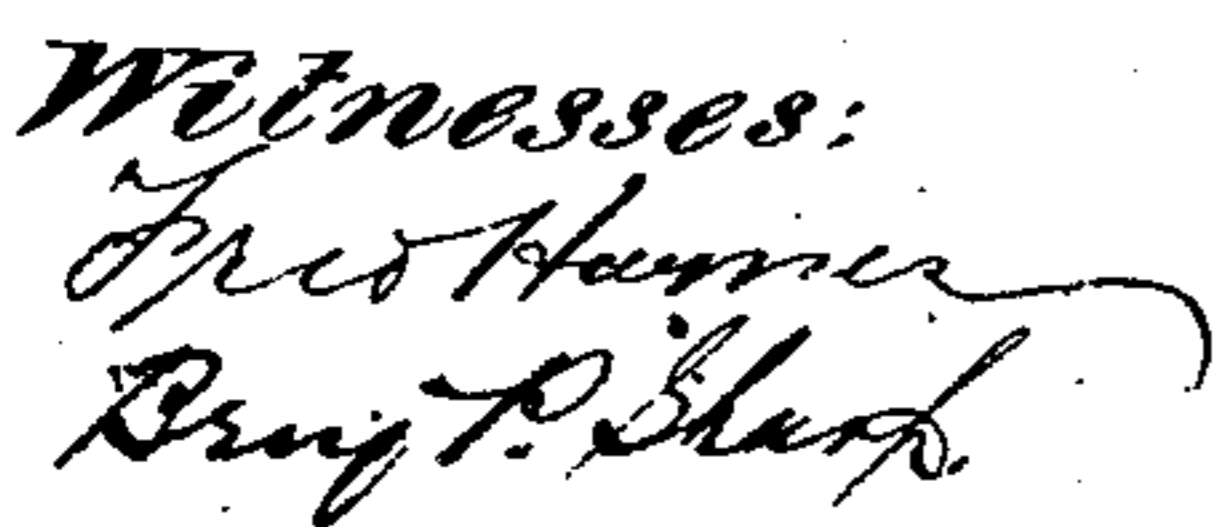


R. WHITEHILL.
Sewing-Machines.

Patented Dec. 17, 1872.

