

(No Model.)

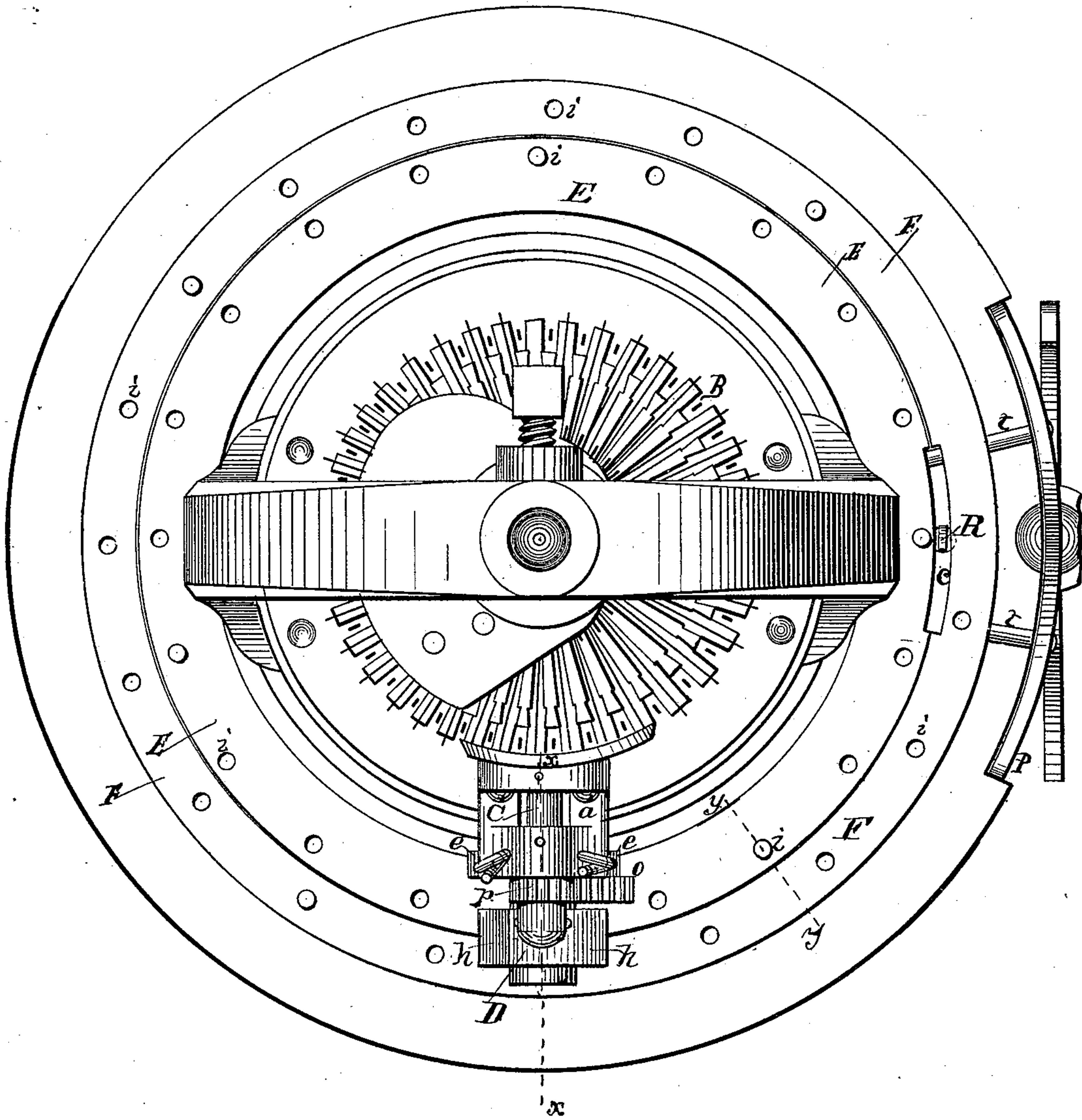
3 Sheets—Sheet 1.

W. D. HUSE.
KNITTING MACHINE.

No. 255,996.

