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L. LAKE & G. P. RISHEL.

MECHANISM FOR WEAVING WIRE WEBS.

No. 514,324. Patented Feb. 6, 1894.

Fig. 1.

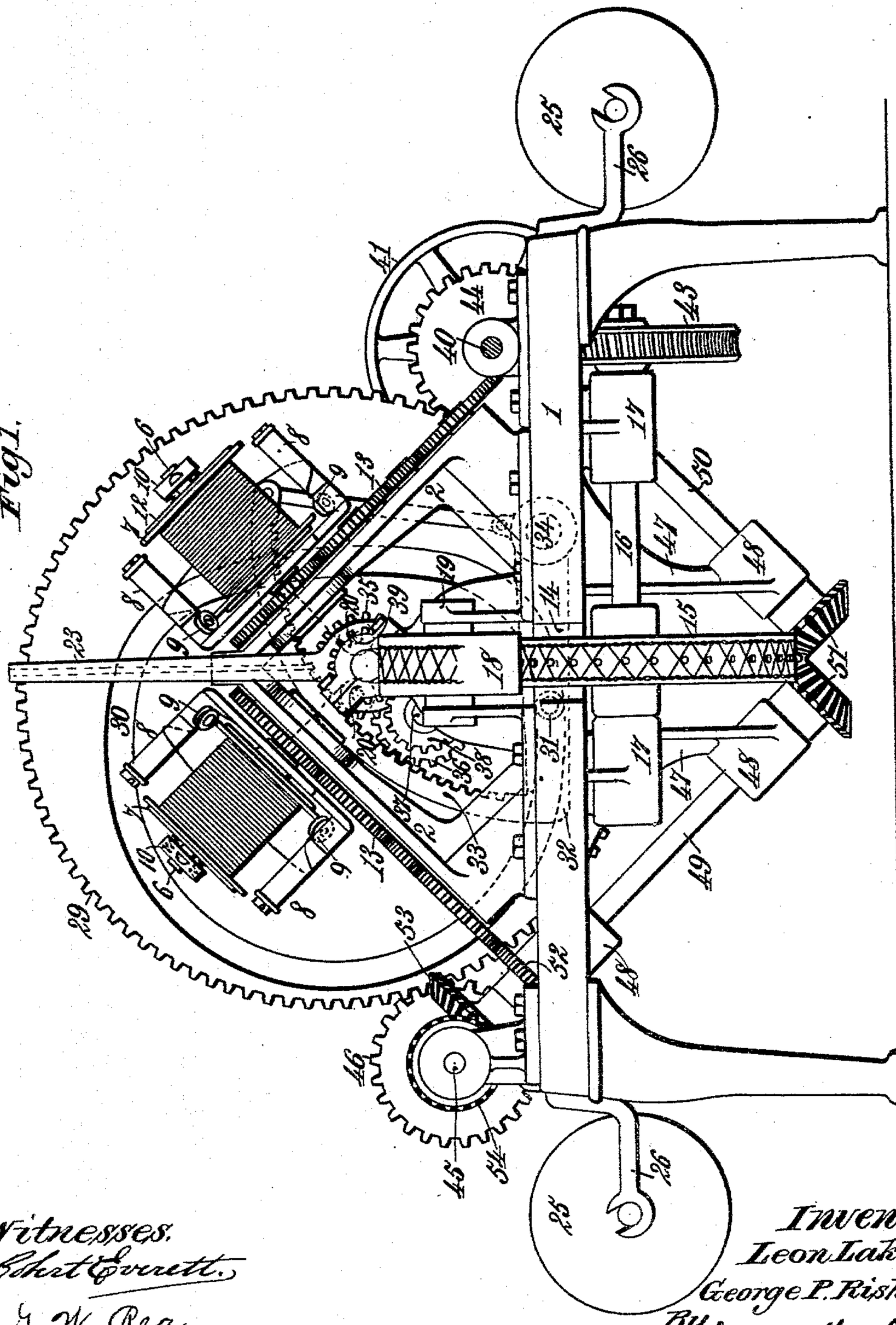

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Fig. 2.

