

(No Model.)

4 Sheets—Sheet 1.

F. L. VEERKAMP, C. F. LEOPOLD & W. DARKER.

BRAIDING MACHINE.

No. 277,523.

Patented May 15, 1883.

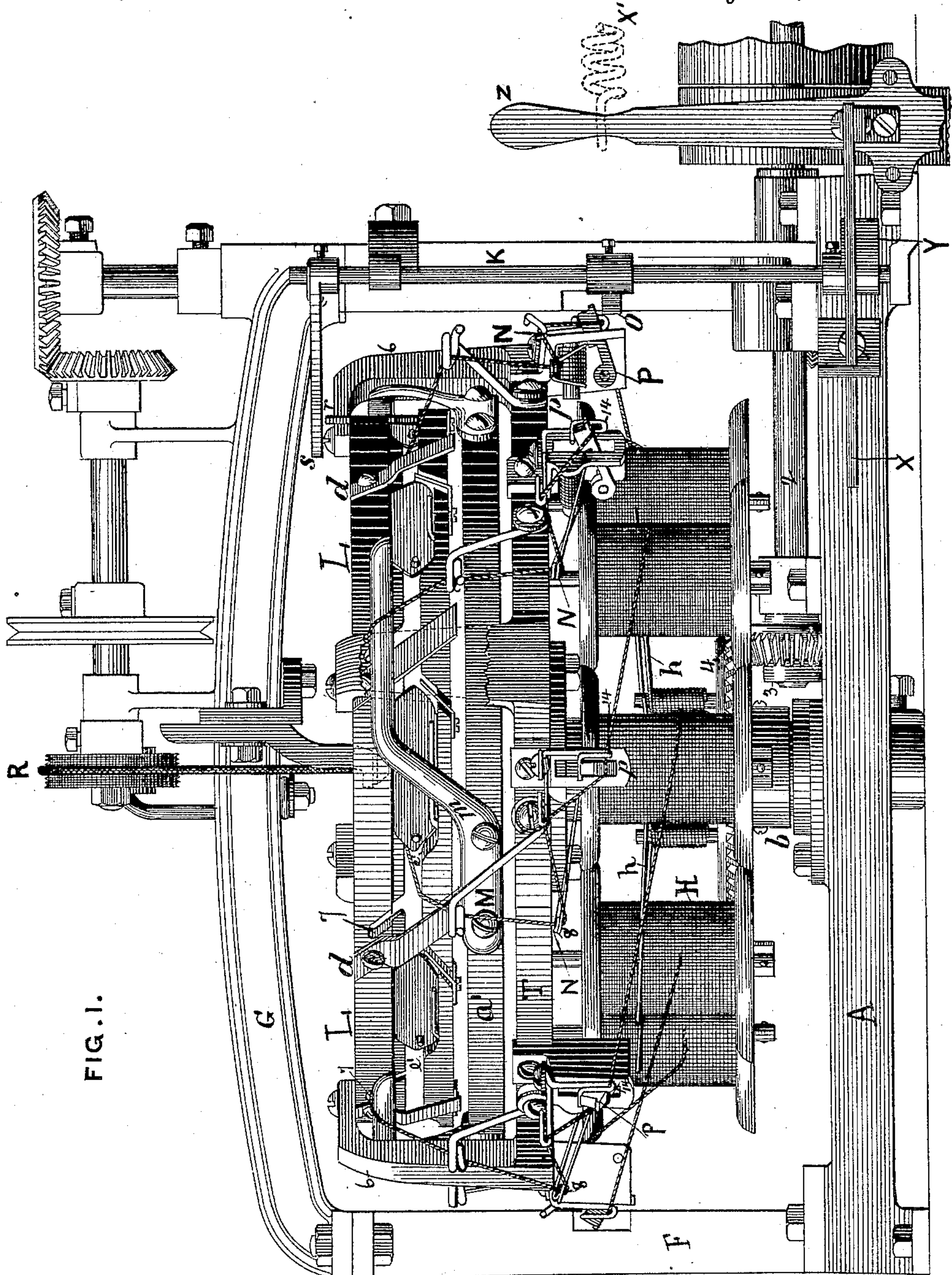


FIG. 1.

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(No Model.)