Patented Apr. 4, 1882.

Fig. 1.



WITNESSES

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By his attorney,
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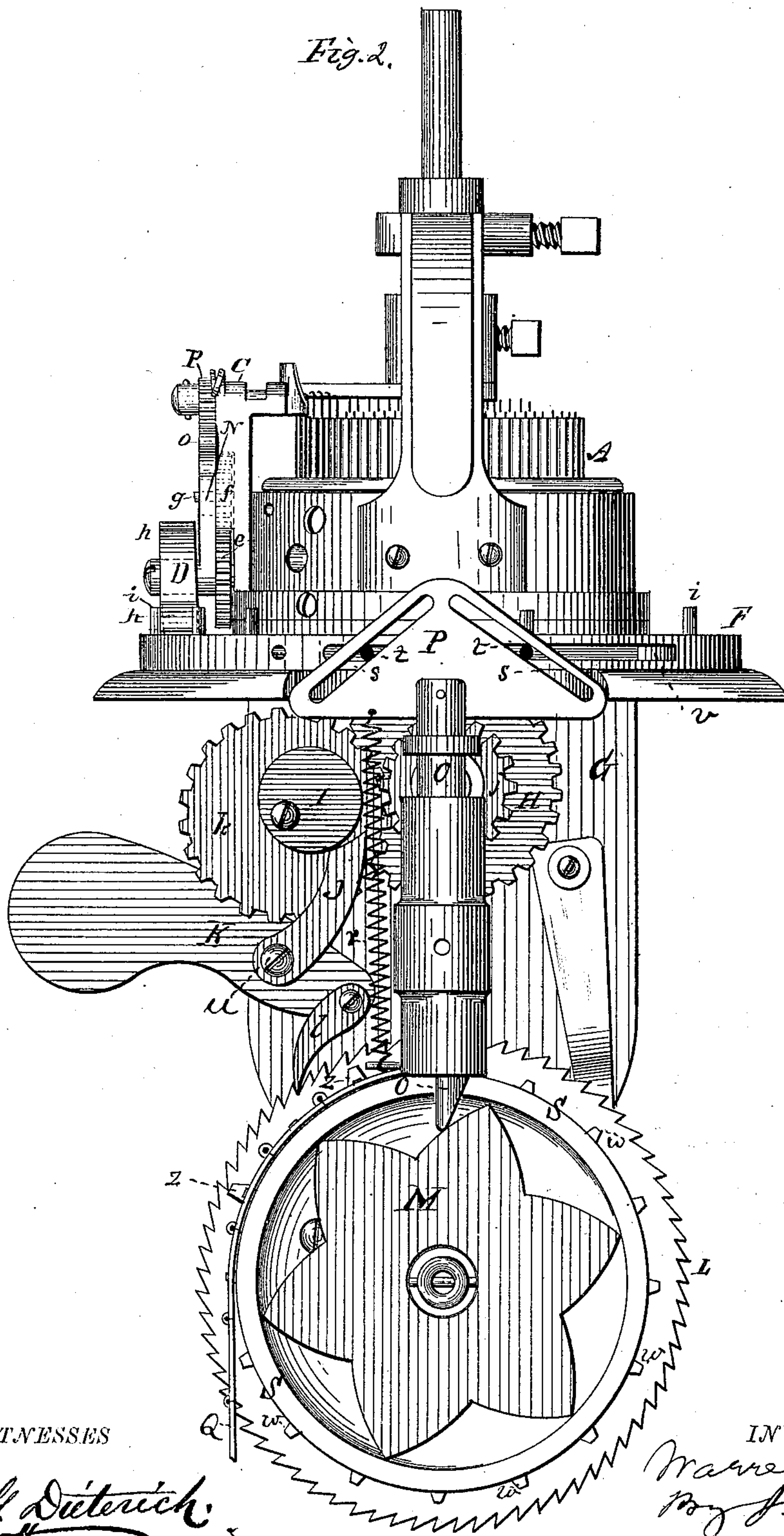
(No Model.)

