

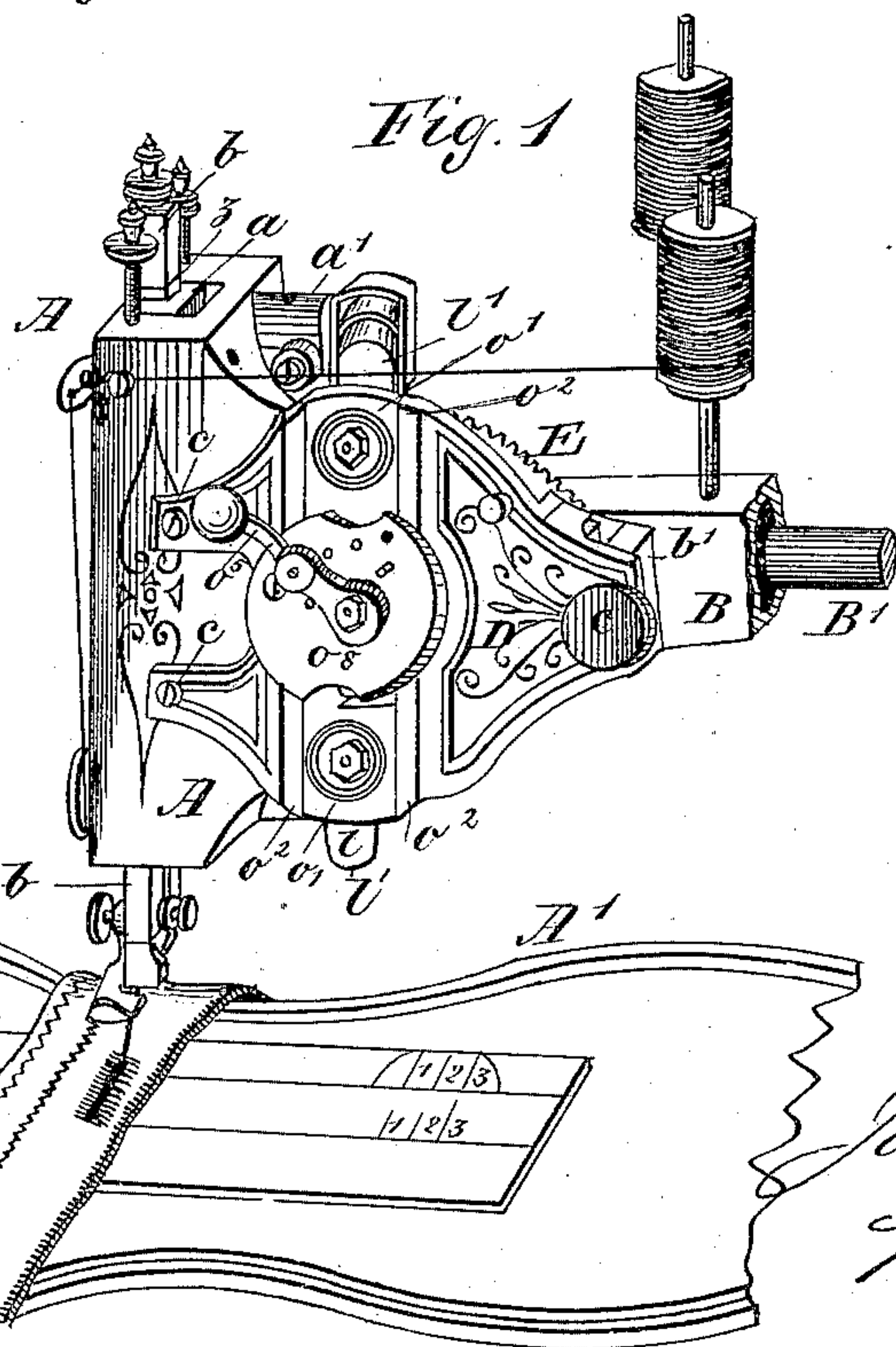
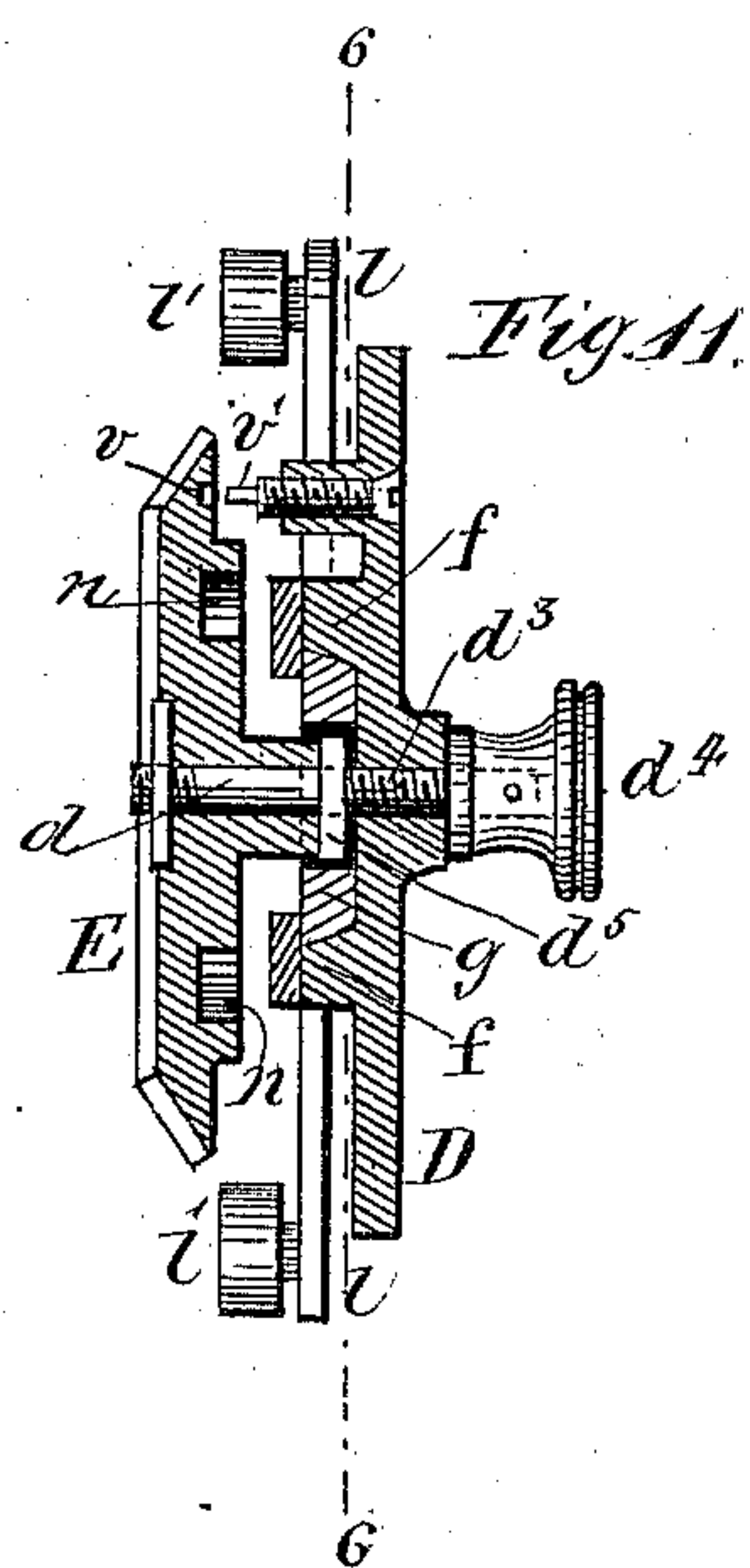
