4 Sheets—Sheet 1.

A. VIVARTTAS.

Making Netting.

No. 104,381. Patented June 14, 1870

Fig: 1.

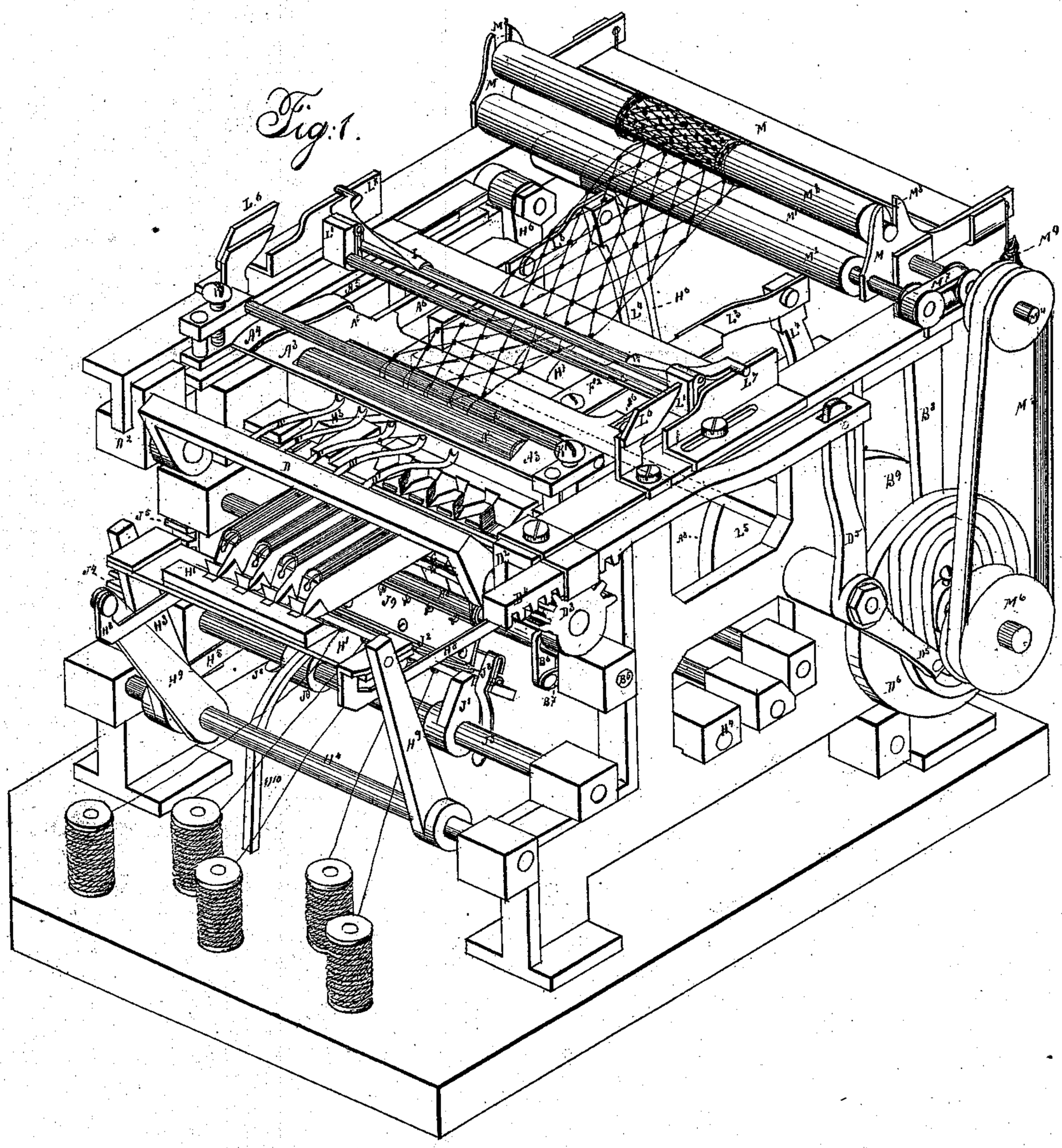

