(Model.)

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C. E. TIBBLES.

SEWING MACHINE.

No. 274,057. Patented Mar. 13, 1883.

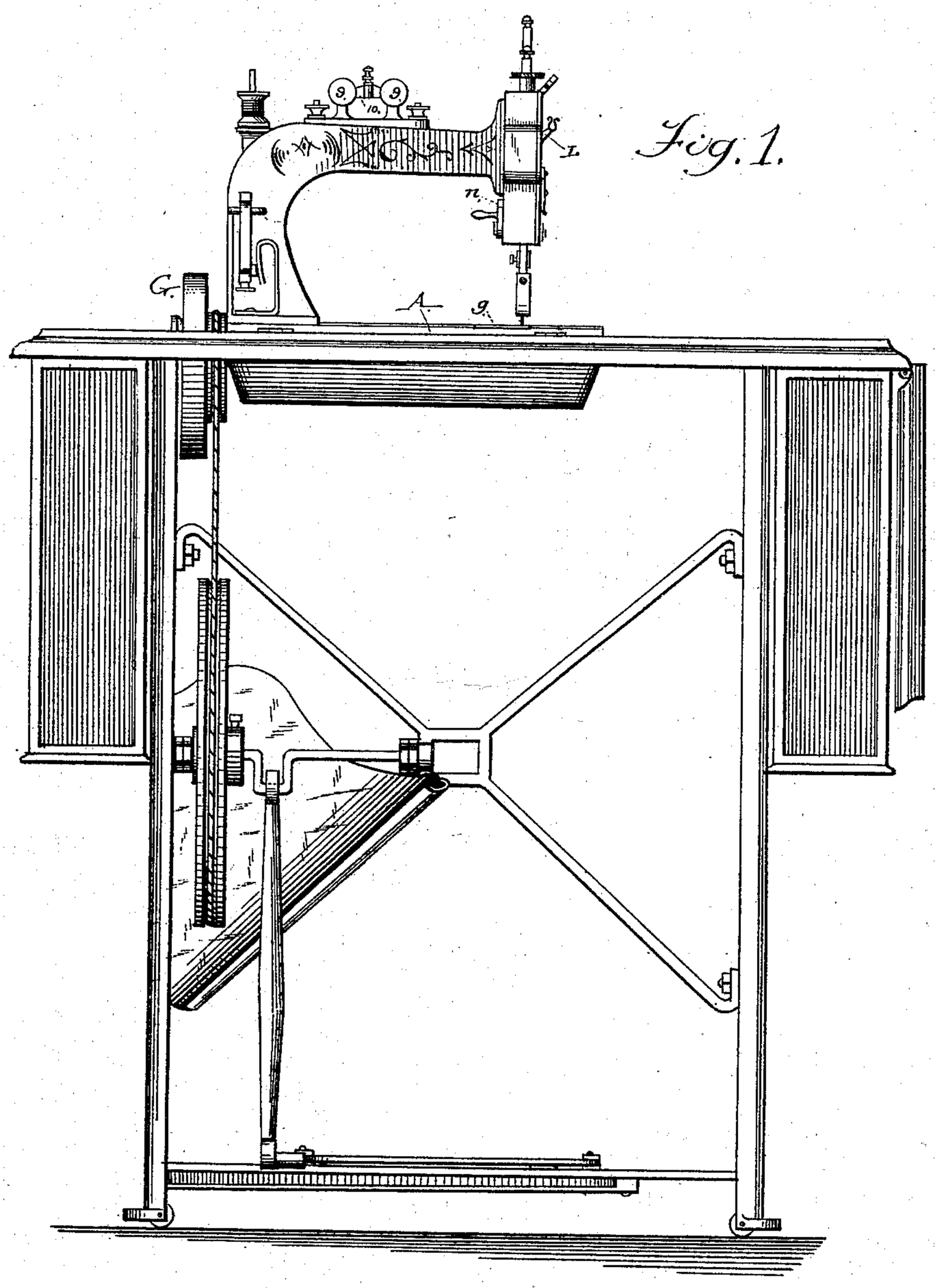

Fig. 1.

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R. K. Evans

Inventor;

Chas. E. Tibbles
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A. H. Evans & Bro
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(Model.)

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C. E. TIBBLES.

SEWING MACHINE.

No. 274,057. Patented Mar. 13, 1883.

Fig. 2.

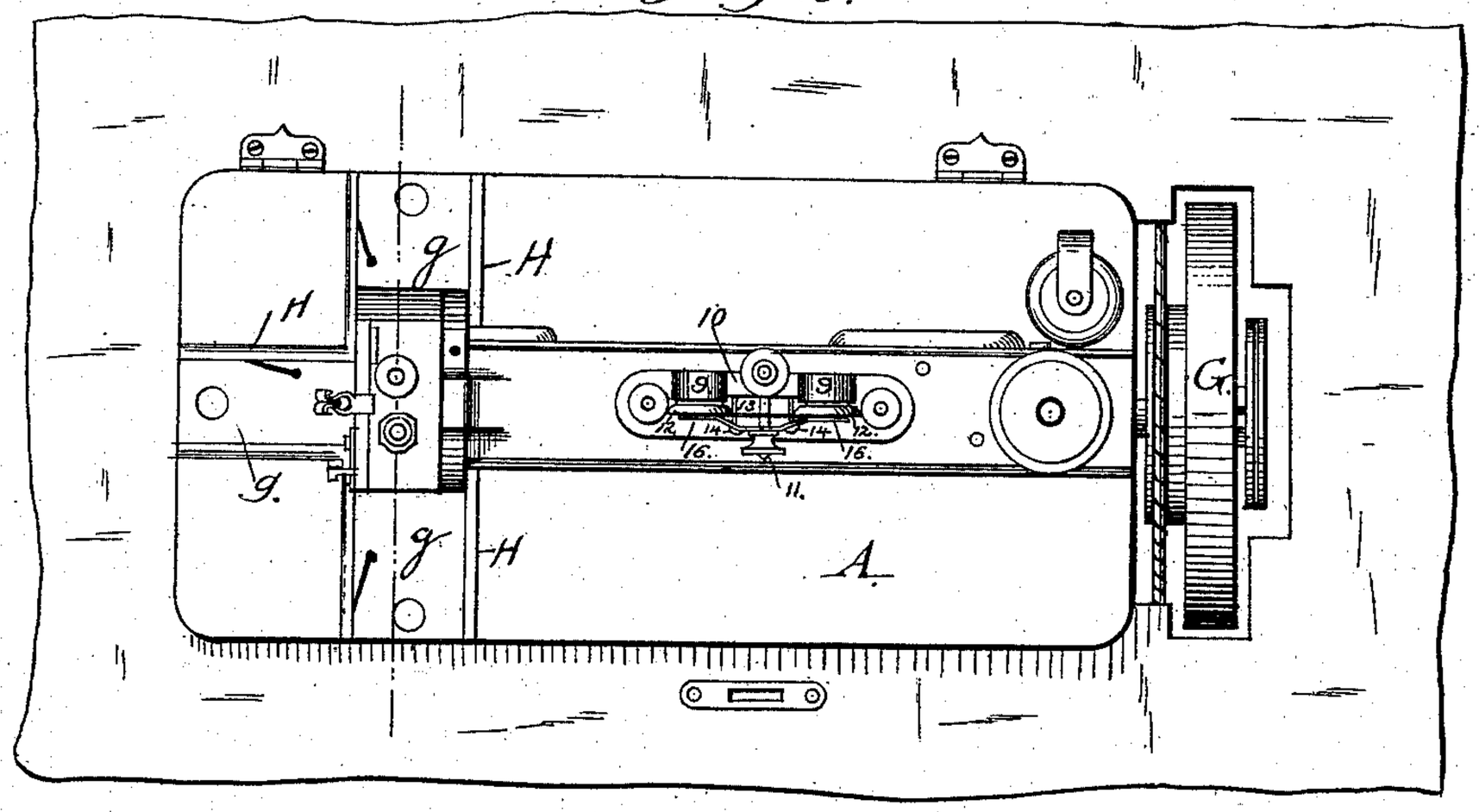
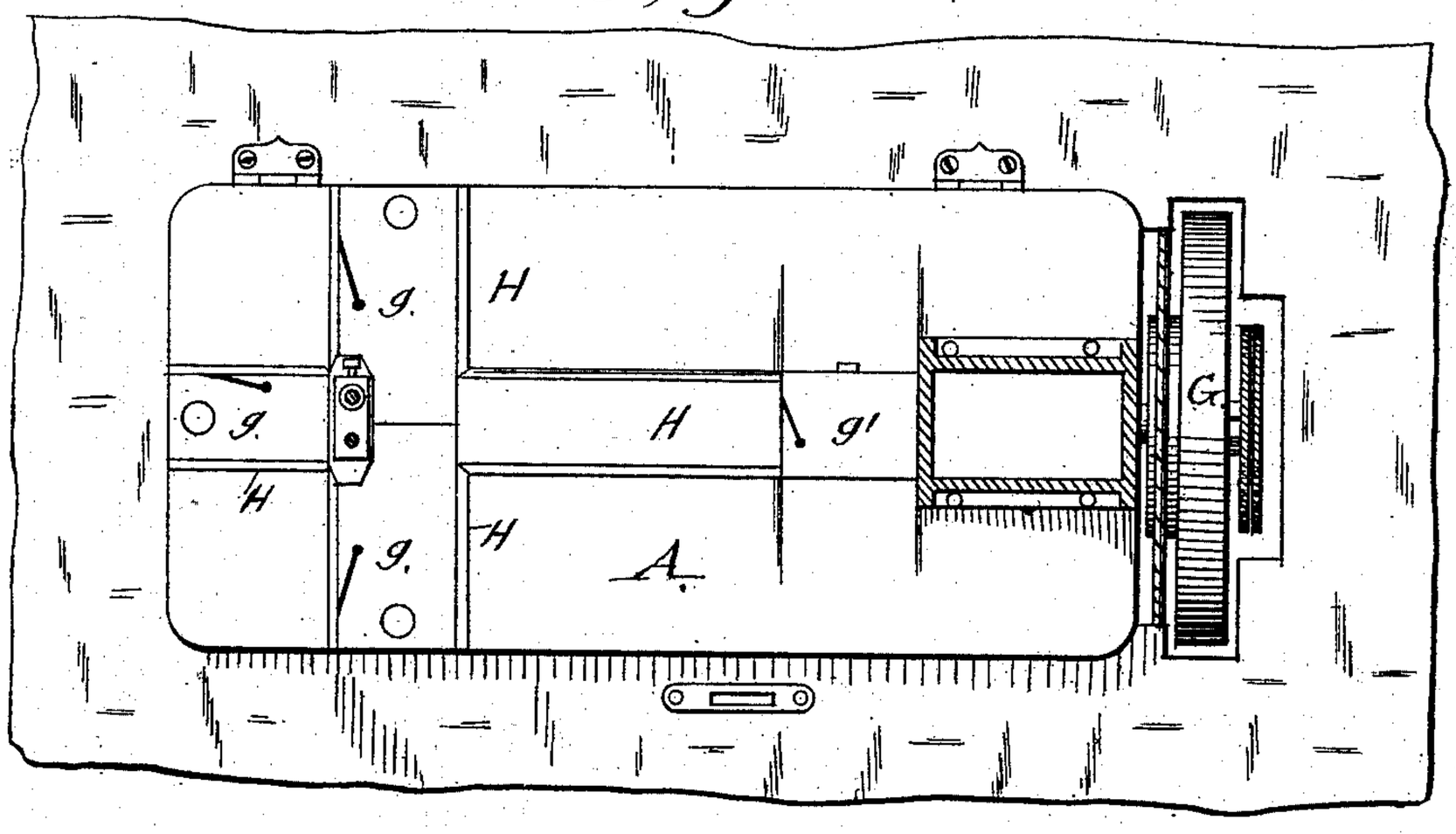