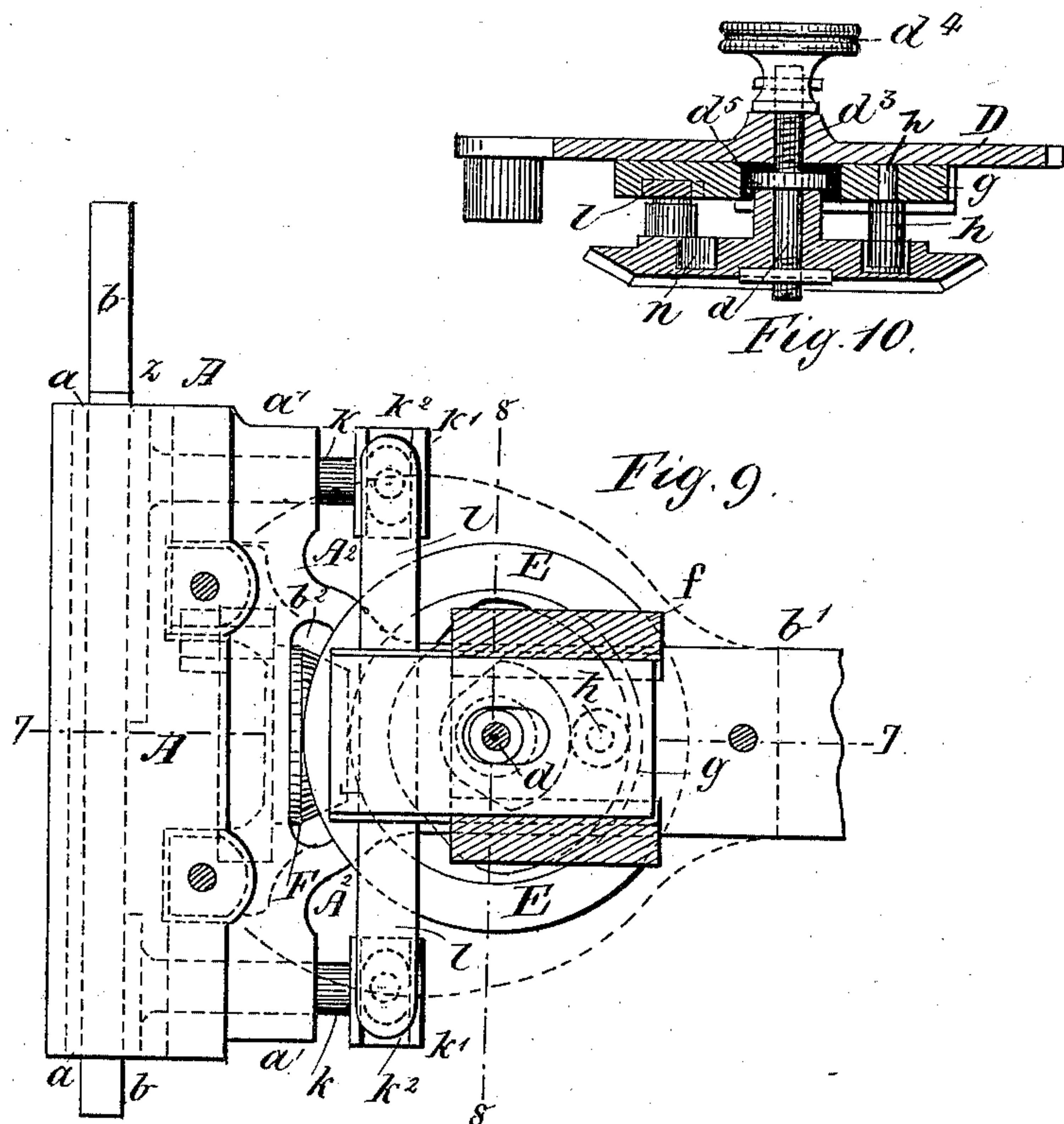
(No Model.)

