

(No Model.)

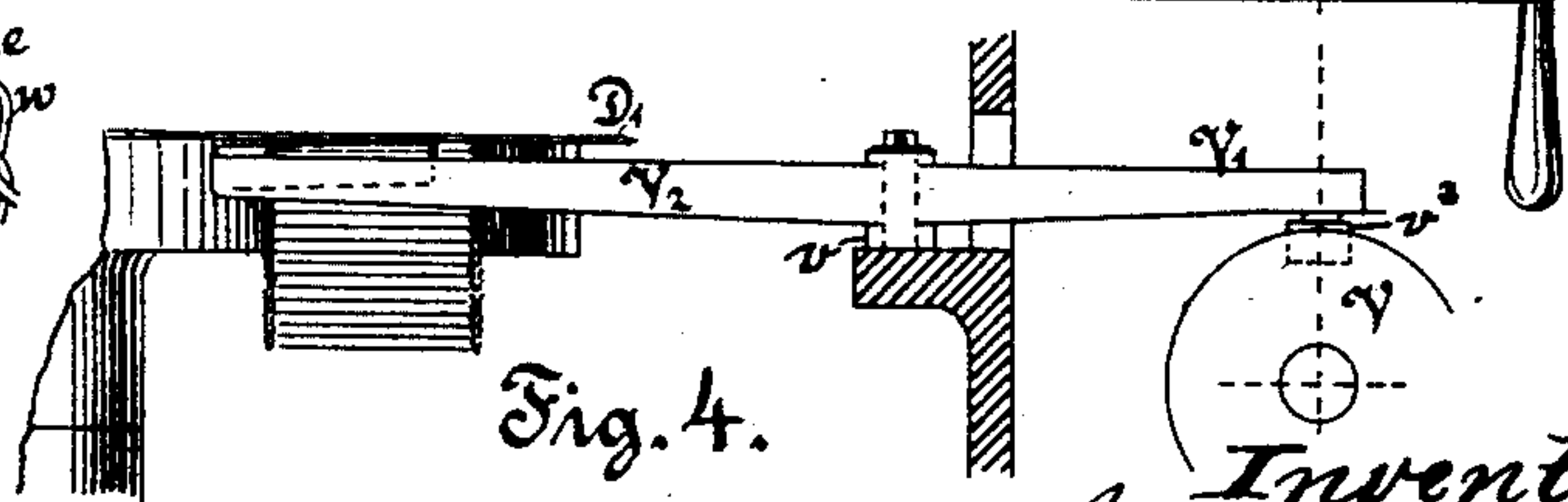
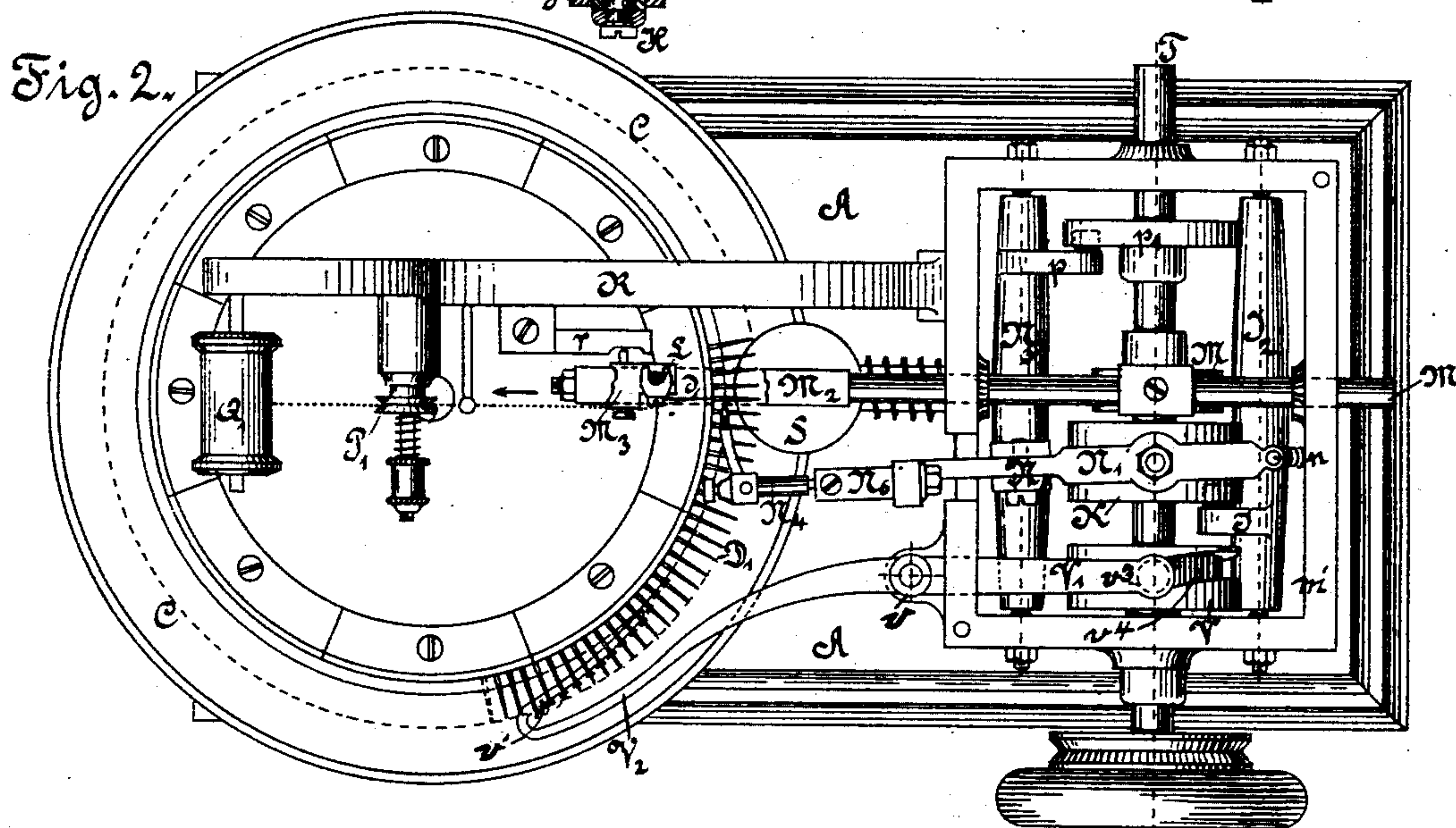
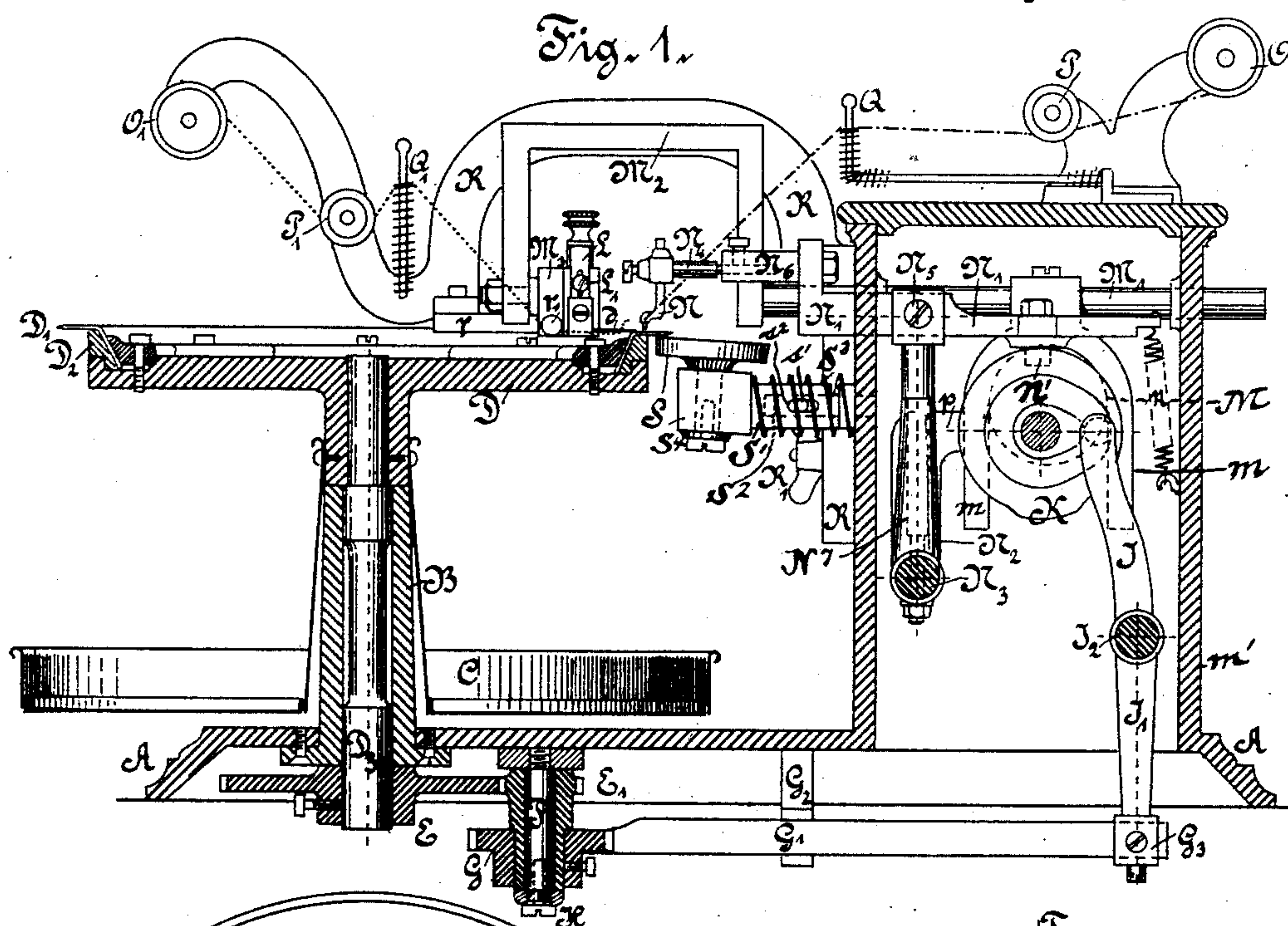
3 Sheets--Sheet 1.

