

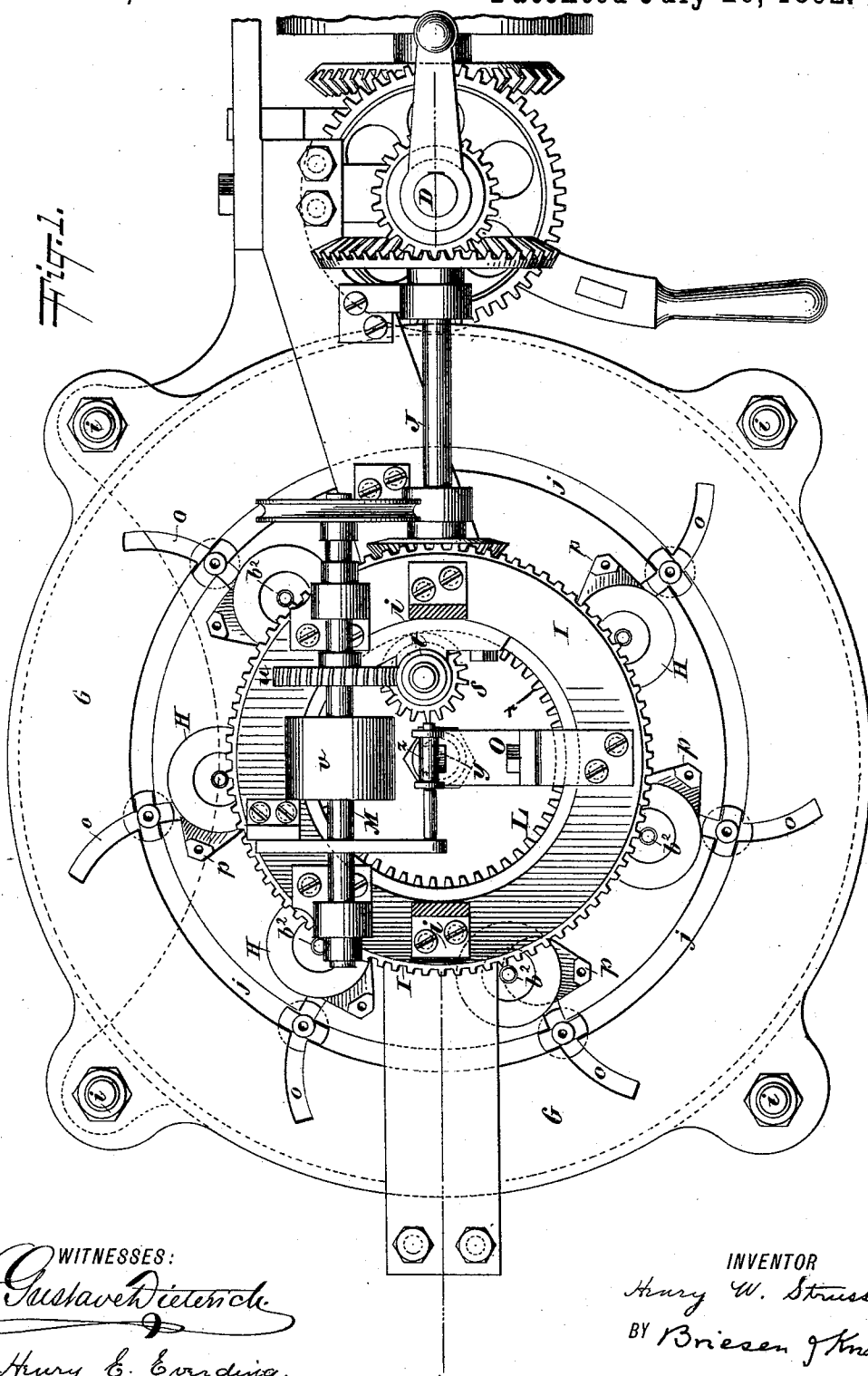
(No Model.)

3 Sheets—Sheet 1.

H. W. STRUSS.
ROTARY BRAIDING MACHINE.

No. 479,474.

Patented July 26, 1892.



WITNESSES:
Gustave Dietrich
Henry C. Everding.

INVENTOR
Henry W. Struss
BY *Briesen & Knauth*
his ATTORNEYS.