3 Sheets—Sheet 1.

J. KAYSER.
SEWING MACHINE.

No. 312,862.

Patented Feb. 24, 1885.



Witnesses
W. E. Boulter
S. Edmonds

Inventor
John Kayser
J. H. Orr
Attorney

(No Model.)

3 Sheets—Sheet 2.

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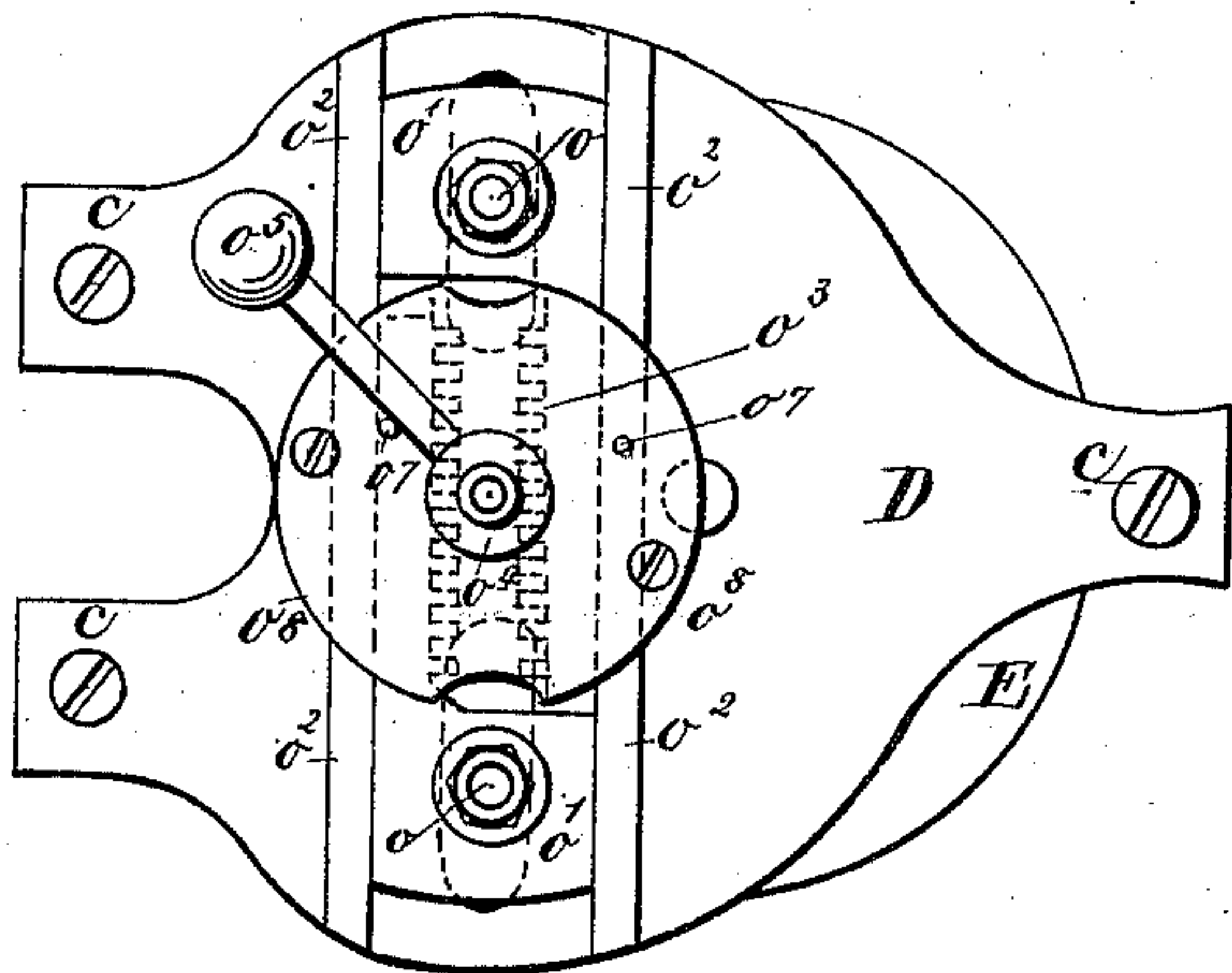


Fig. 4.