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Fig. 2

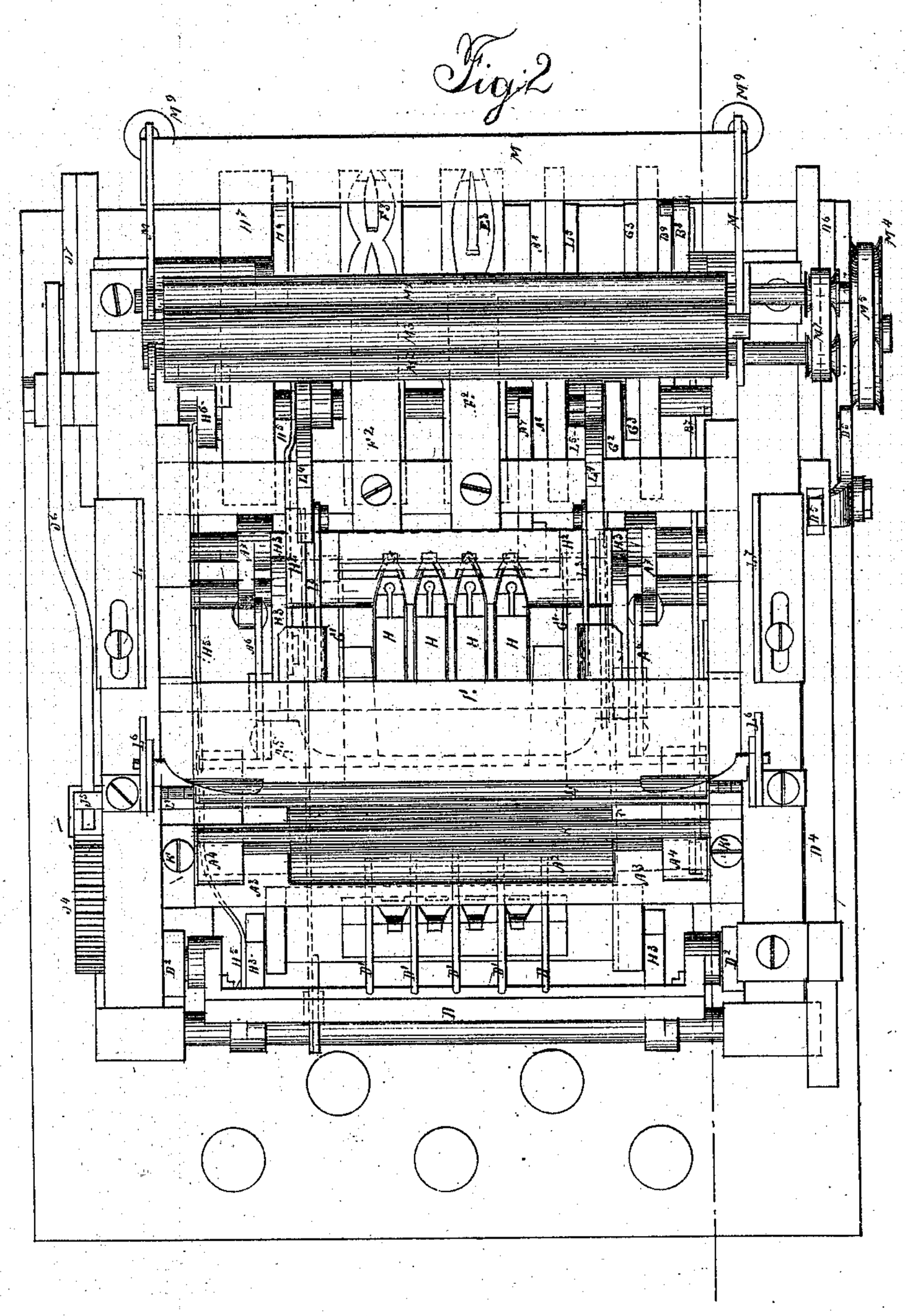

