

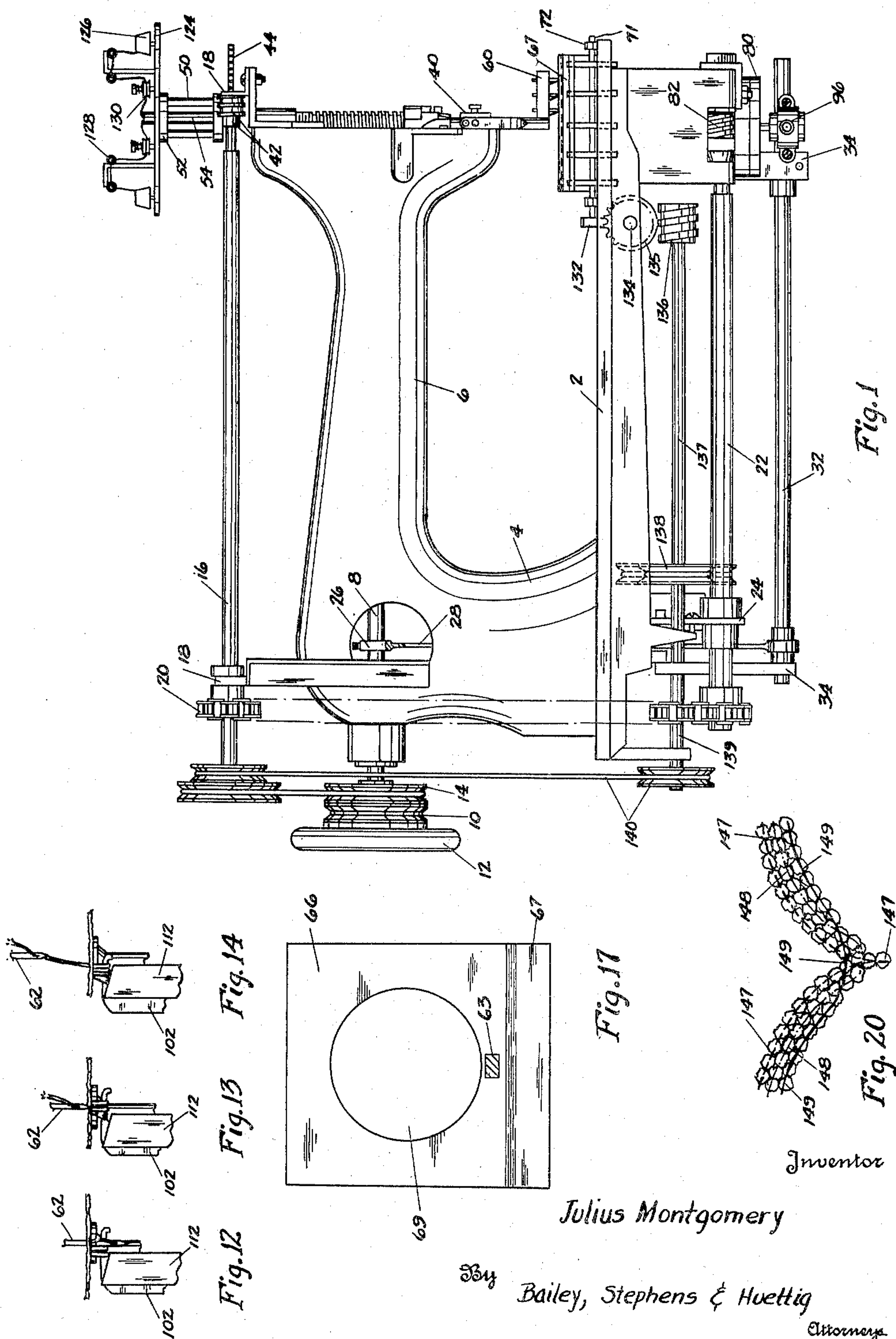
Feb. 6, 1951

J. MONTGOMERY
CHENILLE SEWING MACHINE

2,540,901

Filed Jan. 16, 1948

4 Sheets-Sheet 1



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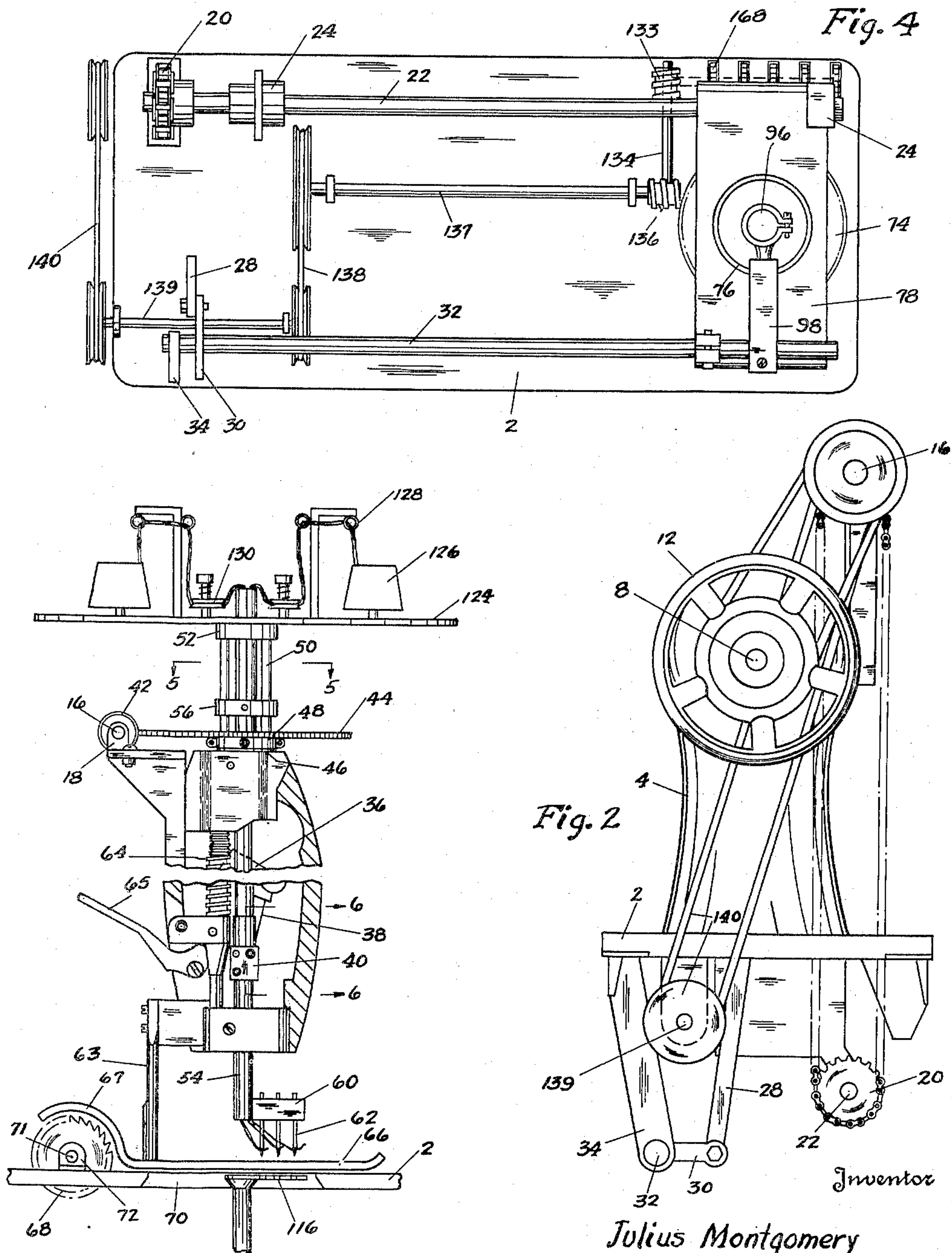