Fig. 3.



Attest;
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SEWING MACHINE.

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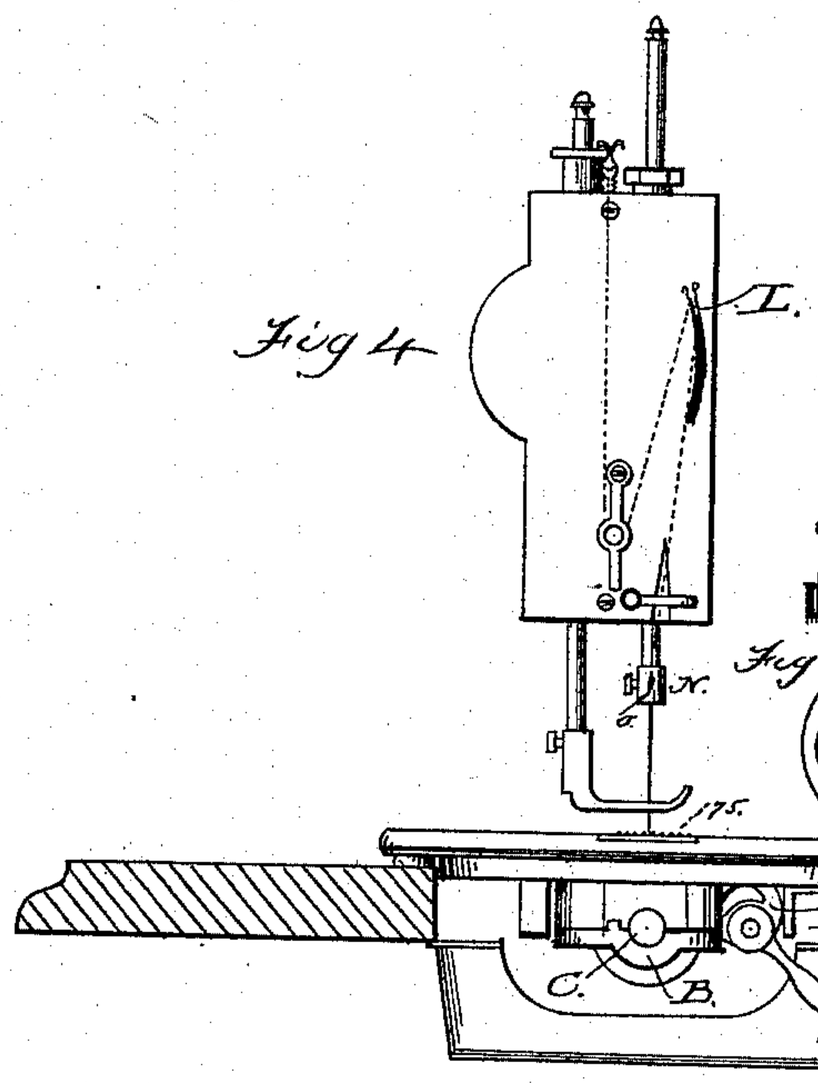
Fig. 4



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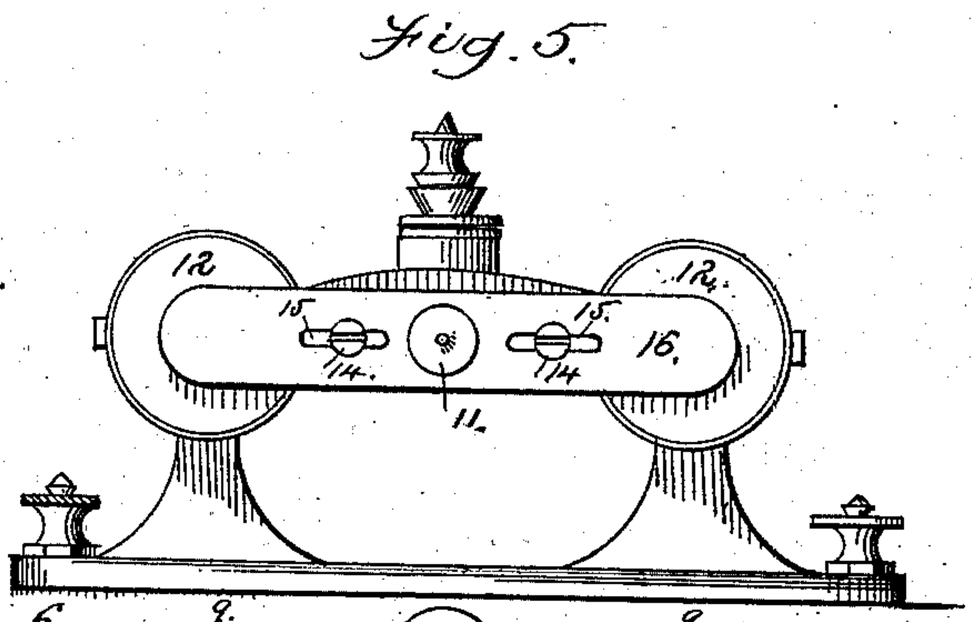


