

No. 758,671.

PATENTED MAY 3, 1904.

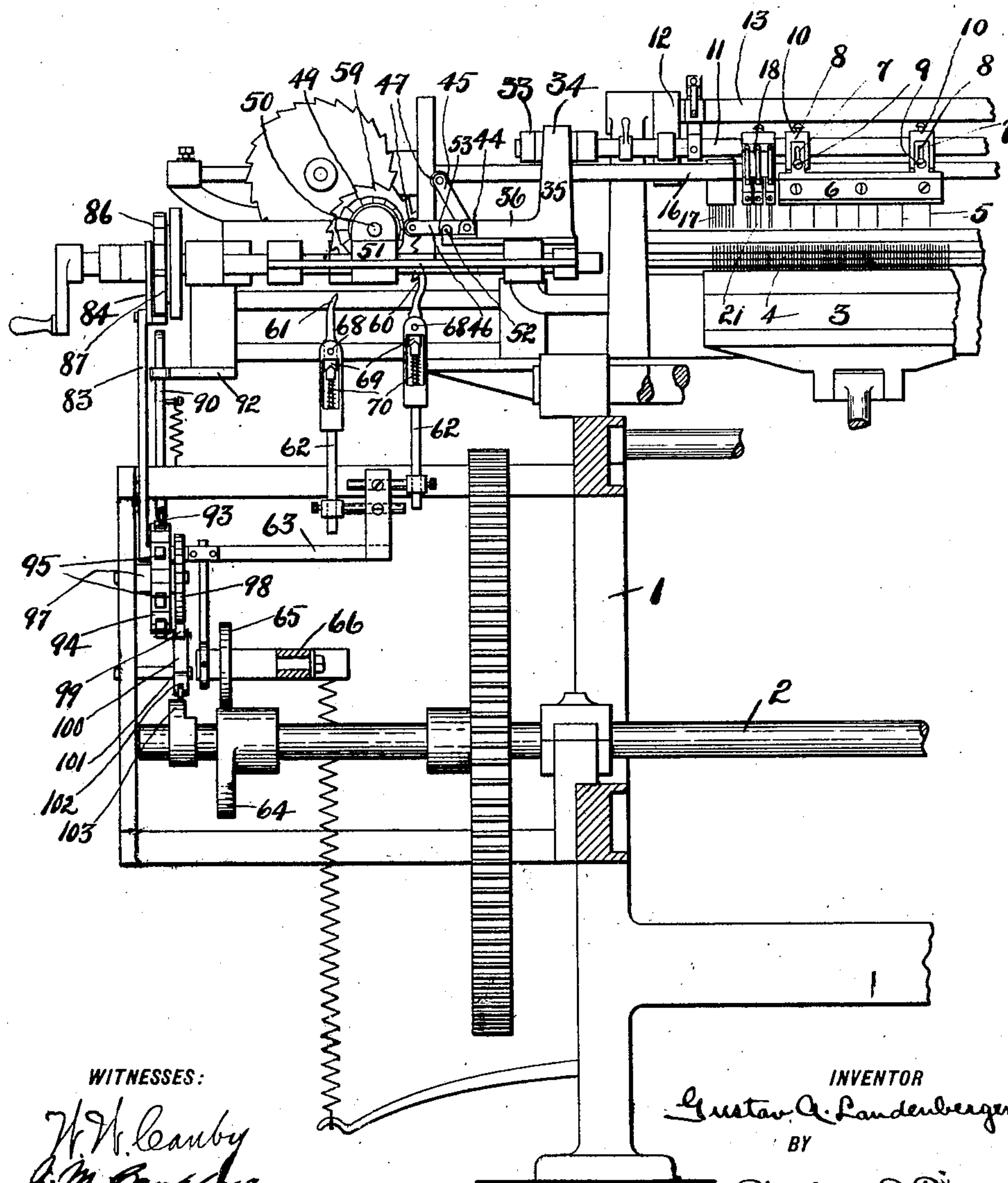
G. A. LANDENBERGER.
STRAIGHT KNITTING MACHINE.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.

7 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

W. H. Canby
J. M. Campbell

INVENTOR

Gustav A. Landenberger

BY

Walter C. Pusey
ATTORNEY.

No. 758,671.

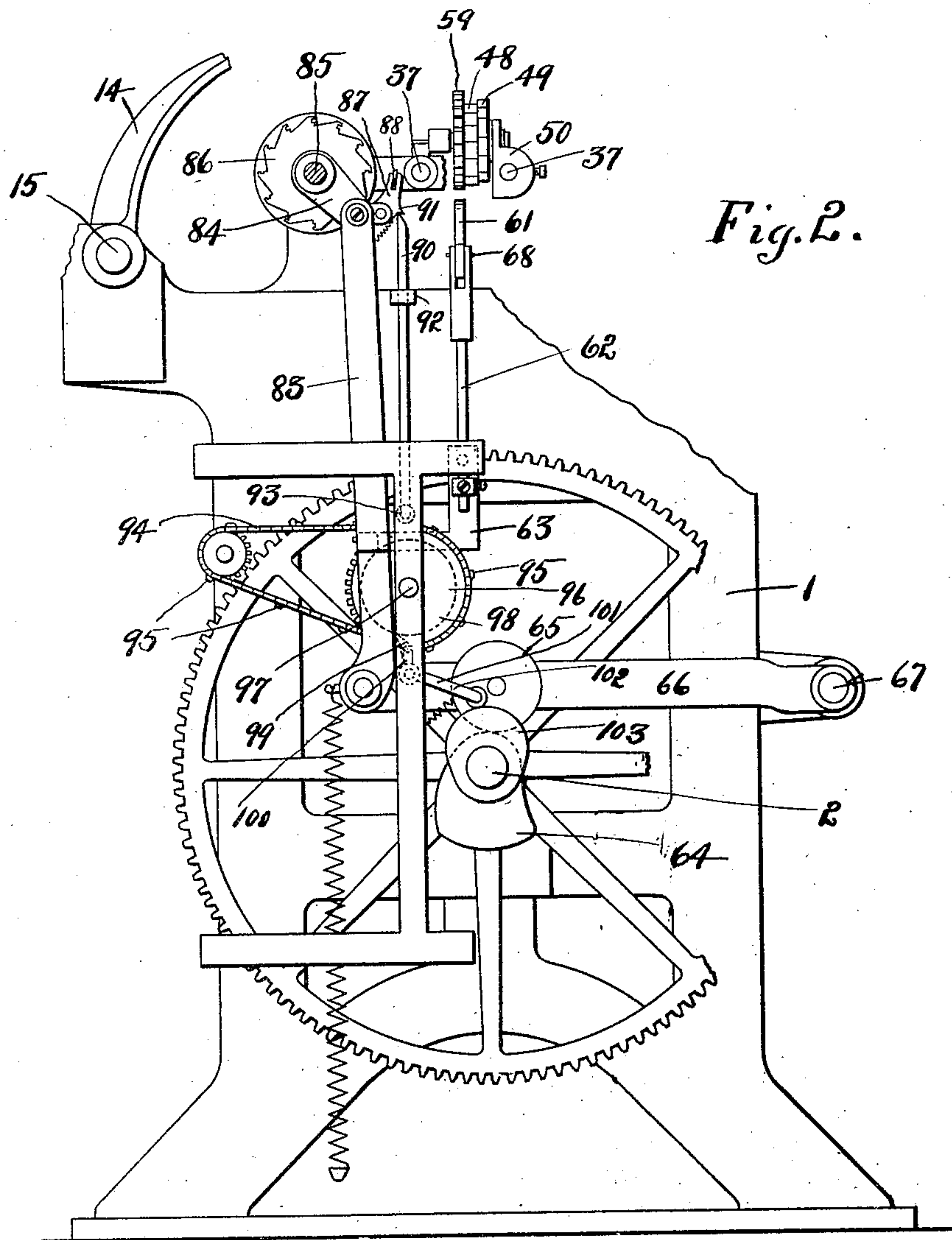
PATENTED MAY 3, 1904.