J. KÖHLER.

MACHINE FOR SEWING LOOPED FABRICS.

No. 520,209.

Patented May 22, 1894.



Witnesses:

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H. Walker

Inventor:

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by William E. Boulter atty

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3 Sheets—Sheet 2.

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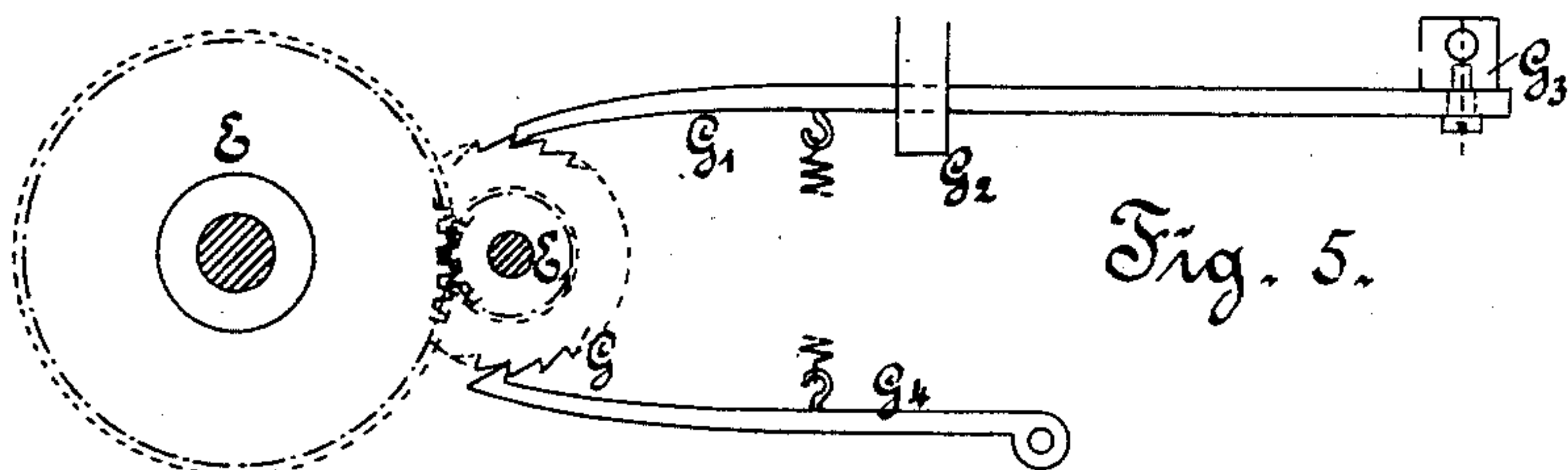


Fig. 5.

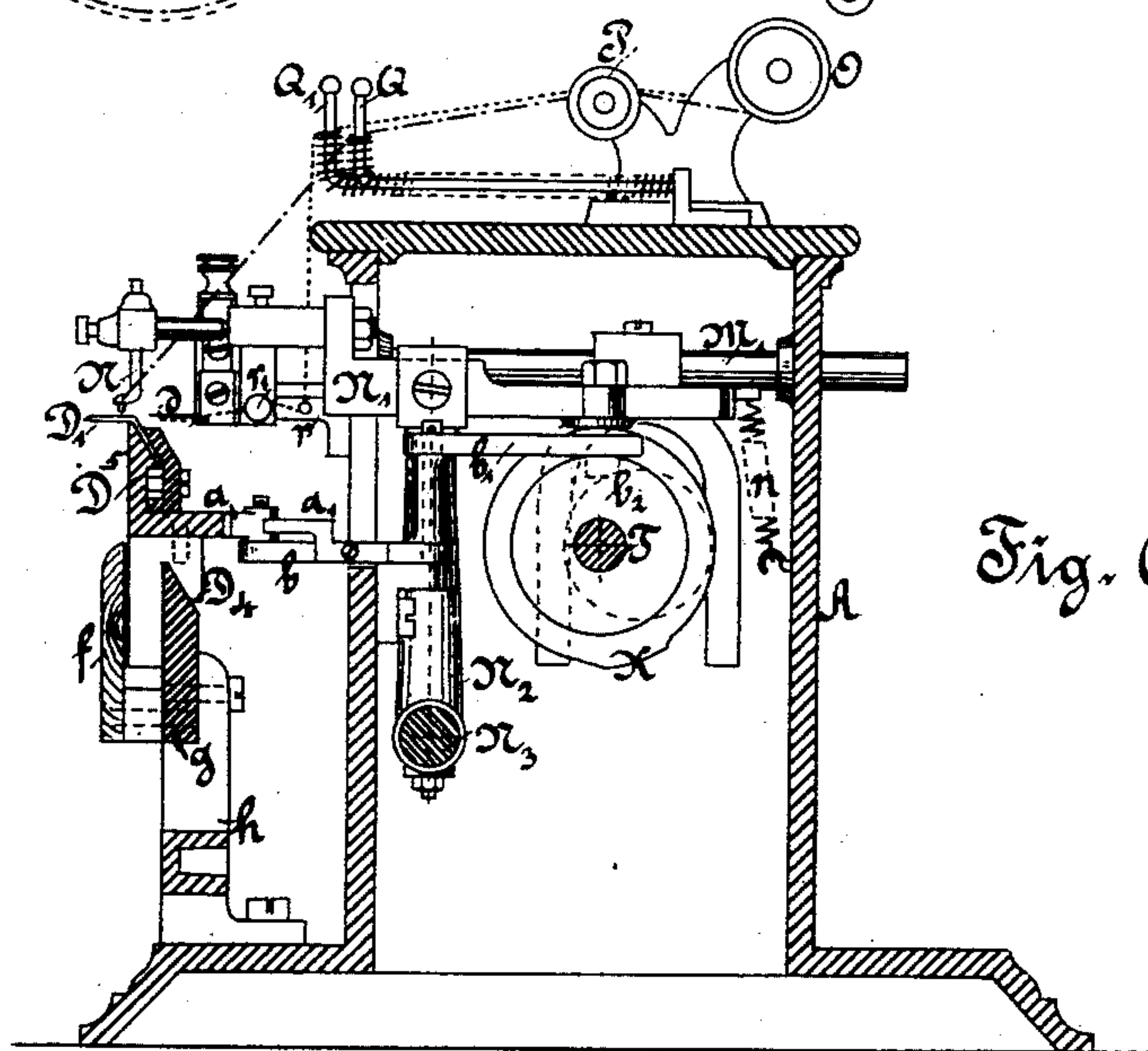


Fig. 6.

