

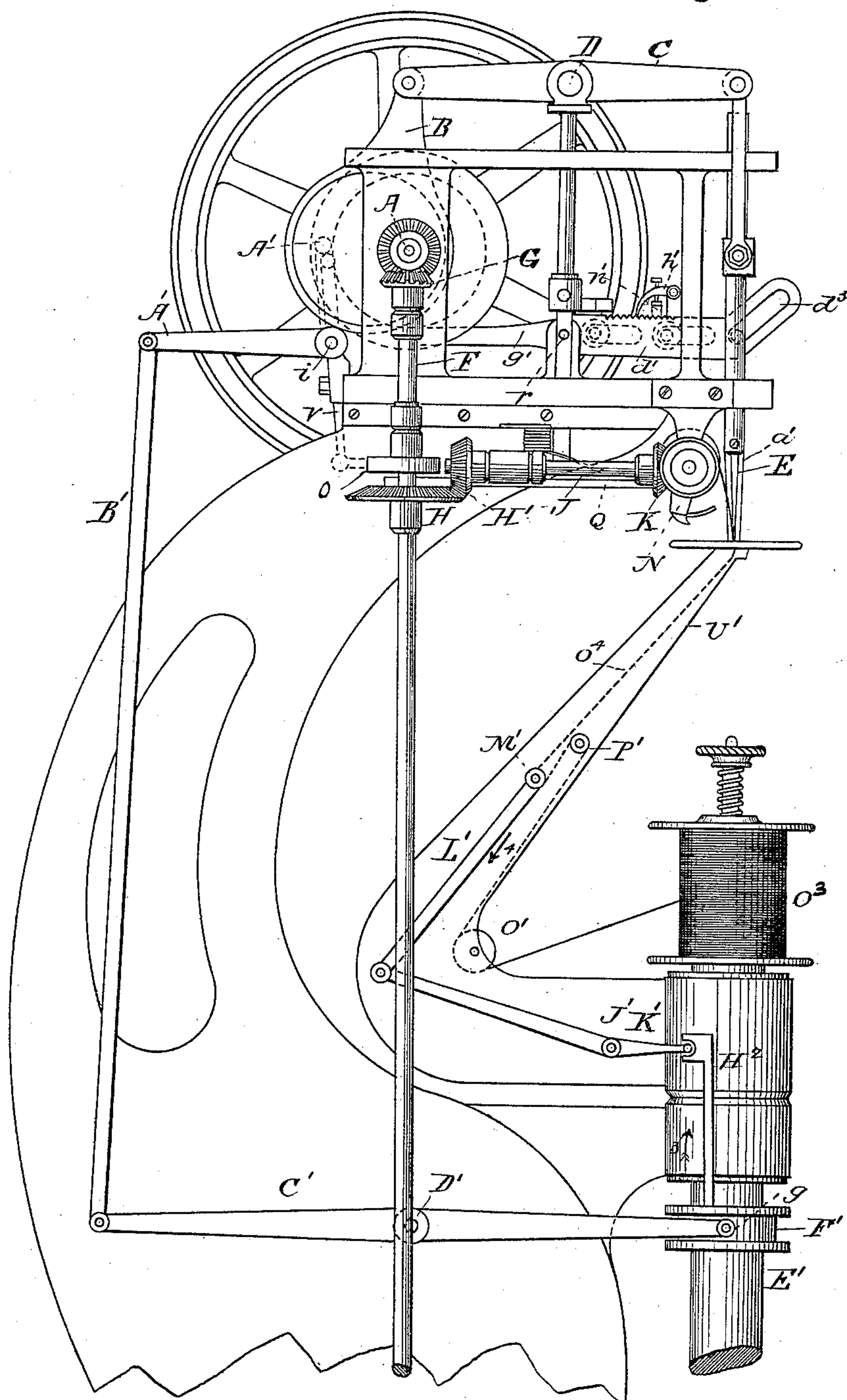
(No Model.)

4 Sheets—Sheet 1.

B. FISCHER.
SEWING MACHINE.

No. 408,227.

Patented Aug. 6, 1889.



WITNESSES.

J. B. Tomlinson.
Fred B. O'Neil.

Fig. 1.