G. A. LANDENBERGER.
STRAIGHT KNITTING MACHINE.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.

7 SHEETS—SHEET 2



WITNESSES:

W. H. Leuby
J. M. Campbell

INVENTOR

Gustav A. Landenberger

BY

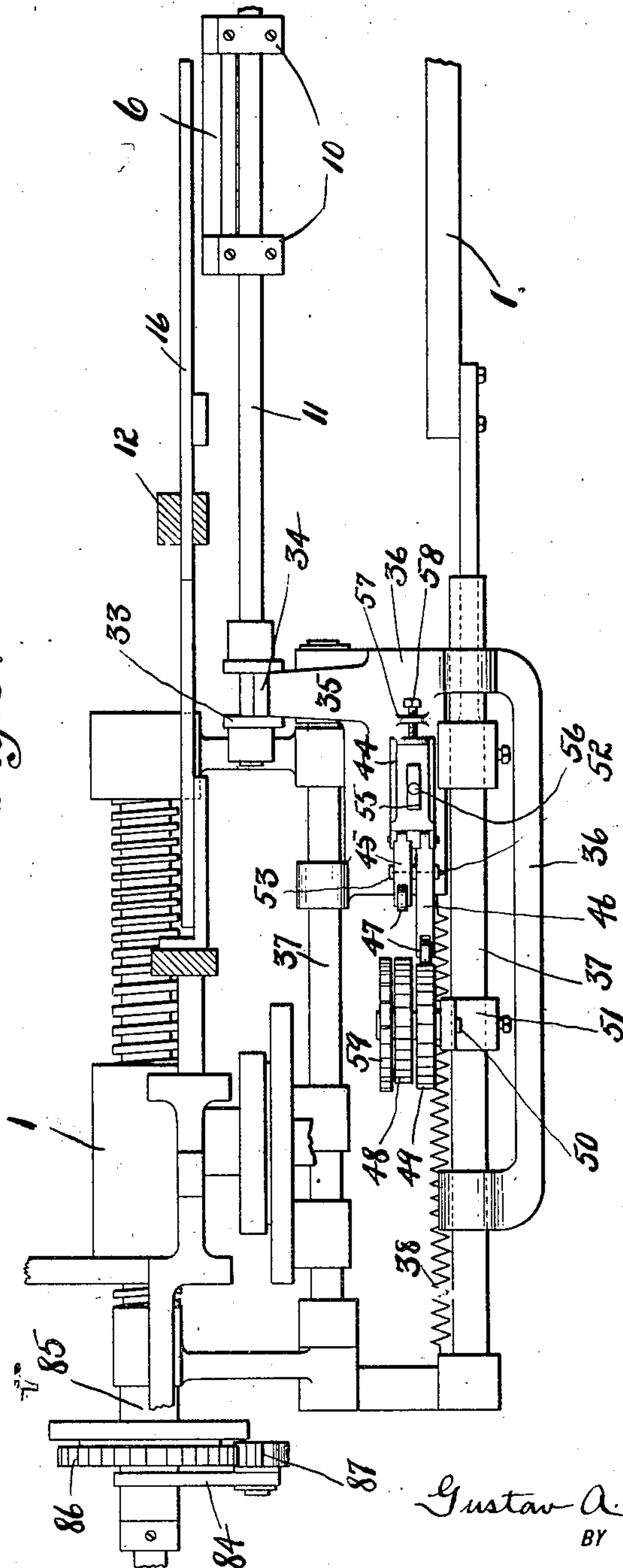
Walter C. Bussey
ATTORNEY.

NO MODEL.

7 SHEETS—SHEET 3

APPLICATION FILED OCT. 1, 1903.

Fig. 3.



WITNESSES:

W. H. Canby
J. M. Campbell

INVENTOR

Gustav A. Landenberger
BY

Walter C. Bussey
~~ATTORNEY.~~

No. 758,671.

PATENTED MAY 3, 1904.

G. A. LANDENBERGER.
STRAIGHT KNITTING MACHINE.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.

7 SHEETS—SHEET 4.

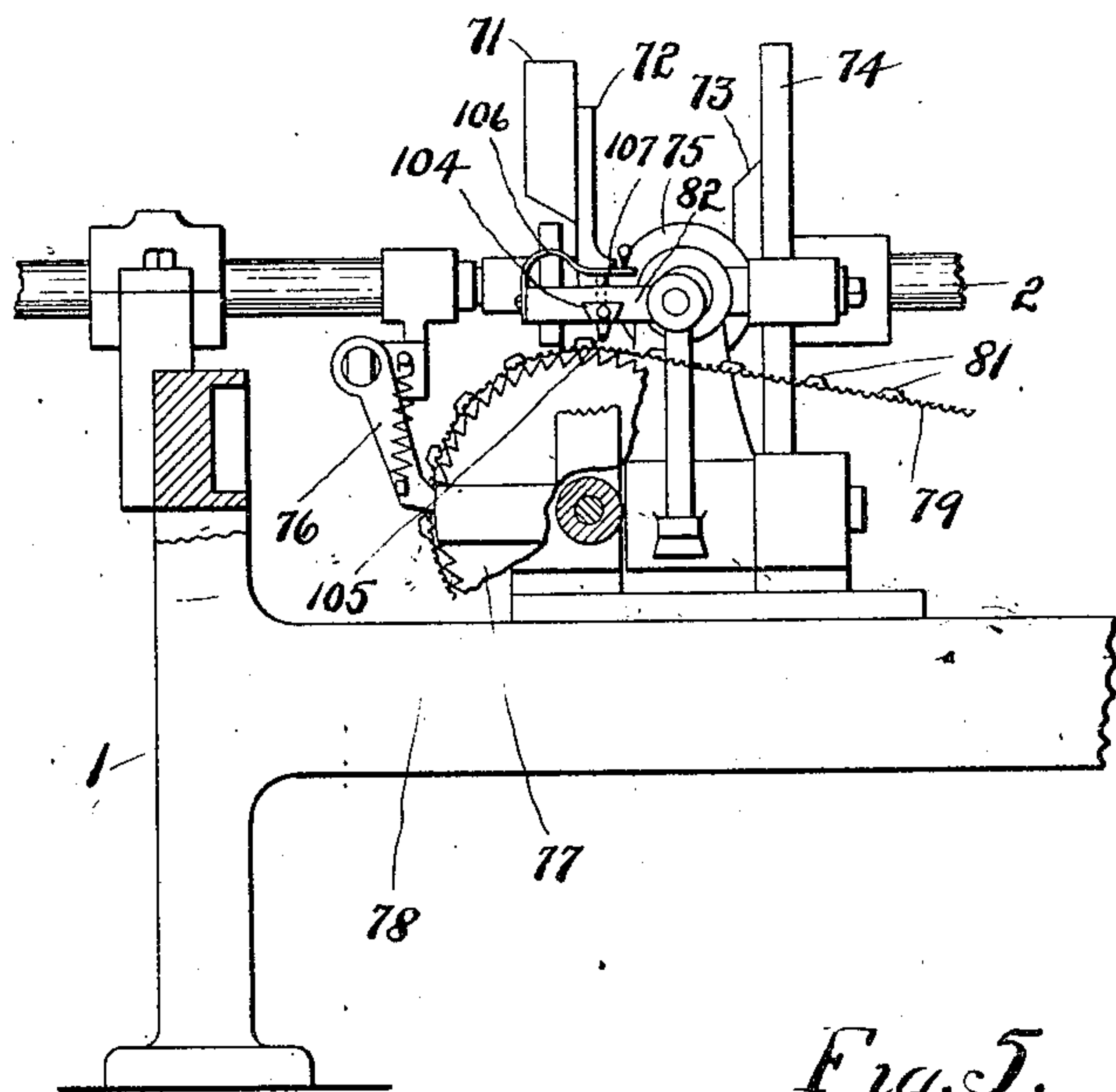


Fig. 4.

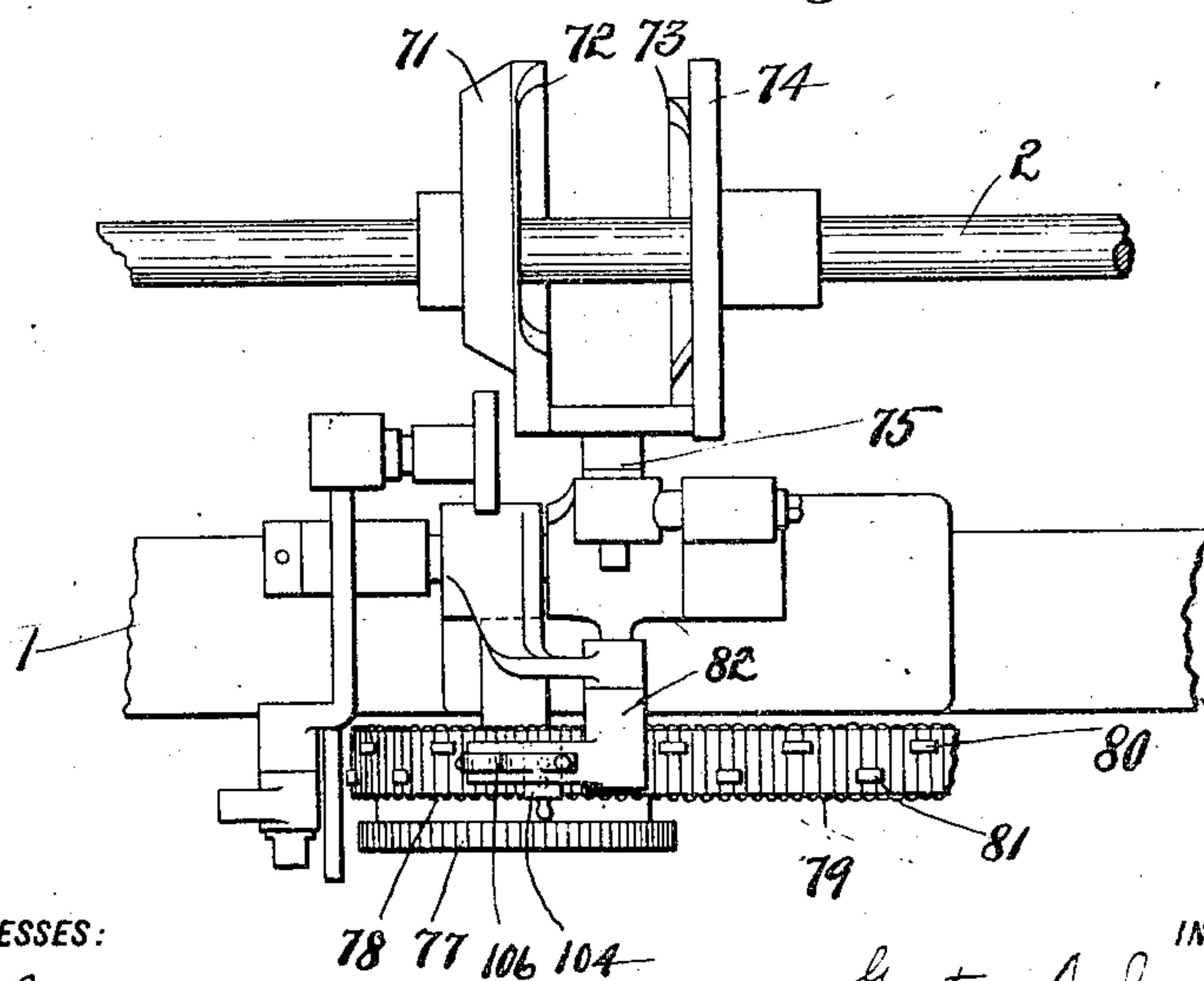


Fig. 5.

