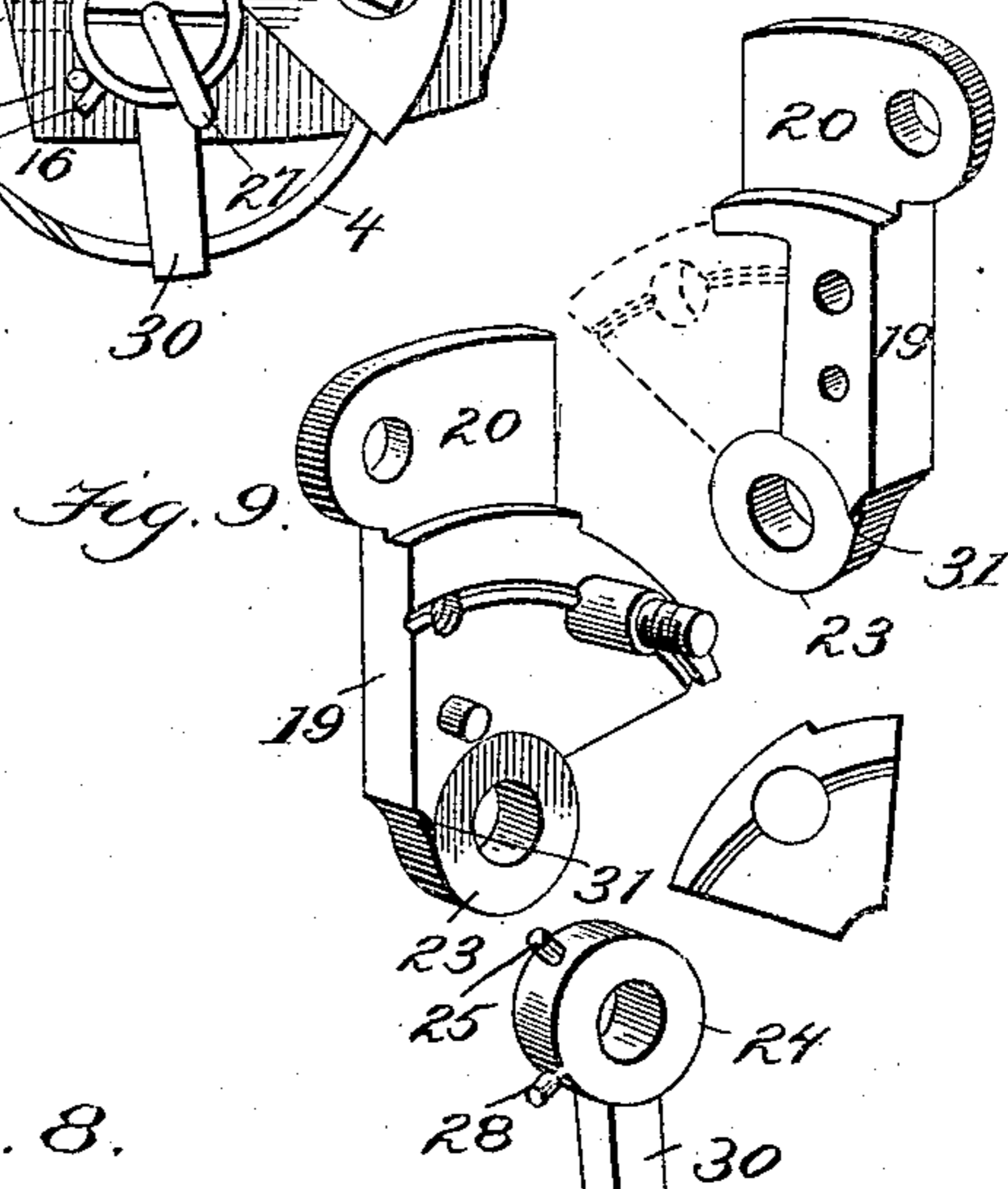
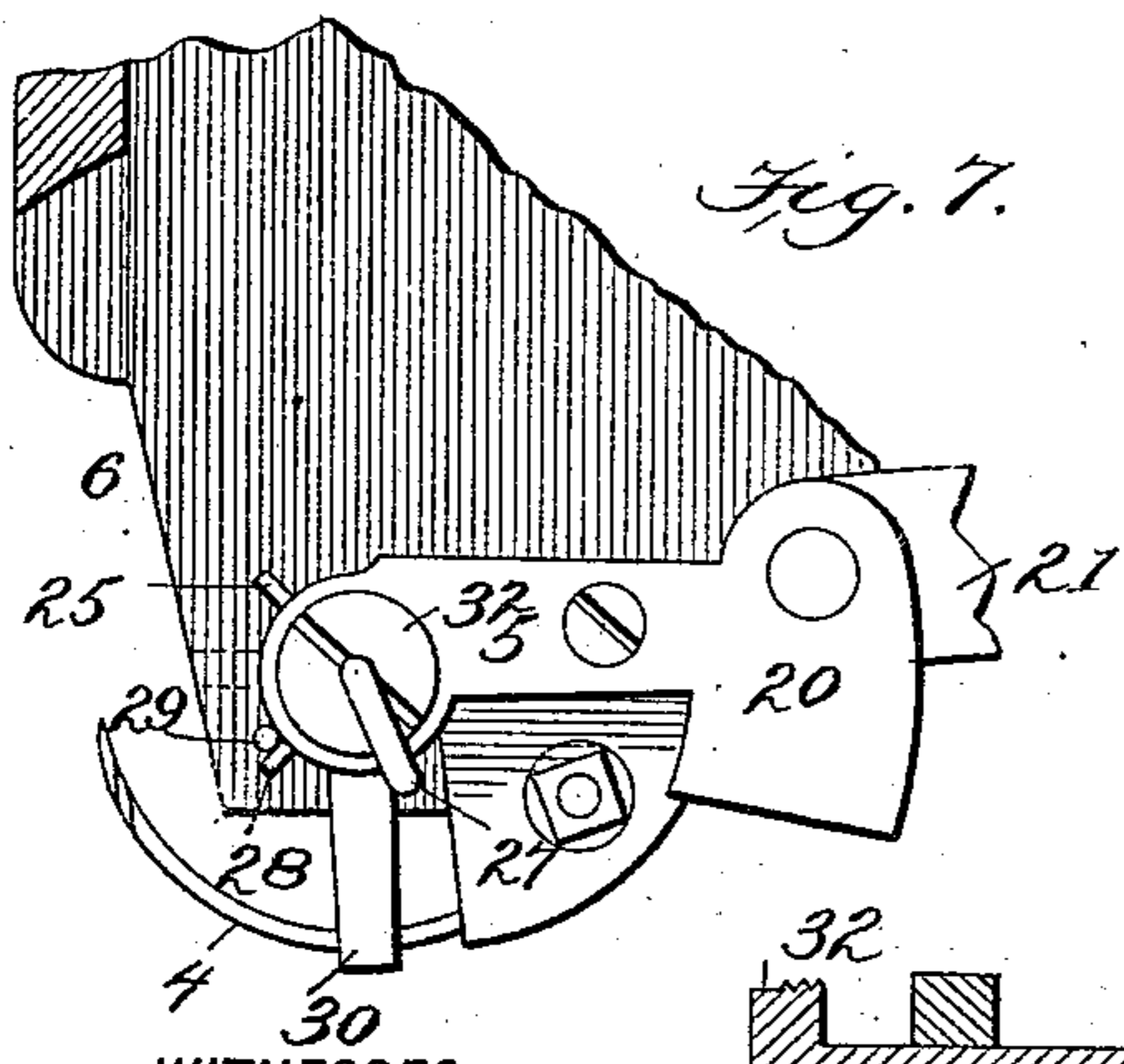