Fig. 3

Fig. 2

Fig. 4

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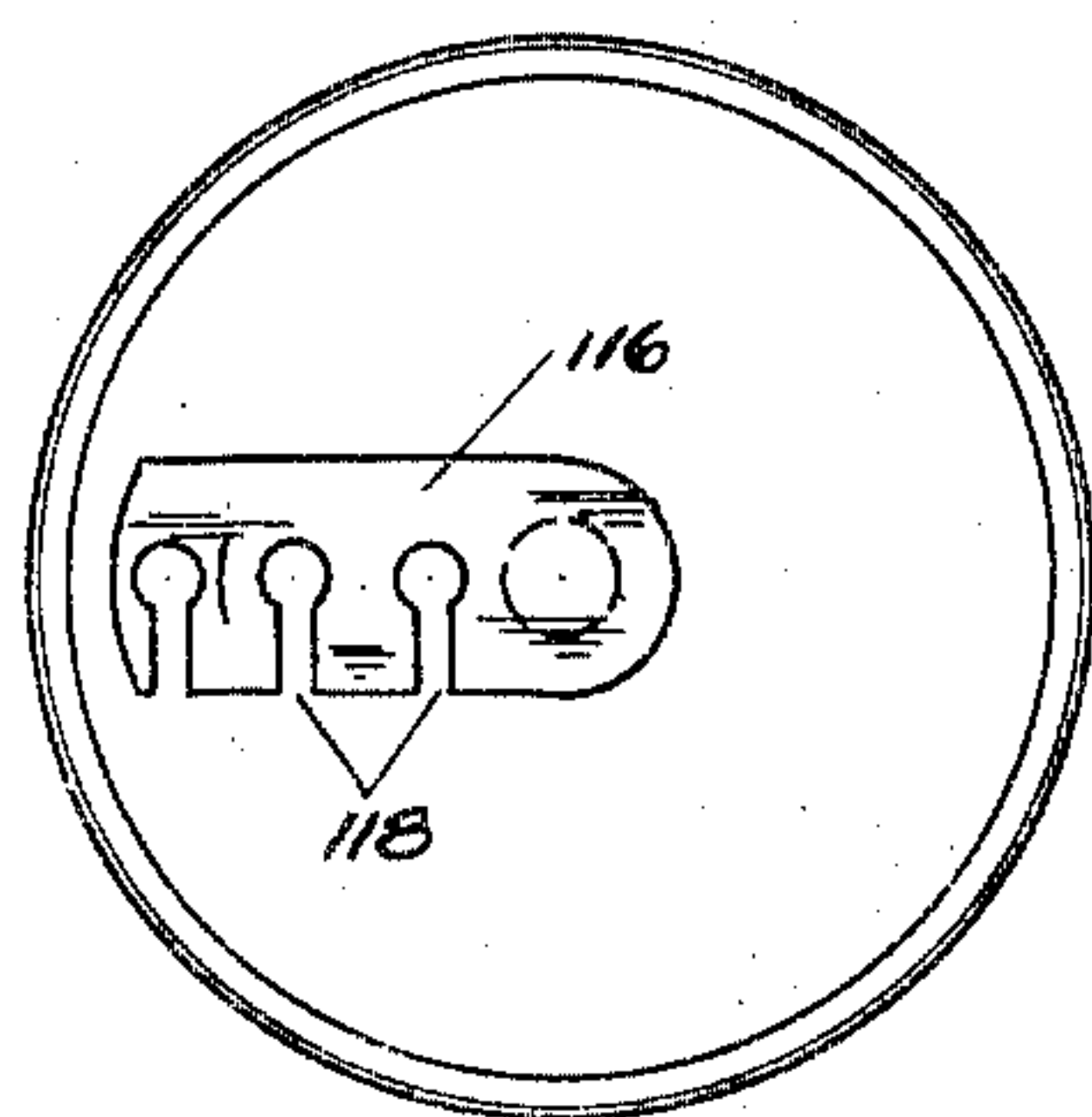
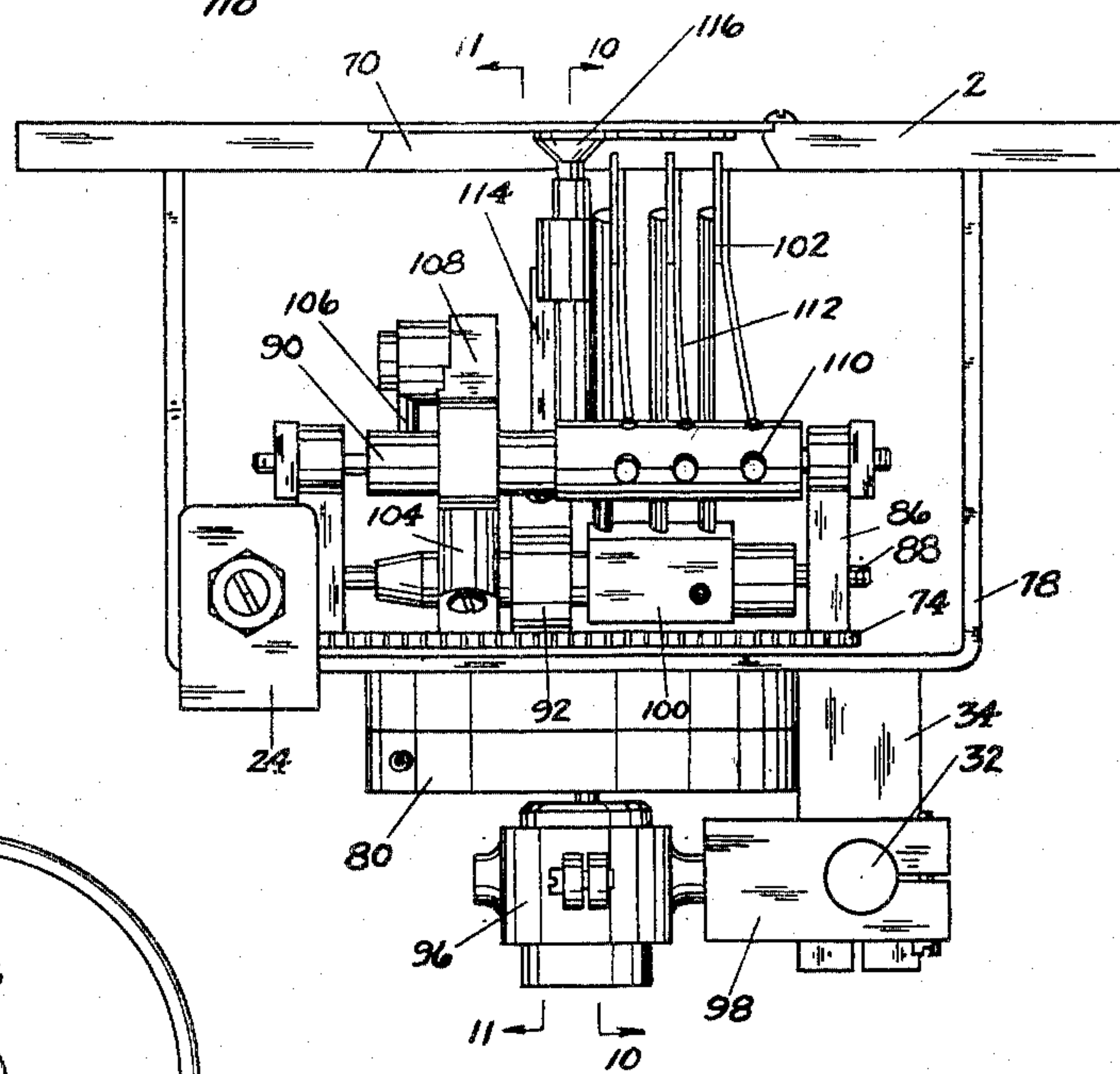