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Fig. 3

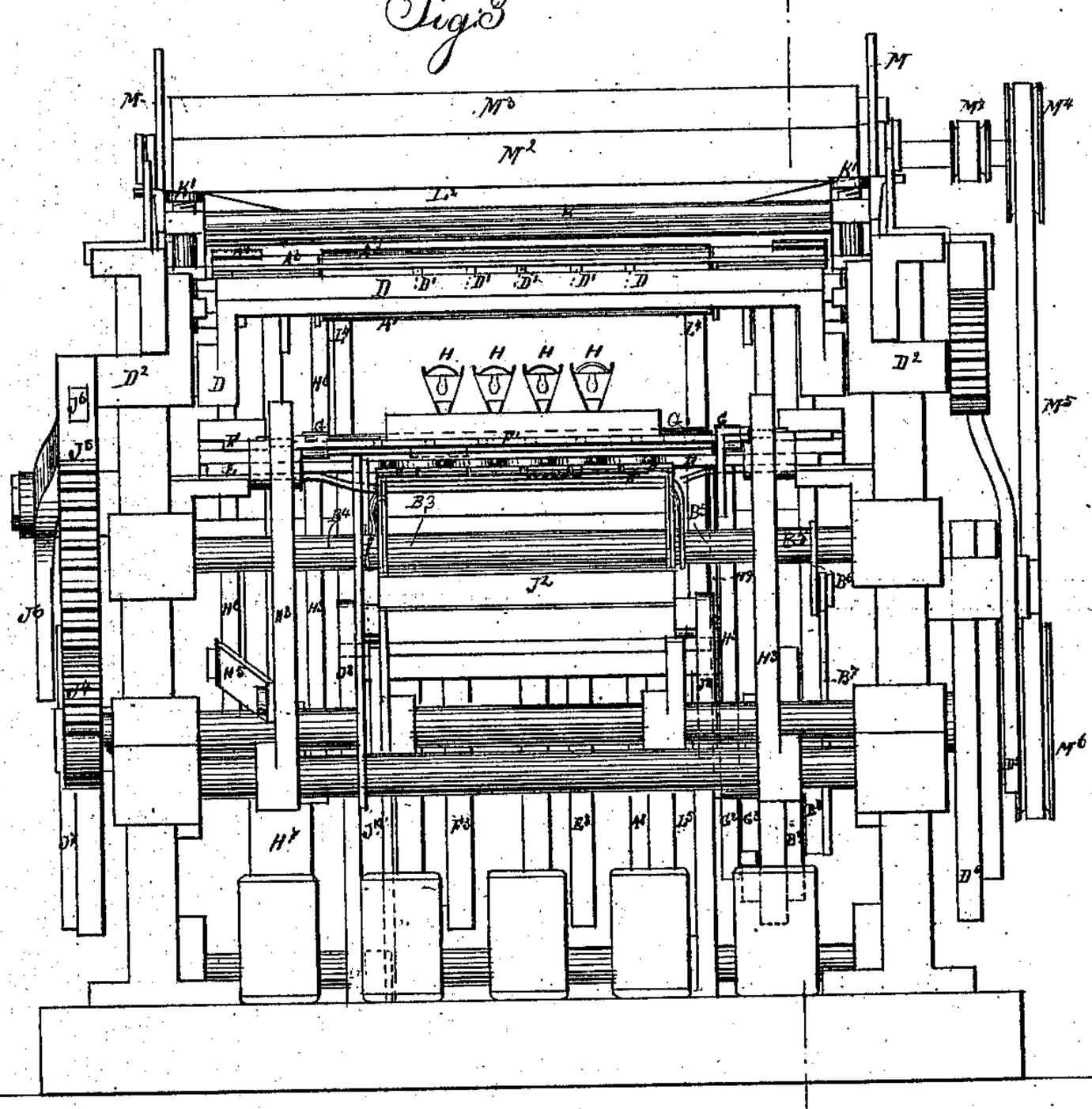


Fig. 5.