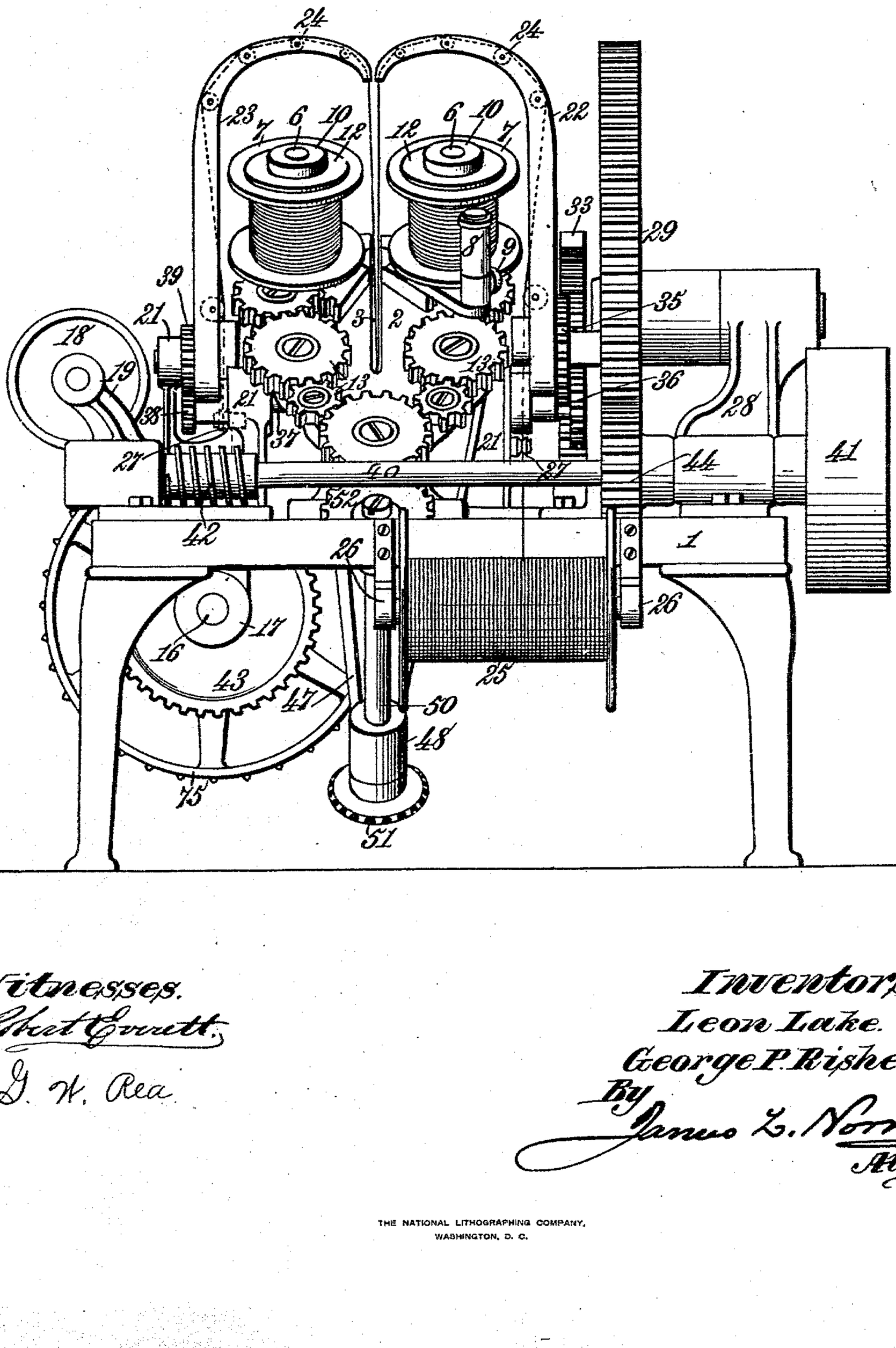

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Fig. 3.

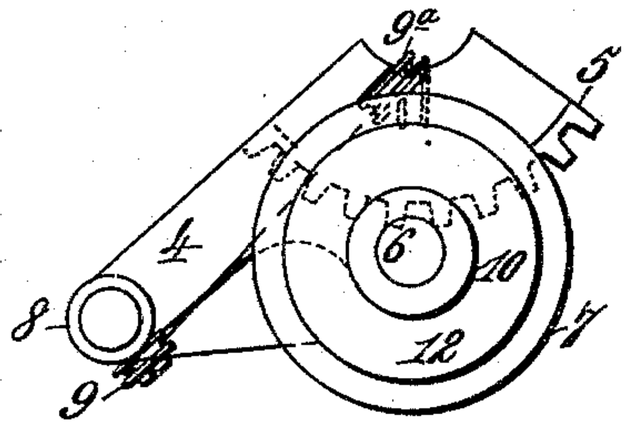


Fig. 4.