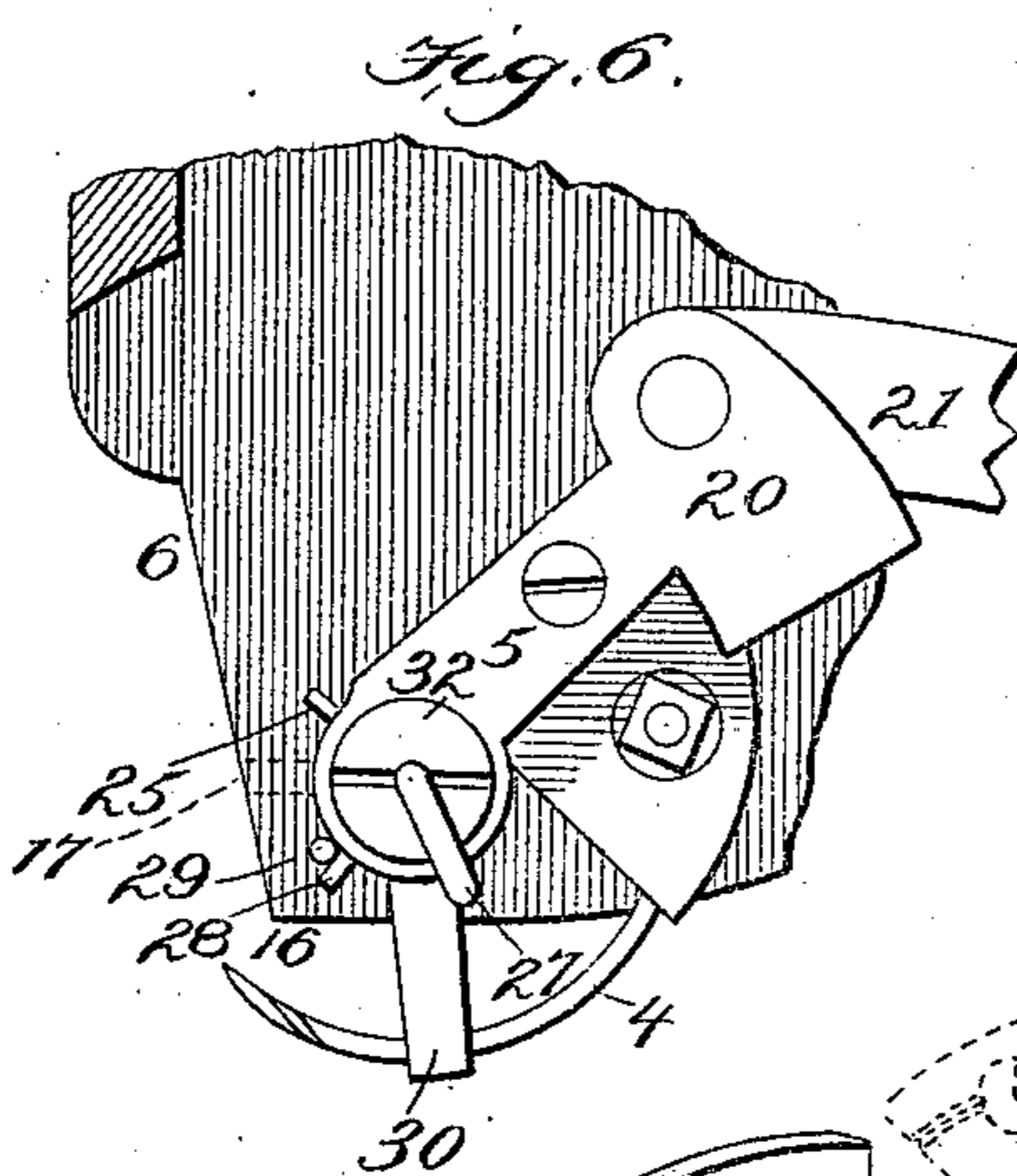
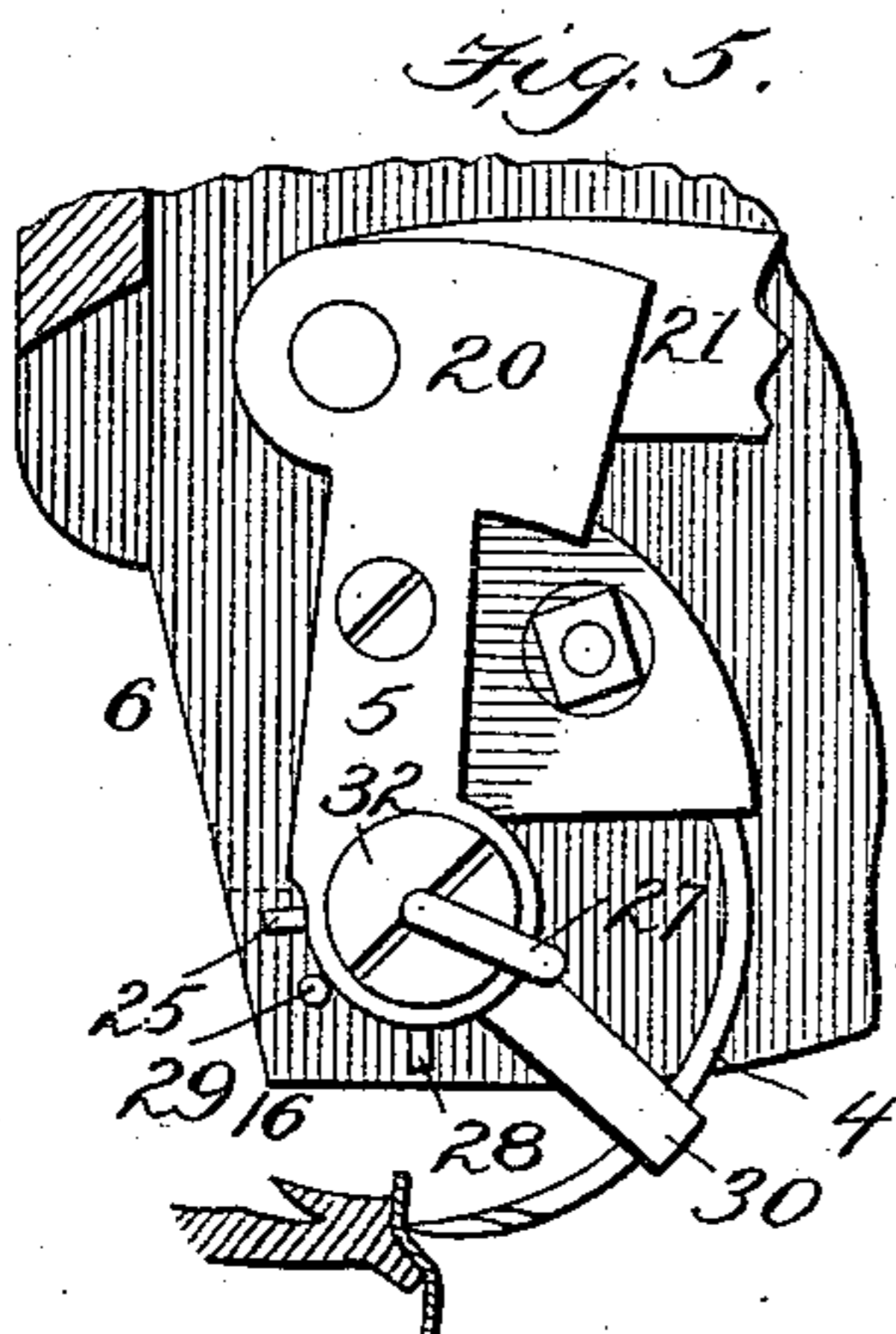
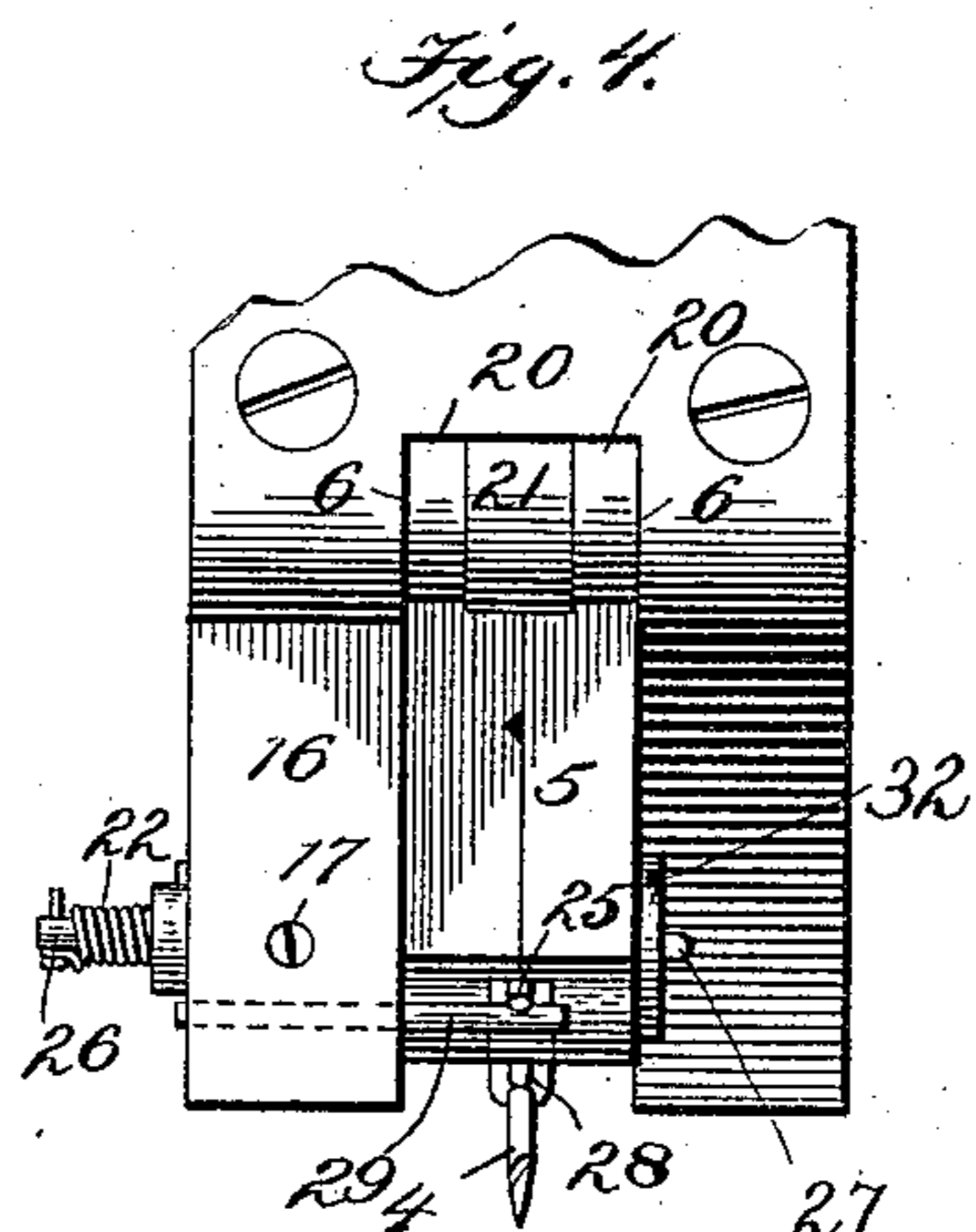