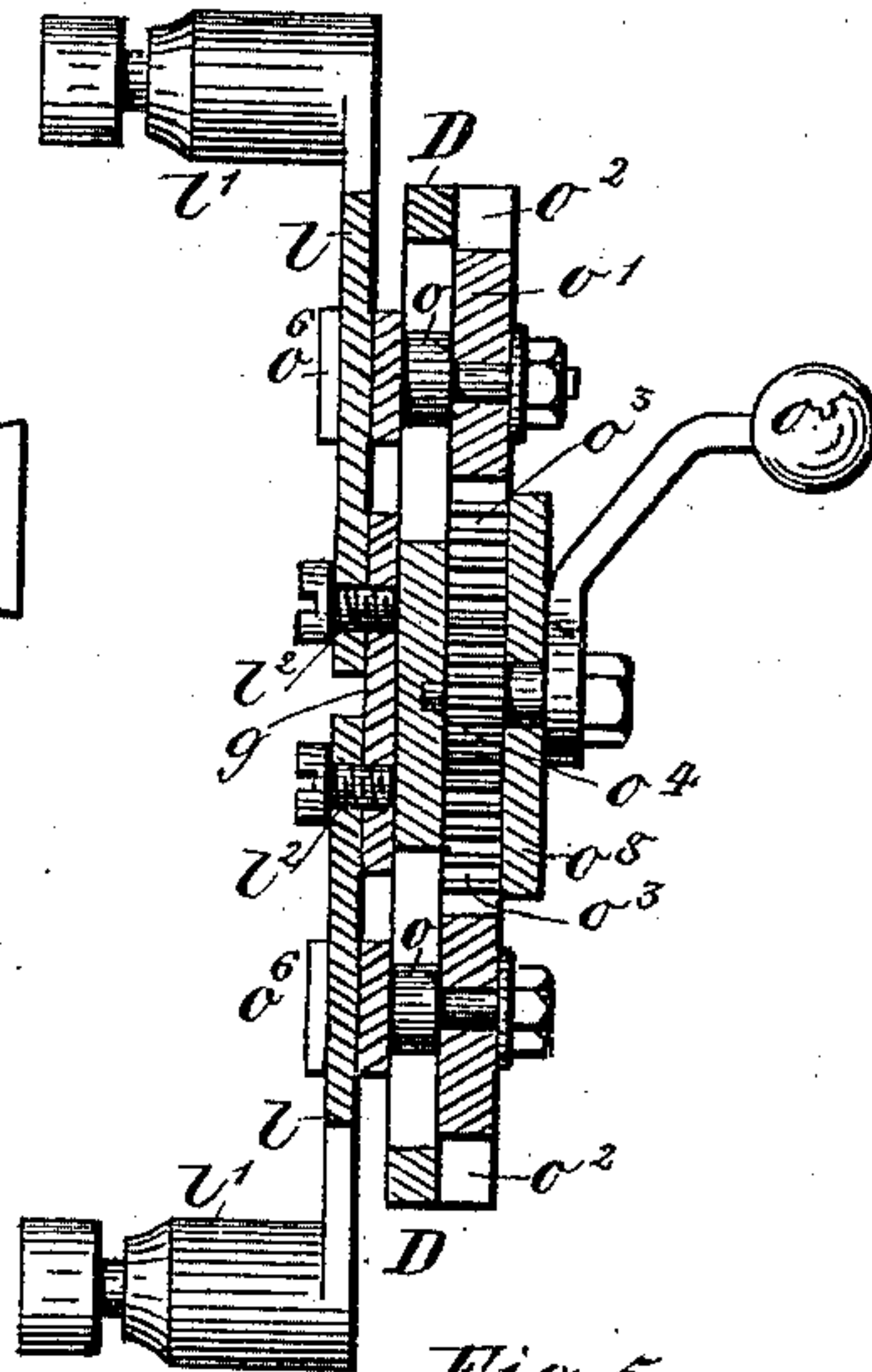


Fig. 5.

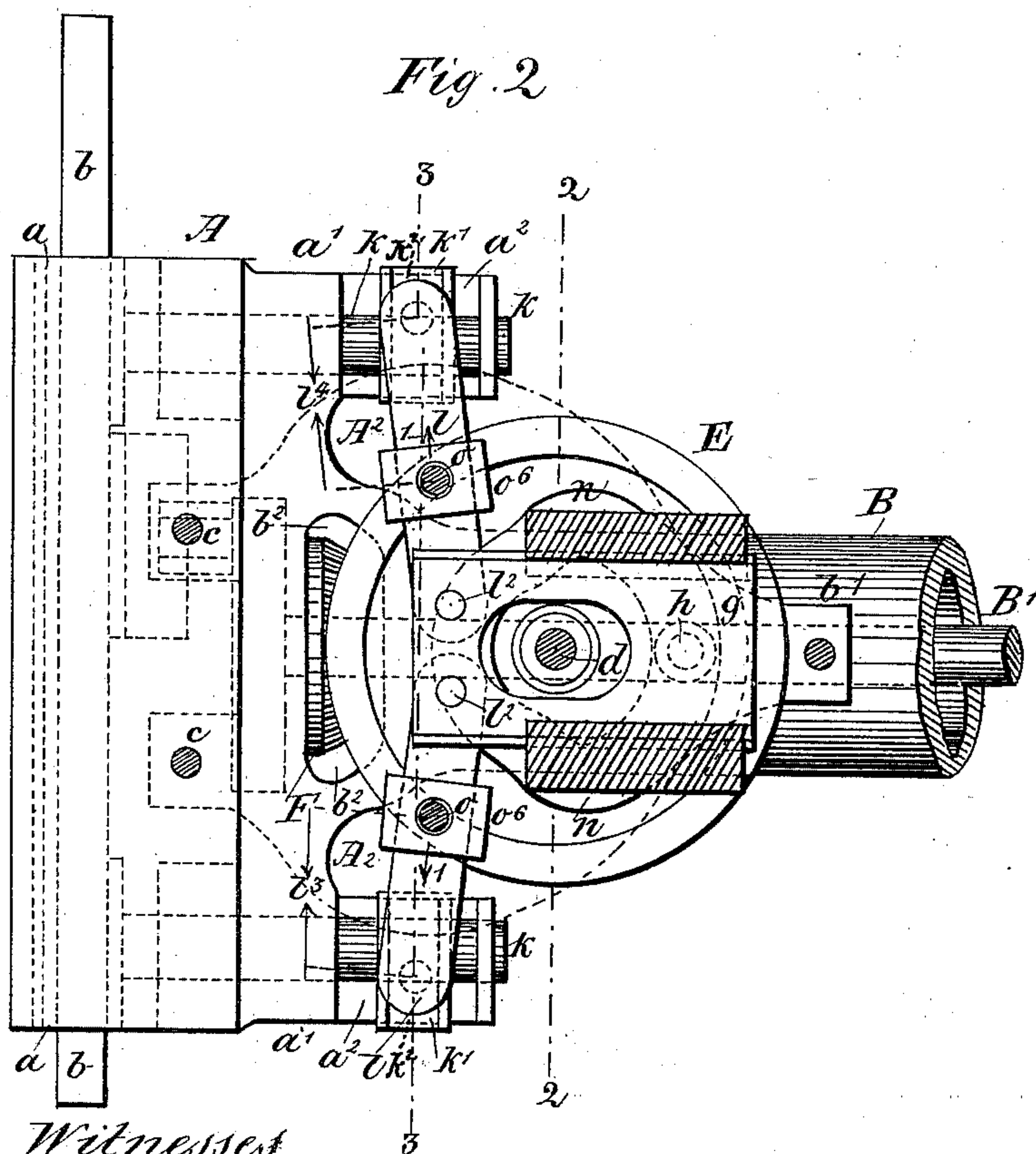


Fig. 2.

