

No. 705,326.

Patented July 22, 1902.

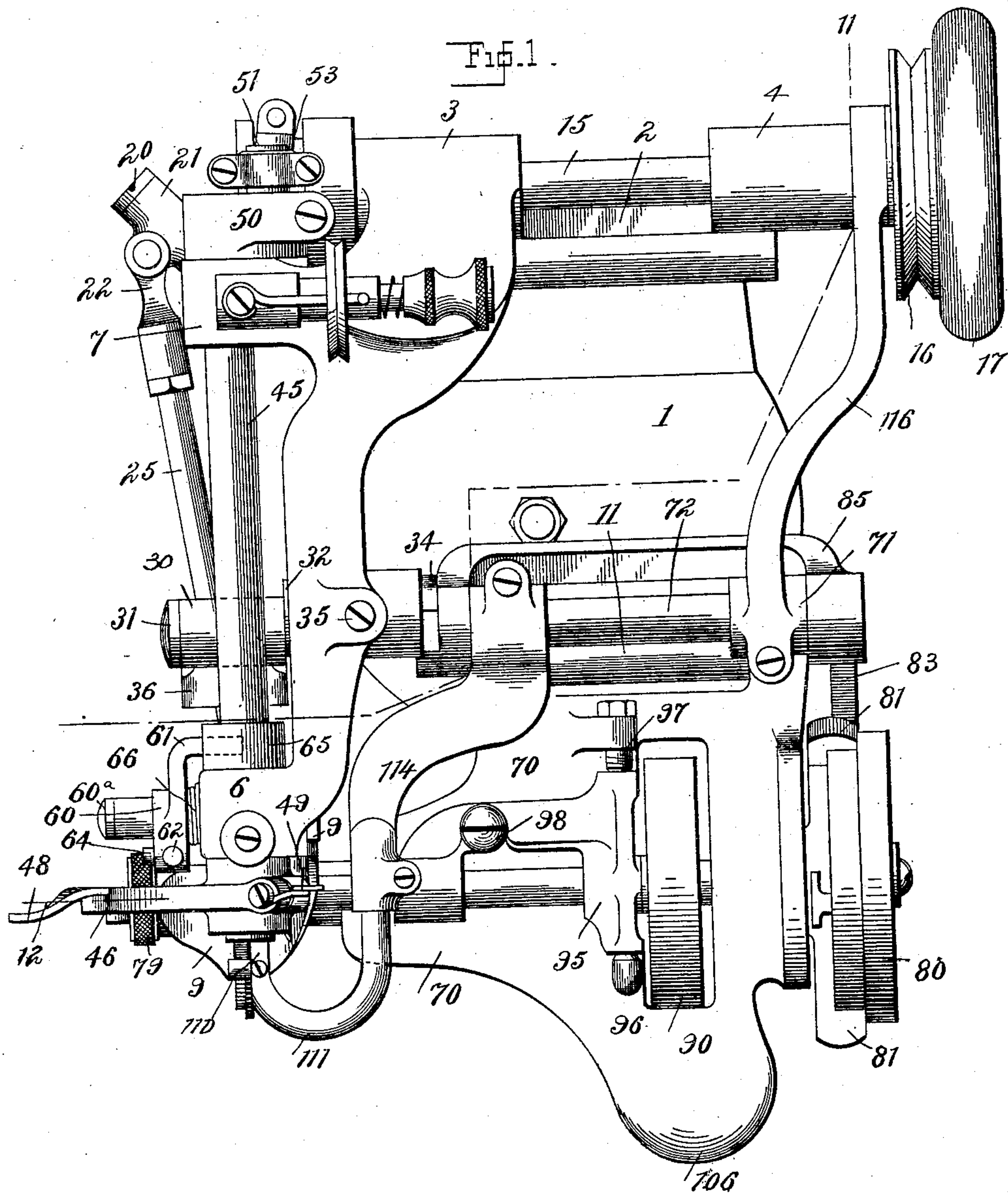
C. A. DEARBORN.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 21, 1900.)

5 Sheets—Sheet 1.

(No Model.)



Witnesses.  
P. F. Linnick  
J. Green

Inventor.  
Charles A. Dearborn  
by *Tracy & Brown*  
Attys

No. 705,326.

Patented July 22, 1902.

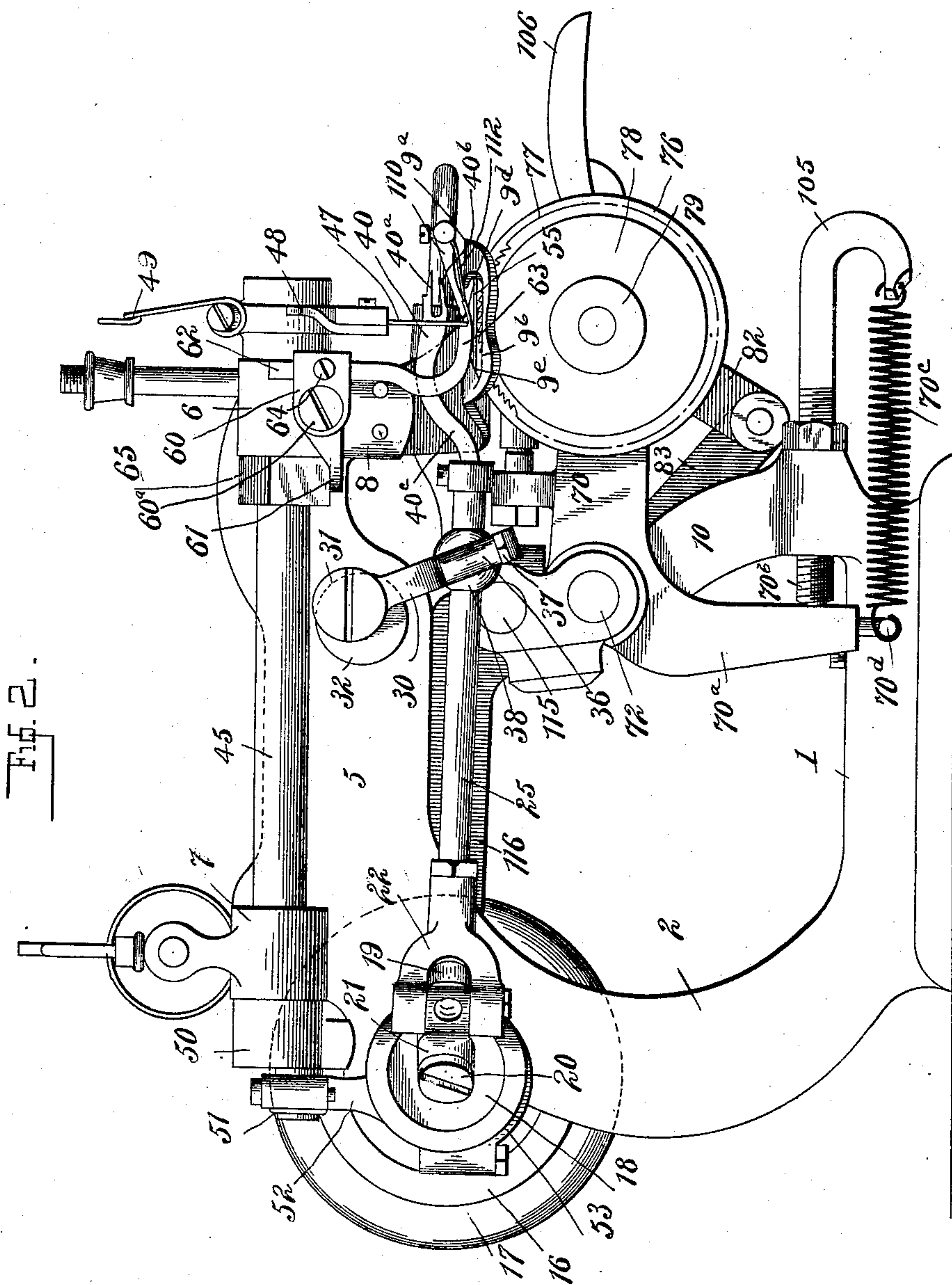
C. A. DEARBORN.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 21, 1900.)

(No Model.)

5 Sheets—Sheet 2.



Witnesses:  
P. F. Lomack.  
J. Green

Inventor:  
Charles A. Dearborn  
by *Sturges & Sons*  
Attys.



No. 705,326.

Patented July 22, 1902.