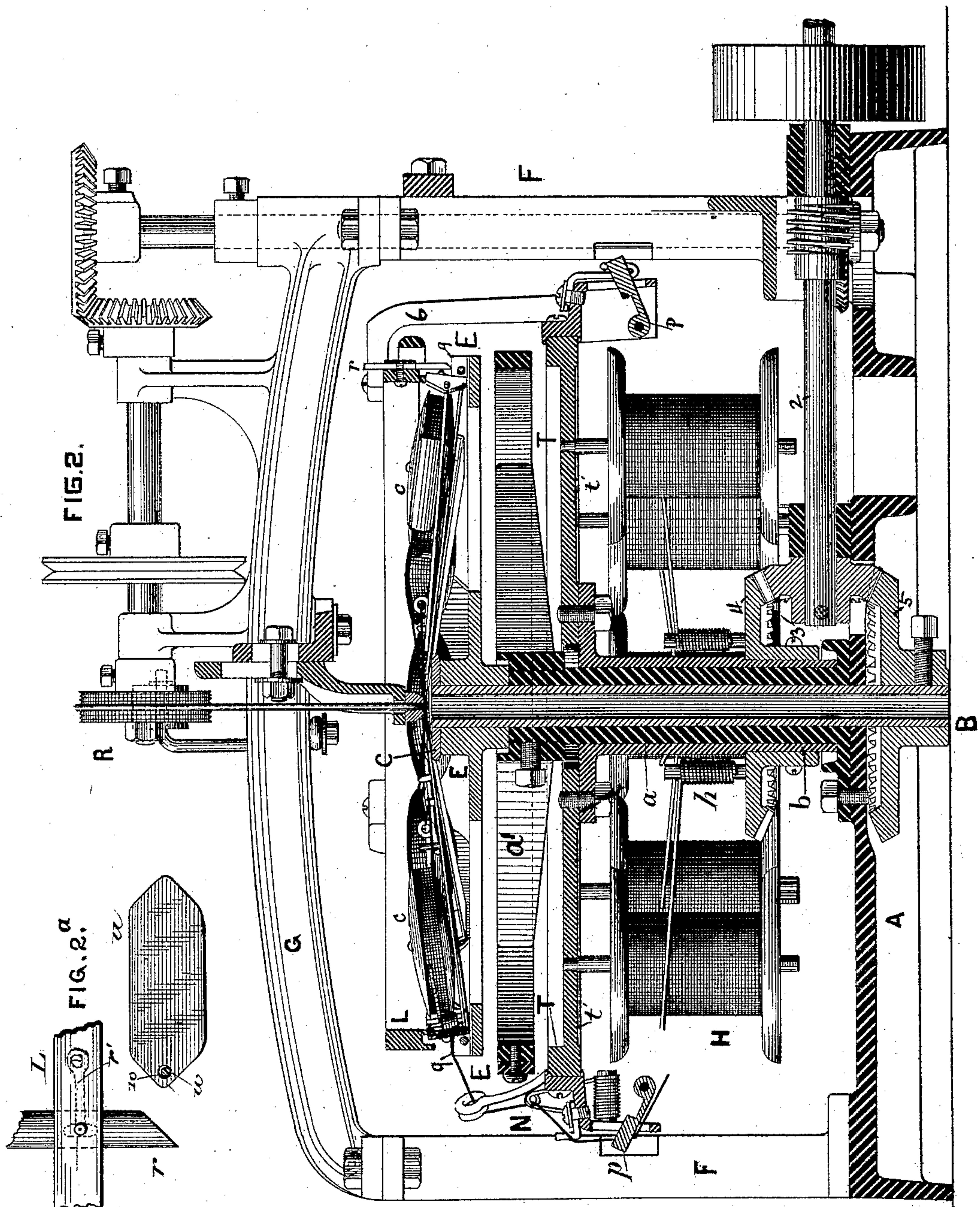
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