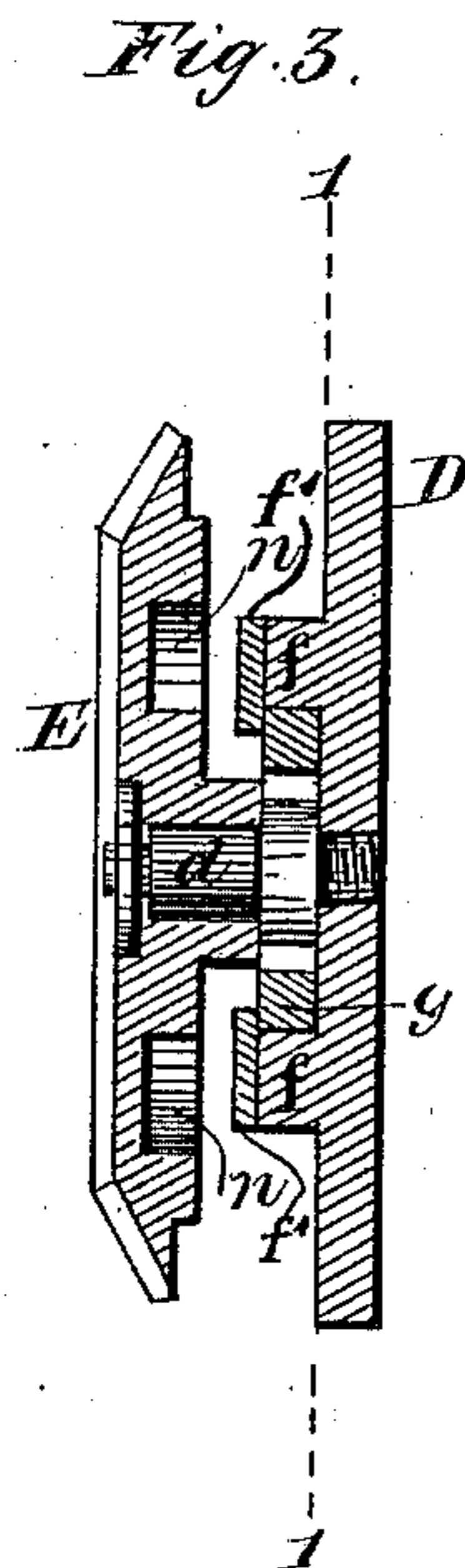


Fig. 3.

Witnesses
W. E. Boulter
S. Edmonds

Inventor
John Kayser
per Henry Orth
his atty.

UNITED STATES PATENT OFFICE.

JOHN KAYSER, OF KAISERSLAUTERN, BAVARIA, GERMANY.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 312,862, dated February 24, 1885.

Application filed May 9, 1884. (No model.) Patented in Germany March 16, 1882, No. 20,879 and July 25, 1882, No. 22,071; in Austria-Hungary May 25, 1882, No. 11,799 and No. 21,009, and in England August 12, 1882, No. 3,860, and April 2, 1884, No. 5,847.

To all whom it may concern:

Be it known that I, JOHN KAYSER, a subject of the King of Bavaria, residing at Kaiserslautern, in the Empire of Germany, have
5 invented certain and useful Improvements in Sewing-Machines, (for which I have obtained Letters Patent in Germany, No. 20,879, dated March 16, 1882, and No. 22,071, dated July 25, 1882; in Great Britain, No. 3,860, dated August
10 12, 1882, and No. 5,847, dated April 2, 1884; and Austria-Hungary, No. 11,799 and No. 21,009, dated May 25, 1882; and have also applied for Letters Patent in Austria-Hungary, under date of April 7, 1884;) and I do hereby
15 declare the following to be a full, clear, and exact description of the invention.

My invention relates to a novel attachment for sewing-machines, whereby a horizontal reciprocating motion is imparted to the vertically-reciprocating needle-bar from the horizontal shaft from which the said needle-bar is operated, to adapt the machine as an over-seaming-machine and for zigzag and other
20 ornamental stitching.

The invention consists, more particularly, in a compact and convenient arrangement of devices for horizontally reciprocating the needle-bar of a sewing-machine, through the medium of a needle-bar guide arranged in or on the
30 overhanging head of the machine, for varying the amplitude of the reciprocation of said needle-bar, and for throwing the devices into and out of operation at will, said devices being operated from the horizontal shaft above the
35 bed-plate, and supported from a plate detachably-connected with the overhanging arm and head of the machine.

The invention further consists in certain details of construction, all as hereinafter fully
40 described, and as shown in the accompanying drawings, in which—

Figure 1 is a perspective view of so much of a sewing-machine as will suffice for a general comprehension of my invention. Fig. 2
45 is a sectional elevation of the attachment on line 1 1 of Fig. 3. Fig. 3 is a transverse section on line 2 2 of Fig. 2. Fig. 4 is a front elevation of the attachment, the levers for reciprocating the needle-bar guide being omit-

ted. Fig. 5 is a transverse section on line 3 3
50 of Fig. 2. Fig. 6 is a sectional elevation on line 4 4 of Fig. 8 of the attachment, illustrating a modified arrangement of appliances for imparting the horizontal reciprocating movement to the needle-bar. Fig. 7 is an elevation thereof; Fig. 8, a section on line 5 5 of
55 Fig. 7, looking toward the head of the machine. Fig. 9 is a section taken on line 6 6 of Fig. 11, illustrating a further modification of the arrangement of the means for imparting
60 the horizontal reciprocating movement to the needle-bar. Fig. 10 is a section on line 7 7 of Fig. 9, and Fig. 11 is a section on line 8 8 of Fig. 9.