3 Sheets—Sheet 2

W. D. HUSE.
KNITTING MACHINE.

No. 255,996.

Patented Apr. 4, 1882.



WITNESSES

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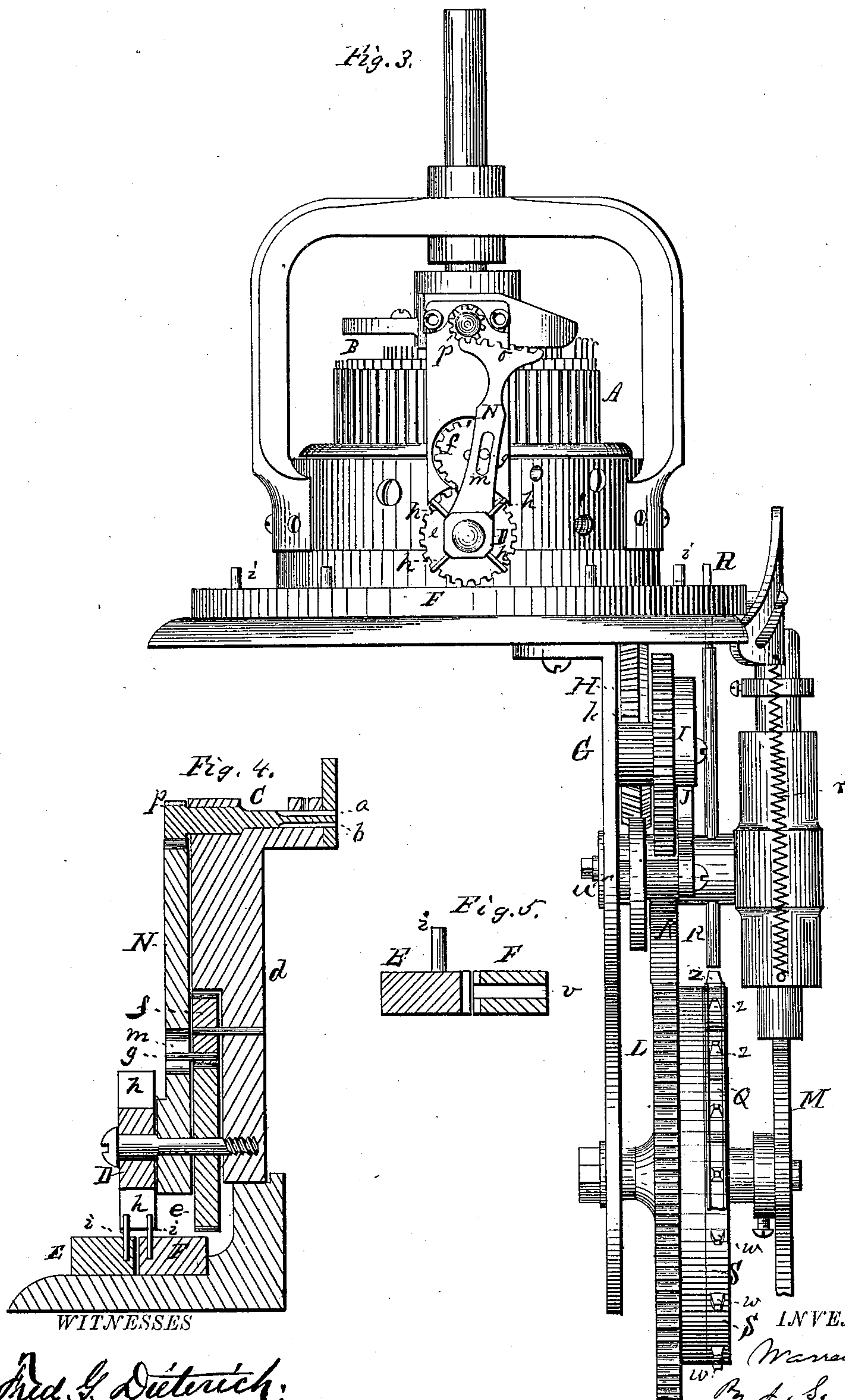
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3 Sheets—Sheet 3.

