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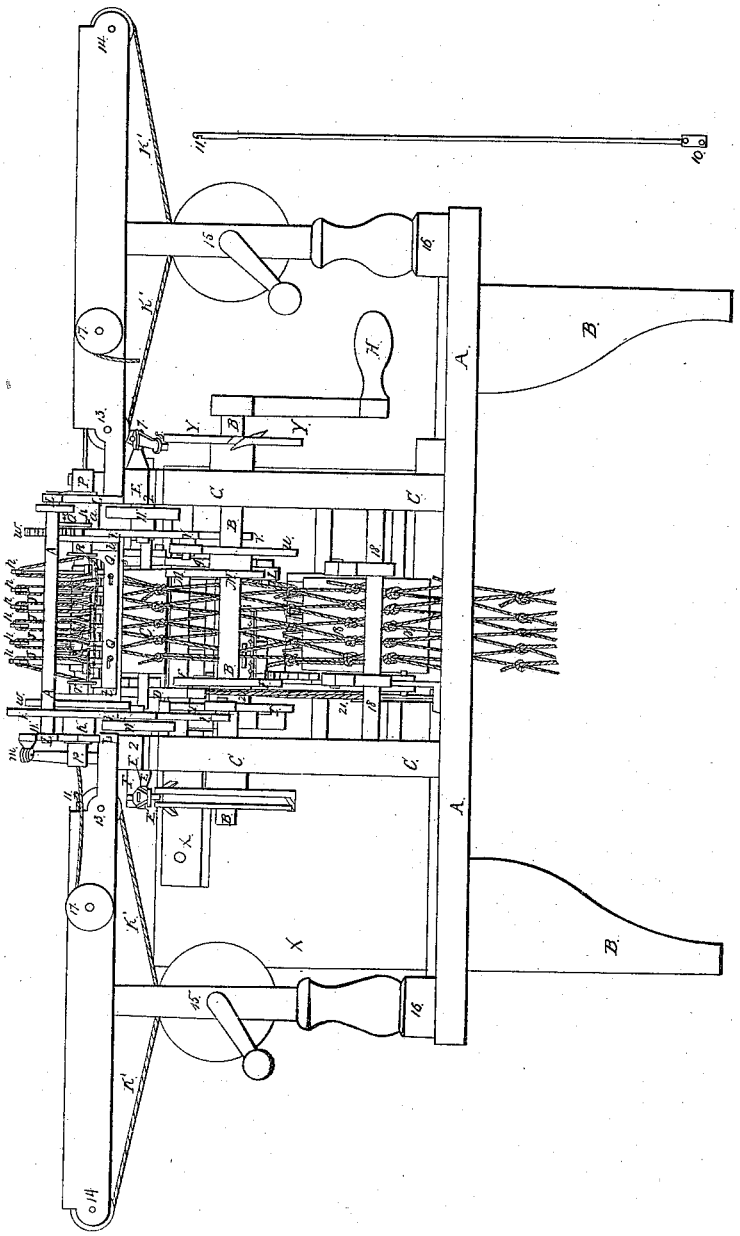
Netting Mach.

No. 4,039.

Patented May 10, 1845.

Fig. 1.



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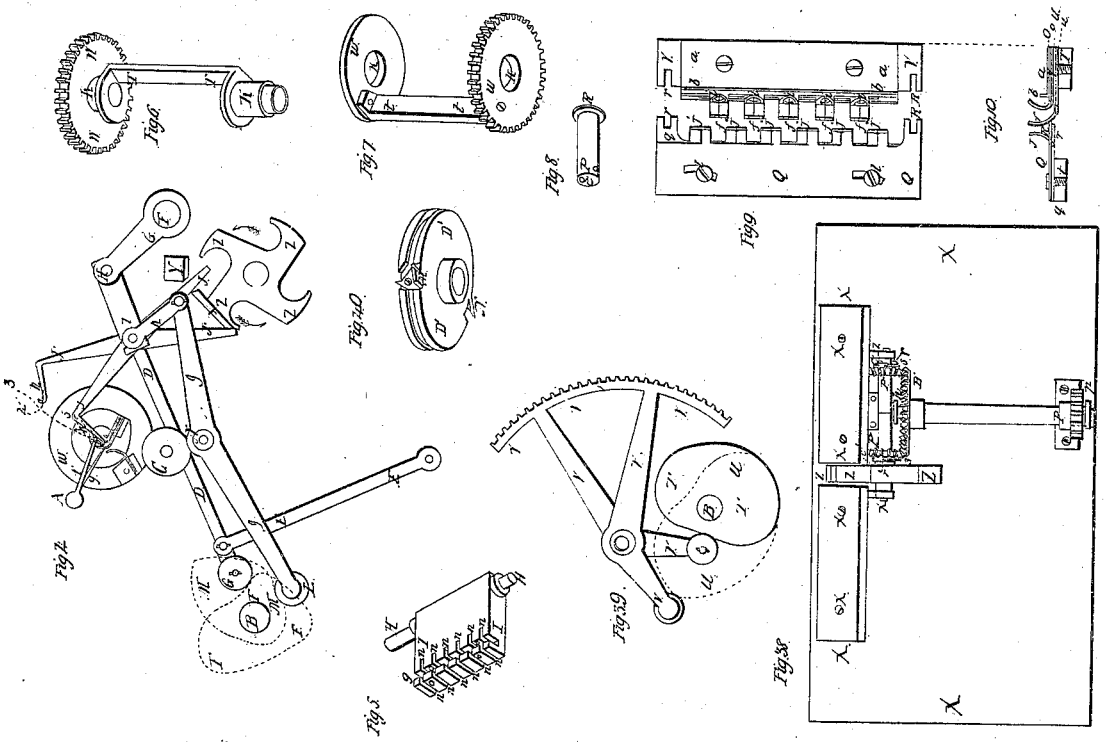

