(No Model.) 3 Sheets—Sheet 1.

G. M. WRIGHT.

WIRE NETTING MACHINE.

No. 517,204. Patented Mar. 27, 1894.

Fig. 1.

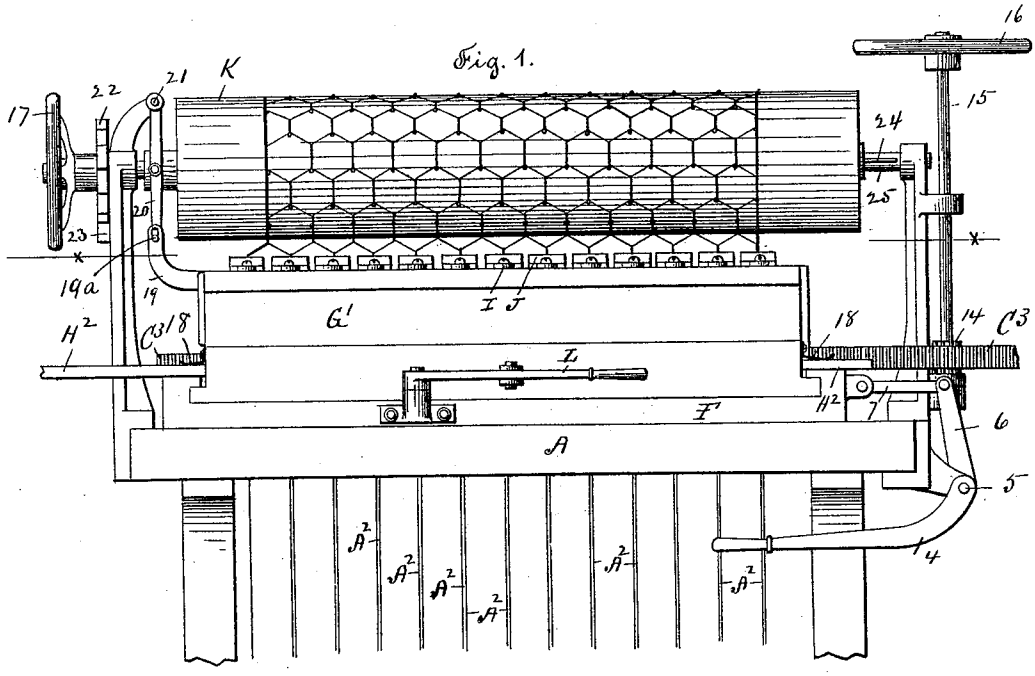


Fig. 2.

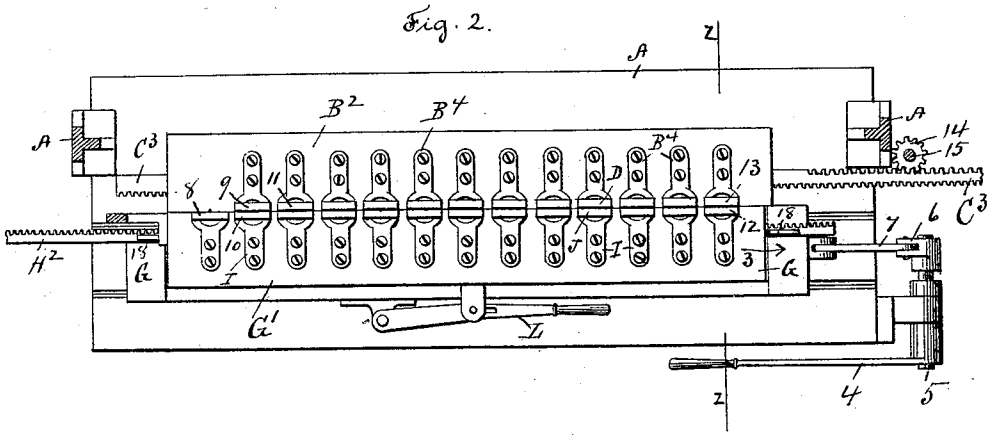
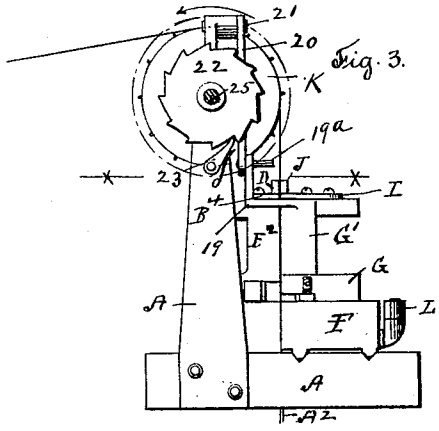


Fig. 3.