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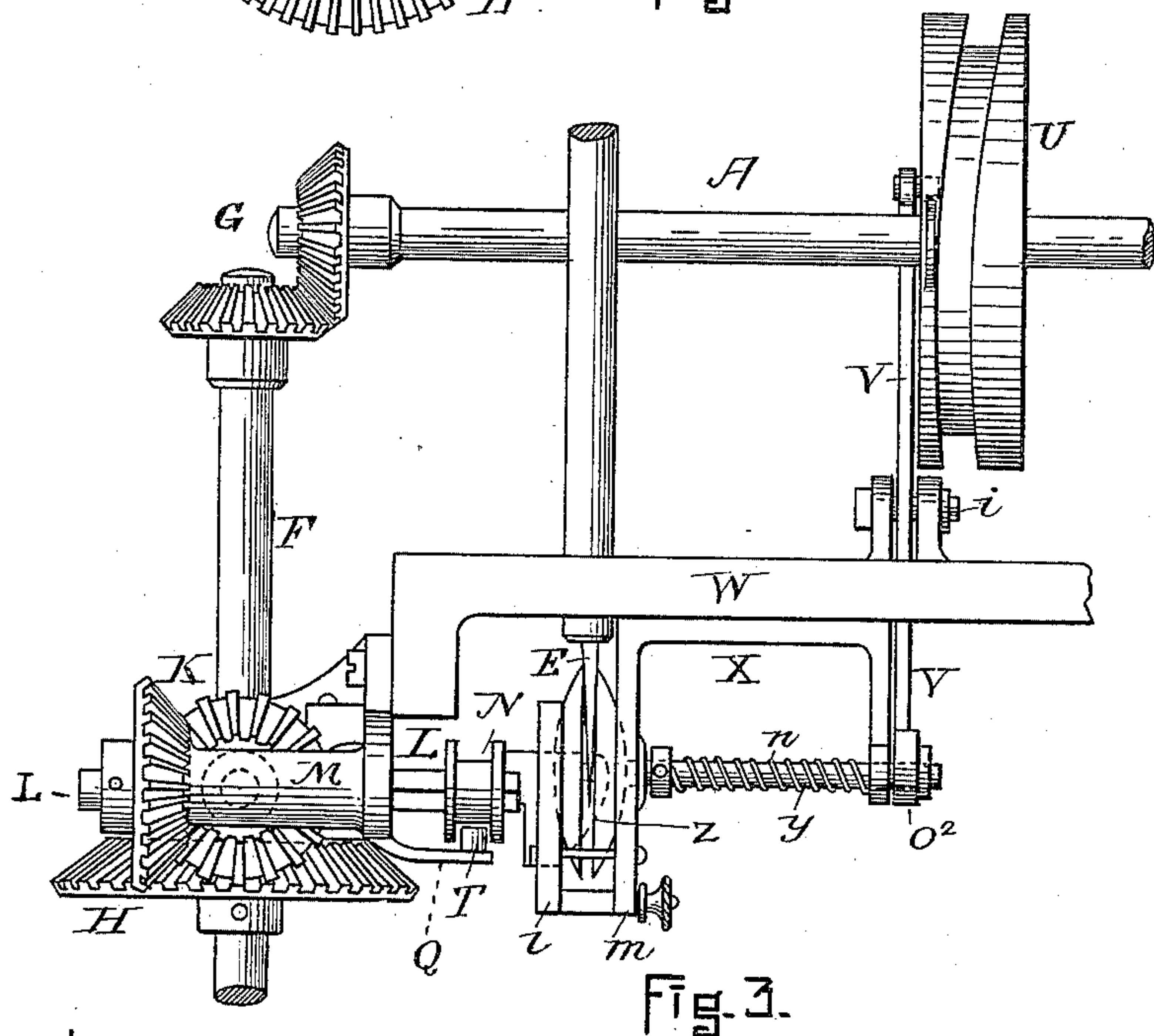
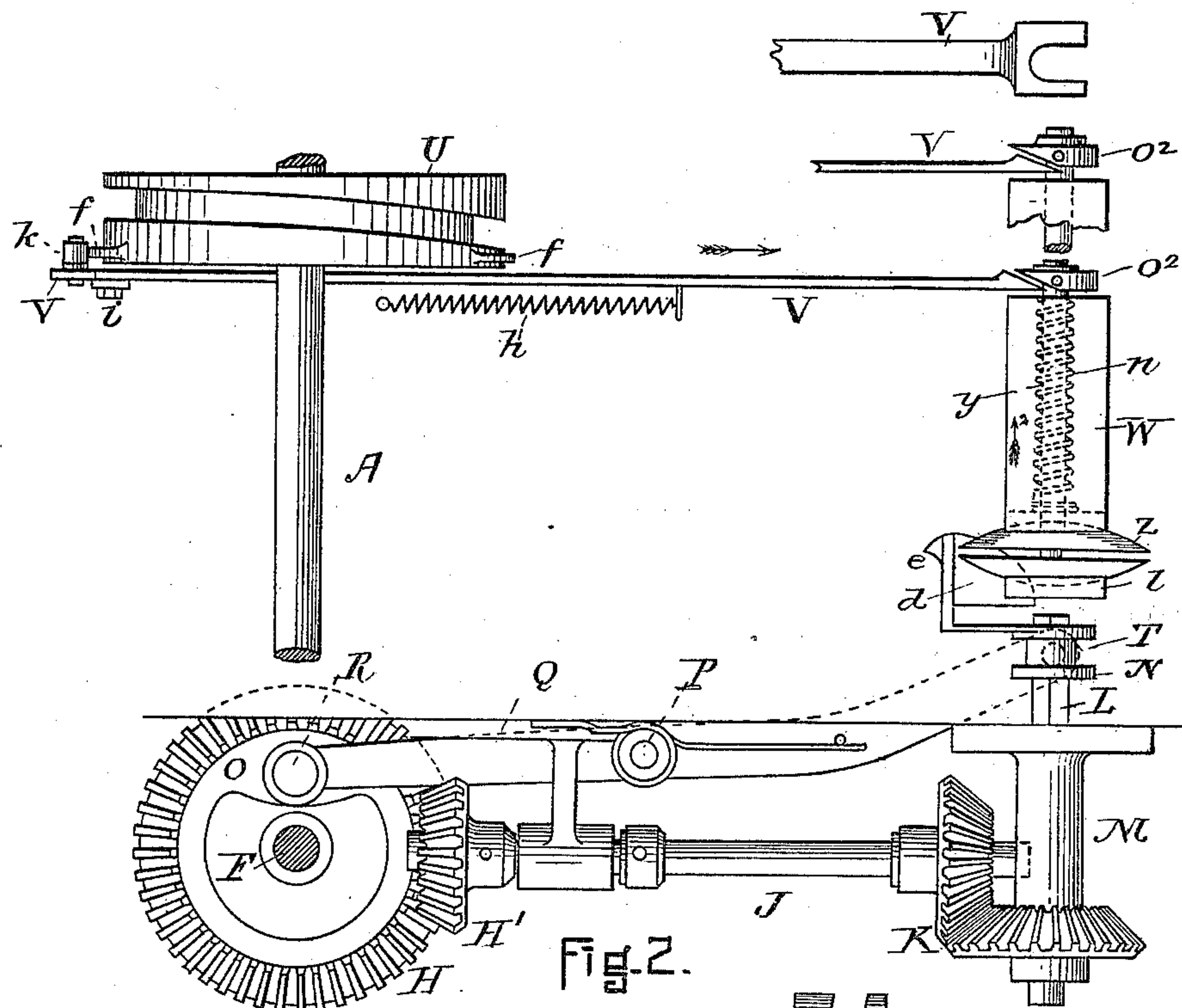
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4 Sheets—Sheet 2.

B. FISCHER.
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(No Model.)

4 Sheets—Sheet 3.

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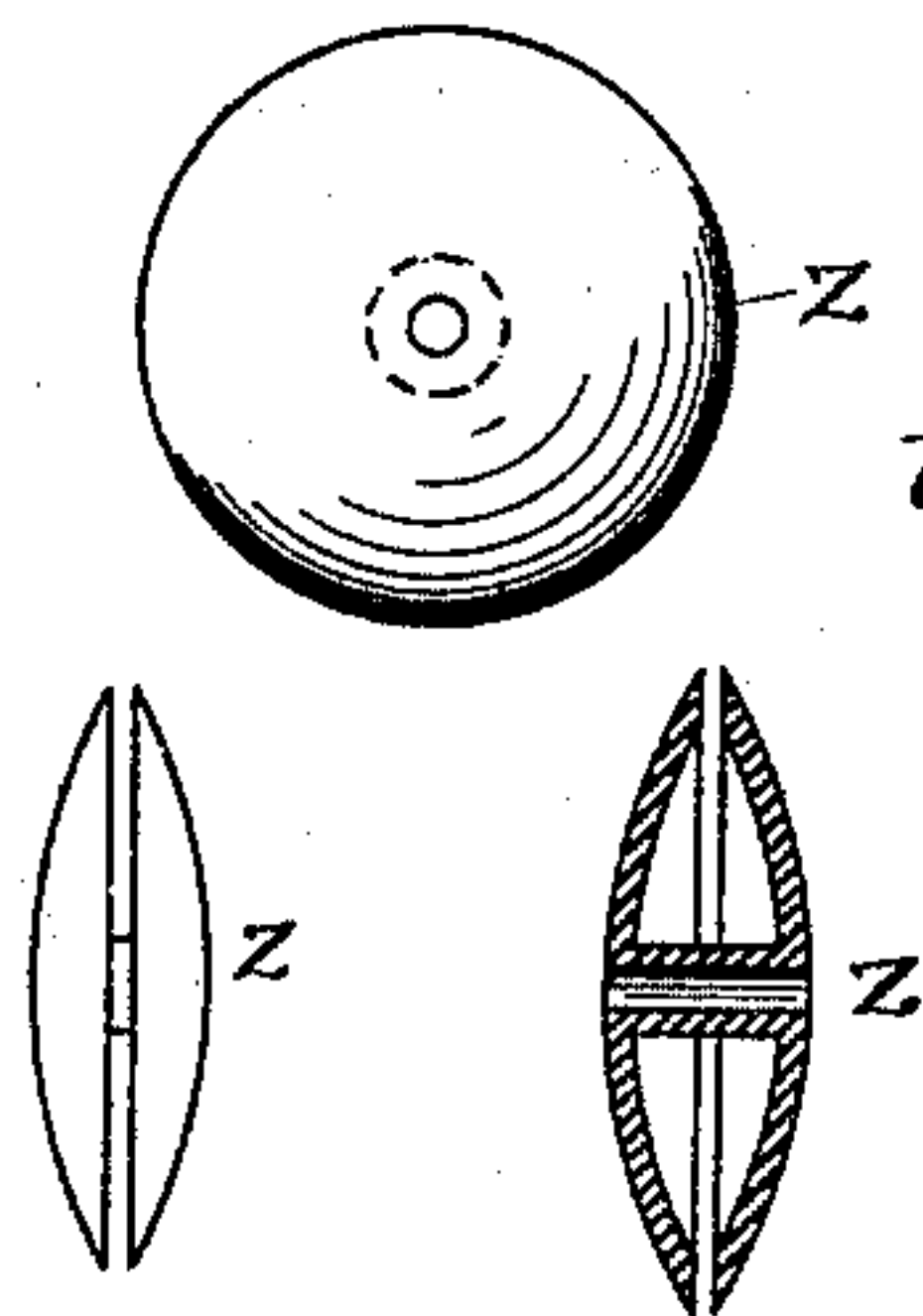