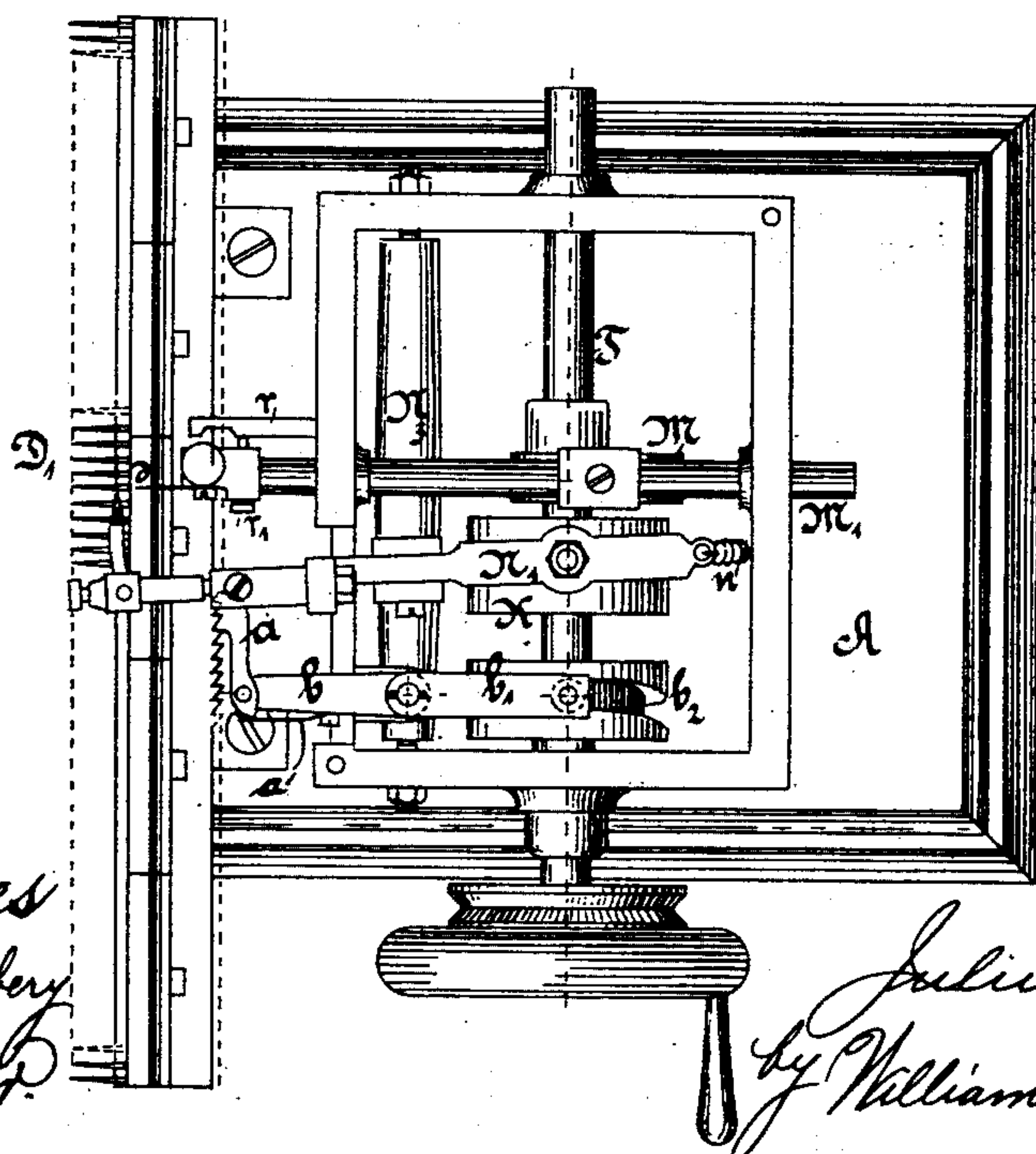


Fig. 7.

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3 Sheets—Sheet 3.

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Fig. 8.

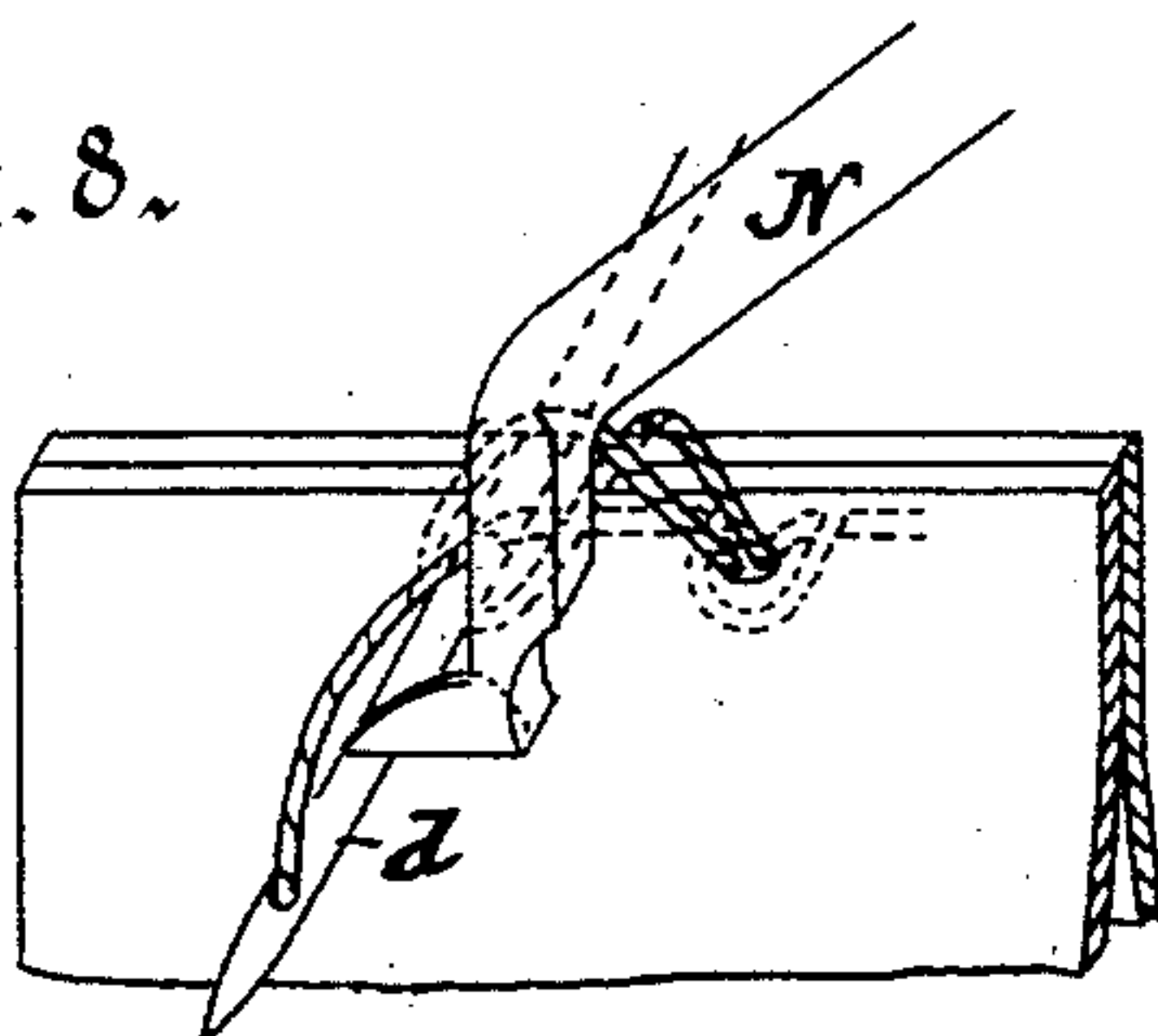


Fig. 9.