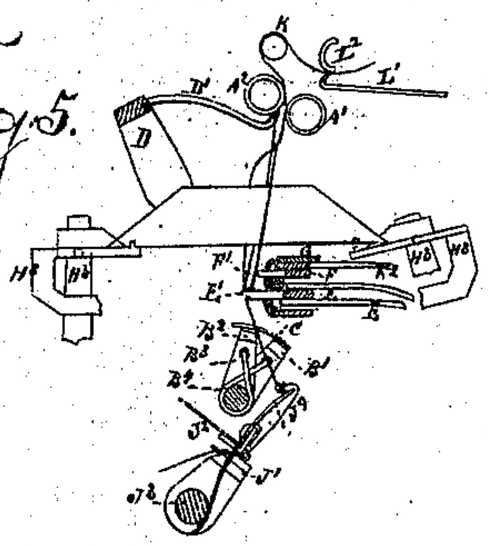
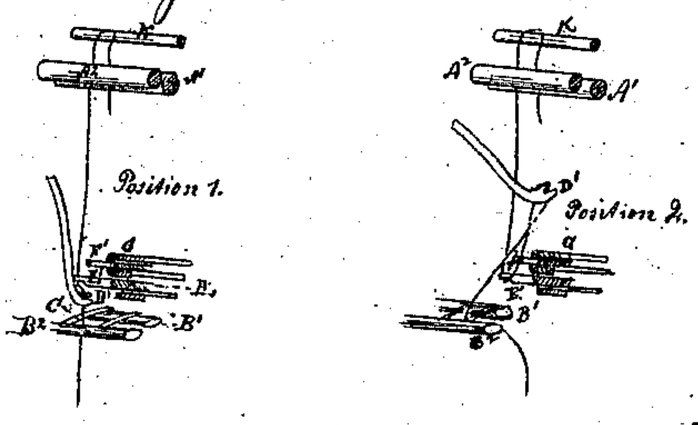
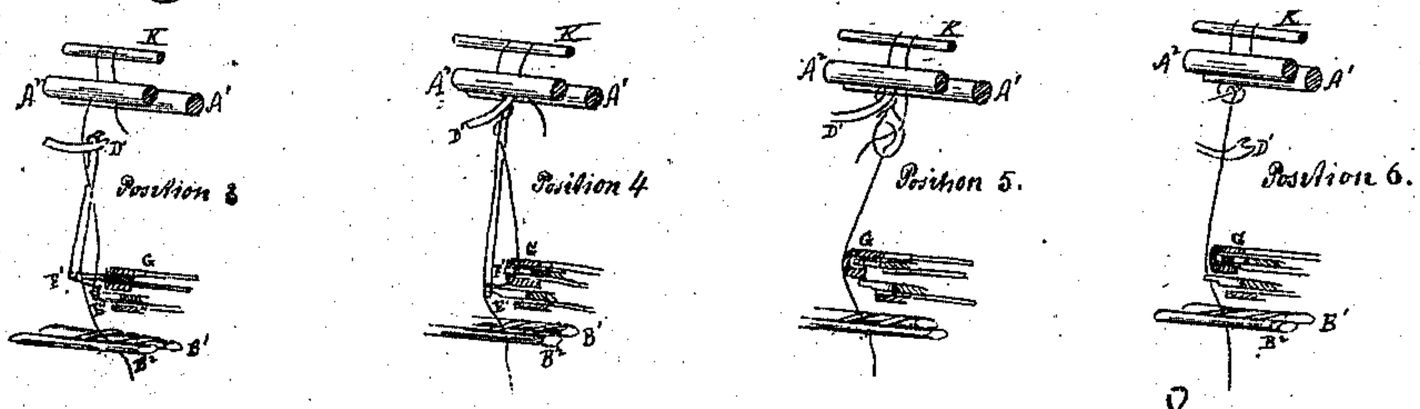


Fig. 6.





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4 Sheets—Sheet 4.