Fig. 4.

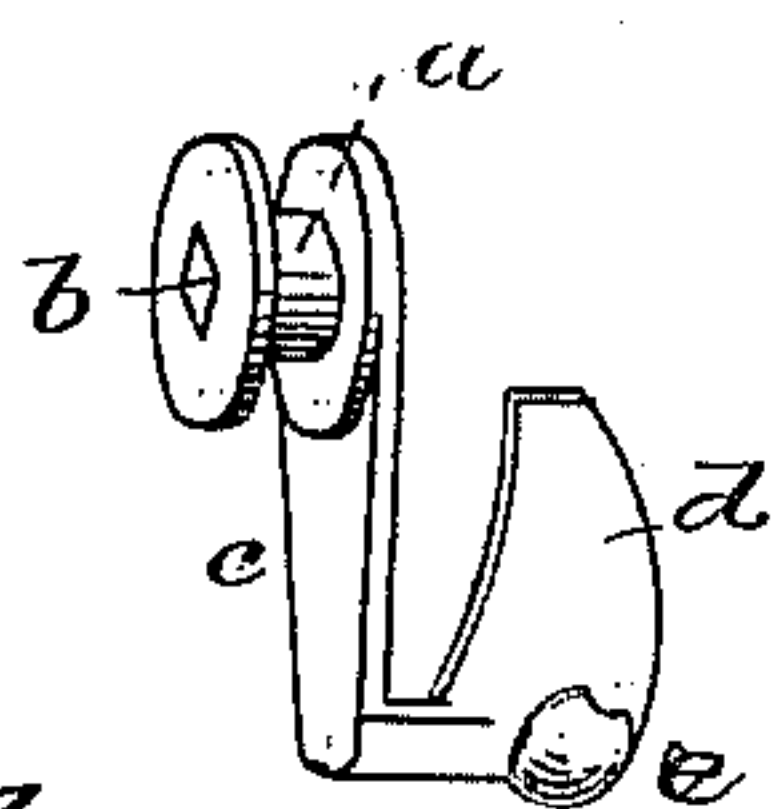


Fig. 5.

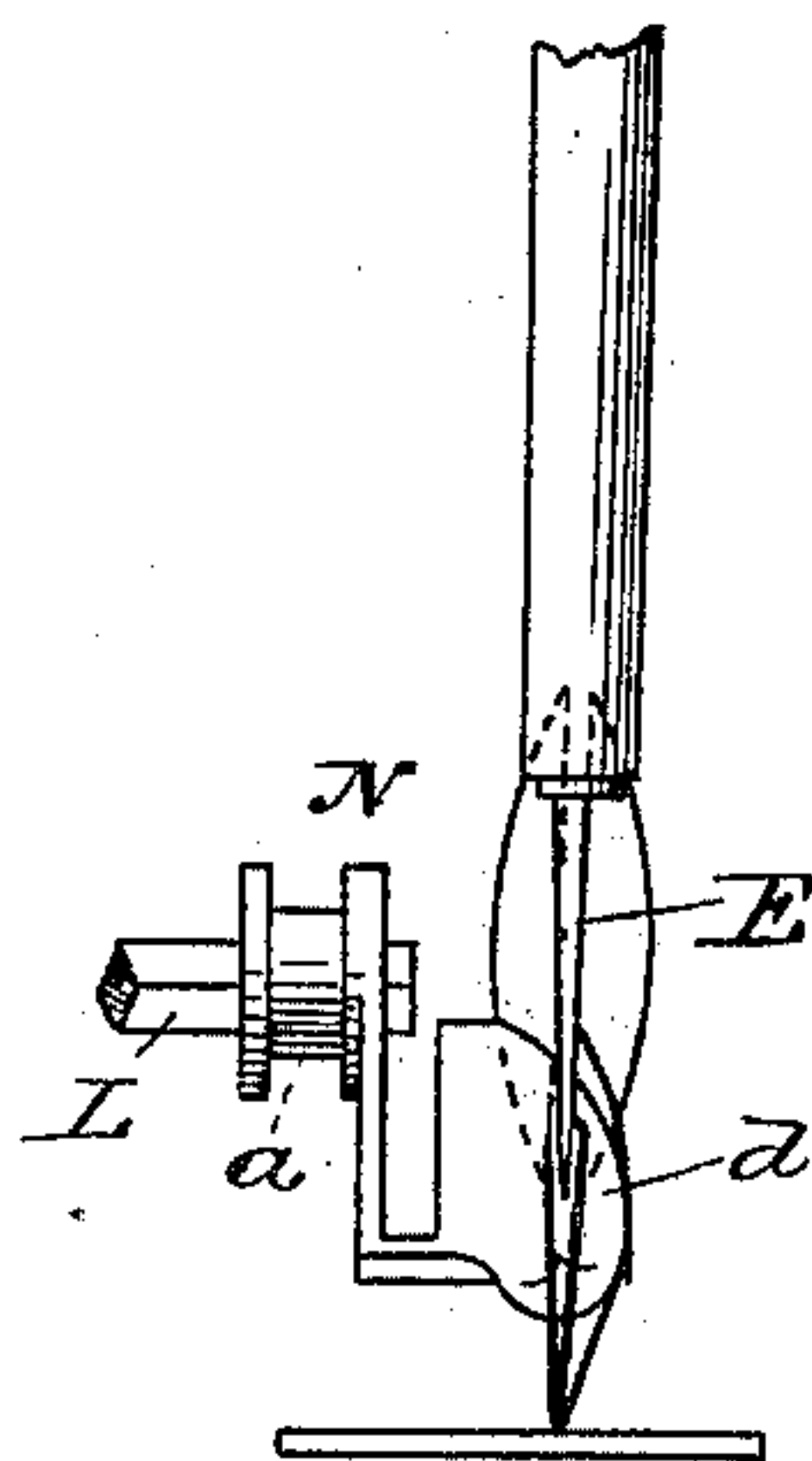
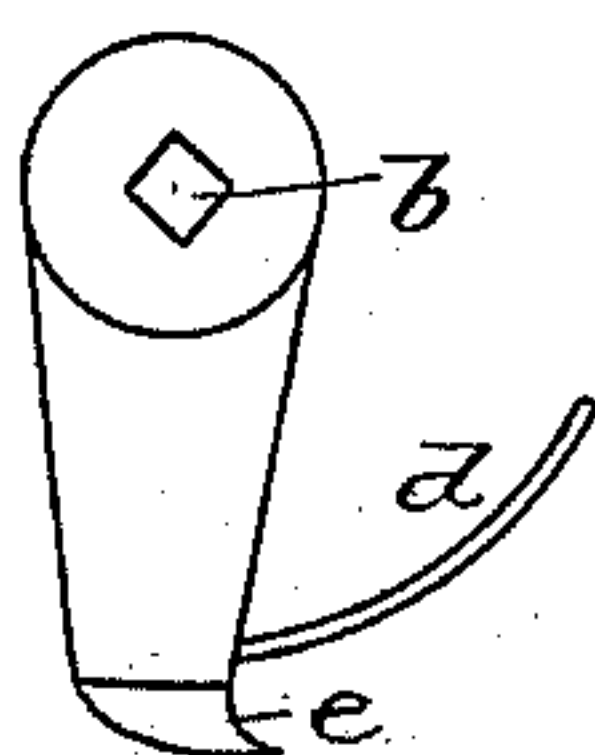


