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Sewing-Machines.

No. 145,025. Patented Nov. 25, 1873.

Fig. 1.

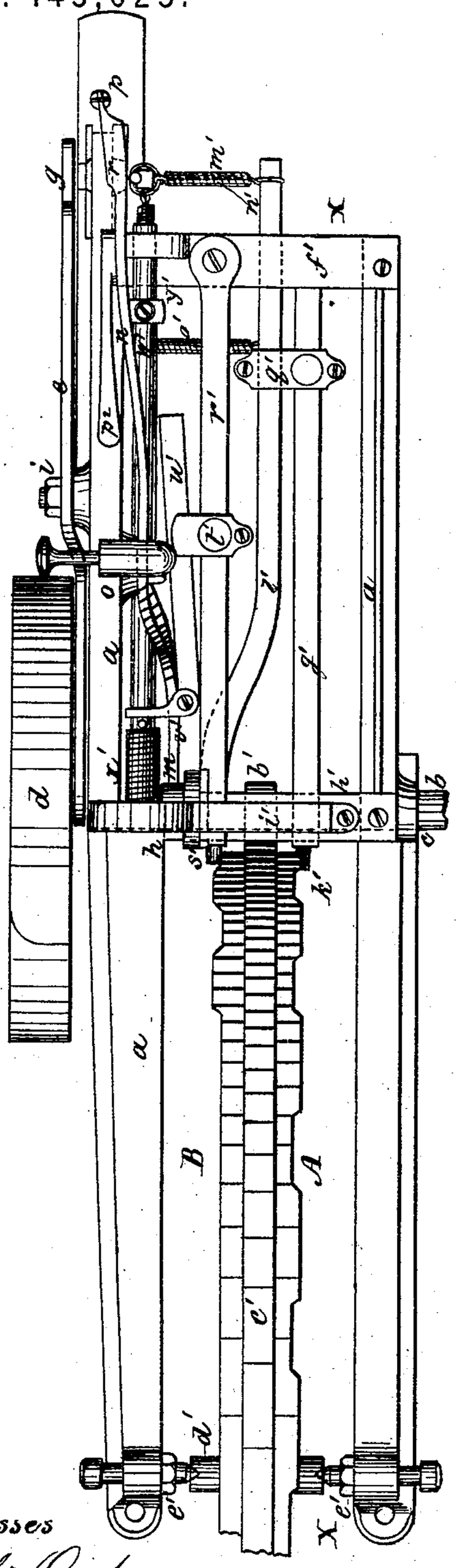
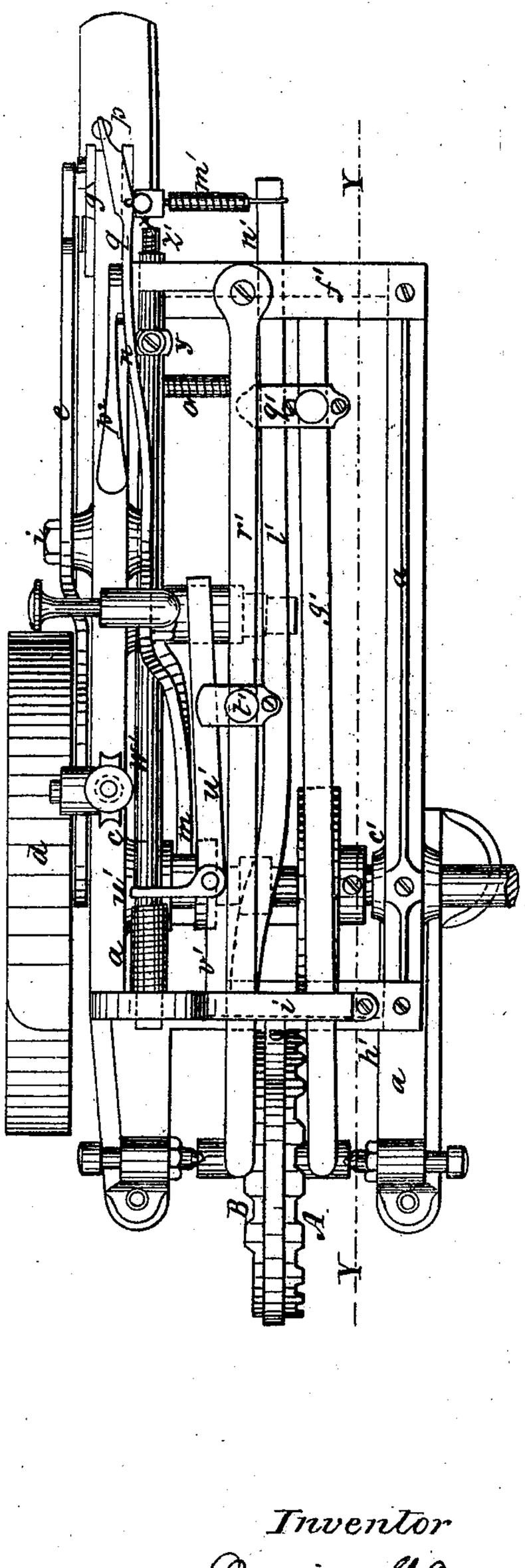


Fig. 7.



