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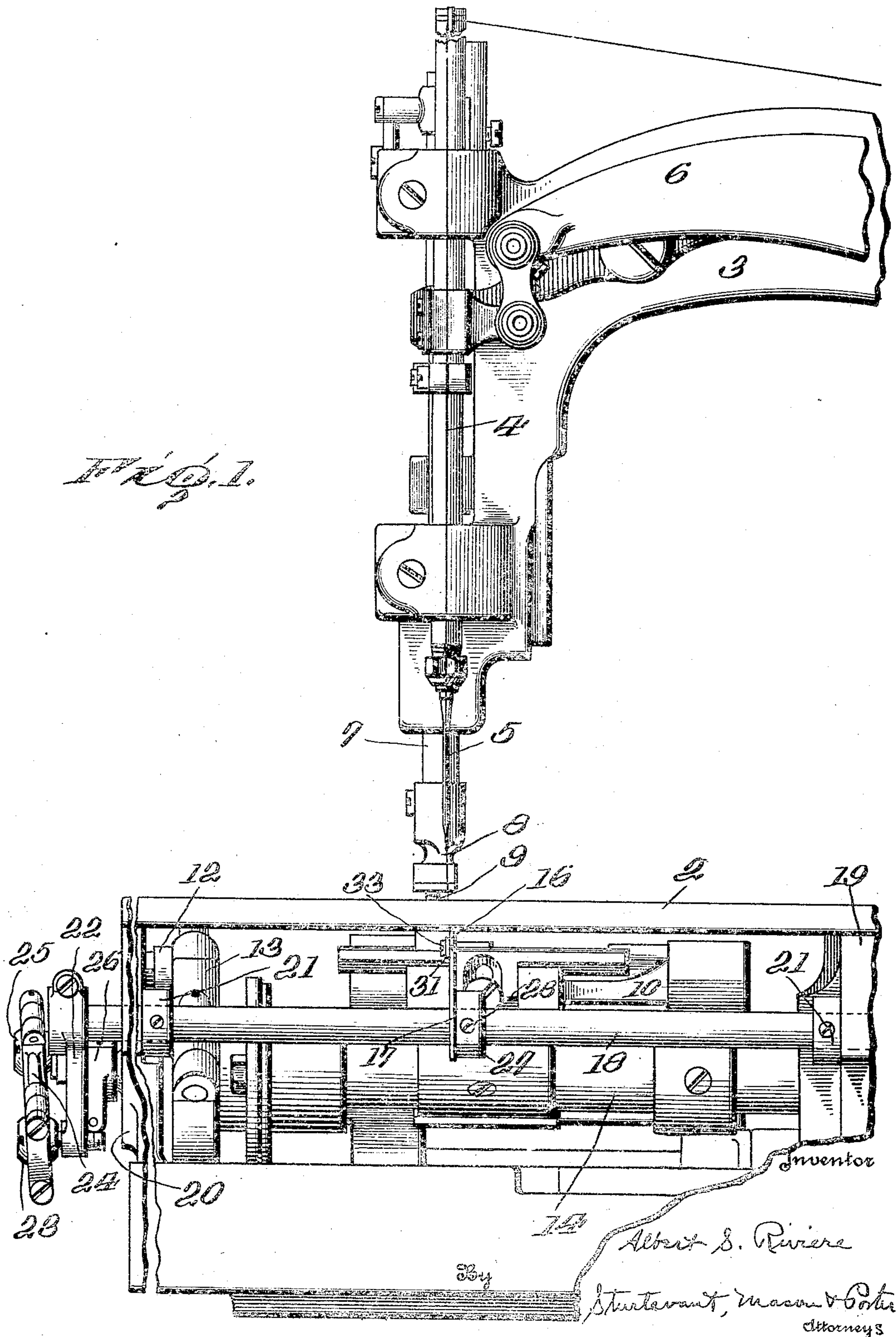
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CHAIN STITCH SEWING MACHINE

Filed Feb. 9, 1931

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Feb. 14, 1933.

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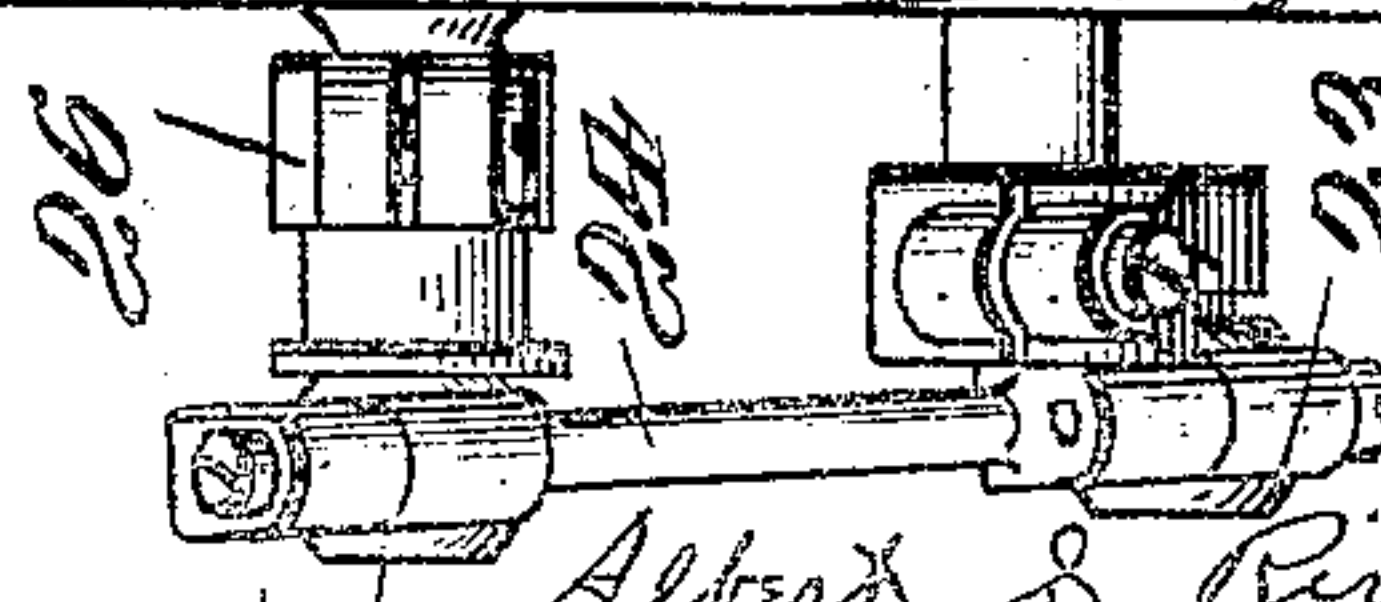
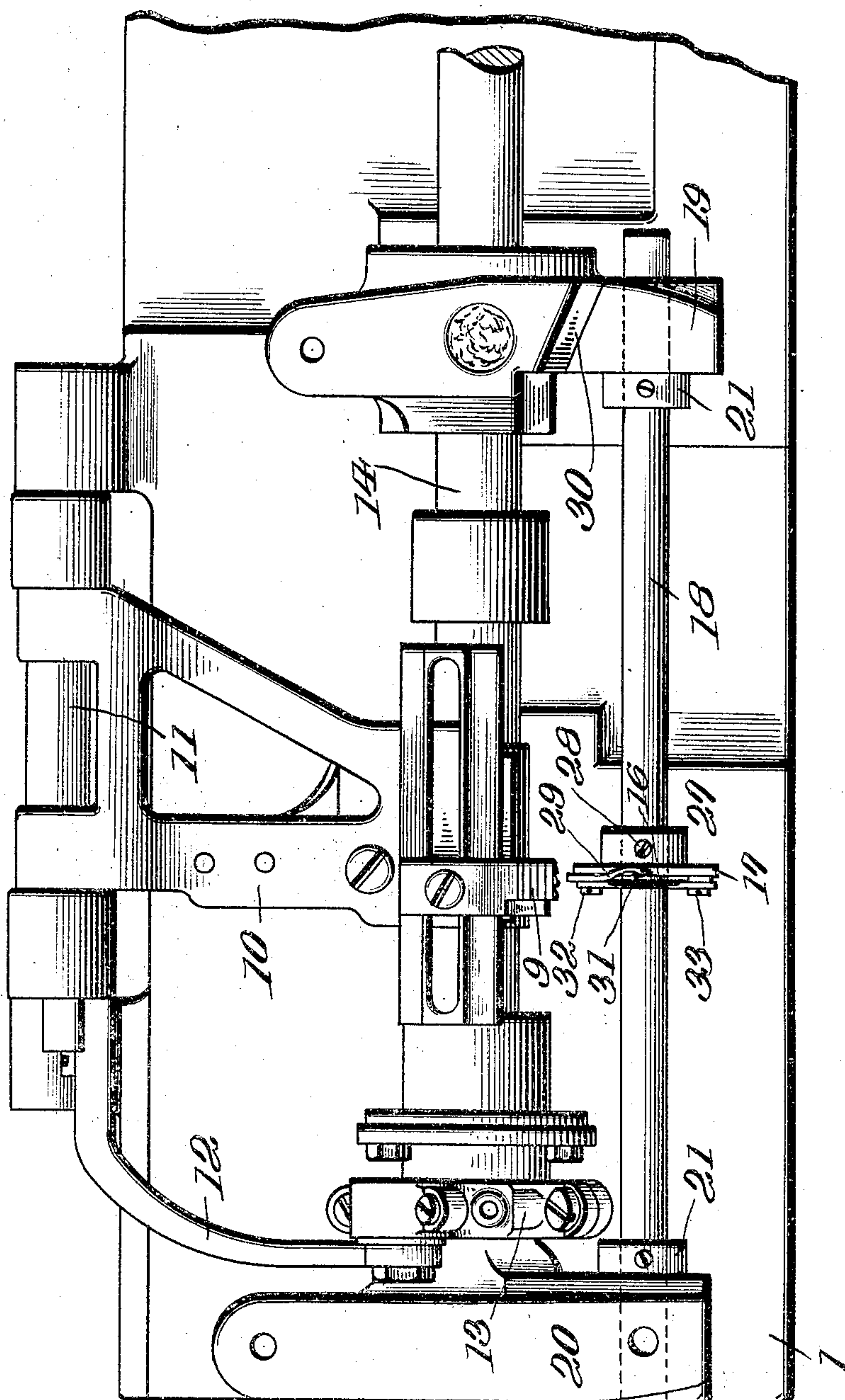
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CHAIN STITCH SEWING MACHINE