Fig. 6.

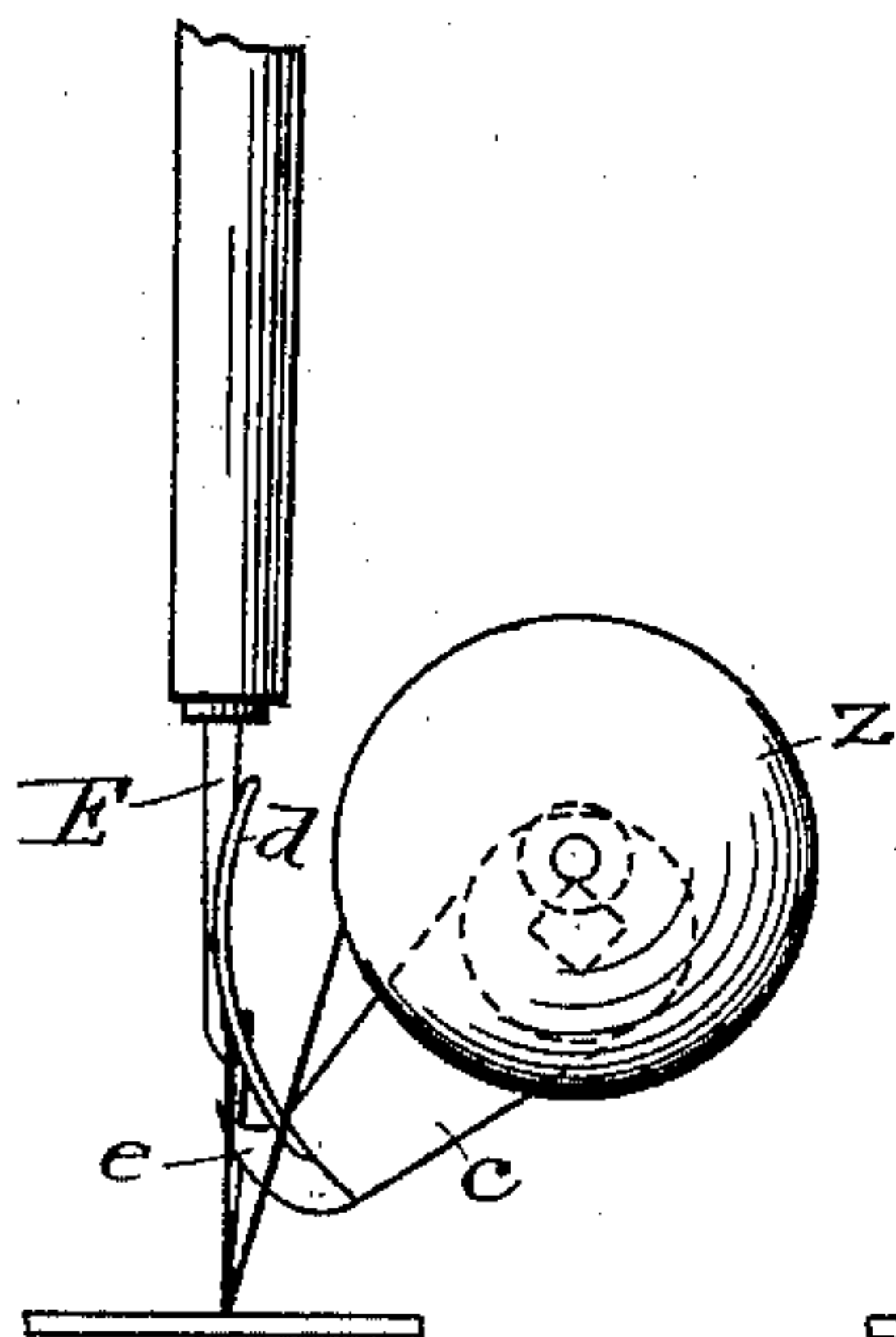


Fig. 7.