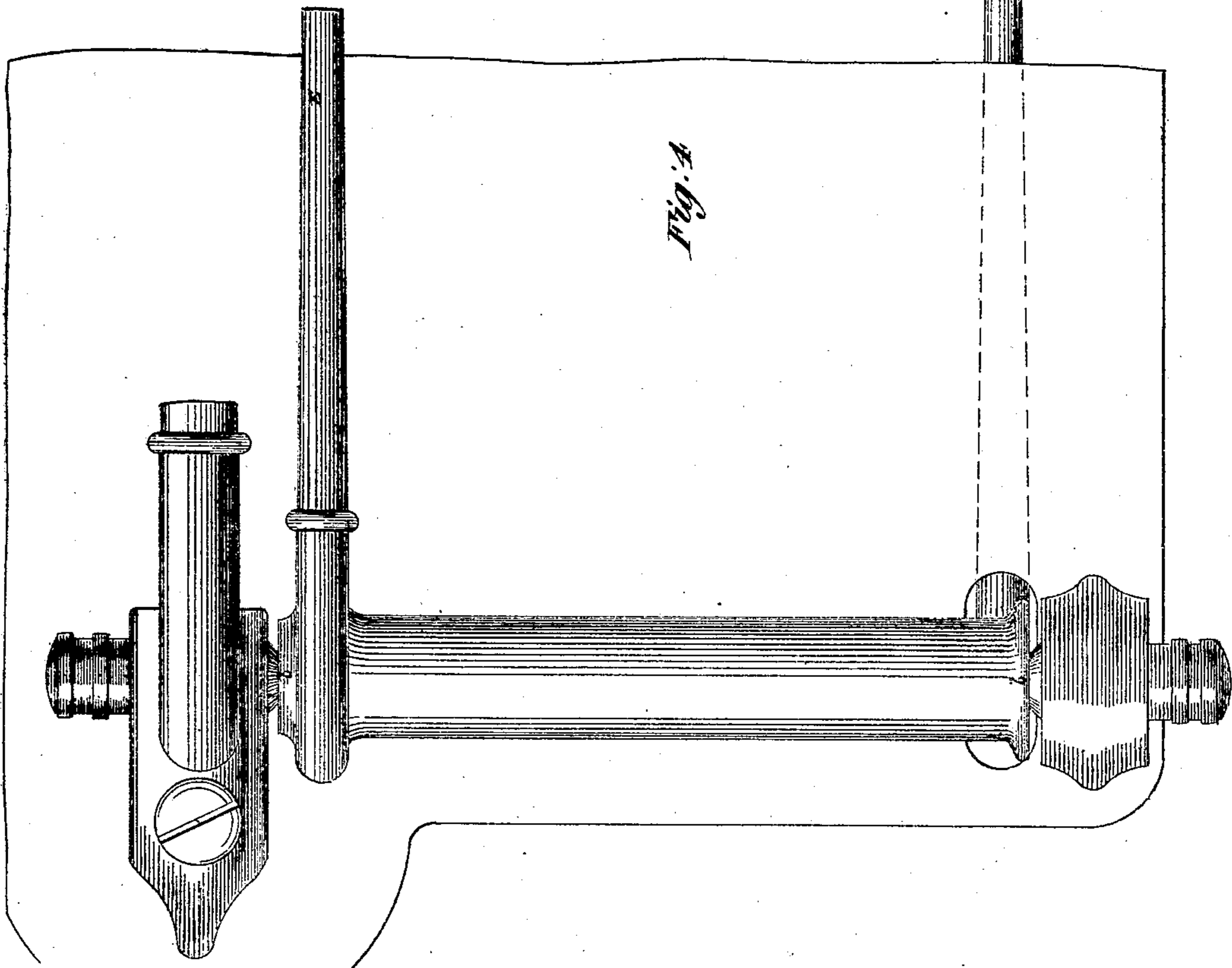
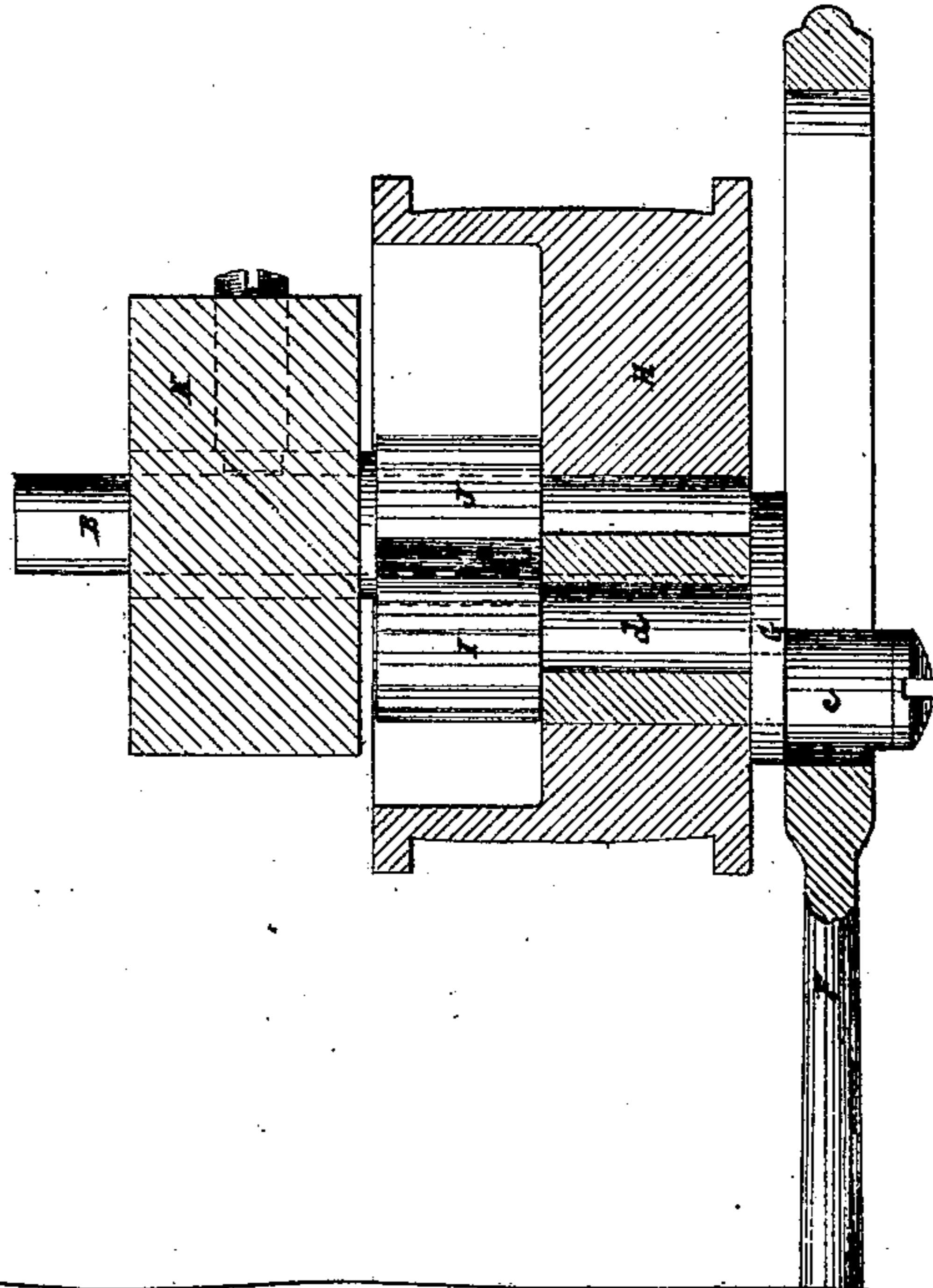