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5 Sheets-Sheet 2

FIG. 2.



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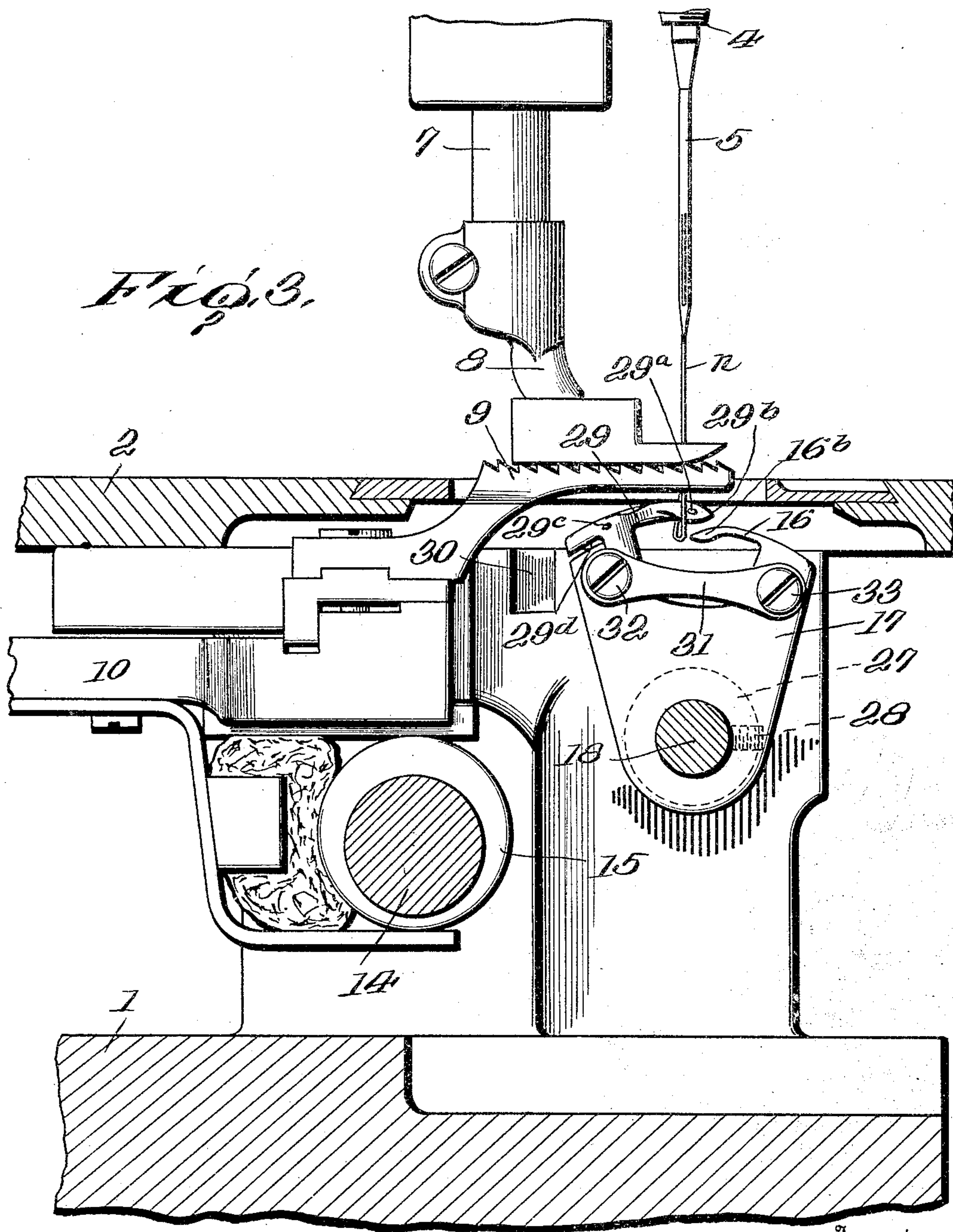
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CHAIN STITCH SEWING MACHINE