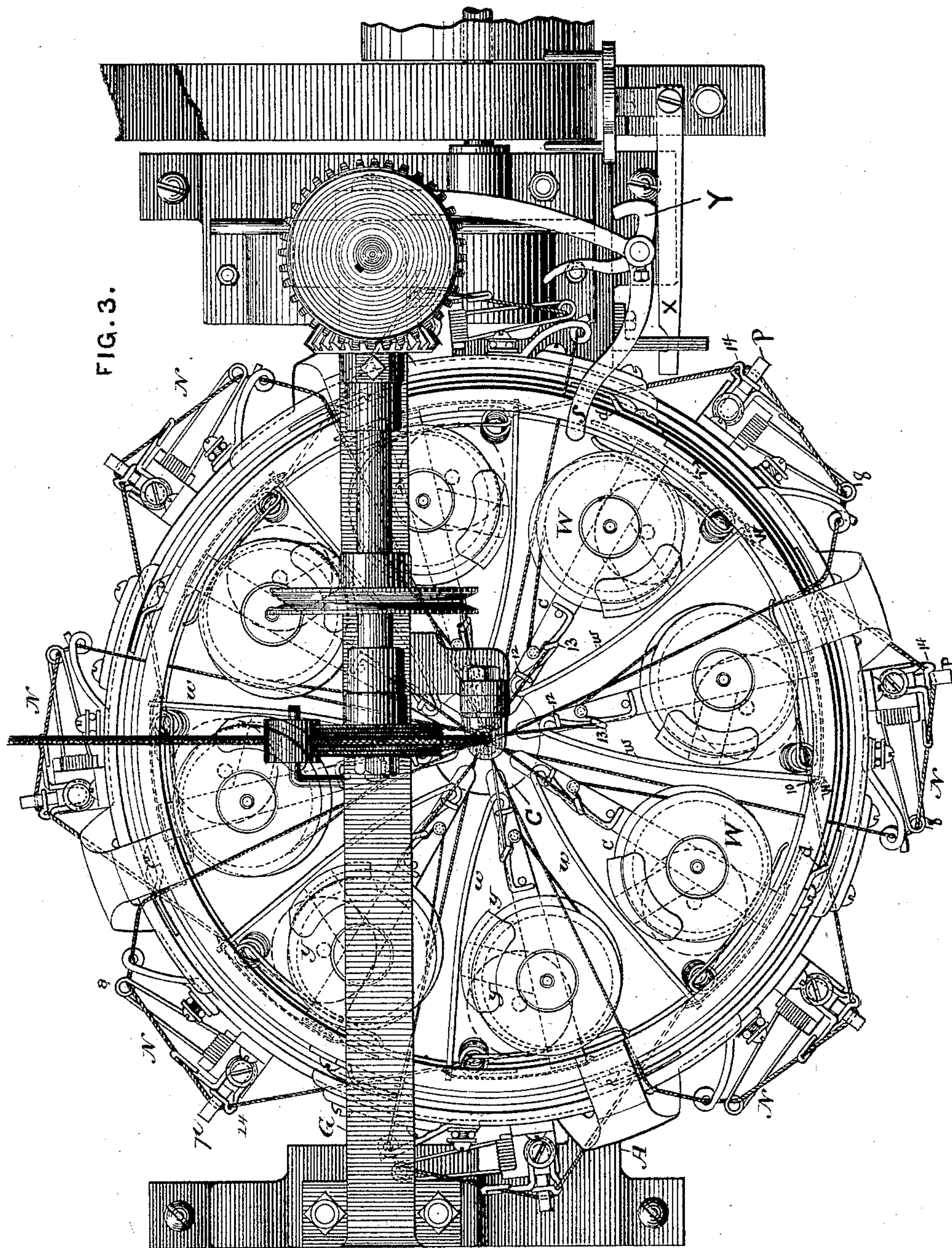
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BRAIDING MACHINE.