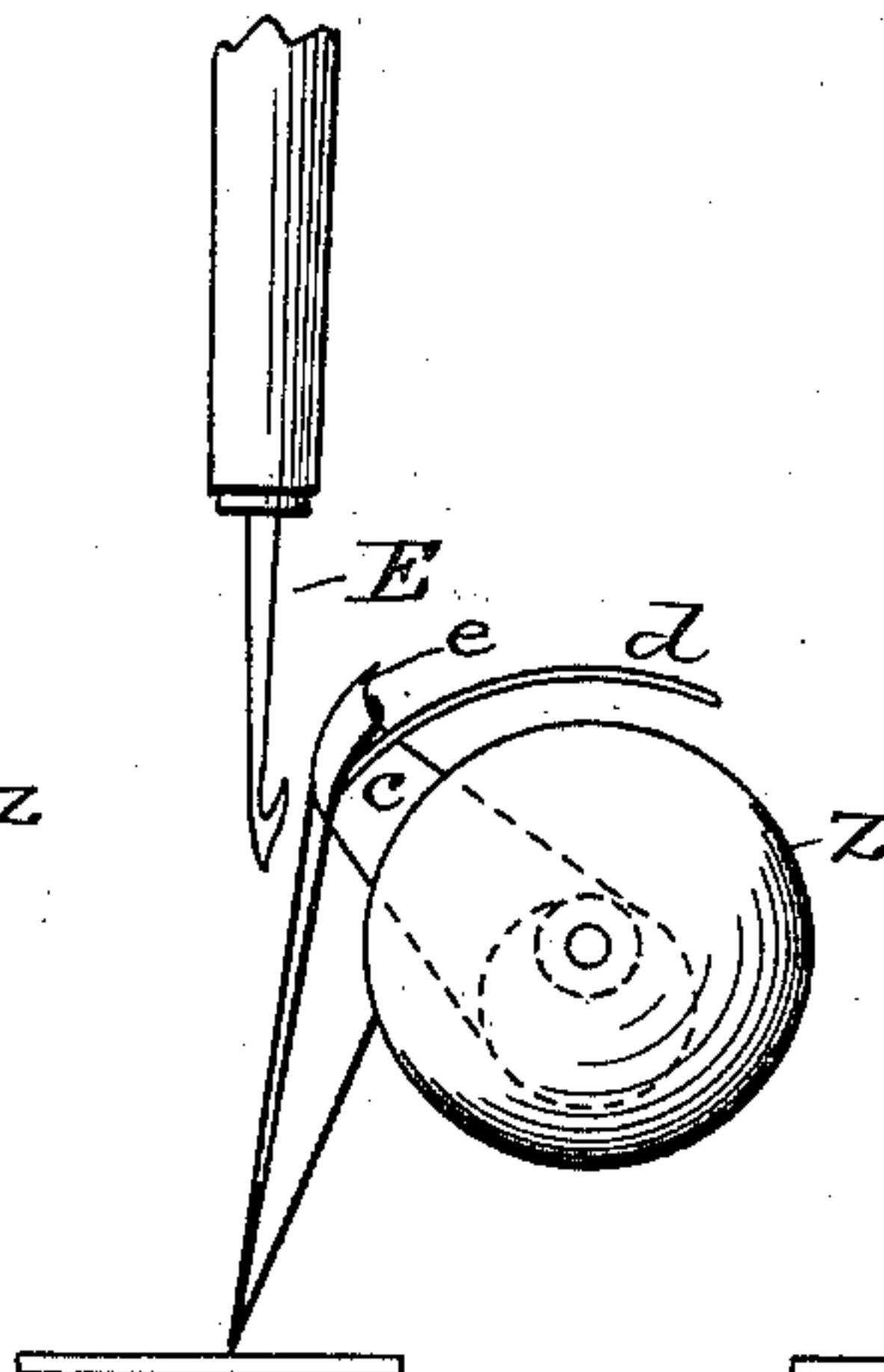


Fig. 8.

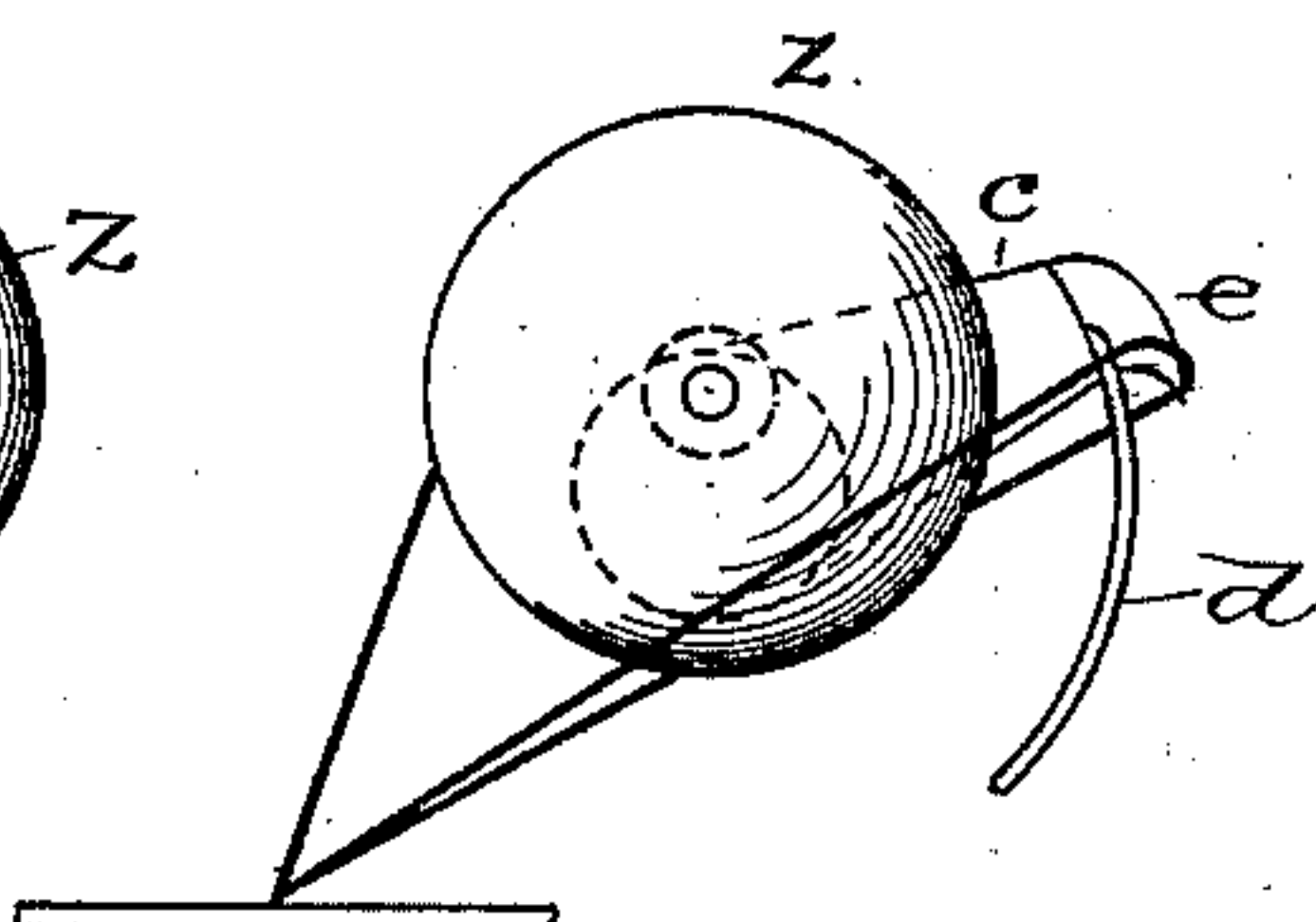


Fig. 9.

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(No Model.)

4 Sheets—Sheet 4.

B. FISCHER.
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No. 408,227.

Patented Aug. 6, 1889.