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5 Sheets-Sheet 3



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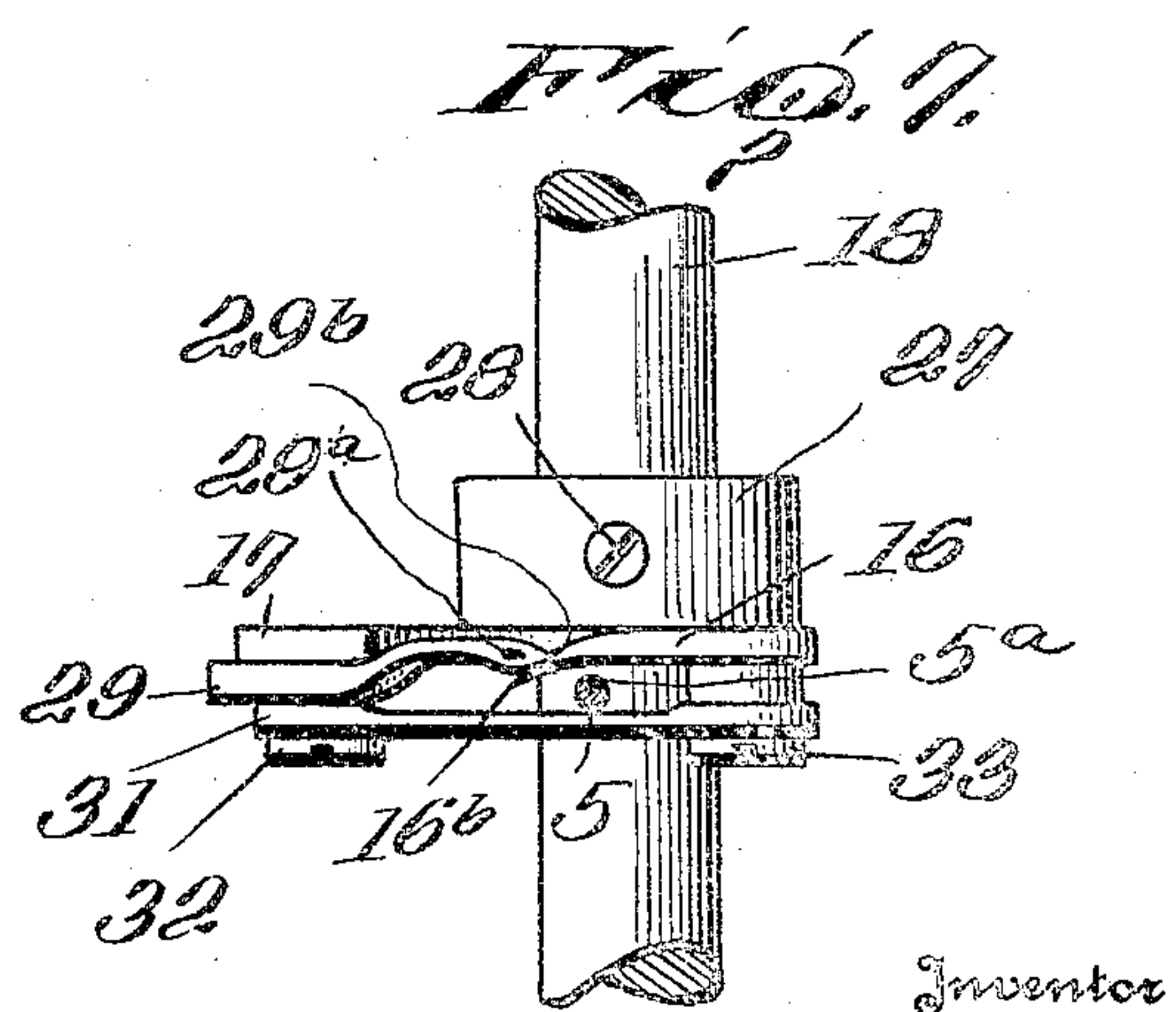