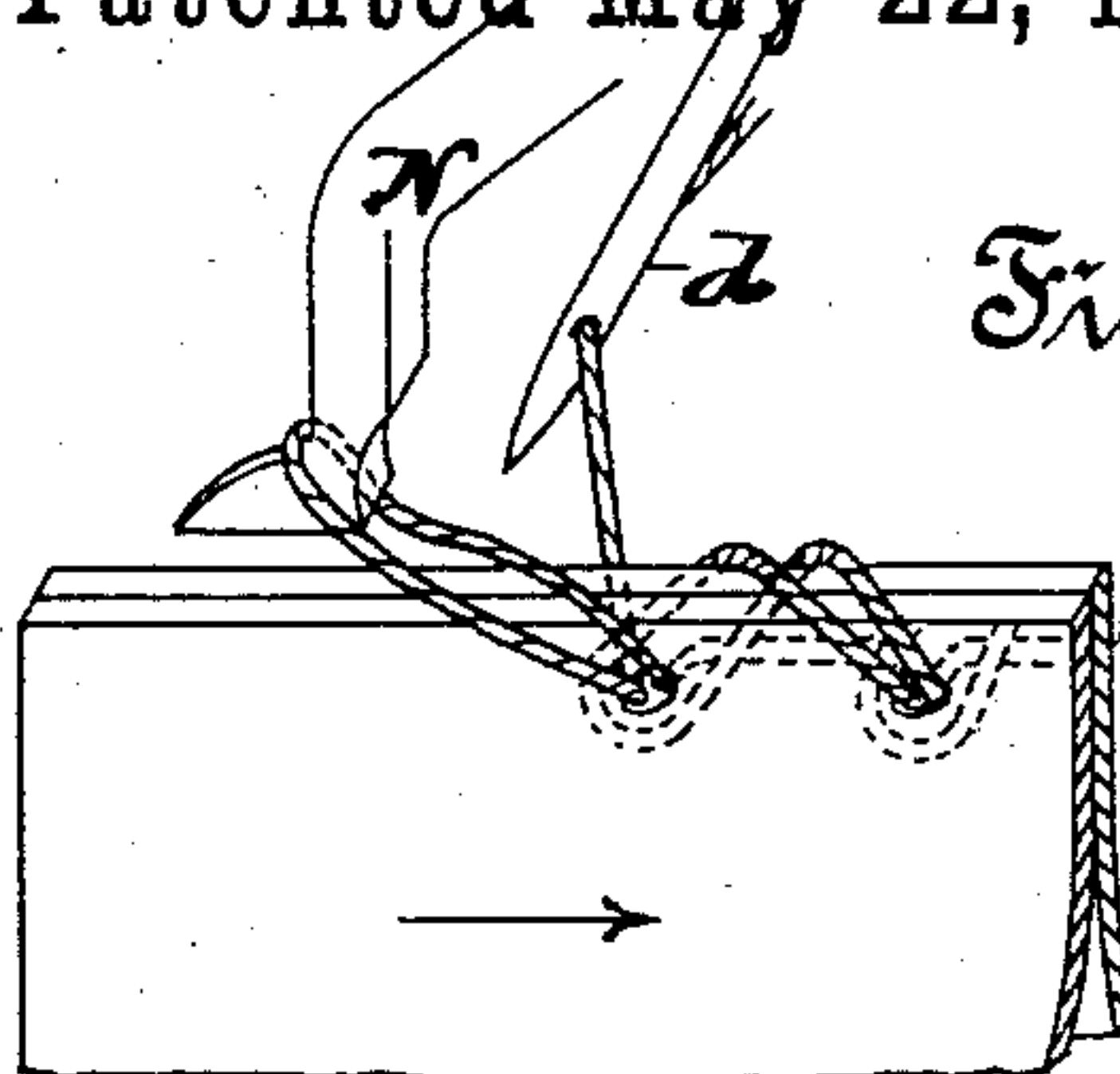


Fig. 10.

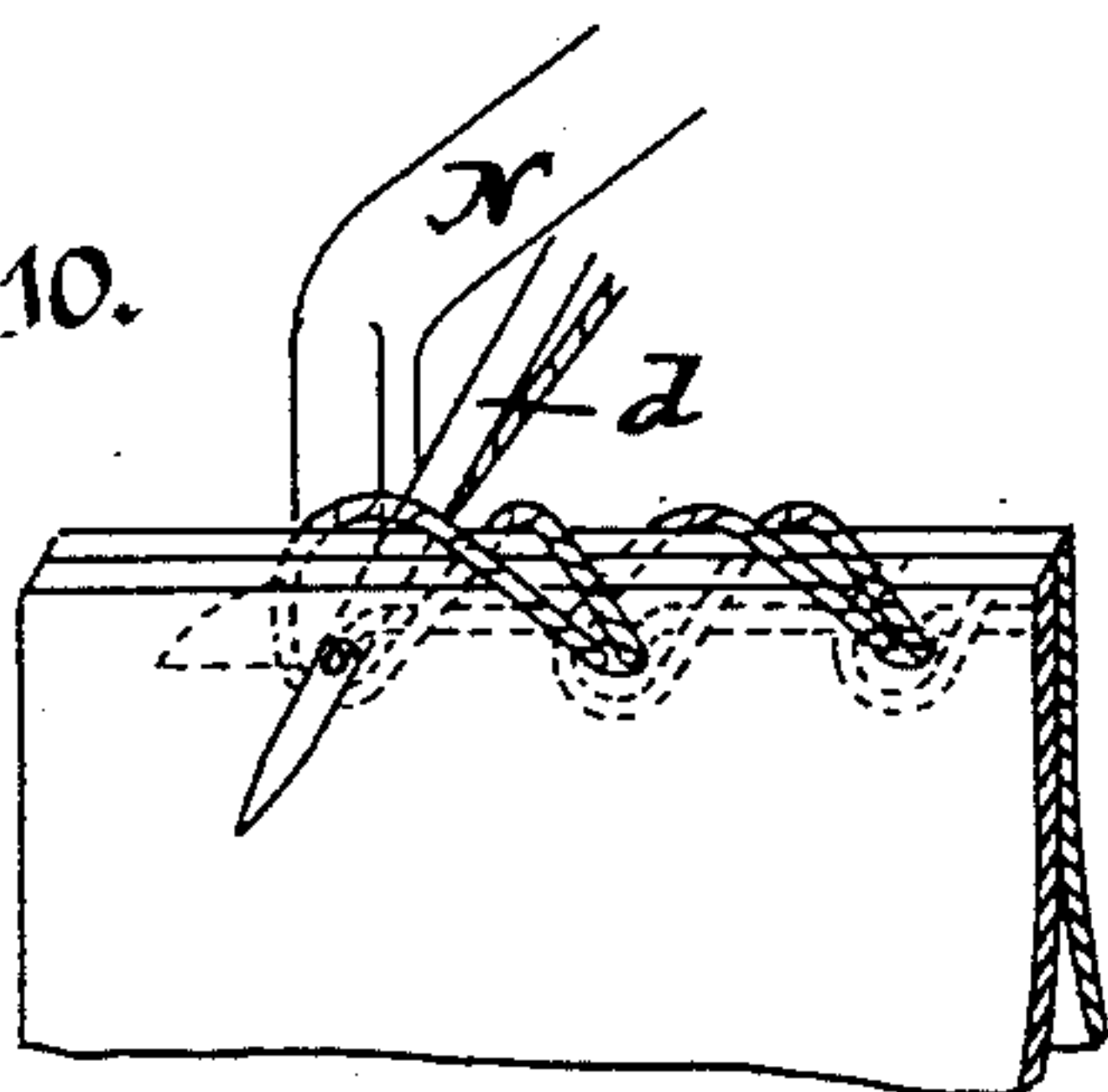


Fig. 11.