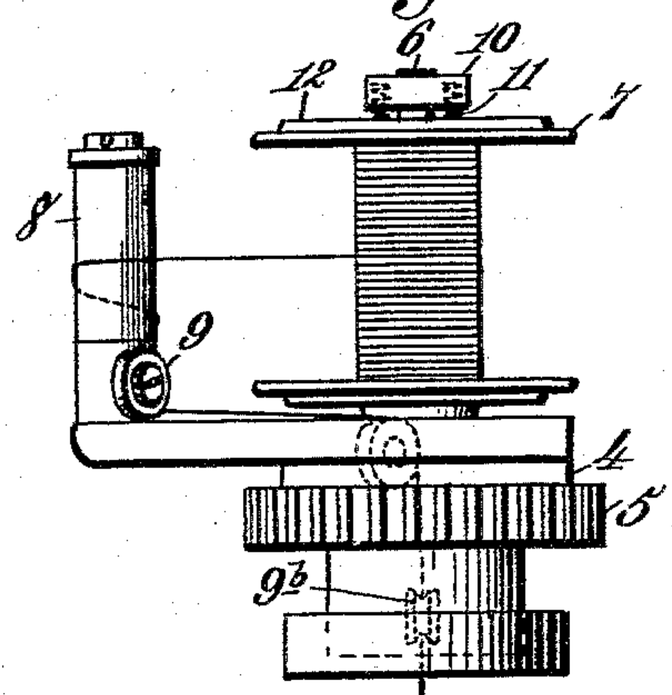
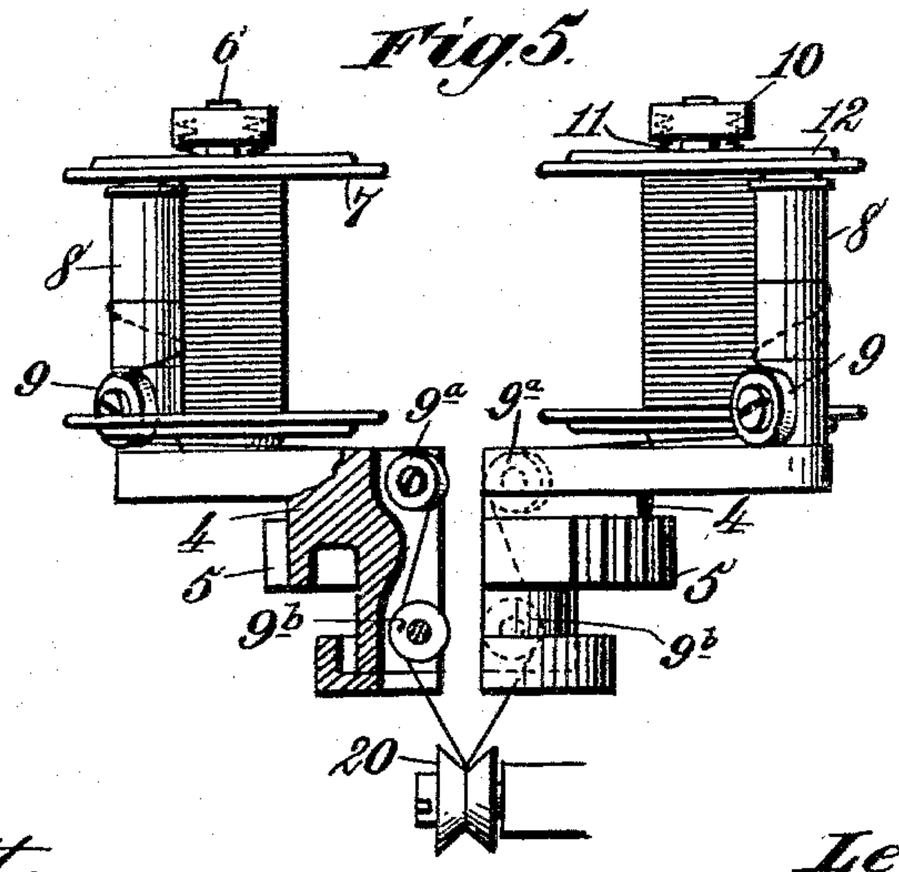


Fig. 5.