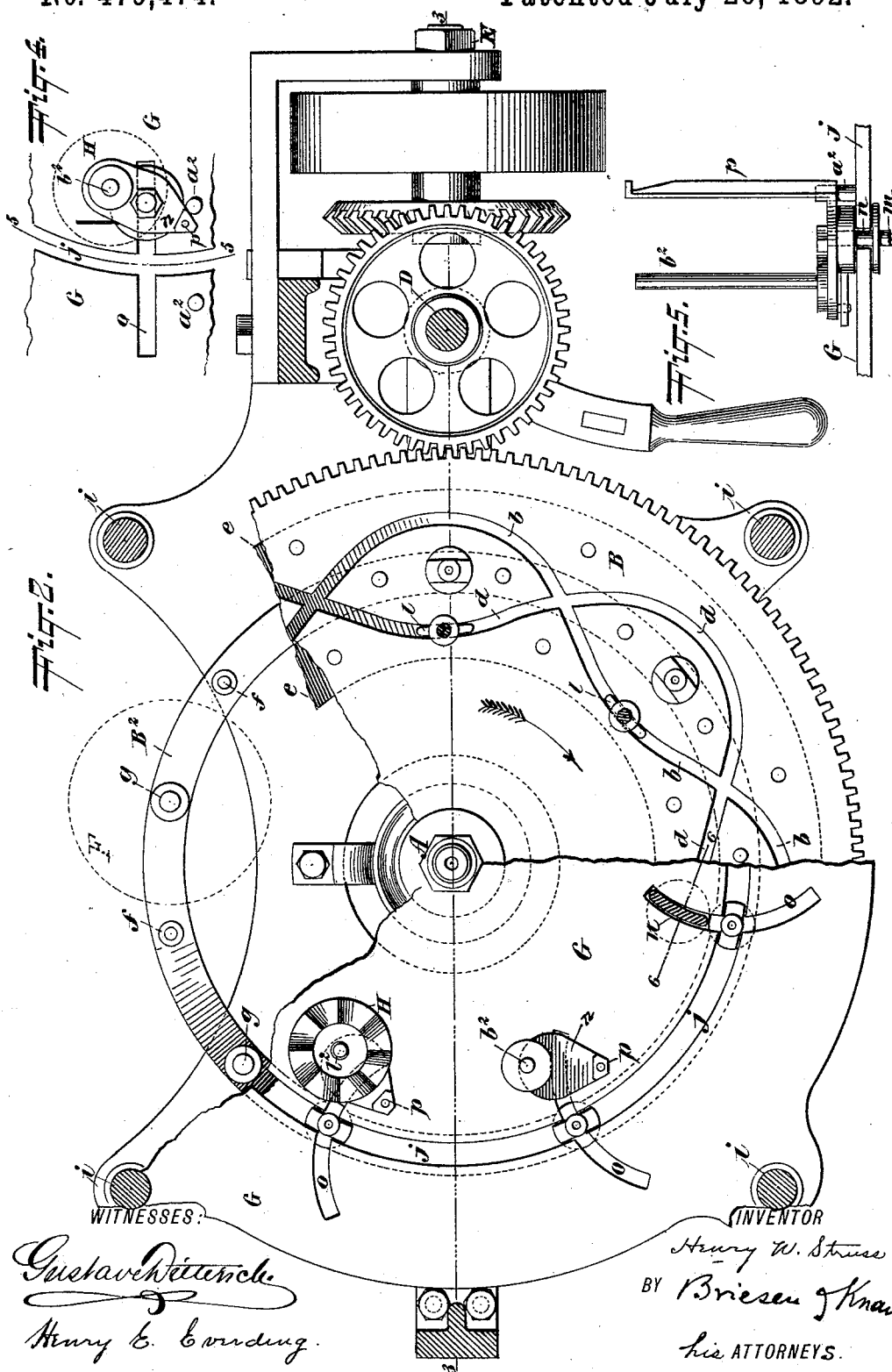
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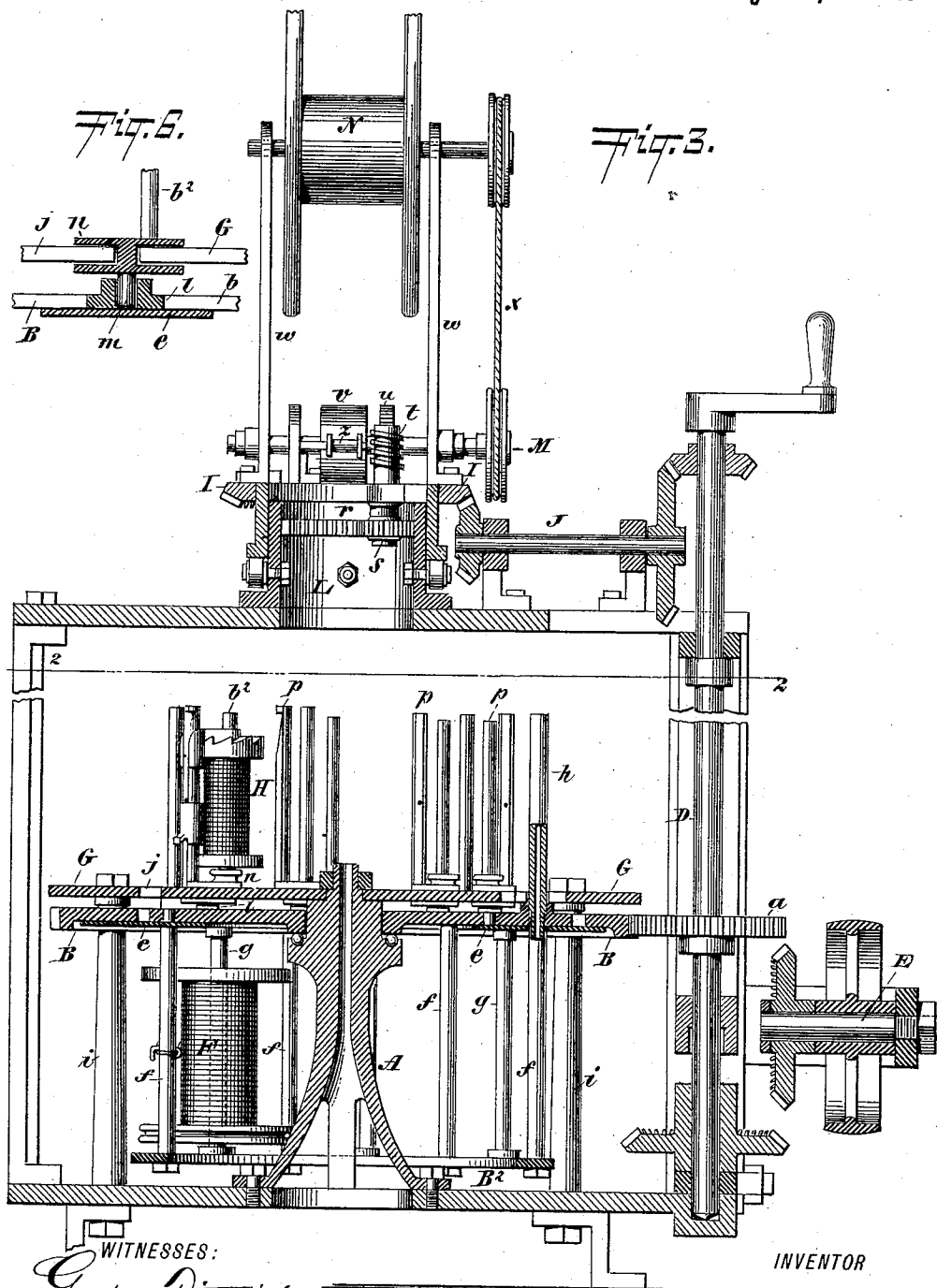
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WITNESSES:
Gustave Dietrich
Henry C. Corning

