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D. H. ROGAN.
Sewing-Machines.

No. 137,321. Patented April 1, 1873.

Fig 1

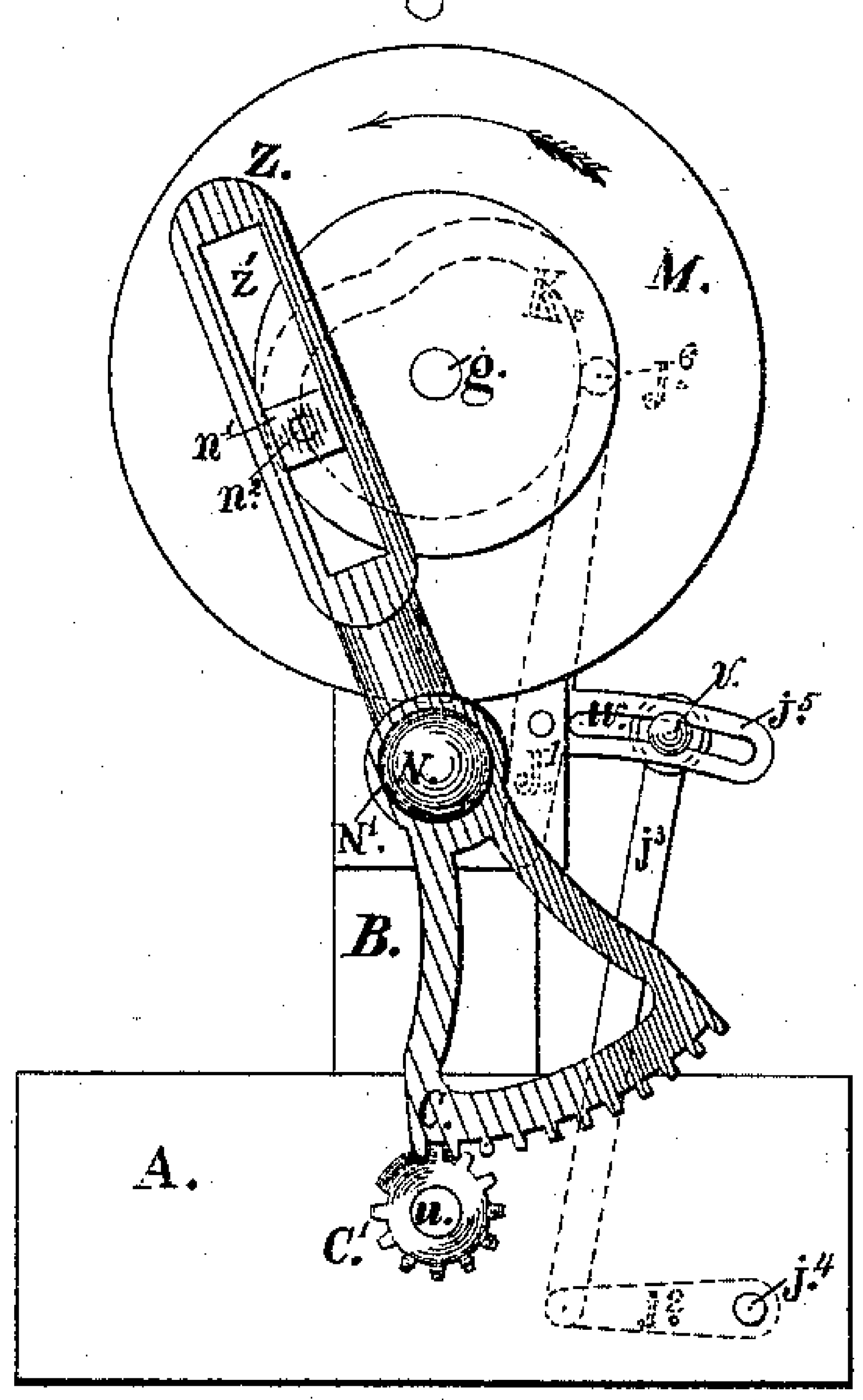
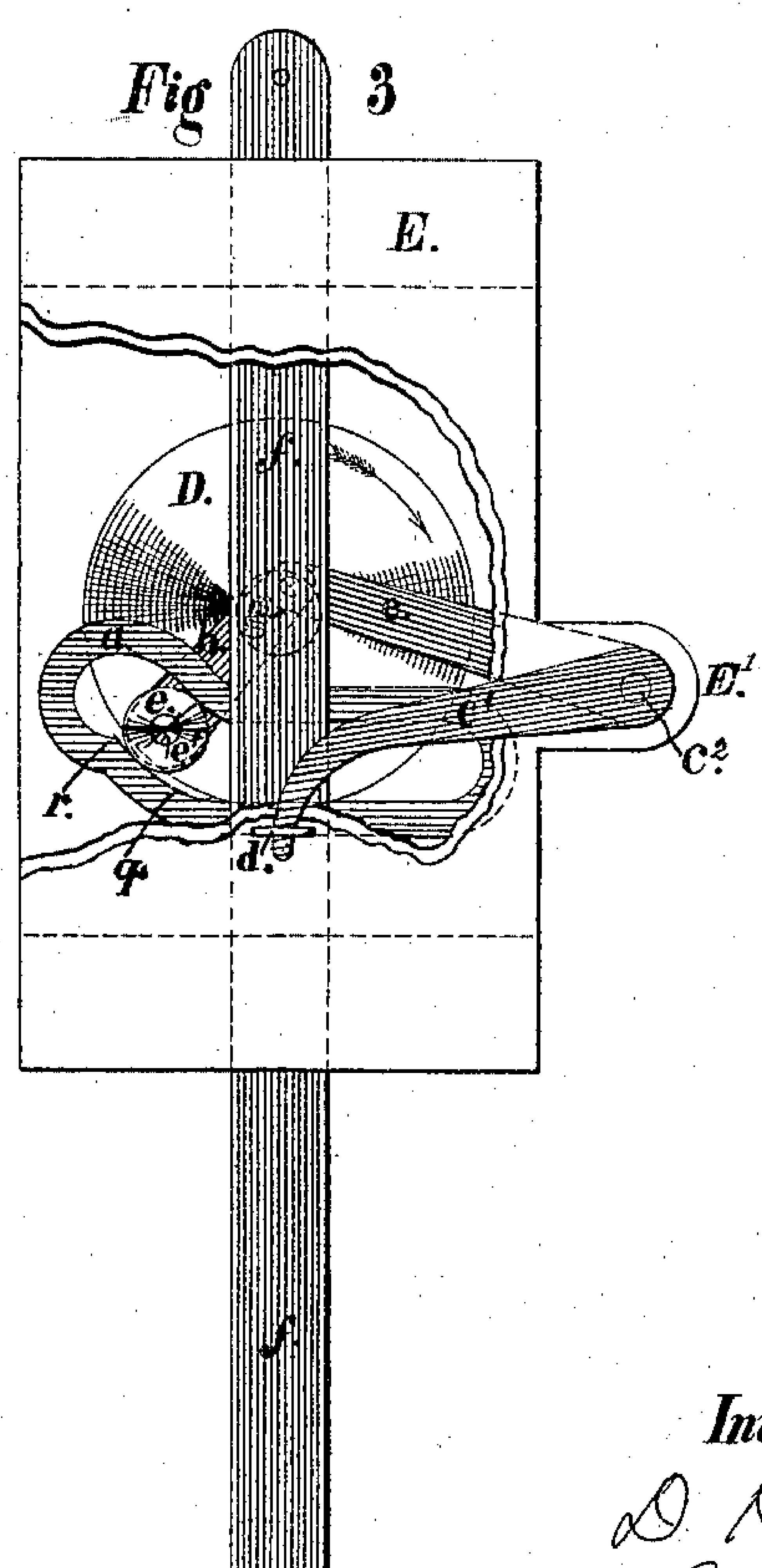