WITNESSES:

W. H. Leiby
J. M. Campbell

INVENTOR

Gustav A. Landenberger
BY

Walter C. Pusey
ATTORNEY.

No. 758,671.

PATENTED MAY 3, 1904.

G. A. LANDENBERGER.
STRAIGHT KNITTING MACHINE.

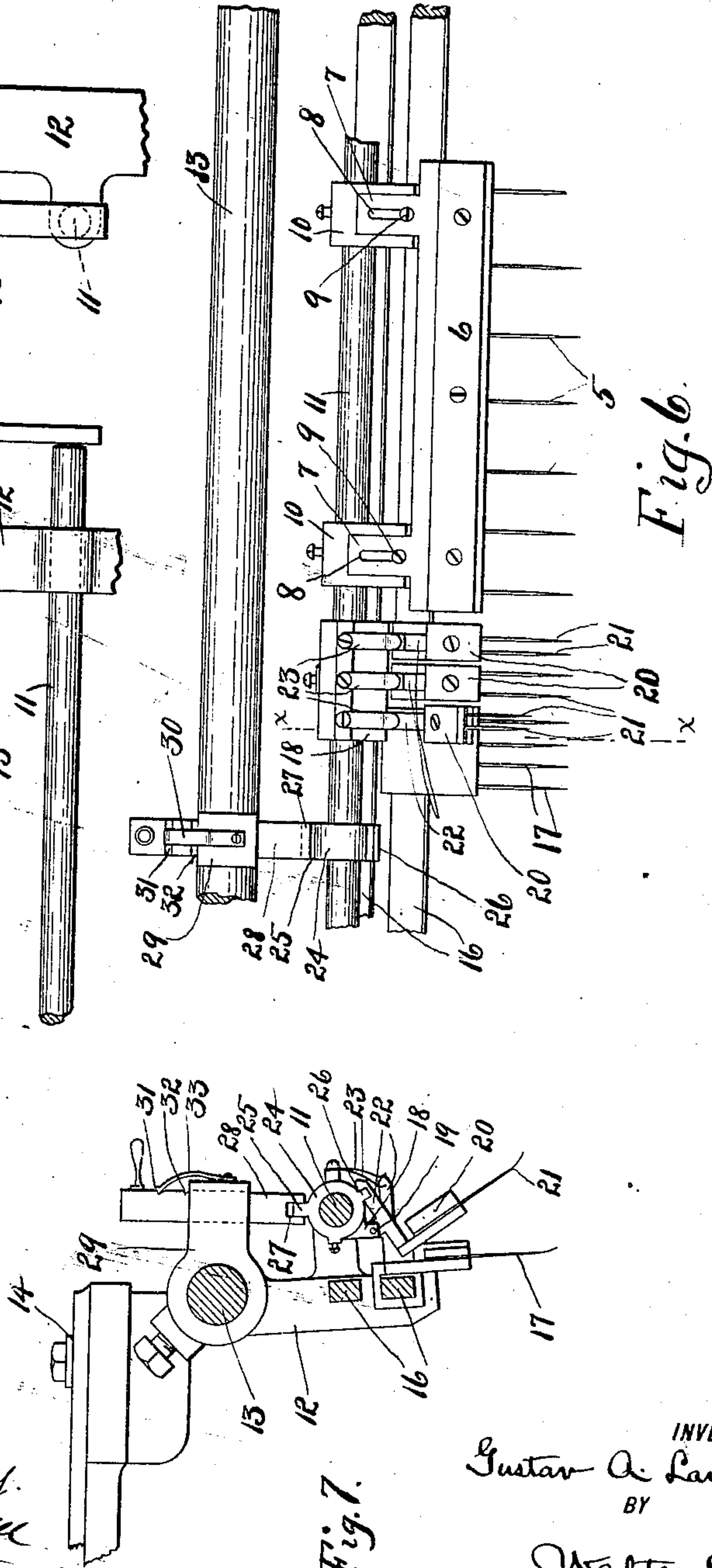
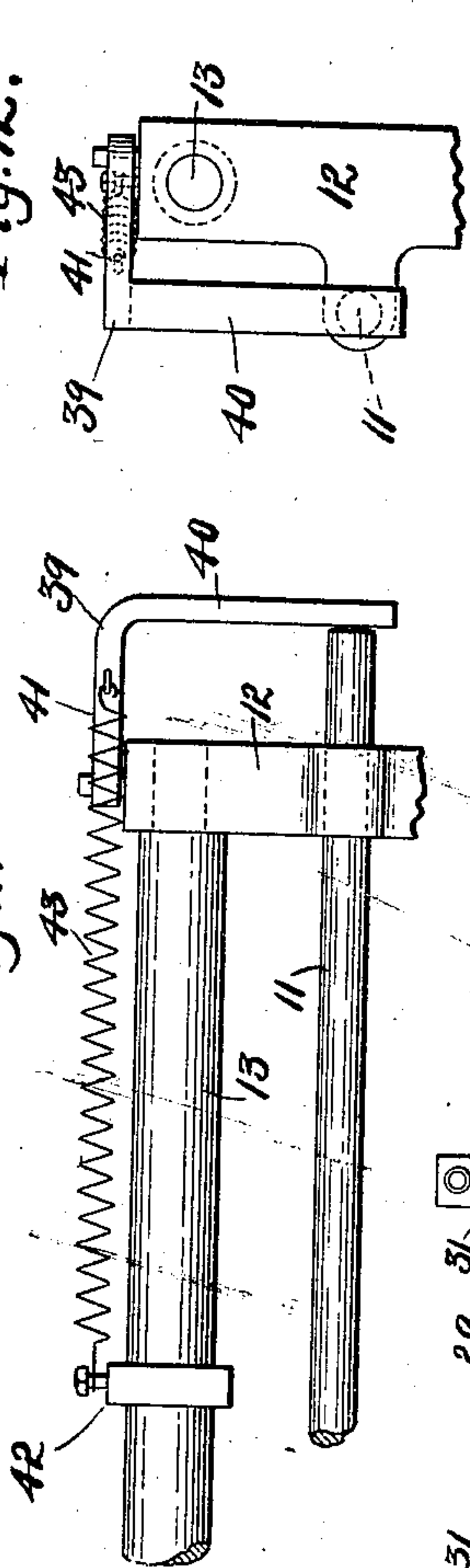
APPLICATION FILED OCT. 1, 1903.

NO MODEL.

7 SHEETS—SHEET 5.

Fig. 12.

Fig. 11.



WITNESSES:
H. H. Canby.
J. M. Campbell.

Fig. 7.

INVENTOR
Gustav A. Landenberger
BY
Walter C. Pusey
ATTORNEY.

No. 758,671.