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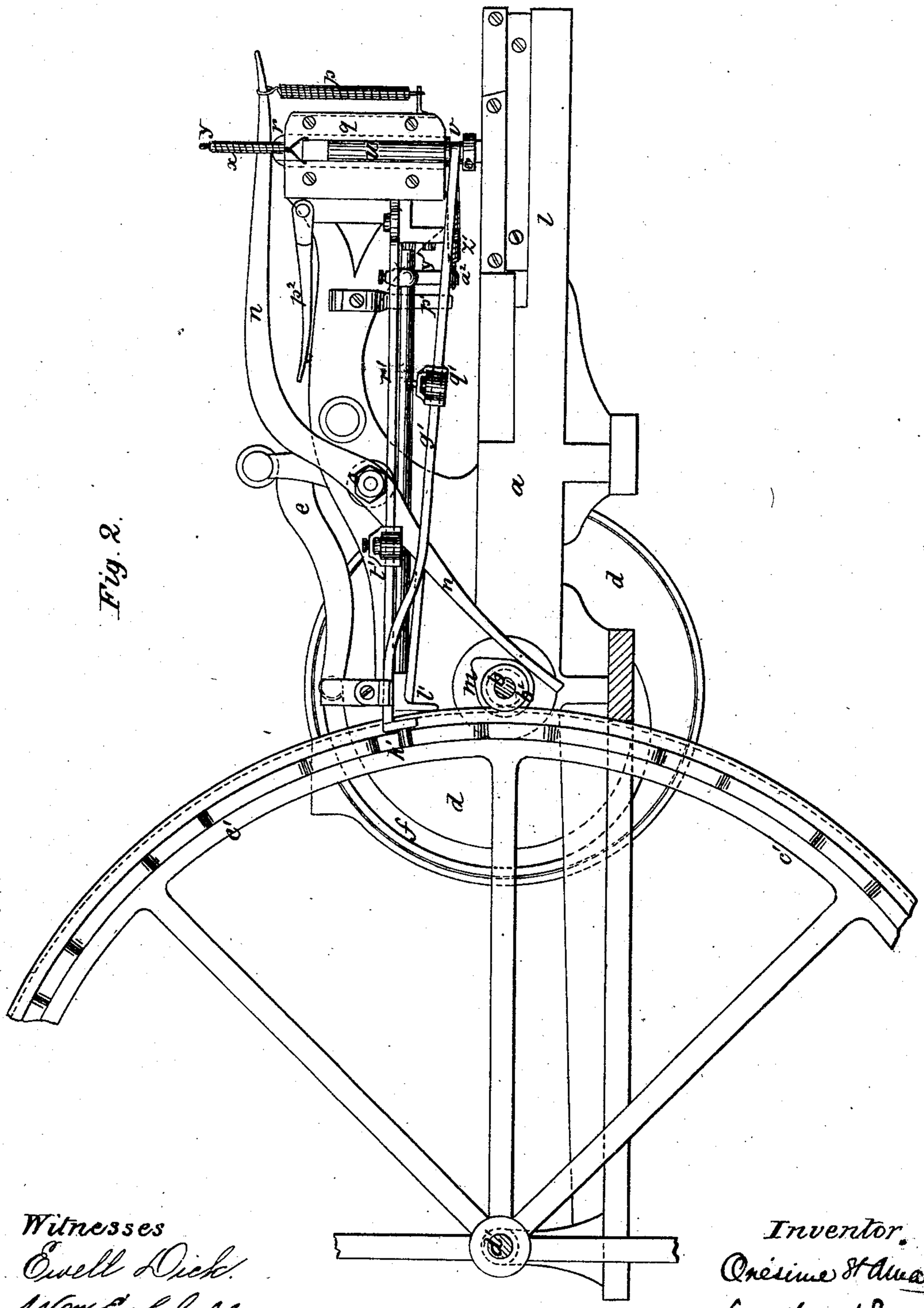

Fig. 2.