No. 277,523.

Patented May 15, 1883.



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(No Model.)

4 Sheets—Sheet 4.

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BRAIDING MACHINE.

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FIG. 4.

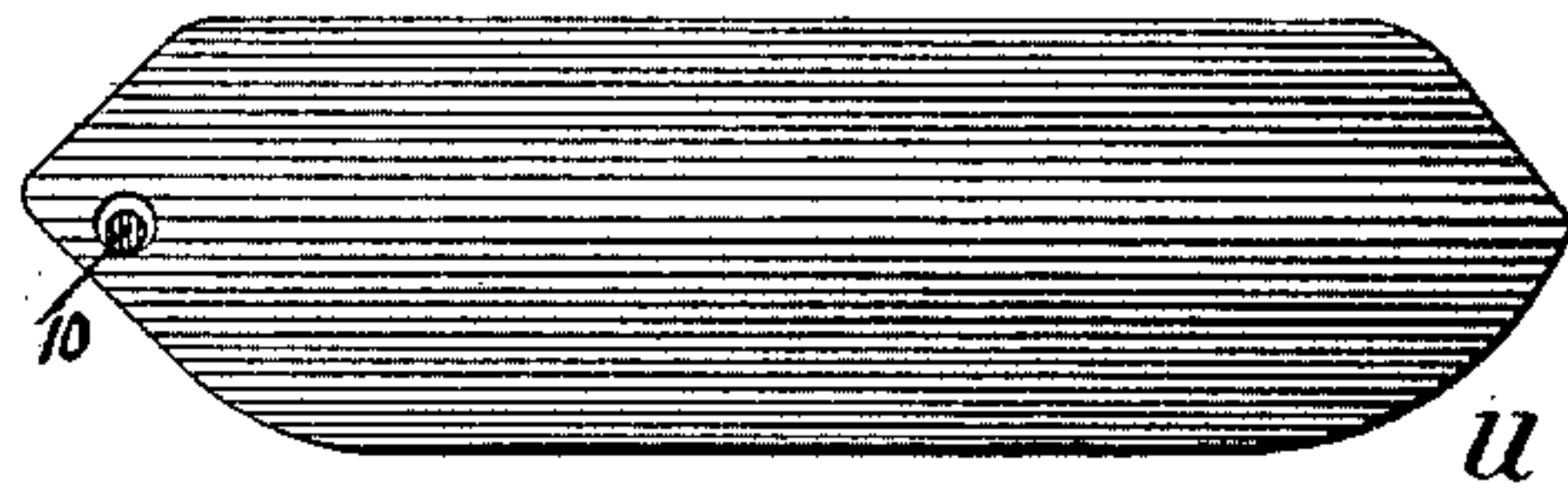


FIG. 5.

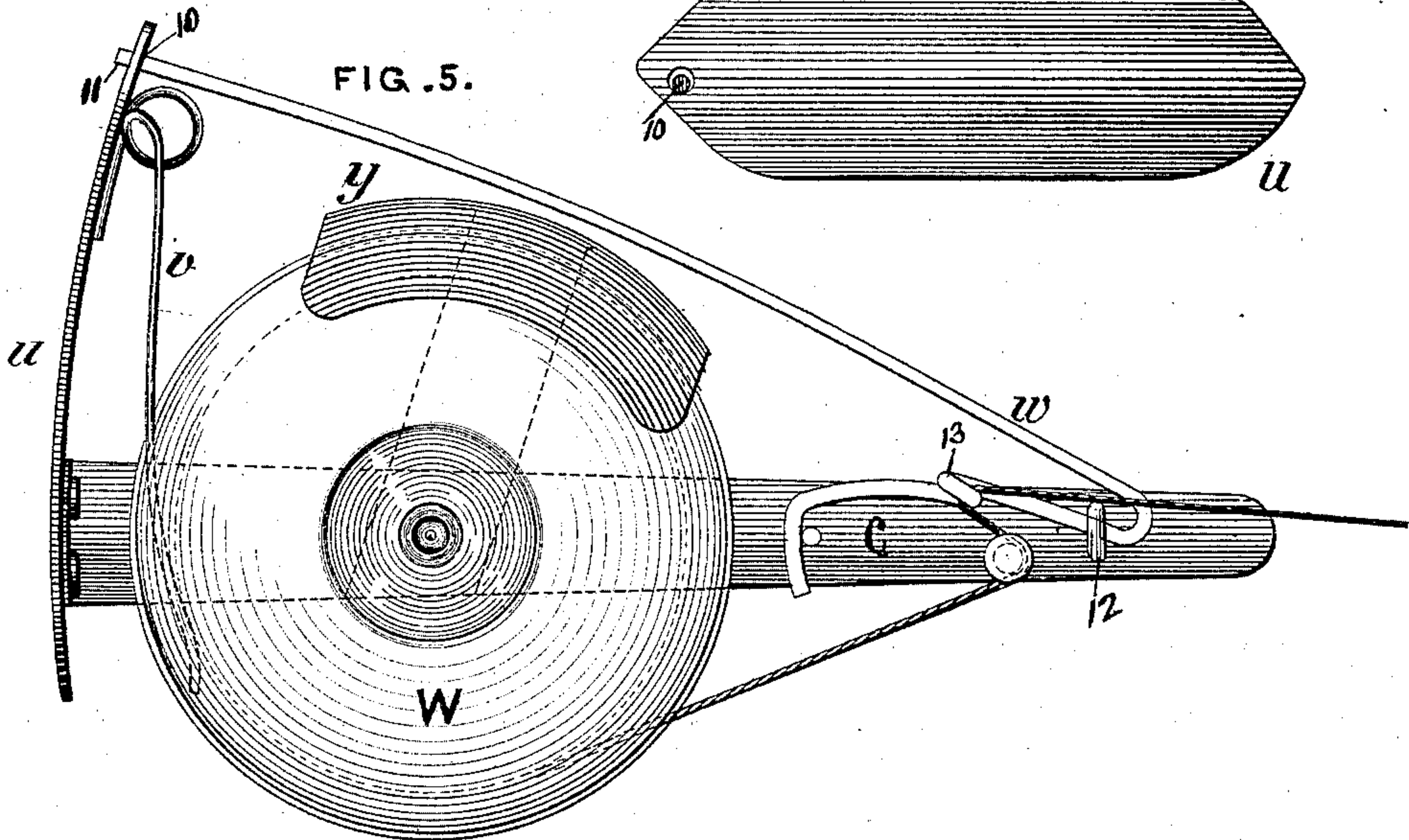


FIG. 6.