Fig 6

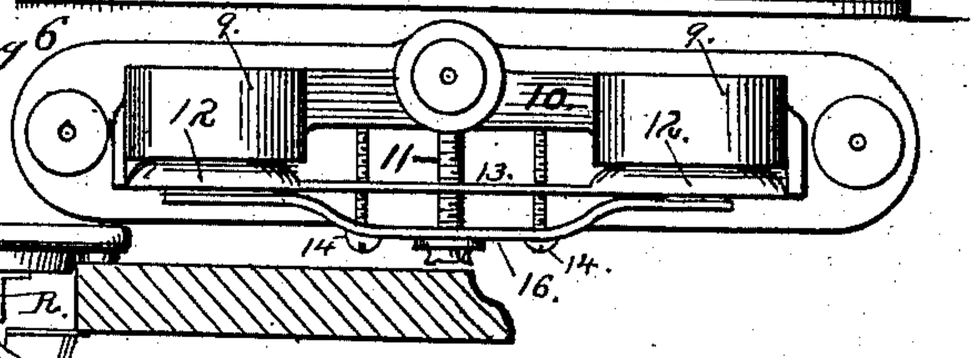
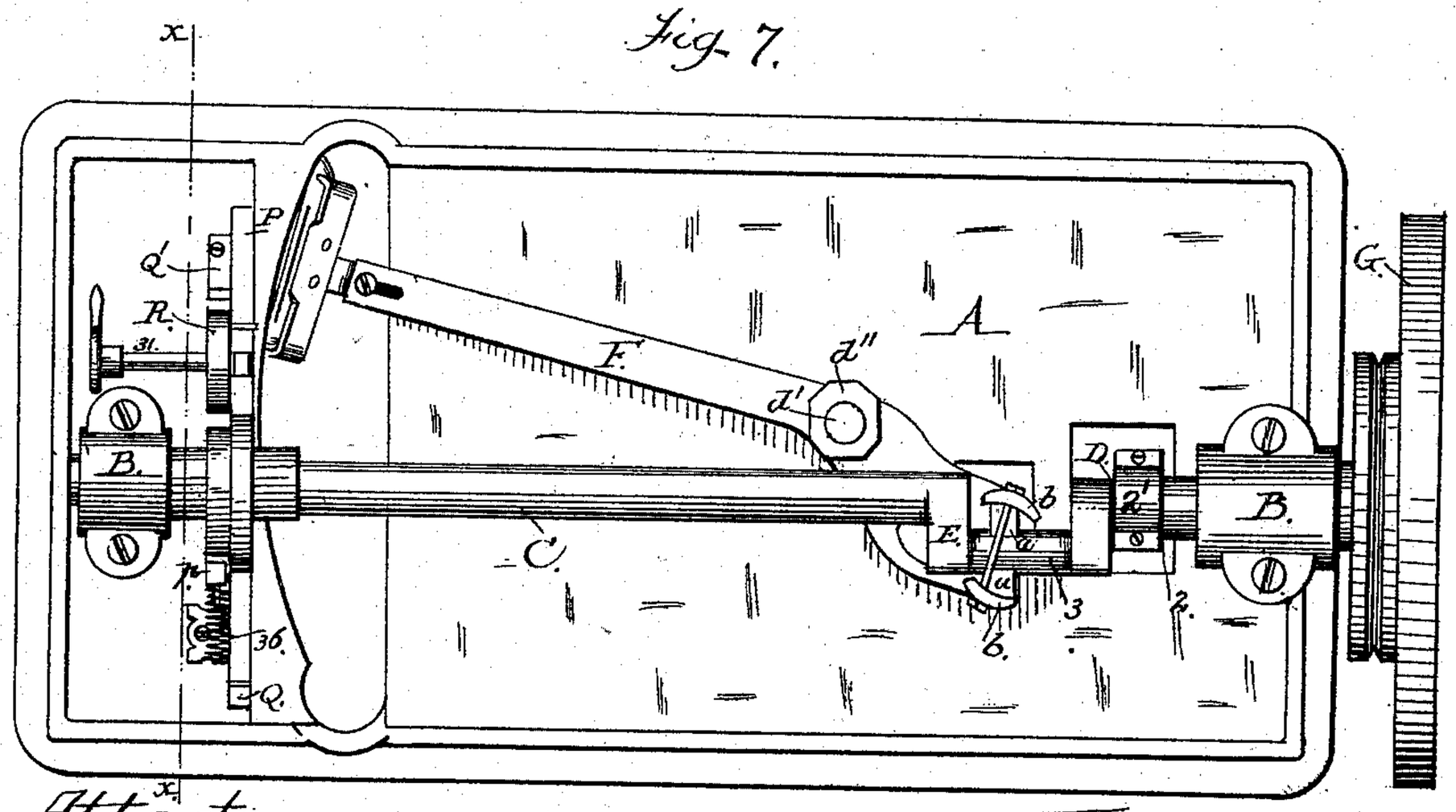


Fig. 7.



Attest:

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SEWING MACHINE.

No. 274,057. Patented Mar. 13, 1883.

Fig. 8.

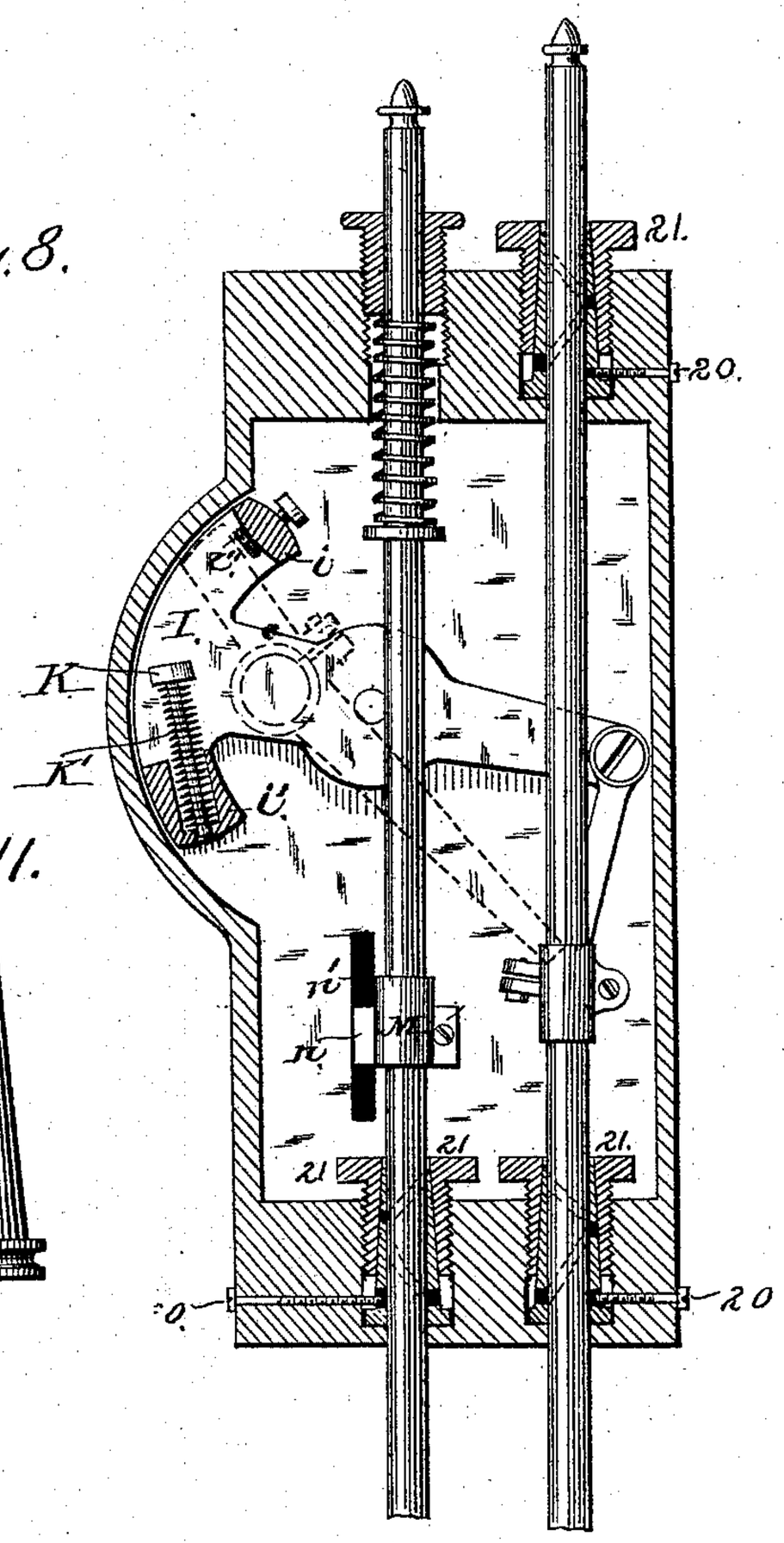

Fig. 9.