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(No Model.) 3 Sheets—Sheet 2.

G. M. WRIGHT.

WIRE NETTING MACHINE.

No. 517,204. Patented Mar. 27, 1894.

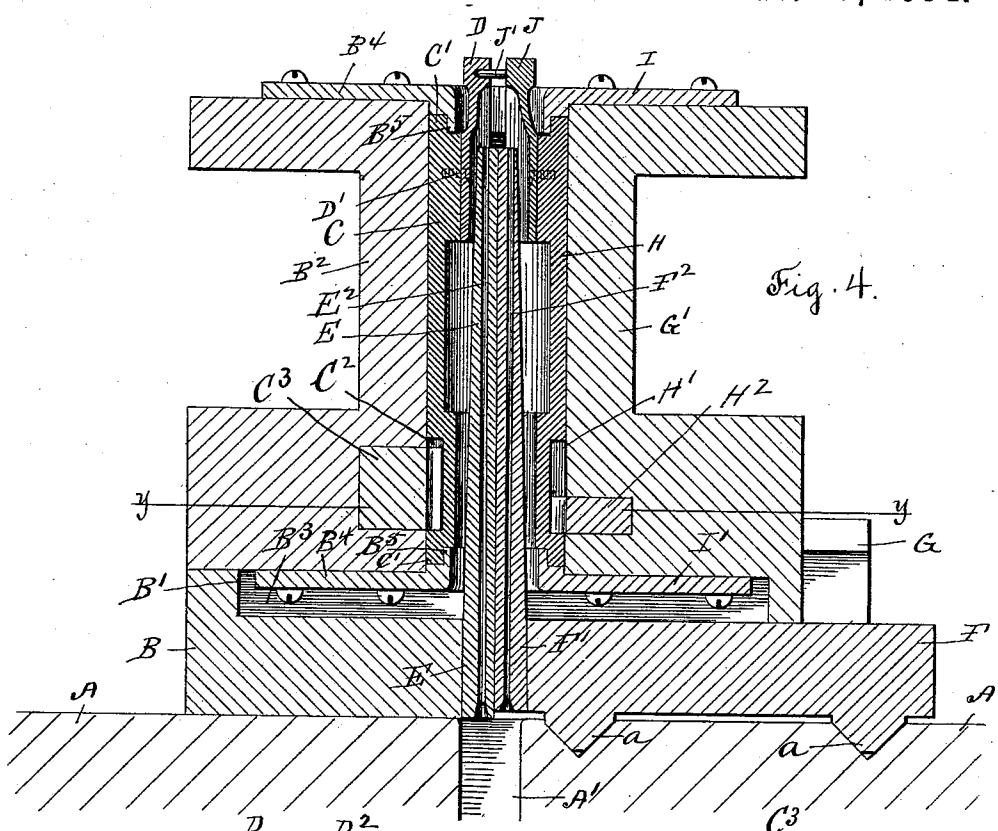

Fig. 4.

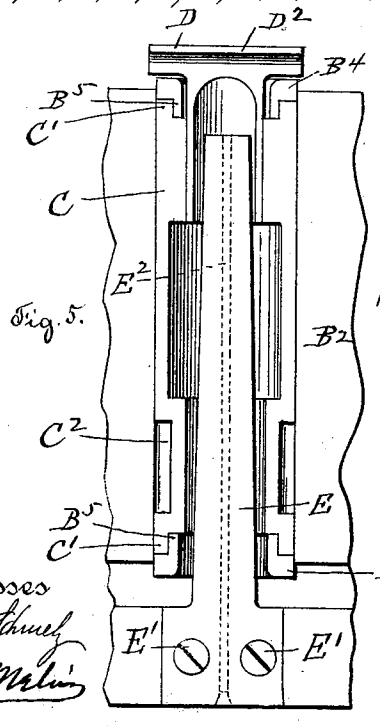

Fig. 5.