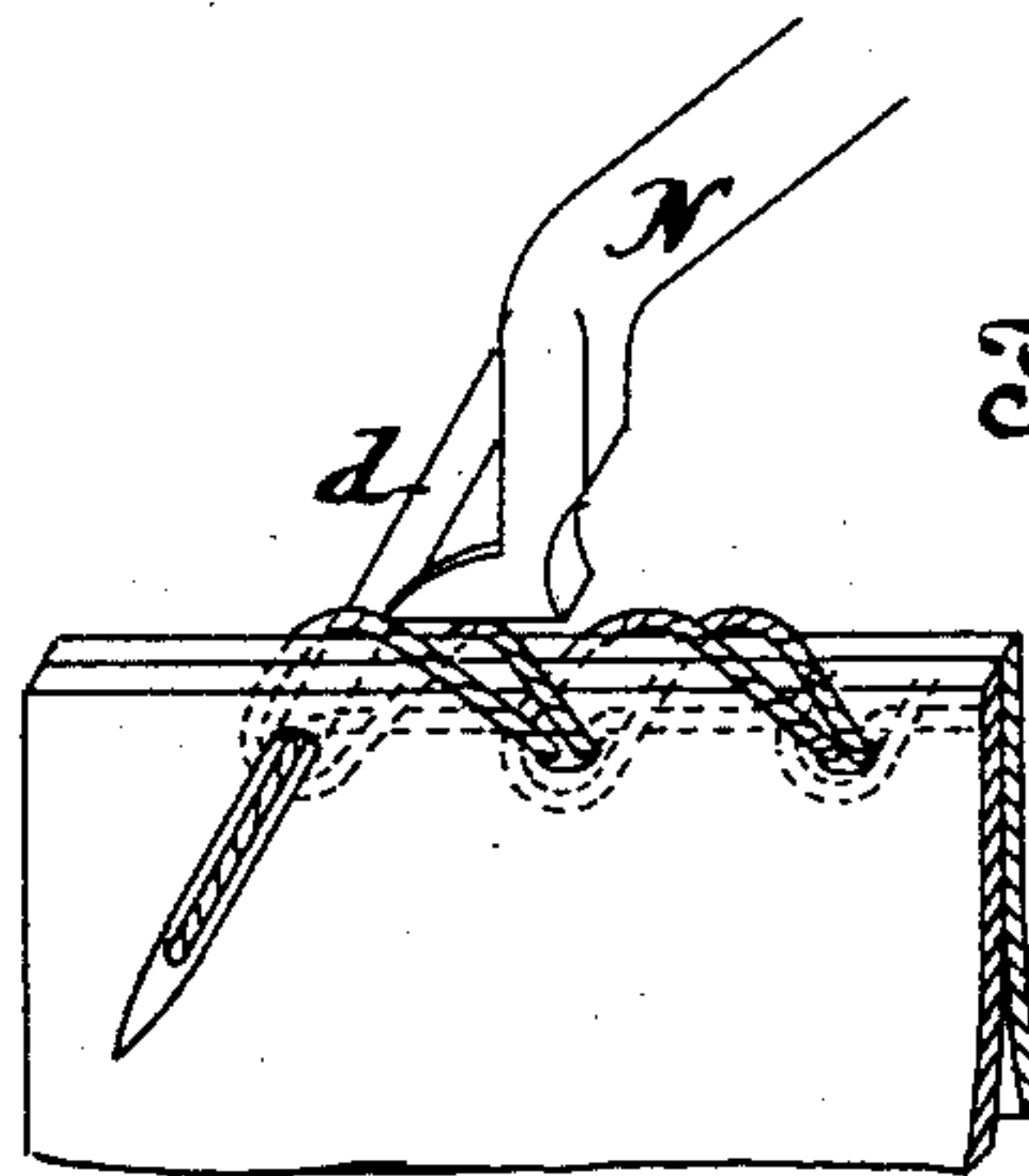


Fig. 12.

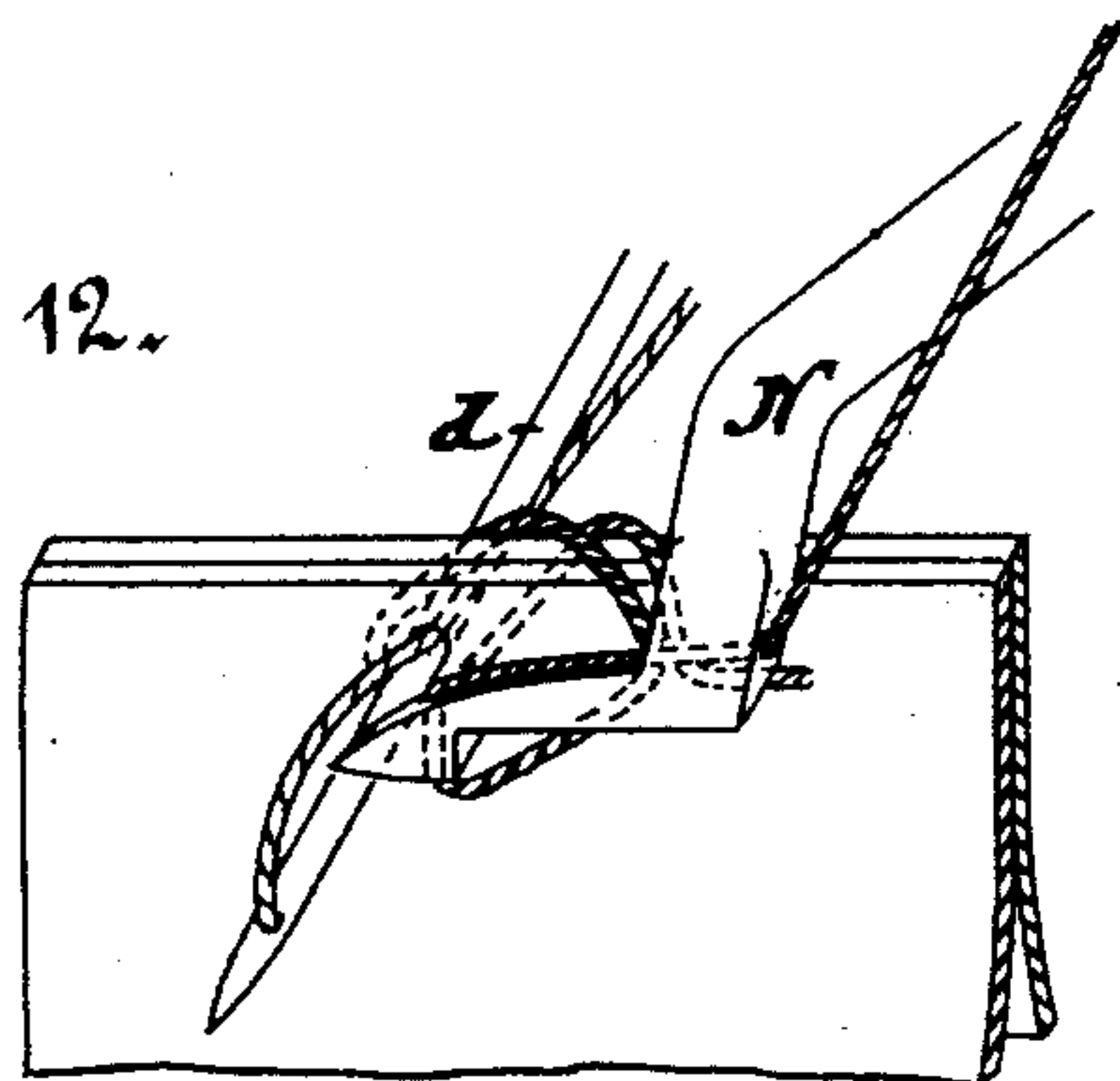


Fig. 13.