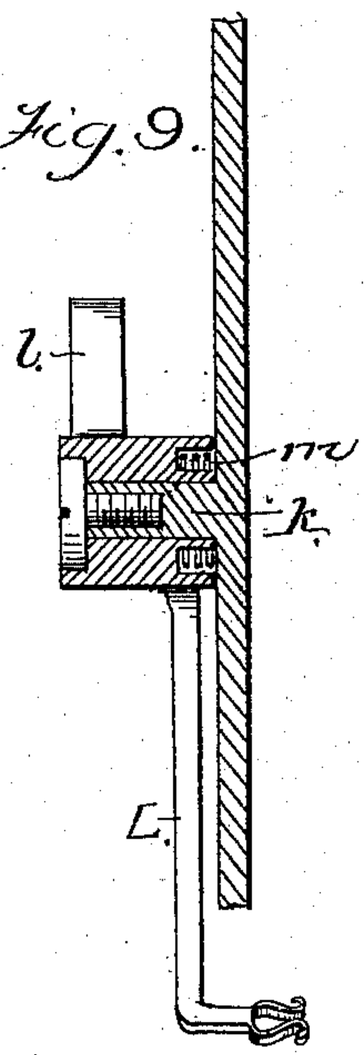

Fig. 11.

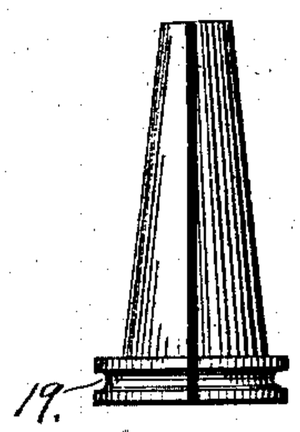

Fig. 10.

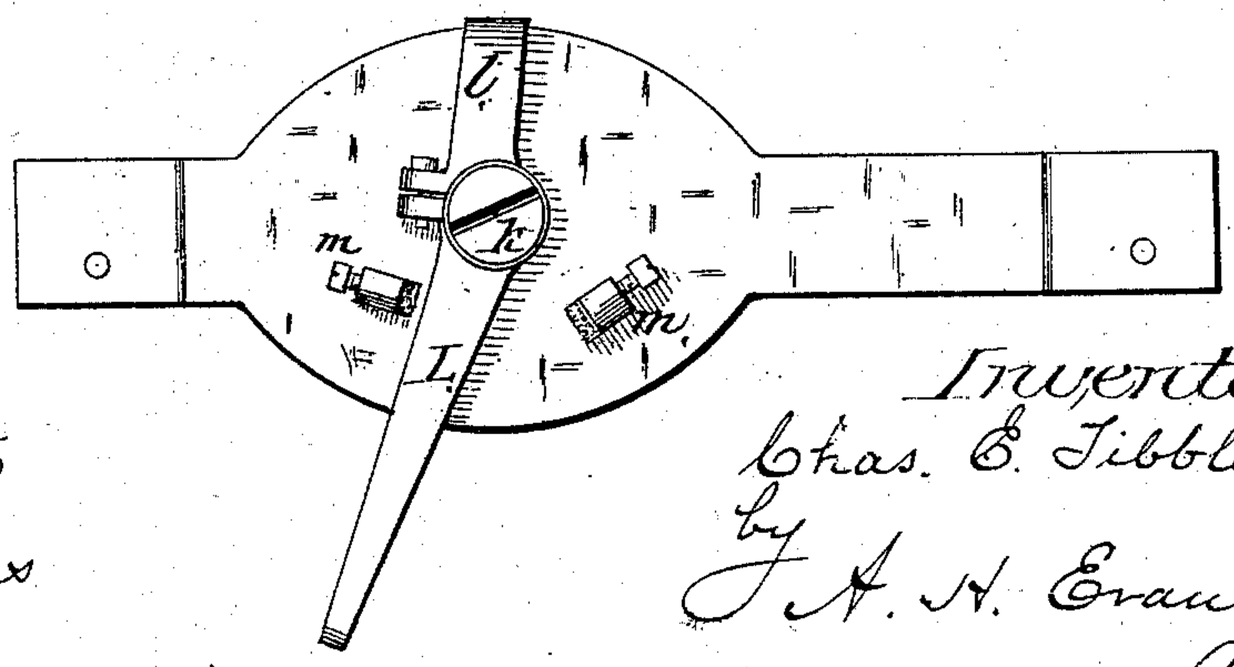

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Fig. 12.

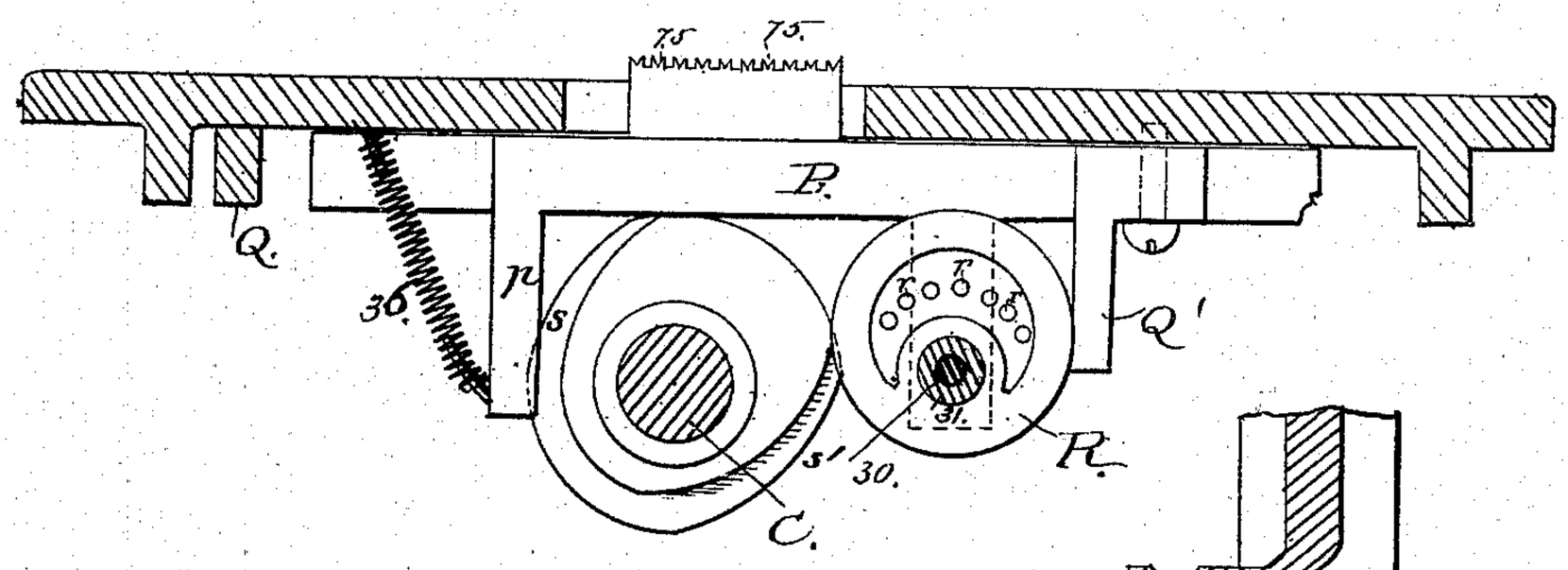

Fig. 13.