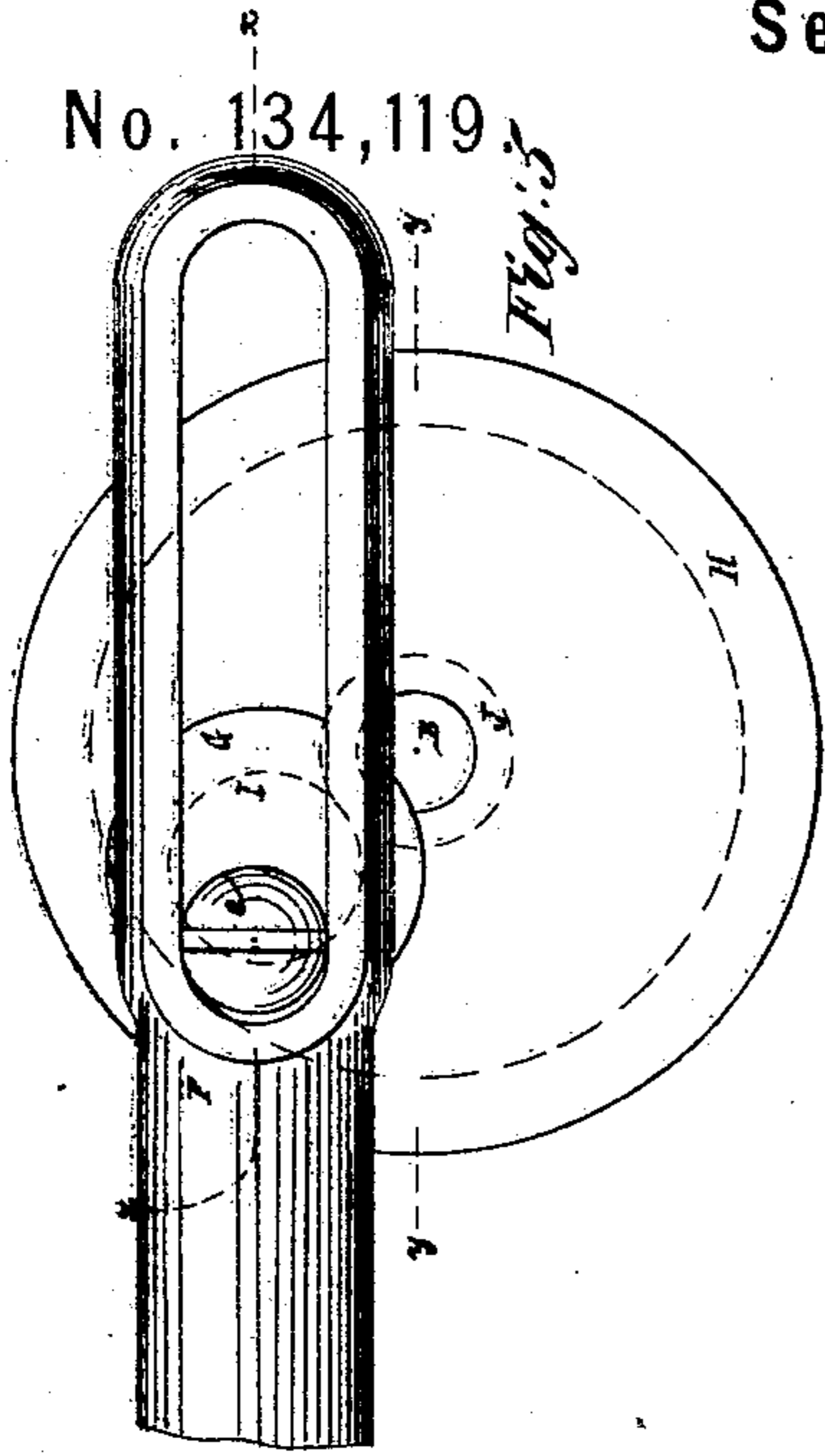