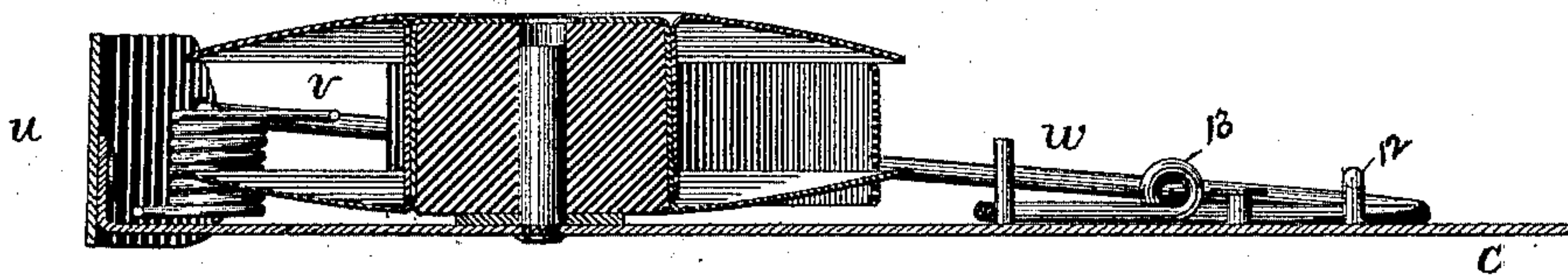
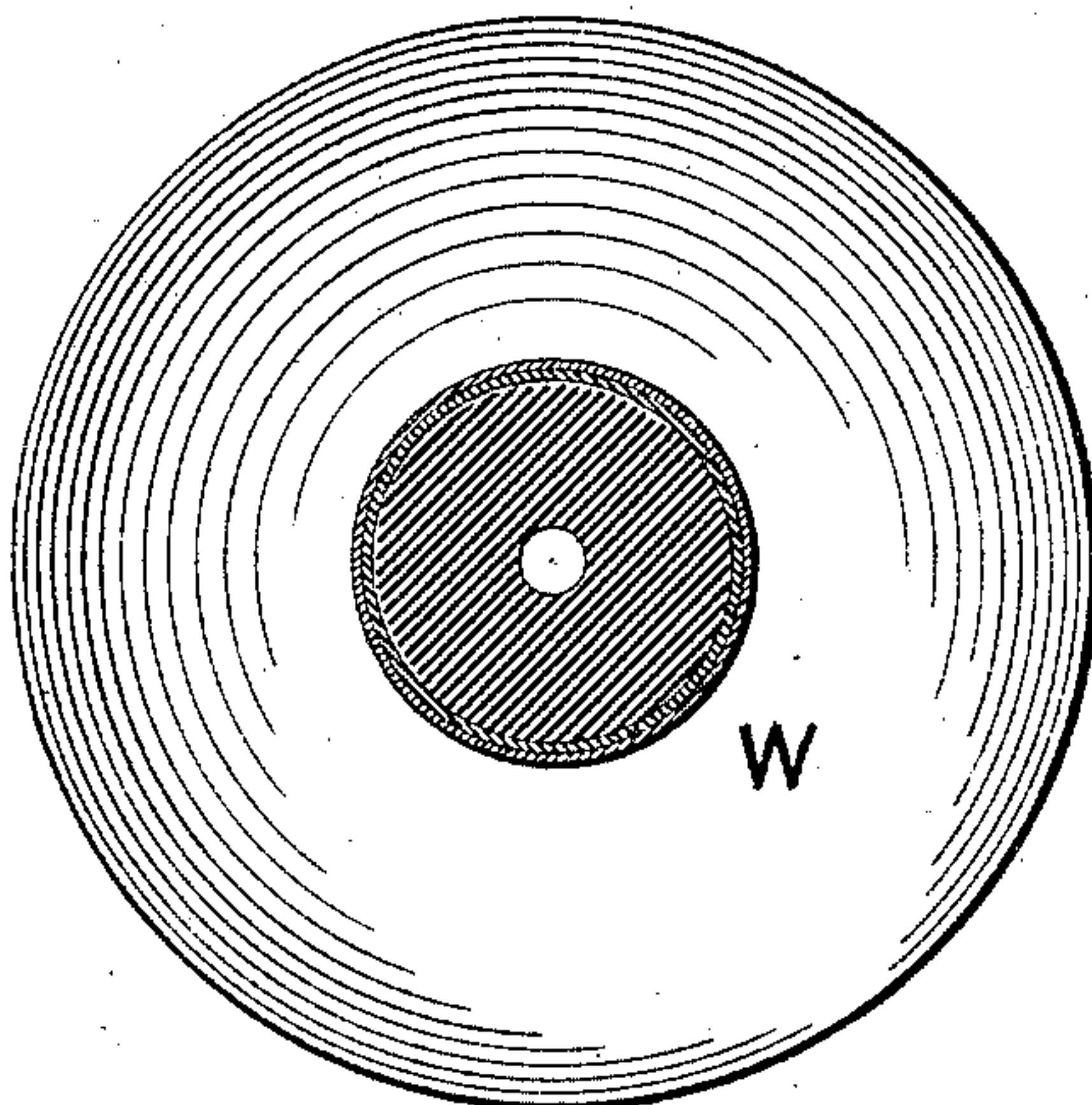