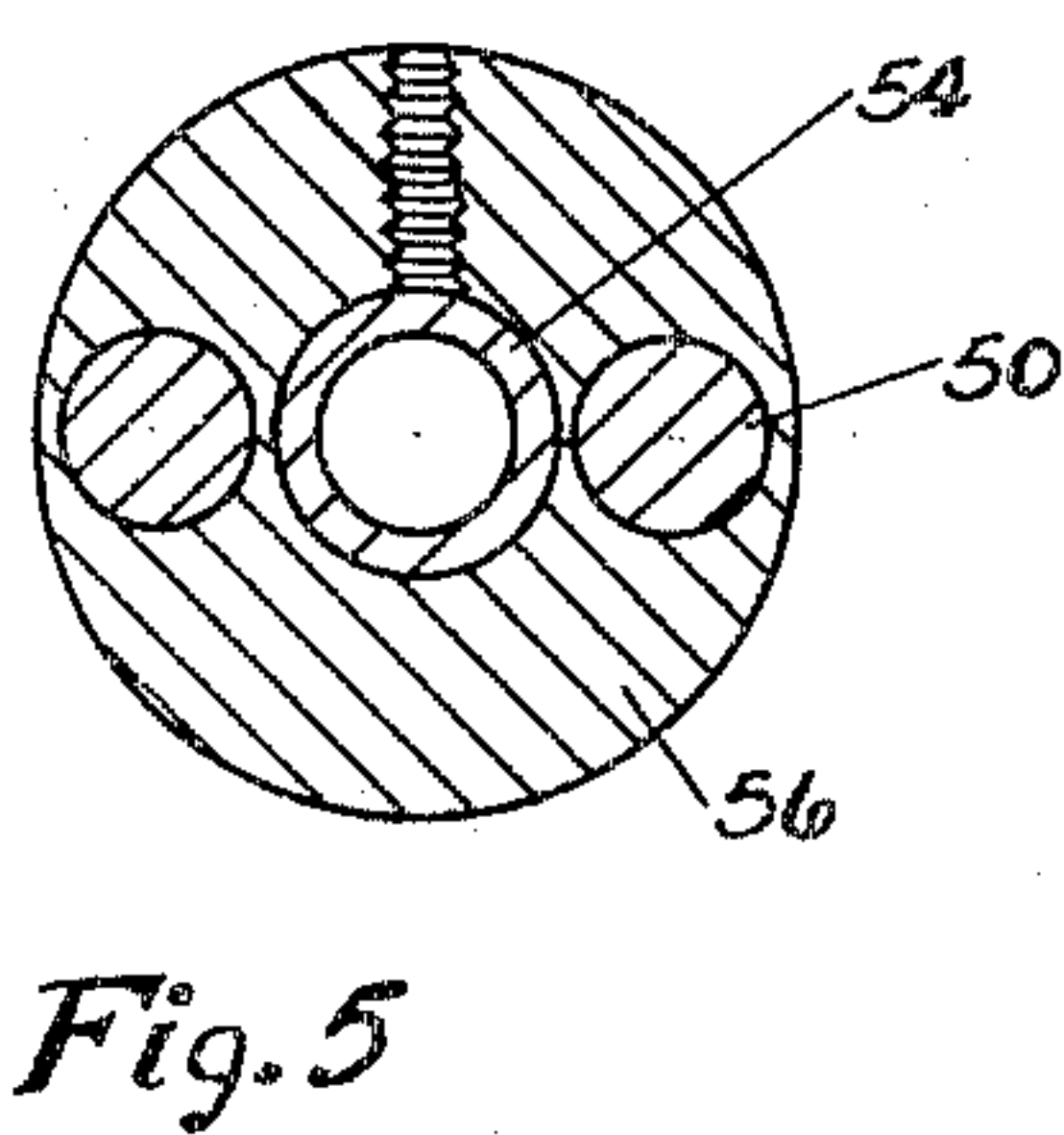
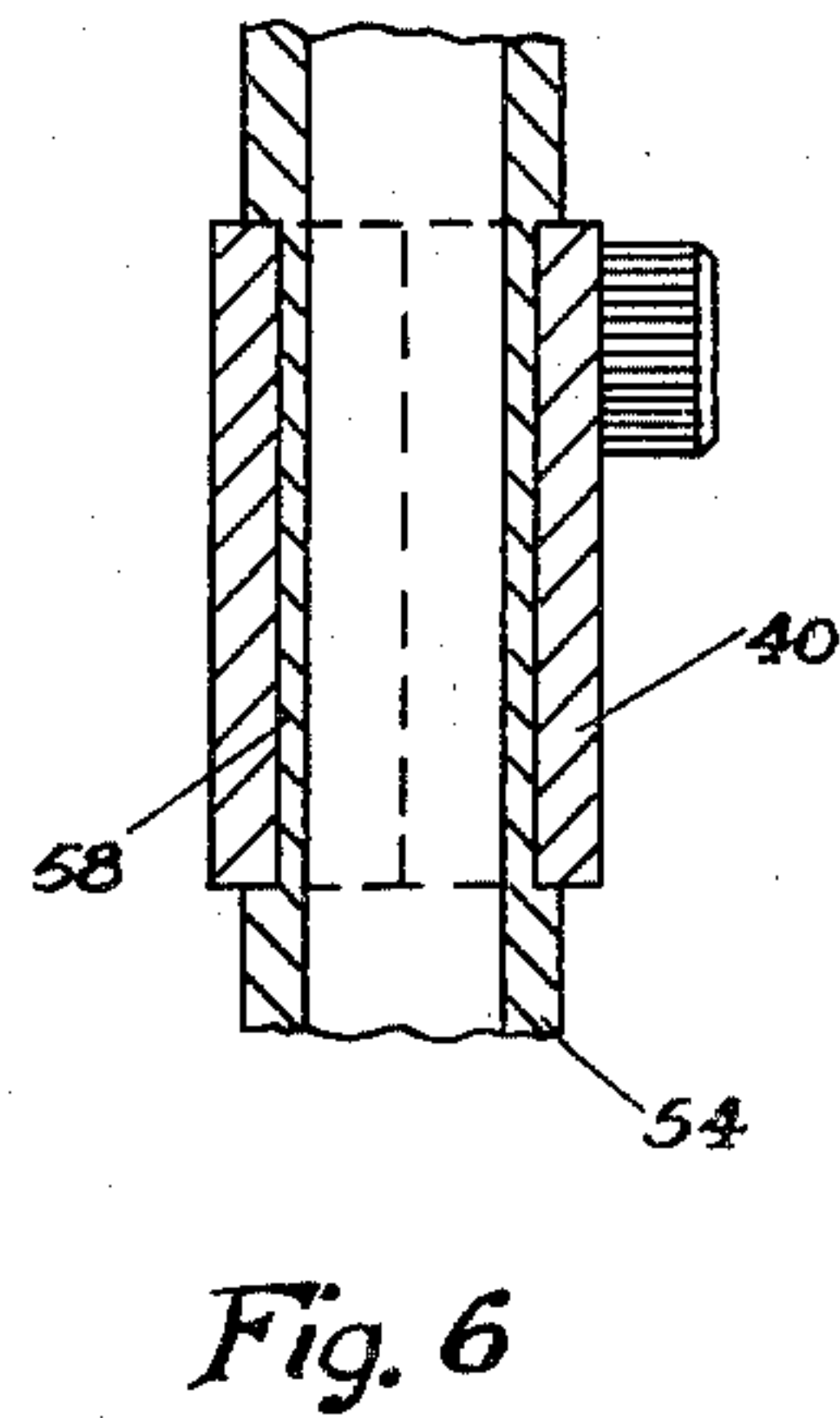
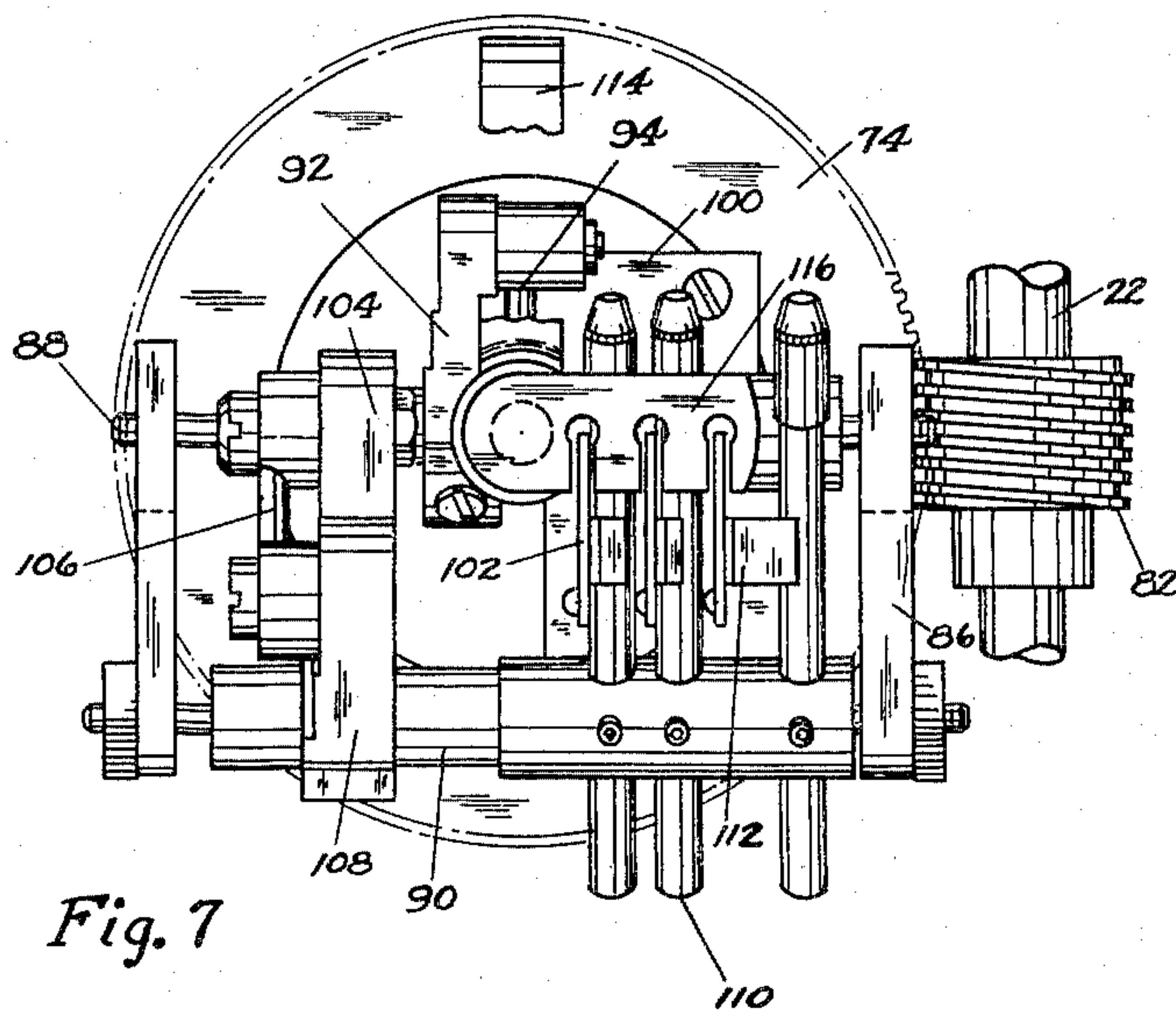