Fig 3



Witnesses:

Stanley Williams

S. N. Rich

Inventor:

D H Rogan by
A M Stout
his atty

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

2 Sheets--Sheet 2

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Fig 2

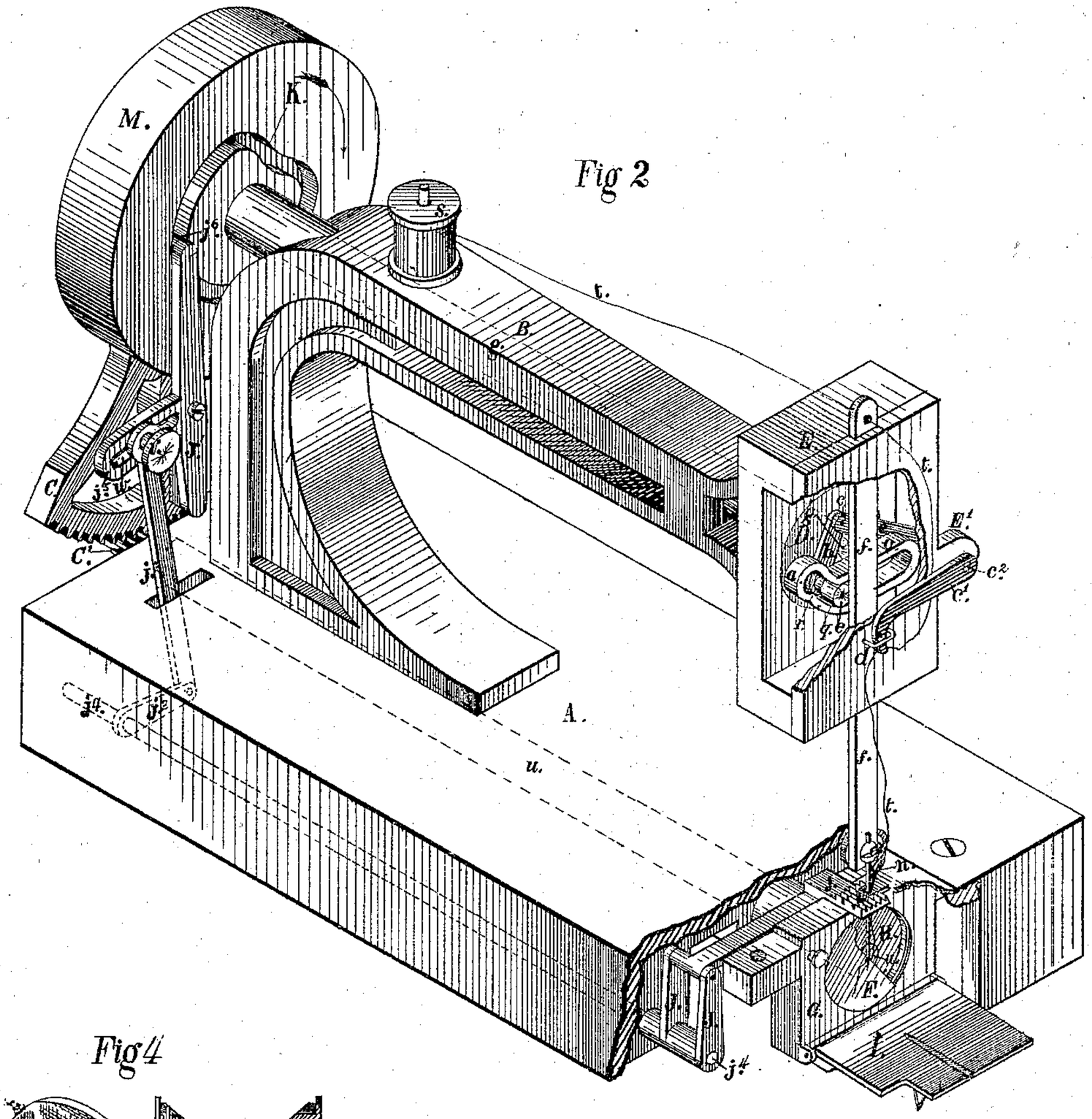
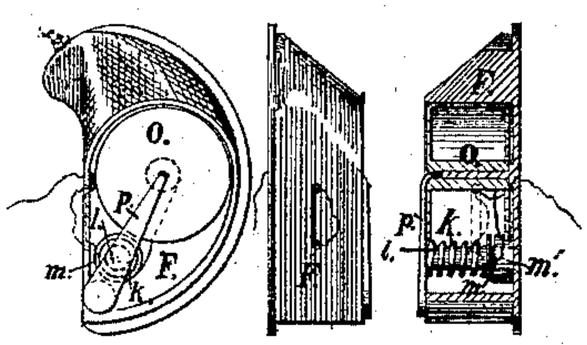