FIG. 7.



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# UNITED STATES PATENT OFFICE.

FLORENCE L. VEERKAMP, CHARLES F. LEOPOLD, AND WILLIAM DARKER,  
OF PHILADELPHIA, PENNSYLVANIA.

## BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 277,523, dated May 15, 1883.

Application filed January 24, 1882. (No model.) Patented in England July 11, 1882, No. 3,288.

*To all whom it may concern:*

Be it known that we, FLORENCE L. VEERKAMP, CHARLES F. LEOPOLD, and WILLIAM DARKER, citizens of the United States, residing in the city of Philadelphia, in the State of Pennsylvania, have jointly invented certain new and useful Improvements in Braiding-Machines, of which the following is a specification.

10 Our invention relates to improvements in rotary braiding-machines in which two sets of bobbins move in contrary directions in concentric annular paths, as described in Letters Patent of the United States granted to F. L. Veerkamp and C. F. Leopold, No. 56,643, dated July 24, 1866; and our improvements consist in mechanism hereinafter described, whereby we are enabled to dispense with many features of the old machine and attain a greater speed in

20 operating the same and produce a larger product in a given time; in mechanism which greatly diminishes the liability to break threads, and in the several parts of the machine, more especially the carrier-bearer for sustaining and conducting the carriers and bobbins around the machine, the grooved ring in which the carriers move, the guiding mechanism for directing the course of the threads and interlocking the same, the tension mechanism for taking up

30 slack thread, the devices for stopping the operation of the machine when a thread breaks or runs off the bobbin, and in the construction of the bobbin-carriers. In the former machine, referred to, the threads of the outer and lower bobbins were caused to pass to one side and then to the other of the inner and upper shuttles by means of curved wires or projections on a cam-plate which pushed the threads outward, while weights and springs, which formed

40 a part of a tension device, applied to each of the threads from the lower bobbins operated to draw the threads inward into recesses in a circular plate which supported and carried the lower bobbins, the action of these parts causing the lower threads to pass alternately from one side to the other of each of the upper thread-carrying shuttles, each of which was separately moved or pushed in a groove in a circular plate affixed to the driving mechanism.

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In the construction of our improved machine, instead of causing the upper shuttles to be moved in a groove or shuttle-race in the shuttle-carrying plate, and by means of rollers or otherwise, and the lower threads to be carried or guided alternately from one side to the other of the upper shuttles through recesses in the shuttle-plate by means of a cam-plate provided with projections or curved wires, and a spring and weight for each of said lower threads, as in said patent described, our present machine is so constructed as to supply a large number of upper threads from bobbins supported in carriers or holders which are not in themselves movable, but each and all held in a single movable carrier-bearer, which consists of a flat circular plate secured to and revolved by a central shaft, and the outer edges of the bobbin-carriers move in a groove formed in an annular ring placed directly above the carrier-bearer, said ring being supported and revolved by means of uprights secured to the rim of a skeleton plate, T, hereinafter described, attached to a revolving sleeve covering the inner tubular shaft referred to, and the arms of which skeleton plate support the lower bobbins, and to the rim thereof are secured tension-springs for the lower threads. The rim of a stationary plate supported from the center of the machine supports guide-arms, over which the lower threads are drawn and guided by means of push-prongs or thread-carrying guides secured to the rim of the grooved annular ring above the carrier-bearer. Thus the carrier-bearer being revolved in one direction by means of the tubular shaft, and the lower bobbin-holder, with the grooved ring and its thread-carrying guides, being revolved in an opposite direction by means of the revolving sleeve, both by appropriate driving mechanism, the upper and lower threads are by these means crossed, interlocked, and platted to form a cord or braid without any separate movement of each upper bobbin-carrier, or any separate movement of each thread-guiding device, the said bobbin-carriers and said thread-carrying guides being stationary on the carrier-bearer and ring, respectively, which latter alone are revolved or moved in the manner described, which, in connection with the fixed guide-arms

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above referred to, causes the lower threads to pass alternately over and under the bobbin-carriers which supply the upper threads.