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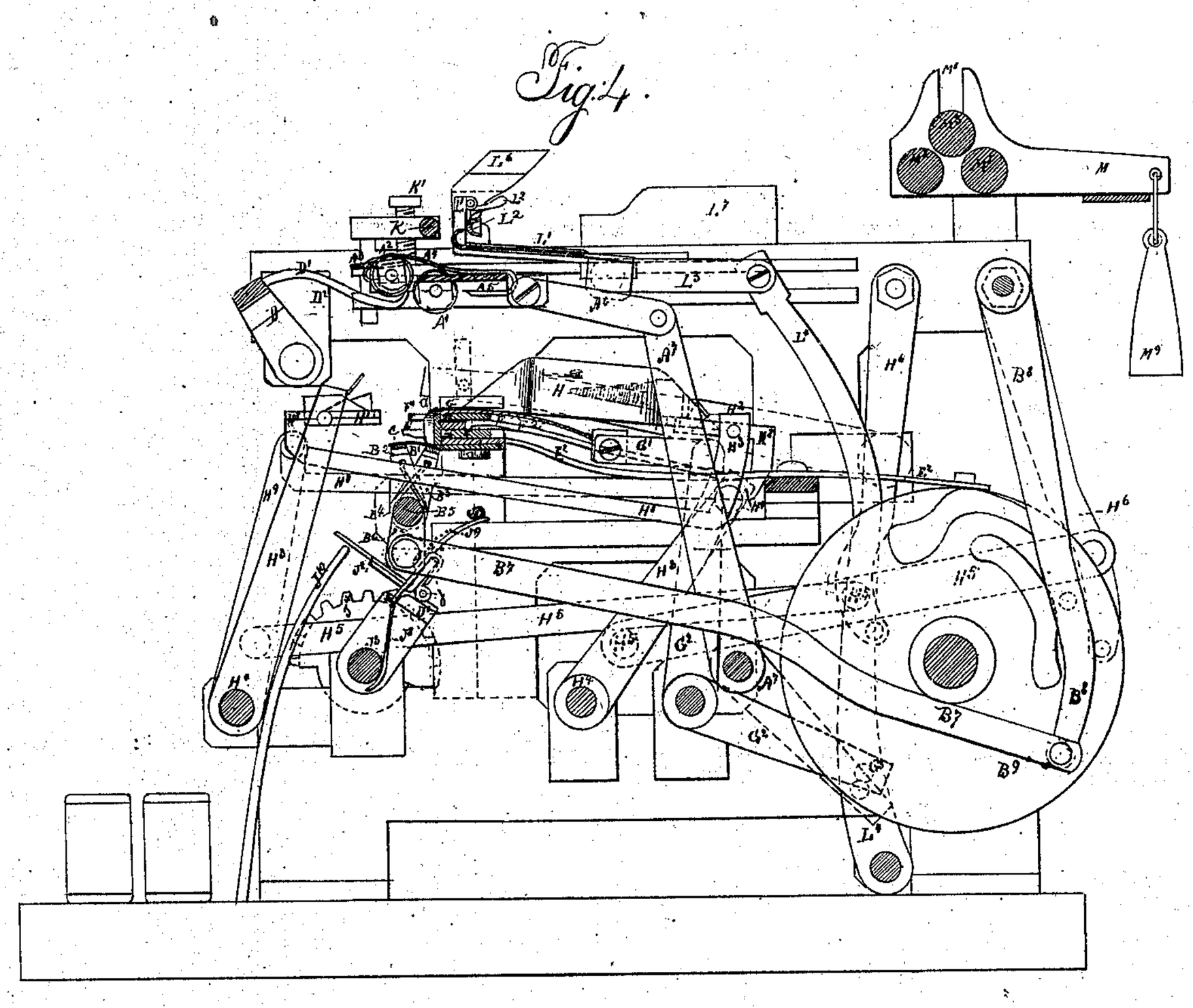
Fig. 4.



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UNITED STATES PATENT OFFICE.

ALOHA VIVARTTAS, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND JOHN W. KEENE, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN MACHINES FOR MAKING NETTING.

Specification forming part of Letters Patent No. **104,381**, dated June 14, 1870.