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UNITED STATES PATENT OFFICE.

HENRY W. STRUSS, OF NEW YORK, N. Y., ASSIGNOR TO MARIE F. STRUSS,
OF SAME PLACE.

ROTARY BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 479,474, dated July 26, 1892.

Application filed September 25, 1891. Serial No. 406,800. (No model)

To all whom it may concern:

Be it known that I, HENRY W. STRUSS, a resident of the city of New York, in the county and State of New York, have invented an Improved Rotary Braiding-Machine, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof, in which—

Figure 1 is a plan or top view of my improved rotary braiding-machine. Fig. 2 is a horizontal section of the same on the line 2 2, Fig. 3, part of the matter shown below the section-line being broken away. Fig. 3 is a vertical section on the line 3 3, Fig. 2. Fig. 4 is a top view, and Fig. 5 a side view, of a modification of the invention; and Fig. 6 is a detail vertical section of one of the upper spool-carriers.

This invention relates to improvements in machinery for making ordinary or woven braid.

In braiding-machines of the general class to which my invention relates as heretofore made two sets of spool-carriers were moved over interlocking tracks in opposite directions. The apparatus necessary for carrying this about required the spools to be all carried above the track-plates that gave direction to the carriers and necessitated the employment of numerous and slow-moving gears. According to my invention, one set of spools moves on a rotating carrier around a common axis, while the other set of spools moves transversely across the track of the first-named carriers, but is not rotated around the same axis. One practical advantage of this arrangement is that it enables me to place one set of spools above and the other set of spools below the cam-plate or track-plate.

Other advantages which are not self-evident to the skilled mechanic will be hereinafter pointed out.

In the accompanying drawings, the letter A represents the central stem or support of the rotary cam-plate or track-plate of my machine. This rotary track-plate or cam-plate is shown at B. It is supported by the post A, as indicated in Fig. 3, and gears into a toothed wheel *a* on a main driving-shaft D, which driving-shaft can either be rotated by hand or by machinery, Fig. 3 indicating a machine-

driven shaft E, which can be thrown into gear with the shaft D when required; but other means for revolving the track-plate may be devised. The track-plate has a grooved surface—that is to say, it has two interlocking undulating grooves *b* and *d* cut into its surface, as clearly indicated in Fig. 2, these interlocking grooves being one set of instrumentalities for giving direction to the upper set of spools. Practically these grooves *b* and *d* are slots that are cut through the plate B, but which are closed on the lower side by a ring or plate *e*, which is riveted to the plate B proper. By means of rods *f*, that project downward from the plate B, a lower ring or plate *B*² is suspended from it. The lower set of spools F (of which one only is shown in Fig. 3, but of which the operative machine would contain quite a number) is hung onto spindles *g*, that extend from the plate *B*² toward the plate B, so that as the plate B is rotated these spools F will be carried around the axis of the plate B. For each spool F a hollow thread-guide *h* projects upward from the plate B, receiving in its tubular bore the thread from the corresponding spool F and delivering it onto the take-up mechanism, to which I will hereinafter more fully refer.

Above the cam-plate B is rigidly supported on stationary posts *i* and on the central post A a plate G, which is but a short distance above B, as indicated in Fig. 3, and which contains an annular slot *j*, (see Fig. 2,) through which annular slot the vertical thread-guides *h*, heretofore mentioned, extend, so that as the plate B is rotated it will be perfectly free because of the presence of this annular slot *j* to permit the thread-guides *h* to revolve around the axis of the plate B.

As far as I have now described this machine, it demonstrates the fact that the lower set of spools F, which are supported beneath the rotating cam-plate B, will be revolved around the axis of the said cam-plate and will deliver to the take-up apparatus their respective threads through upwardly-projecting thread-guides *h*, which also and solely revolve around the axis of said cam-plate B.

I will now describe the action of the laterally-moving upper set of spools and thread-