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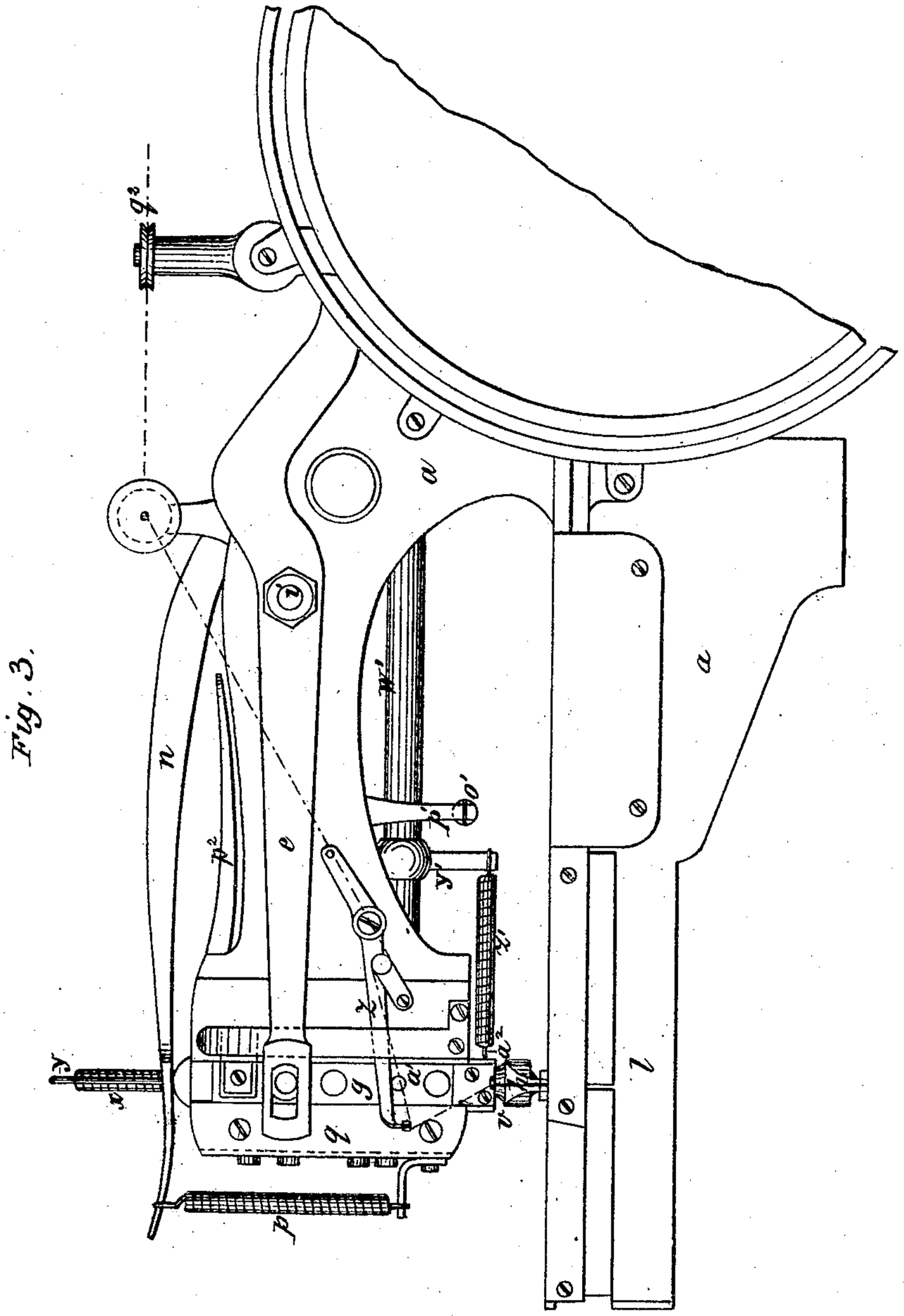

Fig. 3.

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Fig. 5.

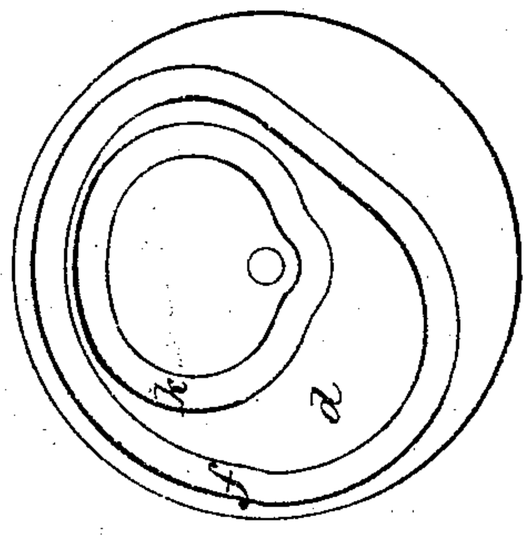

Fig. 4.