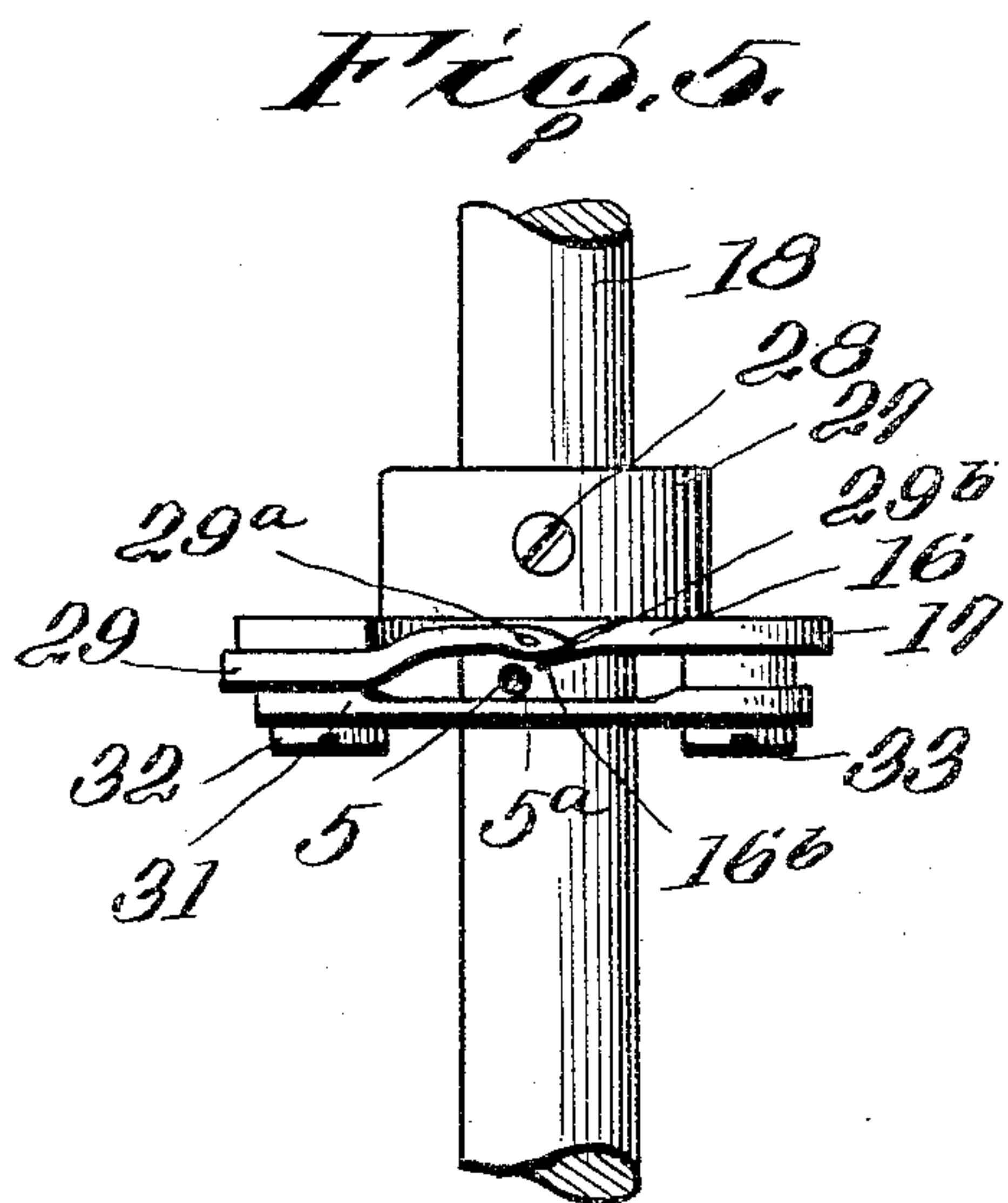
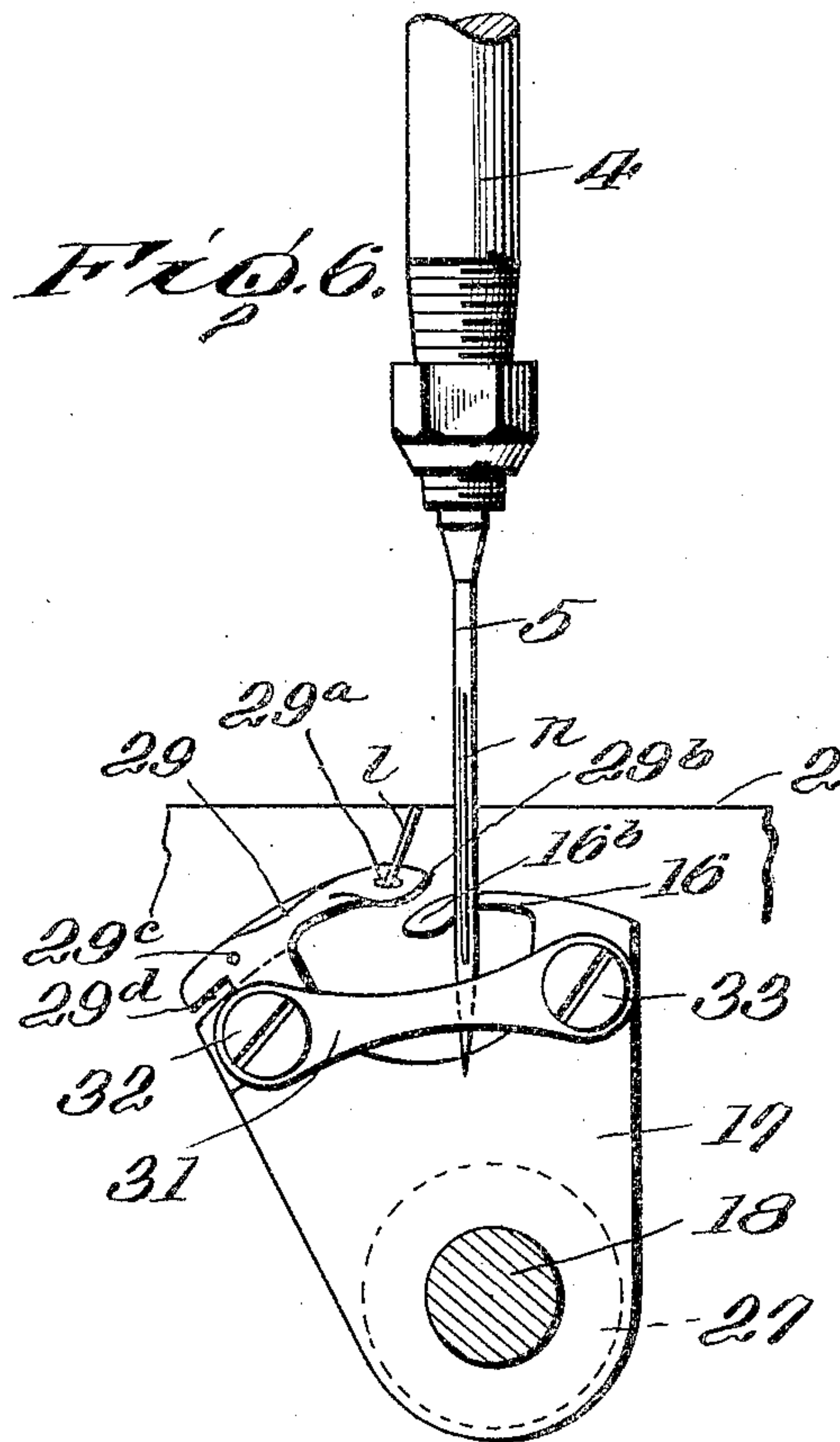
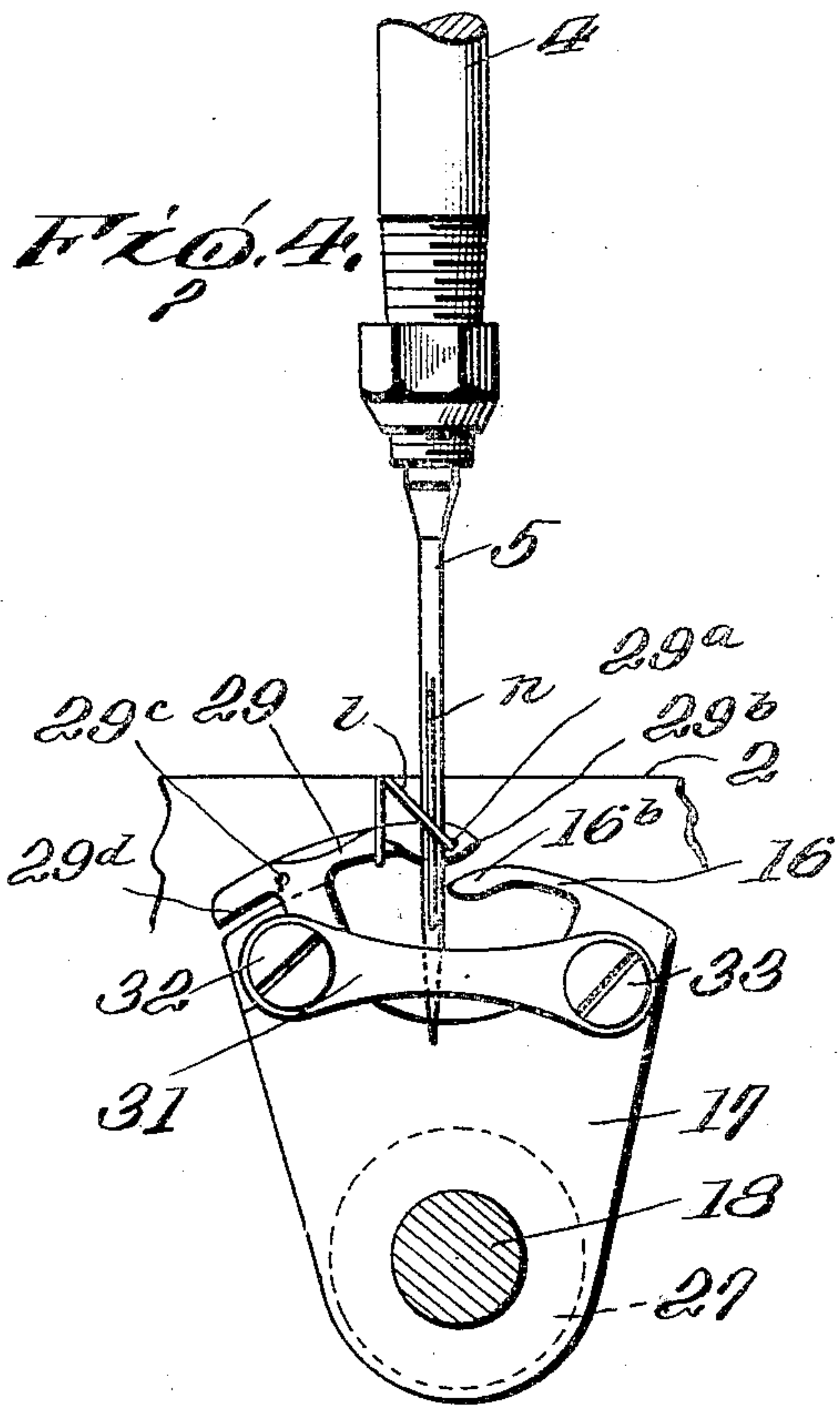
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CHAIN STITCH SEWING MACHINE