Like letters of reference indicate like parts
65 wherever such may occur in the above figures of drawings.

Referring to Fig. 1, A' indicates the bed-plate, to which is secured the usual hollow standard, having an overhanging horizontal
70 arm, B, that terminates in a head, A, which latter supports a needle-bar guide, a, adapted to reciprocate horizontally, and in which the needle-bar reciprocates vertically. A strip of fabric on the bed-plate A', under the needle-
75 bar, shows, at x, a partially-stitched button-hole, the needle in its reciprocating movement passing alternately along the edges of the fabric in the slit and into and through the fabric at some distance from the slit, the lateral
80 movement of the needle and needle-bar taking place when the needle-bar and needle are about to reach or reach the limit of their upward movement, or are about to commence
85 their downward movement.

So far as described the operation is not new, and needs, therefore, no further description so far as the formation of the stitch is concerned, as this is well known; nor do I wish to lay claim to the combination, in a sewing-
90 machine, of a vertically and horizontally reciprocating needle with a shuttle for the purposes stated, my invention simply comprehending appliances whereby a horizontal reciprocating movement may be transmitted to
95 the needle-bar guide and needle in a more convenient manner than this has been done heretofore, whereby the amplitude of said hori-

zontal reciprocation may be varied and the mechanism thrown into and out of operation at will, and which appliances are adapted for application to all classes of sewing-machines in which the needle-bar is reciprocated from a horizontal shaft located above the bed-plate of the machine and for co-operation with said shaft.

The horizontal shaft B' is or may be driven in any usual or preferred manner, and its movement communicated to the shuttle and feed devices through the medium of a vertical shaft contained in the standard. As such devices form no part of this invention, and as these appliances may be of any usual or preferred construction, I have deemed it unnecessary to illustrate the same in the drawings.

The needle-bar is reciprocated, as usual, by the crank-pin of a disk secured to the end of the horizontal shaft B', said pin traveling in the cam-groove of a cam attached to the needle-bar. At or near the upper and lower end of the needle-bar guide *a* are secured two studs or pins, *k*, that project through and for some distance in rear of the head A, which latter is preferably provided on its rear face and at suitable points with projecting hollow sockets or bosses *a'*, through which the pins or studs *k* pass and by which they are guided in their reciprocating movements. Near their ends one-half of the circumference of the bosses *a'* may be cut away to expose the pins *k* and form lateral recesses *a''*, between the inner faces of which a coupling, *k'*, slides. The coupling *k'* is secured to the pin or stud *k* by means of a screw or pivot, and has a vertical groove, *k''*, in its face for purposes which will be presently explained.

For a suitable distance in rear of the point of junction of the arm B with the head A said arm has a plane vertical face, at the rear end of which is a projecting boss, *b'*, to which my improved appliances are secured. Intermediate of the boss and the point of junction of the arm with the head is an opening or recess for the reception of the end of the shaft on which the attachment gear-wheel is mounted, as presently explained, and at or near the point of junction of the arm with the head there is an opening, *b''*, of suitable form, through which projects the driving-pinion F. The latter is secured on the outer end of shaft B', immediately in rear of the disk that reciprocates the needle-bar, in the usual manner, the heart-cam groove connected to said needle-bar being in this case made of such depth as to allow it to move with the needle bar and guide *a* toward and from the disk without becoming disengaged therefrom. The pinion may form an integral part of said disk, and serves to communicate the rotation of the shaft B' to a gear-wheel, and through the latter to the mechanism by which the needle-bar guide and needle-bar are reciprocated horizontally. These parts may, however, be arranged and constructed in any other suit-

able or convenient manner—as, for instance, as shown in Fig. 9, where the arm and head are connected by arms A².

All the appliances by which I obtain the object of my invention are secured to or mounted on a face-plate, D, thus constituting an attachment, and said plate may be secured in any convenient manner, as by screws *c*, to the boss *b'* and the head A. The plate carries a stud or short shaft, *d*, upon which is loosely mounted a bevel gear-wheel, E, that meshes with and is driven from the bevel-pinion F on shaft B'. The wheel E has twice as many teeth as the pinion F, the latter making, therefore, two revolutions to every revolution of the wheel E, in order to impart to the needle-bar guide *a* and needle-bar *b* a horizontal movement in one direction at each complete reciprocating of said needle-bar guide and needle-bar. The horizontal motion is timed relatively to the vertical motion of the needle-bar so that the former motion will take place when the needle-bar is about to reach or has reached the limit of its vertical movement, or is about to commence its downward movement. The horizontal movement may be imparted to the needle-bar guide *a* in various ways, and, referring to Figs. 1 to 5, inclusive, the plate D on its inner face has two projecting ribs, *f*, (see Fig. 3,) that form a way in which slides a plate, *g*, held within the way by any convenient means, as by forming inwardly-projecting flanges on the ribs *f*, or by securing thereto inwardly-projecting plates, *f'*, as shown in Fig. 3. The slide *g* is slotted longitudinally, through which slot *g'* passes the stud *d*, that carries the gear-wheel E, as shown in Fig. 2, and permits the plate to reciprocate in its way. The slide *g* carries a stud, *h*, on which, to reduce friction. I prefer to mount loosely a roller, *h'*, as shown in dotted lines in Fig. 2 and in full lines in Fig. 10. The pin and roller project into a cam-groove, *n*, formed in the rear face of the wheel E, the form of which is plainly shown in Figs. 2 and 9, whereby a horizontal reciprocating motion is imparted to the needle-bar guide through intermediate mechanism, presently to be described, when said wheel E is rotated by the pinion F.