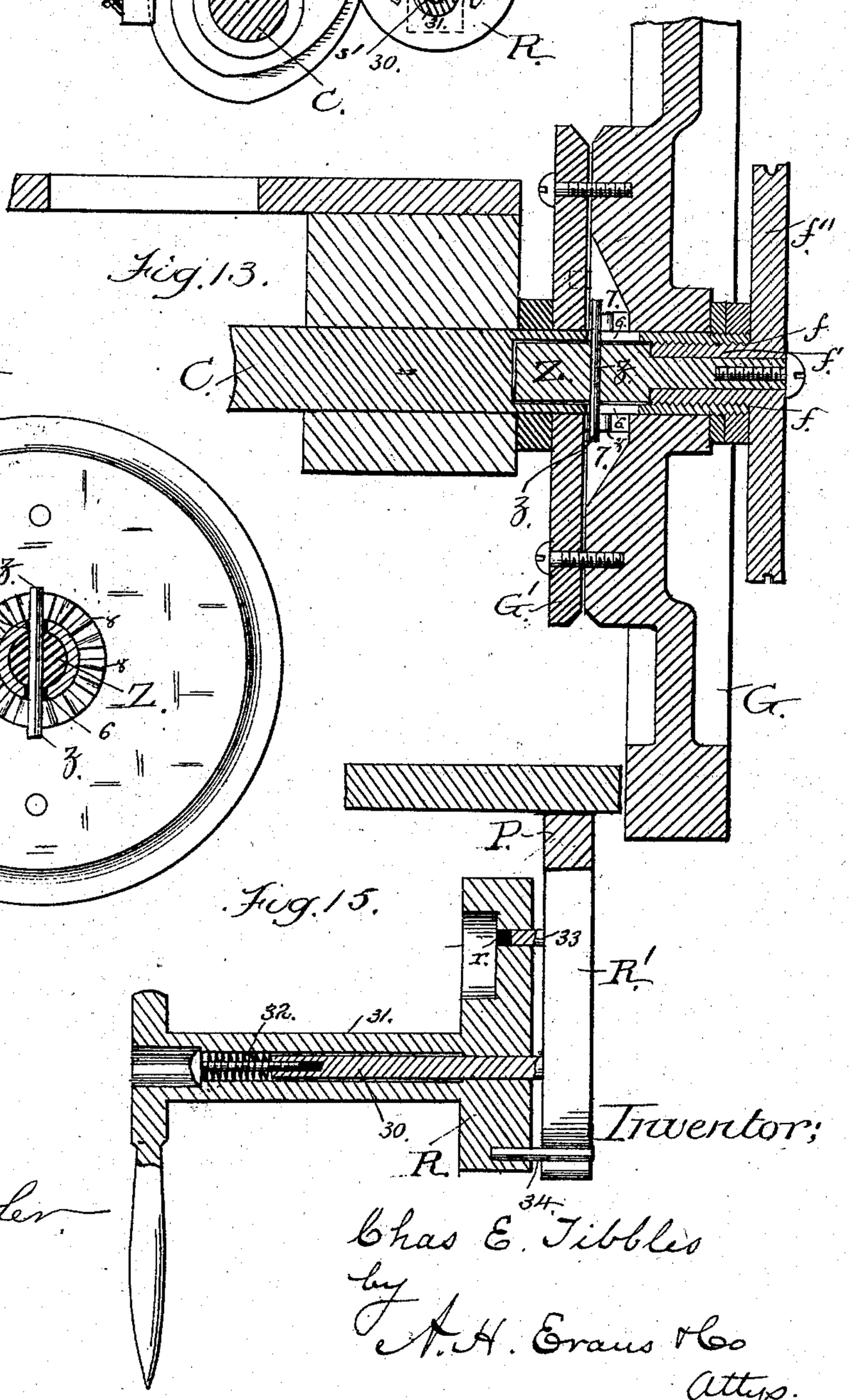

Fig. 14.

Fig. 15.

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SEWING MACHINE.

No. 274,057. Patented Mar. 13, 1883.

Fig 16.

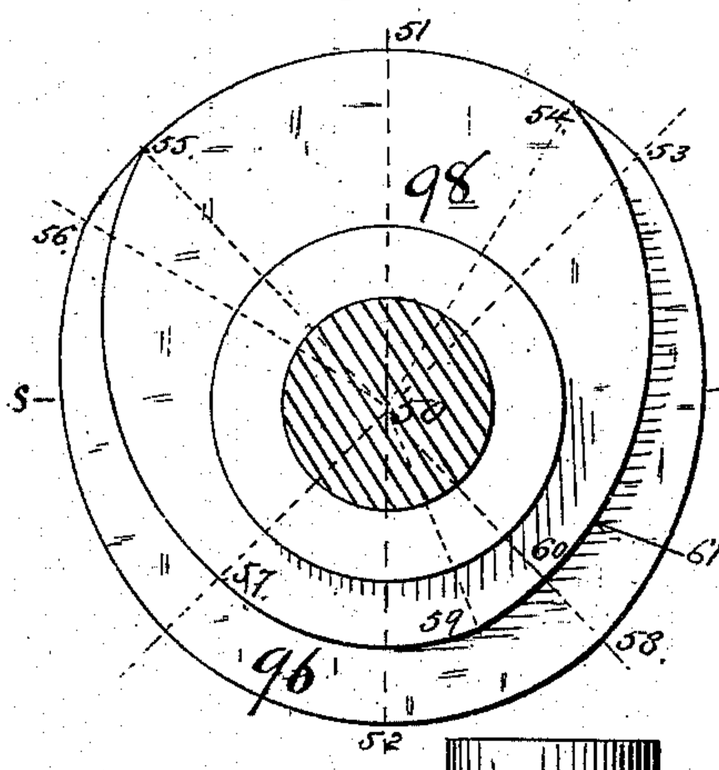


Fig. 19.

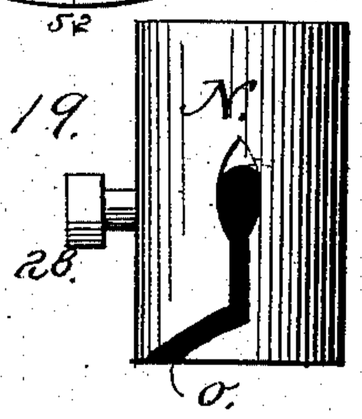


Fig. 22.

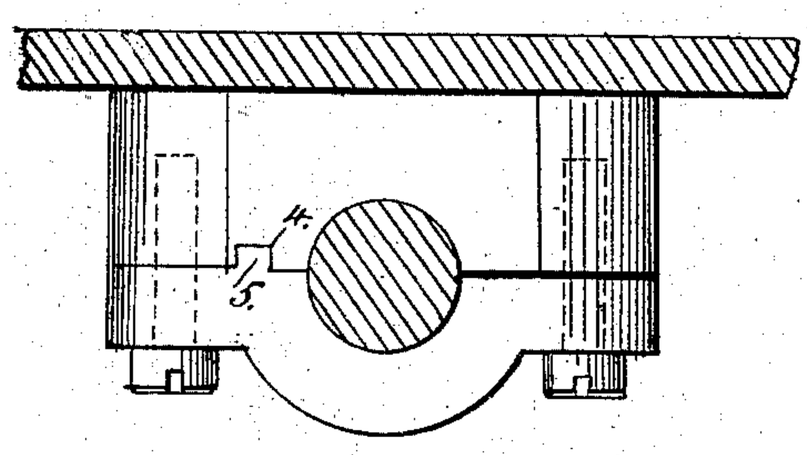
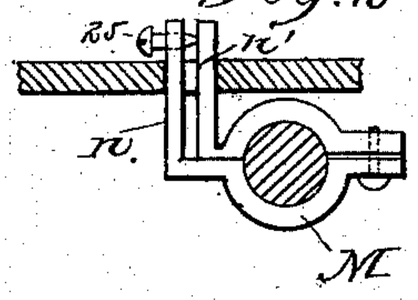


Fig. 24



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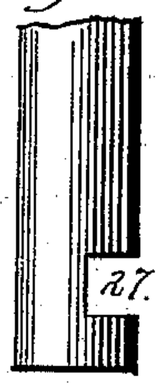
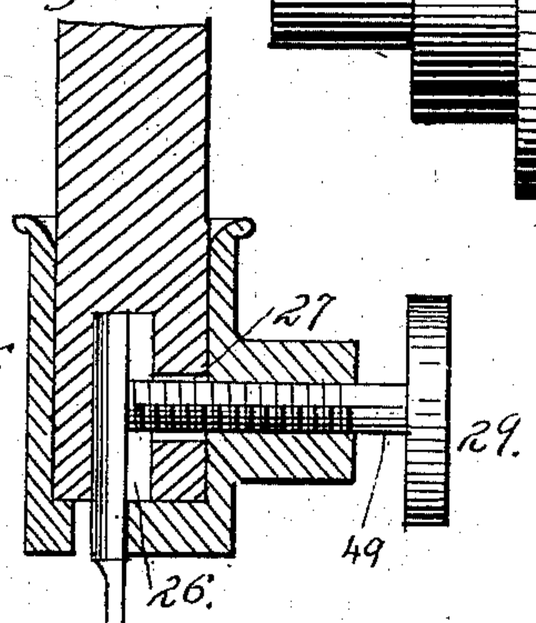


Fig 17

Fig 20.



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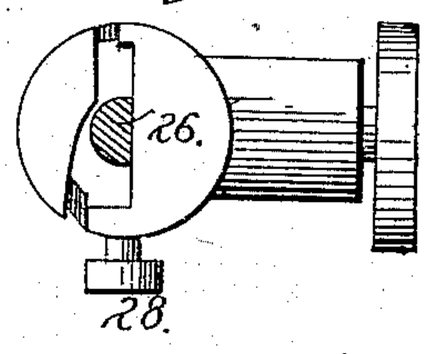


Fig. 23.