No. 255,996.

Patented Apr. 4, 1882.



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UNITED STATES PATENT OFFICE.

WARREN D. HUSE, OF LACONIA, NEW HAMPSHIRE.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 255,996, dated April 4, 1882.

Application filed August 13, 1881. (No model.)

To all whom it may concern:

Be it known that I, WARREN D. HUSE, of Laconia, in the county of Belknap and State of New Hampshire, have invented an Improved Knitting-Machine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification—

Figure 1 being a top view of a circular-knitting machine provided with my improvements; Fig. 2, a front view of the same; Fig. 3, a side view thereof, taken at right angles to the view in Fig. 2; and Figs. 4 and 5, partial sections of the same, taken respectively in planes indicated by the lines *x x* and *y y*, Fig. 1.

Like letters designate corresponding parts in all of the figures.

The machine to which my present improvements are applied is for knitting figured goods in two or more colors, the figures being changed by bringing first one thread and then the other or another thread uppermost or foremost in position in their thread-guides and the hooks of the needles, thereby bringing the same principally or prominently to view on the face of the fabric. The general construction and purpose of the machine are substantially the same as in the knitting-machine described in Letters Patent No. 220,924, granted to me October 28, 1879; and my present improvements are upon certain functional parts of that invention, now to be described. Thus not only the needle-cylinder A, needle-disk or dial-plate B, and other parts common to knitting-machines of this class are the same as shown in the said Letters Patent, but many of the principal parts special to that invention are the same, including most of the parts mounted on the flange G, which projects downward from the frame of the machine, the cog-wheel H, gearing into the main gear-wheel on the needle-cylinder, the transmitting-gear *j k*, eccentric I, wiper J, pivoted at *u*, the pawl-lever K, bearing the pawl *l*, which engages with the ratchet-wheel L, and the cam M, moved by the said pawl and ratchet-wheel.

My present improvements and the parts described in the former patent which they displace or modify I will now proceed to specify.

First. Instead of the separate lever thread-

guides and alternating cams for shifting them, as described in the said patent, I now employ a partially revolving or reciprocating thread-guide, C, having thread-guide eyes *a b* therein, (at opposite sides thereof when only two threads are used,) and I give an oscillating movement thereto to the extent of half a revolution for each shifting of the threads by novel means, as follows: On the shaft of the actuating tappet-disk or wheel D, (corresponding in action with the part similarly lettered in the former patent,) mounted in a suitable bearing or attachment, *d*, secured to the revolving needle-cylinder, is a spur-gear wheel, *e*, which gears into a pinion, *f*, above it, the said pinion having twice as many teeth as there are teeth on the gear-wheel *e* between the angles of adjacent tappet-projections *h h* on the actuating-disk, so that whenever the said disk is partially turned by striking one of its tappets the said pinion will be turned one-half of a revolution. On this pinion is a crank-pin, *g*, which moves in a slot, *m*, in a rack-bar, N, that has a vibratory movement on a center at its lower end, its pivot conveniently being the shaft of the disk D, and it has a set of rack-teeth on its widened upper end, *o*, of sector shape, concentric with the center of the rack-bar's movement. These rack-teeth gear into a pinion, *p*, on the thread-guide C, and the arrangement is such that each vibratory movement of the rack-bar will turn the thread-guide half a revolution when two threads are guided, as represented. Therefore this whole organization as now described is such that the movement of the disk D, by moving along one of its tappets *h h*, turns the pinion *f* one-half of a revolution. Consequently the crank-pin on the pinion moves the rack-bar N from one extremity of its vibratory movement to the other, and that movement, by turning the pinion *p* (and consequently the thread-guide C) half a revolution, shifts the thread-guide so as to reverse the positions of its thread-guide eyes. The next movement of the disk D, by the same operation, reverses the vibratory positions of the rack-bar, and thereby reverses the positions of the threads. This whole device is compact, not liable to get out of order, is sure in its operation, and is readily attached to the needle-cylinder of a knitting-machine by one or two screws.