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(No Model.) 4 Sheets—Sheet 4.

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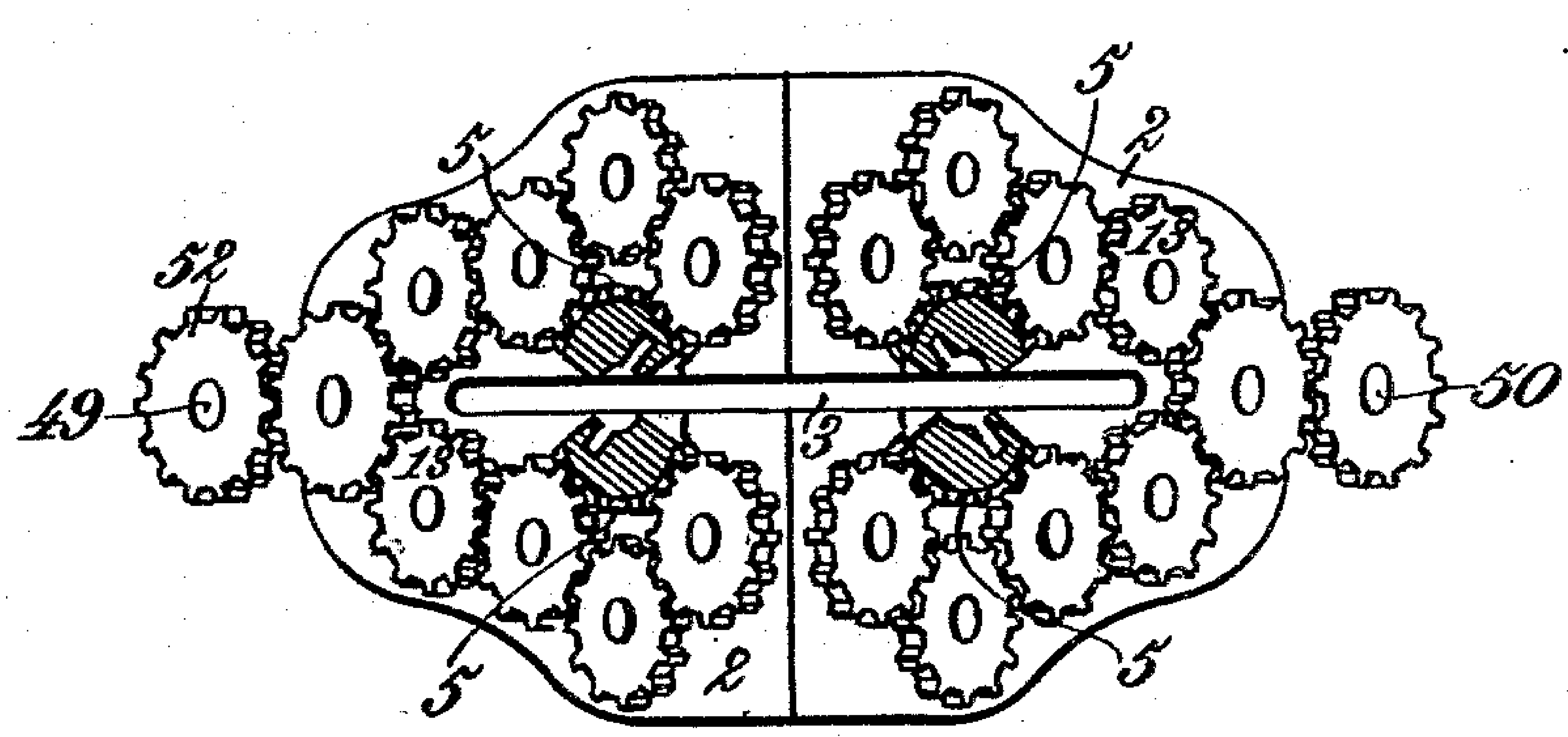
Fig. 6.



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UNITED STATES PATENT OFFICE.