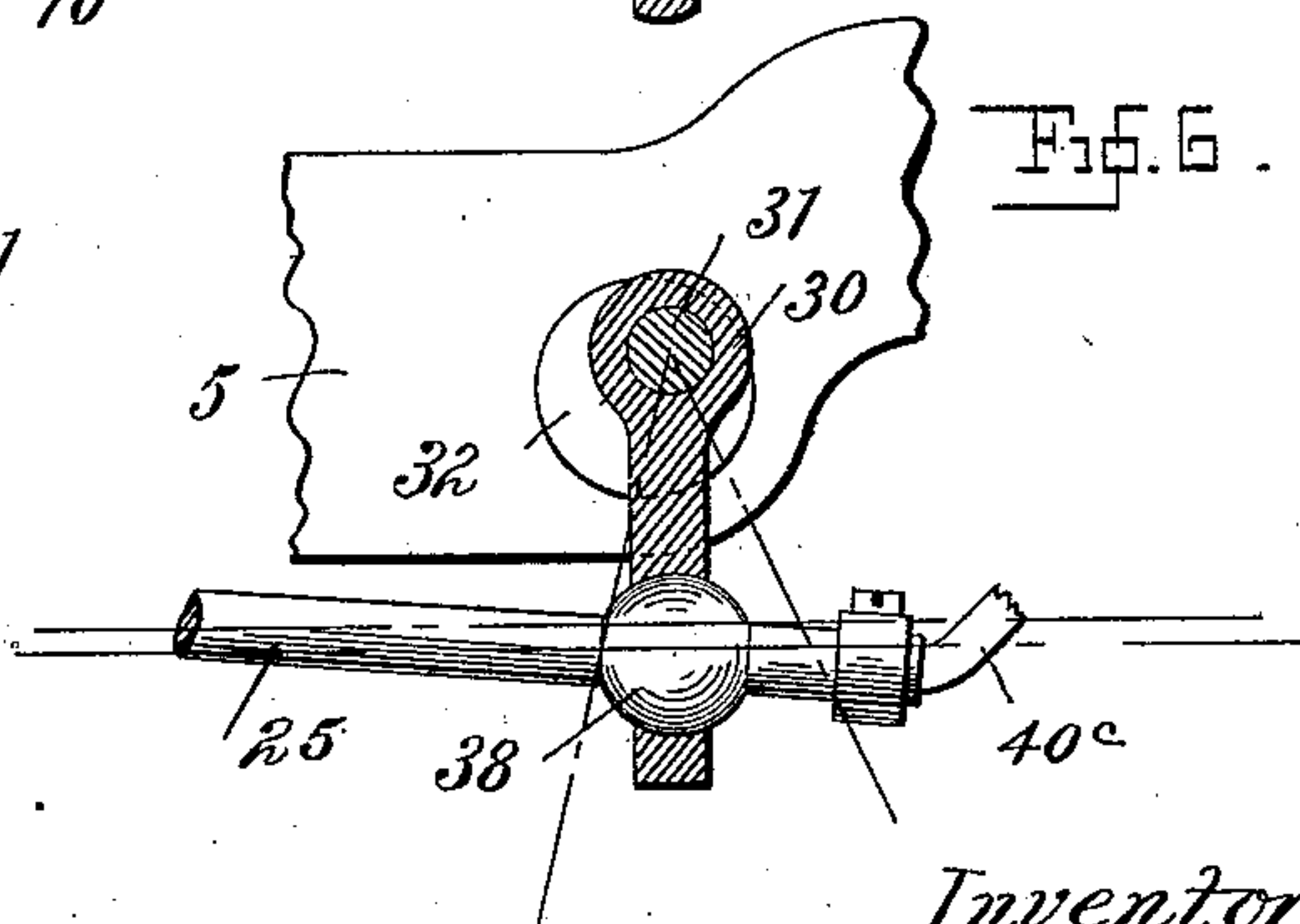
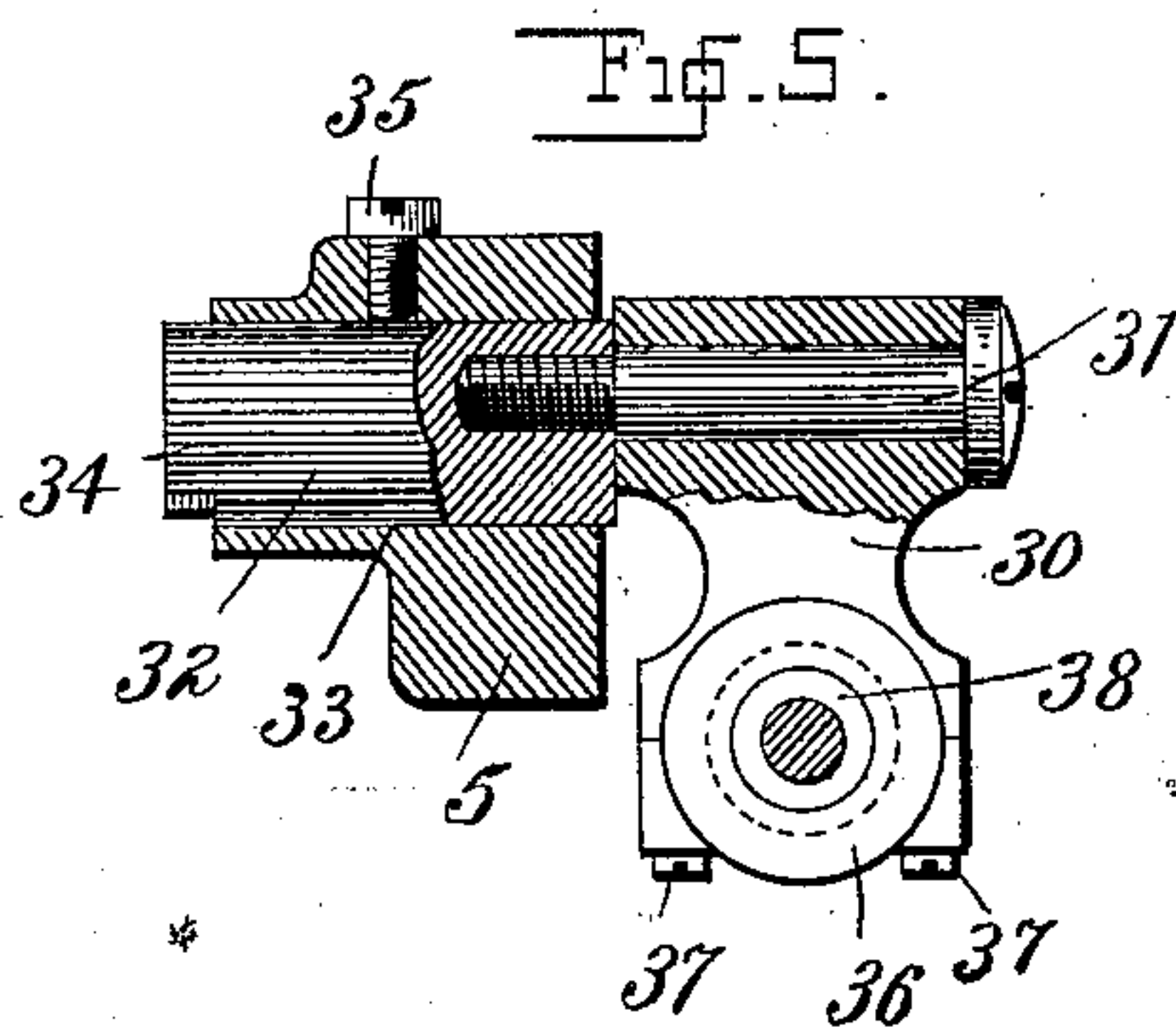
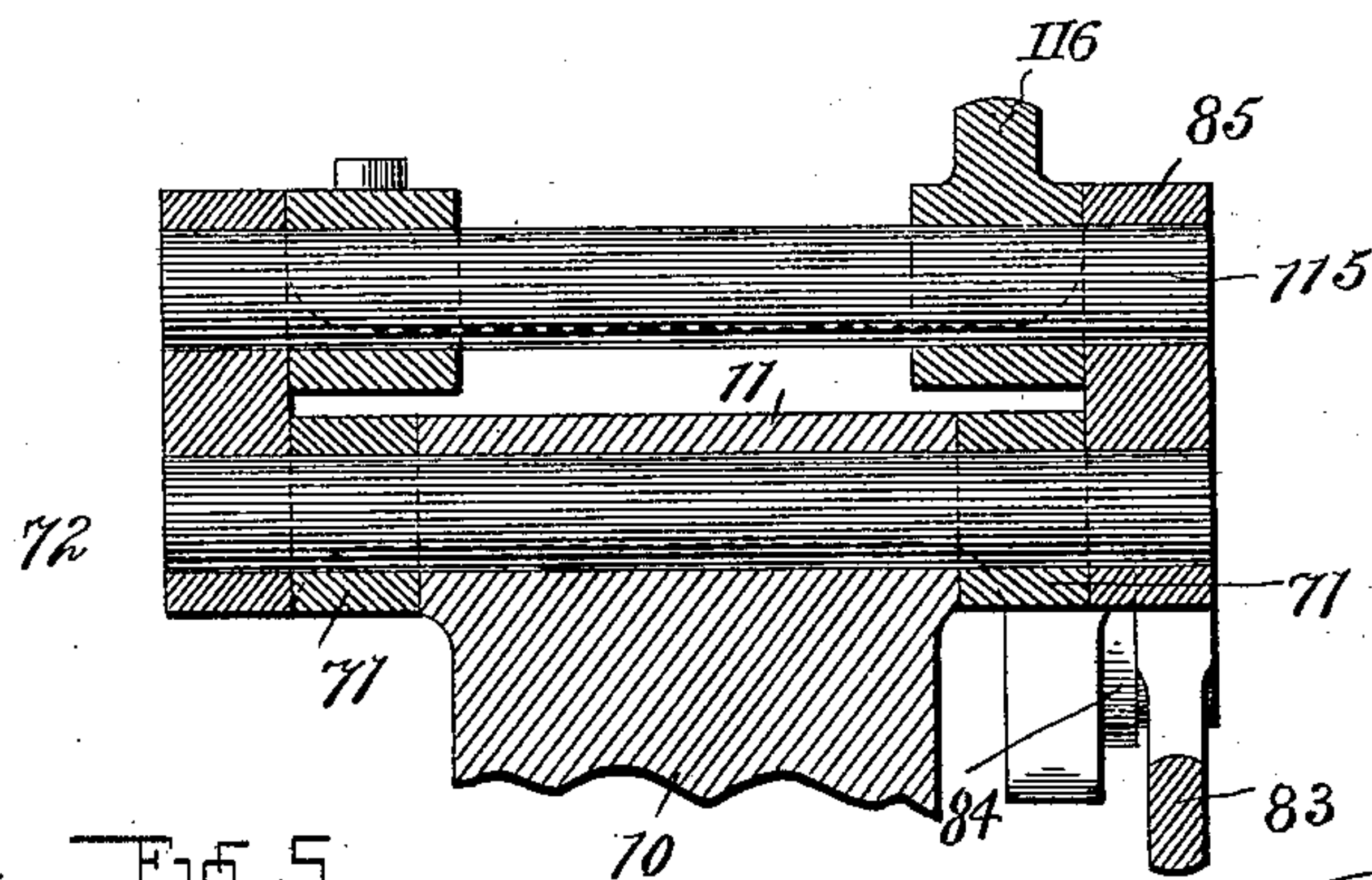
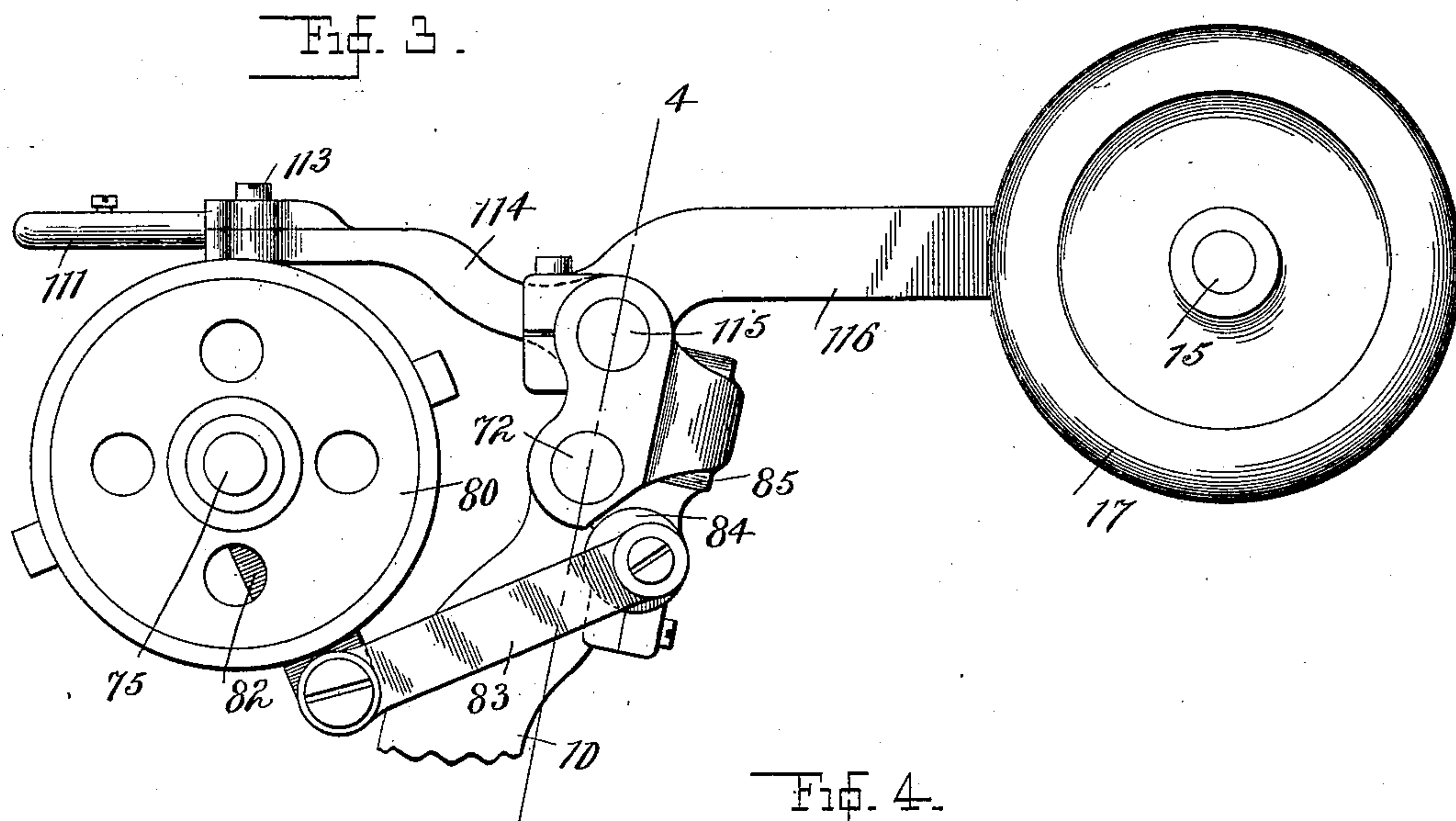
C. A. DEARBORN.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 21, 1900.)

(No Model.)

5 Sheets—Sheet 3.



Witnesses.

P. F. Somack

J. Green

Inventor.