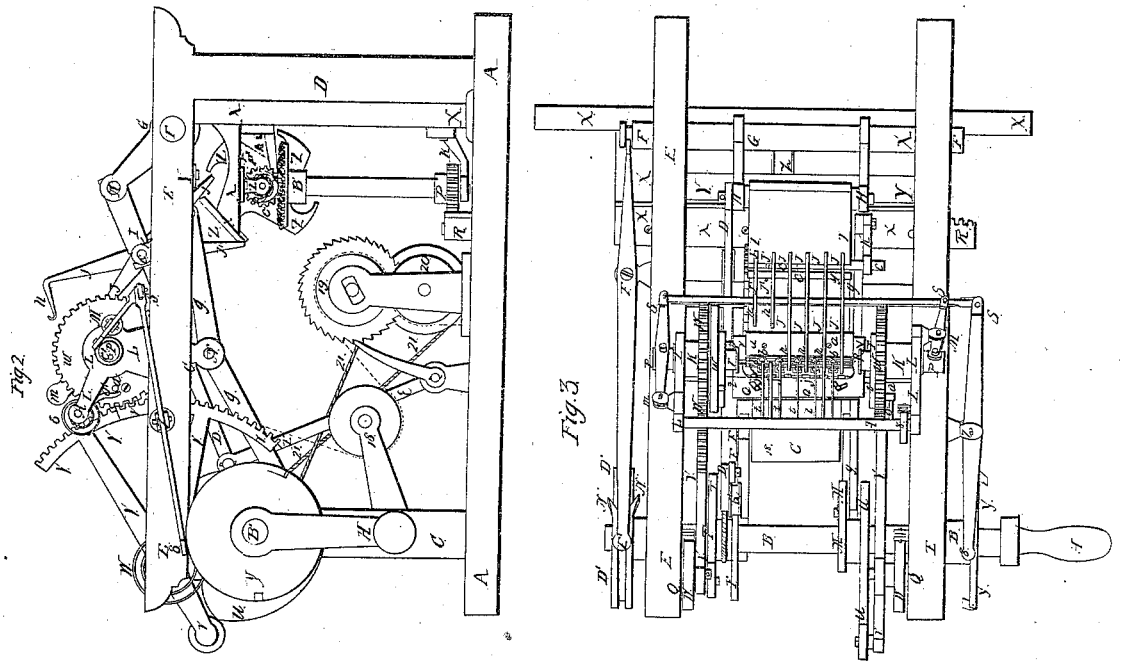

Sheet 3-3 Sheets.

Cornelius & Mott.