Robert Whitehill

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Patented Dec. 17, 1872.

No. 134,119



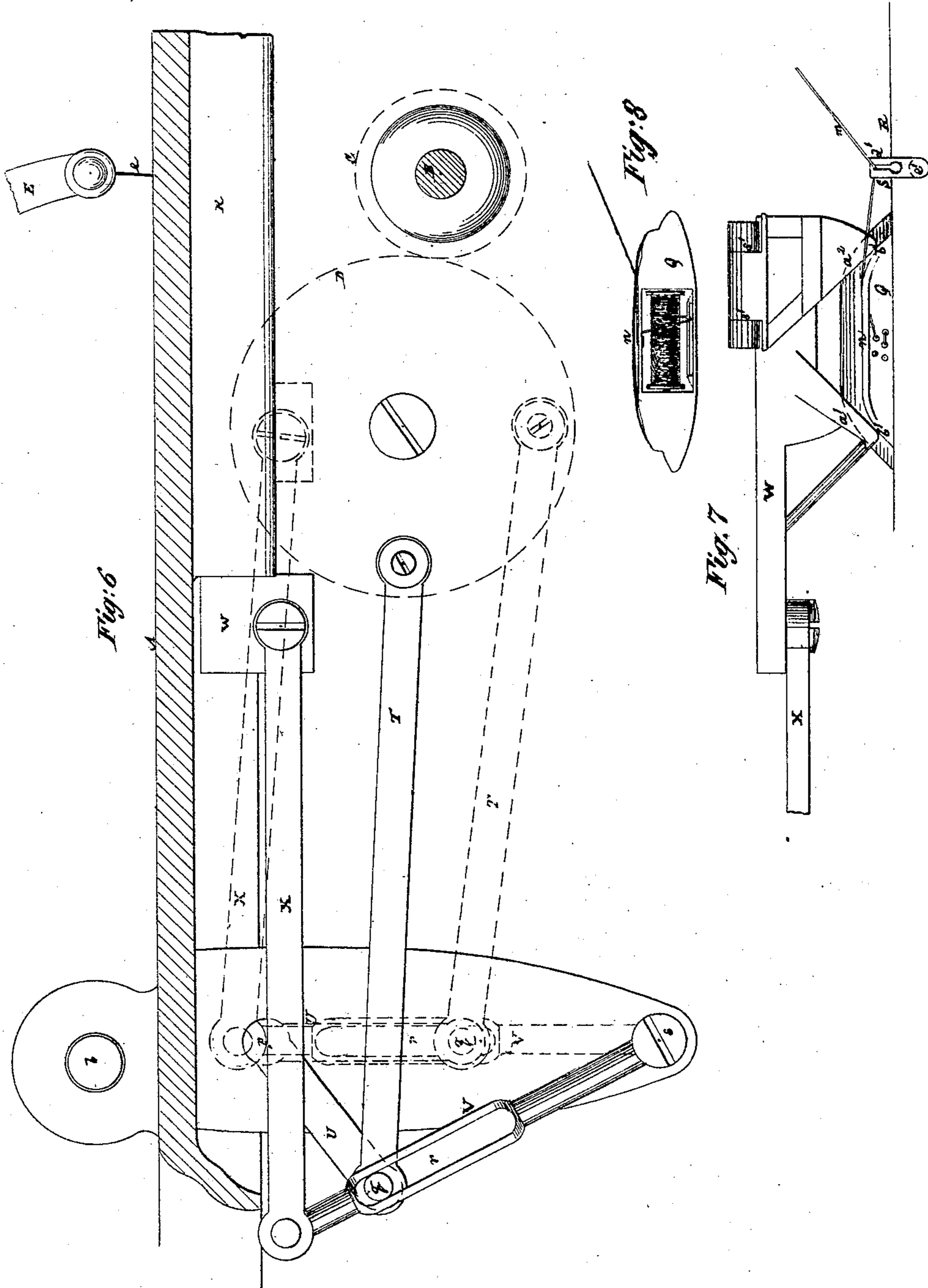
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No. 134,119.