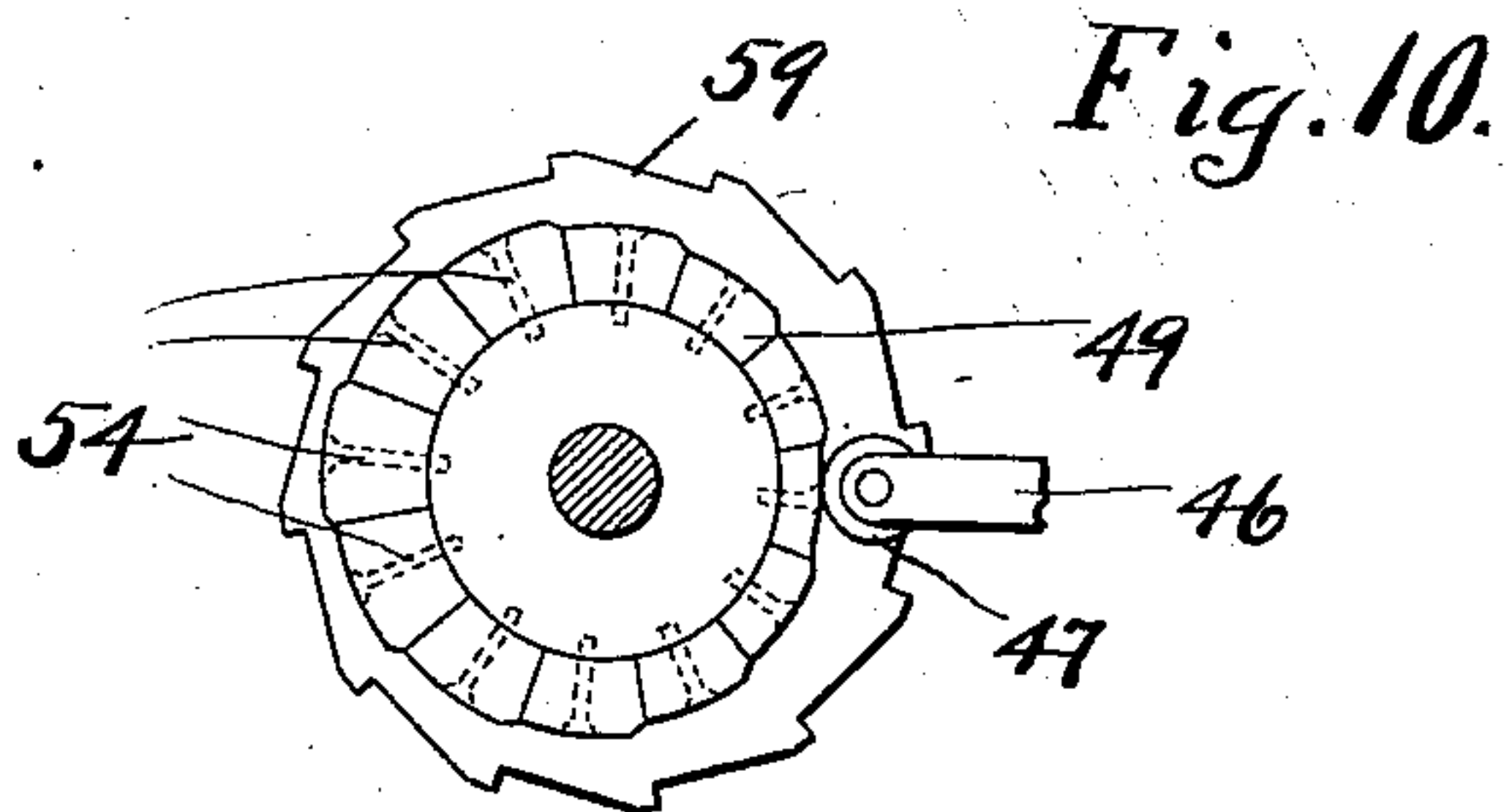
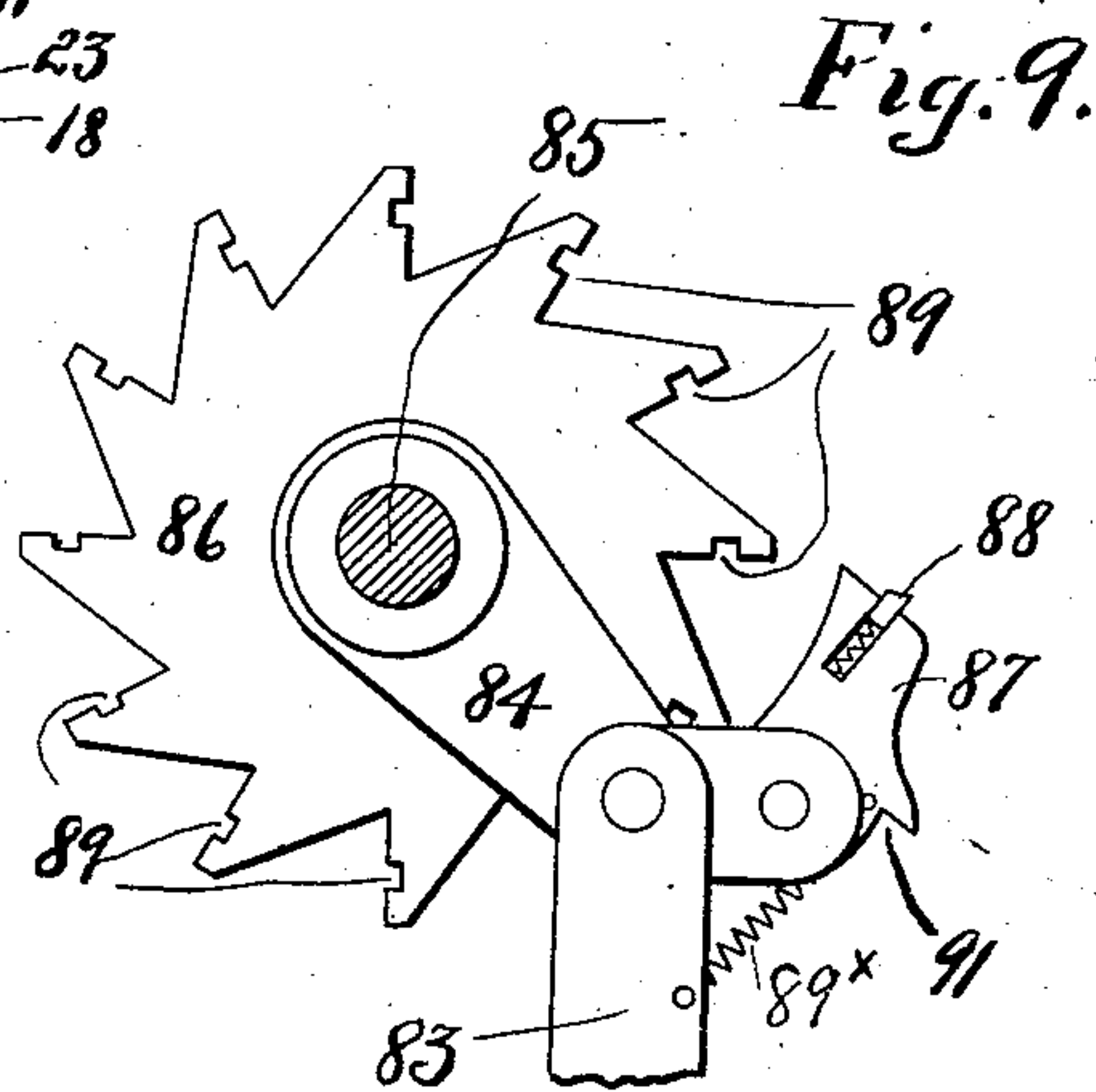
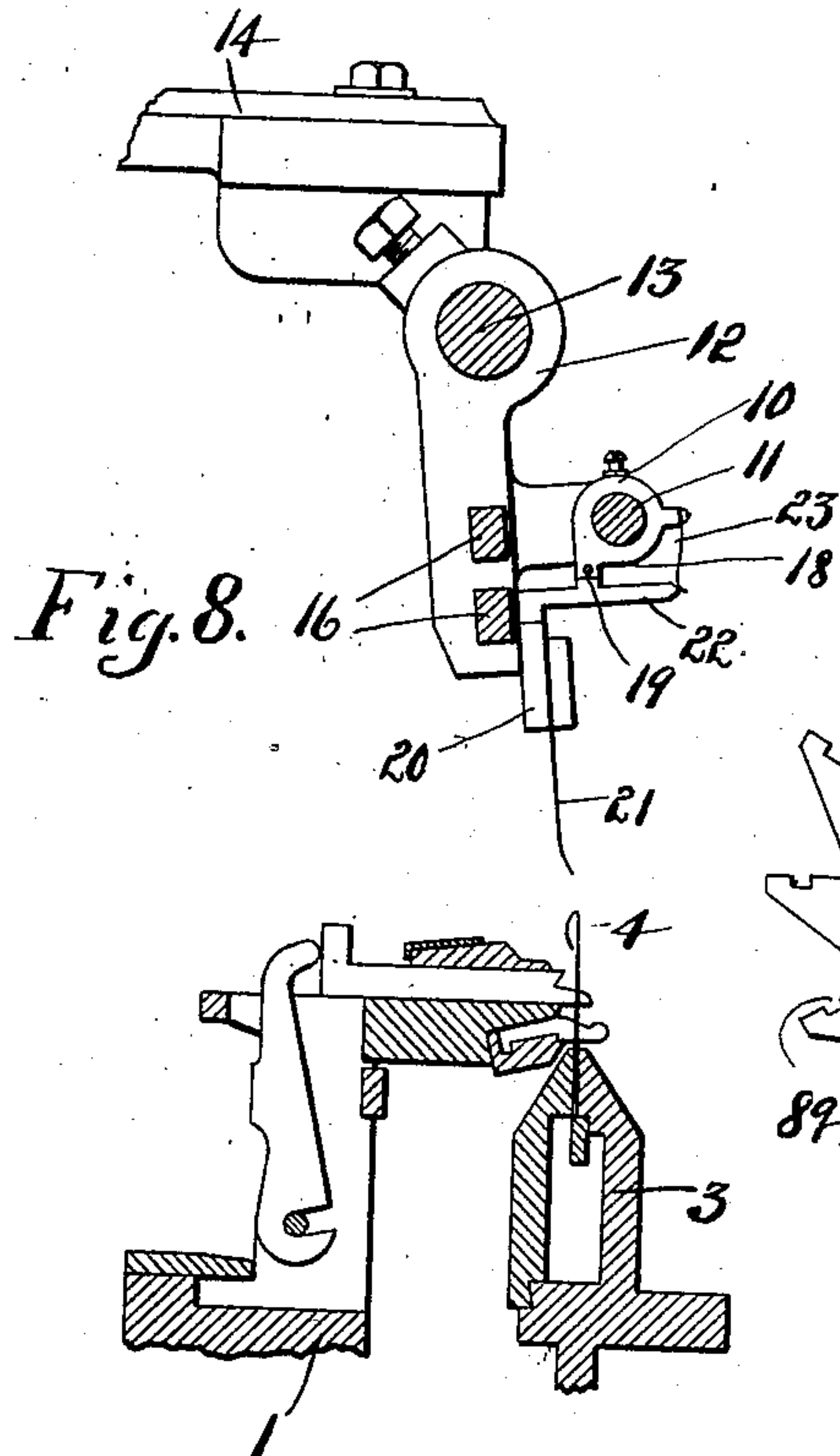
PATENTED MAY 3, 1904.