Filed Feb. 9, 1931

5 Sheets-Sheet 4



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CHAIN STITCH SEWING MACHINE

Filed Feb. 9, 1931

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FIG. 8.

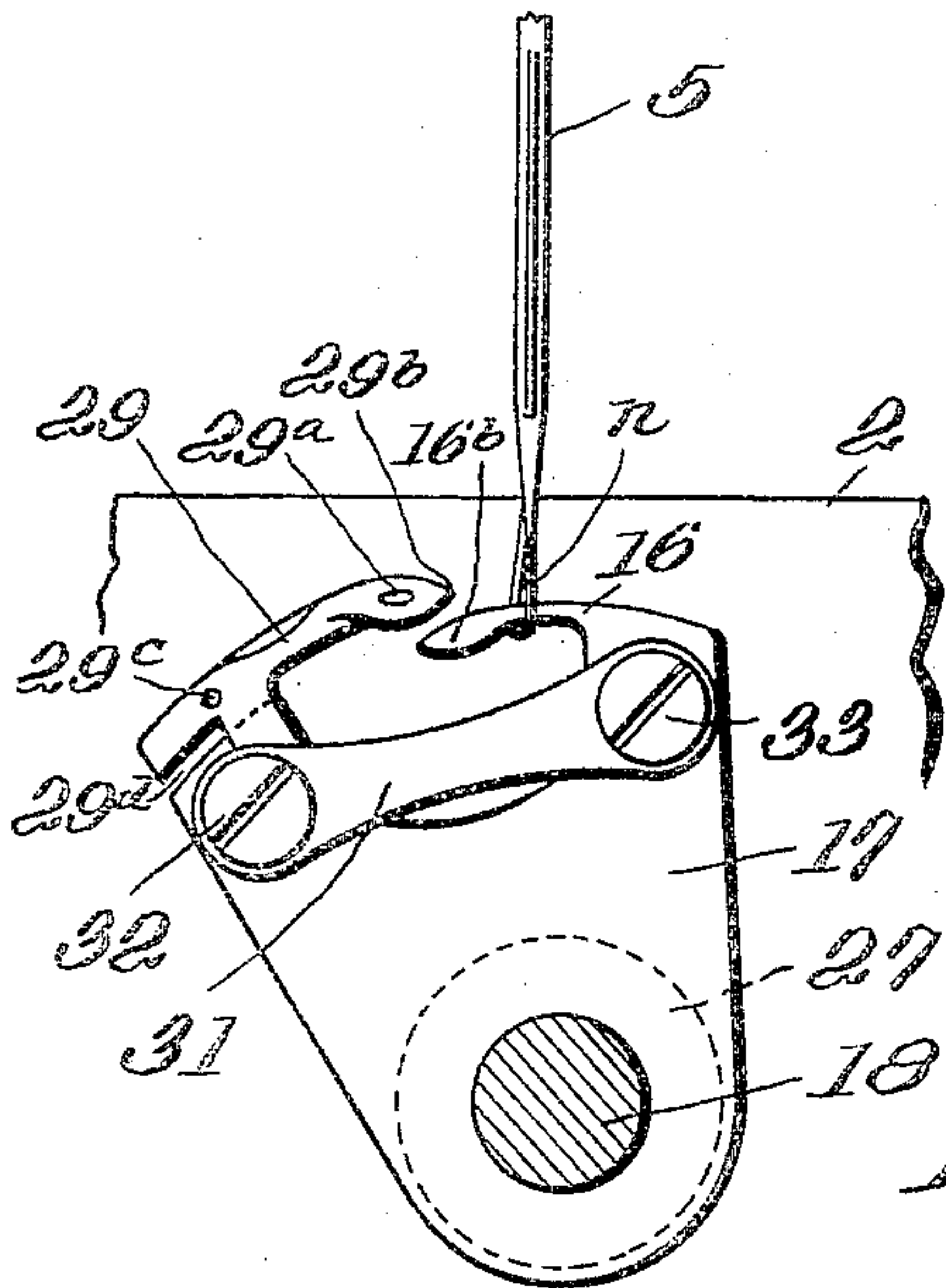


FIG. 10.

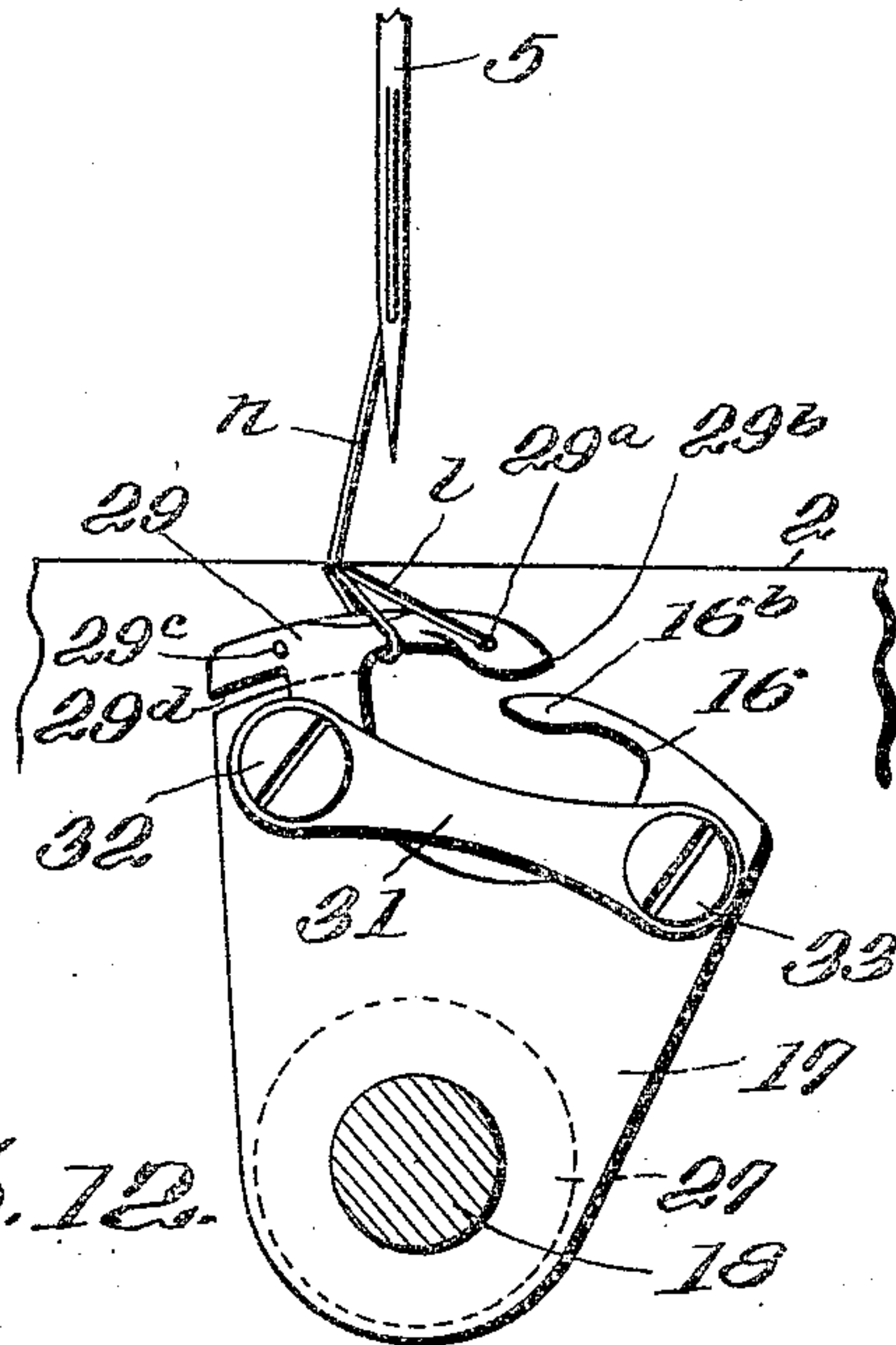


FIG. 12.

FIG. 9.