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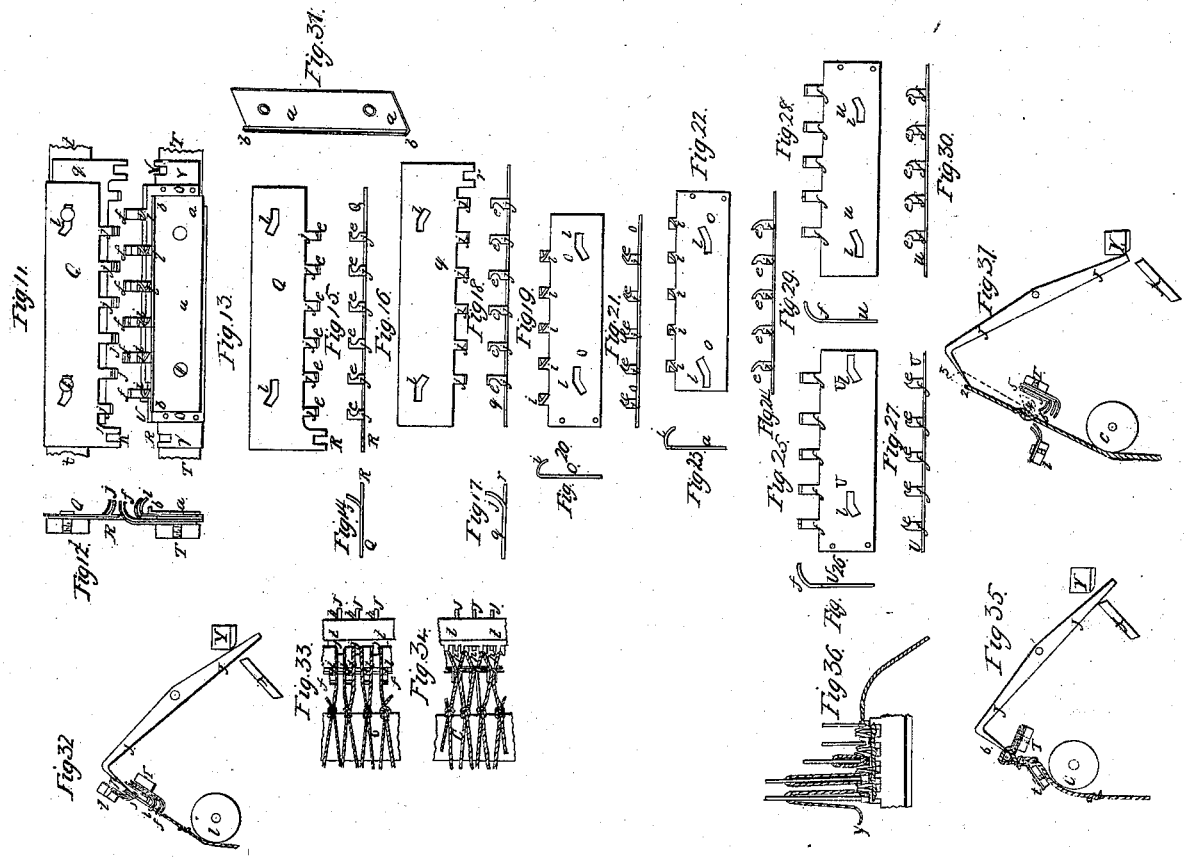

UNITED STATES PATENT OFFICE.

JOHN D. CORNELIUS AND JAS. MOTT, JR., OF WESTBURY, NEW YORK.

MACHINE FOR KNITTING FISHING-SEINES AND OTHER NETWORK.

Specification of Letters Patent No. 4,039, dated May 10, 1845.

To all whom it may concern:

Be it known that we, JOHN D. CORNELIUS and JAMES MOTT, Jr., both of Westbury, in the town of North Hempstead, Queens county, in the State of New York, have invented a new and useful machine called a "machine for knitting network" for fishing-seines and other purposes, the meshes being connected in the usual manner by the common flat or square knot, of which machine the following is a full and exact description.

The machine, of which a vertical front elevation is presented in Figure 1, of the drawings hereto appended is fixed to a bench, marked A A of suitable dimensions for properly holding the different part of said machine herein described. The bench is supported at a height convenient for working, say two feet, by four legs, two of which, B, B are seen in the figure. A vertical side elevation of the bench and principal parts of the machine is presented in Fig. 2, and a horizontal plan of the same parts of the machine in Fig. 3. Fig. 4 is a vertical transverse section, showing the most important parts of the machine in combination, the other parts being supposed to be removed; in all of these the letters of reference are the same where the same parts are shown.

The frame is erected on the middle of the bench, and consists, as will be seen by referring to Figs. 1, 2, 3, of four upright posts, C, C, D, D, each about a foot long, to the tops of which are attached two crossrails, E, E, each about eighteen inches long.