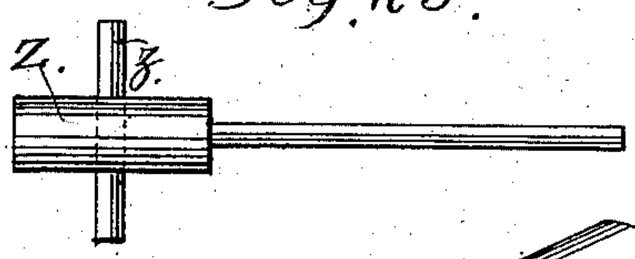


Fig 25

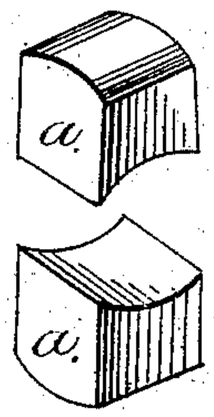
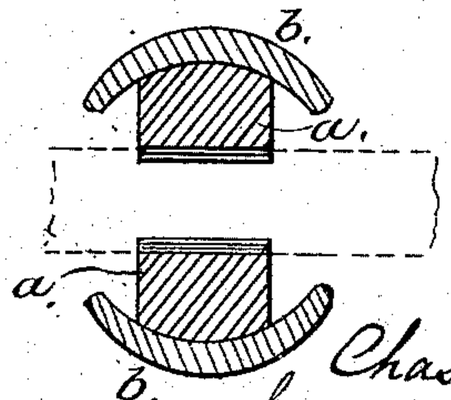


Fig. 26.



Attest

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Chas. E. Tibbles

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SEWING MACHINE.

No. 274,057. Patented Mar. 13, 1883.

Fig. 27.

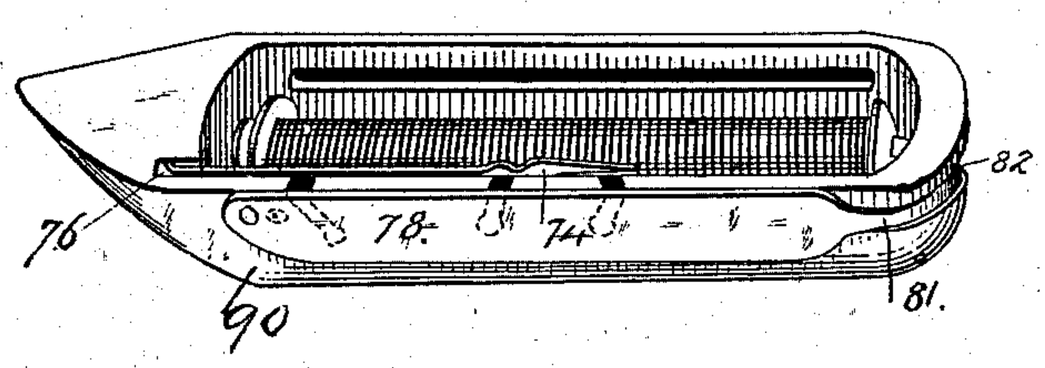


Fig. 28.

Fig 29

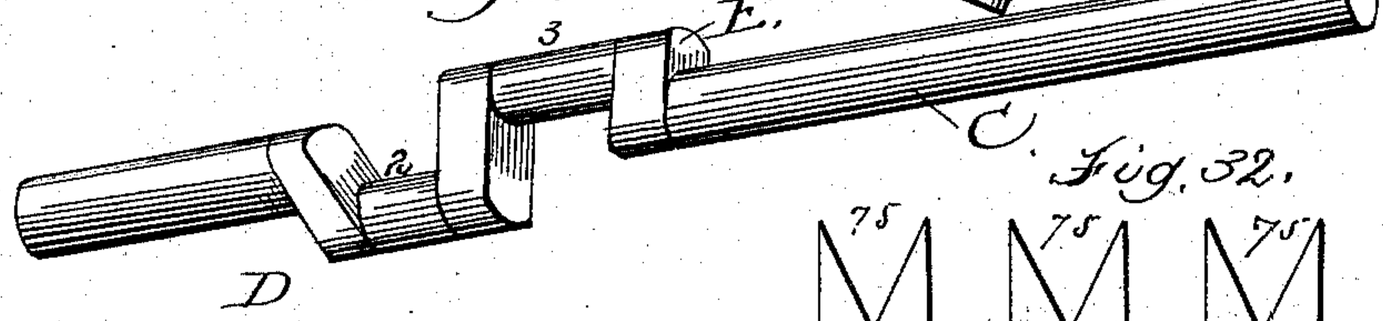


Fig. 32.

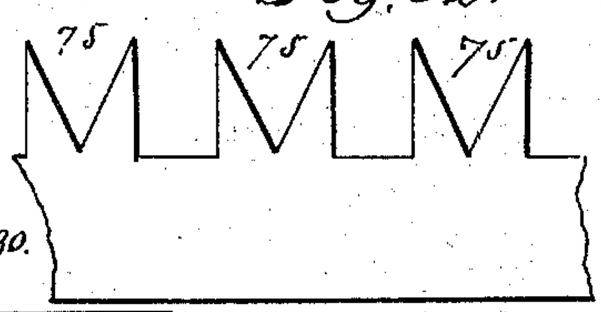


Fig 30.

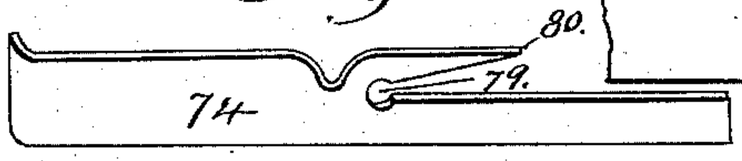
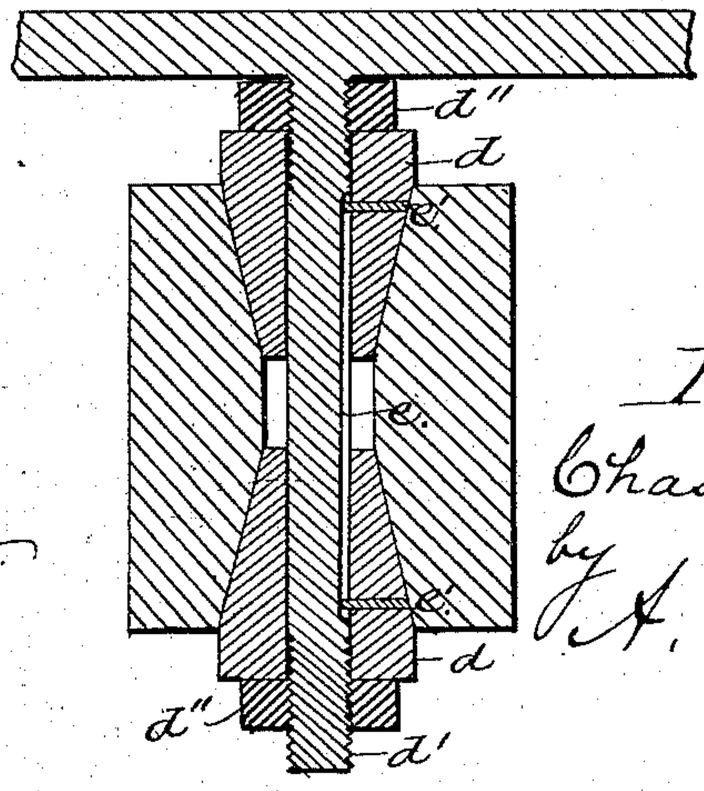


Fig. 31.



Attest;

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R. K. Evans

Inventor;

Chas. E. Tibbles

by A. A. Evans & Co.

Attys.

UNITED STATES PATENT OFFICE.

CHARLES E. TIBBLES, OF BURLINGTON, IOWA, ASSIGNOR TO THE TIBBLES SEWING MACHINE COMPANY, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 274,057, dated March 13, 1883.

Application filed January 4, 1883. (Model.)

To all whom it may concern:

Be it known that I, CHARLES EDWIN TIBBLES, of Burlington, in the county of Des Moines and State of Iowa, have invented certain Improvements in Sewing-Machines; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a rear elevation of the machine complete. Fig. 2 is a plan view of the bed-plate and needle-arm. Fig. 3 is a plan of the bed-plate with the needle-arm in section. Fig. 4 is an end elevation of the machine with the table in section. Fig. 5 is a side view of the upper tension. Fig. 6 is a plan of same. Fig. 7 is a bottom plan of the bed-plate and operating mechanism. Fig. 8 is an elevation of the head of the machine with the face-plate removed, showing the contained mechanism. Fig. 9 is a cross-section through the hub of the take-up arm. Fig. 10 is a plan view of the take-up arm and its support. Fig. 11 is an elevation of the compressible bushing. Fig. 12 is a section on line *x x*, Fig. 7. Fig. 13 is a vertical section of the balance-wheel, shaft, and connecting devices. Fig. 14 is a face view of the binding-plate on the fly-wheel. Fig. 15 is a vertical section through the eccentric that controls the throw of the feed-bar. Fig. 16 is an enlarged view of the feed-cams. Fig. 17 is an edge view of the cams enlarged. Figs. 18, 19, 20, and 21 are details of the lower end of the needle-bar. Fig. 22 is a detail of the cap-journal used in the machine. Fig. 23 is a detail of the sliding bolt and locking-pin to hold the fly-wheel to the main shaft. Fig. 24 is a detail of the presser-bar yoke. Figs. 25 and 26 are details of the shuttle-lever mechanism. Figs. 27 and 28 are views of the shuttle. Fig. 29 is a view of the main shaft and its double crank. Fig. 30 is a view of the interior tension-spring of the shuttle. Fig. 31 is a vertical section through the pivot of the shuttle-lever. Fig. 32 is an enlarged view of the teeth of the feed-point.