Fig 4



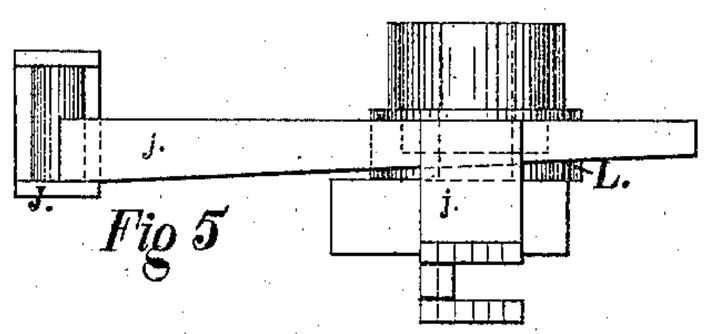
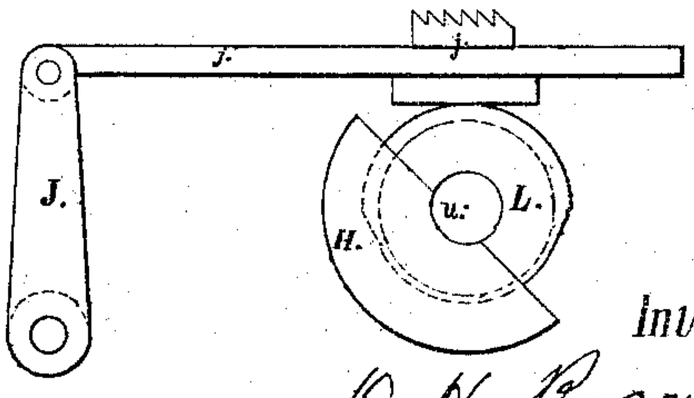


Fig 5



Witnesses:

Stanley Williams

F. N. Rich

Inventor

D. H. Rogan by

A. M. Stout

his atty

UNITED STATES PATENT OFFICE.

DANIEL H. ROGAN, OF NEWTON, IOWA, ASSIGNOR OF ONE-HALF HIS RIGHT TO ALBERT LUFKIN, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **137,321**, dated April 1, 1873; application filed January 3, 1873.

To all whom it may concern:

Be it known that I, DANIEL H. ROGAN, of Newton, county of Jasper and State of Iowa, have invented certain Improvements in Sewing-Machines, of which the following is a specification:

The first part of my invention relates to the combination of a mechanical device for changing regular circular motion into a variable and reciprocating circular motion, and a shaft conveying such motion therefrom, and a shuttle having a central thread-delivering eye receiving such motion from such mechanical device from that shaft, as will be more fully described and explained hereinafter. The second part of my invention relates to a combination of the balance-wheel with a certain groove therein, and certain levers, bars, and a link, by which the feed-motion is regulated and communicated to the feed-plate, as hereinafter more fully described and explained. The third part of my invention relates to the combination of devices inside of the shuttle-box to afford the proper tension to the lower thread, all of which will be more fully described and explained hereinafter.

In the accompanying drawing, Figure 1 represents a rear view of the mechanical device for operating the shuttle. Fig. 2 is an isometrical view of the front end of a machine embracing my improvements, having the casings broken away in order to display the interior of the parts. No upper tension or presser-foot is shown in that or any of the other figures. Fig. 3 is a front-end elevation of the frame or box containing the needle-bar, as well as the slotted cams and levers, which are instrumental in operating the same and the take-up. Fig. 4 represents several different views of the shuttle. Fig. 5 represents a plan and vertical section of some of the parts engaged in the operation of feeding the cloth to the needle.

The said mechanical device consists of the balance-wheel M upon the main shaft *g*, carrying a crank-pin, n^2, which slides in the slotted arm of the toothed sector C. Just below the periphery of the wheel M is a projection, N′, of the arm B of the main frame, and upon that projection is pivoted a toothed sector, C, provided with a slotted arm, *z′*. Within the slot *z′* of that arm the crank-pin slides back and forth as the wheel is revolved, and thus the sector, meshing with the teeth of the pinion C′, turns the shaft *u* alternately to the right and left about three-fourths of a revolution. This proportion of a revolution I find most eligible, in order to give such motion to the shuttle, which is confined against the forward end of the shaft *u* in the shuttle-box G, and held in place by the door I, that it will enter and pass through the loop with its point to form the stitch, and then turn into position to enter the loop again, and thus the thread is never twisted or untwisted.

It is obvious that the wheel in making one revolution moves the sector once forward and once backward, and that the movement when the crank-pin passes nearest the pivot of the sector is much more rapid than when the crank-pin is furthest therefrom. This quick movement of the shuttle is eminently advantageous, inasmuch as the needle-bar has to stop and await its performance, as hereinafter explained.