Fig. 8
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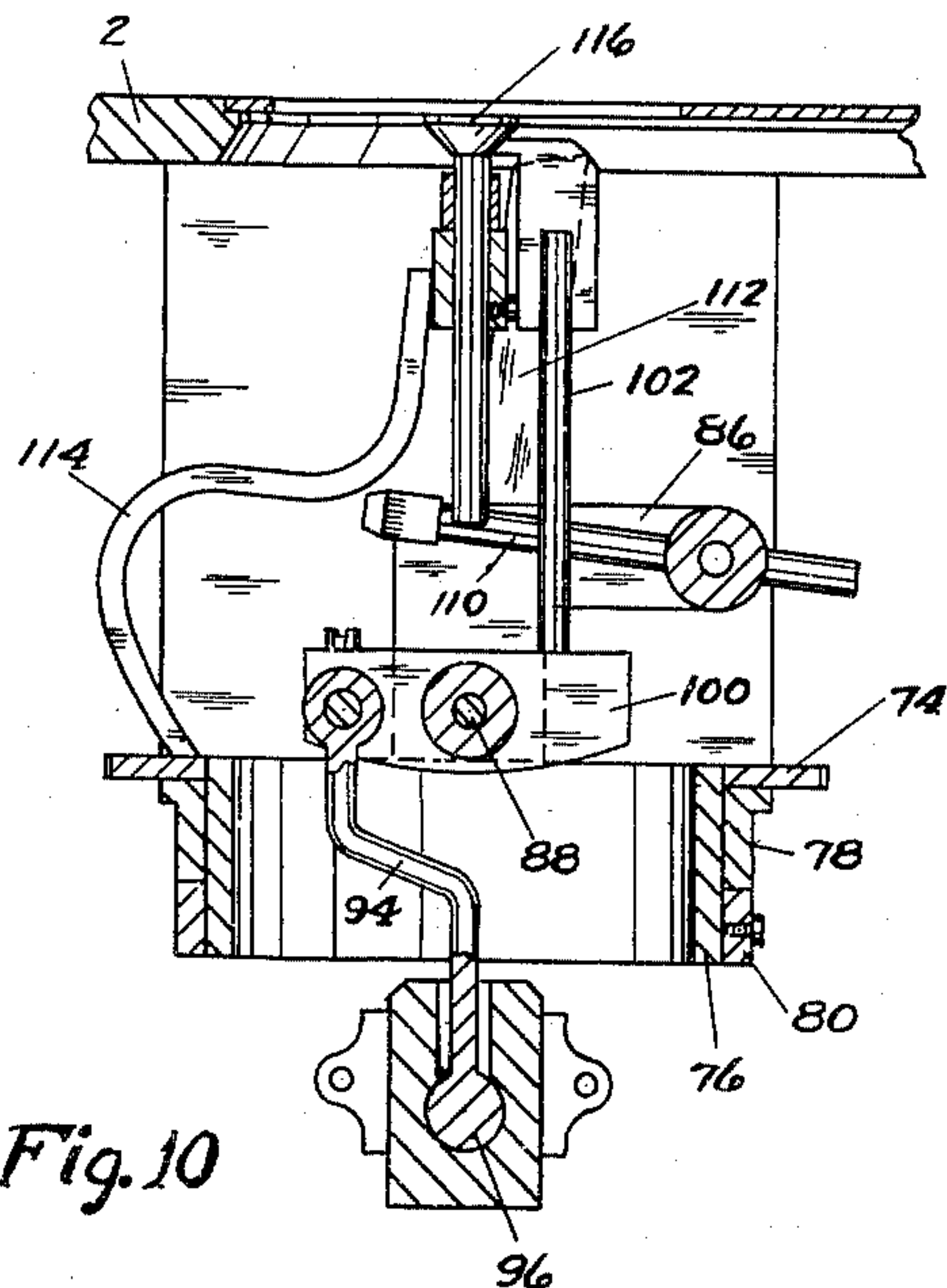