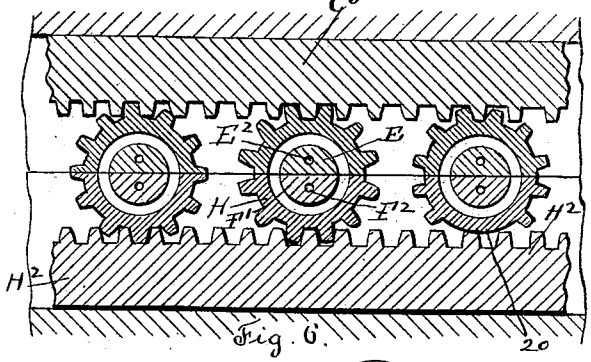

Fig. 6.

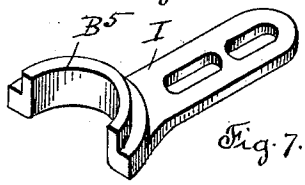

Fig. 7.

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(No Model.) 3 Sheets—Sheet 3.

G. M. WRIGHT.

WIRE NETTING MACHINE.

No. 517,204. Patented Mar. 27, 1894.

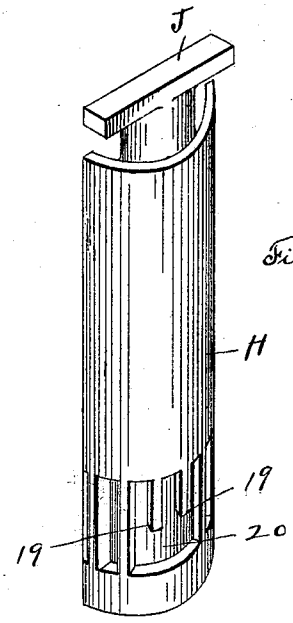

Fig. 8.

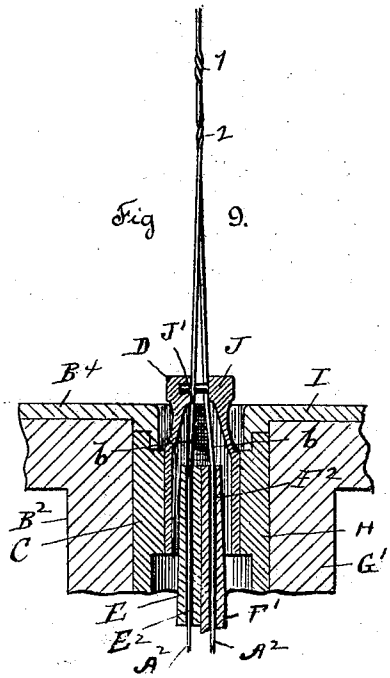

Fig 9.

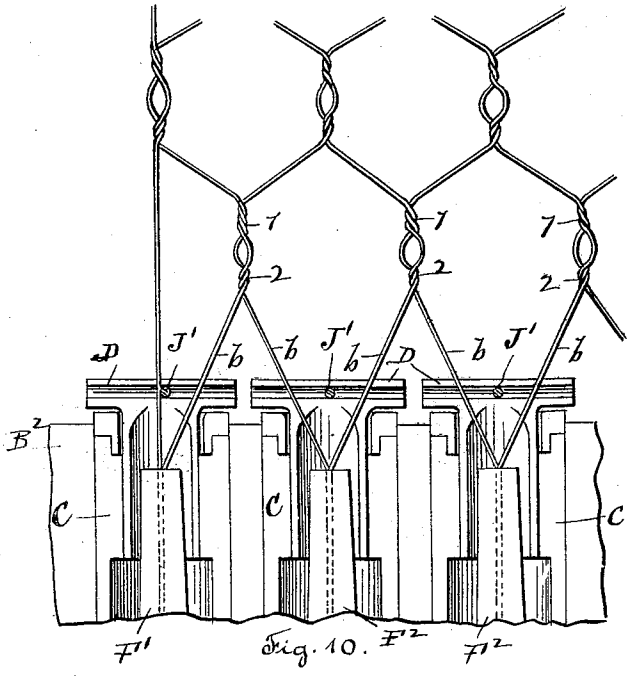

Fig. 10.

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UNITED STATES PATENT OFFICE.

GEORGE M. WRIGHT, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE WRIGHT & COLTON WIRE CLOTH COMPANY, OF SAME PLACE.

WIRE-NETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 517,204, dated March 27, 1894.