My invention relates to shuttle sewing-machines; and the object of my invention is to perfect the operation of the working parts and cheapen the construction of such machines.

My invention consists in sundry details of construction and combination of devices, as hereinafter fully described, and specifically pointed out in the claims.

In order that those skilled in the art may make and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A is the bed-plate of the machine, and B B boxes, in which is journaled the driving-shaft C. The driving-shaft is provided with a double crank, whereby I am enabled to operate both the needle-bar and shuttle-lever in time from the driving-shaft, the needle-bar being operated by a rock-shaft arranged above the work-plate and connected by a pitman with the crank on the driving-shaft. It is designed to forge this double crank-shaft in one piece; but the shaft and cranks may be made in more than one piece, if found desirable without departing from the spirit of my invention.

The crank D, which is nearer the fly-wheel, has a straight wrist, 2, and is provided with a strap, 2′, which, with a pitman, operates the needle-bar.

The crank E is also provided with a straight cylindrical wrist, 3, somewhat longer than the wrist 2 and said crank is quartering to crank D—that is to say, the crank D projects from the axis of the main shaft in an angle of just ninety degrees from the line of projection of the crank E. The crank E vibrates the shuttle-lever F by means of two sliding gibs or blocks, *a a*, which have concave faces which clasp the wrist 3 and slide in a yoke or forked end, *b b*, of the shuttle-lever.

By the devices described I obtain a crank motion from the main shaft, which is utilized to operate both the needle-bar and shuttle-lever in time when said shaft is rotated in either direction. The shuttle-lever is sustained or supported by a double-cone adjustable bearing, whereby any lost motion may be taken up, and the shuttle-lever may be raised or lowered for purposes of adjustment. This bearing consists of two centrally-bored truncated cones, *d d*, which fit an opening of corresponding shape in the shuttle-lever and have (passing entirely through them) a bolt, *d′*, which depends from the bed-plate, and is threaded at each end in order that jam-nuts *d″ d″* may raise or lower the pivot. If the cone-bearings *d d* were allowed to turn with the shuttle-lever,

they would soon work off the jam-nuts. In order to avoid this, I provide the bolt *d'* with a longitudinal groove, *e*, and have a pin, *e'*, projecting from each of the cones into the groove *e*, so as to prevent the cones from turning on the bolt *d'*.

The cap journal-boxes which I use to sustain the driving-shaft and other bearings in the machine are constructed as follows: The box is provided with a groove, 4, and the cap is provided with a rib, 5, which tightly fits in said groove (see Fig. 22) and prevents any tendency of the cap to move around either of the screws as a center of motion, and also allows the cap to be held firmly in place by one screw, while the other screw is only used to draw the cap to a snug bearing on the shaft.

The devices that key the balance-wheel to and release it from the driving-shaft are somewhat similar to the devices shown and described in my application No. 61,930, filed May 20, 1882, and are an improvement thereon, the locking device being a positive-motion one. The end of the driving-shaft is hollow or tubular and is internally threaded at *f*. A sliding bolt, Z, having a cylindrical stem and a transverse drive-pin, *z*, through it, is placed in this hollow end of the shaft and moved back and forth by means of screw *f'* and hand-wheel *f''*. The ends of drive-pin *z* project through slots 6 6 in the shaft and enter a chamber, 7, formed between the balance-wheel G and a plate, G', which is secured to the back of the wheel by screws. Immediately around the center and on the interior face of the plate G' are a series of radial ribs or projections, 8 8, (see Fig. 14,) with which pin *z* engages or intermeshes when driven against plate G' by screw *f'*. When screw *f'* is withdrawn the drive-pin projects into chamber 7 and the balance-wheel can be rotated without turning the main shaft.

In sewing-machines heretofore used much annoyance has been experienced, owing to the necessity for raising the bed-plate on the hinges to oil the bearings of the machine. I avoid this by casting my bed-plate with a cross-shaped rib or raised portion, H, having sliding sections *g g g g'*, which are over the main bearings of the machine. By this construction I am enabled to oil the shuttle-race, carrier, and feed mechanism, and the needle-bar and shuttle-lever actuating devices without having to raise the bed-plate of the machine.

The upper or spool tension is an improvement on that shown and described in my application of May 20, 1882, before mentioned, whereby I avoid having to pivot two of the friction-plates.

The rear tension-plates, 9 9, are sustained by posts or a rigid bar, 10, which is centrally tapped to receive the thread of a thumb-screw, 11.

The outer tension-plates, 12 12, are supported on the ends of a rigid bar, 13, which has a central opening through which loosely passes screw 11, and pins 14 14 project through slots 15 15 in a curved flat spring, 16, which is compressed beneath the head of screw 11, and the tension-plate bar 10, whereby the tension is regulated.

The compressible bushings in the boxes supporting the needle-bar and presser-foot bar are made substantially like those in my former application of May 20, 1882, there being one feature of novelty—to wit, a groove, 19, around the base of the bushing, adapted to receive the end of a screw, 20, which will hold the bushing down in its place when the surrounding threaded nut is being withdrawn. Instead of the groove 19, holes for the reception of screws 20 may be made in the bushings, as shown in Fig. 8.

I will now proceed to describe my take-up mechanism. On the end of the needle-bar rock-shaft is a vibrating head or lever, I, projecting away from the needle-bar and traveling in the arc of a circle. At the ends of the curved portion of lever I are projections *i i'* at right angles to the face of the lever. The projection *i* is provided with a cushion, *i''*, made of rawhide and adjusted by a set-screw. The projection *i'* is bored to receive a plunger, K, backed by a coiled spring, K'. Between the projections *i* and *i'* lies an end, *l*, of the take-up arm L, which vibrates on a pivot, *k*, supported by the face-plate of the machine, or some frame specially introduced into the head of the machine for that purpose, and in its hub is a coiled detent-spring, *m'*. Properly-cushioned stops, *m m*, limit the travel of the take-up arm.

The operation is as follows: As the needle-arm rises the projection *i* on the curved portion of the lever I passes downward and carries with it the end *l* of the take-up bar until the thread-carrying end of the take-up reaches its highest elevation, and is there retained by means of a coiled detent-spring, *m'*, inclosed in the hub of the take-up bar. The needle-bar then starts downward, leaving the take-up bar at its highest throw, where it remains until the spring-plunger K strikes beneath arm *l*, and with a yielding spring-pressure starts the take-up downward just at the moment the needle enters the cloth, whereby the necessary slack is given to the thread.

In order to insure a truly-vertical reciprocation of the presser-foot bar and guard against its turning, so the needle-hole will not register with the needle-hole in the throat-plate, I provide a yoke, M, rigidly secured to the presser-bar and having a split end, *n*, which projects through slot *n'* in the casting of the head. A set-screw, 25, is adapted to spread the halves of this split end *n* equally from a central line and compensate for wear of the slot or yoke. The lower end of the needle-bar is bored at 26 with a cylindrical hole the size of the shank of any desired needle known to the trade. The shell of the end of the needle-bar is then cut out to form a semicircular slot, 27, for a purpose hereinafter set out.

Over the lower end of the needle-bar, by means of a set-screw, 28, I fit a cylindrical cap, N, the lower face of which is so constructed as

to cover a portion of the cylindrical needle-hole, 26, and thereby make its entrance of irregular shape, so that a needle having a shank whose cross-sectional area corresponds in shape to the uncovered portion of hole 26 can only be set in one position, and that the proper one, thereby providing a certain guide for properly inserting the needle. After its insertion the shank is held by set-screw 29, (provided with the smooth shank 49 to receive the actuating-arm of a ruffler,) which passes through semi-circular slot 27, through which means the cap can be adjusted around the end of the needle-bar without interfering with the hold of the screw on the needle. For convenience I provide the cap N with a slot thread-guide, *o*.

I will now proceed to describe the feed mechanism, which operates on the same general principle as that shown in my application of May 20, 1882.