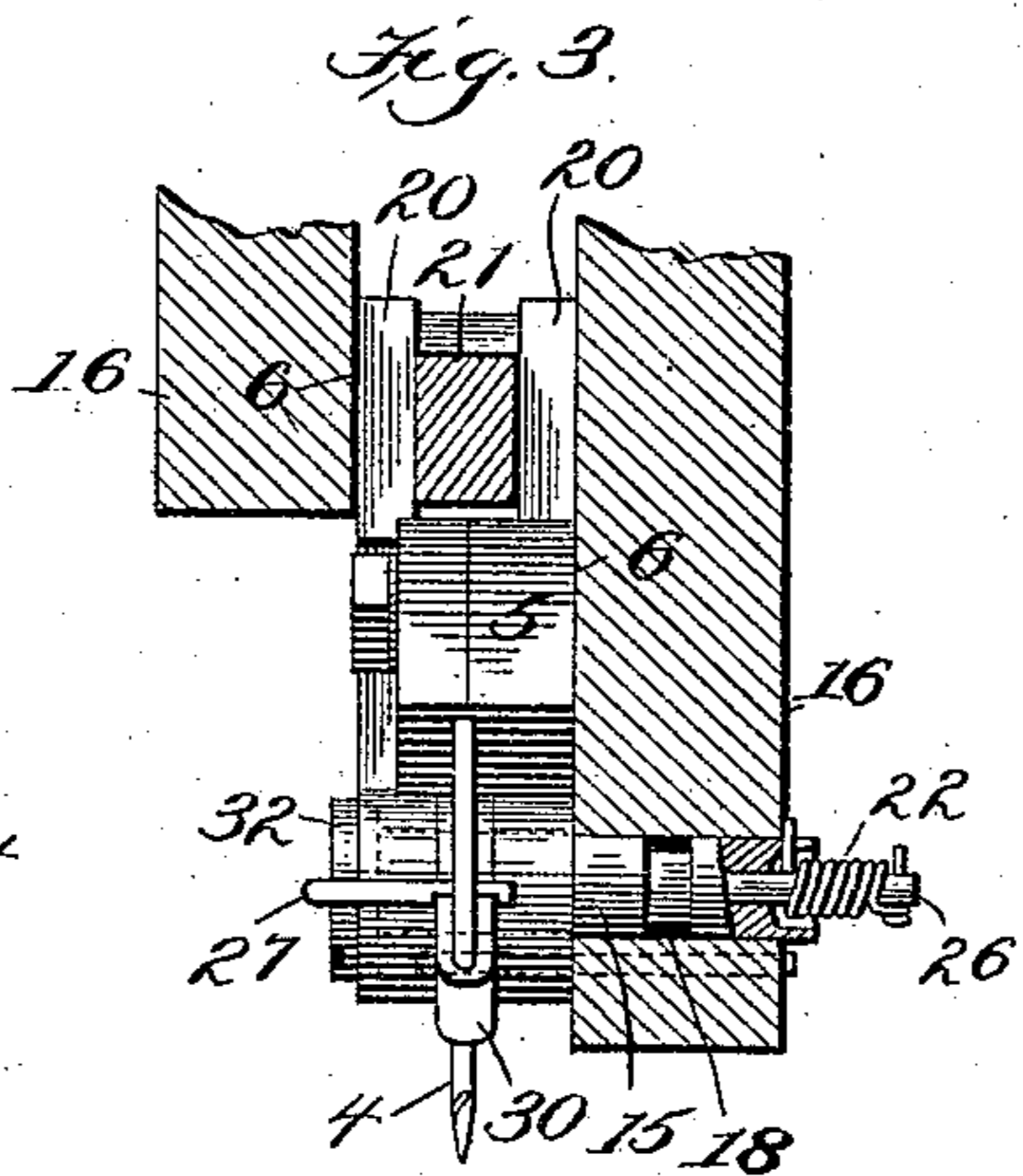
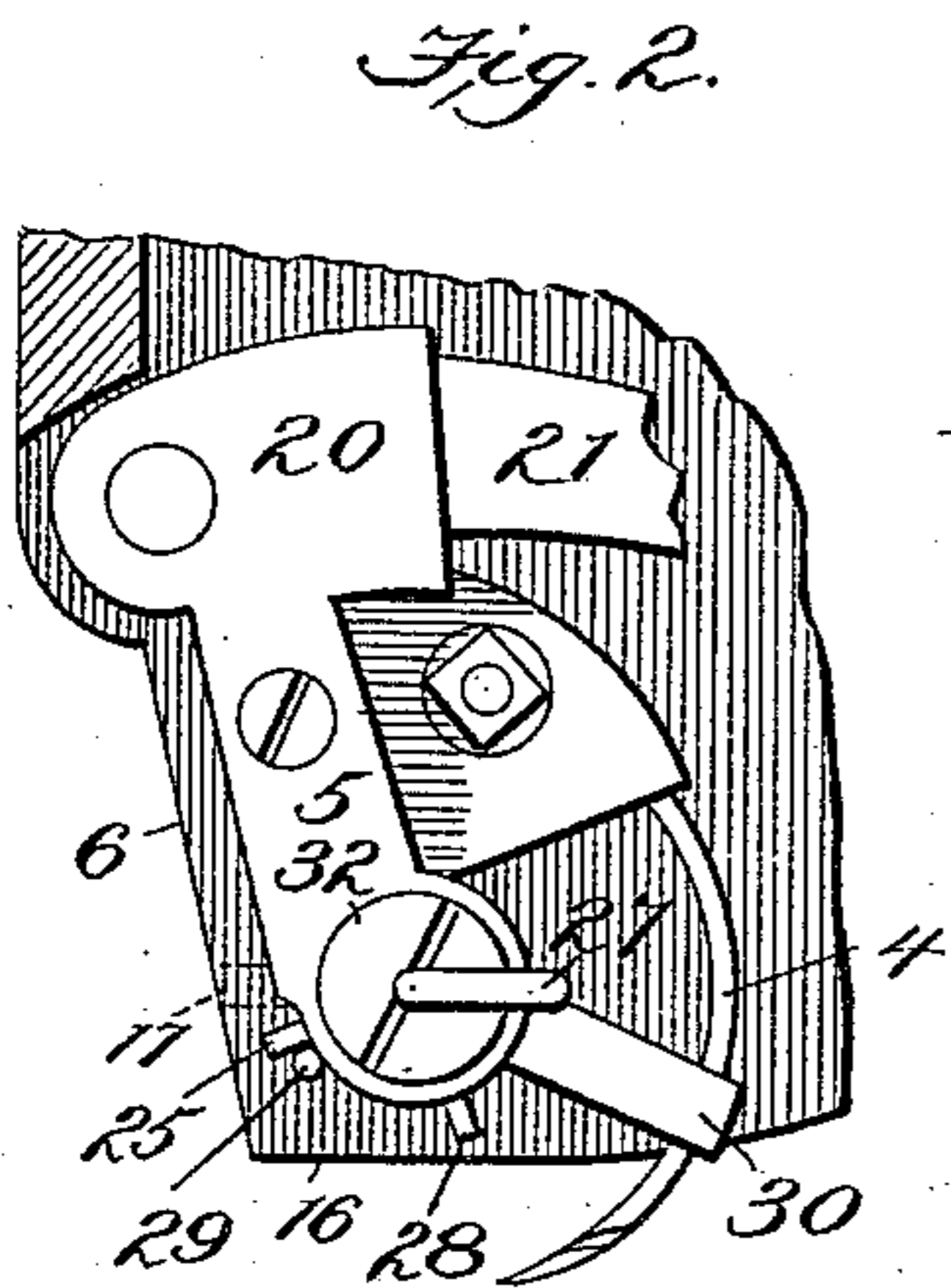
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UNITED STATES PATENT OFFICE.