The mesh frame.—Between the back part of the crossrails E, E, (Figs. 2, 3) is that part of the machine called the meshframe, which is composed of the swivel, F G H F, the comb, H I I H, and the jacks, J, J, which are somewhat similar to the comb and jacks of a stocking frame. The swivel has a straight arbor, E F, running in holes, or bearings, in the crossrails, E, E, of the frame, so that it may vibrate in its bearings either endwise or about its axis; to this arbor are fastened two parallel arms, G H, G H, about 3 inches long in the ends, H, H, of which the comb, H I, shown separately in Fig. 5, rests upon its pivots H, H. The comb H I (Figs. 2, 3, 4, 5) is a straight bar of iron, about 3 inches wide and $\frac{3}{4}$ of an inch thick, across the front side or edge, I, I, of which a number of transverse grooves or notches *n*, *n*, Fig. 5, are cut at a uniform distance apart, for the purpose of receiving the jacks. The depth of the notches may be $\frac{3}{4}$ of an inch, and their distance which is called the gage of the machine may be $\frac{3}{8}$ of an inch more or less. On the upper side of the comb, a groove, *g*, *g*, Figs. 3, 5, is cut through the middle of the notches, *n*, *n*, the whole length of the comb and $\frac{3}{8}$ of an inch deep. A straight wire, *c*, *c*, Figs. 2, 3, 4, fastened to the bottom of the groove, and passing through a hole in the middle of each jack forms a common center to all the jacks each turning independent of the others as in the stocking frame. The jacks J, J, are flat pieces of steel about $\frac{1}{12}$ of an inch thick and 4 inches long, of the shape shown in Figs. 2, 4, each jack having a hook, *h*, at one end, about an inch long, standing at right angles to the body of the jack J J. The number of jacks and the gage of the machine being determined, will give the length of the comb and the breadth of the machine between the crossrails.

The knotframe.—The knotframe seen at K K between the cross-rails in front of the meshframe, is composed of the table T T, the counter-table *t t*, three pairs of jaws and the pieces necessary to move them in a proper manner. The table, T T, Figs. 3, 6 is a straight piece of metal, about as long as the comb, to the ends of which are attached the sockets, K K, the inside diameter of which may be about $\frac{5}{8}$ of an inch. The counter-table, *t*, *t*, Figs. 3, 7, 1, is a straight piece, similar to the table, to the ends of which are fastened the wheels *w*, *w*, as seen in the figure. The sockets K, K, of the table pass freely through the sockets *k*, *k* of the wheels of the counter-table and run in their bearings in the pieces L, L, which are fastened to the cross rails of the frame so that the table and counter-table turn or vibrate independently on a common axis; the table being driven by the toothed wheel W fastened to one of its sockets, and the counter-table by the toothed wheel *w*. Through the sockets of the table pass the plungers, P R, *p r*, one of which, P R, may be called the right-plunger, and the other, *p r*, the left plunger. They are cylindrical pieces (Fig. 8,) fitting the sockets easily with a circular rim, R, *r*, on the inner end

of each, for the purpose of moving the jaws. The right plunger, P R, is moved by the lever P M S turning on a joint in the stud M which is fast to the piece L, and the left plunger is moved by the lever *m p s* jointed to the stud *m*. The ends S, *s*, of the levers are attached by joints to the connecting rod, S *s*, so that the motions of the plungers are equal, and in opposite directions; that is when one of the plungers is moved to the right by the connecting rod, the other will be moved the same distance to the left and vice versa.