guides, and for this purpose invite attention primarily to Fig. 6 of the drawings in connection with Fig. 2. From these figures it will appear that the grooves *b d* alternately carry blocks *l*, into each of which enters an upright pin *m*, that projects downwardly from a block *n*, which block *n* is received in one of a series of transverse slots *o*, which are cut into the plate G so as to traverse the annular slot *j*. These transverse slots *o* are either curved, as in Fig. 2, or straight, as in the modification shown in Fig. 4. Now as the plate B is revolved in the direction of the arrow shown in Fig. 2 each compound block *l m n* will be made to move transversely from one end of a slot *o* to the other, because the lower block *l*, which is swiveled by the pin *m* to the upper block *n*, will in its groove *b* (or *d*, as the case may be) be crowded first outwardly and afterward again inwardly, and so on, owing to the undulations of the said groove *b*, (or *d*, as the case may be.) The upper surface of the block *n* is utilized as a carrier for an upwardly-projecting spindle *b*², which receives the upper spool H, and for an upper thread-guide *p*, as indicated in Fig. 2, so that as the machine operates in the manner already stated each upper spool H will be traversed along the line of the transverse slot *o*, being moved back and forth, while meanwhile the lower spools F will be rotated around the axis of the cam-plate B. The threads from all these different spools are finally delivered in the take-up mechanism, of which I will only give a general explanation. In this take-up mechanism is contained an annular wheel I, which receives rotary motion from the spindle J, which is geared with the shaft D. The annular wheel I is fitted around a stationary hub L, which is also annular, as indicated in Fig. 3, and which contains internal gearing *r*, into which meshes a pinion *s*, that is hung in a projection of the rotating wheel I, this pinion carrying a worm *t*, that meshes into a worm-wheel *u* on a shaft M, (see Fig. 1,) which shaft carries a wheel *v*. The rotating wheel I also carries in posts *w* the final receiving-reel N, which is connected with the shaft M by a belt *x* (shown in Fig. 3) or by other means. The rotary annular wheel I also carries (see Fig. 1) a plate O, in which there is a slot *y* directly beneath a little anti-friction roller *z*, which is carried by suitable brackets that project from the annular rotating wheel I. The threads from the different spools F and H are passed through the slot *y* over the anti-friction roller *z*, around the pulley *v*, and are then finally taken up by the reel N. When using the straight traversing slots *o*, as in Figs. 4 and 5, I prefer to tilt the carrier *n* by causing it to strike stationary pins *a*² at the ends of its respective strokes, so as thereby to impart to the spool H a greater degree of traversing motion than to the carrier itself. This will be evident from an inspection of Fig. 4. Now it

will be clear if it is remembered that in an ordinary braiding-machine in which two sets of carriers are moved in opposite directions through interlocking undulating tracks the take-up is stationary and that thereafter in my improved machine, in which only one set of spools is rotated around the axis of the cam-plate, (the other being merely reciprocated back and forth,) the take-up mechanism in order to produce ordinary braiding must be revolved at half the speed at which the cam-plate is revolved. Hence I have so arranged the gearing which transmits motion from the shaft D to the annular wheel I that the said annular wheel I will revolve at half the speed of the cam-plate B, all of which will appear from an inspection of the relative gearings shown in Fig. 3. By this proportioning of the mechanism for rotating these parts I obtain ordinary braiding; but if the take-up should remain stationary, or if it should revolve as fast as the cam-plate B, then my machine will produce what is known as "braided weaving." For either of these functions, therefore, my machine is fully adapted. It is immaterial to the function of my machine whether the number of spools F corresponds to or is greater or less than the number of spools H; immaterial, also, whether the number of cross-slots *o* is the same as the number of intersections of the grooves *b d*. It will be seen that by placing the bobbins or spools F below the cam-plate, instead of above, as heretofore, I make the distance to be traversed by the crossing carriers as short as possible. Thereby I am able to use larger bobbins than could be used in former mechanism, and am also able to obtain satisfactory results with a small degree of cam motion. Thus I have a decided increase in the speed of producing a given quantity of braid and a decided lessening of the labor of attendance to a certain given quantity of product, particularly since the lower bobbins or spools F can be very much larger in capacity than the upper bobbins H. What I claim, and desire to secure by Letters Patent, is—

1. The combination of the cam-plate B and mechanism, substantially as described, for rotating the same, said cam-plate having interlocking undulating grooves *b d*, with the stationary plate G, having annular slot *j* and cross-slots *o*, and with means for holding spools F suspended below the cam-plate, thread-guides *h*, projecting from the cam-plate through the annular slot *j*, and with the swiveled carriers *l m n*, whose lower portions are fitted into the grooves *b d*, while their upper portions enter the traversing slots *o*, and with thread-guides *p*, all arranged for operation substantially as herein shown and described.

2. The combination of the stationary plate G, having annular slot *j* and cross-slots *o*, with the rotating cam-plate B, having intersecting undulating grooves *b d*, and with spool-carriers held in said grooves and cross-slots, and

lower spool-carriers *g*, all arranged for operation substantially as herein shown and described.

5 3. The combination of the cam-plate B, arranged to receive upwardly-projecting spools H and downwardly-projecting spools F on its opposite sides, with mechanism for traversing

one set of spools and rotating the other set of spools around the axis of said cam-plate, substantially as herein shown and described. 10

HENRY W. STRUSS.

Witnesses:

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HARRY M. TURK.