FRANCIS ARTHUR MILLS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF TO JAMES MUNDELL, OF SAME PLACE.

NEEDLE-GUIDE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 551,987, dated December 24, 1895.

Application filed April 17, 1895. Serial No. 546,129. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS ARTHUR MILLS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Needle-Guides, of which the following is a specification.

In sole-sewing machines in which a curved barbed needle operates with a reciprocating movement in co-operation with a looper-finger operating in a circular path around the needle and in which the needle alternately enters the work to draw the loop of thread through the between substance in uniting the upper with the sole it is important to guide and to support the needle while advancing and penetrating the between substance, so that the needle will be prevented from being bent or sprung and will act with certainty in placing and firmly tightening the stitches in the channel of the sole. For supporting and guiding the needle as it enters the stock a needle-guide has been used, and to render this guide more certain in its function to maintain its proper position in relation to the point of the needle to support the same while piercing the work and to keep it in proper shape, so that the guide will always move with it and the needle will pierce the hole in the work in the proper place in relation to the shoulder and channel of the sole, is the object and purpose of my improvement. For obtaining these objects I provide within an axial bore in the bearing on which the needle-carrier is mounted an arm extending at one end outside of said bearing and having a return end arranged to engage the back of the needle-guide, the other end of said arm engaging the other end of said bearing by a spring which acts by torsion to turn the arm and thereby to maintain a constant pressure of its return end against the needle-guide to keep it in proper relation with the point of the needle. This construction allows the bearing 5, on which the needle-guide is loosely mounted, to be turned in its seat in the sewing-head to wind the torsional spring, which, by its connection with the armed rod 26, causes the latter to press the needle-guide forward, and the force of the spring can thereby be regulated as desired to