Second. Instead of the lever operated by the cam M and the connecting rod or link reaching therefrom to move the tappet-ring E, (marked the same as in the former patent,) I now employ a vertically and longitudinally reciprocating bar or rod, O, which slides in a suitable holder, *q*, attached to the flange G or other fixed part of the machine. The lower end of this sliding bar is suitably shaped, as indicated, to ride on the cam M, which lifts it or gives it its upward movement, and a spring, *r*, assists its weight to give it its downward movement. On the upper end of this reciprocating bar is a cam-plate, P, having two cam slots or grooves, *s s*, located in positions inclined toward each other at the upper ends and separated most at their lower ends, or vice versa. In connection with this cam-plate, I employ two tappet-rings, E F, (instead of the one ring specified in the former patent,) one inside of the other, as shown, and each has a pin, *t*, on its periphery, one extending outward into one of the cam-slots *s s* and the other extending into the other cam-slot. There is a peripheral slot, *v*, in the outer ring, E, through which the pin of the inner ring extends to reach the cam-slot, the length of this slot being sufficient to allow the full extent of movement to be given to the rings. This construction is to allow the two rings to be located at the same height, which is the best arrangement. Both rings E F have as many holes as required in their upper sides for receiving tappet-pins *i i*, which are removable, so as to be placed at any desired intervals apart. Thus the upward movement of the cam-plate P further separates the pins *t t* of the rings, causing one ring to advance and the other to recede in the pathway of the tappet-disk D, the tappets *h h* of which are wide enough to cover both sets of tappet-pins *i i* in the two rings, so that the pins of one ring meet the tappet-disk sooner and the pins in the other ring meet the disk not so soon as before, and the downward movement of the cam-plate P causes the pins *t t* to come nearer together, thereby reversing the movements of the rings and causing the advance of the tappet-pins of the one which before was made to retreat and the pins of the other ring to retreat. The effect of these special movements is to knit on the goods stripes alternately widened and narrowed. By moving only one of the rings, or by removing the tappet-pins from one, zigzag stripes are produced, and by removing the pins *t t* from the rings and operating one of the rings by a pawl pivoted to the bar O spiral stripes may be

made, as set forth in the former patent, by a similar movement.

Third. In my former patent herein referred to I mentioned the employment of a Jacquard chain to produce long-repeated and complicated patterns or figures of goods. In the accompanying drawings I have represented a Jacquard chain, Q, mounted on a sprocket-wheel, S, which is attached to or is cast as a periphery of the ratchet-wheel L, provided with suitable sprocket-projections, *w w*, to prevent the slipping of the chain. The projections *z z* on the links of this chain lift the rod R, (corresponding in action to the rod similarly lettered in the former patent,) and when the rod simply rides on the surface of the chain-links its upper end is below the tops of the rings E F, or too low to touch the tappets on the disk D. In order that this rod may be moved into the pathway of the tappet-disk D without interfering with the movements of the rings E F, I flatten the upper end of the rod and allow it to move in a space, *c*, formed by cutting away the two adjacent surfaces of the rings, as shown in Fig. 1. This dispenses with the lever and corresponding cam-projections on the ratchet-wheel L, as specified in the former patent.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the thread-guide C, rack-bar N, crank-pinion *f*, pinions *p* and *e*, tappet-disk D, and means for operating the said disk, substantially as and for the purpose herein specified.

2. The cam-plate P and means for reciprocating the same, in combination with the rings E F and means for connecting the cam-plate and rings, substantially as and for the purpose herein specified.

3. The two tappet-rings, E F, provided with pins *i i*, in combination with the cam-plate P, means for operating the same and connecting it with the rings, the tappet-disk D, and needle-cylinder, substantially as and for the purpose herein specified.

4. The combination of the rings E F, rod R, adapted to ascend between the two rings, sprocket-wheel S, Jacquard chain Q, tappet-disk D, and the needle-cylinder, substantially as and for the purpose herein specified.

The foregoing specification signed by me this 15th day of June, 1881.

WARREN D. HUSE.

Witnesses:

THOS. J. WHIPPLE,
ORISON TWOMBLY.