Charles A. Dearborn

By *Samuel W. Brown*

Attys.

No. 705,326.

Patented July 22, 1902.

C. A. DEARBORN.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 21, 1900.)

(No Model.)

5 Sheets—Sheet 4.

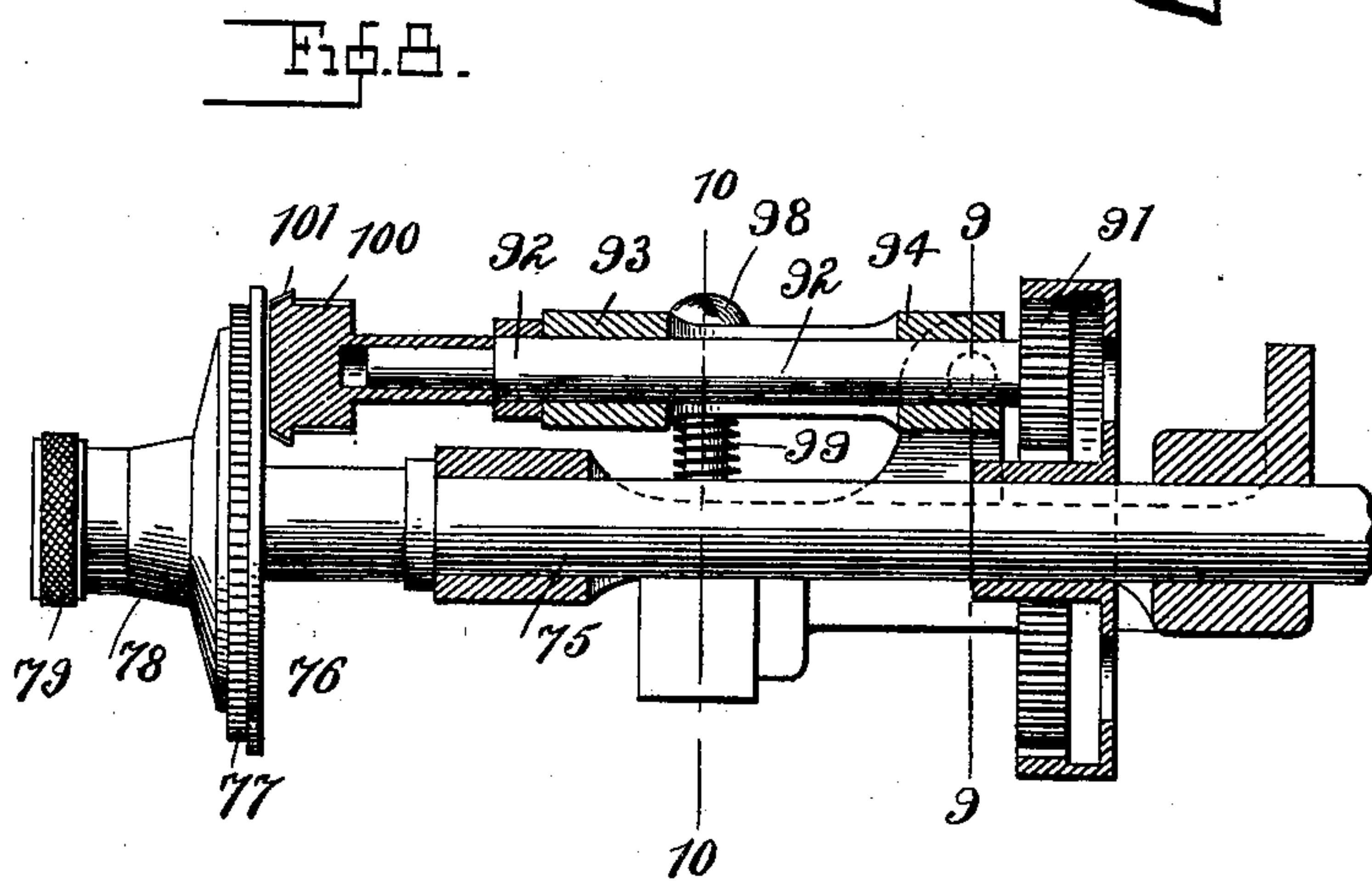
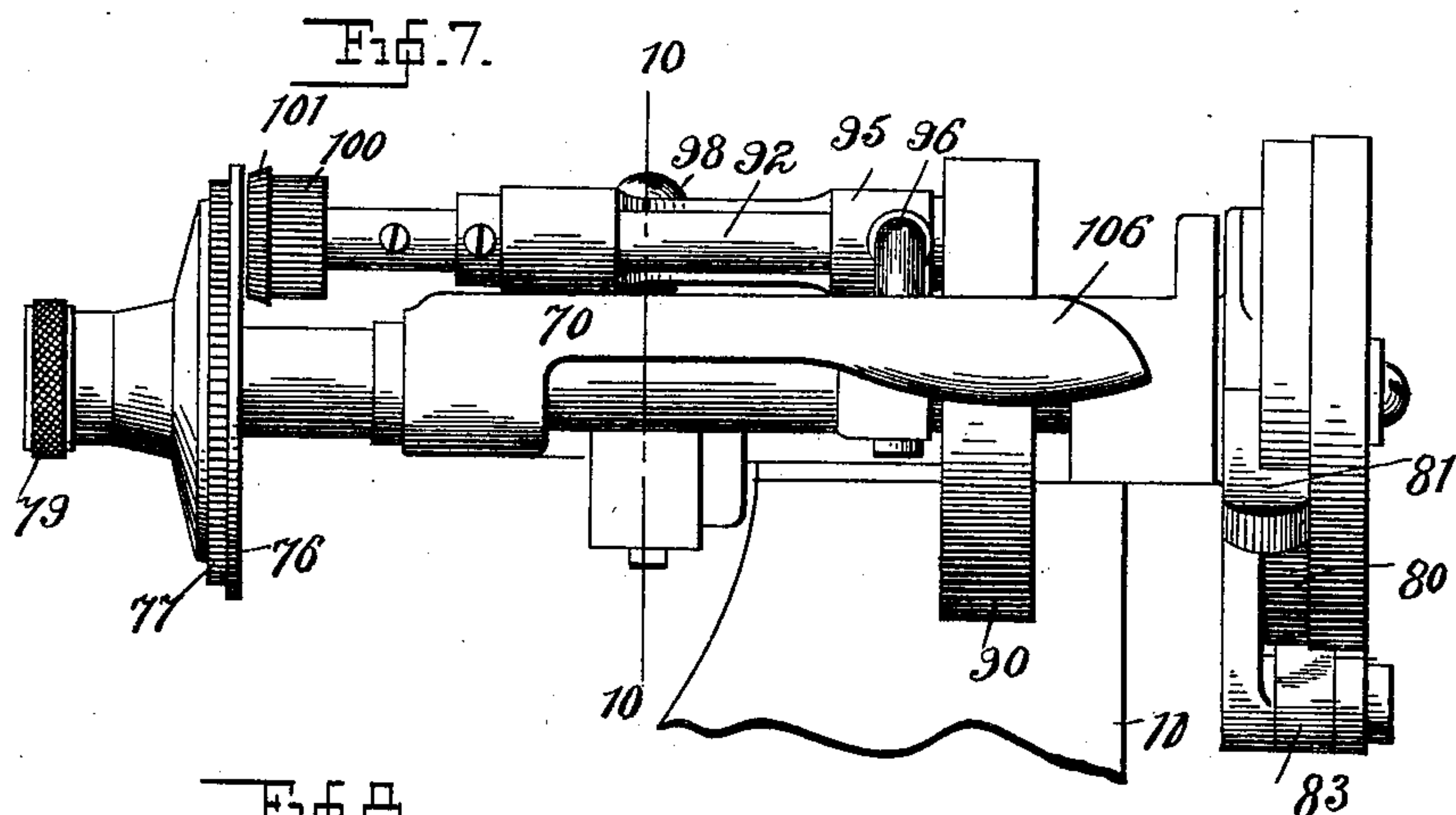


Fig. 9.

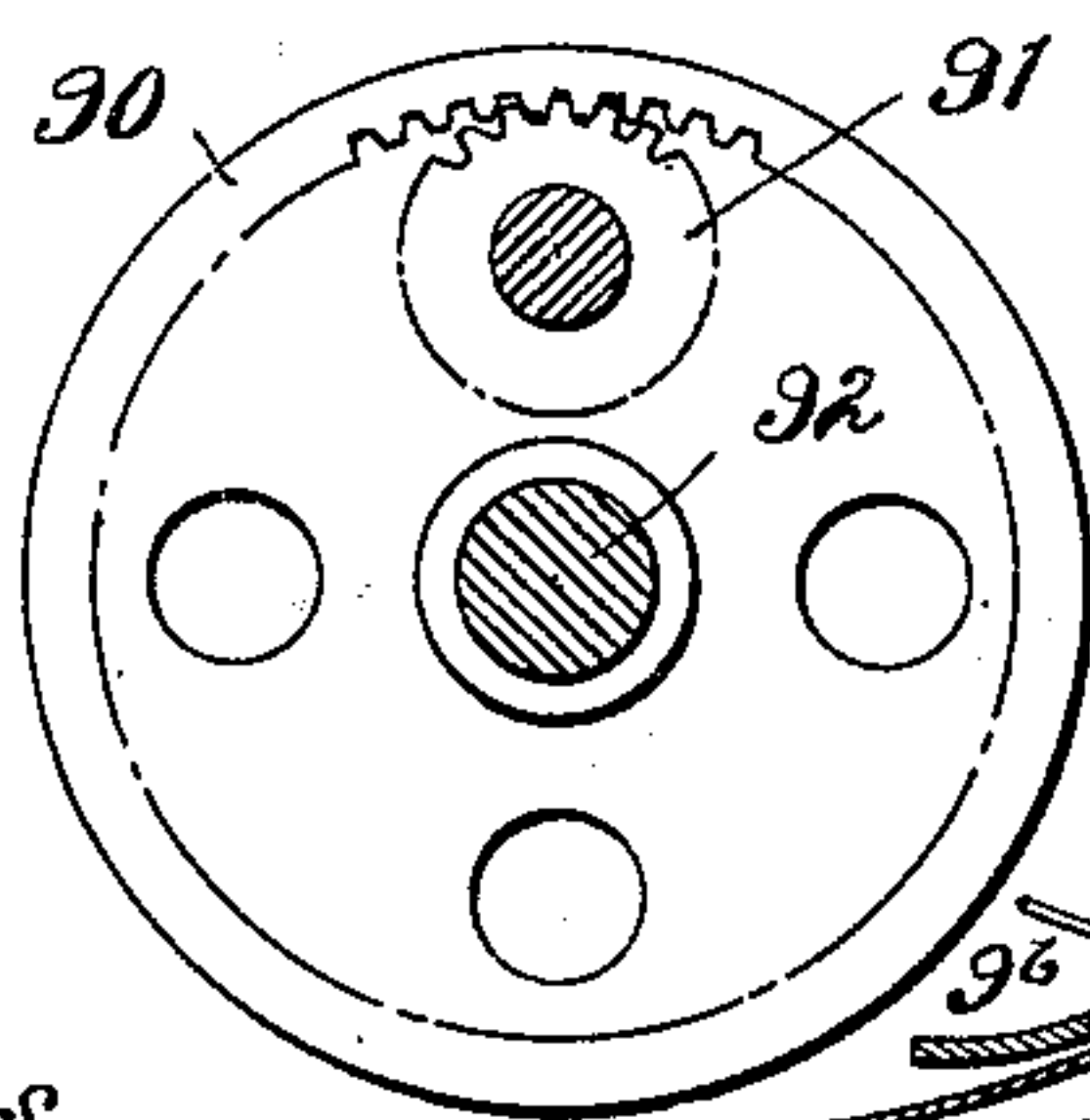


Fig. 11.