maintain the proper action of the needle-guide. This construction also gives the advantage of placing the spring at the outer side of the sewing-head and of securing the needle-carrier in the latter by means which permits the turning of said bearing in its seat to adjust the tension of the spring.

The accompanying drawings, which form part of this specification, represent the needle, its carrier and guide, and so much of a sewing-machine as illustrates the application and use of my invention in the form in which I prefer to employ it; but it will be understood that my invention is not limited to the precise form herein shown and described, as various modifications may be made without departing from its spirit and without exceeding the scope of the concluding claims.

Referring to the accompanying drawings, Figure 1 shows in vertical longitudinal elevation so much of a sewing-machine as illustrates the embodiment therein of my improvement in the needle-guide and its relation to operating connections therefor. Fig. 2 shows the needle-carrier, the needle and the needle-guide, the position of the needle being that of its extreme backward movement and the needle-guide in position to support the needle. Fig. 3 is a vertical section of a part of the sewing-head and shows in sectional front elevation the bearing 15 for the needle-carrier and the needle-guide, the connection of the latter with the arm 27 of the rod 26 and the connection of the torsional spring with said bearing and armed rod, the parts being in their respective relations seen in Fig. 2 and the line of said section taken through the seat of said bearing. Fig. 4 shows a front view of Fig. 2, showing the fixed stop-pin in the sewing-head for limiting the forward movement of the needle-guide, as seen in Fig. 6. Fig. 5 is a view like Fig. 2, showing the needle in the position it occupies when about to enter the work and the needle-guide in position to support the needle. Fig. 6 is a similar view showing the needle-guide in its full forward movement having been arrested by the fixed stop-pin, the needle being in the position it occupies when its point has passed through the work. Fig. 7 is a similar view showing the

needle in its full forward position ready to receive the thread to form the next loop. Fig. 8 shows a horizontal section of the bearing of the needle-guide and the arm therein for operating the needle-guide, and Fig. 9 shows the needle-carrier parts separated.