Application filed July 10, 1891. Serial No. 399,100. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. WRIGHT, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Wire-Netting Machines, of which the following is a specification, accompanied by drawings representing a machine for making wire-netting and embodying my invention, and in which—

Figure 1, represents a front view of so much of the machine as comprises the operative mechanism, by which the meshes of the netting are formed. Fig. 2, is a top view of the same with the take-up roll removed on line *x*, *x*, Figs. 1 and 3. Fig. 3, is an end view of the same. Fig. 4, is a sectional view on line *z*—*z* of Fig. 2. Fig. 5, is a view of one of the stationary wire tubes and one of the rotating half-cylinders with its wire jaw. Fig. 6, is a sectional view on line *y*—*y* of Fig. 4. Fig. 7, is a perspective view of one of the half-cylinder holders. Fig. 8, is a perspective view of one of the half-cylinders and wire jaws. Fig. 9, is a sectional view of the wire jaws and the upper ends of the stationary wire tubes and showing the position of the wires as held between the wire jaws at the beginning of the twisting operation, and Fig. 10, represents three of the wire jaws in front view, the corresponding and opposing jaws having been removed, and also showing the position of the wires with reference to the wire jaws at the beginning of the twisting operation.

Similar letters and numerals refer to similar parts in the several figures.

My invention relates to certain improvements in machines for making wire netting in which a series of parallel wires are twisted together at intervals so as to form a netting composed of a series of meshes, which in the netting herein described are hexagonal in form. It has been customary in manufacturing netting of this description to cause one of the wires to be rotated around another wire with which it is twisted producing a twist in the same direction. This method of forming wire netting requires that one of the wires should be carried in a cop-tube revolving about the other wire. The rotation of one wire about the other has been obviated by twisting the wire in opposite directions, making one half of the twist a right hand twist and the other half of the twist a left hand twist and my present invention relates to mechanism by which this class of netting is manufactured and it has for its object to provide a simple and efficient mechanism by which the right and left hand twist of the wires is produced at a single operation.

Referring to the drawings, A, denotes a table or supporting stand, upon which the operating mechanism is mounted and is provided with a central opening A′, extending across the table and through which the wires A^2, to be twisted and of which the netting is composed, are conducted from spools or bobbins placed beneath the table A, and not shown in the drawings.

Supported upon the table A, and held in a fixed position thereon is a plate B, having an upturned flange B′, upon its ends and rear side upon which rests the flanged frame B^2, forming a chamber B^3, to receive the twisting-cylinder holders B^4, by which the lower ends of the twisting-cylinders are held in position. Other holders B^4, similar to the lower holders B^4, are attached to the upper surface of the flanged plate B^2. The flanged plate B^2, is provided with a series of semi-circular recesses to receive a series of half-cylinders, one of which is shown in perspective view in Fig. 8, and in sectional view at C, Fig. 4. These half-cylinders are provided at their upper and lower ends with flanges C′, C′, which are inclosed by the semi-circular flanges B^5, B^5, upon the cylinder holders B^4, B^4, by which the half-cylinder C, is held from longitudinal movement, but is allowed to turn freely within the flanged block B^2. The half-cylinder C, is provided with gear teeth C^2, which are engaged by the racks C^3, having a sliding movement within the block B^2.

To the upper portion of the half-cylinder C, is attached the wire-holding jaw D, by means of screws D′, and to the plate B, I at-

tach the wire tube E, by means of screws E′, E′. The wire tube E, extends upwardly nearly the entire length of the half-cylinder C, and is provided with a hole E^2, extending throughout its length to receive one of the wires to be twisted.

Sliding in ways *a*, upon the bed A, is a plate F, to the edge of which are attached the wire tubes F′, similar to the wire tubes E. Sliding transversely across the plate F, in ways G, is the flanged block G′, provided with concave recesses to receive the half-cylinders H, held in place by the cylinder holders I, and I′, and carrying at their upper ends the wire jaws J. The cylinders H, are provided with gear teeth H′, engaged by a rack H^2, sliding in the block G′, the two half-cylinders C, and G′, forming a complete cylinder and having a rotating motion in their bearings by the reciprocating movement of the driving rack C^3, engaging the gear teeth C^2, and H′.