To all whom it may concern:

Be it known that I, ALOHA VIVARTTAS, of the city, county, and State of New York, have invented a new and useful Machine for the Manufacture of Netting; and I do hereby declare the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Sheet 1, Figure 1, is a perspective view of the machine. Sheet 2, Fig. 2, is a top view of the same. Sheet 3, Fig. 3, is a front elevation. Sheet 4, Fig. 4, is a side elevation and view. Sheet 3, and Figs. 5 and 6 thereupon, are a series of sectional and perspective views, showing the operation and position of the parts in various stages of the work.

My invention consists of a machine for making netting for seines and other purposes, of the description known as the "diagonal mesh," with the knot known as the "fisherman's bend," "bow-line," or "weaver's knot," for which purpose the material is divided into two portions, the first portion or warp being formed into a series of open knots, through which the other portion of the material is passed, when those knots are drawn taut, and a second series formed, the operation being performed in such a manner as to produce a continuous web or net, without further manipulation than to supply the material and to lubricate the machine, thus enabling one attendant to superintend the running of several machines.

The machine consists of the following principal divisions: First, the mechanism for forming the open knots or knot-movements; second, the mechanism for passing a portion of the material through the open knots or shuttle-movements; third, the mechanism for drawing the knot taut, or draw-up movements; fourth, the arrangement of devices for regulating the size of the mesh and discharging or winding up the finished netting, or mesh-movements.

All of these movements are produced and made effectual by the peculiar arrangement of mechanism to be hereinafter described.

The knot-motions consist of—

First, the rolls A^1 A^2, which are covered with woolen, leather, rubber, or other soft or elastic material. These rolls hold the netting steady while the knot is being formed, but allow it to pass freely when constructed. To accomplish this, the roll A^2 is secured to the roll A^1 by a hinge or sliding joint, A^3 A^3, governed by the springs A^4 A^4, so as to allow the rolls to separate while the finished knot is passing, but closing them again upon the netting with as equable a pressure as possible. The rolls A^1 A^2 are both held in the sliding carriage A^5, and operated by the connections A^6 A^6, the levers A^7 A^7, and cam A^8.

Second, the straight bars B^1 B^2, which may be fixed or roll, as the different classes of work may require, and are covered on their working-surfaces by a soft or elastic material. B^2 is jointed to B^1 by hinges or slides B^3 B^3, and so governed and controlled in their action by the springs B^4 B^4 as to permit them to open sufficiently so as to allow the passage of that portion of the material that is to form the open knot, and, by constant and equable pressure, to exert a steady friction on the material while passing. B^1 B^2 are secured to the rock-shaft B^5, and operated by means of the arm B^6, connection B^7, lever B^8, and cam B^9. The slotted bar C is, in this case, shown as secured to B^1; but it may otherwise be secured permanently to the frame of the machine, its object being to keep the material operated upon in position by means of the slots, which steady the material sidewise, but allow it to travel backward and forward by the action of the devices B^1 B^2.

Third, the bar D, with the curved forks D^1, is hung in such a manner, in bearing D^2 D^2, that, by means of the segment D^3, rack D^4, lever D^5, and cam D^6, it can be moved so as to carry the forks D^1 from the devices B^1 B^2 toward the devices A^1 A^2, lifting, as it passes, a bight of the material, and holding it in position until the knot is formed, the shuttle passed, and the knot is drawn up, when it returns and repeats the movement with the next knot.

Fourth, the sliding bar E, with the projections E^1, is operated, by means of the lever E^2 and cam E^3, in a direction from right to left, or across the paths of D^1 and B^1 B^2, so that, a forward movement of B^1 B^2 having laid the

material into the fork of D^1, the cross-movement of E strikes the material above D^1, and bends it over in such a manner that the upward movement of D^1 picks up the bight, so that the material may now lead from the netting at A^1 A^2 to the projection E^1, thence to the fork D^1, thence through C to B^1 B^2.