Referring to Fig. 1, so much of the machine as is illustrated is organized after the construction shown and described in my patent of August 14, 1894, No. 524,336, and it is to such machines that my present invention is adapted for use; but it is obvious that my invention for needle-guides can be applied for use with other forms and constructions of machines. The sewing mechanism is mounted in a housing structure or head 1 at the front end of a supporting-frame 2, within or upon which is mounted suitable cam-cylinders 3 for operating the several members of the mechanism employed in sewing with the loop-stitch. As such loop-stitch-forming mechanism is well understood, it is deemed unnecessary to particularly describe the elements or members thereof or their operation. A brief designation, however, of the elements of such mechanism is deemed necessary in connection with my present improvement, and for such mechanism more particularly reference is made to my said patent.

The needle 4 is of the curved barbed construction and is supported by a guide 30 and is fitted in a carrier 5, which is mounted to have a reciprocating movement in the arc of a circle in a space between the walls 6 6 and at the lower end of the sewing-head or housing, Figs. 3 and 4. In front of the needle a looper-arm 7 hangs and is mounted in the sewing-head at a point above the needle to have an oscillating movement in front of, across the path of and around the eye or barb thereof. A back-gage 9 and slide-rest 10 support the lasted shoe in position to the sewing mechanism, while the feed-lever 11 is mounted to operate in the channel of the sole to feed the work between each stitch, the work being held by the feed-lever and the back-gage while the needle is moving to enter and to draw the loop through the between substance.

The machine is provided with suitable waxing and heating devices, which may be mounted upon or at the rear end of the machine, while the tension device may be mounted upon the top of the sewing-head above the looper-arm, so that the conduit 12 containing the waxing-tube for the thread 13 will pass from the wax-pot in a straight line to the tension device to deliver the waxed thread in close proximity to the tension-wheel 14.

The needle-carrier 5 is mounted to move loosely upon a bearing 15, fitted in a horizontal position in a hole in one of the vertical side plates 16 of the sewing-head. In this position this bearing is held from turning by a clamp-screw 17, entering the left side plate 16 of the sewing-head and abut-

ting upon the bottom of a circumferential groove 18, Figs. 3 and 4, in said bearing, whereby the latter can be turned in its seat for a purpose which I shall presently state.

The carrier-bearing 15 extends across this space between the vertical plates 16 at the front and bottom of the sewing-head, and the needle-carrier is fitted loosely upon the said bearing, so as to have an oscillating movement thereon with a close fit upon and between the inner walls of the said side plate. A preferred construction of this needle-carrier is of like plate parts 19 19, to one of which the needle is clamped so that its barbed end will project beyond the lower side of the carrier. The plate parts are each recessed on their inner faces, so that when secured together the recessed parts form cheeks 20 20, between which the pitman-rod 21 is pivoted in direct longitudinal line with the needle, so that there is no side strain or unequal wear on the carrier. These cheek parts are fitted to move closely between the walls 6 6 of the sewing-head plates, which thereby serve as guides for supporting the upper end of the needle-carrier, prevent undue strain and wear upon the bearing of said carrier and give a firm movement to the needle in piercing the work.

The bearing 15 of the carrier is cylindrical and is fitted in a corresponding hole or seat in the sewing-head plate wherein it is held so that it can be turned. This bearing projects across the space between the plates of the sewing-head to receive the carrier. The other end of the bearing projects slightly beyond the outer wall of its seat for connection by a torsional spring with the device which operates the needle-guide. At its seat upon the bearing 15 the needle-carrier is formed with recesses 23 23 on the inner walls of its plates to receive the eyed end 24 of the needle-guide, which is loosely fitted upon said bearing, so that the needle-guide and the needle-carrier will operate together and also independently of each other upon the fixed bearing.

The eyed end of the needle-guide has a stop 25 placed to be struck by the carrier at its shoulder 31 when it is moved forward, as in Figs. 2 and 5, by its connected pitman-rod 21 to give an inward or retracting movement to the needle-guide, to follow the needle, which passes through a hole in the guide, back in its function of bracing and guiding it, as seen in Fig. 2.

For keeping the guide in proper relation to the barb of the needle I provide the following means: In the bearing for the carrier I make an axial bore open at both ends, Fig. 8, and therein fit an arm 26, which passes through and beyond the bore at both ends. At its inner end this arm has a return-bend 27, forming a short arm outside of the bearing 15 of the carrier and in position to engage with the inner side of the needle-guide.

At its outer end this arm 26 has a coiled

spring 22, one end of which connects with the said arm and its other end with the bearing 15 of the needle-guide, which gives the spring a torsional action upon the arm 26, which is thereby constantly pressed by its return-bend 27 against the needle-guide to maintain it in proper position to support the needle. The spring extends within a recess in the end of the bearing 15 and engages a slot therein.

(See Fig. 8.) A second lower stop 28 on the eyed end of the needle-guide is placed in position to engage stop 29, fixed to and projecting inward from the sewing-head plate, whereby the forward movement of the needle-guide is limited in its guiding and supporting function for the needle, as seen in Figs. 6 and 7.