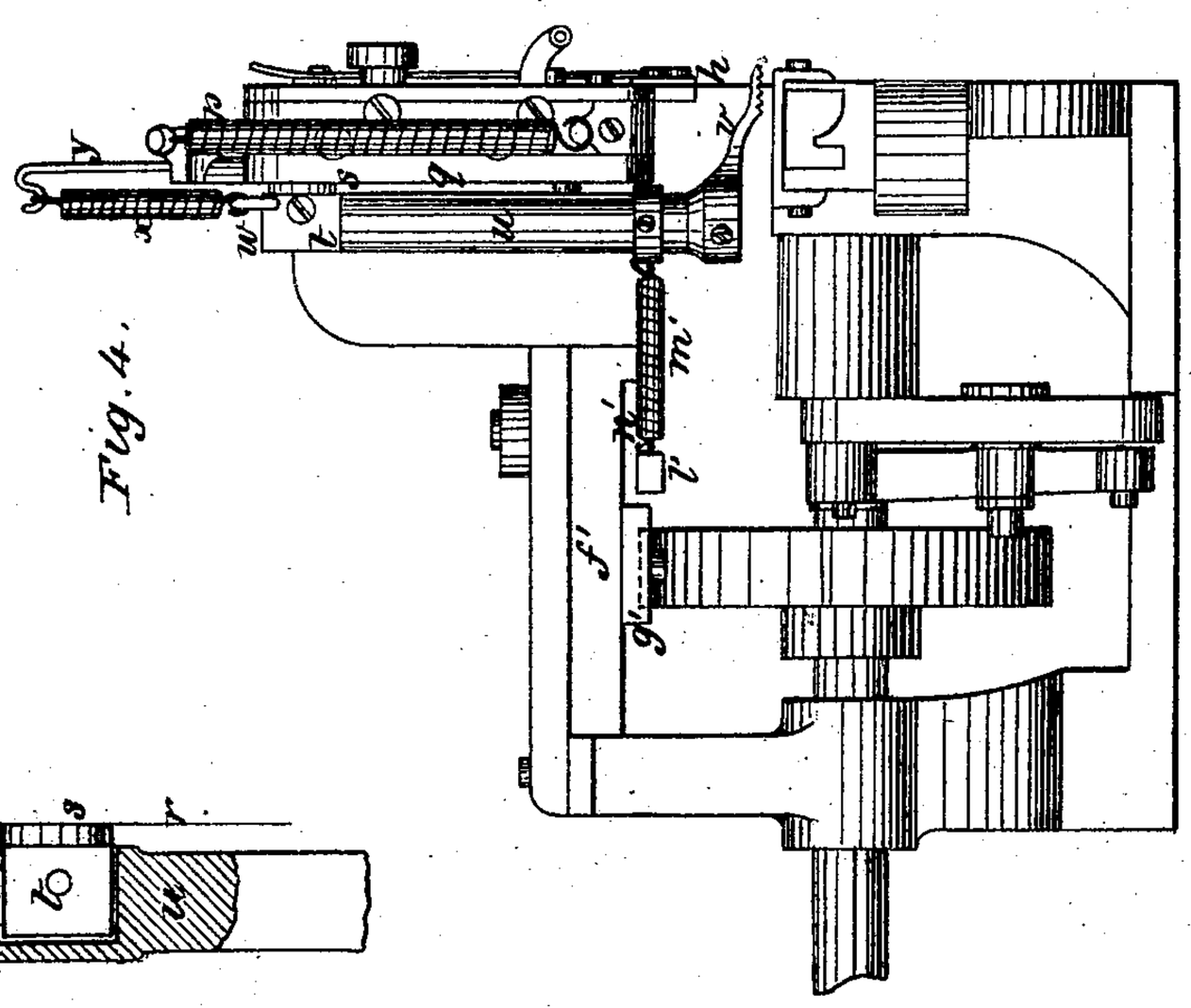

Fig. 6.

Fig. 10.