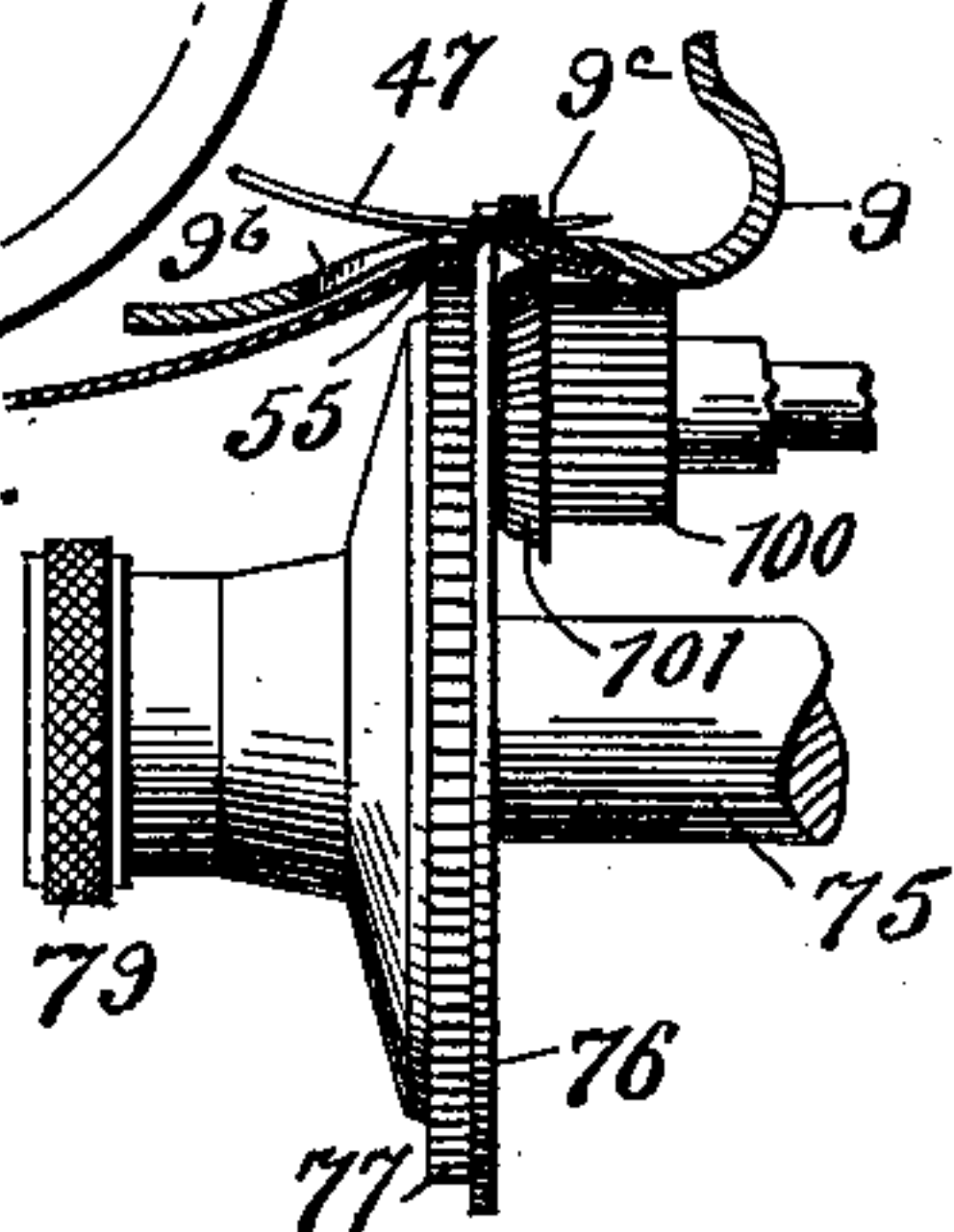
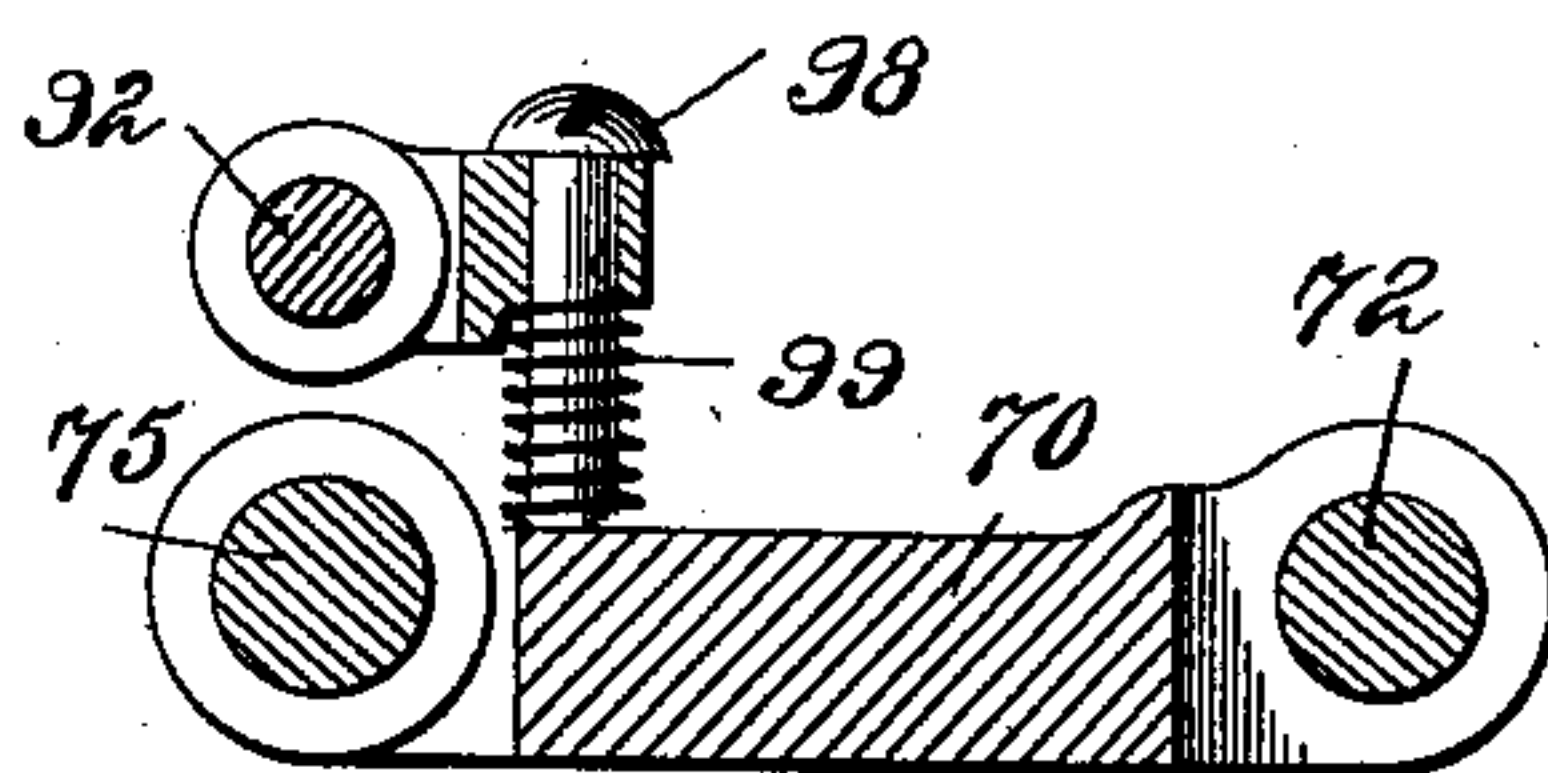


Fig. 10.



Witnesses,  
Peter F. Lomack  
J. Green.

Inventor,  
Charles A. Dearborn  
by *King & Sons*  
Attys.



No. 705,326.

Patented July 22, 1902.