Each pair of jaws is composed of two slips of brass about $\frac{1}{40}$ of an inch thick and near an inch broad, one of which is called the right and the other the left jaw. In one edge of each jaw a number of teeth are cut whose distance is exactly aqual to the gage of the machine and the breadth of the teeth about $\frac{1}{4}$ of the gage, say $\frac{1}{10}$ inch. The counter table *t t*, carries a pair of jaws, Q Q, called the turning jaws; they have each as many teeth, about $\frac{3}{16}$ of an inch long, as there are jacks in the meshframe. Fig. 13 is a full-size plan of the right turning jaw exhibited flatwise, Fig. 14 is a transverse and Fig. 15 a longitudinal section of the same. In the right side of each tooth, *j*, of this jaw, a notch, *e*, called the eye of the tooth, is cut of the shape shown in Fig. 15, for the purpose of receiving the thread, and the teeth are bent up from the body of the jaw, Q, in the manner shown in Fig. 14. Two or more slots, *l*, *l*, Fig. 13, are cut into the body of the jaw. Their length is a little less than the gage of the machine one half being parallel and the other inclined to the jaw, as shown in the figure. The jaw is moved or vibrated endwise on these slots by the rim R of the right plunger taking into the notch R of the jaw. Fig. 16 is a horizontal plan of the left turning jaw, Fig. 17, a transverse section and Fig. 18, a longitudinal or edge section of the same. It is made in the same manner as the right turning jaw, only that the eyes of the teeth, the notches and slots are in the opposite direction. The body of this jaw, *q q*, is moved by the rim of the left plunger passing into the notch *r*. The teeth eyes and slots are marked the same as the right turning jaw. The turning jaws, Q, *q*, are attached to the counter table, the right jaw lying on the left, by means of screws passing through the slots *l*, *l*, into the countertable as shown in Figs. 9, 10, so that the jaws may slide easily on the countertable and each other, and the slots moving easily upon the screws which determines the direction of their vibrations. The remaining two pairs of jaws attached to the table, called the central and raising jaws, have each one tooth less than the turning jaws. The right central jaw, O O, with its teeth, *i i*, are shown flatwise in Fig. 19, endwise in Fig. 20, and edgewise in Fig. 21. The form of the eyes and ends of the teeth may be understood from Fig. 21, and the form of the teeth are bent in from Fig. 20, and the shape of the slots from Fig. 19, all of which resemble those of the turning jaws, already described. The left central jaw, *o o*, with its teeth, *i i*, and slots *l l*, is represented flatwise in Fig. 22, endwise in Fig. 23, and edgewise in Fig. 24. The right raising jaw, U, with its teeth, *f*, *f* and slots, *l*, *l*, is shown flatwise, endwise, and edgewise in Figs. 25, 26, 27 and the left raising jaw, *u u*, is exhibited in the same manner in Figs. 28, 29, 30. Besides these two pairs of jaws last described, a slip of metal, called the cap, *a b*, Figs. 3, 31, similar to the jaws, but without teeth, is attached to the table. It is nearly of the same dimensions with the jaws and has one edge, *b*, turned up about $\frac{1}{10}$ of an inch, to prevent the meshes from dropping below the eyes of the teeth of the jaws of the table. These 5 pieces are fixed flatwise upon each other upon the table in the following order: The left raising jaw, *u*, lies on the table, on this jaw, lies the right raising jaw U, then the left central jaw, *o*, fourth the right central jaw O, and on the top of the cap. Screws whose heads are countersunk in the cap, pass through the slot of the paws and fasten them to the table so that they may vibrate easily on their slots. A horizontal plan of all the jaws, as they are fixed on the table and countertable, is given in Fig. 9, and a transverse section of the same in Fig. 10. A slip of metal V of the same thickness as the jaws is riveted between the ends of the two right jaws, O, U, of the table. This piece connects the two right jaws together and is called the connecting piece. In the end of the connecting piece, V, is a notch, R, made to receive the rim of the right plunger. The two left jaws of the table *o*, *u*, are connected with the left plunger in the same manner by the left connecting piece, V, and its notch, *r*. Thus it will appear that all the right jaws are attached to the plunger, P R, and move with it, and the three left jaws in the same manner move with the left plunger, *p r*. The jaws in Figs. 9, 10, are in the position in which they are said to be shut or the teeth have hold of the meshes, and those represented in Figs. 1, 3, 4, are in the same position, the connecting rod being to the extreme right: by moving the connecting rod, S *s*, Fig. 3 to the left the plungers will both be moved outward, carrying with them the jaws which are attached to their rims; that is, the right jaws to the right, and the left jaws to the left as represented in Fig. 11 in which position they are said to be open or let go their hold of the meshes. Fig. 12 is a transverse section of the jaws in the same position. In opening,

the teeth the corresponding right and left jaws, are moved first obliquely, in opposite directions, by means of the inclined part of the slots, so that the teeth may pass each other; and then parallel to the body of the jaws till they come in the position in Figs. 11, 12, where the right and left teeth stand side by side, opposite each other.

Slur wheelwork and carriage.—It being necessary in the operation of knitting to move the jacks about their centers in the comb, successively, from the position J J, Fig. 4, to that represented by J′ J′, and the slur of the stocking frame not being adapted to give this extent of angular motion, it is done by a system of wheelwork, attached to a sliding frame called the carriage, and driven by a rack.

The carriage X *x*, Figs. 2, 3, slides parallel to the comb in grooves X X, made in the bench and rails of the frame; it is shown with its wheelwork also in Fig. 38, and is composed of one straight piece X X to which are fastened two pieces, *x*, *x*, in the manner and form represented in Figs. 2, 3, 38. To the edge of each of the pieces X, X, is fastened a straight piece of iron *x x*, called the meshgage, a little longer than the comb, the breadth of which may be an inch and a quarter, more or less, as on this the size of the meshes depend. The ends of the two pieces *x*, *x*, of the meshgage are far enough apart in the middle, to admit the slur wheel, Z Z, which is about half an inch wide and 2½ inches in diameter, to turn freely between them. The circumference of the slur wheel is cut into four segments or hammers Z, Z, of the form shown in Fig. 4, and its arbor runs in bearings *z*, *z*, fixed to the carriage. The segments on the slur wheel may, however, be varied in number, the other parts being so managed as to suit the number of divisions. The sockets of the beveled pinions P′, P′, turn easily or are loose on the slur-wheel arbor, and to each pinion P′, is attached a click *c*′, with a spring *s*, which drives a ratchet wheel *r*′ of four teeth, fixed to the arbor of the slur wheel. The direction of the clicks, and teeth of the ratchet wheel is such that either of the pinions will carry with it the slur wheel forward or in the direction of the arrows, Fig. 4, but not backward. The pinions are driven by the beveled wheel B′ whose arbor runs in the bearings, *k*, *k*, on the lower end of this arbor is the pinion P, driven by the rack R, which is fixed to the bench. By this arrangement the slur wheel will revolve in the direction of the arrows Fig. 4, or forward, whichever way the carriage is moved.