In order to produce the feed movement a slot, K, is made in the inner face of the balance-wheel M in the form of a cam, and an elbow, j^6, of an upright bar, J′, provided with a slotted arm, j^5, runs in that slot when the wheel revolves. By means of a link, j^3, and the slot *w*, a lever, j^2, pivoted to the link j^3, and a milled screw, *v*, provided with a nut, an adjustable connection is formed between the bar J′ and the horizontal shaft j^4, extending under the bed-plate, as indicated by broken lines, and this shaft is connected with the feed *j* by levers J J. Now, by means of the adjustable connection, before mentioned, between the slotted arm of J′ and the link j^3, the upper end of the latter may be fastened at any point along the length of the slot in the horizontal bar j^5, so as to regulate the feed and the length of the stitch exactly as may be desired.

In order to give the desired motion to the needle-bar, bearings are furnished in the arm B of the main frame for the shaft *g*, upon which the balance-wheel M is fastened at one end, and on the other end of this shaft is fastened the disk D, near the circumference of which is fixed a crank-pin, *e′*, provided with a roller, *e*, and embracing that roller is the slotted cam-

block *a*, rigidly attached to the needle-bar *f*, which moves vertically in ways provided for it, as shown in Figs. 2 and 3. When the disk D is revolved it imparts vertical reciprocating motion to the needle-bar; but that motion is not regular, as it would be if the cam were straight; for when the cam is in the position shown in Fig. 2 that part of the inside of it which is between the points *q* and *r* is precisely the arc of a circle described by the crank-pin *e'*, and consequently during the passage of the crank-pin from the one point to the other the needle-bar is at rest, and during that instant of time—about one-twelfth of the time of one revolution by the quick movement of the mechanical device before described—the shuttle enters the loop and forms the stitch.

In order to operate the take-up *d*, it is mounted and rigidly fixed upon the shaft c^2, which has its bearing in the projection E' of the frame, and upon the other end of the shaft c^2 is fixed a straight bar, *c*, and to the other end of that bar is pivoted a link, *b*, the end of which is also pivoted upon the crank-pin, all of which is shown clearly in Fig. 3. In that figure the crank-pin is shown resting upon the short arc *q r*, before mentioned, and the bar *c* and link *b* nearly at right angles with each other, and the take-up *d* at its lowest point; but when the disk is revolved the crank-pin approaches the shaft c^2, the ends of the bar *c* and link that are pivoted together rise and revolve their shaft c^2, which raises the take-up, and the needle bar rises with them until the crank-pin rises to its highest point of revolution, when it begins to descend, but the take-up continues to rise until the crank-pin has caused the needle-bar to descend nearly a quarter of an inch, thus accomplishing the object of the combination.

The proper tension of the lower thread inside of the shuttle is accomplished by the following combination of parts: A little hollow cylinder, *m'*, is raised from the inner surface of the flanged plate of the shuttle F, and a pin, *k*, provided with a collar, is inserted in the cylinder so that the collar will fit down upon the top of the cylinder, and around the upper portion of the pin is placed a spiral spring, *l*, and over the upper end of the spiral spring and pin is placed the plate-spring *p* to hold the spiral spring with needful pressure. A screw-nut upon the upper end of the pin would answer the same purpose. The pin is provided with a hole through it under the collar for the thread to pass through, and when the thread is in it and between the collar and the top of the cylinder its tension is effected.

In Fig. 5 is shown the cam L upon the shaft *u* for lowering the feed-plate *j* out of the way of the cloth preparatory to making the feed movement; and it is obvious that, as the feed-plate is above the shuttle, the teeth may extend on each side of the needle in the form of a **U**, and thus feed the cloth more squarely and evenly than it would if it extended on one side only.

In Fig. 2 is shown the shuttle-box G with its door I down, and in the shuttle-guide, which is a circular opening, is shown the shuttle F and the shuttle-driver H, the two together filling the said circular opening. The shuttle F is retained in place by the door I when closed against the shuttle-box G.

Claims.

1. The toothed sector C provided with the slotted arm *z*, and the wheel M having the crank-pin n^2, combined with the pinion C', rock-shaft *u*, and shuttle having a central thread-delivering eye, all constructed and arranged substantially as shown and described.

2. The combination of the balance-wheel M provided with the cam-groove K, the lever J' having the slotted arm j^5, the lever j^2, link j^3, shaft j^4, and bars J J, constructed and arranged to operate the feed, substantially as and for the purpose described.

3. The combination inside of the shuttle F of the pin *k* having hole *m* and collar, cylinder *m'*, spiral spring *l*, and plate-spring *p*, substantially as described and shown, and for the purpose set forth.

Witnesses: DANIEL H. ROGAN.
C. W. W. WOODROW,
JAMES WILSON.