Fig. 10

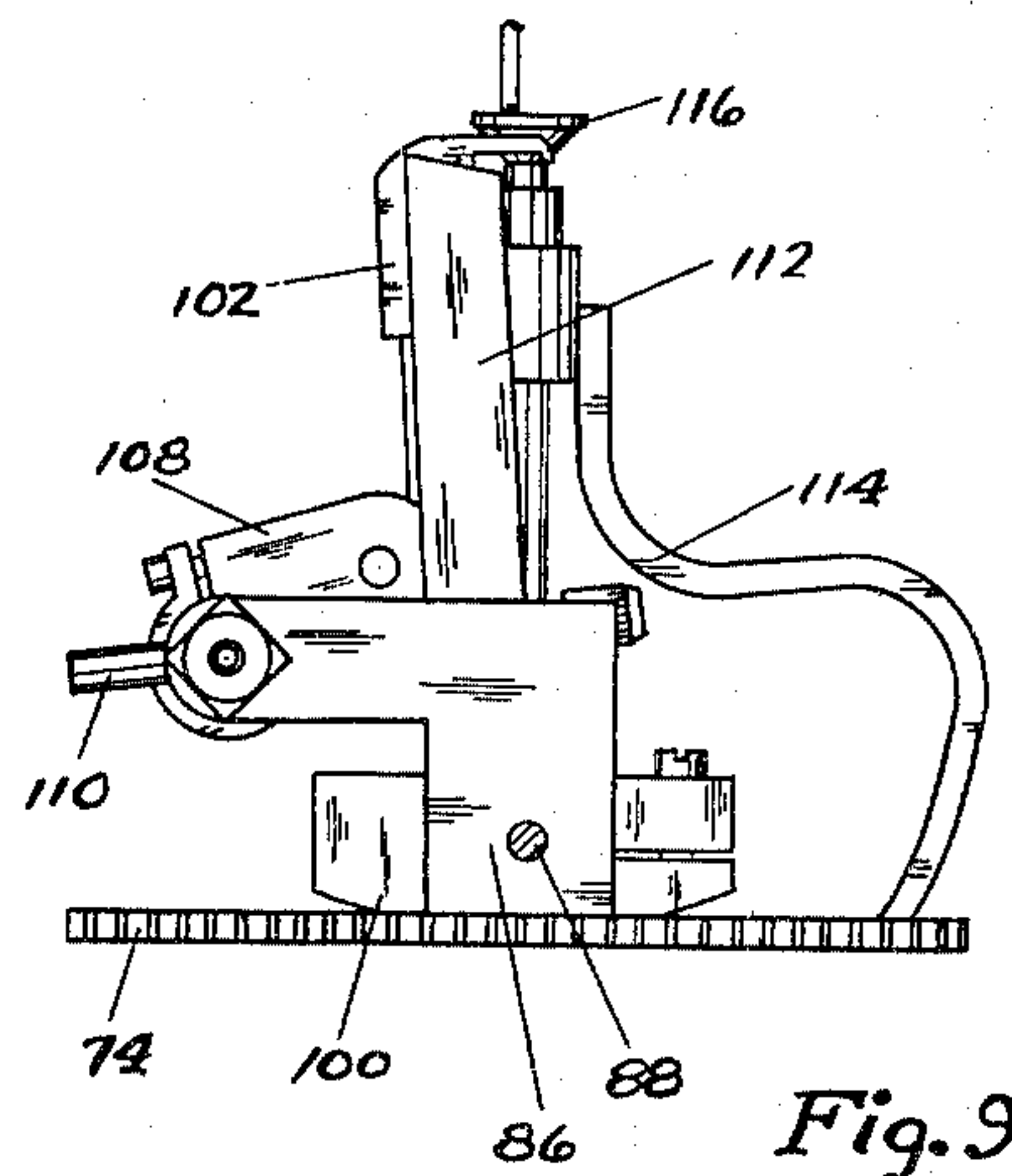


Fig. 9

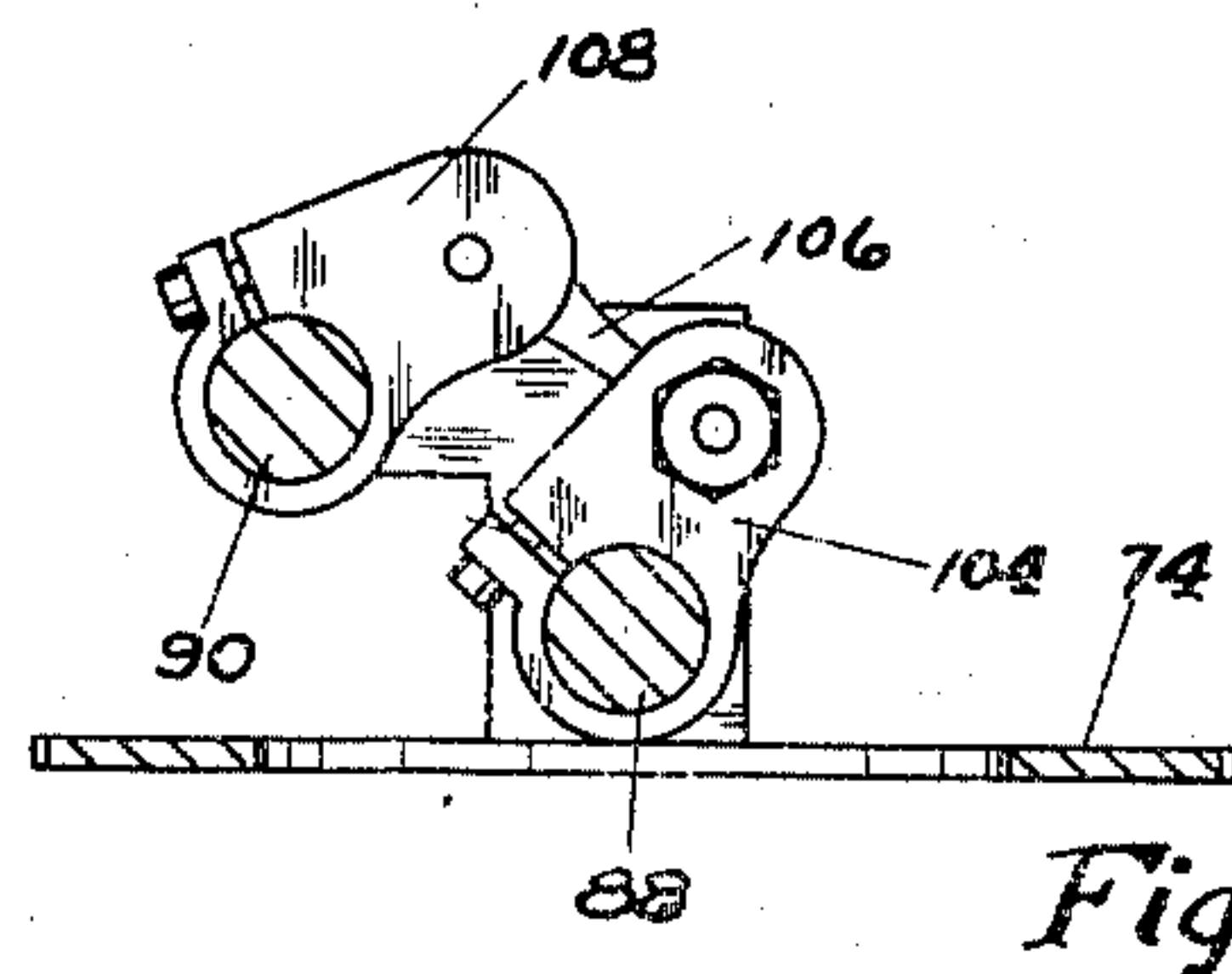


Fig. 11

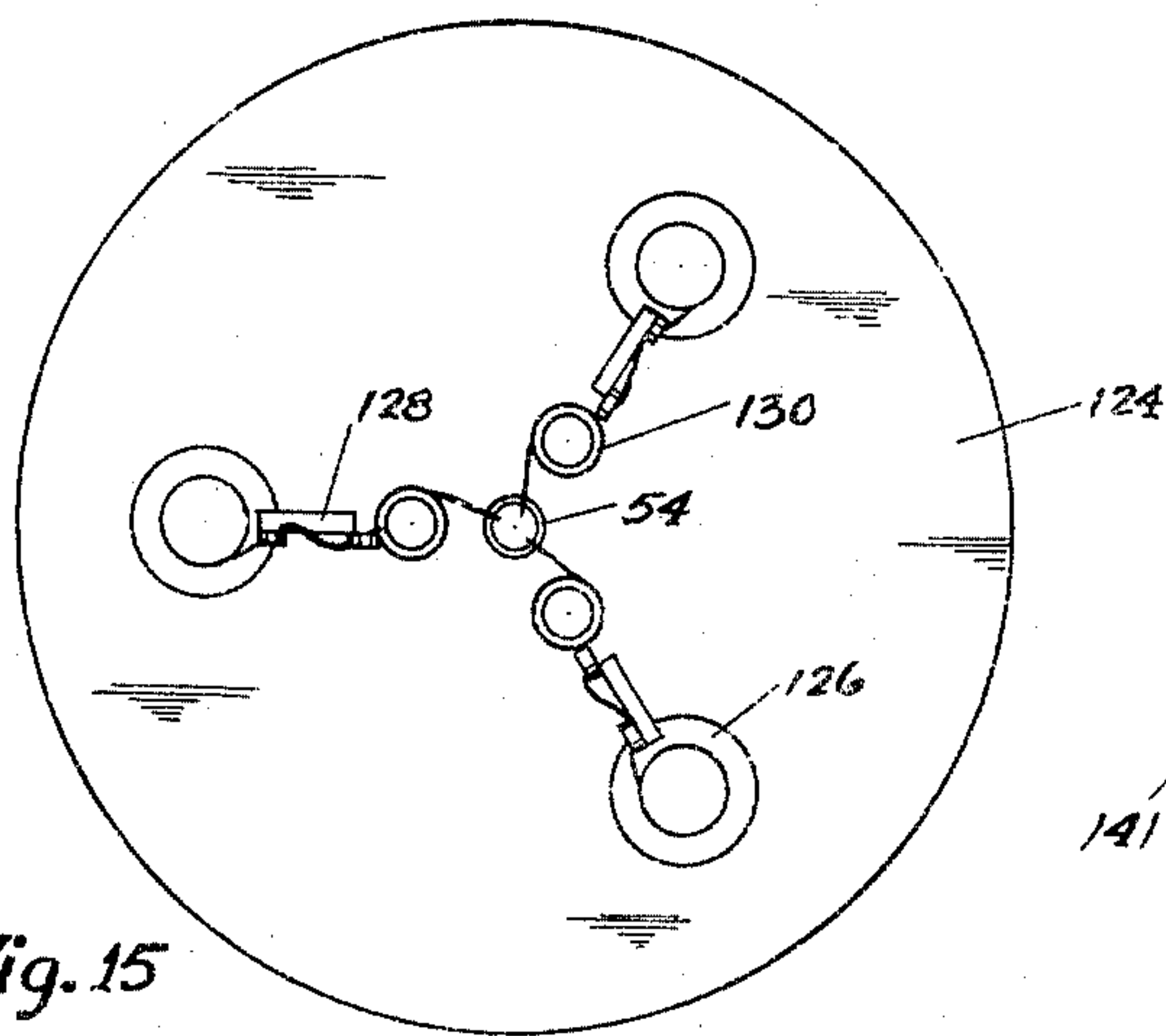


Fig. 15

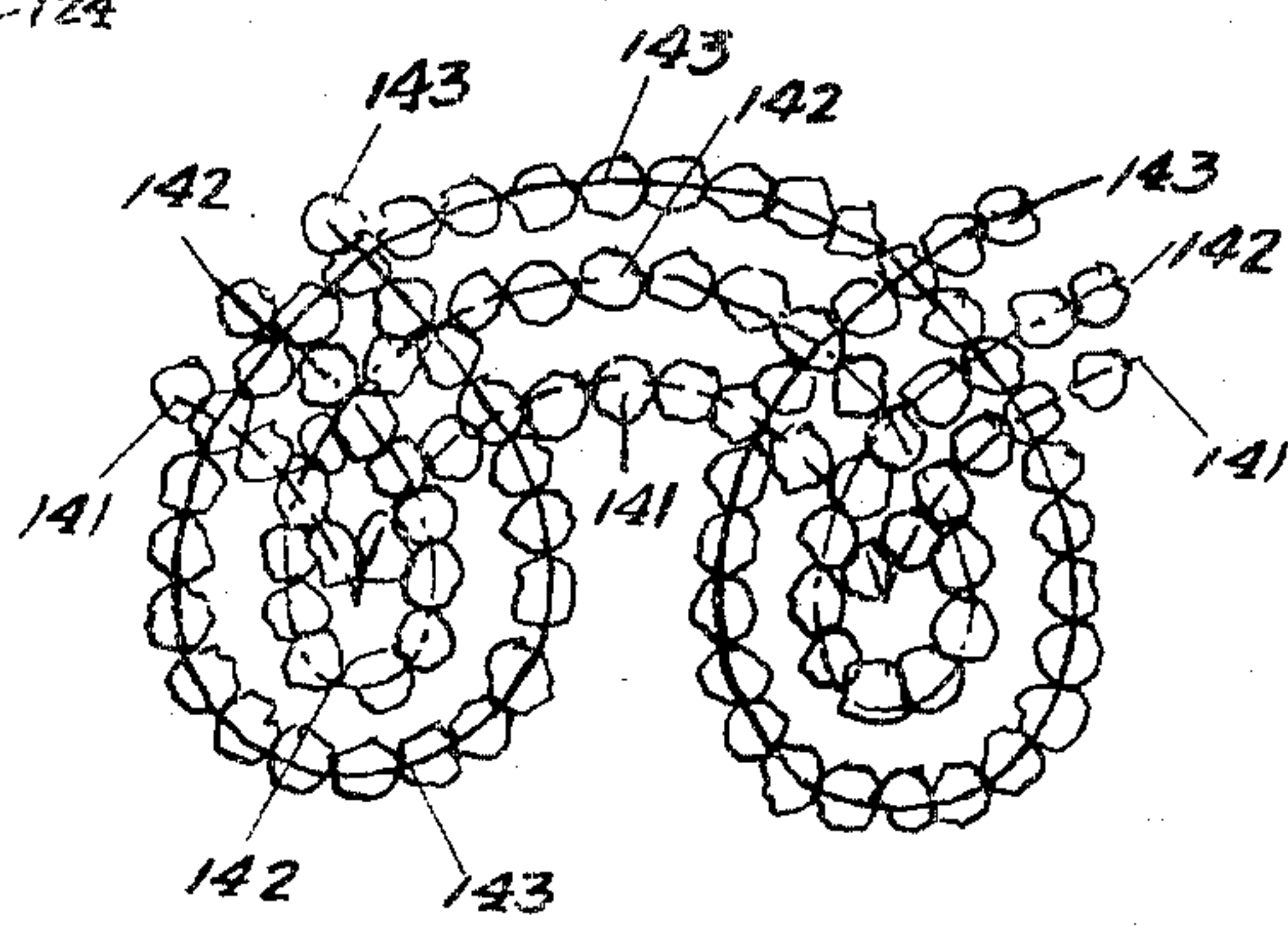


Fig. 18

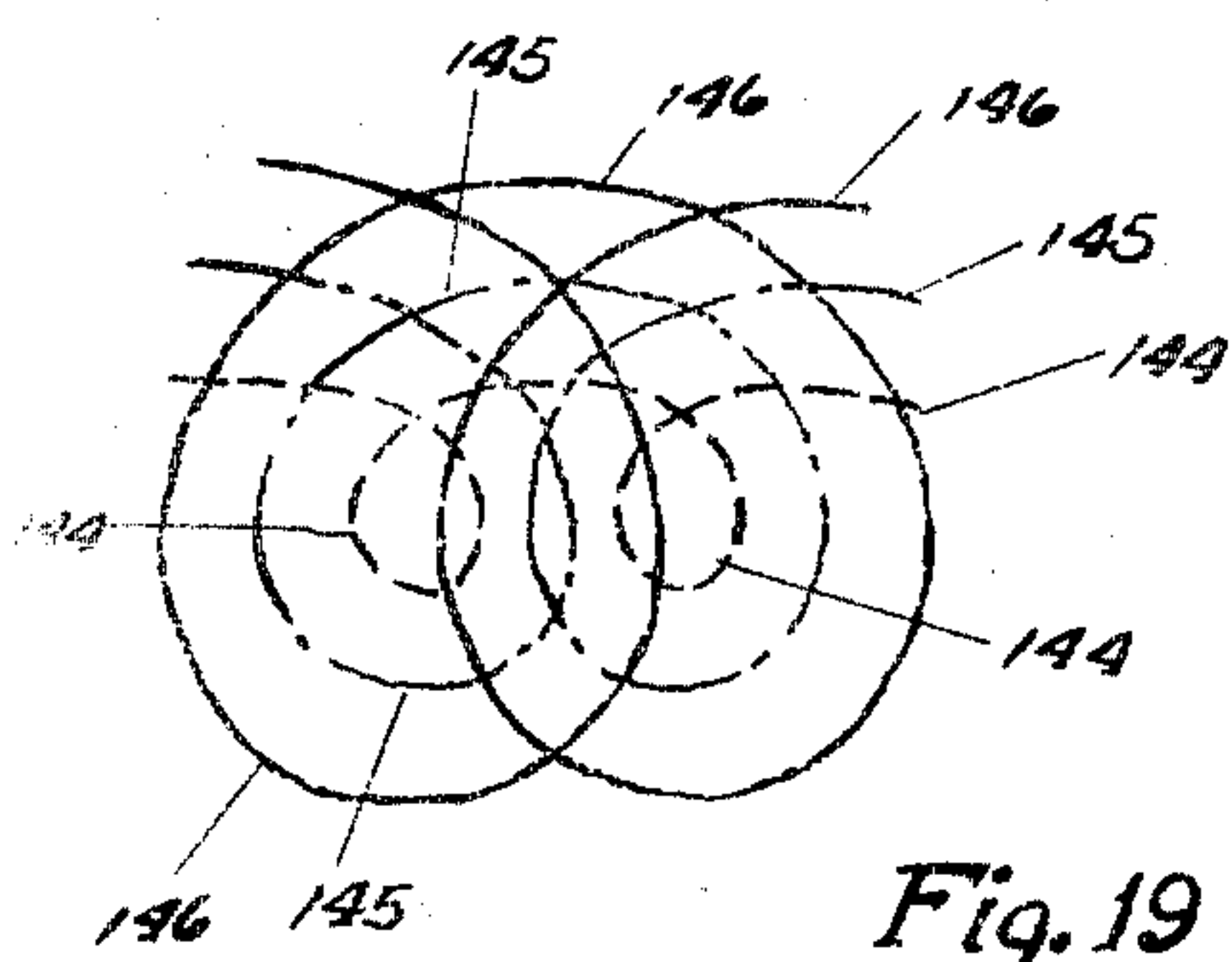


Fig. 19

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UNITED STATES PATENT OFFICE

2,540,901

CHENILLE SEWING MACHINE

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Application January 16, 1948, Serial No. 2,775

10 Claims. (Cl. 112—79)

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The invention relates to chenille sewing, and more particularly to machines for sewing chenille patterns on a fabric. It is especially designed for the sewing of curving rows of chenille tufts.

Various types of chenille sewing machines have been used in the past, but most of these sew in a straight line of tufts, or require that the fabric be moved in varying directions to form a pattern. In making large bed spreads or the like, the movement of the fabric in changing directions requires considerable labor and skill, and the work is quite slow.

The primary object of the present invention is to provide a machine which is capable of producing chenille patterns of varying types on a fabric economically and rapidly.

Another object of the invention is to provide a machine of this type which produces a pattern while moving the cloth or other fabric to which the chenille is applied in a straight line.

Still another object of the invention is to provide a machine capable of sewing lines of chenille tufts which follow some form of trochoidal curve.

A further object of the invention is to provide a device of this type which is in general similar to a conventional sewing machine, with the addition of such parts as are needed to accomplish the desired result.

Still a further object of the invention is to provide, on opposite sides of a fabric holding means, a needle and a loop holding hook (preferably combined with a cutter), the needle and hook being mounted and driven to move in corresponding paths, preferably circular paths; in combination with means for feeding the fabric. The needle and hook then cooperate to form loops (or tufts if a cutter is used) on the lower side of the fabric, the hook holding the loops extended when the needle is withdrawn.