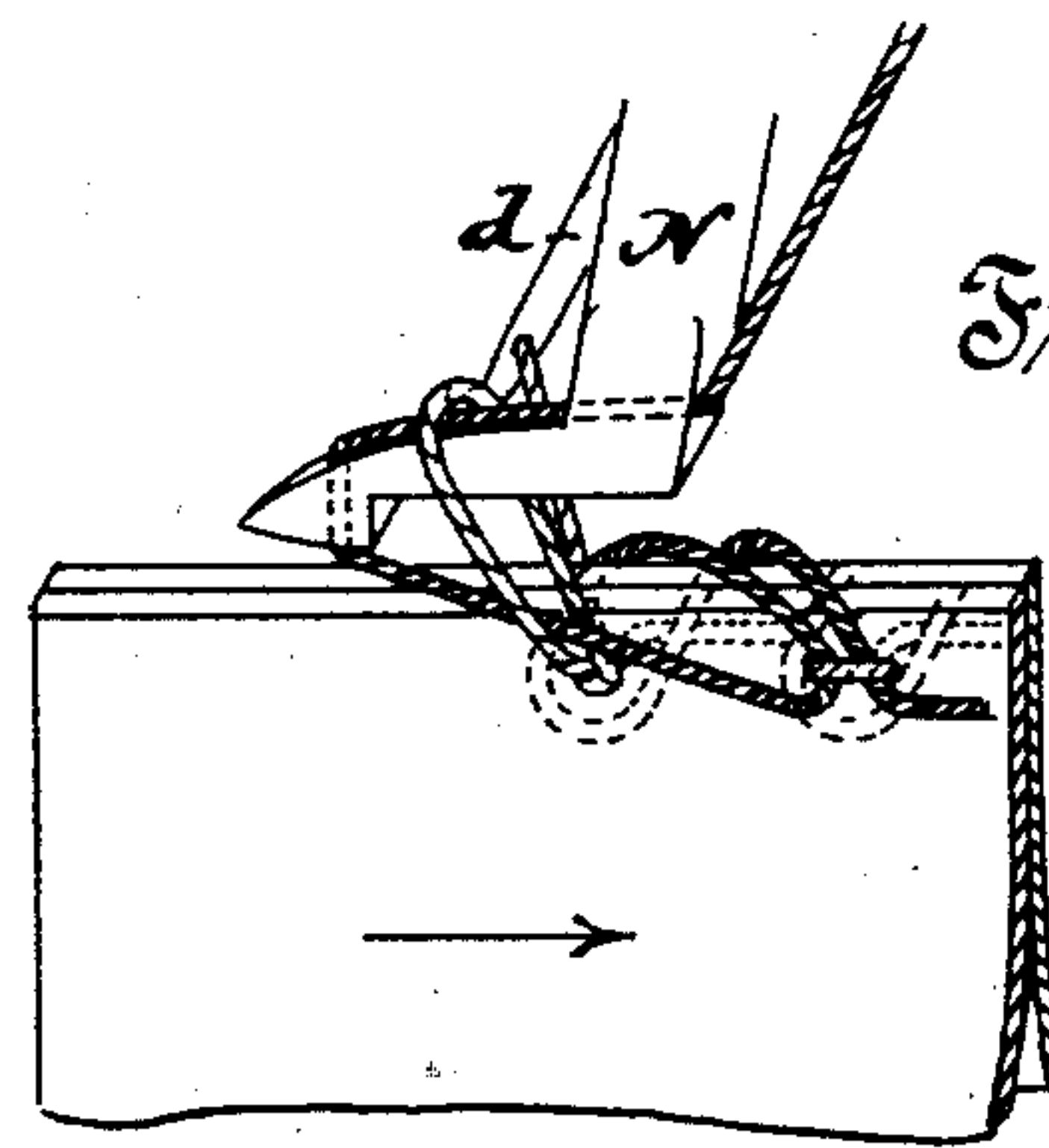


Fig. 14.