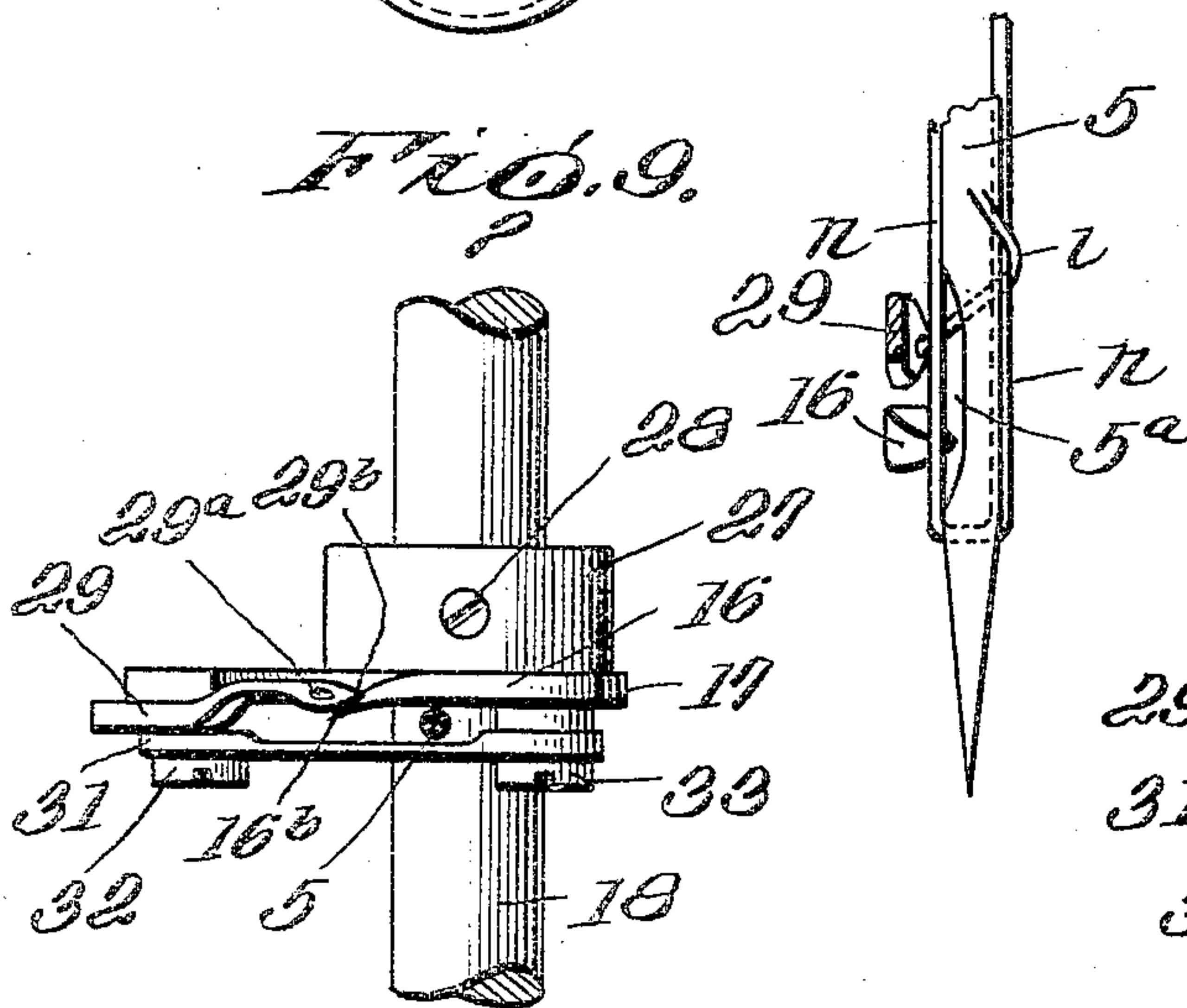
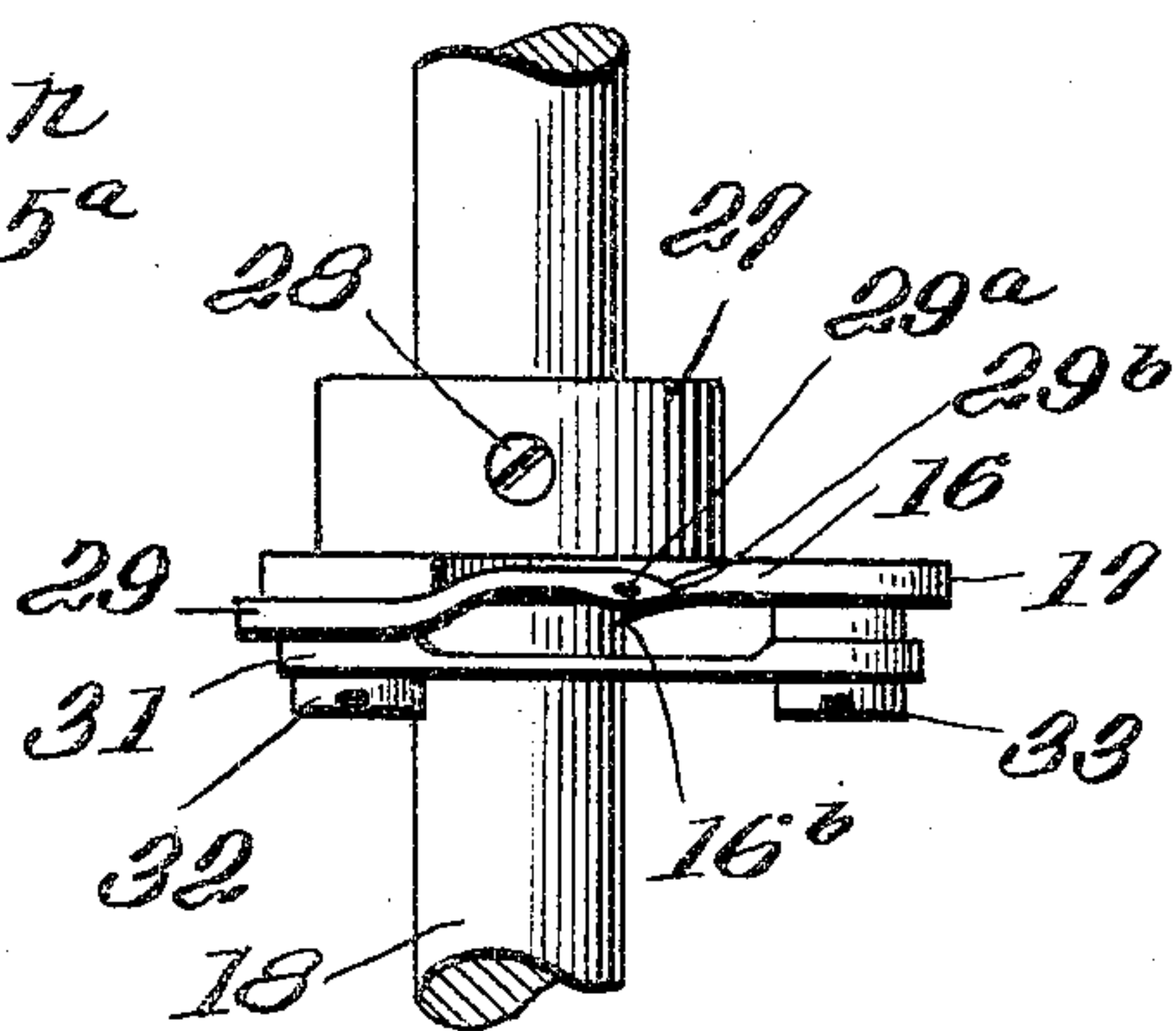


FIG. 11.



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CHAIN STITCH SEWING MACHINE

Application filed February 9, 1931. Serial No. 514,624.

The invention relates to new and useful improvements in a chain stitch sewing machine and more particularly to a machine wherein a retainer enters the needle thread loop and holds the same for the thread carrying looper to enter. It has been a common expedient in a chain stitch forming mechanism of this character to provide a retainer and a looper which move back and forth in a plane at one side of the needle and parallel with the line of feed.

An object of the present invention is to provide a sewing machine of the above type wherein the looper is opposed to the retainer and is so shaped as to insure that the needle on its descent passes between the looper thread running from the eye of the looper to the previous stitch and the body of the looper.

A further object of the invention is to provide a machine of the above type wherein the looper and the retainer are a rigid part of the same carrier which is oscillated for imparting movements to the looper and retainer.

A further object of the invention is to provide a stitch forming mechanism of the above character wherein a needle guide is provided, which is mounted on the carrier for the looper and retainer and so positioned thereon as to hold the needle to its path and insure the retainer passing the needle so as to enter the needle thread loop.

These and other objects will in part be obvious and will in part be hereinafter disclosed.

In the drawings, which show by way of illustration one embodiment of the invention:

Fig. 1 is a front view of a portion of a machine embodying the improvements.

Fig. 2 is a plan view of the parts beneath the work support with the feed dog broken away to show the looper and retainer.

Fig. 3 is a vertical sectional view along the line of feed with the presser foot and feed dog in side elevation.

Fig. 4 is a view showing the needle, the loop retainer, the looper and the carrier for said looper and retainer, with the needle on its down stroke and the retainer is about to

enter between the needle thread and the body of the needle.