An additional object of the invention is to provide a machine for sewing several lines of chenille simultaneously in a pattern of intersecting curved lines, and more especially for sewing simultaneously a plurality of trochoids of chenille.

Further objects and advantages of the invention will appear more fully from the following description, especially when taken in conjunction with the accompanying drawings which form a part thereof.

In the drawings:

Fig. 1 shows in side elevation, with parts broken away, a sewing machine embodying my invention;

Fig. 2 is a rear view of the machine;

Fig. 3 shows in front elevation, with parts

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broken away, the needle guiding and operating portion of the machine;

Fig. 4 is a bottom plan view of the machine;

Figs. 5 and 6 are horizontal and vertical sections respectively on the lines 5—5 and 6—6 respectively of Fig. 3;

Fig. 7 is a top plan view of the hook and cutter portion of the machine;

Fig. 8 is a side elevation of the mechanism of Fig. 7;

Fig. 9 is a front elevation thereof;

Figs. 10 and 11 are cross-sections on the lines 10—10 and 11—11 respectively of Fig. 8;

Figs. 12 to 14 show three different positions of the needle, hook and cutting mechanism during the making of a stitch;

Fig. 15 shows in top plan view the needle mechanism of the machine;

Fig. 16 is a plan view of the throat plate of the machine;

Fig. 17 is a plan view of the presser foot; and

Figs. 18 to 20 show different patterns produced by such machine.

As shown in the drawings, the machine includes a base or table 2 with an upright 4 supporting arm 6. Through the arm extends main shaft 8 which can be driven by a motor through pulley 10 adjacent hand wheel 12. A second pulley 14 is connected by a belt to needle shaft 16 mounted in bearings 18 above arm 6. This shaft through chain and sprocket connection 20 drives the hook turning shaft 22 mounted in bearings 24 below table 2.

Main shaft 8 also has an eccentric at 26 which reciprocates link 28 connected to rock lever 30 on hook operating shaft 32 located below the table in bearings 34. Link 28 extends through the hollow upright 4. At its front end, main shaft 8 has a crank 36 connected by link 38 to a block 40, the purpose of which will be described below.