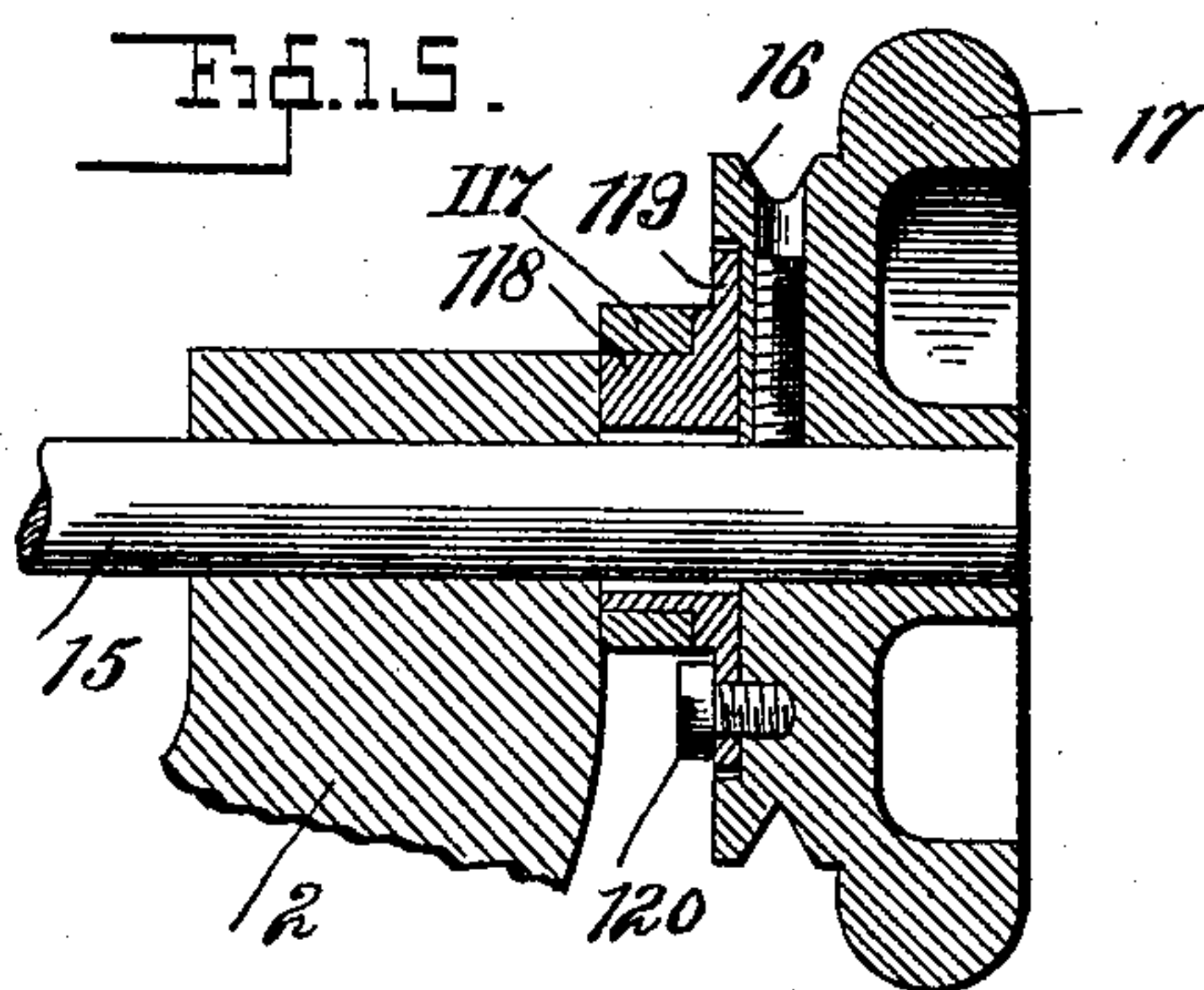
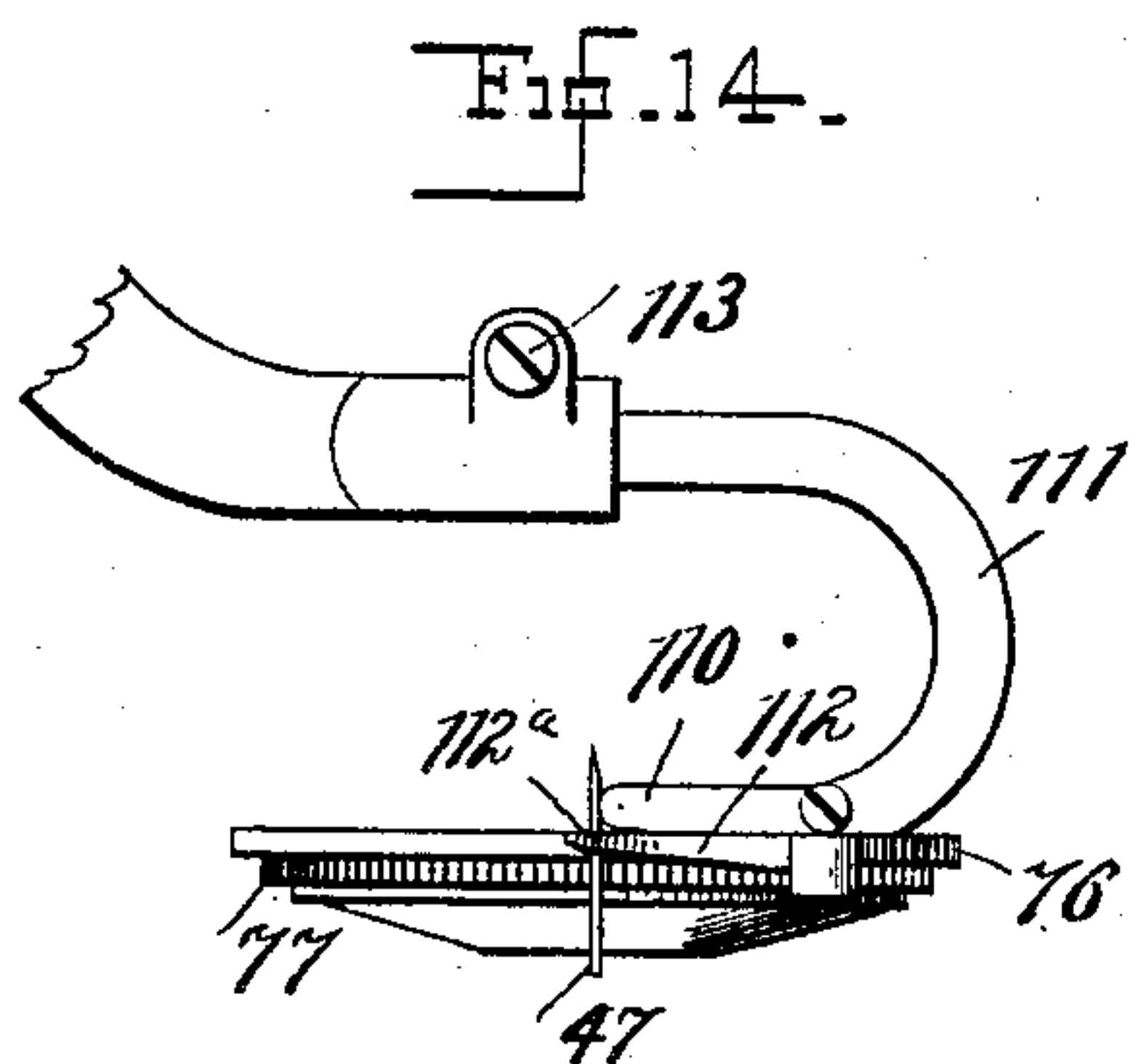
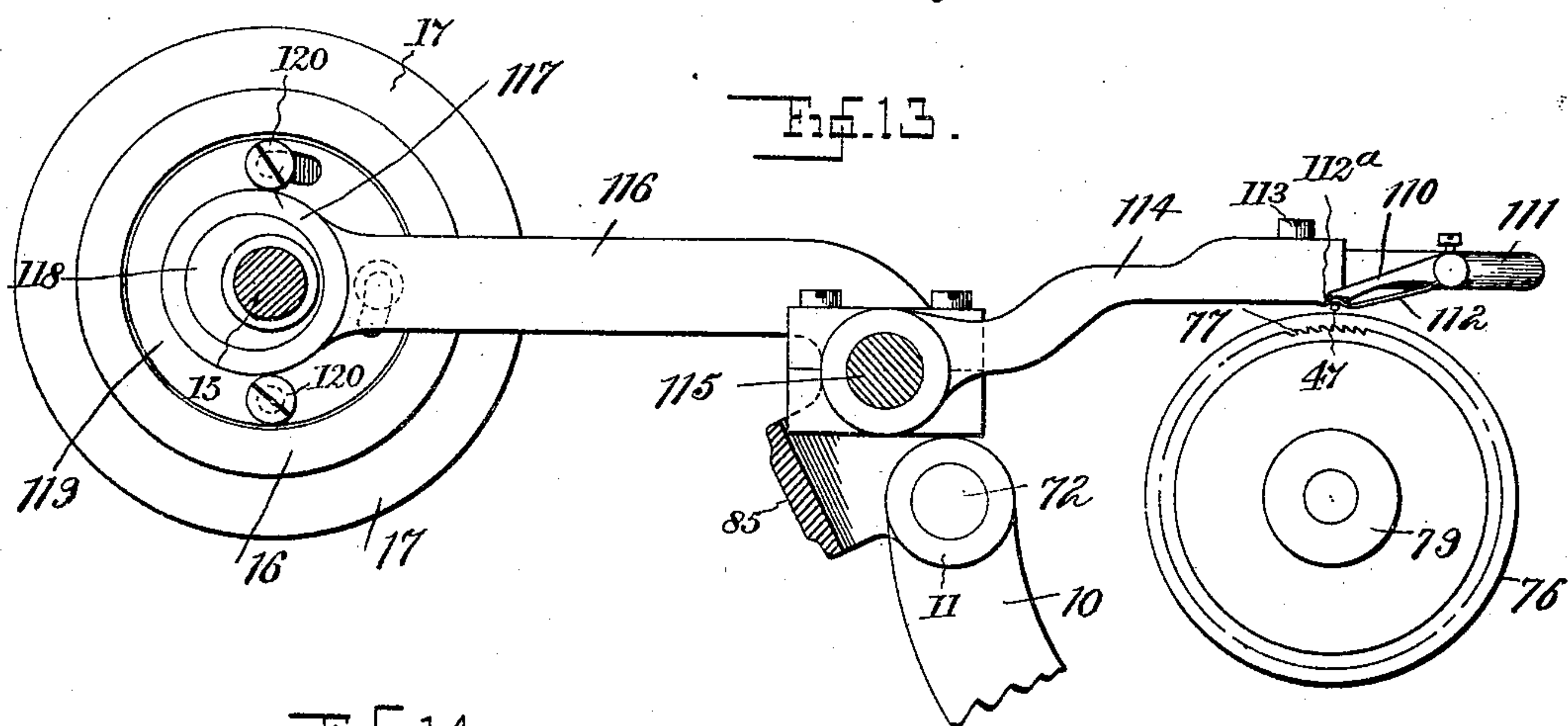
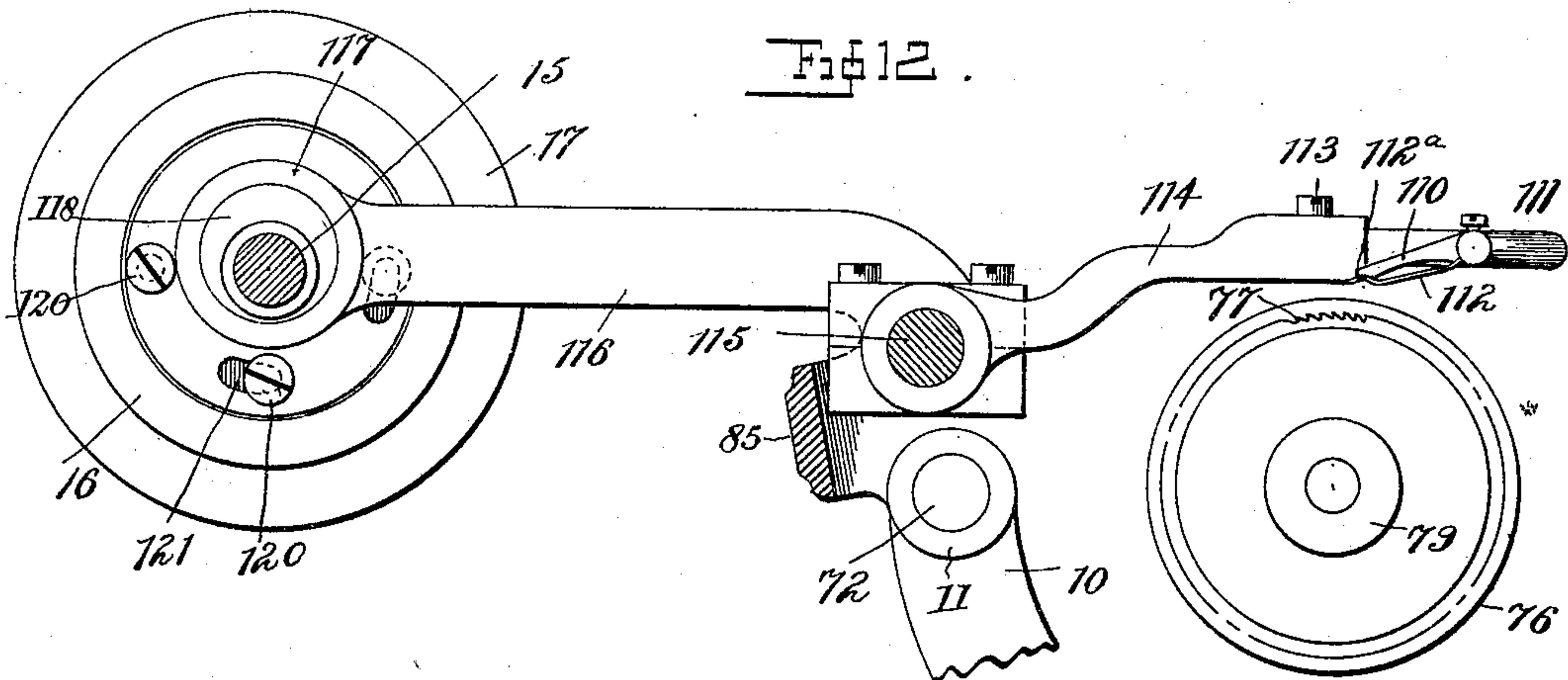
C. A. DEARBORN.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 21, 1900.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses.  
P. F. Sonnek  
J. Green.

Inventor.  
Charles A. Dearborn  
by *[Signature]*  
Att'y



# UNITED STATES PATENT OFFICE.

CHARLES A. DEARBORN, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO FREDERICK W. LORCH.

## FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 705,326, dated July 22, 1902.

Application filed March 21, 1900. Serial No. 9,500. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. DEARBORN, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

My present invention relates to improvements in the style of sewing-machines set forth in Letters Patent No. 639,669, granted to me December 19, 1899, which was designed for doing blindstitching.

In practically developing the machine covered by my above-named patent I encountered several difficulties more or less serious to the proper operation of the machine, and my present improvements have been devised for the purpose of overcoming these difficulties. The machine of my said patent embodies a suitable feed mechanism, a rigid presser-foot, a needle reciprocating transversely to the path of the work, and a looper coöperating with the needle and provided with suitable operating mechanism to cause it to first move forwardly at one side of the line of stitching to take a loop from the needle above the work, then axially to carry the looper across the line of stitching, then rearwardly above the work to enable the looper to present the loop to the needle, and finally a second axial or rocking movement to carry the looper back across the line of stitching to its first position. The feed mechanism of this patented machine comprises, essentially, a rotary cylinder having two serrated portions and a ridge-forming rib between the serrated portions and means for giving the feed-cylinder an intermittent rotary motion. The feed mechanism is mounted upon a spring-sustained frame, the spring of which holds the feed-cylinder into working relation with the work under the stationary presser-foot, forms a ridge in the work for the penetration of the needle, and allows the feed mechanism to yield sufficiently to accommodate the thickness of the material being operated upon.