Patented Dec. 17, 1872.



Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT WHITEHILL, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 134,119, dated December 17, 1872.

To all whom it may concern:

Be it known that I, ROBERT WHITEHILL, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a sectional side elevation through the central portion of the rear of the cloth-bed and through the shuttle-box and contiguous devices at the front end of said bed, also showing a side view of a compound crank-movement for operating the needle. Fig. 2 is a top view of a shuttle-thread controller, and Fig. 3 is a side view of the same. Fig. 4 is a broken, partly sectional, plan, showing the compound crank-movement for operating the needle, the section being an irregular one at the lines *xx* and *yy* in Fig. 5, which latter is a side view of said movement. Fig. 6 is a sectional side elevation mainly in illustration of the shuttle-motion. Fig. 7 represents a plan of the shuttle-driver with shuttle and shuttle-thread controller, and Fig. 8 a face view of the shuttle.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawing.

This invention, although applicable in part to other machines, is more especially designed for lock-stitch or double-thread machines, in which a reciprocating double-nosed shuttle is used, and caused to form a loop with the needle-thread at each point of the shuttle, thus making two loops of the needle-thread or two lock-stitches during each combined single and return movement of the shuttle, whereby the shuttle, to complete a certain amount of work in a given time or for a given number of strokes of the needle, only requires to travel at half the velocity of a single-nosed shuttle. To this end the invention comprises a combination, with a double-nosed shuttle, of a shuttle-thread controller arranged to reciprocate simultaneously with the needle, but in a reverse direction to it, whereby the needle-thread and shuttle-thread are both drawn at the same time to form the stitch, and the duty of the shuttle is confined to supplying the secondary thread, or relieved from draw to produce the

stitch. The invention also consists in a peculiar compound revolving-crank movement for operating the needle and giving to the latter what is known as the "dwell motion," in which the needle first moves down to its extreme depth, then partly rises to form the loop, then dwells or stands still for the shuttle to pass through, and finally completes its ascent to form the stitch. The invention likewise consists in a peculiar shuttle-driving motion, whereby the shuttle is made to move more rapidly as it passes through the needle-thread loop than when it approaches and leaves the latter, thus reducing the length of the needle's pause and timing the action of the shuttle to a rapid motion of the needle.