Fifth, the sliding bar F, with the projections F^1, is operated, by means of the lever F^2 and cam F^3, in a direction parallel to E, the projections striking the portion of the material between E^1 and D^1, carrying it over to one side, but which at the same time is prevented by the further movement of B^1 B^2 from interfering with the material between D^1 and B^1 B^2, at which time E^1, by a reverse motion, carries its bight back under the portion of the material between D^1 and B^1 B^2, being, by the same forward movement of the latter, prevented from interfering therewith, so that the material may pass from the netting at A^1 A^2 to E^1, thence to D^1, thence to F^1, thence over itself to B^1 B^2, as seen in position 2 of Fig. 6. The motion of B^1 B^2 is now reversed, laying the material back against itself, and into the range of motion of F^1, (as seen in position 3, Fig. 6,) which, by a reverse motion, leaves the bight it held, and, striking the part of the material between D^1 and B^1 B^2, draws that bight out through the loop against which it lies, making a perfect knot, which, by the third motion of E and the continued motion of F, is opened ready for the passage of the shuttle. (See Fig. 6, position 4.) The material then passes from the netting at A^1 A^2 to E^1, thence to D^1, thence around the part from A^1 A^2 to E^1, and through between that and the part from E^1 and D^1 to F^1; then back through and between the same parts to E^1, thence through C to B^1 B^2. These knots are formed right and left, in alternate sucession, by the motion of E and F and their cams, with which they are connected.

Sixth, the triple sliding bar or guard G, which, by means of the connections G^1 G^1,. levers G^2, and cam G^3, is moved backward and forward across the path of E and F, and, when brought forward, throws the material off of and holds it clear of E^1 and F^1, (see Fig. 6, position 5,) thereby facilitating the drawing up of the knot, which being accomplished, it returns to its normal position.

The shuttle-movements consist of—

First, a series of shuttles or carriers, H H, containing the portion of the material which passes through the open knots or filling. These carriers are made of metal or other suitable material, tapered toward each end, and with an opening or socket in the bottom, near each end. These shuttles are supported by the carriages H^1 H^2, the latter having trunnions formed upon them, by which they are supported on the arms H^3 H^3 of the rock-shafts H^4 H^4, and, by means of the devices or connections H^5 H^5, levers H^6 H^6, and cam H^7, receive their proper motion. The carriages H^1 H^1 are steadied in their position by means of the devices H^8 H^8 and arms H^9 H^9, so that, when the carriage H^1 moves forward by the action of the cam H^7, it also rocks upon its trunnions, and the same result is produced upon the carriage H^2. The carriages H^1 H^2 have, each of them, a series of sockets, constructed and fitted to receive the ends of the shuttles H H, and also a series of projections adapted to fit into the openings or sockets in the bottom of the shuttles H H, the whole being constructed and arranged in such a manner that while the open knots are being formed the shuttles are held by one or the other of the carriages H^1 H^2, alternately, one end of each carrier being in the socket of the carriage, and the projection of the carriage being in the socket of the carrier. When the open knot is ready, as before described, (see Fig. 6, position 4,) the carriage, having the carriers attached, moves forward, tipping as it moves, passing the ends of the shuttles through the open knots before them, and into the sockets of the other or opposite carriage, and continuing its motion, tipping its projections out of the sockets of the carriages, leaving them free to be drawn out of the sockets of the carriage supporting them, by the opposite carriage, to which they become attached, and which starts back, at the same time tipping, so that the shuttles become connected with the last-mentioned carriage by means of the sockets and projections above described, and being drawn, by a positive motion from the first carriage, out through the knot, and held there until the next knot is prepared, when they are returned through the newly-formed knots to the first or opposite carriage, in the same manner as they were passed through the last, each shuttle engaging, by the action of E and F, with the material to the right or left of that it engaged before, forming a continuous web or net, making the diagonal mesh with a single passage of the shuttle through the knot or bend.