The feed mechanism of the machine covered by my above-named patent is capable of yielding as a whole to suit the thickness of the material being operated upon; but when

unequal thicknesses of material are presented upon opposite sides of the ridge-forming rib the machine cannot properly accommodate the same. In my present application I provide a two-part work-supporting under feed mechanism, the parts of which are independently mounted upon opposite sides of the ridge-forming rib, so as to yield independently under the unequal pressures of the different thicknesses of material at opposite sides of the line of stitching. I prefer to mount both parts of the feed mechanism upon a common spring-supported feed-frame and arrange one of the parts upon an auxiliary spring-supported frame journaled upon the main feed-frame. With such an arrangement of feed mechanism the unequal thicknesses of material at the opposite sides of the line of stitching upon the work will not interfere with the uniform feed of the work nor the formation of a uniform ridge in the work through which the needle penetrates.

In addition to the two-part under feed mechanism referred to I provide a reciprocatory upper feed device, which is arranged to engage the upper exposed face of the work to feed it along in unison with the under exposed face of the work, which is operated upon by the under feed mechanism. The rigid presser-foot is formed with an opening for exposing the upper surface of the work to the action of the upper feed mechanism and also to allow for the formation of the ridge in the work for the penetration of the needle.

Coöperating with the upper feed device and with the ridge-forming rib of the under feed devices is a spring-finger extending from its support in the line of feed and formed with a transverse needle guide or gate through which the needle passes. This spring-finger engages the work directly above the ridge-forming rib adjacent to the path of the needle to confine the material at this point while the needle is operating and to insure the placing of the lower thread of the loop sufficiently in advance of the path of the needle for the needle to take the loop. I also provide the rigid presser-foot with a spring-finger which engages the work to one side of the ridge-forming rib to hold the work uniformly to the ac-



tion of one part of the under feeding mechanism.

The two-part under feed mechanism and the upper feeding device are operated by a single eccentric and link. The upper feed device comprises a feed-finger mounted upon an approximately horizontal arm rigidly mounted upon a rock-shaft which is journaled in the free end of an approximately vertical rocking frame. A link rock-arm is rigidly secured to the said rock-shaft and extends rearwardly to the eccentric, which is adjustably mounted upon the main driving-shaft of the machine. The operation of the eccentric causes the frame to rock forward and backward and the rock-shaft to oscillate in its bearings in the rocking frame, giving the upper feed device a compound movement approximating an ellipse flattened on its lower side. The two-part lower feed mechanism is driven from the rocking frame by means of a friction-clutch upon the shaft of the feed mechanism and a link extending from the rocking frame to the said friction-clutch. To enable one of the parts of the lower feed mechanism to yield independently of the other, I mount said part upon an auxiliary frame which is journaled upon the main feed-frame and receives its motion from suitable gearing between it and the operating-shaft of the main feed.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings and afterward point out the novelty more particularly in the annexed claims.

In said drawings, Figure 1 is a plan view of a sewing-machine embodying my improvements. Fig. 2 is a side elevation of the same looking at the stitch-forming mechanism, which is at the left-hand side of the machine. Fig. 3 is a detail side elevation of part of the opposite side of the machine, representing the feed-operating mechanism. Fig. 4 is a detail vertical sectional view taken on the line 4 4 of Fig. 3. Figs. 5 and 6 are detail views illustrating the swinging bearing of the looper-rod. Fig. 7 is a detail front elevation of the two-part lower feed mechanism. Fig. 8 is a vertical sectional elevation of the same. Fig. 9 is a detail sectional view taken on the line 9 9 of Fig. 8. Fig. 10 is a detail sectional view taken on the line 10 10 of Figs. 7 and 8. Fig. 11 is a detail transverse sectional view taken on line 12 12 of Fig. 1. Fig. 12 is a sectional elevation taken on the line 11 11 of Fig. 1, the machine-arm, presser-foot, needle, and operating mechanism being omitted for the sake of clearness. Fig. 13 is a similar view showing a different position of the parts. Fig. 14 is a detail plan view illustrating part of the upper feed device and part of the lower feed device. Fig. 15 is a detail sectional view illustrating the feed-operating eccentric and part of the main driving-shaft.

The machine is built up upon a base of any suitable construction, such as is shown.

1 indicates the rigid central base-frame, having an upwardly-extending rear arm or section 2, terminating in the sleeves or shaft-bearings 3 and 4, and the forwardly-extending arm 5, having journal-bearings 6 and 7 and supporting upon a lug 8 the rigid presser-foot 9. The base-frame also has a central vertically-extending broad portion 10, terminating in a sleeve 11. The purposes of these parts of the base-frame will be hereinafter explained.

15 is the main driving-shaft of the machine, journaled in the sleeves or bearings 3 4 of the base-frame and having keyed to one end a driving-pulley 16 and fly-wheel 17 and at its opposite end a crank-disk 18. Projecting at an angle of forty-five degrees from the crank-disk 18 is an arm 19, supporting a crank-pin 20, upon which is swiveled the sleeve 21, which is capable of rotating thereon.

22 is a yoke pivotally connected with the sleeve 21 and adjustably and rigidly secured to the rear end of the looper-rod 25.

30 is a rock-arm journaled at its upper end upon a pin 31, which is eccentrically secured in a block 32, which is adjustably mounted in a suitable opening 33 of the sewing-machine arm 5. The block 32 is formed with a wrench-head 34, by means of which it can be rotated in its support for adjusting the pivot-pin 31 upwardly or downwardly with relation to the plane of feed of the work.

35 is a set-screw threaded into a suitable opening in the sewing-machine arm 5 and adapted to engage the adjustable block 32 for securing it in the desired adjusted position.

The lower free end of the rock-arm 30 is formed with a removable bearing-yoke 36, secured to the arm by screws 37, the inner surfaces of said yoke 36 and the corresponding face of arm 30 being cut out to form a circular concave bearing or socket. The looper-rod 25 has secured to it a spherical bearing-head 38, which rests in the concave bearing or socket formed at the free end of the rock-arm 30, so as to cause the rock-arm 30 to move forwardly and backwardly upon its bearing 31 under the action of the longitudinal movement of the looper-rod 25, said bearing at the same time allowing movement between the looper-rod and rock-arm in all directions. The bearing connecting the looper-rod to the rock-arm is, in effect, a universal-joint connection.

At the forward end of the looper-rod 25 is mounted the looper proper, 40, having two fingers or prongs 40<sup>a</sup> and 40<sup>b</sup> and a bent stem 40<sup>c</sup>, connecting it to the looper-rod 25. The specific construction of the looper proper is the same as described and illustrated in my above-named patent. By adjusting block 32 the looper 40 can be moved upwardly or downwardly with relation to the path of the needle to insure the passage of the needle centrally between the prongs of the looper.

45 is the needle rock-shaft journaled in the



machine-frame bearings 6 and 7 and having rigidly mounted upon its forward end a needle-carrying rock-arm 46, in which is mounted the curved needle 47.

48 and 49 are ordinary thread-guides.

Secured to the rear end of the needle rock-shaft 45 is a rock-arm 50, having universal-joint connection 51 with a link 52, which encircles an eccentric 53, mounted upon the main power-shaft 15, adjacent to the crank-disk 18. The link 52 and the eccentric 53 are formed with mated spheroidal engaging surfaces to allow free lateral play of the link. By means of the mechanism just described the needle is given a reciprocatory motion in an arc transverse to the path of the work, which is fed by the mechanism presently to be described.

The rigid presser-foot 9, which, as above stated, is supported from the lug 8 of the machine-frame arm 5, is formed with a central longitudinal groove 9<sup>a</sup> in its under face and two approximately parallel elongated openings 9<sup>b</sup> and 9<sup>c</sup>, arranged upon opposite sides of the central groove. 55 is a spring-tongue rigidly secured to a lug 9<sup>d</sup> of the presser-foot and extending under another similar lug 9<sup>e</sup>. This spring-tongue 55 is capable of yielding but slightly, it being confined in its spring action by the lugs 9<sup>d</sup> and 9<sup>e</sup>. The purpose of spring 55 will be presently explained.

In order to permit the use of a short needle in my machine and obviate the necessity of using the objectionable long needle, I provide a needle-guide, which normally engages the needle to insure its proper engagement with the work and which intermittently moves away from the path of the needle to avoid interference with the needle-supporting arm.

60 is a short rock-arm journaled to the sewing-machine arm 5 at 60<sup>a</sup>, and 62 is the shank of the needle-guide 63, which is vertically adjustable in the rock-arm 60 and secured in any desired adjusted position therein by means of a set-screw 64. The rock-arm 60 has a rearwardly-extending heel 61, which is engaged by a cam 65, keyed to the needle rock-shaft 45. A spiral spring 66 surrounds the journal 61 and engages at its opposite ends the rock-arm 60 and machine-arm 5, giving the needle-guide a spring tendency to move away from the needle and out of the path of the needle. The action of the cam 65 upon the heel of the rock-arm 60 intermittently moves the needle-guide into operative relation to the needle.

Journaled upon the central upwardly-projecting arm 10 of the machine-frame is the forwardly-extending main feed-frame 70, which is formed with integral journal-ears 71, which are journaled upon a shaft 72, supported in the bearing 11 of machine-arm 10.

75 is the main feed-shaft, journaled in the pivoted feed-frame 70 and carrying at its outer end a cloth-supporting ridge-forming disk 76 and a serrated feed wheel or roll 77. The disk 76 and feed-wheel 77 are rigidly se-

cured upon the shaft 75 by means of a suitable collar 78 and screw-nut 79. The disk 76 has a slightly greater diameter than the feed-wheel 77, so as to project circumferentially a little beyond the feed-wheel 77 and form a rib or ridge in the work by pressing it up into the opening of the rigid presser-foot. The size of the ridge-forming disk 76 with relation to the size of feed-wheel 77 will in practice be varied to suit different thicknesses of work to be sewed. For this purpose I propose to have different sizes of disks 76 for the machine. Thus in sewing upon thin materials I will use a disk 76, which will form a very narrow rib above the periphery of the feed-wheel 77, and in sewing thicker materials I will employ a larger disk 76 to form a deeper ridge-forming rib. Keyed to the opposite end of the feed-shaft 75 is a clutch-wheel 80, with which engage the frictional feed-dogs 81, mounted upon an oscillatory frame 82, which is pivotally connected to a pitman 83, which is journaled at its opposite end to a lug 84, formed integral with a rocking frame 85. The rocking frame 85 is journaled upon the rigid shaft 72 and has a rocking motion imparted to it by the mechanism hereinafter described. By the rocking of the frame 85 the frictional feed-dogs are caused to intermittently rotate the friction wheel or drum 80, and thereby cause the intermittent rotation of the ridge-forming disk 76 and feed-wheel 77.

The feed wheel or roll 77 just described constitutes one of the yieldingly-supported lower feed members of my machine. I will now describe the other yieldingly-supported lower feed member.

Keyed to the shaft 75 is an internal gear 90, with which meshes a small gear 91, keyed to the end of an auxiliary feed-shaft 92, which is journaled in the bearings 93 and 94 of an auxiliary feed-frame 95. The auxiliary feed-frame 95 is journaled upon cone-pointed bearings 96 and 97, the latter one of which is adjustable. These bearings are mounted upon the main feed-frame 70 and are arranged as close as possible to the internal gear 90, so as to produce as little motion as possible to the small gear 91 when the auxiliary feed-frame is moved upon its bearings.

98 is a limiting set-screw passing loosely through an opening in the auxiliary feed-frame and threaded into the main feed-frame, and 99 is a spiral spring surrounding the screw 98 for yieldingly supporting the auxiliary feed-frame in normal elevated position upon the main feed-frame.