Needle shaft 16 at its forward end carries a worm 42 engaging a worm wheel 44. This worm wheel has a central downwardly projecting trunnion having at its lower end a flange 46, this trunnion being held in a bearing 48 to mount the wheel for turning. Upstanding from wheel 44 are two posts 50 connected at their tops by a disc 52. Needle bar 54 extends slidably through aligned central openings in wheel 44 and disc 52. Secured to the needle bar is a disc 56 (see Fig. 5) having openings slidable on posts 50, so that the needle bar can slide up and down through wheel 44 but is forced to turn about its axis as the wheel turns.

Block 40 (see Fig. 6) is formed in two parts

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held together by screws or the like. Needle bar 54 has a section 53 of reduced cross section into which the two block members engage, so that the needle bar moves up and down with the block but can turn freely in it. At its lower end, the needle bar carries a transverse arm 60 in which are mounted three needles 62, so that as the needle bar turns the needles move in a circular path around the needle bar axis.

On disc 52 is mounted a carrier 124 supporting three balls 126 of yarn, which is led through guides 128 and tension devices 130 to the top of the needle bar, which is in the form of a hollow tube. The three yarns pass downward through the bar to the three needles, and the needle bar acts as a takeup for all three threads, as will be explained below.

Below the table, and beneath the needle mechanism, is the loop forming and cutting mechanism (Figs. 7 to 11). This mechanism is carried by a ring 74 secured on a sleeve 76 having a large central opening. Sleeve 76 (Fig. 10) can turn in an opening in plate 78 mounted below table 72, and is held in this opening by ring 80 secured on its lower end. The periphery of ring 74 has worm gear teeth meshing with worm 82 on shaft 22.

Ring 74 has on opposite sides upstanding L-shaped ears 86. Mounted in these ears are a hook carrying shaft 88 and a cutter carrying shaft 90. Shaft 88 has secured on it a rock lever 92 connected by link 94 extending through the central opening of sleeve 76 to a ball and socket joint 96 on arm 98 secured to shaft 32. Shaft 88 also carries a lever 100 in which are mounted three loop-holding hooks 102. A third lever 104 on shaft 88 is connected by link 106 to lever 108 on shaft 90. This shaft has three cross pins 110 in which are secured cutters 112, these being thin pieces of spring metal each resiliently pressing against one side face of one of the hooks 102.