The jaws D, are provided with grooves D^2, extending lengthwise their face and receiving the pin J′, held in the center of the jaws J. The wires to be twisted are carried through the holes E^2, and F^2, in the wire tubes E, and F′, between the jaws D, and J, and upon opposite sides of the pin J′, and their upper ends attached to the take-up roll K. The rotation of the twisting-cylinders C, and H, by the sliding motion of the driving rack C^3, will cause the two wires to be twisted together above and below the pin J′, as shown at 1 and 2, Fig. 10, the twist 1, above the pin J′, being the reverse of the twist 2, below the pin J′. The block G′, is then moved along the ways G, and away from the block B^2, by means of a lever L, Fig. 2, withdrawing the pin J′, from between the twisted wires. The plate F, carrying the block G′, the series of wire tubes F′, and the series of half-cylinders H, is then moved in the direction of the arrow 3, Fig. 2, by means of the lever 4, rocking shaft 5, arm 6, and link 7, a distance equal to the distance between the centers of the twisting-cylinders, bringing the jaw 8, Fig. 2, opposite the jaw 9, and the jaw 10, opposite the jaw 11, and so on, and carrying the jaw 12, to the right and out of engagement with its opposing jaw 13. The reciprocating motion of the table F, carries its attached wire tubes F′, and brings each of the wires held therein opposite the wire held in the next adjacent tube to the right. The block G′, is then moved along the ways G, by the lever L, bringing the opposing twisting-cylinders into contact so as to form a complete cylinder to be again rotated by the reciprocating movement of the driving rack C^3, the pin J′, entering the groove D^2, in the jaws D, and between the wires to be twisted, which are held in the position shown at *b*, *b*, Fig. 10, the pins J′, being shown in sectional view. The operation of twisting the wires together is then repeated, the block G′, moved away from the block B^2, by the lever L, and the table F, moved back into the position shown in Fig. 2, by means of the lever 4, and the operation of twisting again repeated. In the mechanism shown, the driving rack C^3, is reciprocated by means of a pinion 14, on the shaft 15, carrying a hand wheel 16, and at every operation of twisting, the take-up cylinder K, is rotated by means of the hand wheel 17, drawing up the wires A^2, the width of the meshes. The half-cylinders, which for the time being are held in the concave recesses in the block G′, are united together by means of the rack H^2, upon the ends of which are placed the friction springs 18, 18, attached to the block G′. The block G′, is provided with one more half-cylinder than the block B^2, so that the two end half-cylinders carried in the block G′, are alternately out of engagement with an opposing cylinder in the block B^2, and the two central gear teeth 19, 19, in the end half-cylinders are cut away as shown in Fig. 8, leaving the blank space 20, so that the end half-cylinders will not be rotated by the reciprocating movement of the rack H^2.

During the operation of twisting, each pair of wires to be twisted together are held in the same plane by the faces of the opposing jaws D, and J, while the pin J′, passing between the wires serves as a twisting pin, causing the wires to be twisted above and below the twisting pin and in opposite directions, the twist upon one side of the pin J′, being a left hand twist, and the twist upon the opposite side of the pin J′, being a right hand twist. The two wires twisted together are held apart by the wire tubes as shown in Fig. 10, one of the wires *b*, extending from a wire tube E^2, and the other wire *b*, with which it is twisted extending from the wire tube F^2, of the next adjacent pair and producing the twist 2, by the rotation of the twisting pin; in like manner the twist 1, is formed above the twisting pin, the wires which are twisted together being held apart by the adjacent meshes upon the wire-cylinder K; both of the twists 1, and 2, being formed simultaneously by the rotation of the cylinder formed by the half-cylinders C, and H, as driven by the rack C^3.

The essential features of my present invention are embodied in that portion of the mechanism directly concerned in the operation of twisting the wires together; the mechanism shown in the accompanying drawings and hereinbefore described, by which the driving rack C^3, is reciprocated and the sliding block G′, moved through the instrumentality of the levers L, and 14, are not herein claimed as various modifications may be substituted therefor, as for example, the driving rack C^3, take-up roll K, and sliding plate G′, may receive their appropriate motions from a common driving shaft through appropriate connecting mechanism instead of by the hand

levers and hand wheels as illustrated in the drawings.

The jaws D, and J, are not necessarily clamping jaws and when the block G′, is carried toward the block B^2, the jaw J, is brought sufficiently near the jaw D, to bring the wires to be twisted into the same plane, and the operation of twisting is performed by the pin J′, which rotates about the axis of the revolving cylinder formed of the two half-cylinders C, and H.

A sliding motion is given to the take-up roll K, simultaneously with the sliding motion of the block G′, by means of an arm 19, attached to the end of the block G′, and having a slot inclosing a pin 19^a, in the end of a lever 20, pivoted at 21, to the frame work of the machine and engaging an annular groove in the hub of the take-up roll K.