Keyed to the free end of the auxiliary feed-shaft 92 is a composite serrated feed wheel or roll 100 101, the portion 100 being of smaller diameter than the portion 101, and the portion 101 being of slightly-conoidal form to give it a feed-surface which is inclined transversely to its periphery and approximately parallel to the arc of travel of the needle. The feed-wheel 101 is adjacent to the ridge-



forming disk 76 and serves to support and feed the work at that side of said disk, while the smaller feed-wheel 100 adjacent thereto allows for the depression of the material by the presser-foot over the edge of the wheel 101, thereby insuring a uniform penetration of the work by the needle.

The main feed-frame 70 is formed with a downwardly-projecting arm 70<sup>a</sup>, which engages a limiting screw or stop 70<sup>b</sup>, mounted in the part 10 of the machine-frame.

70<sup>c</sup> is a spiral spring engaging a lug 70<sup>d</sup> on the arm 70<sup>a</sup> and having its opposite end attached to an adjustable curved arm 105, mounted in the part 10 of the machine-frame. The purpose of the spring just described is to yieldingly support the feed-frame 70 normally in raised position and at the same time allow said frame to be depressed for the insertion of the work beneath the presser-foot and also to allow the frame to yield sufficiently for the thickness of the material which is passing through the machine.

106 is a forwardly-projecting handle, by which the feed-frame can be depressed for the insertion of the work between the rigid presser-foot and lower feed mechanism.

The yielding under feed mechanism comprises the two rotatable sections or wheels which are arranged, as described, to yield independently, and when in operative relation to the stationary presser-foot they conform approximately to the under recessed or grooved operative surface of the presser-foot and hold the work in conformity with said operative surface of the presser-foot for the action of the needle.

In addition to the two-part under feeding mechanism which I have just described I provide an upper feed device, which is adapted to engage the upper exposed face of the work within the opening of the rigid presser-foot. This upper feed device comprises a feed-finger proper, 110, having a serrated lower engaging face and formed upon a curved supporting-shank 111. Adjustably attached to the feed-finger 110 and extending parallel with it in the direction of feed of the work is an auxiliary spring-finger 112, formed with a transverse needle guide or gate 112<sup>a</sup> and adapted to engage the work adjacent to the path of the needle and above the ridge-forming rib of the disk 76, the needle passing through said guide or gate 112<sup>a</sup> into the material. 113 is a set-screw adjustably securing said spring-finger 112 to the feed-finger 110. The spring-finger 112 serves two important purposes. In the first place, it confines the ridge of the work above the ridge-forming rib and insures a uniform penetration of the material by the needle, a function which I have found practically necessary in producing uniform blindstitching. In the second place, the spring-finger 112, moving with the upper feed device up to the moment of penetration of the work by the needle, effects the placing of the lower thread of the loop (on the looper) suffi-

ciently far in advance of the path of the needle to insure the penetration of the loop by the needle just prior to the penetration of the work. The movement of the work under the action of the feed tends to move said lower thread of the loop into proper position for the needle to take the loop; but I have found in practice that any slight uneven places upon the goods will cause the said lower thread of the loop to be retarded when drawn over the work by the looper, and the presence of the said spring-finger 112 affords a smooth surface for the said under thread of the loop to be drawn over into proper position by the action of the looper.

The shank 111 of the upper feed-finger is adjustably mounted in a socket formed in the forward end of a rock-arm 114, which is rigidly secured to a rock-shaft 115, journaled to the upper free end of the approximately vertical rocking frame 85. A link rock-arm 116 is rigidly secured to the rock-shaft 115 and extends rearwardly to the main driving-shaft 15 of the machine and terminates in a yoke 117, which encircles an eccentric 118. The eccentric 118 is mounted upon a flanged disk 119, which is adjustably secured to the inner face of the driving-pulley 16 by means of set-screws 120, which pass through elongated slots 121 in disk 119 into the face of the driving-pulley. By adjusting the eccentric 118 upon the driving-shaft 15 its throw can be regulated to give the required movements to the upper and lower feed devices.

The operation of the machine will be clear with but slight further explanation. The machine is primarily intended to accomplish overseaming blindstitching, which is useful in seaming the lower edges of trousers-legs, skirts, and other garments. The material to be sewed is folded at one edge to form the hem of the desired depth and by depressing the feed-frame is inserted in the machine between the under feed devices and presser-foot, the turned-up portion or hem of the material (the double thickness) being placed to the right just over the auxiliary feed device. When the feed-frame is released, it returns to its normal raised position and forces the main and auxiliary under feed devices and the ridge-forming disk or plate up into engagement with the work, said ridge-forming disk 76 pressing a ridge or rib of the work up into one of the openings of the presser-foot alongside of the spring-tongue 55, which latter holds the material to the action of the main under feed-wheel 77. The upper feed-finger 110 (on its forward stroke) engages the work over the auxiliary feed-roll 101, and the inner edge of the rigid presser-foot forces the work down over the high edge of feed-roll 101 into engagement with auxiliary feed-roll 100, thereby forming an abrupt edge of the rib or ridge in the work to cause the needle to emerge from the work at the high edge of feed-roll 101 just above the thin inner edge of the presser-foot. At the moment the needle



starts to penetrate the rib or ridge in the work the feed devices are at rest. The needle penetrates the ridge of the work transversely of the direction of feed and moves to the right until its point is a sufficient distance from the work-ridge to form a loop of the needle-thread sufficiently large for the looper to take. Just as the needle starts to return (forming on the upper side of the needle an arc or loop in the thread from the needle-eye to the work-ridge, as usual) the looper is on its forward stroke, with its two prongs or fingers in the same horizontal plane, the two prongs or fingers of the looper passing into engagement with and taking the loop and moving axially with it to carry it to the needle side of the work-ridge as the needle completes its return movement. When the needle has completed its return movement and is about to start forward on another stroke, the looper is beginning its backward stroke, with both of its prongs or fingers in the same vertical plane holding the thread-loop open for the entrance of the needle. Just as the needle is about to enter the thread-loop the lower thread of the loop comes in contact with the spring-finger 112 of the upper feed device and slides forwardly thereon to get in front of the needle to insure the needle taking the loop. The needle then passes through the thread-loop into the guide or gate 112<sup>a</sup> of finger 112 and penetrates the work-ridge above the disk 76, the finger 112 holding the ridge of work firmly down upon the disk to insure the penetration of the needle at the proper depth to make a blind stitch. The needle-guide 63 is in position to guide the needle during the greater part of its stroke, it receding just in time to get out of the way of the needle-supporting arm on the forward stroke of the needle after the needle has penetrated the work and coming back into operative position on the return stroke of the needle just after the needle-supporting arm has moved back out of its way and before the needle has been entirely withdrawn from the work.

I consider the two-part under feed mechanism, each part of which yields independently, of great importance for the following reason: In blindstitching a hem upon a piece of goods the hem portion is always approximately double the thickness of the main part of the goods and has irregularities of greater thicknesses in crossing seams, such as are encountered in trousers-legs and skirts, and it will be readily seen that with a machine having a single yielding under feed mechanism, such as shown in my former patent, the feed must yield as a whole to suit the greater thickness of the hem portion of the work, and in case the difference in thickness between the two sides of the work is very marked the thinner portion of the work will not be held up to the action of the needle, and the needle cannot penetrate it sufficiently to properly sew the hem to it. This objection could readily be overcome with a single under feed de-

vice, such as referred to in my above-named patent, if the thickness of the hem were uniform from end to end by simply allowing a greater space between the feed mechanism and presser-foot at the hem side; but the difficulty lies mainly in the fact that in practical sewing it is necessary to hem across seams of more or less thickness, and the presence of such seams in the work produces a varying thickness in the hem being formed, the thickness being always approximately double that of the seamed material upon which the hem is being formed. With the single yielding under feed mechanism, therefore, it is impossible to automatically accommodate the feed to the varying thicknesses of the work on the two sides of the line of stitching. In my machine, however, the two parts of the under feed mechanism upon the opposite sides of the ridge-forming rib are independently yielding, and the auxiliary under feed yields under the pressure of the varying extra thickness of the hem without interfering with the main under feed device, which is independently held up into engagement with the thinner main part of the work. Both sides of the work are thereby held in proper relation to insure sewing the hem to the main part of the work, and blindstitching upon the main part of the work is at the same time insured. All irregularities in the thickness of the work on the two sides of the line of stitching are independently accommodated by the independently-yielding members of the two-part under feed mechanism, and at the same time the work is fed uniformly forward by a step-by-step movement by the action of the under feed and upper feed devices. The upper feed-finger engages the work above the auxiliary feed-roll 101 and has a forward movement in an approximately straight line, then an upwardly and rearwardly movement above the work, and a downwardly movement into engagement with work for another forward-feeding stroke, the movements of the upper feeding-finger describing an ellipse flattened on its lower side.

The combination, in a sewing-machine, of a stationary presser-foot, a ridge-forming rib engaging the work beneath the presser-foot, and the two independently-yielding work-supporting members, which engage and support the work beneath the presser-foot upon opposite sides of the line of stitching defined by the ridge-forming rib, is broadly new, as far as I am aware, and I claim the same, broadly, in my present application. I also claim, broadly, the upper feed device in combination with the stationary presser-foot and the independent yielding work-supporting members referred to. The spring-fingers engaging the work above the under feed and ridge-forming rib and operating for the purpose explained are also considered novel, and it is my intention to claim them in a broad sense in the relation set forth.

The many structural features set forth in the specification and drawings are important



for the purposes set forth; but I would have it understood that my claims are not to be limited to the specific details of construction except in those claims in which the details are specifically set forth.

The stitch-forming mechanism hereinbefore described, and illustrated in the drawings connected with this case, is not claimed in my present application, but forms the subject of a divisional application, Serial No. 37,745, filed November 26, 1900.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism including a needle, a stationary presser-foot, and suitable feed mechanism, of a yieldingly-mounted ridge-forming rib engaging the work beneath the presser-foot and over which the work is fed, and a spring device engaging the work directly above said ridge-forming rib adjacent to the path of the needle, substantially as set forth.

2. In a blind-stitch sewing-machine, the combination of a suitable stitch-forming mechanism, including a needle, a stationary presser-foot, and suitable feed mechanism, of a yieldingly-mounted ridge-forming rib engaging the work beneath the presser-foot and over which the work is fed, and a spring-finger formed with a needle guide or gate and engaging the work directly above the ridge-forming rib adjacent to the path of the needle, substantially as set forth.

3. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism, and a stationary presser-foot, with a ridge-forming rib constructed and arranged to engage the work beneath the presser-foot, and an upper feed device constructed and arranged to engage the upper exposed face of the work adjacent to said ridge-forming rib, substantially as set forth.

4. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism including a needle, and suitable feed mechanism, of a ridge-forming rib over which the work is fed, a spring-finger engaging the work directly over said ridge-forming rib adjacent to the path of the needle, and a movable support carrying said spring-finger and causing it to move forward intermittently in engagement with the work and in unison with the feed, substantially as and for the purpose set forth.

5. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism, with the upper and lower feed devices constructed and arranged to engage the work upon its upper and lower exposed faces respectively, a ridge-forming rib over which the work is fed, and a spring-finger mounted upon the upper feed device and engaging the work above the ridge-forming rib adjacent to the path of the needle, substantially as set forth.

6. In a blind-stitch sewing-machine, the

combination of suitable stitch-forming mechanism, with the upper and lower feed devices constructed and arranged to engage the work upon its upper and lower exposed faces respectively, a ridge-forming rib over which the work is fed, a spring-finger mounted upon the upper feed device so as to engage the work above said rib adjacent to the path of the needle, and a needle guide or gate in said spring-finger through which the needle is projected into the work, substantially as set forth.

7. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism including a needle, a ridge-forming rib over which the work is fed, and suitable feed mechanism constructed and arranged to feed the work over said rib transversely to the path of the needle, a spring-finger, and a support for the finger, said spring-finger extending from its support in the direction of feed and engaging the work directly above the said rib adjacent to the path of the needle, substantially as set forth.

8. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism including a needle, a ridge-forming rib over which the work is fed, and suitable feed mechanism constructed and arranged to feed the work over said rib transversely to the path of the needle, a spring-finger, and a support for the spring-finger, said spring-finger extending from its support in the direction of feed and engaging the work above the said rib adjacent to the path of the needle, and a needle guide or gate formed in said spring-finger through which the needle is projected into the work, substantially as set forth.

9. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism, with a lower rotary feed device engaging the work upon its under exposed face, a ridge-forming rib over which the work is fed, an upper reciprocatory feed device engaging the upper exposed face of the work, and a spring-finger mounted upon the upper feed device, and engaging the work above said rib adjacent to the path of the needle, substantially as set forth.

10. In a blind-stitch sewing-machine, the combination of suitable stitch-forming mechanism including a reciprocatory needle arranged to operate in a path transverse to the direction of movement of the work, a lower feed device engaging the under exposed face of the work, a ridge-forming rib over which the cloth is fed, an upper reciprocatory feed device engaging the upper exposed face of the work and operating across the path of the needle, a spring-finger mounted upon the upper feed device and formed with a transverse needle guide or gate, said spring-finger extending from its support in the direction of feed and engaging the work above the ridge-forming rib adjacent to the path of the needle, and means for operating the upper and lower feed devices in unison, substantially as set forth.



11. In a sewing-machine, the combination of a machine-frame, suitable stitch-forming mechanism, a rigid presser-foot, a main rotary under feed device arranged to engage the under face of the work, a shaft upon which said under feed device is mounted, and an intermittent rotary feed mechanism upon said feed-shaft, with a reciprocatory feed-finger adapted to engage the upper exposed face of the work, a rocking frame upon which said feed-finger is mounted, means for operating said rocking frame, and means operatively connecting said rocking frame with said intermittent rotary feed mechanism, whereby the latter is operated by and in unison with the former, substantially as set forth.

12. In a sewing-machine, the combination of a machine-frame, suitable stitch-forming mechanism, a rigid presser-foot, a main rotary under feed device arranged to engage the under face of the work, a shaft upon which said under feed device is mounted, and an intermittent rotary feed mechanism upon said feed-shaft, with a suitable reciprocatory upper feed device, and operating mechanism operatively connected with the upper feed device and the intermittent rotary feed mechanism of the under feed device, whereby said feed devices will be operated in unison, substantially as set forth.

13. In a sewing-machine, the combination of suitable stitch-forming mechanism, with a stationary presser-foot, a yieldingly-mounted ridge-forming rib adapted to engage the work beneath the presser-foot, and a yieldingly-mounted feed device independent of the ridge-forming rib and arranged to engage the work beneath the presser-foot adjacent to the ridge-forming rib, substantially as set forth.

14. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a rigidly-mounted presser-foot, with a ridge-forming rib arranged to engage the work beneath the presser-foot, a yieldingly-mounted feed device, arranged to engage the work beneath the presser-foot at one side of the ridge-forming rib, and an independent yieldingly-mounted work-supporting device engaging the work beneath the presser-foot at the opposite side of the ridge-forming rib, substantially as set forth.

15. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a rigidly-mounted presser-foot, with a ridge-forming rib arranged to engage the work beneath the presser-foot, a yieldingly-mounted lower feed device arranged to engage the work beneath the presser-foot at one side of the ridge-forming rib, an independent yieldingly-mounted work-supporting device engaging the work beneath the presser-foot at the opposite side of the ridge-forming rib, and an upper feed device arranged to engage the work upon its upper face, substantially as and for the purpose set forth.

16. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a

rigid presser-foot, with two independently-yielding feed devices arranged to engage the work beneath the presser-foot, and a feed device arranged to engage the work upon its upper face, substantially as set forth.

17. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a rigidly-mounted presser-foot, with a yieldingly-mounted lower feed device arranged to engage the work beneath the presser-foot at one side of the line of stitching, an independent yieldingly-mounted work-supporting device arranged to engage and support the work beneath the presser-foot at the other side of the line of stitching, and a suitable upper feed device arranged to engage the work upon its upper face, substantially as and for the purpose set forth.

18. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a rigidly-mounted presser-foot, with a yieldingly-mounted lower feed device arranged to engage the work beneath the presser-foot at one side of the line of stitching, an independent yieldingly-mounted work-supporting device arranged to engage and support the work beneath the presser-foot at the other side of the line of stitching, and a suitable upper feed device arranged to engage the work upon its upper face directly above the said yielding work-supporting device and upon the opposite side of the line of stitching from the lower feed device, substantially as and for the purpose set forth.

19. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a spring-supported main feed-frame, a main feed device carried thereby and arranged to engage the work beneath the presser-foot, of an auxiliary spring-supported frame, an auxiliary feed device carried thereby and arranged to engage the work beneath the presser-foot adjacent to the main feed device, and means for operating the main and auxiliary feed devices, substantially as set forth.

20. In a sewing-machine, the combination of suitable stitch-forming mechanism, with a spring-supported feed-frame, suitable main feed mechanism mounted upon said frame, an auxiliary spring-supported frame journaled upon said main feed-frame, an auxiliary feed device mounted upon said auxiliary frame, and means for operating said main and auxiliary feed devices, substantially as set forth.

21. In a sewing-machine, the combination of suitable stitch-forming mechanism, a rigid presser-foot, a yieldingly-mounted ridge-forming rib, a feed-shaft pivotally mounted at or near one end independently of the ridge-forming rib, a feed-roll mounted upon said feed-shaft, and a yielding support for the opposite end of said feed-shaft, substantially as set forth.

22. In a sewing-machine, the combination of suitable stitch-forming mechanism, and a



rigidly-mounted presser-foot, with a yieldingly-mounted ridge-forming rib engaging the work beneath the presser-foot, a yieldingly-mounted work supporting and feeding device arranged upon one side of the ridge-forming rib beneath the presser-foot and adapted to yield with the ridge-forming rib, and another yieldingly-mounted work supporting and feeding device arranged beneath the presser-foot upon the opposite side of said rib and adapted to yield independently of the rib and the first-named work supporting and feeding device, substantially as set forth.

23. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, and two independently-yielding feed devices arranged upon opposite sides of the ridge-forming rib or plate, said rib or plate and the two feed devices being arranged to engage the work beneath the presser-foot, and means for operating the feed devices, substantially as set forth.

24. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, and two independently-yielding feed devices arranged upon opposite sides of the ridge-forming rib or plate, said rib or plate and the two feed devices being arranged to engage the work beneath the presser-foot, an upper feed device engaging the work above one of the yielding supported under feeding devices to one side of the ridge-forming rib, substantially as set forth.

25. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, and two independently-yielding feed devices arranged upon opposite sides of the ridge-forming rib or plate, said rib or plate and the two feed devices being arranged to engage the work beneath the presser-foot, a spring device engaging the work above one of the yieldingly-mounted lower feed devices to one side of the ridge-forming rib, and an upper feed device engaging the work above the other yieldingly-mounted lower feed device on the other side of the ridge-forming rib, substantially as set forth.

26. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, and two independently-yielding feed devices arranged upon opposite sides of the ridge-forming rib or plate, said rib or plate and the two feed devices being arranged to engage the work beneath the presser-foot, a spring device engaging the work above one of the yieldingly-mounted under feed members, another spring device engaging the work above the ridge-forming rib, and an upper feed device engaging the work above the

other yieldingly-mounted under feed member, substantially as set forth.

27. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, and two independently-yielding feed devices arranged upon opposite sides of the ridge-forming rib or plate, said rib or plate and the two feed devices being arranged to engage the work beneath the presser-foot, two spring devices engaging the upper exposed face of the work, one of said spring devices being arranged above one of the yieldingly-mounted feed devices, and the other spring device being arranged above the ridge-forming rib or plate, substantially as set forth.

28. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a spring-supported feed-frame, a feed-shaft journaled in said feed-frame, means for operating said shaft, a ridge-forming disk or circular plate secured to said shaft, a feed disk or wheel also secured to said shaft alongside of said ridge-forming disk or plate, said ridge-forming disk and feed disk or wheel being arranged to engage the work beneath the presser-foot, and an independently-yielding feed device arranged to engage the work beneath the presser-foot adjacent to said ridge-forming disk or plate, substantially as set forth.

29. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a spring-supported main feed-frame, a feed-shaft journaled in said feed-frame, means for operating said feed-shaft, a ridge-forming rib or plate mounted upon said shaft, a feed disk or wheel also mounted upon said shaft, an auxiliary spring-supported feed-frame mounted upon the main feed-frame, an auxiliary feed-shaft journaled in said auxiliary frame, a feed-wheel mounted upon said auxiliary shaft and supported adjacent to the ridge-forming rib or plate, and suitable gearing between the main feed-shaft and auxiliary feed-shaft, substantially as set forth.

30. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a spring-supported main feed-frame, a main feed-shaft journaled in said feed-frame and carrying an internal gear, means for operating said feed-shaft, a ridge-forming rib or plate mounted upon said shaft, a feed disk or wheel also mounted upon said shaft, an auxiliary spring-supported feed-frame mounted upon the main feed-frame, an auxiliary feed-shaft journaled in said auxiliary frame, a feed-wheel mounted upon said auxiliary shaft and supported adjacent to the ridge-forming rib or plate, and a gear keyed to the auxiliary feed-shaft meshing, with said internal gear of the main feed-shaft, substantially as and for the purpose set forth.



31. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a spring-supported main feed-frame, a feed-shaft journaled in said feed-frame, means for operating said feed-shaft, a ridge-forming rib or plate mounted upon said shaft, a feed disk or wheel also mounted upon said shaft, an auxiliary spring-supported feed-frame extending approximately parallel to the main feed-frame and pivotally mounted adjacent to one of its ends to the main feed-frame, a feed-wheel mounted upon the free end of said shaft adjacent to the ridge-forming rib or plate, a gear keyed to the opposite end of said auxiliary feed-shaft, and an internal gear keyed to the main feed-shaft adjacent to the pivotal support of the auxiliary feed-frame, said internal gear meshing with the gear on the auxiliary feed-shaft, substantially as and for the purpose set forth.

32. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, and two independently-yielding feed devices arranged upon opposite sides of the ridge-forming rib or plate, said rib or plate and the two feed devices being arranged to engage the work beneath the presser-foot, one of said yieldingly-supported feed devices being formed of relatively high and low portions, the high portion of which engages the work adjacent to the ridge-forming rib or plate, substantially as and for the purpose set forth.

33. In a sewing-machine for blindstitching, the combination of suitable stitch-forming

mechanism, and a rigid presser-foot, with a yieldingly-mounted ridge-forming rib or plate, a yieldingly-supported main feed wheel or roll engaging the work beneath the presser-foot at one side of the ridge-forming rib or plate, and a yieldingly-supported auxiliary feed wheel or roll engaging the work beneath the presser-foot on the other side of the ridge-forming rib or plate, said auxiliary feed wheel or roll comprising a relatively high conoidal part which engages the work adjacent to the ridge-forming rib or plate and a relatively low cylindrical part which engages the work adjacent thereto, substantially as set forth.

34. In a sewing-machine for blindstitching, the combination of suitable stitch-forming mechanism including a curved needle and operating mechanism to reciprocate it in an arc, a rigid presser-foot formed with an elongated opening in it, a ridge-forming rib or plate constructed and arranged to engage the work beneath the presser-foot and form a ridge in the work within the opening in the presser-foot, and a yieldingly-supported feed wheel or roll consisting of a relatively high conoidal portion and a relatively low cylindrical portion, the conoidal portion of said feed-roll engaging the work adjacent to the ridge-forming rib or plate under the opening in the presser-foot and the cylindrical portion of said feed-roll engaging the work under the presser-foot adjacent to its opening, substantially as set forth.

CHARLES A. DEARBORN.

Witnesses:

WM. E. KNIGHT,  
D. J. NEWLAND.