A bracket 114 extends upwardly and inwardly from ring 74 to a point above the center of the ring, where it carries a throat plate element 116 extending outward to a point below needles 62. Aligned with needles 62 are throat openings 118, these being in the form of notches opening in the trailing edge of element 116.

The machine so far described is substantially similar to that shown in my earlier application Serial No. 746,439, filed May 7, 1947.

The device therein disclosed produces concentric circles of chenille tufts on a fabric, by holding the fabric stationary while the needles and cooperating tuft forming devices moved in concentric circular paths. I have now found that different types of patterns may be produced if the fabric is moved as the needles turn, preferably in a straight line. With such a procedure, each needle forms a line of stitches in the form of a trochoid. Depending on the rate of feed as compared with the rate of radius of rotation of the needle, such curve may be either a cycloid or a prolate or curtate trochoid.

For accomplishing this feeding, I may use the arrangement now to be described.

The presser foot (see Figs. 3 and 17) is mounted in the usual manner on a vertically slidable bar 63 resiliently pressed downward by spring 64 and capable of being lifted and held in raised position by lever 65. The presser foot includes a flat portion 66 having a round opening 69 therein of a diameter somewhat greater than that of the path of the outermost needle. The table 2 below the presser foot has a similar open-

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ing 70 therein, within which turns throat plate 116.

At one edge, the presser foot also has a curved flange portion 67. This portion fits closely around toothed wheels 68 mounted on a shaft 71 mounted in bearings 72 carried by table 2.

Shaft 71 is driven through worm gear 132 and worm 133 by a transverse shaft 134 mounted below table 2. Shaft 134 in turn is driven through worm gear 135 and worm 136 by shaft 137, itself driven by pulleys and belting 138 from shaft 139. The latter is driven by pulleys and belting 140 from needle shaft 16.

This machine operates as follows:

Cloth on which a chenille pattern is to be formed is placed on table 2 and the presser foot is lowered to hold a circular area of the cloth across opening 70. The machine is now operated, and needles 62 pass through the fabric carrying loops of yarn with them. Hooks 102 and cutters 112 are in the position shown in Fig. 10, out of the path of the needles. When the needles approach their lowest positions, the hooks advance to a position just on the outside of the needles (Fig. 12) where they engage in the loops of thread. The needles then are retracted to the position shown in Fig. 13, the hooks holding the loops in extended position below the cloth. As the needles reach their highest positions (Fig. 14) the cutters 112 advance upward. This series of operations is repeated to cast a series of loops on each needle. After the second or third loops are cast on, the loops are pushed one by one into the paths of cutters 112 (see Fig. 14) and are cut thereby to form tufts on the lower side of the fabric.

The needle and the hook and cutting mechanism move in unison in a circular path during this operation. The throat plate element 116 also turns with the needles, so as to support the cloth at all times. Since the throats 118 open on the side of the throat element where loops have already been formed, that is, on the trailing edge, the formed loops or tufts do not interfere with the movement of this element.

As the needles and needle bar move upwardly from the position shown in Fig. 12 the loops are retained by hooks 102, so that this part of the yarn is held against upward movement. As the top of the needle bar rises, therefore, it pulls additional thread through the tension mechanisms so as to provide the slack for the next loops as the needles again move down through the fabric.

As the needles are forming tufts at various points around the periphery of circles having the needle bar axis as their centers, the cloth which is engaged between presser foot portion 67 and wheels 68 is fed across the machine. If the lineal rate of feed just equals the peripheral speed of a needle, that needle will form a series of tufts in a cycloidal curve. If the needle speed is greater, the resulting curve will be a curtate trochoid; if less, a prolate trochoid.

By varying the relative speeds, as by changing the belt and pulley drives 138, 140, these different types of curves may be produced. Fig. 18 shows a pattern in which the inner needle forms a cycloid 141, while the other two needles follow curtate trochoids 142, 143. In Fig. 19, the speed of feed of the cloth is slower, and all three needles form curtate trochoids at 144, 145 and 146 respectively. Fig. 20 shows the result with higher speeds of the cloth, the outer needle forming a cycloid 147 while the two inner needles form prolate trochoids 148, 149.

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Obviously, if only one or two needles are mounted in needle holder 60, only one or two trochoidal lines will be formed.

When the pattern is completed, the presser foot is raised, the cloth is shifted so that all the loops are pulled to the backs of the hooks, and the machine is turned, preferably by hand, until the knives or cutters rise and cut these loops to form tufts.

While I have described herein one embodiment of my invention, I wish it to be understood that I do not intend to limit myself thereby except within the scope of the claims hereto or herein-after appended.

I claim:

1. In a machine for forming chenille patterns on a fabric, means for feeding a fabric, means for holding a substantial area thereof in taut condition as it is fed, a needle, means mounting said needle for reciprocation in a direction transverse to the fabric held by such holding and feeding means, means to guide said needle to move in a circular path in a direction transverse to the longitudinal axis of the needle, a loop holding hook, means mounting said hook on the opposite side of said fabric holding means from said needle mounting means, means to move said hook to engage and hold in extended position a loop of flexible material carried through the fabric by said needle, means to guide said hook for movement in a circular path corresponding to the path of movement of such needle, and cutting means associated and movable with said hook to cut the loops formed by said needle and hook.

2. In a device as claimed in claim 1, a throat plate element on the opposite side of the fabric from said needle, said element having a slot extending thereto, and means to guide said element for movement in a path in which said opening remains aligned with said needle, said slot opening substantially circumferentially of said circular path and on the trailing side of said element.

3. In a device as claimed in claim 2, said feeding means comprising rollers mounted for rotation, a presser foot having a portion engageable with said rollers to press the fabric therebetween, and means to turn said rollers.

4. In a device as claimed in claim 1, said feeding means comprising rollers mounted for rotation, a presser foot having a portion engageable with said rollers to press the fabric therebetween, and means to turn said rollers.

5. In a machine for forming chenille patterns on a fabric, means for feeding fabric, means for holding a substantial area thereof in taut condition as it is fed, a needle carrier mounted for reciprocation in a direction transverse to the fabric held by such holding means, means to reciprocate such carrier, said carrier including needle holding means offset from the longitudinal axis thereof, means to rotate said carrier to cause the needle to move in a circular path in a direction transverse to the longitudinal axis of

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the needle, a member rotatably mounted on the opposite side of said fabric holding means from said needle mounting means, a loop holding hook eccentrically mounted on said member, means to move said hook to engage and hold in extended position a loop of flexible material carried through the fabric by said needle, means to rotate said member so as to move said hook in a circular path corresponding to the path of movement of such needle, and cutting means associated with said hook mounted on said movable member for rotation therewith.

6. In a device as claimed in claim 5, said carrier being hollow for the passage of thread to the needle, and tension means adjacent the end of the carrier remote from the needle.

7. In a machine for forming chenille patterns on a fabric, means for feeding a fabric, means for holding a substantial area of the fabric in a taut condition as it is fed, a plurality of needles, means mounting said needles for joint reciprocation in a direction transverse to the fabric held by such holding means, means to guide said needles to move in concentric circular paths in a direction transverse to the longitudinal axes of the needles, a plurality of loop holding hooks, means mounting said hooks on the opposite side of said fabric holding means from said needle mounting means, means to move each of said hooks to engage and hold in extended position a loop of flexible material carried through the fabric by one of said needles, means to guide each of said hooks for movement in a path corresponding to the path of movement of one of said needles, and cutting means associated and movable with each of said hooks to cut the loops formed by said needles and hooks.

8. In a device as claimed in claim 7, means to hold a plurality of supplies of flexible material, and means mounting such holding means to turn with said needles.

9. In a device as claimed in claim 8, said needle mounting means including a needle carrier mounted for reciprocatory and turning movement, said needle carrier being hollow and having needle holding means at one end thereof, said supply holding means being located adjacent the other end of said needle carrier, so that flexible material from such supplies can extend through said needle carrier to said needles.

10. In a device as claimed in claim 9, a plurality of tension means carried by said supply holding means and between such supplies and said needle carrier.

JULIUS MONTGOMERY.

REFERENCES CITED

The following references are of record in the file of this patent:

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