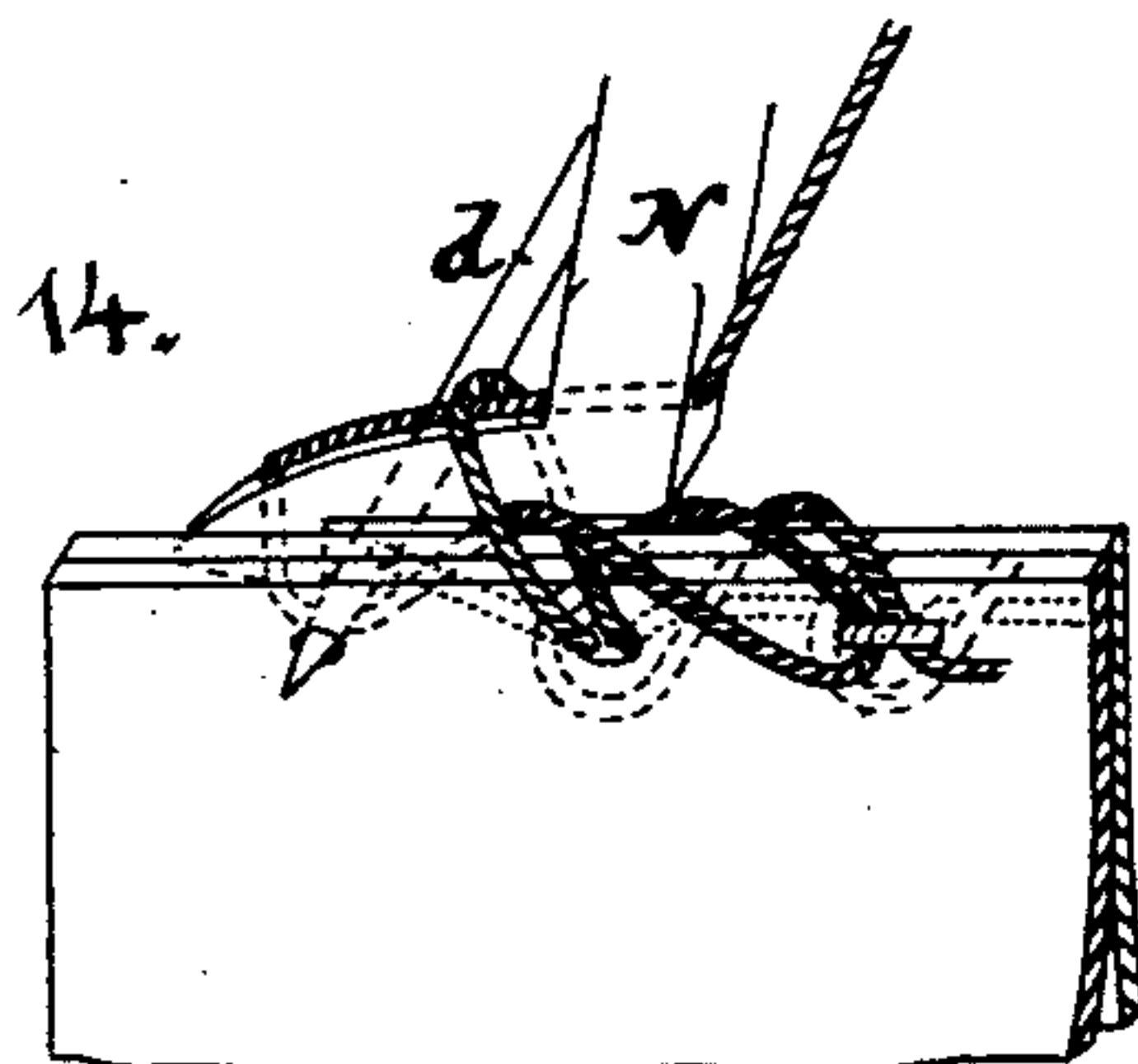
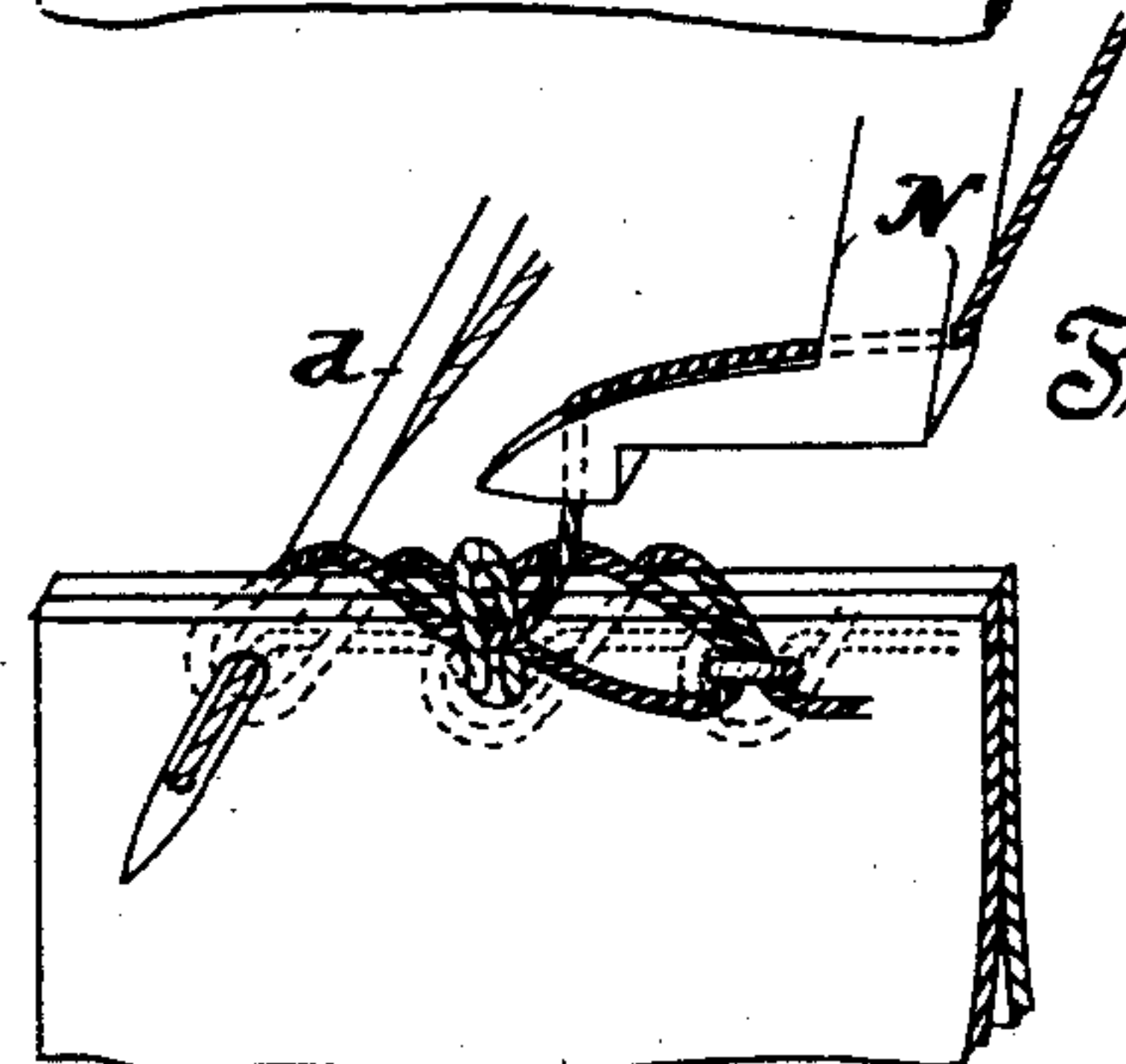


Fig. 15.



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# UNITED STATES PATENT OFFICE.

JULIUS KÖHLER, OF LIMBACH, GERMANY.

## MACHINE FOR SEWING LOOPED FABRICS.

SPECIFICATION forming part of Letters Patent No. 520,209, dated May 22, 1894.

Application filed September 9, 1890. Serial No. 364,406. (No model.) Patented in Germany November 9, 1888, No. 48,294; in France December 11, 1888, No. 194,692; in England January 12, 1889, No. 592, and September 17, 1889, No. 14,602, and in Spain January 20, 1891, No. 11,575.

*To all whom it may concern:*

Be it known that I, JULIUS KÖHLER, a subject of the Emperor of Germany, residing at Limbach, in the German Empire, have invented certain new and useful Improvements in Machines for Sewing Looped Fabrics, (for which Letters Patent have been obtained in Germany, No. 48,294, dated November 9, 1888; in England, No. 592, dated January 12, 1889, and No. 14,602, dated September 17, 1889; in France, No. 194,692, dated December 11, 1888, and No. 194,692, dated December 11, 1889, (certificate of addition,) and in Spain, No. 11,575, dated January 20, 1891,) of which the following is a specification.

There are at present employed machines for connecting together pieces of knitted or like fabrics formed of uniform meshes, in such manner that the needle passes through each mesh of the edges to be connected. The seam connecting the edges of the goods is consequently formed of a species of "chain" stitches or loops and it is a well-known fact, that this kind of seam labors under the disadvantage that it is thicker on one side than on the other. But a further point deserving of consideration is that the goods it is required thus to stitch or knit together may greatly vary in the size of and the distances between their meshes, so that the distance between the opening needles must vary according to the fineness or texture of the material. In the usual circular knitting machines the removal or exchange of the ring carrying the mesh-opening needles is not feasible so that a series of different machines are required for stitching together goods of various degrees of fineness.

The object of this invention is to stitch together pieces of knitted material and taking in each succeeding mesh by means of an overcast seam formed of one or two threads and so to arrange the machine that it is adapted to stitch together fabrics of different grades or widths of meshes.

In the accompanying drawings:—Figure 1 is a vertical longitudinal section of this improved circular sewing machine. Fig. 2 is a plan thereof with the top plate or cover removed and Figs. 3 to 5 are detail views. Fig.

6 is a vertical longitudinal section of the machine provided with a flat row or comb of impaling pins. Fig. 7 is a plan view of the parts shown in Fig. 6, the cover-plate being removed. Figs. 8 to 11 are detail perspective views illustrating the manner of forming an overcast seam with one thread. Figs. 12 to 15 are like views illustrating the manner of forming an overcast seam with two threads.

Upon the bed plate A Fig. 1, of the machine is erected a hollow upright post B within which a shaft D<sup>3</sup> is adapted freely to turn. To the upper end of the shaft is secured the disk or plate D while a toothed wheel E is secured on the lower end thereof. The wheel E (Figs. 1 and 5) gears with the pinion E' loosely mounted upon a fixed pin F and retained thereon by a screw H. The long nave or boss of this pinion E' is fitted for the reception of the ratchet wheel G with the teeth of which engages the pawl G' which is connected at G<sup>3</sup> to the two-armed lever J J' fulcrumed at J<sup>2</sup>. To enable both the pinion E' and through it the needle ring to be set for rotating any desired distance (according to the fineness of the work) a number of ratchet wheels each different in size though of a uniform pitch may be employed; in which case the pawl G' is uniformly actuated by a cam K. The counter-pawl G<sup>4</sup> (Fig. 5) prevents the ratchet wheel G from turning backwardly.