Fig. 5 is a plan view of the same with the needle in section.

Fig. 6 is a view similar to Fig. 4, but showing the loop retainer as having entered the needle thread loop, and the needle on the first part of its up stroke.

Fig. 7 is a view similar to Fig. 5 and showing the parts as positioned in Fig. 6.

Fig. 8 is a view similar to Fig. 4 but showing the needle as it is about to leave the fabric with the needle loop still on the loop retainer.

Fig. 9 is a plan view of the parts as positioned in Fig. 8.

Fig. 10 is a view similar to Fig. 8, but showing the needle loop as transferred to the thread carrying looper and the needle on its down stroke.

Fig. 11 is a plan view of the parts as arranged in Fig. 10.

Fig. 12 is an enlarged view showing the needle in side elevation with the point of the retainer about to pass between the needle thread and the body of the needle.

The invention is directed to a sewing machine having a thread carrying needle, a loop retainer adapted to enter the needle thread loop on the down stroke of the needle, and retain the same while the needle rises, and a thread carrying looper adapted to enter the retained needle thread loop. The looper and the retainer are rigidly mounted on the same carrier. This carrier is in turn mounted for oscillation so that the looper and the retainer move in a plane at one side of the needle path and parallel with the line of feed. The loop retainer has the point thereof slightly deflected to one side of the body of the retainer so that the needle thread loop as it is moved back on the retainer is shifted slightly away from the needle path. The thread carrying looper is opposed to the loop retainer and has its point disposed so as to move in a line directly above the body portion of the retainer, so that it can enter the needle thread loop retained on the body portion. The thread carrying looper has the body portion thereof back from its eye curved

laterally away from the line of feed so as to insure the needle on its next descent passing between the needle thread and the body of the looper. Attached to the looper carrier 5 is a needle guard which cooperates with the needle and positions the same so that the loop retainer will with certainty pass the needle and into the needle thread loop.

Referring more in detail to the drawings, 10 the invention is shown as applied to a sewing machine which includes a supporting bed 1, on which is mounted a work support 2. Carried by the bed is a standard provided with an overhanging arm 3. Mounted for 15 reciprocation in the overhanging arm 3 is a needle bar 4 carrying a needle 5, said needle bar is reciprocated by means of a needle lever 6. Also mounted in the overhanging arm is a presser bar 7 carrying a presser foot 8. 20 The material is fed across the work support 2 by means of a feed dog 9. The feed dog 9 is carried by a feed bar 10 attached to a feed rocker 11, which is provided with an arm 12 connected to an eccentric strap 13 25 cooperating with an eccentric on the cam shaft 14. The feed bar is raised and lowered by an eccentric 15 on the main shaft 14. Thus it is that the feed dog is moved back and forth and feeds the fabric across the work 30 support beneath the presser foot.

Cooperating with the needle beneath the work support is a loop retainer 16. Said loop retainer is mounted on a carrier 17 secured to a shaft 18. This shaft 18 is mounted 35 in suitable bearings carried by the standards 19, 20, attached to the supporting bed 1. These are the standards on which the work support is mounted. The shaft is held from endwise movement by collars 21, 21, 40 which are fixed thereto. The shaft is oscillated by means of a crank 22 which is fixed to the end of the shaft. This crank carries a ball stud 23 to which a link 24 is connected. The link 24 is in turn connected to a ball 45 stud 25 on a crank 26, carried by the end of the main shaft 14. As the main shaft rotates the shaft 18 will be oscillated. The carrier 17 is provided with a collar hub 27 which is attached to the shaft 18 by means of 50 a set screw 28. The carrier is therefore rigid on the shaft 18 and oscillates with said shaft. As shown in the drawings, this loop retainer is formed as an integral part of the carrier 17. It will be understood, however, that it 55 may be otherwise formed and secured to the carrier. It will be noted that the loop retainer 16 is provided with a tapered point 16b located to one side of the body of the retainer. In other words, the loop retainer 60 is bent or deflected away from the line of feed so that when this point 16b enters the needle thread loop and the needle thread loop slides back on the body of the retainer, the loop will be deflected away from the path of 65 the needle. The loop retainer has the lower

face thereof adjacent the point, curved downwardly and upwardly so as to produce a shoulder for retaining the needle thread loop back on the body of the looper. This curved portion forming the shoulder is indicated at 70 16b in the drawings.

Also mounted on this same carrier 17 is a thread carrying looper 29. The thread carrying looper as shown in the drawings is 75 formed as an integral part of the carrier 17, said looper has an eye 29a near its point. It also has an eye 29c near the heel of the looper. On the side face of the looper away from the needle is the usual groove. At the heel of the looper is a thread guiding slot 29d. In the 80 supporting bearing for the work support and main shaft adjacent the standard end of the machine is a thread guiding slot 30. The thread runs from the supply through suitable thread controls, thence through the slot 30 85 and to the thread guiding slot 29d, thence to the eye 29c and along the thread groove in the side of the looper to the eye 29a near the point of the looper. The thread carrying looper between the thread eyes 29a and 29c, 90 is curved away from the line of feed. The point 29b of the thread carrying looper moves in a line directly above the body of the thread retainer 16. Therefore, the point of the looper will enter the needle thread loop re- 95 tained on the thread retainer and as the loop slides back on the looper, it will be carried away from the line of feed. The line of feed carries the fabric directly rearward from the 100 path of movement of the needle and thus it is that the looper thread running from the eye of the looper to the previous stitch is placed at the opposite side of the needle from 105 the body of the looper and the needle on its next descent will pass with certainty between the looper thread and the body of the looper and thus enter the thread triangle formed therefor.

Mounted on the looper carrier is a needle guard 31, said needle guard is attached to the 110 carrier by screws 32, 33. The needle guard has its inner face shaped and disposed so that when the needle moves downward through the fabric, it will pass between this needle guard and the loop retainer and said guard will pre- 115 vent the needle from being deflected out of its normal path of travel so that its thread loop will not be engaged by the retainer. In other words, this needle guard positions the needle 120 so as to insure that the loop retainer will engage and enter the needle thread loop.

In Figs. 4 and 5 of the drawings, the needle is shown on its down stroke and the retainer is just about to pass between the needle thread 125 and the body of the needle and thus enter the needle thread loop. The guard holds the needle so that the point of the loop retainer will pass close to the needle and with certainty between the needle and its thread.

In Figs. 6 and 7, the needle is shown as 130

just beginning its return movement and the retainer is well into the needle thread loop. In Figs. 8 and 9, the loop retainer is shown as holding the needle thread loop while the needle has moved up so that the point thereof is about to leave the fabric.

In Fig. 3 of the drawings the looper is shown as having moved forward into the needle thread loop which was held on the retainer and the retainer has moved out of the needle thread loop. The point of the looper moving in a line directly above the body of the retainer, entered with certainty into the thread loop held on the retainer.

In Figs. 10 and 11 of the drawings, the looper is shown as moved well forward toward the end of its stroke and the needle is descending to enter the fabric on its next stroke. While the needle was up the fabric has been moved and the previous stitch point where the threads are concatenated has moved back in the line of feed a stitch length away from the point where the needle will puncture the fabric. At this time the looper thread, which is indicated at 1 in the drawings, extends from the eye of the looper to the previous stitch. The loop formed in the needle thread which is indicated at n is around the looper and extending upwardly and laterally of the looper to this previous stitch point. As the needle descends, its point will pass between the looper thread and the body of the looper, which is curved away from the line of feed to give clearance for the needle to pass and thus it is that the needle enters with certainty into the thread triangle formed therefor. This triangle is defined by the looper thread running from the eye of the looper to the previous stitch, the needle thread loop running from the body of the looper to the previous stitch and the body of the looper along the outer face of which the looper thread extends from one eye of the looper to the other.