LEON LAKE AND GEORGE P. RISHEL, OF HORNELLSVILLE, NEW YORK, ASSIGNORS TO CHARLES O. ROSE AND GEORGE P. RISHEL, OF SAME PLACE.

MECHANISM FOR WEAVING WIRE WEBS.

SPECIFICATION forming part of Letters Patent No. 514,324, dated February 6, 1894.

Application filed July 8, 1893. Serial No. 479,942. (No model.)

To all whom it may concern:

Be it known that we, LEON LAKE and GEORGE P. RISHEL, citizens of the United States, residing at Hornellsville, in the county of Steuben and State of New York, have invented new and useful Improvements in Mechanism for Weaving Wire Webs, of which the following is a specification.

This invention relates to mechanism for weaving wire strands into webs for wire fences, screens and similar wire structures and has for its object to improve and simplify wire weaving machinery of the class described in Letters Patent No. 453,066, granted to George P. Rishel, May 26, 1891.

The invention consists in the peculiarities of construction and novel combinations of devices in machinery for weaving wires as hereinafter more particularly described and claimed.

In the annexed drawings illustrating the invention—Figure 1 is an end elevation of a wire weaving machine embodying our improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a plan of one half or segment of a twisting head and its attached parts. Fig. 4 is an elevation of the same. Fig. 5 is a partly sectional elevation of a divided twisting head with its spools, tension pulleys and guide pulleys. Fig. 6 is a plan of the two divided twisting heads and their actuating gearing and double inclined supporting bracket.

Referring to the drawings the numeral 1, designates the machine table. Upon one end of this table is secured a vertical double inclined bracket 2 having a central longitudinal slot or cleft 3 formed therein. Each inclined side of the bracket 2 has mounted upon its upper end a divided twisting head 4, each half of which is provided on its under side with a segmental gear 5, that is somewhat less than a semi-circle. To each half or segment of the twisting head 4, is secured a spindle 6 for a spool or bobbin 7 filled with wire of suitable size for forming the twisted side wires or strands of a web. The wire from each spool or bobbin 7 is passed around an adjacent tension pulley 8, and thence downward around a small guide pulley 9, whence it is passed horizontally to another guide pulley 9^a, thence downward through a recess in the depending portion of the segmental gear to another pulley 9^b. The tension pulleys 8 are mounted on the respective segments of the twisting heads at the inner and outer sides of the spools 7, alternately and the guide pulleys 9 are each mounted at the base of a tension pulley.

To the top of each bobbin spindle 6 is detachably secured in any suitable manner a cap 10 inclosing springs 11 bearing against a tension plate 12 that is arranged to exert sufficient friction on the upper end of the spool or bobbin 7 to prevent a too rapid unreeling of the wire.

Each inclined side of the bracket 2, supports a double train of gears 13 arranged to connect or mesh at suitable points with the segmental gears 5, of the divided twisting heads 4 in such manner as to maintain the proper relative position or parallelism of the segmental portions of each twisting head while being revolved.

One end of the machine table 1, is centrally slotted or recessed at 14, Fig. 1, to afford passage for a sprocketed feed wheel 15 mounted on a transversely arranged rotary shaft 16 journaled in bearings 17 beneath the table top. An idler pulley or delivery roll 18 is mounted in bracket bearings 19 above the table and adjacent to the feed wheel 15, for the purpose of supporting the completed web as it is conducted away from the machine.

From the twisting heads 4, the warp wires pass down between guide pulleys 20, Figs. 1 and 5 that are mounted below the bracket 2 and arranged at such distance apart as to give the required width to the twisted or woven web. The web passes from these guide pulleys 20 onto and below the feed wheel 15, in engagement with the sprockets thereon, and is thereby carried upward over the delivery roll 18 and thence out of the machine.

At opposite ends of the machine, and pivotally supported in suitable brackets 21 mounted on the table top, are arranged two oscillatory arms 22 and 23 by means of which the filling wires are laid into the web and crossed therein so as to be engaged and held by the warp wires as they are being twisted

together by the action of the twisting heads. These oscillatory arms 22 and 23 have their upper ends curved toward each other so that when in a perpendicular position they will nearly meet at a point above and between the divided twisting heads. Each oscillatory arm has its outer face longitudinally grooved and provided with a series of guide rollers 24 that support and guide the filling wires which are drawn off from spools or bobbins 25 supported in suitable bearings provided in bracket arms 26 projecting from opposite sides of the machine table or frame. A guide pulley 27 may be mounted on each of the brackets 21 in a convenient situation to assist in guiding the filling wires to the lower ends of the respective oscillatory arms whence they travel along the guide rollers 24 to the upper ends of said arms and thence down into engagement with the warp wires or side wires of the web as the arms are oscillated past each other.