In the disk or plate D Fig. 1, is fitted the ring D<sup>2</sup> in which in practice may be formed grooves for the reception of the impaling pins D'. Each of these impaling pins D' as shown in Fig. 3, is provided at its bent part with a groove e adapted for the reception of the stitching needle d which is thus caused always to strike below the mesh or loop w. To facilitate the suspension of the goods on the impaling pins each of these pins is provided with a sharp point at its forward end so that each succeeding mesh can easily be passed on the corresponding pin. The stitching or sewing needle strikes the said impaling-pin from the rear and therefore never misses the groove e even should the impaling-pin be somewhat turned to one side.

As the mechanism by which circular motion is imparted to the impaling-pins is ar-



ranged underneath the plate A, it does not prevent the needle-ring  $D^2$  from being removed or replaced by one of finer or coarser pitch. This arrangement further prevents the goods from becoming soiled with oil. Along with the disk or plate D is turned the circular plate or tray C in which long pieces of fabric may be placed in readiness for the action of the machine.

The needle bar  $M'$  is shifted backward and forward by means of an eccentric M and a fork or yoke  $m$ , which, as seen in Fig. 1, straddles the eccentric M, the latter being mounted upon the shaft T having bearings in the housing  $m'$  of bed-plate A. The needle bar at its forward end carries the cranked or bent arm  $M^2$  Figs. 1 and 2, which is provided with a head  $M^3$  receiving a slide L whereby the needle may be raised or lowered as required.

The looper N is fitted for a three-fold movement:—(first,) a rising and falling motion (Fig. 1); (second,) a motion parallel to the geometrical plane (that is to say transversely of the needle); (third,) a motion in the direction of the needle bar  $M'$  and at right angles to the second motion just described. The first two movements are produced jointly by the eccentric periphery of the cam K, Figs. 1 and 2, and by the action of the groove formed in the periphery of the said cam, while the third movement is derived from the cam  $p'$  (Fig. 2) and the arm  $p$  formed upon the rocking shaft  $N^3$ .

The looper N is adjustable vertically within its holder  $N^4$  (Fig. 1) while the latter is itself capable of adjustment in the backward and forward direction within the piece  $N^6$  which latter again can be shifted sidewise and thus enables the looper to be adjusted precisely in accordance with the requirements of the work. The holder  $N^6$  is carried by a lever  $N'$  pivoted at  $N^5$  to the arm  $N^7$  on shaft  $N^3$ , said lever  $N'$  having a pin or roller  $n'$  engaging in a peripheral groove in cam K. The extreme rear end of the lever is engaged by a spring  $n$ , the opposite end of which is attached to the housing  $m'$ .

The thread supplied to the stitching needle is wound off the spool  $O'$ , Figs. 1 and 2, which is carried by the arm R to which are also attached the drag or tension device  $P'$  and the spring  $Q'$ . This arm R is detachably secured to the frame of the machine by means of a winged nut  $R'$ . From  $Q'$  the thread passes through the thread-guide or drag  $r'$  and thence to the needle  $d$ . The looper thread runs from the spool O through the drag or tension device  $P'$  to the spring Q and thence to the looper. When it is required to produce a seam with one thread only the looper is not provided with a thread.

Below the impaling-pins  $D'$  is arranged a spring-controlled disk S, Figs. 1 and 2, secured to the frame for keeping the work on the said needles during the operation of the machine. Said disk S is secured on the outer

end of an arm or sleeve  $S'$  which is loosely mounted upon a rod  $S^2$  secured to the housing  $m'$ , the said rod  $S^2$  having a pin  $s'$  which projects through a slot  $s^2$  in the sleeve  $S'$ . A coiled spring  $S^3$  encircles the sleeve and bears at its ends upon the enlargement  $S^4$  of the sleeve and the housing  $m'$ .

To remove the work as it is being stitched from the impaling pins, a stripper  $V^2$  (Figs. 2 and 4) is employed. Said stripper consists of an arm or lever which is pivoted at  $v$ , to the housing and terminates at its forward end in a yielding or spring portion  $v'$  which lies immediately below the impaling pins. The rear end  $V'$  of the stripper is provided with a pin or roller  $v^3$  which lies in the circumferential cam-groove  $v^4$  of a disk V.

In sewing machines in which the row or "comb" of impaling-pins is flat instead of being circular, the same mechanism as that used in connection with the needle-ring above described is employed whether the seam is to be produced with one or with two threads. The impaling-pin-ring is here replaced by an angle iron bar  $D^5$  (Figs. 6 and 7) upon which the impaling-pins  $D'$  are held down by means of guard plates. The pins are of the same shape as those of the arrangement described above. The angle iron  $D^5$  which may be of any suitable length rests with its guide-blocks  $D^4$  (Fig. 6) upon a long rail  $g$  whereon it may be reciprocated. In front of this rail  $g$  a wooden ledge or guard  $f$  is screwed which protects the fabric from damage by the oil. The carrier or bracket  $h$  connects this rail with the bed-plate.

The angle-iron or bar  $D^5$  (Fig. 6) is provided with ratchet teeth (Fig. 7) which are adapted to be engaged by the pawl  $a$ . This pawl is mounted upon a lever  $b$   $b'$  operated by a cam  $b^2$ . When the bar  $D^5$  is removed and another of finer or coarser pitch substituted for it the pawl  $a$  must also be replaced by another pawl. In machines adapted for this exchange of pins the cam  $b^2$  is preferably open and the backward play of the pawl produced by a spring  $a'$  may, in practice, be limited by any suitable means to suit the greater fineness of the fabric operated upon.

The operation of a sewing machine of this description whether fitted with a circular or flat mesh comb (or series of impaling pins) is as follows: "Overcast" seams with one thread are produced by means of the looper as in Figs. 8 to 11. The loop formed in the thread by the backward motion of the needle, Fig. 8, is entered by the looper and while the fabric is moved along the distance of one mesh, Fig. 9, this loop is passed over the edge and depressed sufficiently (Fig. 10) for the needle to enter it. The looper then withdraws from the loop, passes back over the edge of the fabric (Fig. 11) and resumes the position which will enable it to enter the next loop (Fig. 8). "Overcast" seams with two threads are produced by means of the form of looper illustrated in Figs. 12 to 15. Both



the needle and the looper in this case are provided each with a thread. The loop formed during the backward motion of the needle, Fig. 12, is entered by the looper on which it remains hooked or hung (Fig. 13) while the fabric proceeds on its course. The looper then descends on the rear of the fabric sufficiently low to enable its own thread to form a loop around the advancing needle Fig. 14. And it then again passes over the edge of the fabric and allows the loop formed by the thread of the needle to slip off. A seam thus formed cannot be destroyed or undone by pulling the thread.

In illustrating the manner in which the stitches are formed it has been assumed that the goods are fed from left to right, but it will of course be understood that the formation of the loops is practically the same if the fabric moves along in the opposite direction; except that the looper in this case should be arranged to act upon the left hand side of the needle.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a machine of the class described, a se-

ries of impaling pins, a revolving table or disk D, tray C, and disk S in combination with a stitch-forming mechanism to sew together the edges of the fabrics, as described.

2. In a machine of the class described, the combination with a revolving series of impaling pins, a reciprocating needle, a looper cooperating with said needle, as described, a rocking lever a cam for actuating it, a reciprocating pawl connected with the rocking lever and actuated by the latter, a ratchet-wheel with which said pawl engages a shaft upon which said ratchet wheel is mounted, a gear wheel mounted on the ratchet wheel shaft, a second gear wheel with which the other gear wheel meshes, and a vertical shaft upon which said second gear wheel is mounted, and a disk also mounted upon said vertical shaft and carrying the impaling pins, all arranged for cooperation, as and for the purpose specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JULIUS KÖHLER.

Witnesses:

R. E. JAHN,

WILLIAM R. MATTHES.