From the above, it will be apparent that I have provided a stitch forming mechanism which is very simple in construction and positive in its action. The retainer and the looper have a fixed position relative to each other. In fact, they are shown as made from one integral structure and therefore there can be no chance of the retainer and looper getting out of proper timing relative to each other. The retainer is timed relative to the needle so that it moves forward and passes between the needle thread and the body of the needle while the needle is on its down stroke. The needle is provided with a scarf as indicated at 5a in the drawings. This provides a clearance space so that the point of the retainer can pass in between the thread and the body of the needle while the needle is on its down stroke, and before it starts to rise and cause the usual bowing out of the needle thread loop. The point of the retainer is

deflected toward the needle path as described above, and this further facilitates the entering of the point between the thread and the body of the needle. By this timing of the retainer so that it moves into the needle thread loop in effect, while the needle is on its down stroke, there is little or no chance of slipping stitches, there is no critical timing of the retainer necessary. The only thing is that it passes between the thread and the needle body after the eye of the needle has moved to a point below the path of movement of the point of the retainer.

Inasmuch as the retainer moves into the needle thread loop and positively holds the same and transfers it to the looper, the needle can move upward and out of the fabric right before the loop has been transferred to the looper. Thus, it is that the needle can be given a very sharp quick stroke. The looper moves forward into the needle thread loop as the retainer is retracted and the loop slips off from the retainer onto the looper. In order to accomplish this transfer of the needle thread loop from the retainer to the looper, no nicety is necessary. The needle on its next descent passes between the looper thread and the body of the looper. While it must pass the looper in rear of its front eye, there is no nicety of timing required as with the usual timing of a looper for entrance directly into the needle thread loop. This enables the looper and retainer to be rigidly mounted on the same carrier, and formed as an integral part thereof, as shown in the drawings.

The looper and retainer in their cooperation with the needle, have no lateral movement. They move back and forth in a fixed plane parallel to the line of feed. The looper carrier and also the looper and retainer can be made of very small dimensions in a direction laterally of the feed and therefore this stitch forming mechanism is particularly adapted for use in a multiple needle machine. The lines of stitches can be placed very close together. The loop retainer is very slender and enters the needle thread loop with comparatively little expanding or enlarging of the same. The stroke of the needle and also the stroke of the looper may be relatively short and with only the usual dwells in their movement incident to a reciprocating or oscillating part. For this reason the amount of thread drawn off or given up during each stitch formation and the reeving of the thread through the needle eye, is reduced to a minimum. A very poor quality of thread can be used for the needle, that is, a thread which is lightly twisted and more easily frayed. The stitch forming mechanism is very positive in its handling of the threads free from vibration and may be driven at a very high speed.

It will be noted that the loop retainer en-

ters the needle thread loop prior to the beginning of the upward movement of the needle, and just as soon as the previous needle loop is dropped from the looper, the upward movement of the needle bar will draw up on the needle thread, pulling it around the retainer and thus pulling the slack out of the needle thread loop which was dropped from the looper. Inasmuch as the thread is drawn up while on the retainer and not after the needle loop has been transferred to the looper, there is no disturbing of the looper thread loop during the pulling up of the previously dropped needle thread loop. This is another feature in this machine which enables the machine to be operated at a high speed, and wherein the skipping of stitches is reduced to a minimum. It will be further noted that the needle is given a very short stroke by reason of the fact that the retainer enters the needle thread loop prior to the upward movement of the needle, and therefore, there is very little thread taken up and given up during the stitch cycle. The needle runs from the spool leading to the upper end of the needle bar and there is no thread controlling mechanism operating on the needle thread other than the eye at the upper end of the needle bar. There is also a minimum amount of looper thread drawn off and taken up due to the fact that the looper has a very short stroke, and no thread controlling mechanism is necessary for operation on the looper thread.

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

1. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, the body of said looper between the thread eyes being curved away from the line of feed so as to insure the needle passing between the looper thread and the body of the looper.

2. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, said retainer having the body thereof adjacent the point curved away from the needle path and said looper having the point thereof disposed so as to move in a line directly over the body of the retainer

for entering the needle thread loop held thereon, said looper having the body between the eyes curved away from the line of feed so as to insure the needle passing between the looper thread and the body of the looper.

3. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, said loop retainer and said looper being rigidly attached to a carrier, and means for oscillating the carrier for causing said retainer and looper to cooperate with the needle.

4. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, said loop retainer and said looper being rigidly attached to a carrier, means for oscillating the carrier for causing said retainer and looper to cooperate with the needle, and a needle guard mounted on said retainer and disposed relative to the needle path for positioning said needle so that the loop retainer will enter the needle thread loop.

5. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, said retainer and said looper being formed as an integral part of a carrier therefor, and means for oscillating said carrier for moving said retainer and looper back and forth in a plane parallel with the line of feed and at one side of the path of the needle.

6. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, said looper having a thread eye adjacent its point and a thread eye adjacent its heel with the body between the thread eyes curved away from the line of feed.

7. In a sewing machine, the combination of a feeding mechanism, a needle, a complementary stitch forming mechanism, including a loop retainer adapted to enter and retain the needle loop and a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, said looper having a thread eye adjacent its point and a thread eye adjacent its heel with the body between the thread eyes curved away from the line of feed, said looper having a thread guiding slot in rear of and adjacent the eye at the heel of the looper.

8. In a sewing machine, the combination of a feeding mechanism, a needle, and a complementary stitch forming mechanism including a loop retainer adapted to pass between the needle thread and the body of the needle on the down stroke of the needle for entering the needle thread loops, and a threaded looper adapted to enter the retained needle thread loop on the retainer, said loop and said retainer being movable in substantially the same plane.

9. In a sewing machine, the combination of a feeding mechanism, a needle, and a complementary stitch forming mechanism including a loop retainer adapted to pass between the needle thread and the body of the needle on the down stroke of the needle for entering the needle thread loop, a threaded looper adapted to enter the retained needle thread loop on the retainer, said looper and said retainer being opposed to each other and movable in a plane at one side of the needle and parallel with the line of feed, the body of said looper between the thread eyes therein being curved away from the line of feed so as to insure the needle passing between the looper thread and the body of the looper.

10. In a sewing machine, the combination of a needle, means for reciprocating the same, and a complementary stitch forming mechanism including a loop retainer, a thread carrying looper, and means for operating the retainer and looper whereby said retainer is moved between the needle thread and the needle and thus entered into the needle thread loop before the needle starts on its upward movement, said looper and said retainer being movable substantially in the same plane.

11. In a sewing machine, the combination of a needle, means for reciprocating the same, a complementary stitch forming mechanism including a loop retainer, a thread carrying looper, means for operating the retainer and looper whereby said retainer is moved between the needle thread and the needle and thus entered into the needle thread loop before the needle starts on its upward movement, said needle reciprocating means including a needle bar, and a needle lever con-

nected thereto, said needle bar having a thread eye at the upper end thereof serving as the sole means for taking up and giving up the needle thread.

12. In a sewing machine the combination of a feeding mechanism, a needle and a complementary stitch forming mechanism including a loop retainer and a thread carrying looper, said loop retainer being adapted to enter each needle thread loop and hold the same for the subsequent entry thereof by said thread carrying looper and means for moving said looper and retainer in unison.

13. In a sewing machine the combination of a feeding mechanism, a needle and a complementary stitch forming mechanism, including a loop retainer and a thread carrying looper and means for oscillating said looper and retainer back and forth in unison in a plane parallel with the line of feed and at one side of the path of the needle, said looper and retainer being opposed to each other and disposed so that the retainer is adapted to enter the needle thread loop and hold the same for the subsequent entry thereof by the thread carrying looper.

14. In a sewing machine the combination of a feeding mechanism, a needle and complementary stitch forming mechanism, including a retainer and a thread carrying looper opposed to each other, means for operating said looper and retainer so that said retainer enters the needle thread loop and holds the same for the subsequent entry thereof by said thread carrying looper and a needle guard associated and moving with said retainer.

In testimony whereof, I affix my signature.
ALBERT S. RIVIERE.

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