In a central position at one end of the machine table is a bracket 28 having a stud upon which a cam gear 29 is loosely mounted. This cam gear is arranged vertically across one end of the machine frame or table which may be suitably recessed to afford room for its rotation. In one face of the cam gear 29 is a cam race 30, Fig. 1, in which is engaged a roller 31 on the lever arm 32 of a segmental rack 33 that is pivoted to the machine frame at 34 in position to be oscillated in a vertical direction across the machine. The segmental rack 33 is internally toothed to mesh with and drive a spur gear 35 attached to the pivoted lower end of the oscillatory arm 22 and through which said arm is actuated. The rack 33 meshes also, but at a lower point, with a spur gear 36 on one end of a longitudinally extended shaft 37 mounted in suitable bearings above the machine table. On the other end of the said shaft 37 is a pinion 38 meshing with and driving a spur gear 39 by which the oscillatory arm 23 is actuated.

A main driving shaft 40 mounted on one side of the machine may receive power through suitable belting to a band wheel or driving pulley 41 at one end. This shaft 40 carries a screw gear 42, Fig. 2, for driving a worm wheel 43 on one end of the shaft 16 through which the feed wheel 15 is actuated. The driving shaft 40 carries also a spur pinion 44 through which the cam gear 29 is rotated. On the opposite side of the machine the cam gear 29 drives a longitudinally arranged shaft 45 through a spur gear 46 on one end. Beneath the opposite sides of the machine frame are secured suitable brackets 47 having bearings 48 which receive two vertically inclined and oppositely arranged shafts 49 and 50 that converge at their lower ends where they are connected by bevel gearing 51 through which one of said shafts is driven from the other. Each of the oppositely inclined shafts 49 and 50 is provided at or near its upper end with a spur pinion 52 through which are actuated the trains of gears 13 for operating the rotary twisting heads. The shaft 49 is provided at its upper end with a bevel gear 53 meshing with a similar gear 54 on the shaft 45 from which the shafts 49 and 50 are driven.

The warp wire from each spool 7 being carried around the adjacent tension pulley 8 and guidepulley 9 is passed down through the slot 3 to one of the spacing guide pulleys 20 where it is united with the corresponding wire from the spool on the other part of the same twisting head. The same disposition is made of the two wires from the pair of spools carried by the other divided twisting head, the latter wires being united in like manner in the grooved periphery of the other spacing guide pulley. These grooved guide pulleys 20 are arranged at a proper distance apart to provide for the necessary interval between the pairs of wires from the twisting heads and thus regulate the width of the completed web. The filling wires are brought from the spools 25, at opposite sides of the machine, and carried along the guide pulleys 24 on the oscillatory arms 22 and 23 to the upper ends of said arms whence they are passed downward to be laid in the intersections of the warp wires or side wires, to each pair of which a few twists have been given. The ends of the several wires are fastened together below the guide pulleys 20 and attached to the sprocketed feed wheel 15 by which the web, as formed, will be drawn out of the machine and continually fed to the delivery roll 18 whence it may be taken, in any required length, as completed.

It will be seen that the relative arrangement of the several parts of the gearing through which the two divided twisting heads 4 are actuated is such that the said twisting heads will be made to rotate simultaneously and in opposite directions, in such a manner as to impart a uniform twist to the warp wires at a point between the spacing guide pulleys 20 as said wires are drawn downward by the sprocketed feed wheel 15.

At every one-fourth revolution of the cam gear 29, its cam race 30, acting through the roller 31, will oscillate the segmental rack 33 either upward or downward in such manner as to cause the oscillatory arms 22 and 23 to swing, say, from a vertical position outward in opposite directions to points a little below the horizontal, then back to a vertical position at the next quarter revolution of the cam, and then, at the next quarter revolution, will cause them to assume horizontal positions in reverse directions to the horizontal positions last occupied. The oscillatory arms 22 and 23 are thus swung in opposite directions past each other at alternate quarter revolutions of the cam gear and occupy a perpendicular position, above the twisting heads, at intermediate periods.