The relative velocity of the carriage and wheelwork is so arranged that when the carriage slides the distance from one jack to the next the slur wheel shall be driven round one quarter of a turn or from one hammer to the next; so that the hammers of the slur wheel may present themselves successively to the packs, as the carriage slides from one side to the other.

A piece of metal Y Y called the bearer is fastened to the lower side of the cross rails about a quarter of an inch back of the meshgage. The tails of the packs being placed between the bearer and meshgage, as a fulcrum, (see Fig. 4) the jacks are moved, *en masse*, by means of the swivel and comb.

We will now show the manner in which, by means of the meshframe and knotframe, already described, the meshes and knots of the network are formed. The ends of the meshes being on the packhooks, and the jacks, table and countertable in the position shown in section in Fig. 32; the jaws being open and the jackhooks opposite the teeth of the turning jaws, the meshes being drawn over the cylinder C, into the teeth of the jaws as shown in plan in Fig. 33, shut the jaws by moving the connecting rod, S *s*, Fig. 3, to the right or toward S. The jaws will then hold the meshes which pass through the eyes of the teeth in the position shown in Fig. 34, each mesh being held open at the end by the teeth of the turning jaw and compressed or closed in the middle by the jaws of the table. Move the jackhooks, *h*, forward, between the teeth *j*, *j*, of the turning jaws (Fig. 34) and turn the table and counter-table from each other so as to clear the meshes from the jackhooks and continue the motion of the packs, table, and counter table with their jaws till they come to this position shown in Fig. 35, where each mesh is held by the jaws in the form of a noose, and the packhooks are introduced in the spaces between the teeth of the jaws of the table, leaving an opening *e*, Fig. 25, through meshes, over the hooks of the jacks and between the teeth of the central and raising jaws, for introducing the twine to form a new range of meshes. The knotframe and meshframe are in the same position in Figs. 1, 2, 3, 4. The carriage being moved to one side, pass the end of the twine through the aperture *e* (Fig. 35) toward that side to which the carriage is moved, and holding the end thus introduced just beyond the outside jack, move the carriage to the other side. By the motion of the carriage when the tail of the first or outside jack slips off the inner end of the part, *x*, of the meshgage on which it rests a hammer, Z, of the slur wheel depresses it, turning the jack to the position, J′, J′, Figs. 2, 4, when the tail of the next jack slipping off is depressed in the same manner, the circular part of the hammers, holding the tails of the packs down till they pass under the other part of the meshgage; in this manner

the tail of all the jacks are, successively, carried under the meshgage by the slurwheel. As the jacks are turned on their center each hook in succession forms a loop, drawing the twine into the aperture *e*, Fig. 35, as shown in Fig. 36 until all the hooks are raised forming a series of loops as in Fig. 1. While the loops are forming, as shown in Fig. 36, the end *y* of the twine should be returned through the noose of the outside mesh next to it, so that both parts of this outside loop may be tied in the same knot.

The table and counter-table with their jaws holding the meshes, are now turned on their axes nearly to the position shown in Fig. 37, the counter-table being turned a little further and the table not so far; at the same time the jacks are moved by means of the swivel and comb from the position J′, J′, Fig. 4, the tails of the packs being raised from the under edge of the meshgage and passing over its surface till they come against the bearer and the pack-hooks moving along the dotted line to the point marked, 1, then the web of the net being held firmly in its position, the tails of the jacks resting against the bearer, the hooks are raised along the dotted line from 1 to 2 while the jaws are opened and the table, countertable and jacks being now brought to the position shown in Fig. 37 so that the meshes are disengaged from the jaws and the knots cast as seen in the figure; the motion of the jack hooks being continued along the dotted line to 3, Fig. 4, 37 draws the knots and the meshes are completed.

The jack hooks are returned along the dotted line to 4, Fig. 37, &c., the web passing between the table and countertable which continue stationary as in Fig. 37, the hooks then drop as shown by the dotted line carrying the meshes in their proper position between the teeth of the table and then move upward along the dotted line to 5 at the same time the countertable turns upward dropping the teeth of the turning jaws into the ends of the meshes as shown in Figs. 32, 33, the jaws again shutting and taking the meshes from the jackhooks as before described.

To this last row of meshes a new row is formed in the same manner with the exception that the twine is passed through the aperture of the meshes and the carriage moved in the opposite direction.