G. A. LANDENBERGER.
STRAIGHT KNITTING MACHINE.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.

7 SHEETS—SHEET 6.



WITNESSES:

H. H. Leuby
J. M. Campbell

INVENTOR

Gustav A. Landenberger

BY

Walter C. Busch
ATTORNEY.

No. 758,671.

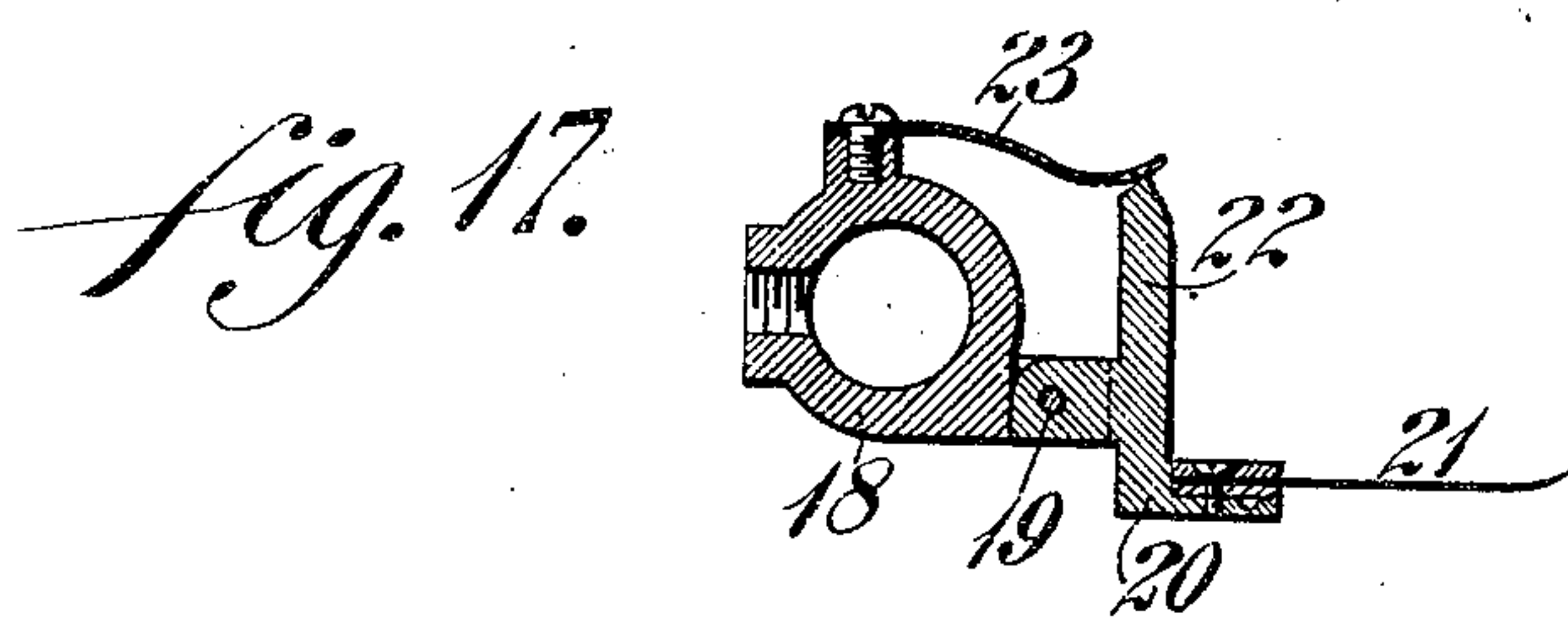
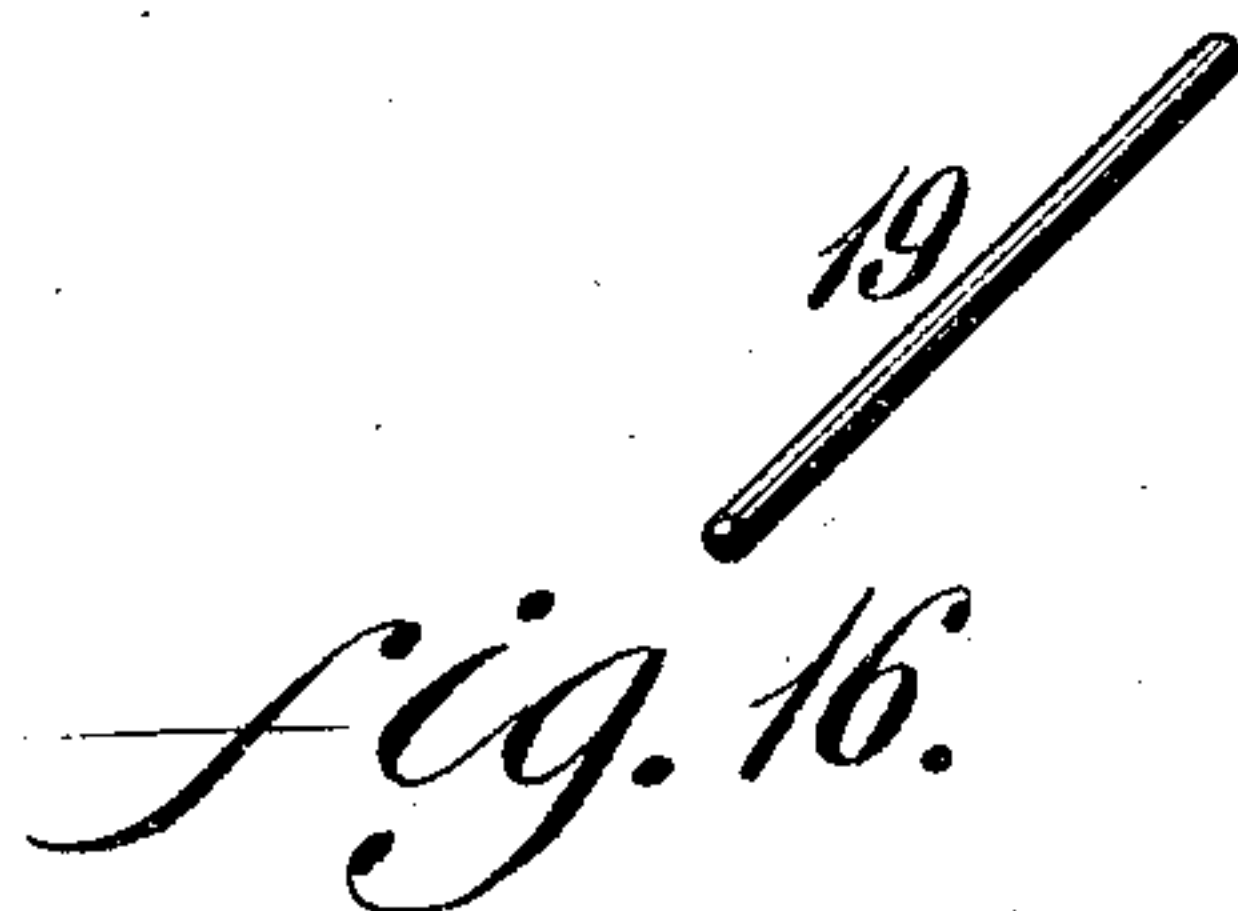
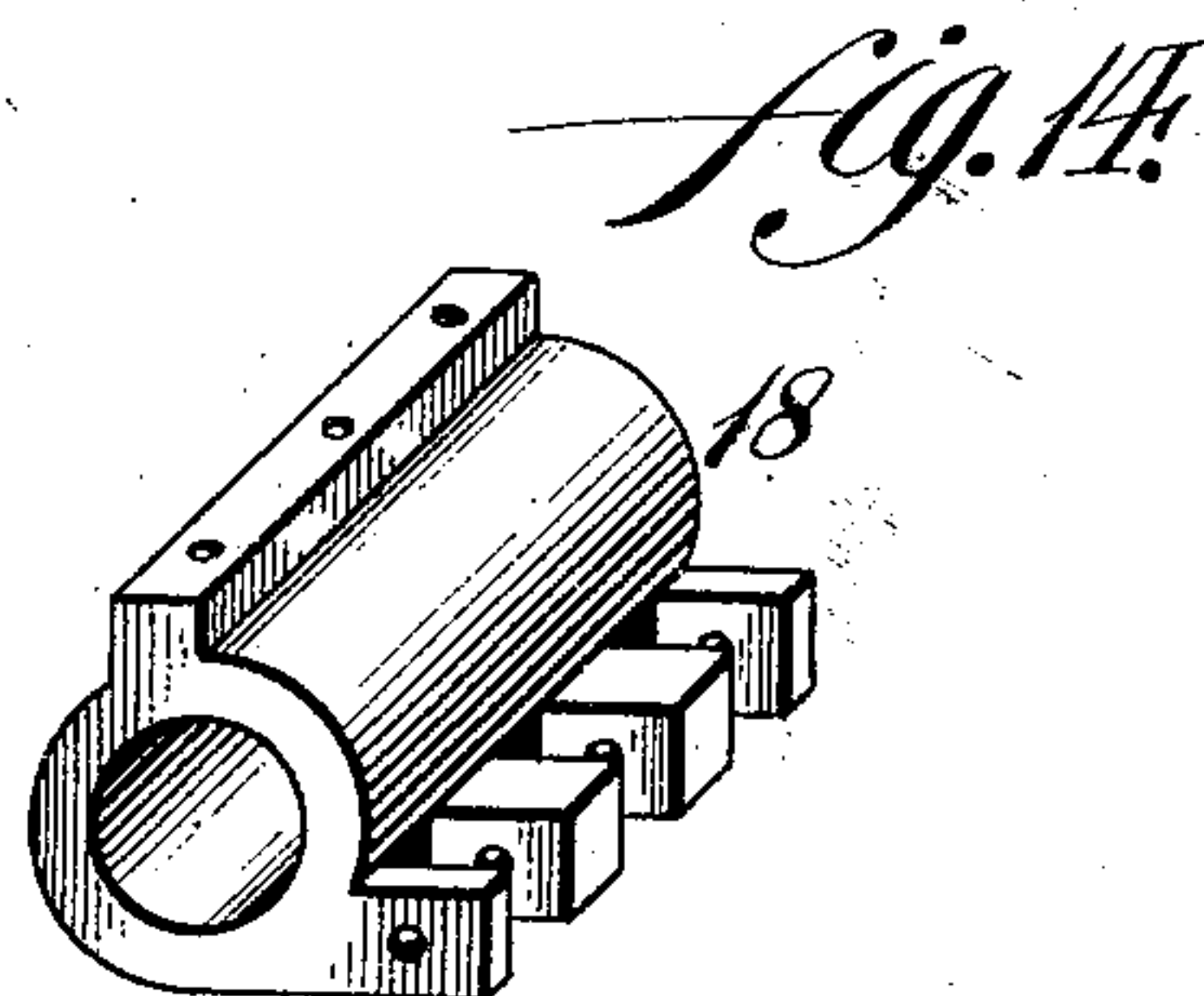
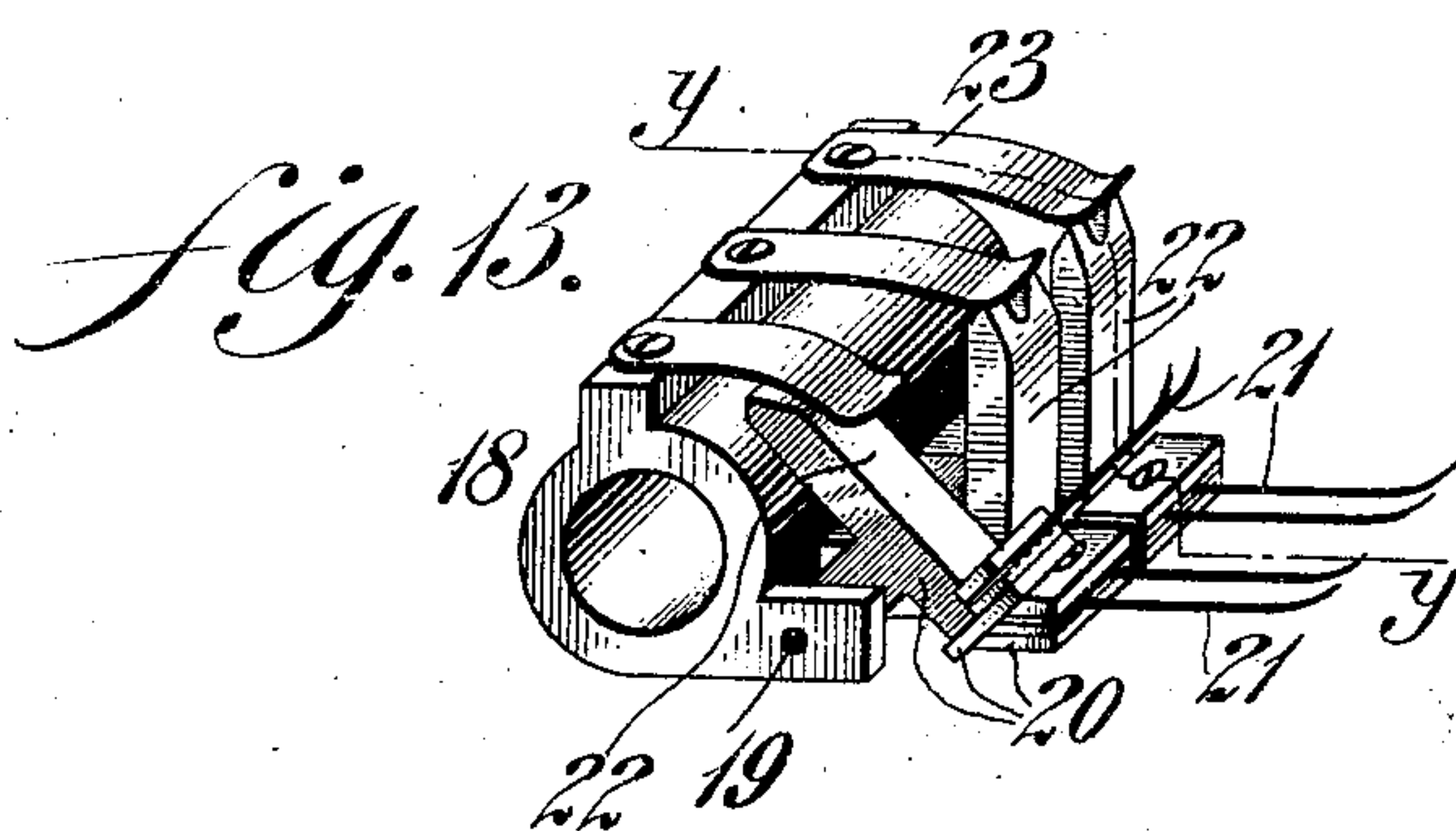
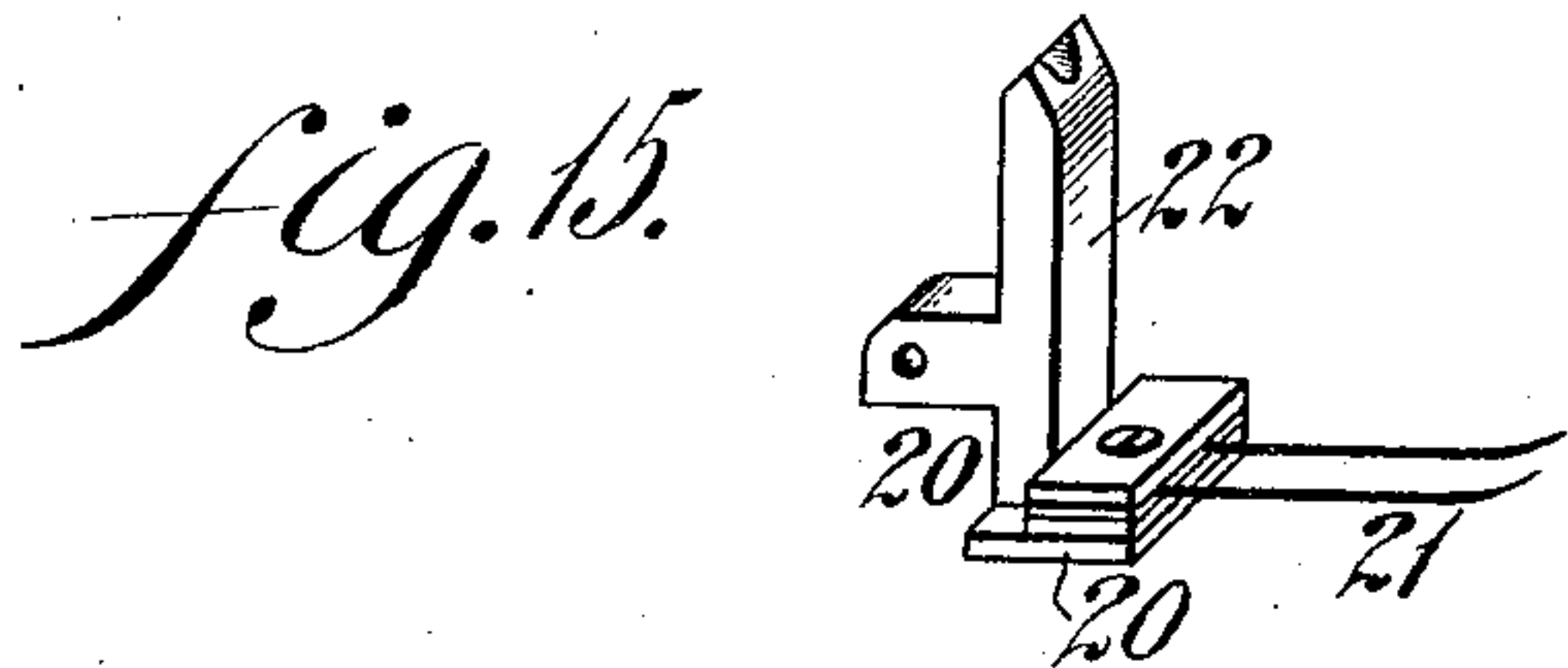
PATENTED MAY 3, 1904.