The draw-up movement consists of the straight-edges J^1 J^2, hinged together in such a manner as to permit the material to pass between them freely when open, but, when at work, closing upon it with firmness, increased by the strain upon it. The edge J^1 is firmly secured to the shaft J^3, which rocks, carrying with it J^1 J^2. The shaft J^3 is rocked by the segment J^4, the rack J^5, the lever J^6, and cam J^7. J^2 is hinged to J^1 at *j*, and held close to it by means of the springs J^8 J^8. J^2 is capable of extension from the center by means of the slots and screws J^9 J^9, and the two are so placed that, while the open knot is being formed, J^2 rests against the projection J^{10}, which holds it off of J^1, so as to allow the material to pass freely; but when the knot is formed and the shuttle passed, (see Fig. 6, position 5,) the cam J^7 causes the shaft J^3 to rock, carrying with it J^1 J^2. As J^2 leaves the projection J^{10}, it closes, by the action of the springs J^8, upon the material, carrying it forward and drawing the knot to any desired

degree of tension, returning and opening in time for the formation of the next knot.

The mesh-movements consist of—

First, the straight roller K, so arranged that it may be raised or lowered by means of the screws K^1 K^1, as may be required.

Second, the straight-edges L^1 L^2, which are so hinged together as to admit of opening and allowing the netting to pass freely, or closing firmly, and holding the netting while the knot is being drawn up by J^1 J^2. The edge L^1 is made to slide by means of the connections or devices L^3 L^3, levers L^4 L^4, and cam L^5. During the time the knot is being formed, the shuttle passing, and the knot drawn up, L^1 L^2 stand forward, closed and held together by the stationary cam-pieces L^6 L^6, the netting being held firmly between them; but after the knot is drawn up the cam L^5 causes L^1 L^2 to slide back, drawing the netting up between A^1 A^2 and over K, until L^2 strikes the adjustable cam-pieces L^7 L^7, which opens L^2 and L^1, and they return open and without action upon the netting until closed by L^6. The size of the mesh is governed by the distance traversed by L^1 L^2 before being opened by L^7 L^7, which are secured by screws and slots, so that they can be set at any desired distance from the normal position of L^1 L^2, thereby making the mesh large or small, at pleasure.

Third, the three rolls M^1 M^2 M^3. M^1 is supported by stationary bearings, and is turned by the pulley M^4, belt M^5, and pulley M^6 on the main shaft. M^2 is supported by a frame, M, which is so arranged as to rock on the same center as M^1, and is revolved by the pulleys and belt M^7 M^7. M^3 rests upon M^1 and M^2, and is steadied in position by the guides M^8 M^8 of the frame M, in such a manner that it may be lifted at will. M^2 and M^3 are a little more than overbalanced by the weights M^9 M^9, so that, while the netting passes between M^3 and M^1, or winds up on M^3, the action of the rolls will always keep the desired tension upon the netting, taking it up as the edges L^1 L^2 move forward, and holding it as they return.

If the netting is rolled upon M^3, the arrangement of the guides M^8 is such that the larger the roll becomes, the more nearly its center plumbs over the center of M^1, so that the weight to be counteracted by M^9 M^9 shall not increase, but remain the same, giving the same quickness of action with a full roll as with an empty one. As the roll M^3 is filled, it is re-removed and another substituted for it without delay or change, except to cut the netting.

What I claim as my invention is—

1. The machine constructed substantially as described, and operating to form netting of the description known as the "diagonal mesh" and "fisherman's bend," and by a single passage of the shuttle.

2. The shuttles H H, in combination with their supports or carriages H^1 H^2, when constructed and operating in the manner and for the purposes herein described.

3. The arrangement and combination of the cam J^7, its arm or lever J^6, rack J^5, segment J^4, and shaft J^3 with the straight-edges J^1 J^2, in the manner and for the purpose herein described.

4. The sliding carriage L^1 with its straight-edge, in combination with the movable clamping-bar L^2, the latter being operated by cams L^6 and L^7, as and for the purpose set forth.

5. The weighted rocking frame M and rollers M^2 and M^3, arranged upon a shaft, to the end of which is attached a pulley, operated by means of the pulley M^6 and a belt connecting the two pulleys, in the manner and for the purpose herein shown and described.

6. The arrangement and combination of the bar D and its forks D^1 with the sliding bars E and F, when the bars E and F have formed upon them projections, in the manner and for the purpose herein described.

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