A represents the cloth-bed of the machine, and B the main driving-shaft arranged below and across the front portion of the bed. This driving-shaft gears by a pinion, C, with a wheel, D, in the rear, of twice the diameter of the pinion, to give only half the number of strokes to the shuttle that the needle has, the latter taking its motion from the more rapidly-revolving driving-shaft B, while the shuttle is actuated by the wheel D, which makes but half the number of revolutions in a given time. E is the needle-arm, which works on a fulcrum at *b*, and is operated by an arm, F, attached to the needle-arm shaft, and arranged to project below the cloth-bed toward the front end of the latter. This arm F is slotted at its forward end to receive within or through it the wrist-pin *c* of a disk-shaped or other crank, G, the shaft or spindle *d* of which has its bearing in a bush fitted eccentrically within the driving-pulley H of the main shaft B. Fast to the opposite or inner end of the shaft of the crank G is a pinion, I, that, as the pulley H and shaft B revolve, travels around a stationary pinion, J, which may be carried by a sleeve secured by a screw to a projection, K, from the under side of the cloth-bed, the shaft B turning concentrically within or through the pinion J and its sleeve, and the two pinions, I and J, being of like diameters. (See Figs. 1, 4, and 5.) By these means a compound crank movement is produced for operating the needle *e*, which gives a steady down movement to the needle; then a slight rise to form the loop; after that a pause, for the shuttle to pass through the loop, and subsequently

a finished ascent of the needle to form and tighten the stitch. Thus, in Fig. 1 of the drawing, supposing the driving-pulley H to be rotating in direction of the arrow z , and the wrist-pin c of the crank G to be in the position represented for it by full lines, then the needle, the direction or path of whose travel is indicated by the dotted line ff in Fig. 1, will have passed its pause or dwell-action, and continue to ascend till the wrist-pin c assumes the position shown by dotted lines c^1 , after which the needle descends till the wrist-pin reaches its dotted position c^2 . From thence to c^3 the wrist-pin slightly rises, and needle with it, to form the loop, as indicated by the dotted lines $i i$, Fig. 1, and, as it moves from c^3 to c^4 , it exerts no lifting action of the needle-arm, but causes the needle to dwell for the shuttle to pass through the loop. The needle-thread k passes from the spool L around a tension device, M, and through a controller, N, and suitable guides to the needle e , said needle-thread controller being pivoted at l , and receiving its intermittent motion at intervals by a fork, O, attached to a leg, P, of the needle-arm shaft, operating conjointly with a spring, O'. The back, middle, and forward positions of this thread-controller are represented by full and dotted lines in Fig. 1. The double-nosed shuttle Q, which is straight, reciprocates horizontally within a race, R, transversely to the feed of the fabric, and has its thread, m , supplied from the reel within it, over or round a running interior lower guide, through a central group of upper eyes, and under or between the upper side of the shuttle, and a longitudinal tension-spring, n , open between its ends for hold on the thread in both directions of the shuttle's travel. From thence the thread m passes through a shuttle-thread controller, S, which is slotted for the proper run of the thread, and has its eye o immediately under the opening in the throat-plate for the passage of the needle down through or within it. The action of this shuttle-thread controller will be hereinafter described. The shuttle Q is reciprocated once for every two strokes of the needle, as follows: To the wheel D (see Fig. 6) is provided a rod, T, which, as said wheel revolves, rocks a lever, U, pivoted above at p , immediately below the cloth-bed. The wrist-pin q , at the lower or outer end of this lever, is extended to enter a slot, r , in a lever, V, which has its fulcrum at s below, and the upper or outer end of which is connected to the shuttle-driver W by a connecting-rod, X. By this combination of devices it will be seen, by reference to Fig. 6, that the connecting-rod X, when starting from the position shown for it by full lines, has a slow motion, in consequence of the angular position relatively to each other of the levers U and V, and the position of the wrist-pin q in the upper part of the slot r of the lever V; but as said levers approximate a vertical position, or in straight line with each other, as shown by dotted lines in said figure, then the pin q , being at the lower part of the slot r , and in its

closest proximity to the fulcrum of the lever V, the rod X and shuttle-driver W move at their highest velocity. This is when the shuttle is passing through the loop of the needle-thread. Consequently the shuttle travels slow at starting, but with an accelerated velocity as it enters and passes within or through the loop, and with a gradually slower velocity as it leaves the loop by reason of the levers U V again flexing on the opposite side of a vertical position to that shown for them by full lines in Fig. 6, and the removed disposition of the wrist-pin q again along the slot r from the fulcrum of the lever V. Such arrangement admits of a rapid motion of the machine, free from all liability of the shuttle catching or failing to pass with its thread through the loop of the needle-thread. The shuttle-driver W (see more particularly Fig. 7) is made with two reversely-oblique or outwardly-spreading horns, $a^1 a^2$, arranged to strike correspondingly sloping heel-pieces $b' b'$, produced by depressions on the upper portion of the shuttle near its ends, and which, while they form efficient driving-surfaces, offer no interference to the clearance or passage of the thread in forming the stitch. The one, a^2 , of these horns is hinged in the rear, at s' , to the shuttle-driver, so that by raising the same the shuttle may be removed or replaced, as required.