To the outer end of the plate *g* at *l' l'*, (see Fig. 2,) are pivoted two levers, *l l*, that have their fulcrum on pins *o o*, secured to the plate D, said levers serving to transmit the reciprocating movement of the slide *g* to the needle-bar guide by connecting the same with the studs *k k* thereof. This connection may be effected by means of studs *l' l'*, projecting laterally from the face of the levers at their outer ends, as shown in Fig. 5, said studs taking into recesses formed in the pins *k k*. The studs *l' l'* may also be provided with blocks, *l''*, as shown in Figs. 1, 9, and 11, which take into the groove of the coupling *k'* on the pins *k*. The fulcrum-pins *o* may be rigidly secured to plate D, in which case the extent of horizontal reciprocation of the needle-bar guide

will be invariable; or said pins may be made adjustable, to vary the throw of the levers l , and thereby vary the amplitude of the reciprocation of said needle-bar guide; and I prefer the latter construction, though I do not desire to limit myself thereto. For instance, if the pins o are moved in the direction of the arrows 1, Fig. 2, the distance l^3 between their fulcra and pivots becomes greater than that l^4 between their fulcra and the point where the power is exerted—namely, the axis of the pins or studs l' and the throw of the levers is decreased, the reverse being the case when the fulcrum-pins o are moved toward the pivot-pins l^2 , as will be readily understood.

This adjustment of the pins o may also be effected in different ways. For instance, as shown in Figs. 2, 4, and 5, they may be secured each to slides o' , sliding vertically between ribs o^2 , formed on the front face of plate D. Each slide o' has its inner face toothed, as shown at o^3 , thus forming sliding rack-bars the teeth of which face each other, which rack-bars o' mesh with a pinion, o^4 , secured to a stud, S, that carries a thumb-screw or a crank, o^5 , by means of which the pinion is rotated. It is obvious that when the pinion is rotated in one or the other direction the rack-bars o' , and with them the pins o , will move either away from or towards the slide g , and to this end it is necessary that the pins o should not be rigidly connected with the levers.

The movement of the pins on the levers may be effected as shown in Figs. 2 and 5, said pins being secured to slide-blocks o^6 , fitted on the levers l ; or, if desired, said levers may be slotted longitudinally and the pins made to project into the slots thereof, as shown in Fig. 6.

Means may be provided to fix the crank o^5 into the various positions of adjustment, which may be effected by forming a series of holes, o^7 , in the face-plate o^8 , within the path of the crank, for the reception of a movable pin against which the crank will abut when brought to the proper point of adjustment.

Instead of operating the slide g through the medium of the cam-groove n , as described, a cam, p , may be combined with the wheel E, as shown in Figs. 6 to 8, said cam operating in rectangular yokes l^5 , formed on the inner ends of the levers l , and the slide g may thus be dispensed with. The arrangement of the cams within the yokes of the levers is such that at each complete revolution of the cams the levers will impart a like reciprocation to the needle-bar guide a , as will be readily understood by an examination of Fig. 6. The adjustment of the throw of these levers is effected by slotting the levers, as at l^6 , and pivotally connecting the same with the studs k of the needle-bar guide, as shown in Figs. 6 and 8.

The slides o' , to which the fulcrum-pins o are connected and which slide between the

ribs o^2 , formed on plate D, are moved by means of a disk, r , rotatably mounted on the attenuated or smaller end, d' , of the stud d , said disk having segmental slots r' , inclining toward its axis, through which project pins o^9 , secured to the slides o' . On rotating the disk r in the direction of the arrow, Fig. 7, by means of one of the buttons or pins r^2 , the fulcrum-pins o on the slide-blocks o' are made to approach the stud d , owing to the inclination of the slots r' toward said stud, the reverse taking place when the disk is rotated in a reverse direction, thus accomplishing the same results as by the arrangement of crank o^5 and rack-bars o' and pinion, the latter being here dispensed with, and slides o' without teeth are employed, as will be readily understood.

By means of the construction described the length of the lateral stitches may therefore be varied, which is of great convenience, for instance, in forming the stitches at the ends of a button-hole, which are usually longer than the others, and this may be effected in the most convenient manner by the rotation of the crank o^5 or the disk r ; and in attachments where such variation is not desired the pins o of the levers are rigidly connected with the supporting-plate D, as shown in Figs. 9, 10, and 11, where a single lever, l , is rigidly connected with the slide g .

To adapt the machine for sewing the usual chain or lock stitch, the attachment may be secured thereto in such manner as to be readily removed therefrom. This may be effected by means of thumb-screws, or by means of the screws c , as shown; or the gear-wheel E may be thrown out of gear with the pinion F simply by rotating the thumb screw or screws c , to remove the attachment sufficiently away from the arm B to disengage the wheel and pinion, and this outward movement of the attachment may be assisted by springs interposed between the plate D and its bearings or other points of the head and arm of the machine; or the wheel E may be arranged upon its stud so as to permit its ready displacement thereon.

The attachment may also be arranged for longitudinal displacement by slotting the boss b' and providing the screws t with a thumb-nut, the forward prolonged end, D' , being arranged to slide in dovetailed guides s , as shown in Fig. 7.

As shown in Figs. 9 to 11, the attachment is rigidly secured to the arm B and head A, and the wheel E is adapted to be moved on its stud d , the end d^3 thereof being screw-threaded and carrying a thumb-nut, d^4 . It is obvious that on rotating the thumb-nut d^4 in one or the other direction on the threaded end d^3 of the stud d the wheel E, that abuts against the washer d^5 , will be moved toward or from the pinion F.