The upward impulse of the feed-bar is given by the faces *s s'* of the feed-cam. The feed-bar P has a depending arm, *p*, which lies in the way of the travel of the cam-face, which horizontally reciprocates the feed-bar, and by it the feed-bar is thrown in one direction, and the feed-bar is thrown in the opposite direction by the cam-face striking the periphery of a variable eccentric, R, which is pivoted to a hanger, R', which depends from the feed-bar. Stops or abutments Q Q' limit the throw of the feed-bar, as described in my other application referred to. The downward impulse of the feed-bar is produced by a spiral spring, 36, having one bearing against the arm *p* and the other against the lower surface of the bed-plate, as shown, so that it exerts a downward, as well as projecting, pressure on the feed-bar. The variable eccentric R is pivoted on a pin, 30, projecting from R' and through a sleeve, 31, wherein a spring, 32, tends to keep the eccentric R continuously pressed toward R', so that the pin 33, projecting from the hanger R', will enter one of the holes *r r* in the eccentric and hold it in any desired position within the limits circumscribed by the stop-pin 34, which projects from the face of the eccentric R and strikes against the edge of hanger R'.

It is quite obvious that as the longest radius of the eccentric is made to approach the center of motion of the feed-cam, and more quickly comes in contact with the cam-face which horizontally reciprocates the feed-bar, the longer will be the contact of this cam-face with the eccentric, and hence the greater will be the throw given the feed-bar.

As the eccentric R is thrown toward or retracted from the feed-cam so is the length of stitch increased or diminished, the abutments Q Q' always limiting the throw of the feed-bar.

Sewing-machines have been heretofore made which feed either to or from the operator as the balance-wheel is turned to or from the operator; but this has been accomplished by a cam movable upon the shaft.

By my construction I am enabled to feed the work in the direction in which the balance-wheel is turned without any shifting-cam. This I accomplish by means of a novel cam, (see Figs. 12 and 16,) which is rigidly secured to the driving-shaft.

In so far as the working-faces of cam 96, which raise the feed-bar, are concerned, they are substantially the same as those ordinarily used in shuttle-machines, the gist of my invention being in the manner of constructing the cam-faces of the cam 98, which throws the feed-bar back and forth.

In Fig. 16 I have shown an enlarged view of the feed-cam, with dotted lines indicating the manner in which it is laid out. All dimensions of this cam 98 are stated relative to a vertical central line, 51 52, drawn through the center of motion, 50. The lines 55 58 and 53 57 quarter the cam exactly. From the center 50 the cam-face which raises the feed-bar is laid out in a true circle, 56 51 53, and are of about one hundred and five degrees, to hold the feed-bar up while it is being projected the length of the stitch. The cam-face that holds the feed-bar at the end of the horizontal throw while the feed-bar drops is coincident through an arc of about seventy-five degrees, 55 51 54, with the curve 56 51 53. On one side, and commencing at a point, 55, about forty-five degrees from the central line, 51 52, one working-face of cam 98 is struck on a curve, 55 57, which gradually nears the center until at the point 57 it has approached to about a distance equal to three-quarters of the radius 50 51. On the opposite side of the central vertical line, 51 52, the other working-face of cam 98 is made on a curve struck from a point, 54, which is about thirty degrees from the said central line, which curve, passing toward the point 61, approaches the center until it reaches the point 61, where it is the same distance from the center 50 as the point 57, all the points of said curve 54 61, measured on lines at right angles to the central line, 51 52, being nearer to said central line than the curve 55 57. From 61 to 59 the curve is flattened, so that the points 61 and 59 are equidistant from the center. The points 59 and 57 are then joined on a true curve struck from the center 50. When the feed is from the operator the portion of the face 57 55 commences to project the feed-bar from the point 57, but when the feed is toward the operator the face 54 61 60 59 does not begin to project the feed-bar until the point 61 is reached. While the cam passes from 59 to 61 the feed-bar is stationary, and held up by cam-face 56 51 53. In the time consumed by the rotation of the face from 59 to 61, without moving the feed-bar, the needle rises from the goods to its greatest elevation, thus making the feed-points start to move the work in the same time with the needle as when the feed is from the operator. The feed-points 75 each have a vertical and an inclined side, and the teeth are so arranged that like sides of the teeth are adjacent. (See Figs. 12 and 32.) By this

construction the straight sides of the teeth hold and force along the material in either direction, as the direction of the feed may change.

I will now proceed to describe my improved shuttle, the principal object of which is to provide a yielding, elastic tension, so that should lumpy thread be used there will be no rigid tension devices to cause the thread to part.

The body of the shuttle 90 is, in outline of face, similar to the one described in my previous application hereinbefore mentioned. Cut into the upper edge of its face are three slots, 71, 72, and 73, and inside the shuttle, beneath said slots, is a spring, 74, the end of which rests in recess 76, and near one end a screw, 77, passes through the wall of the shuttle, and bears against said spring 74 without being attached to it, so that the screw can be turned in to force spring 74 away from the wall of the shuttle to reduce the tension of the spring. On one side of spring 74 is a projecting tongue, 80, which forms a slot, 79, the end of which is coincident with slot 73. On the top of the shuttle is pivoted a latch, 78, which moves in a plane parallel to the top of the shuttle, and rests upon the slots 71 72 73 when the shuttle is threaded. The end of the latch 78 has a downwardly-curved spring-arm, 81, which springs over the heel of the shuttle into a groove, 82, whereby it is secured by an elastic yielding spring-fastening, which will allow lumpy thread to pass. In threading the shuttle the thread passes from the bobbin out through slot 73 down through slot 72, between spring 74 and the top of the shuttle to slot 71, and out over the shuttle between the latch 78 and the shuttle.

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

1. In a sewing-machine, the shuttle-lever provided with two projecting arms, *b b*, having their interior faces curved, as shown, in combination with the crank E, having a cylindrical wrist and two independent gibs, *a a*, having convex surfaces to conform to the curvature of the interior of arms *b b*, and concave surfaces to conform to the curvature of the cylindrical wrist, all constructed, arranged, and operated substantially as set forth.

2. The compensating-pivot consisting of the double cones *d d*, provided with screws *e'*, bolt *d'*, provided with groove *e*, and jam-nuts *d''*, substantially as described.

3. In combination with a feed-bar adapted to be moved positively both forward and backward, a cam for horizontally moving the said feed-bar by a positive motion in either direction in time, said cam having one working-face, 54 61, with all its points cut nearer in direct lines to the vertical central line, 51 52, than the points of the other working-face, 55 57, substantially as and for the purpose set forth.

4. In a sewing-machine, the combination of the main shaft C, a feed-cam, a feed-bar, P, eccentric R, provided with sleeve 31, pin 30, spring 32, and stop-pin 33, adapted to enter the holes *r r* in the eccentric, all constructed and arranged to operate as described.

5. The feed-dog provided with feed-points or teeth 75, having one side vertical and the other side inclined, and arranged in a series of pairs, so that the same shaped sides of each pair are adjacent, substantially as described.

6. The bed-plate A, provided with the cross-shaped raised portion, having removable slides *g g g g'*, for the purpose specified.

7. The compressible bushing provided with a groove, 19, around its base, in combination with the bearing provided with screw 20, for the purpose set forth.

8. In a tension device for a sewing-machine, two rigid friction-surfaces, in combination with two movable friction-plates, 12 12, supported on rigid bar 13, spring 16, and set-screw 11, all constructed, arranged, and operated as described.

9. The balance-wheel G and plate G', provided with central radial corrugations, in combination with the hollow-end shaft C, having slots 6 6, bolt Z, provided with a cylindrical stem, cross-pin *z*, and wheel f^2, provided with a threaded sleeve, which enters the hollow end of the shaft, substantially as set forth.

10. An arm attached to the needle-bar rock-shaft, and provided with head I, carrying stops, *i i'*, in combination with the take-up arm L, pivoted independently within the head, for the purpose set forth.

11. The take-up bar having a hollow hub, in combination with an inserted coiled detent-spring, *m'*, substantially as described.

12. The take-up bar L, in combination with an operating-lever, and a spring device, K K', for starting the take-up downward with a yielding spring-pressure, substantially as set forth.

13. The lever-head I, having projections, *i i'*, adjustable stop *i''*, and spring device K K', in combination with the take-up arm L, having a projecting end, *l*, detent-spring *m'*, and stops *m m*, all constructed, arranged, and operated as set forth.

14. The needle-bar having the cylindrical needle-hole 26, in combination with a removable cap or guide, N, provided with a face which partially covers the entrance to needle-hole 26, substantially as set forth.

15. The needle-bar provided at its lower end with a cylindrical opening and the semicircular slot 27, in combination with the removable cap N, provided with a set-screw, 29, entering slot 27, for the purpose specified.

16. The latch 78, pivoted to the top of the shuttle and moving in a plane parallel thereto, and provided with a downwardly-projecting spring-catch, 81, in combination with the shuttle-heel provided with groove 82, for the purpose set forth.

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