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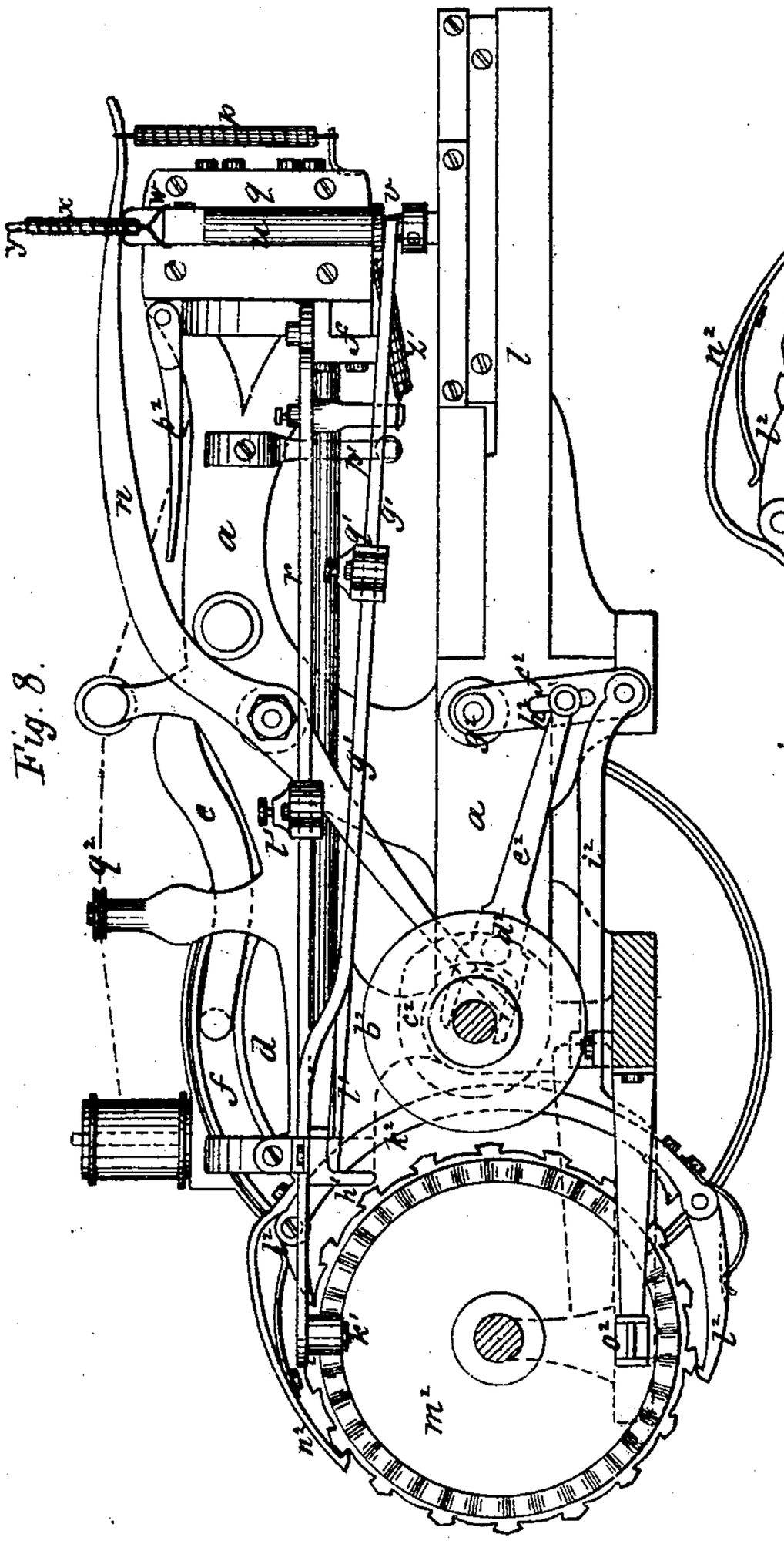

Fig. 8.