Other well-known means for adjusting the wheel longitudinally on its shaft may be employed to insure the proper engagement of the

wheel and pinion, so that the horizontal reciprocation of the needle-bar guide will take place at the proper time—that is to say, when the needle-bar is about to reach or has reached the limit of its upward movement, or is about to commence its downward movement. The needle-bar may be provided with an index, kerf, notch, or other indicating-mark, *z*, Fig. 1, to indicate the position the needle-bar should assume when the wheel E is to be thrown out of or into gear with the pinion F.

To prevent the rotation of the wheel E when out of gear with pinion F, a set-screw, *v'*, (see Fig. 11,) adapted to penetrate into a recess, *v*, in the rear face of the wheel, may be employed, or a set-screw bearing against the periphery of the cam-groove, or any other means to prevent the rotation of said wheel when out of gear with the pinion, may be resorted to—as, for instance, the rear face of the wheel E may be provided with one or more lugs projecting, when the wheel is moved out of gear, with the pinion, into suitable recesses or abutting against suitable projections formed in or on the supporting-plate D—to lock said wheel against rotation.

I have hereinabove described various means for imparting a horizontal reciprocating motion to the needle-bar guide, needle-bar, and needle, various means for adjusting the amplitude of said horizontal reciprocation, and various means for throwing the mechanism into and out of operation, to illustrate that, without departing from the nature of my invention, the details thereof may be varied.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, with the overhanging arm and head of a sewing-machine, the shaft B', carrying pinion F, and the needle-bar guide *a*, of a lever connected with the guide, the bevel-wheel E, mechanism, substantially such as shown and described, connecting the lever with the wheel, for converting the rotary motion of said wheel into reciprocating motion, to oscillate the lever on its fulcrum and reciprocate the needle-bar guide, and a supporting-plate for said devices, detachably connected with the arm and head of the machine, for the purposes specified.

2. The combination, with the overhanging arm and head of a sewing-machine, the shaft B', carrying pinion F, and the needle-bar guide *a*, of a lever adjustable on its fulcrum, connected with the guide, the bevel-wheel E, mechanism, substantially such as described and shown, connecting the lever with the wheel, for converting the rotary motion thereof into reciprocating motion to oscillate the lever on its fulcrum and reciprocate the needle-bar guide, and a supporting-plate for said devices detachably connected with the arm and head of the machine, for the purposes set forth.

3. The combination, with the overhanging arm and head of a sewing-machine, the shaft B', carrying pinion F, and the needle-bar guide

a, of a lever connected with the guide, the bevel-wheel E, a cam operated from the wheel, to oscillate the lever on its fulcrum and reciprocate the guide, and a supporting-plate for said devices, detachably connected with the head and arm of the machine, for the purposes set forth.

4. The combination, with the overhanging arm and head of a sewing-machine, the shaft B', carrying pinion F, and the needle-bar guide *a*, of a lever connected with the guide, a bevel-wheel, E, the shaft whereof is adjustable longitudinally in its bearings, a cam connected with the lever and operated from said wheel, for converting the rotary motion thereof into reciprocating motion and oscillating the lever on its fulcrum, and a supporting-plate for said devices, detachably connected with the arm and head of the machine, for the purposes specified.

5. The combination, with the overhanging arm and head of a sewing-machine, the shaft B', bevel-pinion F, and the needle-bar guide *a*, of a lever connected with the guide, the bevel-wheel E, adjustable longitudinally in its bearings, mechanism, substantially such as described, connecting the lever with the wheel, for converting the rotary motion of the latter into reciprocating motion to oscillate the lever on its fulcrum, a stop to lock the wheel E in position when adjusted, and a supporting-plate for said devices, detachably connected with the overhanging arm and head of the machine, for the purposes specified.

6. The combination, substantially as herein described, with the overhanging arm and head of a sewing-machine, the shaft B', carrying bevel-wheel F, and the needle-bar guide *a*, having studs *b*, of the levers *l*, the slotted slide *g*, carrying stud or pin *h*, the bevel-wheel E, provided with a cam-groove, *n*, and the supporting-plate D, for the purposes specified.

7. The combination, substantially as herein described, with the overhanging arm and head of a sewing-machine, the shaft B', bevel-pinion F, and the needle-bar guide *a*, having studs *b*, of the slotted levers *l*, adjustable fulcrum therefor, the slotted slide *g*, its stud or pin *h*, the bevel-wheel E, its cam-groove *n*, and the supporting-plate D, for the purposes specified.

8. The combination, substantially as herein described, with the overhanging arm and head of a sewing-machine, the shaft B', bevel-pinion F, and the needle-bar guide *a*, having studs *b*, of the slotted levers *l*, slotted slide *g*, its stud or pin *h*, the bevel-wheel E, adjustable longitudinally on its shaft and having a cam-groove, *n*, and the supporting-plate D for said devices, for the purposes specified.

9. The combination, substantially as herein described, with the needle-bar guide *a*, the slotted levers *l*, and the described mechanism for oscillating said levers, of the rack-bars *o'*, the fulcrum-pins *o*, pinion *o'*, and means, sub-

stantially such as described, for operating the pinion, for the purposes specified.

10. The combination, substantially as herein described, with the needle-bar guide *a*, the
5 slotted levers *l*, and the described mechanism for oscillating said levers, of the rack-bars *o'*, the fulcrum-pins *o*, pinion *o'*, means, substantially such as described, for operating the pinion, and a stop for locking the pinion and

parts operated therefrom, for the purposes so specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN KAYSER.

Witnesses:

J. ENGLERT,
F. MUENCH.