In the operation of the machine the needle-carrier is caused to have an oscillating movement and operates the needle in a circular path. The needle-guide moves with and upon the needle to guide and support it while piercing the work. In this function it is shown in Figs. 6 and 7 in its full forward position, having been arrested by the stop 28 29, and in such position the guide has supported the needle while it entered and passed through the work. In Fig. 5 the needle-guide is shown in position to support the needle when commencing to pierce the work.

In Fig. 2 the needle and its guide are shown in their full backward position. In Fig. 7 both the needle and its guide are shown in their forward position. In the forward movement of the needle the torsional spring 22 carries the needle-guide 30 forward until it reaches the point shown in Fig. 6, where it is stopped by the stop 28 in its eyed end coming in contact with the stop 29 in the sewing-head. The needle continues its forward movement to the position seen in Fig. 7, which is its full forward movement, and at this point the looper-finger threads the needle. The needle then moves back to the position shown in Fig. 6, leaving the needle-guide at rest by the action of the torsion-spring, until the carrier-shoulder 31 comes in contact with the stop 25 on the eyed end of the guide, and carries the latter back against the torsional action of the spring until the guide reaches the position shown in Fig. 2, which is the full backward movement of the needle-carrier, needle and its guide, the loop having been pulled in and the stitch set. From the position shown in Fig. 2 to the position shown in Fig. 6 the torsional action of the spring has forced the needle-guide forward to its full limit in relation to the point of the needle, while the latter continues its forward movement to the position shown in Fig. 7, leaving at rest the needle-guide. By placing the spring 22 on the end of the guide-operating arm 26 gives the advantage of adjusting the spring to increase its force, and gives a convenient way of applying it, the end 32 of said bearing having a screw-head for turning it.

From the foregoing it will be seen that

while the needle-guide is moving forward from the position shown in Fig. 2 to the position shown in Fig. 6, and while the guide is moving backward from the position shown in Fig. 6 to the position shown in Fig. 2, it is between the extremes of such movements that the needle-guide is controlled in its relation to the needle-point and moved forward by the torsional action of the spring.

It is evident that immaterial changes may be permitted from the general construction and arrangement of parts contributing toward my invention, and for this reason I do not wish to be understood as limiting myself in precise detail and construction.

The devices which I have described for turning the bearing 15 in its seat and for clamping it fast to the sewing-head by the screw 17 in the sewing-head, Fig. 4, and the circumferential groove 18 in said bearing (seen in Fig. 3) are for the purpose of winding the spring to increase its tension and to regulate the force with which it causes the armed rod to bear against the needle-guide, as seen in Fig. 8. I prefer to groove the bearing to receive the end of the clamp-screw, because the latter thereby holds the bearing in its true relation to its seat and prevents the screw from burring the bearing, and allows it to be easily removed when necessary to remove the needle-carrier.

I claim as my improvement—

1. In a shoe sewing machine, the combination, with the needle, a carrier therefor and a needle-guide, of a fixed bearing for said carrier and needle guide, having an axial bore open at both ends, an arm loosely fitting said bore and having an external return end engaging said needle-guide and a spring connecting the other end of said axial-arm with said bearing for moving the needle-guide forward and suitable means for moving said guide backward against the torsional action of the spring for the purpose stated.

2. In a shoe sewing machine, the needle-carrier loosely mounted on a fixed bearing and a needle-guide also loosely mounted on said bearing and having stops 25 and 28 on its bearing end, in combination with an arm loosely mounted in an axial-bore of said bearing and adapted to engage said needle-guide, a fixed stop 29 and a spring connecting said bearing and axial arm for effecting the forward movement of said needle-guide for the purpose stated.

3. In a shoe sewing machine, the combination, with the needle, its carrier and a fixed bearing therefor, of a needle-guide and an arm loosely fitted in an axial bore of the said fixed bearing, having a return arm 27 engaging said needle-guide, and a spring coiled upon said axial arm and connecting it with the said fixed bearing, whereby to exert a torsional force upon said axial arm for the purpose stated.

4. In a shoe sewing machine, the combination, with the needle, a carrier therefor, and

the needle-guide, a fixed tubular-bearing for the carrier and guide and an armed-rod within said bearing adapted to engage the needle-guide, of a spring coiled upon said rod and
5 connected to turn it in said bearing, and a stop-pin 29 in the sewing-head adapted to engage said guide for the purpose stated.

5. The combination in a shoe sewing machine, of the needle-carrier, the needle-guide
10 and a bearing therefor having a circumferential groove and an axial bore open at both ends, an arm loosely fitting within said bore, a spring wound upon and connecting respectively the end of the arm and the end of the
15 bearing, the other end of said arm having an external return bend, and a screw for engaging the bearing groove whereby the torsional

force of the spring may be adjusted and the bearing fixed in its relation to said spring and arm. 20

6. In a shoe sewing machine, the combination, with the needle a carrier therefor and the needle-guide, of a fixed tubular-bearing on which the carrier and said guide are loosely fitted, a rod seated loosely within and passing
25 through said bearing and having its end engaging the guide, the other end of said rod having a spring connecting said rod and fixed bearing, substantially as described for the purpose specified.

FRANCIS ARTHUR MILLS.

Witnesses:

EUGENE ZIEGLER,
THOMAS W. BINKER.