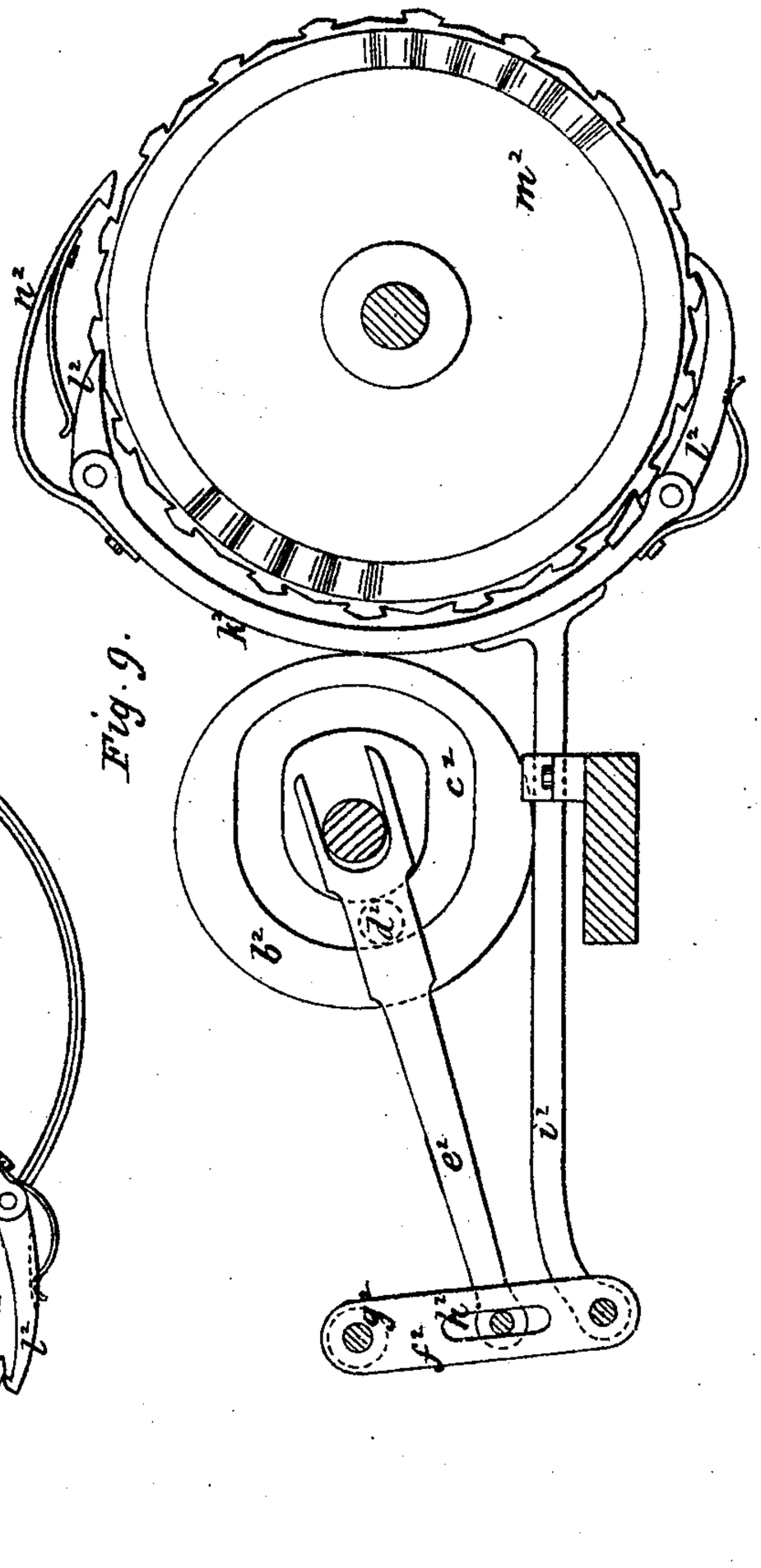

Fig. 9.

Witnesses.
Ewell Dick
Wm. E. Shaffer

Inventor.
Onesime St Amant
By Atty Abbott

UNITED STATES PATENT OFFICE.

ONÉSIME ST. AMANT, OF QUEBEC, CANADA, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOSEPH WOODLEY, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **145,025,** dated November 25, 1873; application filed October 28, 1873.

To all whom it may concern:

Be it known that I, ONÉSIME ST. AMANT, of the city of Quebec, in the District and Province of Quebec, Canada, have invented certain new and useful Improvements on Sewing-Machines, of which the following is a specification:

This invention has reference to improvements in sewing-machines to produce one capable of varying the line of the stitching in any required direction, and also capable of producing various patterns in stitching, the whole being done automatically. My invention principally consists in the combination, with the other members of a sewing mechanism requisite to produce a stitch, of a universal feed adapted to carry the work backward as well as forward, to either side or in any direction, whether in a curved or straight line, all the movements of the feed, including the backward movement, being effected automatically, according to the pattern employed. This invention is particularly adapted for, and is here represented as used with, a foot or top feed, but is not confined to this, as it may be easily adapted to an under feed, or what is commonly known as the "jump" feed.

Reference being had to the accompanying drawings, in which similar letters of reference indicate like parts, and where Figure 1 represents a plan of the machine, Fig. 2 represents a sectional back elevation of the machine taken on line X X, Fig. 1. Fig. 3 represents a part front elevation of the machine. Fig. 4 represents an end elevation of the machine. Fig. 5 represents a detail of cam-wheel *d*. Fig. 6 represents a detail of rod *u*. Fig. 7 represents a plan of modification of the machine. Fig. 8 represents a sectional back elevation of the machine on line Y Y. Fig. 9 represents a detail of cam-ratchet wheel m^2, &c. Fig. 10 represents the stitching.