While the oscillatory arms 22 and 23 are in a perpendicular position, or nearly so, the

filling wires carried by said arms will occupy a position between the opposite pairs of side wires, and by the time a predetermined length of twist has been formed in each pair of said wires, by the action of the twisting heads, the continued rotation of the cam gear will cause the upper ends of the oscillatory arms to move outward or away from each other, so as to cross the filling wires between the side wires and lay said filling wires into the intersections of the side wires immediately above the last twisted portion of each pair. By a single turn of the twisting heads 4, the side wires are closed upon the filling wires and as the revolution of the cam gear 29 continues, the arms 22 and 23 will again assume a perpendicular position, drawing the filling wires between the side wires again and holding them in that position while a second length of twist is formed in each pair of side wires. The oscillatory arms 22 and 23 are now moved outward again, but in the opposite direction to their former outward movement, and thus the filling wires are again crossed between the side wires and laid in the intersections above the twists. These operations are continuously repeated during the formation of the wire web and the product is progressively moved along, by the feed wheel 15, to the delivery roll 18, as before described.

What we claim as our invention is—

1. In mechanism for weaving wire webs, the combination of a double inclined bracket, a divided twisting head mounted on each inclined side of said bracket, each twisting head comprising two segmental portions each of which carries a spool and tension device, and a double train of gears in mesh with each twisting head to maintain a proper relation of its segmental parts during the rotation of the head, substantially as described.

2. In mechanism for weaving wire webs, the combination of a double inclined bracket having a central longitudinal slot, twisting heads mounted on the opposite inclined sides of said bracket and each comprising two segmental portions, a spool and tension device carried by each part of each twisting head, gearing for rotating said twisting heads in opposite directions, and spacing guide pulleys located below the slotted bracket to receive the wires from each pair of spools, substantially as described.

3. In mechanism for weaving wire webs, the combination of a double inclined and longitudinally slotted bracket, rotary twisting heads mounted on the opposite inclined sides of said bracket to supply the side wires for the web, spacing guide pulleys located below the slotted bracket, and two oscillatory arms having their upper ends overhanging the twisting heads and adapted to carry the filling wires in opposite directions between and into engagement with the twisted side wires, substantially as described.

4. In mechanism for weaving wire webs, the combination with rotary twisting heads for carrying the side wires, and two oscillatory arms adapted to carry the filling wires in opposite directions between the side wires, of a rotary cam gear, an oscillatory segmental rack having a roller engaged in a cam race formed in one side of the cam gear, and gearing intermediate of said rack and the oscillatory arms, substantially as described.

5. In mechanism for weaving wire webs, the combination with rotary twisting heads and two oscillatory arms, of a cam gear having a cam race in one side, an oscillatory segmental rack having a roller engaged in the cam race, gearing intermediate of said rack and the oscillatory arms, and gearing intermediate of the periphery of the cam gear and the rotary twisting heads, substantially as described.

6. In mechanism for weaving wire webs, the combination with rotary twisting heads, and two oscillatory arms having their upper ends overhanging said twisting heads, of a rotary cam gear, an oscillatory rack having a roller engaged in a cam race of the cam gear, intermediate gearing for actuating the oscillatory arms from said rack, two parallel longitudinally arranged shafts each of which is geared to one side of the cam gear, a driving pulley on one of said shafts, and gearing to connect one of said shafts with the twisting heads to rotate said heads simultaneously in opposite directions, substantially as described.

7. In mechanism for weaving wire webs, the combination of rotary twisting heads, two oscillatory arms mounted at opposite ends of the machine, and having their upper ends curved to overhang the twisting heads, a cam gear, an oscillatory segmental rack actuated from said cam gear, gearing through which the oscillatory arms are actuated from said rack, two parallel longitudinally arranged shafts geared with opposite sides of the cam gear, means for applying power to one of said shafts, gearing for actuating the rotary twisting heads from one of said shafts, a feed wheel geared with one of said shafts to take the completed web from the machine, and a delivery roll to receive the web from said feed wheel, substantially as described.

In testimony whereof we have hereunto set our hands and affixed our seals in presence of two subscribing witnesses.

LEON LAKE. [L. S.]
GEO. P. RISHEL. [L. S.]

Witnesses:
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GEO. B. ELWELL.