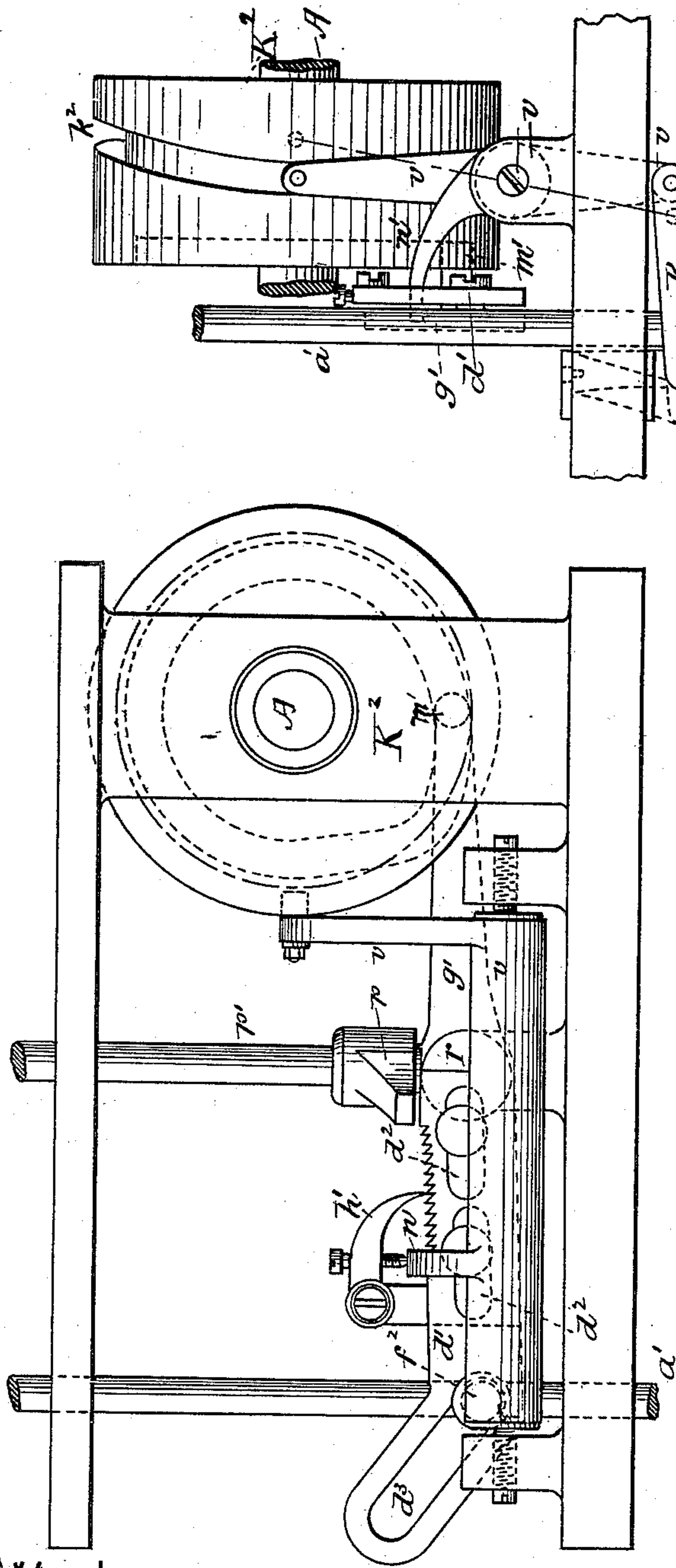


Fig. 10.

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Fig. 12.

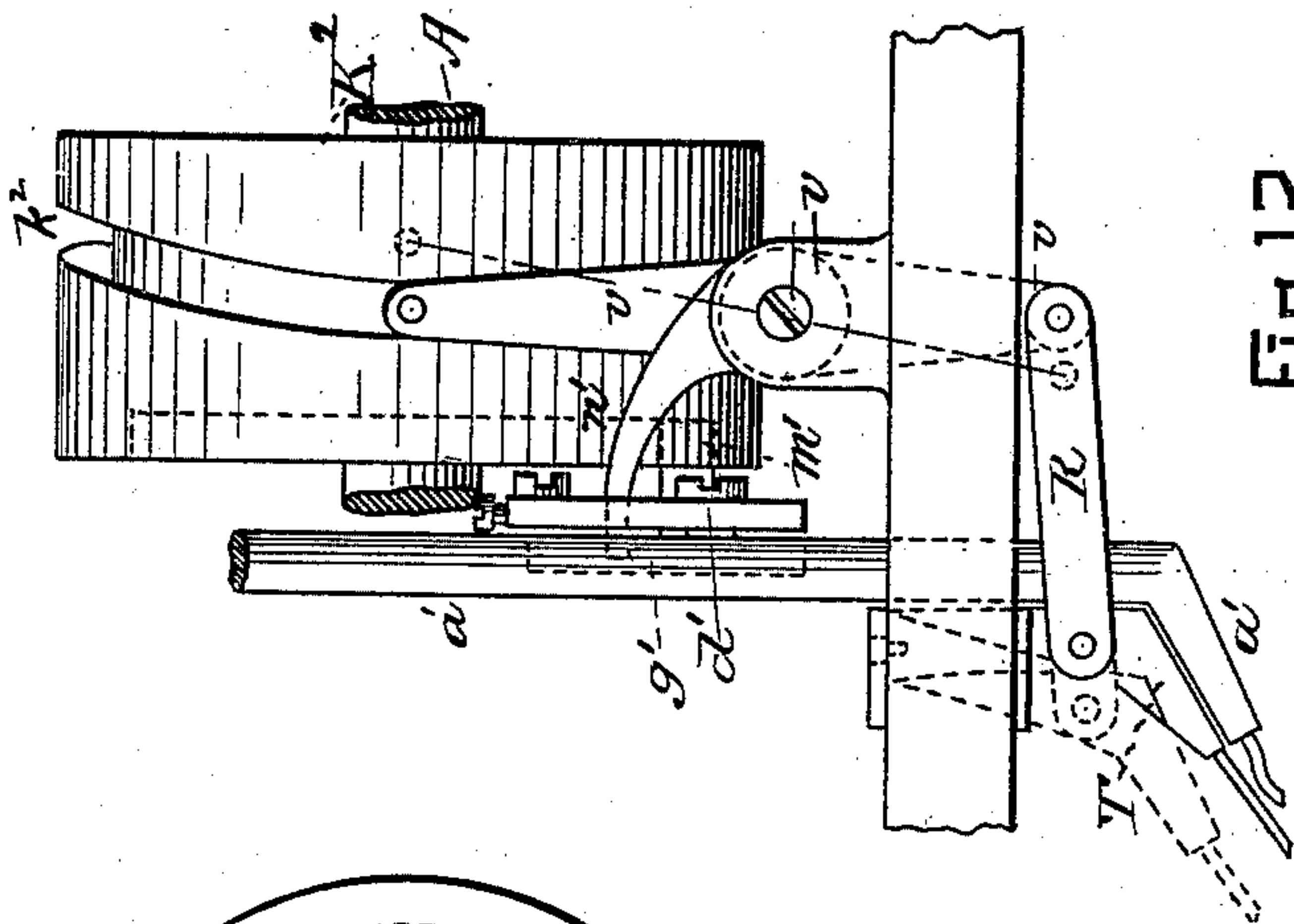
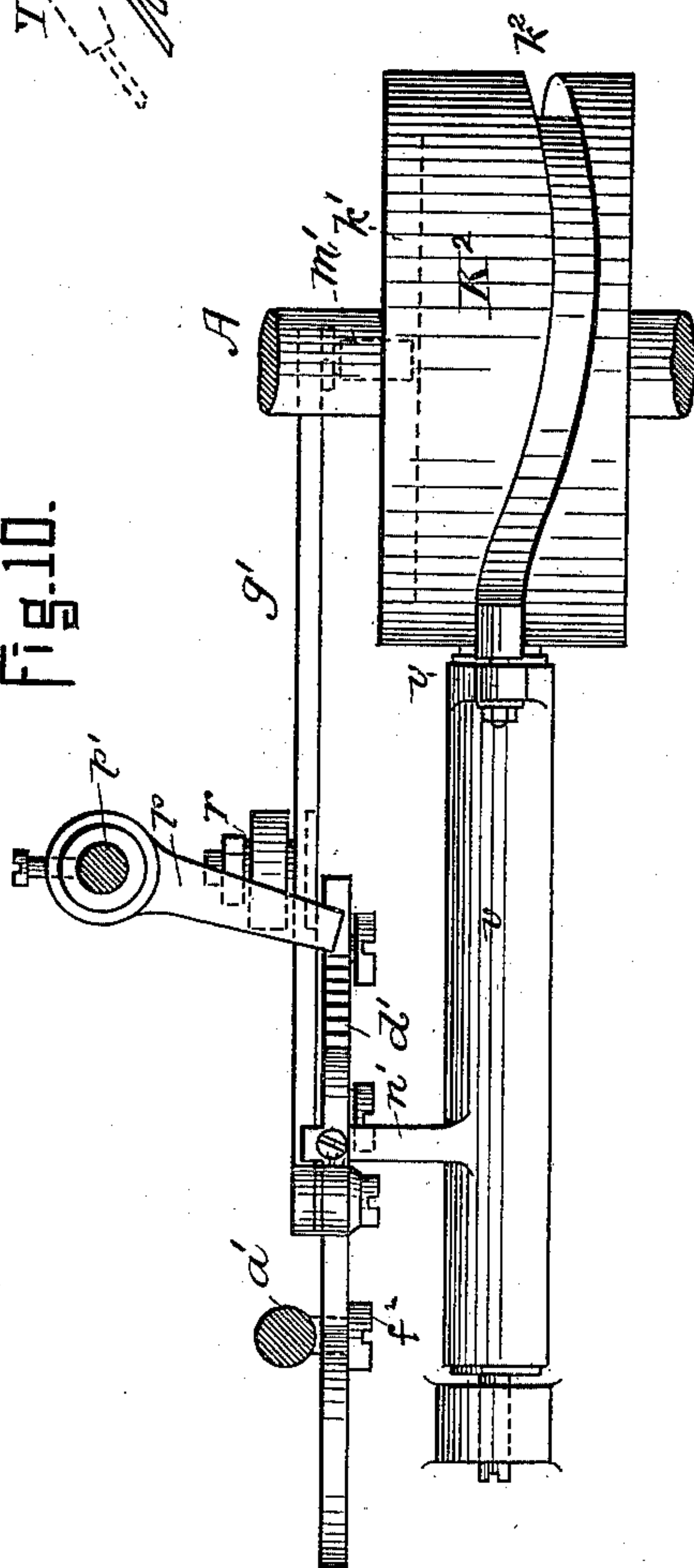