In order to enable others skilled in the art to make and use our invention, we will proceed to more particularly describe its construction and operation, reference being had to the accompanying drawings, in which—

Figure I is a front elevation of the machine with a part broken away; Fig. II, a sectional view thereof; Fig. III, a top view thereof; Figs. IV, V, VI, and VII, views of the upper bobbin and carrier; and Fig. II<sup>a</sup>, a section of the grooved ring and its bolt *r*, showing the vertical edge of the bobbin-carrier.

Similar letters refer to like parts throughout the several views.

The frame-work of the machine consists of the base A, having in its center a hollow cylindrical projection or upright tube, *a*, on the outside of which is placed a revolving sleeve, *b*, and through both sleeve and projection extends a tubular shaft, B, at the upper end of which is placed or secured a small disk, C, for the purpose of supporting the inner ends or stems of the carriers *c*, the outer ends of which rest edgewise on the rim of the carrier-bearer E in recesses *e'*, made at suitable intervals therein. From the base of the machine arise two uprights, F F, with a cross-arm, G, to connect them and hold the take-up device R.

The machine is driven by a main shaft, 2, having on its inner end a bevel-gear wheel, 3, working into a bevel-gear wheel, 4, secured to the revolving sleeve *b*, and the inner tubular shaft, B, is operated by means of a bevel-gear, 5, connecting it with the gear 3 on the main shaft.

The carrier-bearer E is secured to the tubular shaft B, and consists of a flat circular plate, above which is placed a grooved ring, L, supported by uprights 6 from and carried around by the rim of the skeleton plate T, the spokes *t* of which sustain the lower bobbins. The upper sides of the vertical edges of the carriers *c* revolve in the groove of the ring L, to which latter are secured push-prongs *d*, set at proper intervals for directing the course of the lower threads up and over the guide-arms M, and over and under the carriers alternately. The grooved ring L is slotted alongside of each push-prong, and into the slots the lower threads slide to enable them to pass over the bobbin-carriers. The lower threads are guided above and below the upper bobbins alternately by means of stationary horizontal guide-arms M, constructed as shown in Fig. I, secured to the rim of an annular plate, *a'*, which is bolted to the hollow upright tube or projection *a*, (see Fig. II,) the plate and hollow tube being immovable and stationary. Each of the lower threads, which are held taut by their respective tension-springs N, hereinafter mentioned, first presses against the lower end of one of the guide-arms M, thus enabling it to pass under one of the bobbin-carriers *c*, after which it is then carried by a push-prong

*d* up and over the upper end of the guide-arm M into one of the slots 7 in the grooved ring L, and thus passes over the next bobbin-carrier, and so on alternately.

To the revolving sleeve *b* is secured the annular skeleton plate T, having the spokes *t*, supporting the rods upon which the lower bobbins, H, are placed. Tension-springs *h* pressing against the bobbins prevent them from delivering the thread too freely as the bobbins move around. Other tension-springs, N, secured to the outer edge of the rim T of the bobbin-holder, have each an eye, 8, at the extreme end, through which the thread from a lower bobbin passes, and serve to hold the thread taut on the guide-arms M and take up any slack. Said threads, after passing through the guide-eye 14, and before reaching the eye 8 of the spring N, pass under and sustain drop-pers *p*, which, when a lower thread breaks or runs off the bobbin, fall and strike an arm, *o*, on the upright rod K, which throws the machine out of gear and stops its operation, as hereinafter described. The carrier-bearer E has suitable recesses and abutments, *e'*, to keep the carriers *c* a proper distance from each other, and also bars 9 (see Fig. II) to sustain them radially.

The bobbin-carriers *c* are constructed, as shown in Figs. V and VI, with a vertical edge, *u*, which moves in the groove of the ring L, a shield, *y*, over and under which the lower threads pass alternately, a tension-spring, *v*, adapted to bear against the thread on the bobbin, and a stopper-rod, *w*, which radiates from the center of the machine, and has its outer end supported in an opening, 10, (see Figs. III, IV, and V,) in the vertical edge *u*. The stopper-rod *w*, on and near its inner end, is provided with an eye, 13, through which the thread from the bobbin passes, and when a thread breaks or runs off the bobbin the said rod, which plays loosely in the hook 12, (see Figs. III and V,) is set free, and by centrifugal force is thrown out through the opening 10 sufficiently far to strike the lower beveled end of the bolt *r* and elevate it enough to hit the latch *s* on the upright rod K (see Figs. I and II) and stop the machine. This bolt *r* is beveled at its lower end, as shown in Fig. II<sup>a</sup>, and works freely up and down in a suitable recess on the outer surface of the grooved ring L, and a flat spring (shown in dotted lines in Fig. II<sup>a</sup>) keeps the bolt *r* elevated after having been raised by the stopper-rod *w*; or, as shown in Fig. II, the grooved ring may be slotted perpendicularly to receive the vertical bolt *r*, which latter is slotted in the part which is within the slot of the grooved ring, and is supported by a set-screw passing through the grooved ring and through the slot of the bolt. Thus when the bolt *r* is elevated by the stopper-rod *w* it will be kept elevated by its frictional contact with the adjoining parts, and will engage with the arm *s* of the stopping mechanism on coming around to the same. The rod K revolves loosely in a slot in the base