Main shaft and parts moved by it.—All of the above described motions of the different parts of the mesh and knotframes in forming the network, except the motion of the jacks in forming the loops or meshes, effected by the slurwheel and carriage, are produced by a single revolution of the main shaft B, B, Figs. 1, 2, 3, which runs in bearings in the front posts, C_2 C, and is turned by a winch and handle H. One of the pivots of the comb, H, Figs. 3, 4, runs through a hole in the end of the rod D, D, on the other end of which is the roller G. The rod E moving on a center attached to the bench is jointed to the rod D near the roller which is pressed by the weight of the meshframe against the cam, F, fixed to the main shaft. The lever, I I, has an arbor, N, running in bearings, N, N, attached to the crossrails; one end of this lever is connected to the wire, *c*, of the comb by the rod K; on the other end is the roller, L, which is pressed against the cam, M, of the mainshaft, by the weight of the comb and jacks, and the pressure of the web on the jack-hooks. The cams, F, M, Fig. 4, are of such a shape as in one revolution to move the jacks, as already described, from the position J′ J′, to that shown by J J, Fig. 4, so that the hooks move through the dotted line 1, 2, 3, 4, 5, 6. The cam, F, giving the proper motion to the swivel on its axis by means of the rod, D D, and the cam, M, moving the comb on its pivots by means of the lever, L, and connecting rod, K. Two toothed segments, V, *v*, Figs. 1, 2, 3, 39, whose sockets turn on studs fixed to the cross rails at Q, Q, pitch respectively into the toothed wheels W, *w*, of the knotframe; on the arms of the segments are two rollers which are kept against their respective cams by the springs W, W, Figs. 1, 2, 3. The cam U, Figs. 1, 2, 39, moves the table by means of the segment, *v* and the cam, S, moves the countertable by means of the segment, V, and these cams are made of such a form as to move the table and countertable on their axes in the manner hereinbefore described. The lever, 8, 7, S, Figs. 1, 2, 3, is jointed to the stud 7 and the connecting rod S. In the end 8 is a pin, which, being moved to the right and left by two notches in the wheel Y, called the jaw-tender, opens and shuts the jaws of the knotframe. The jaw-tender, Y, is fixed to the mainshaft and the notches are made in its circumference in the form shown in Fig. 1, and at such points in the circumference as to open and shut the jaws when the parts of the mesh frame are carried to the proper positions, by the cams of the mainshaft. The jackhooks, it will be seen from Figs. 1, 3, are opposite the closed teeth of the turning jaws, but when delivering the meshes to the jaws, Fig. 34, they are between these teeth, so that in this position the meshframe is moved half the gage of the machine to one side. The meshframe is moved this distance, from its central position to the right and left, alternately, to accommodate itself to the alternate disposition of the meshes, by the arbor of the swivel, sliding or vibrating in its bearings, just after the knots are drawn, while the jackhooks are moving from 3 to 4, shown by the dotted line in Fig. 4, and the meshframe is returned to its cen-

tral position again just after the meshes are cleared from the hooks. This vibration of the arbor of the swivel, endwise, is produced by the action of a circular rim, D′ D′, called the railway, on a pin in the end of a lever E′ F E′, called the shifting jack. The shifting-jack, Figs. 1, 3, turns on a center in the stud F′, and is connected with the swivel by its end F taking into a groove turned in the end of the swivel arbor. A groove is turned in the middle of the rim of the railway to receive the pin E′ of the shifting jack; and this pin is moved to the outside of the rim of the railway, to the right and left alternately by the switch M′ Figs. 1, 40, and is returned into the groove in the center by two notches N′, N′, Figs. 1, 3, 40, similar to those of the jaw tender.

The switch is a flat piece 1, 2, 3, of the shape shown in Fig. 40, turning in a place cut in the rim of the railway in the manner shown in Fig. 40, about its center M′. The depression or notch in which the switch is sunk permits the point 2, Fig. 40, to be turned to either side of the groove. The switch is turned from one side to the other, by the pin of the shifting jack, acting on the points 1, 3, in passing from the center to the outside of the rim against the inclined edge of the switch. The switch and notches N′ N′ are placed at such parts of the rim of the railway which is keyed to the main shaft, as to move the meshframe sidewise in the manner first above described.