G. A. LANDENBERGER.
STRAIGHT KNITTING MACHINE.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.

7 SHEETS—SHEET 7.



Witnesses

L. Douville,
P. H. Hagli

Inventor

Gustav A. Landenberger.

By Wiedersheim & Fairbanks
Attorneys

UNITED STATES PATENT OFFICE.

GUSTAV A. LANDENBERGER, OF PHILADELPHIA, PENNSYLVANIA.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 758,671, dated May 3, 1904.

Application filed October 1, 1903. Serial No. 175,279. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV A. LANDENBERGER, a subject of the Emperor of Austria-Hungary, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Straight-Knitting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a front elevation of one end of a straight-knitting machine embodying my invention. Fig. 2 is an end elevation of Fig. 1. Fig. 3 is an enlarged plan view of Fig. 1. Fig. 4 is an enlarged front elevation of a portion of the machine, showing the pattern mechanism for controlling the longitudinal reciprocations of the shogging-shaft. Fig. 5 is a plan view of Fig. 4. Fig. 6 is an enlarged front view of the lace-points and the fashioning-points at one side thereof and their supporting-bars, showing the parts in a position occupied during the fashioning operation, two of the auxiliary lace-points being thrown up out of position so as to escape the fashioning-points. Fig. 7 is an end view of Fig. 6. Fig. 8 is an enlarged sectional elevation, broken away, taken on line *xx*, Fig. 6. Fig. 9 is an enlarged detail of a portion of the mechanism for actuating the fashioning-points independently of the lace-points. Fig. 10 is a side elevation of a portion of the pattern mechanism for controlling the action of the lace-points, whereby they are given a longitudinal movement in transferring the loops from certain needles to certain other needles in forming the lace effect in the fabric. Fig. 11 is a side elevation of a portion of the machine, showing the auxiliary spring mechanism for aiding in reciprocating the lace-point-carrying shaft. Fig. 12 is an end view of Fig. 11. Fig. 13 is a perspective view of a portion of the device, showing the lace-points and the parts connected therewith. Figs. 14, 15, and 16 show in perspective various parts of this portion of my device detached from each other. Fig. 17 is a vertical section through the line *yy*, Fig. 13.

This invention relates to improvements in straight-knitting machines for knitting either

plain work or lace effects or patterns in the fabrics.

It comprises means whereby the lace-points may be supported either in or out of their operative position.

It also comprises novel mechanism for rotating the fashioning-point-bar shaft.

It further consists of novel features of construction, all as will be hereinafter fully set forth.

In the drawings I have shown only so much of the machine as I have deemed necessary to illustrate my invention, the general construction of machines of this class being well known, as illustrated, for instance, in Letters Patent No. 658,826, issued October 2, 1900, and No. 703,055, issued June 24, 1902.

In the said drawings 1 denotes the general framework of the machine, in which is journaled in such manner as to be capable of being reciprocated longitudinally by mechanism and for a purpose hereinafter set forth the usual shogging-shaft 2, which is rotated from a suitable source of power and from which the other mechanisms of the machine are driven.

3 designates one of the usual needle-bars, adapted to be actuated from the shogging-shaft 2 by mechanism such as is well known and which I have not, therefore, deemed it necessary to show in the drawings hereof. Said mechanism causes the needles 4 to receive the threads fed thereto in the usual manner and to form the usual loops of the fabric.

The lace-points 5 are carried by a bar or frame 6, which has upwardly-extending lugs 7, provided with vertical slots 8, through which pass screw-bolts 9 for adjustably securing the same to collars 10 on a bar 11, which bar is carried by a frame 12 on a second bar 13. The bar 11 is so mounted on frame 12 as to be capable of being moved longitudinally thereon, as and for a purpose hereinafter appearing.

The bar 13 is carried by arms 14, pivoted to a shaft 15. The arms 14, bar 13, frame 12, and the lace-points and other parts carried thereby are adapted to be rocked forward and downwardly and back again by suitable well-known mechanism, whereby the lace-points are caused to enter the loops on the needles

and to remove the same therefrom, and by suitable mechanism, hereinafter described, are at the same time caused to move longitudinally to transfer said loops to other needles, according to the required lace-pattern.

A suitable mechanism for rocking the frames 12, carrying the lace-points, &c., is illustrated and described in the said Letters Patent No. 703,055, and I have therefore deemed it unnecessary to illustrate the same herein. Also carried by the frame 12 are longitudinally-slidable bars 16, which bars carry the usual fashioning-points 17 and are (by suitable mechanism hereinafter referred to) caused to move toward the lace-points in narrowing the fabric and out again in widening to fashion the fabric, all in the well-known manner. It is often desirable to extend the lace effect close to the lines of the fashioning. This I accomplish by mounting upon the bar 11 at each side of the said lace-point-carrying frame 6 a frame 18, having pivoted thereto on a shaft or shafts 19, Fig. 7, a series of L-shaped frames 20, which latter frames carry auxiliary lace-points 21, said frames 20 having, respectively, forwardly-projecting arms 22, whose free ends are V-shaped, as seen, and are respectively impinged against by flat springs 23, whereby the said frames and points carried thereby may respectively be held either in working position—that is, in line with the other lace-points 5 and fashioning-points 17, as in Fig. 8—or may be held out of working position and out of the way of the fashioning-points 17, as seen in Fig. 7. It will thus be clear that when the straight portion of the web is being knit, the ordinary and auxiliary lace-points being in operation, the lace effect will be produced entirely across the fabric, except in the line of the fashioning-points, (when the latter are in their outward—that is, the inactive position;) but as the narrowing is begun first the one of said frames 20 next to the approaching fashioning-points is thrown up to the position shown in Fig. 7, thus bringing the auxiliary lace-points 21, carried thereby, out of the way of the fashioning-points. Then as the fashioning-points continue to move inwardly toward the lace-points 5 in the narrowing operation the next frame 20 is thrown up out of operative position, and so on until the narrowing operation is completed, when the action is reversed. Thus the lace effect is produced in the fabric close up to the line of the fashioning-points.

Well-known automatic means may be provided for throwing the frames 20 into and out of relative position, but as this forms no part of my invention I have not thought it necessary to show or describe such means, particularly as the movement may be produced by hand.

When it is desired to knit plain work on the machine—that is, without the lace effect—the lace-points may be thrown up and locked

out of working position in the following manner: The bar or shaft 11 is provided with one or more collars 24, having each two projecting lugs 25 and 26, one of which, 25, when the lace-points are in working position is engaged by the lower forked end 27 of a rod 28, which is vertically slidable in an arm 29, extending from the bar 13, which rod 28 is held in position vertically by a spring 30, which is adapted to engage either of two notches 31 32 in the face of the rod, and so maintain the same in either position to which it may be moved.

When it is desired to move the lace-point frames 6 and 20 out of the operative position, (when plain work is to be knitted on the machine,) the rod 28 is moved upwardly until its forked end 27 releases the lug 25 of collar 24, and the shaft 11 is rotated until the other lug 26 comes under the rod 28, whereupon the latter is again lowered and its forked end 27 engages such lug, and so locks the lace-points in the inoperative position.

The mechanism for shifting shaft or bar 11 longitudinally to cause the lace-points carried thereby to (in conjunction with the usual reciprocations thereof in a vertical plane) transfer loops from the needles to other needles to form the lace effect is as follows: On one of the free ends of said shaft 11 is a grooved collar 33, engaged by a yoke 34 of an arm 35, which extends upwardly from a frame 36. This frame 36 is carried by and adapted to slide longitudinally upon bars 37 of the main frame of the machine and is normally held in retracted position by a spring 38; but as said spring 38 will not ordinarily suffice to retract shaft 11 as well as said frame 36 I usually provide a second spring arrangement for retracting said shaft. At the opposite end of the machine from the frame 36 and pivoted to one of the frames 12 is a lever 39, having a depending limb 40, which presses against the free end of the shaft 11. Extending between the horizontal limb 41 of said lever 39 and a collar 42 on bar 13 is a spring 43, which tends to maintain the limb 40 of said lever pressing strongly against the free end of said shaft 11. (See Figs. 11 and 12.) Mounted upon the frame 36 is a block 44, which has pivotally secured thereto at its outer end two or more arms 45 46, carrying rollers 47 at their free ends, which rollers are adapted to impinge, respectively, against pattern-wheels 48 49 on a shaft 50, having bearings in a bracket 51, secured to bar 37. These arms 45 46 are secured in position in line to engage said pattern-wheels by a pin 52, which is passed through holes in brackets 53 and through registering holes in said arms, and when it is desired to have either one of said arms in line with its pattern-wheel it is only necessary to thus secure the desired one and to throw the other up out of such engaging position, as seen in Figs. 1 and 3. As the pattern-wheels 48 and 49 are rotated by mechanism herein-

after described the pattern-sections 54 of one of said wheels impinging against the one of the arms 45 46 that coöperates therewith press the frame 36 inwardly against the stress of spring 38, and so through the yoke-arm 35 moves the shaft 11 longitudinally against the stress of the spring-pressed lever 39. At the same time, or rather just prior to this operation, the well-known mechanism (not shown) for causing the lace-points to move in a vertical plane to enter the loops on the needles and lift the same therefrom has been actuated. This longitudinal movement of the shaft 11 causes the loops held by the lace-points to be transferred from the line of the needles from which they were removed to the line of other needles, whereupon the points are again moved downwardly in a vertical plane to cause the loops to be placed over such latter needles, whereby the lace effect is produced in the fabric. The pattern of this lace effect may be widely varied by changing the pattern-wheels or may be readily and instantly changed by throwing the arm 45, which is in line with its wheel 48, out of such working line and bringing the arm 46 down into position to impinge against its wheel 49, which latter would have the "sections" thereon arranged to form a different pattern in the fabric.