Fig. 11.



INVENTOR.

Bruno Fischer
by George D. G. Brown
Atty.

UNITED STATES PATENT OFFICE.

BENNO FISCHER, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR TO
C. S. LARRABEE, TRUSTEE, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,227, dated August 6, 1889.

Application filed September 26, 1887. Serial No. 250,640. (No model.) Patented in England March 16, 1887, No. 3,957, and in Germany October 27, 1887, No. 41,192.

To all whom it may concern:

Be it known that I, BENNO FISCHER, a subject of the Emperor of Germany, residing at Frankfort-on-the-Main, Germany, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification.

My improvements relate to machines for sewing the soles of boots or shoes to their uppers; but they are not restricted solely to such machines, and can be applied to other sewing-machines.

They consist of mechanism for forming a lock-stitch, consisting substantially of a spool, in combination with a rotary loop-carrier, said spool being stationary and of such a form and so held as to allow the passage of the loop over it when it is momentarily released by the pins holding it, so that the loop will pass completely over it, in order to be drawn into the material, when the spool is immediately gripped and held fast again.

Figure 1 is a side view of a sole-sewing machine with my improvements. Figs. 2 to 9 show the mechanism for forming a lock-stitch. Fig. 2 shows a view from above; Fig. 3, a front view, and Figs. 4 to 9 the parts in detail. Figs. 10 to 12 show the feed mechanism in side and front views.

In order to make the explanation of my invention clearer, I have drawn Figs. 2 to 12 double the scale of Fig. 1.

The machine is driven by means of the shaft A, on one end of which is a balance-wheel, to be turned by hand or power. The movement of the needle E is communicated from the main shaft A through the eccentric B and the lever C, mounted on fulcrum D.

Mechanism for forming a lock-stitch, (Figs. 1 to 9).—The vertical shaft F is geared at G to main shaft A, and by it set in motion, which motion it communicates, through the gear H H', shaft J, and gear K, to the shaft L. The beveled gear H on the shaft F is in ratio to its connecting gear-wheel on shaft J as two to one, so that one revolution of the main shaft A and shaft F will give the shaft J double the number. The shaft L, after passing through the bearing H, is squared, Figs. 2 and 3. Mounted on

this squared end and movable on it is the loop-carrier N. A horizontal movement or play of looper N on squared shaft L is given from the eccentric O, fixed on shaft F, by means of the lever Q, which has its fulcrum at P. On one end of said lever is the cam-roll R in cam O. The other end is provided also with a cam-roll running in the slotted part of loop-carrier N at T, so that the loop-carrier N at the same time that it is caused to rotate twice by the aforesaid gears H H' J K is moved once from left to right, or inversely, by means of cam O communicating through lever Q.

The construction of the loop-carrier itself is shown in Fig. 5, enlarged perspective and side views.

In the middle of the slotted sleeve *a* is seen the square opening, which fits on the squared end of shaft L. This sleeve is extended in the arm *c*, the shovel-formed extension *d*, and its projection *e*, which I call the "loop-catcher."

On the main shaft A is mounted the eccentric U, with the boss *f*. (See Figs. 2 and 3.) By means of spring *h* the roller *k* in bell-crank V, which is fulcrumed at *i*, is so pressed that by the rotary movement of the eccentric U the boss *f* comes under roll *k*, thus moving the lever in the direction of the arrow, Fig. 2. Between the jaws *lm* of the hanger or bracket X, which is attached to plate W, lies the spool Z, as seen in Fig. 3, touching the jaws only at its outside center. This spool (shown in Fig. 4 in front view, side view, and vertical section) is composed of two circular metal plates, ovaled on outside from the center to periphery and connected together by a center pin, on which the waxed thread is wound. These two plates do not touch each other, but are placed sufficiently apart to enable the winding of a considerable length of thread on the center pin between them.

On the bolt *y*, which has its bearings in hanger X, is the spring *n*, with collar. This spring presses the bolt *y* against the spool Z, so that the said spool is held fast between the bolt *y* on the one side and the jaw *l* of the hanger on the other side, so that it cannot move, the pressure of the spring regulating the action of said spool, so that it can give up

thread as required. On the other end of bolt y is the beveled piece O^2 , and contiguous to it is the beveled end of the bell-crank V , Fig. 2, which end is also forked to engage the bolt y . If the bell-crank V is moved in the direction of the arrow, Fig. 2, the forked end, being beveled, slides forward on the beveled piece O^2 and causes the bolt y to move to the right in the direction of the second arrow, thus releasing the pressure from spool Z and leaving it free.

The working of the whole mechanism is as follows: The work to be sewed having been put into the machine, the thread from the upper spool is drawn down to the material a little to the left, out of the way of the needle, and is held by the left thumb. The needle descends and draws up the loop from the under thread. The carrier catches this loop and carries it over the other spool, when the take-up mechanism described below draws in the loop, and thus makes the first stitch.