A ratchet-wheel 22, held from reverse motion by a spring pawl 23, is carried upon the shaft 25, of the take-up roll K, the take-up roll having a spline connection with the shaft 25, by means of a spline 24. It would be obvious as the connection of the take-up roll K, with the lever 20, is made at the center of the lever, the sliding movement of the take-up roll K, upon the shaft 25, will be one half the extent of the sliding motion of the block G′, causing the take-up roll to be moved on its shaft at each reciprocating movement of the block G′, a distance equal to half the space between the centers of adjacent twisting cylinders.

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

1. In a machine for making wire netting, the combination with a twisting mechanism by which the wires are engaged and twisted, of a pair of non-rotatable wire holding tubes through which the wires to be twisted are conducted and delivered to said twisting mechanism, whereby the twisting action of said twisting mechanism is limited, substantially as described.

2. In a wire netting machine, the combination with a pair of opposing jaws arranged upon opposite sides of the wires to be twisted and capable of being rotated, of a pin projecting from the face of one of said jaws and arranged to pass between the wires to be twisted, and the opposing jaw being provided with a recess in its face adapted to receive said projecting pin, substantially as described.

3. In a machine for making wire netting, the combination of a pair of non-rotatable wire holding tubes through which the wires to be twisted are conducted, and a pair of rotatable jaws arranged at the ends of said tubes, by which the wires are twisted against the ends of said tubes, substantially as described.

4. In a machine for making wire netting, the combination with a stationary block supporting a series of half-cylinders provided with jaws having a grooved or recessed face, of a sliding block carrying a series of half-cylinders provided with jaws having twisting pins projecting from their faces, stationary wire tubes and movable wire tubes carried by said sliding block, said stationary and movable wire tubes being inclosed by said half-cylinders, substantially as described.

5. In a machine for making wire netting, the combination with stationary and sliding blocks, of twisting half-cylinders held in said blocks, and flanged cylinder holders attached to said blocks and engaging the ends of said half-cylinders, substantially as described.

6. In a machine for making wire netting, the combination with the rotating wire twisting devices provided with pinions, of a longitudinally moving rack having a reciprocating motion and engaging said pinions, and a second rack H^2, said rack H^2 being independent of the driving mechanism and engaging said pinions, whereby said pinions are held from independent rotation, substantially as described.

7. In a machine for making wire netting, the combination of stationary and sliding blocks provided with journaled bearings in their opposing faces, twisting cylinders composed of half-cylinders journaled in said stationary and movable blocks, gear teeth formed on said cylinders, an actuating rack engaging said gear teeth, jaws attached to said twisting cylinders, a twisting pin held between said jaws, and wire tubes inclosed in said twisting cylinders, substantially as described.

8. In a machine for making wire netting, the combination of a series of twisting half-cylinders held in a stationary block and provided with gear teeth, an actuating rack held in said stationary block and engaging said gear teeth, a series of half-cylinders held in a sliding block and provided with gear teeth, with the outer half-cylinders in the series having a portion of their gear teeth removed, and a rack held in said sliding block and engaged by said gear teeth, substantially as described.

9. In a machine for making wire netting, the combination of a stationary block, half-cylinders journaled therein, a sliding block, half-cylinders journaled therein, said sliding block being capable of sliding along the side of said stationary block and also toward and away from said stationary block, jaws carried by said half-cylinders, stationary and movable wire tubes inclosed in said twisting cylinders, and a take-up roll by which the wires to be twisted are drawn through said tubes, substantially as described.

10. In a machine for making wire netting, the combination with a stationary and sliding block containing half-cylinders journaled therein, by whose rotation the wires are twisted, wire tubes through which the wires to be twisted are conducted, and a take-up

roll, by which the wires to be twisted are drawn through said tubes, said take-up roll and said sliding block being connected so as to have a simultaneous sliding movement, substantially as described.

11. The combination with a sliding block carrying a series of half-cylinders, of a take-up roll carried upon a rotating shaft and having a spline connection therewith, a pivoted lever pivoted upon the rigid frame work of the machine and engaging said take-up roll, said pivoted lever being connected with and actuated by said sliding block, whereby a longitudinal movement is imparted to said take-up roll, substantially as described.

Dated at Worcester, in the county of Worcester and State of Massachusetts, this 2d day of July, 1891.

GEORGE M. WRIGHT.

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