In order to effect a ready adjustment of the arms 45 and 46 to take up any wear, I mount the block 44 slidably on the frame 36 and provide the same with a longitudinal slot 55, through which passes a set-screw 56, securing it in position. Through a lug 57 of frame 36 passes an adjusting-bolt 58 for adjusting (when the screw 56 is loosened) the position of said block 44, and so of the arms 45 and 46 with relation to the path of rotation of the pattern-wheels 48 49.

As seen in Fig. 10, the pattern-sections 54 are secured to the periphery of the pattern-wheels by countersunk screws passing therethrough into the face of said wheels. On the shaft 50 of the pattern-wheels 48 49 is a ratchet-wheel 59, that is in line to be engaged and suitably rotated by two pawls 60 61, carried by vertically and horizontally adjustable arms 62 of a frame 63. This frame 63 is adapted to be reciprocated vertically to cause the said spring-actuated pawls 60 61 to engage and rotate the ratchet-wheel 59 by a cam 64 on the shogging-shaft, which cam at certain times actuates a roller 65 on an arm 66, pivoted to a stud 67 of the machine-frame, and to the inner end of which arm the said frame 63 is pivoted, the vertical arm of the frame 63 moving in suitable guides (not shown) on a cross-bar 63^x of the machine.

It will be observed that each of the pawls 60 61 is pivoted to its arm on a stud 68 and has an arm 69 extending below said pivots, with a A-shaped groove therein, which is adapted to engage and seat upon the upper end of

a spring-pressed rod 70, mounted slidably on said arm 62, whereby said pawls are respectively normally held in vertical position to engage said ratchet-wheel; but when it is desired that the said pawls, or either of them, shall not engage said ratchet-wheel they may be pressed backwardly on their pivots and the said arm 69 disengaged from said rod 70 against the stress of the spring pressing said rod.

The cam 64 on the shogging-shaft is made with a narrow face, as seen, whereby when said shogging-shaft is moved a short distance longitudinally said cam will either engage said roller 65, and so actuate the lace-points, according to the pattern-wheels 48 49, or will be disengaged therefrom when lacework is not to be incorporated in the fabric. This longitudinal movement of the shogging-shaft is caused by the following mechanism: The shogging-shaft 2 has the usual four cams 71, 72, 73, and 74 between cams 72 and 73, of which the shogging-truck 75 is adapted to rest. The cam 71, through well-known connections, actuates a pawl 76, which operates a ratchet 77 on the shaft of a pattern-wheel 78, around which passes a pattern-chain 79, provided with sets of buttons 80 and 81, said sets being respectively out of line with each other. The cam 72 moves the shogging-shaft 2 from left to right longitudinally and the cam 73 from right to left. Cam 74 moves the shogging-truck out of engagement with the cams 72 and 73, and the buttons on chain 79 elevate a lever-arm 82 and through other well-known connections actuated thereby shift the shogging-truck into position to engage said cams 72 and 73, and thus the said shogging-shaft is shifted (during its rotation) longitudinally to cause cam 64 to engage roller 65, and so actuate the pattern mechanism for actuating the lace-points, as hereinbefore described.

The fashioning-points 17 are in the usual well-known manner carried by bars 16, adapted to be shifted longitudinally in the frames 12 and fashion the goods.

Extending upwardly from frame 63 is a bar 83, whose upper end is pivoted to an arm 84, journaled on a horizontal shaft 85, upon which shaft a toothed wheel 86 is mounted. The bar 83 also carries, pivoted thereto, a dog 87, having a spring-tooth 88, adapted to engage a notch 89 in a tooth of wheel 86 when desired, whereby the wheel 86 may be rotated step by step, and as the frame 63, and so bar 83, is moved upwardly by cam 64 on the shogging-shaft said shaft 85 will be rotated and through the usual intervening mechanism will move the fashioning-points longitudinally in fashioning the fabric. The dog 87 is normally—that is, when the fashioning operation is not being effected—maintained away from wheel 86 by a spring 89^x, but when it is desired to fashion said dog is automatically pushed into engagement (at proper predeter-

mined times) successively with the teeth of said wheel by a rod 90, whose upper end engages a notch 91 in the rear of said dog and which rod is adapted to slide through a guide-lug 92 of the machine-frame and carries a roller 93 at its lower end impinging against a pattern-chain 94, carrying buttons 95, which chain runs over a wheel 96 of a shaft 97, journaled in the machine-frame. The dog 87 is provided with a spring-actuated tooth 88, adapted to engage in a notch 89 in each tooth with the wheel 86. This engagement of the tooth 88 of the notch 89 prevents the accidental displacement of the dog 87 until the desired partial rotation has been accomplished. The shaft 97 carries also a ratchet-wheel 98, whose teeth are engaged and which is rotated step by step by a pawl 99 on an arm 100 of a lever 101, the free end of whose other arm, 102, carries a roller which rides upon a broad-faced cam 103, carried by the shogging-shaft.

As it is sometimes desirable that the machine be used to knit plain-fashioned goods—that is, without the lace effect—I provide the pattern-chain 79 with the two sets of buttons 80 and 81, as hereinbefore referred to, one of which sets of buttons, 80, controls the pattern when lacework is being incorporated in the fabric, and the other set, 81, controls the fashioning mechanism when plain-fashioned goods are to be produced. I also make the contact-point of the lever 82 with said buttons adjustable in order that said contact-point may be brought opposite either set of buttons, as may be required. This adjustment I make in the following manner: On the free end of the lever-arm 82 I mount, so as to be capable of sliding laterally, a dovetail slide-piece 104, having a projecting lug 105 to contact with either of the sets of buttons 80 or 81, as desired, and secure the said piece 104 in either position of adjustment by a bow-spring 106, secured to said lever-arm and having a pin 107 projecting from its lower side and adapted to seat in either of two holes in the slide-piece 104, according to the position of the slide-piece.

When the machine is being used for doing plain-fashioned work only, the pawls 60 61 are thrown back out of position to engage the ratchet-wheel 59 and the lace-points are locked up out of line of the needles, as hereinbefore described, and when the machine is knitting plain goods without either the lace effect or any fashioning the pawl 76 is disengaged from

the ratchet 77, thus throwing out of operation both the fashioning and the lace-forming attachments.

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

1. In a knitting-machine the combination with a needle-bar, needles and means for actuating the same, of a pivotally-supported frame, a lace-point mounted in said frame, and a spring engageable with said frame and adapted to maintain it either in or out of its operative position.

2. In a knitting-machine the combination with a needle-bar, needles and means for actuating the same, of a plurality of pivotally-supported frames, lace-points carried by each of said frames, springs engageable with said frames and adapted to maintain them either in or out of their operative position and means for successively moving said frames to bring said points out of their operative position.

3. In a knitting-machine a fashioning-point-bar shaft, a toothed wheel on said shaft, a dog adapted to intermittent engagement with the teeth of said wheel and spring-actuated means for locking said dog in engagement with one of said teeth.

4. In a knitting-machine a fashioning-point-bar shaft, a toothed wheel on said shaft, a dog adapted to intermittent engagement with the teeth of said wheel and a spring-actuated tooth in said dog for engaging a depression in said teeth.

5. In a straight-knitting machine, the combination with the needle-bar, its needles and means for actuating the same, of pivotally-mounted L-shaped frames with inclined ends, lace-points carried by said frames, springs acting against said inclined ends, and means for actuating the auxiliary lace-points as and for the purpose set forth.

6. In a straight-knitting machine, the combination with the needle-bar, its needles and means for actuating the same, of pivoted frames carrying auxiliary lace-points, primary lace-points, fashioning-points, means for actuating said frames, rotating collars with lugs, a vertically-slidable forked rod adapted to be engaged by said lugs, and a spring engaging said rod to hold it in position vertically.

In testimony whereof I have hereunto affixed my signature this 24th day of March, A. D. 1903.

GUSTAV A. LANDENBERGER.

Witnesses:

JOHN M. CAMPBELL,
WALTER C. PUSEY.