I will now describe the operation of sewing more in detail. After the hook-needle E has passed through the material and drawn up the under thread, forming a small loop, first comes the shovel-formed part d of N and presses the thread which leads from the spool to the work to one side, so that the catcher e of loop-carrier N can take the loop from the needle E , then carrying it with it in its rotary movement, Fig. 8, over the spool Z , which is momentarily released by movement of bolt y to allow free passage of the loop over it. The carrier N moves to the left, thus disengaging its catcher from the loop, thus allowing it to be drawn in by means of the drawing-in arrangement and form a stitch. The moment that the loop passes the spool Z the forked and beveled end of bell-crank V moves backward, disengaging the bolt y , so that spring n can operate and press said bolt against spool Z and hold it fast. The loop having passed, the spool is drawn in by the following mechanism, Fig. 1.

On the shaft A is an eccentric in combination with the levers $A' B' C'$. The first is a bell-crank with fulcrum at i . The lever C' has its fulcrum at D , and is provided with cam-roller g , which runs in slotted sleeve F' , movable on the vertical shaft E' , and communicating movement through vertical stand H^2 , and which connects with lever K' , fulcrumed at J' , and then by connecting-rod L' , on the upper end of which is thread-roller M' . The thread is carried from spool O^3 and at O' around the roller at angle of the horn, and then up over the roller P' in U' , thence down and around the roller M' , and thence upward to the material. If the eccentric on main shaft A , communicating through the levers $A' B' C'$, moves the sleeve F' and the upright H^2 in the direction of the arrow 3, then the bell-crank, connecting-rod, and roller M' will have given to it a downward movement, as shown by arrow 4, and producing the desired tension on the thread O^4 and drawing in the loop.

In regard to the rotary movement of the

loop-carrier, it is to be remarked that during one upward movement of the needle E the loop-carrier, in consequence of the ratio of the above-described gears $H H'$, will make two revolutions, which allows time, first, to carry the loop over the spool Z ; secondly, through its horizontal movement to press the thread to one side and release the loop from the hook E , further to make room for the needle to descend and form the next stitch. Besides this, the quicker movement of the loop-carrier allows a slower movement of the needle and thereby more exact operation of the whole mechanism.

The feed mechanism (shown in Figs. 1, 10, 11, and 12) consists, essentially, of the guide-bar g' , the pawl h' , the rack d' , with slots $d^2 d^3$, the finger n' , connected with the lever v , the cam p , acting upon the rack, the presser-foot a' , and the feed-dog T . The motion to these parts is given by the cam K^2 upon the driving-shaft A , which cam is provided with lateral curves k' and circumferential inclined path k^2 , with the former of which the roller m' on guide-bar g' is engaged. The rack d' is connected with the guide-bar g' , pivoted at r by means of the slots d^2 and slide-bolts therein, in such a manner as to enable a movement of these parts relatively to each other in the longitudinal direction of the bar g' . As soon as g' , by reason of its connection with the groove k' of the cam K^2 , is pressed downward by the roller m' on the one side, the other part beyond the fulcrum r will, with the rack d' , move upward, whereby the presser a' , which is connected with the rack d' by the sliding bolt f^2 in the slot d^3 of the said rack, is likewise raised. The part of the rack d' which forms the loop d^3 is bent to an angle, as illustrated in Figs. 1 and 10. When material of different thickness is to be sewed, the presser-foot a' will move upward or downward in correspondence therewith, according as such thick or thin material comes under the same, this motion being transmitted to the rack d' , for the reason that the presser-foot a' is connected by the sliding bolt f^2 and the loop d^3 with the aforesaid rack d' , which is thus displaced laterally on the guide-bar g' . With thick material the sliding bolt f^2 will therefore be higher in the loop d^3 than with thinner material. The pawl h' , fixed to the guide-bar g' , which by engaging with the rack d' prevents the automatic displacement of the latter, is disengaged by the finger n' , secured to the shaft v , as soon as the feed-dog has fed the material the length of a stitch, so that the presser-foot again comes onto the material and occupies a position determined by the thickness of the same. The feed-dog T is pushed forward and backward by the lever v , which is connected at one end with said feed-dog by the link R , while the other end engages with the cam K^2 in groove k^2 .

In order to prevent the mechanism from being lifted while the needle is on its upward

throw, the finger *p* on rod *p'* bears upon the rack *d'*.

What I claim as my invention is—

1. In a sewing-machine, mechanism for making a lock-stitch, consisting of a hook-needle, and mechanism, substantially as described, whereby it is reciprocated vertically, the spool *O*³, located below the work-table, and means, substantially as described, whereby its thread is held in the upward path of the needle-hook, the spool *Z*, located between the jaws *l m*, in close proximity to the path of the needle above the work-table, the bolt *y*, one end of which bears against the spool *Z*, and means, substantially as described, whereby said bolt is reciprocated intermittently, and the loop-carrier *N*, located upon the squared shaft *L* and capable of a sliding movement thereon, mechanism, substantially as described, for rotating the shaft, the lever *Q*, pivotally connected to the loop-carrier *N*, and mechanism, substantially as described, whereby said lever is oscillated, all as set forth.

2. In a sewing-machine, mechanism for making and tightening a lock-stitch, consisting of a hook-needle, and mechanism, substantially as described, whereby it is reciprocated vertically, the spool *O*³, located below the work-table, and means, substantially as described, whereby its thread is held in the upward path of the needle-hook, a take-up mechanism, whereby said thread is tightened after the stitch is made, said mechanism consisting of the rollers *O' P'*, connecting-rod *L'*, roller *M*, the lever *K'*, sleeve *F'*, mounted on shaft *E*, and mechanism, substantially as described, whereby said sleeve is reciprocated, in combination with the spool *Z*, located between the jaws *l m*, in close proximity to the path of the needle above the work-table, the bolt *y*, one end of which

bears against the spool *Z*, and means, substantially as described, whereby said bolt is reciprocated intermittently, a loop-carrier *N*, and mechanism, substantially as described, whereby said loop-carrier is rotated across the line of said thread, and mechanism whereby it is reciprocated during its rotation toward and from the spool *Z*, all substantially as and for the purposes set forth.

3. In a sewing-machine, mechanism for making a lock-stitch, consisting of a hook-needle, and mechanism, substantially as described, whereby it is reciprocated vertically, the spool *O*³, located below the work-table, and means, substantially as described, whereby its thread is held in the upward path of the needle-hook, the spool *Z*, the loop-carrier *N*, located upon the squared shaft *L* and capable of a sliding movement thereon, mechanism, substantially as described, for rotating the shaft, the lever *Q*, pivotally connected to the loop-carrier *N*, and mechanism, substantially as described, whereby said lever is oscillated, said spool *Z* being located between the jaws *l m* and in combination with the clamping-bolt *y*, with its spring, the bracket *X*, attached to the frame of the machine, the beveled piece *O*², located upon the farther end of the bolt *y*, the bell-crank *V*, provided with the beveled end located in contact with the beveled piece *O*², and means, substantially as described, whereby the beveled end of said bell-crank is reciprocated, as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENNO FISCHER.

Witnesses:

THOMAS STAUDACHER,
WILHELM KREBS.