a is the rigid frame-work for holding the moving parts in place; *b*, the main shaft rotated by hand or power, and communicating motion to all the other moving parts carried in bearings *c c* in the frame-work. *d* is the double main cam-wheel having grooves on its inner side, as shown in Fig. 5, and is secured on the end of the shaft *b* in any required manner to revolve with it. By means of a projection on the end of the lever *e*, pivoted, at *i*, to the frame-work, and entering into the groove *f*, the rise and descent of the needle-slide *g* and needle *h* are effected. *k* is the groove in the cam-wheel *d*, in which moves the projection at the end of the shuttle-slide arranged within the arm *l* of the frame-work *a*, and suitably formed for that purpose, the needle *h* co-operating with the shuttle to form the stitch in a similar manner to the machines at present in use. On the main shaft *b* is placed the cam *m* made with a collar for better securing it thereto; actuating the lever *n*, pivoted, at *o*, to the frame-work *a*. The other extremity of this lever is kept pressed down by a spiral spring, *p*, attached for that purpose, as shown in the drawings, to the head *q*. The construction of the back of the head *q* and that of the presser-foot is most clearly shown in Figs. 2, 4, 6, and 8, where, by supplementary pieces, a groove is formed to receive the slide *r*, from which projects a stud, *s*, to which is attached, by a pivot-pin, *t*, the end of the rod *u*, the presser-foot *v* being secured to its lower end. This stud *s* is arranged to rotate slightly in the slide *r*. The hanging of the rod *u* on the pivot-pin *t* permits the forward-and-back movement of the foot, and the arrangement of the pin *s*, so that it may rotate slightly in the slide *r*, allows the lateral vibration or movement of the foot. The attachment between the rod *u* and the lever *n* (from which the up-and-down movements of the feed-foot are derived) is effected by means of a yoke or link, *w*, to which is secured one end of a spiral spring, *x*, attached, at the other end, to the hook and standard *y* on the lever *n*. The construction of the front side of *q* is clearly shown in Figs. 1, 3, and 7. By supplementary pieces a groove is formed for the needle-slide *g;* and on the face of the head *q* is pivoted a deviating tension-arm, *z*, alternately raised by the stud *a'* and pushed down by the end of the lever *e*. Upon the shaft *b* is secured the pinion-wheel b^1 rotating with it, and intermeshing with the large spur-wheel *c'* placed on a small shaft, d^1, which is carried, as shown in Fig. 1, preferably in center bearings e^1. Around the spur-wheel c^1, a short distance from its periphery, is formed

on each face a series of projections, corrugations, and indentations, these, however, being varied according to the pattern to be stitched on the cloth, work, or goods.

In Fig. 1, on the side of the wheel marked A, a projection will give (by mechanism hereinafter more particularly described) a forward movement to the feed, a plain surface will allow it to remain stationary, and an indentation below that surface will give the feed backward. On the side B of the wheel, similarly, a plain surface, a projection, and an indentation give a straight line or a deviation either to right or left, and by the combined action of these surfaces, projections, or indentations on the sides A and B the lines of stitching may be varied in any diagonal or sinuous direction.

The inequalities above referred to are caused to actuate the presser-foot by mechanism which I will at once proceed to describe.

To the under side of the brace f^1 is pivoted, where shown in Figs. 1 and 4, the end of the lever g^1, in which is formed a shoulder passing over the brace h^1 and under the guard i^1. To the free end of this lever g^1 is secured the roller k^1 acted upon by the corrugations, &c., above described, on the A side of the wheel c^1. l^1 is a lever, one end of which is pivoted under the brace h^1, while its other end extends a little beyond the presser-foot v, as shown in Figs. 1 and 2, being connected to the rod u by a spiral spring, m^1, a distance piece, n^1, of wire, or other similar material being interposed. o^1 is a spring attached to the lever l^1 at one end, at the other to a projection, p^1, formed on the frame-work a, as shown in Fig. 3. The action of this spring o^1 is to draw the end of the lever l^1 horizontally over in the direction toward the head q. It will be seen that the action of the spring o^1 on the lever l^1 influences that of the lever g^1 through a coupling-link, q^1, which may be adjusted at any point on these two levers, whereby the motion of the forward feed may be adjusted, and by the action of this spring o^1 the roller k^1 is kept pressed against the A side of the wheel c^1. To the top of the brace f^1, by means of a pivot, is attached the lever r', extending to the B side of the wheel c^1 the same distance, and in like manner as the lever g^1 on the A side. It is also provided with a roller, s', similar to that k^1 already described. On r' is placed an adjustable slide, t', to act upon the bell-crank lever w', pivoted to an arm, v', of the brace h^1. w' is a rod, one end of which passes through an easily-fitting eye in the brace h^1, and the other end through an eye similarly formed in the brace f^1. x' is a spiral spring, situated on the rod w', as shown in the drawings, causing it to press continuously in the direction of the presser-foot v, but held in place by any suitable pin, and acting on the short arm of the bell-crank w', which transmits the force of the spring x through the slide t' to the lever r, keeping the roller s' on its extremity pressed against the B side of the wheel c^1. As shown in Figs. 1, 2, and 3, a short arm, y', is attached to the rod w', by means of a set-screw. The lower end of this is connected to the presser-foot v by a spiral spring, z', and distance-wire a^2. Thus the motion of the roller on the end of the lever r', acting on the B side of the wheel c^1, is transmitted to the presser-foot v.