The shuttle Q simply serves to supply the secondary thread and is not used to draw or make the stitch, but this latter action is effected by the shuttle-thread controller S in combination with the needle e . This shuttle-thread controller S (see Figs. 1, 2, 3, and 7) has its eye o and slot in an upper flat arm or branch, d' , from the stem e' of the controller, arranged to correspond with the eye and slot in the throat-piece of the cloth-bed, and immediately below and in line with the throat-piece, so that the needle e passes through the eye in the throat-piece and in the controller. Said controller has an up-and-down intermittent motion simultaneously with the needle, but in reverse directions to it, being stationary, however, for a large portion of the action of the needle. Thus, when the needle is at its top stroke the controller S is in its lowest position, and makes its ascent during the early portion of the descent of the needle; said controller then stands stationary during the passage of the needle-thread through the fabric and eyes of the throat-piece and controller, and remains stationary till the needle in its ascent is about leaving the fabric and for the remainder of its up-stroke or portion thereof, during which time the controller S moves down. In this way said controller and needle operate to draw the needle-thread and shuttle-thread both at one time and in reverse directions to form the stitch.

In view of the shuttle-thread controller S being required to work in timely action with the needle, it is desirable but not absolutely necessary that its motion should be derived from that of the needle, for which purpose,

and to obtain a proper action of it, said controller is operated as follows: Pivoted to the lower end of the stem e' of the controller, which is guided in its up-and-down course, is the forward end of a lever, A' , that has its fulcrum at f' , and the forward end of which is forced up by the action of a spring, g' , against the under side of the shuttle-box to hold the controller in its raised position and to keep the back end of the lever A' correspondingly depressed, for the purpose of keeping it in position to be elevated when it is required to give to the controller its down-stroke. This latter action is effected by a pin, h' , on the leg P of the needle-arm shaft, coming at the requisite time during the rocking of said leg in contact with the under inclined edge of a bar or piece, B' , attached to the lever A' , and lifting on the back end of the latter, which takes place during the concluding portion of the ascent of the needle. As the needle, however, commences its descent the spring g' operates to raise the controller and to lower the back end of the lever A' , after which the pin h' leaves the bar B' , and the controller remains stationary in its raised position till said pin during the concluding portion of the next ascent of the needle again comes in contact with and passes under or along the lower edge of bar B' .

To vary the action of the controller S so as to make it catch sooner or later on the shuttle-thread, according to the stitch required, the bar B' is pivoted at i' to the lever A' , and made adjustable up or down by means of a slot, k' , and screw l' .

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination, with the needle and double-nosed shuttle, of a shuttle-thread controller arranged to move simultaneously with the needle but in reverse directions to it, substantially as and for the purpose herein set forth.

2. The combination, with the needle-arm, of a compound crank movement, consisting of a revolving disk, arm, or pulley, H , a concentric stationary pinion, J , and an eccentric revolving pinion, I , traveling in common with the pulley and carrying a crank, G , having a wrist-pin, c , for giving to the needle a dwell movement, substantially as specified.

3. The shuttle Q , operated by a revolving crank movement, D , in combination with the lever U , the rod T , the slotted lever V , and the rod X of the shuttle-driver, essentially as described.

4. The shuttle-thread controller S , constructed and arranged for operation in relation with the needle, as described, in combination with the lever A' , the arm B' , the pin h' , and the spring g' .

5. The adjustable arm or piece B' , in combination with the pin h' , the lever A' , and the shuttle-thread controller S , whereby the latter may be regulated to catch sooner or later on the shuttle-thread, substantially as specified.

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