A A, Figs. 1, 2, 3, is the arbor of what we call the twin comb, said arbor running in bearings in the standards L, L, as shown most distinctly in Fig. 2. It has a number of straight teeth or wires t', t', t', which are directly over the teeth of the jaws of the table when the knot frame is in the position shown in the Figs. 1, 2, 3, 4, and they are moved to this position and held in it by the pin a in the wheel of the countertable, acting against the arm o' of the twine comb, and they are turned up out of the way when the countertable turns up, by the spring 8, which is wound spirally round the arbor A, A, and is attached to the standard L, Fig. 2. The use of the twin comb, is for the twine to act against in raising the meshes and thus prevent straining the teeth of the jaws or deranging the twine in them. The tuckers g, g, Figs. 3, 4, are fixed to the arbor of the twine comb, between the two outside teeth, and their ends pass under the jackhooks as shown in Fig. 4; their use is to free the end of the twine returned into the aperture from all except the outside mesh. The twine is drawn through the aperture e of the meshes, Fig. 35, to the right and left alternately, to form a new row of meshes, by means of two needles 10, 11, Fig. 41, having a hook, 11, at one end and a guide or square piece at the other, 10, shaped as seen in the figure. A hole e' Figs. 2, 8, is made through each plunger opposite this aperture e, Fig. 35, of the meshes, and the needles run, in a line with the holes, in grooves made to fit their guides in the needle rails 13, 14, which are supported by the crossrails and studs 15, 16, Fig. 1. Each needle is driven, backwards and forwards, through the holes in the plungers and aperture or opening of the meshes, by two cords K′ K′ fastened to the guide, running over the pulley 13, 14, in the opposite ends of the needle rail, and fixed at the opposite ends to the circumference of a wheel, 15, which is turned by a winch. The twine to be knit is placed upon two bobbins, 17, 17, from which it is taken alternately by the opposite needles.

The web of network, as it is knit passes over the cylinder C, Figs. 1, 2, 3, 4, and in the direction of the dotted line Fig. 2, under the tightener 18 and over and between the holding rollers 19, 20 through an opening in the bench. The holding rollers 19, 20, carry the network forward as it is knit being driven by a band 21, from the main shaft, and they are prevented from slipping backward and permitting the web to return when the knots are drawn by a ratchet wheel and catch. The use of the tightener is to keep the web at a proper tension, and allow it to be moved by the jackhooks except at the time of drawing the knots when the tightener, being in its highest position, will not give way.

Having described the different parts of the machine, it remains to show the manner of using it in the operation of knitting. The jacks and knot frame being brought to the position shown in Fig. 35, pass the needle which is on the same side as the carriage, through the plungers to the other side; hook the thread on the needle and draw it through the meshes; move the carriage across to raise the loops and at the same time return the needle which will carry the end of the thread into the outside meshes and disengage it from the hook of the needle, and return the needle to its first position in the groove of the needle rail; give one turn to the main shaft and the row of meshes will be completed, when another row may be formed in the same manner from the opposite direction.

We claim—

1. The manner of forming the knots, by turning over the loops, or meshes, already made, into the form of a noose, across the whole net at once, as herein set forth, by means of a knotframe constructed and operating substantially as described.

2. We claim the manner of introducing the twine through the apertures of the nooses formed by the knotframe, by means

of a needle, substantially the same as set forth in the description in combination with the netting machine herein described.

3. We claim the manner of casting off the knots from the knotframe; and of tightening them, by means of the action of the swivel and bearer against the ends of the jacks, while the web of the previously formed net passes over the roller, C, and is held firmly in its position.

4. We claim the manner herein set forth of combining the parts constituting the knotframe consisting principally of the table, T, T; the countertable, *t*, *t;* three pairs of jaws attached to the table and countertable, each of which pairs of jaws is composed of two slips, or pieces of metal, which are made to slide upon each other, so as to open and close said jaws; the arrangement and combination of the plungers, P, R, and *p*, *r*, and of the connecting rods, S, by which said plungers and jaws are actuated being substantially such as herein described and represented.

5. We claim the manner in which we have combined and arranged the jacks and the slur-wheel, with its carriage, and their appendages; by which combination and arrangement the jacks are made to rise successively, and to draw the twine up so as to constitute a loop; the slur-wheel being divided into four, or any preferred number of, parts, and being moved on with the carriage, and actuated by a rack and pinion, substantially in the manner, and for the purpose, herein set forth.

6. We claim the manner of arranging as formed the twine comb, with its teeth, or wires, *t'*, *t'*, to act against the rising meshes by the aid of the arm *o'*, acted upon by the pin *a*, in the wheel of the countertable, or in any other way that is substantially the same.

7. We claim the manner of combining and arranging the mesh-frame, knot-frame, twine-comb, and their immediate appendages, so as to coöperate with each other, substantially as herein set forth, and for the purposes herein mentioned.

In testimony whereof, we the said JOHN D. CORNELIUS and JAMES MOTT, Jr., hereto subscribe our names in the presence of the witnesses whose names are hereto subscribed, on the 18th day of October, A. D., 1842.

JOHN D. CORNELIUS.
JAMES MOTT, JR.

Signed in our presence:
JOHN A. SEAMIG,
JACOB S. TITUS.