It will be thus seen that the several movements of these levers are transmitted to the presser-foot when the same is down upon the work to be stitched, and that by the movement thus imparted to it the presser-foot is able to push or pull the work in any direction required by the pattern. The wheel c^1 is made to cause the stitching to be done in the pattern shown in Fig. 10; and it will easily be understood that the machine may be provided with a set of wheels, c^1, for the purpose of executing any desired patterns.

As a modification of the machine, the wheel c^1 and pinion b^1 may be omitted, and in their stead the following arrangement, clearly shown in Figs. 7, 8, and 9, substituted. On the shaft b is attached a wheel, b^2, having a cam-groove, c^2, on its face. (Shown in Figs. 8 and 9.) In this cam-groove works a roller, d^2, attached on the forked arm e^2, as shown. f^2 is a link pivoted at g^2 to the frame a, and provided with a slot, h^2, in which is placed a pin, connecting the end of the arm e^2 with it. By moving this pin toward or from the pivot g^2, the throw or stroke of the other end of the link f^2 is adjusted. To the lower end of the link f^2 is pivoted the arm i^2, to which is attached the bent bar k^2, the pawls l^2 rotating the cam-wheel m^2 being pivoted to it, while n^2 are stop-pawls, for preventing any undue amount of motion in the wheel m^2. This cam-wheel is carried on the frame in a manner so clearly shown in the drawings as to require no further description. o^2 are friction-pads, placed on each side of the wheel m^2 to further assist the safety-pawls. The wheel m^2 is provided on its periphery with teeth, of suitable configuration to be acted upon by the pawls above mentioned, to rotate it at each movement of the link f^2, while its edges are corrugated or notched, as hereinbefore described, for the wheel c^1; and for the same purpose the side marked A acting on the lever g^1, and that marked B on the lever r'. p^2 shows any one of the ordinary forms of latch for upraising and there holding the presser-foot, as in the ordinary sewing-machine. q^2 is the tension, of one of the ordinary configurations.

I have described the foregoing modification in order to indicate the ease with which various mechanical devices can be employed to give effect to my invention. On the whole, however, I prefer, and in practice use, the arrangement of parts first above specified.

It will, of course, be understood that the movements of the various parts—viz., the pattern-wheel, levers for operating in connection with the A and B sides of that wheel, mechanism for producing the up-and-down movements of the feed, and mechanism for making the stitch—should be so timed that the feed-foot shall be against the work at the time the pat-

tern-wheel is actuating the levers to move said work in the required direction, and that the needle shall make the stitch during the intermissions between the feed movement. The chief and characteristic feature of my invention is, as above stated, that the feed takes place automatically backward as well as forward, giving, therefore, much more range for automatic pattern movements than has heretofore been practicable.

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

1. The combination, in a sewing mechanism of otherwise ordinary or suitable construction, of a feed capable of universal movement, and a pattern wheel or cam, and intermediate mechanism connecting said pattern and feed, constructed and operating substantially as shown and described, to cause said feed to automatically carry the work during the progress of the sewing backward as well as forward, to either side or in any direction, substantially as and for the purpose set forth.

2. In combination with the presser-foot v, having an intermittent rise and fall, as described, the wheel c^1, provided on its lateral faces with projections, indentations, and plane surfaces, as described, and the system of levers communicating movement from said wheel to said presser-foot, all substantially as herein shown and set forth.

3. The wheel c^1, in combination with the levers g^1 and l^1, link q^1, and spiral springs m^1 and o^1, for actuating the presser-foot v, substantially as described.

4. The wheel c^1, in combination with lever r', slide t', bell-crank lever w', and rod w', caused to move as described, and actuating the presser-foot v, as and for the purposes described.

5. The wheel c^1, having projections, indentations, and plane surfaces, in combination with pinion b^1, as described.

6. The rod u with presser-foot v, in combination with stud s, pivot-pin t, yoke w, and spring x, substantially as set forth.

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

ONÉSIME ST. AMANT.

Witnesses:
JOHN BULKLEY,
JOHN HATCH.