of the machine, and has affixed to it by a set-screw a sleeve provided with a cam, Y, which cam, when the rod K is moved, operates to unhook the rod X, connected with the lever Z, which, when released, is operated, by means of the spring X', to shift the driving-belt from the tight pulley to the loose one.

The upper bobbins, W, (shown in Figs. IV and VII,) are made of any suitable metal, and are formed convex to give strength, and to aid in shedding the lower threads as the latter pass over and under the carriers alternately. It is essential that they should be of the form shown. The heads of the bobbins are each spun with a sleeve in the center, one slipping over the other and forming the barrel, a suitable wooden hub being inserted.

The operation of the machine is as follows: Motion being given by means of the driving-shaft, the lower bobbin-holder, with its bobbins, moves in a circle, and the carrier-bearer, with its carriers and bobbins, in a contrary direction. The threads from the lower bobbins are directed by the push-prongs along underneath the carriers, then up and along the guide-arms and over the next carriers, thus causing each of the lower threads to pass alternately over and under the upper bobbins and carriers, interlocking the threads and producing the braided cord, which is drawn up through a suitable guide by the take-up device R, located over the central disk.

It is apparent that the number of upper and lower bobbins may be increased or diminished, and that the construction and arrangement of many of the parts may be varied without departing from the main features of the invention. In our improved machine, herein described, the movements of necessary parts and the consequent wear and tear thereof are reduced to a minimum and excessive friction thereby avoided, and the machine can be run at a high velocity, producing a greatly-increased product in a given time as compared with former machines.

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

1. The combination, in a braiding-machine, of a set of upper bobbin-carriers, a revolving carrier-bearer, and devices for supporting a set of lower bobbins, with mechanism for revolving the carrier-bearer and lower bobbin-holder in contrary directions from each other in concentric annular paths, but in different planes, stationary or fixed guides, lower thread-carrying guides, and mechanism for supporting and moving the thread-carrying guides, whereby the threads from each of the lower bobbins

are made to cross alternately over and under the threads from each of the upper bobbins and be platted to form cord-braid, substantially as set forth.

2. The carrier-bearer E, with its recesses, abutments, and rim, for holding and carrying the bobbin-carriers c, in combination with said bobbin-carriers, and with mechanism for supporting and revolving the said carrier-bearer, arranged and operating substantially as set forth.

3. The grooved ring L, and mechanism for revolving the same in an opposite direction to the carrier-bearer, in combination with said carrier-bearer, substantially as described.

4. The stationary guide-arms M, constructed and arranged as described, and means for supporting the same, in combination with devices for supplying a set of braiding-threads, and with thread-carrying guides or push-prongs d, and mechanism for supporting and moving the same, whereby the position and course of the lower threads are regulated and directed, the whole being constructed, arranged, and operating substantially as set forth.

5. The bobbin-carriers c, provided with a vertical edge, u, shield y, a tension-spring, v, and stopper-rod w, substantially as and for the purpose described.

6. The combination of the upright rod K, having projections o and s, and cam Y, the rod X, and belt-shifting mechanism, with the droppers p, bolt r, a frame carrying said droppers and bolt, and adapted to supply one set of braiding-threads, a carrier adapted to supply a second set of braiding-threads, means for rotating said frame and carrier in opposite directions and crossing the threads, and means for elevating said bolt on the breakage of one of the upper threads carried by said carrier, substantially as described.

7. The tension-springs N, constructed and arranged as described, in combination with the stationary horizontal guide-arms M and means for supporting the same, mechanism for impelling the thread along the guide-arms, and a revolving frame adapted to hold a set of lower bobbins and supply a set of braiding-threads, substantially as and for the purpose set forth.

In witness whereof we have signed our names to this specification.

FLORENCE L. VEERKAMP.  
CHARLES F. LEOPOLD.  
WM. DARKER.

Witnesses:

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W. H. BENEDICT.