

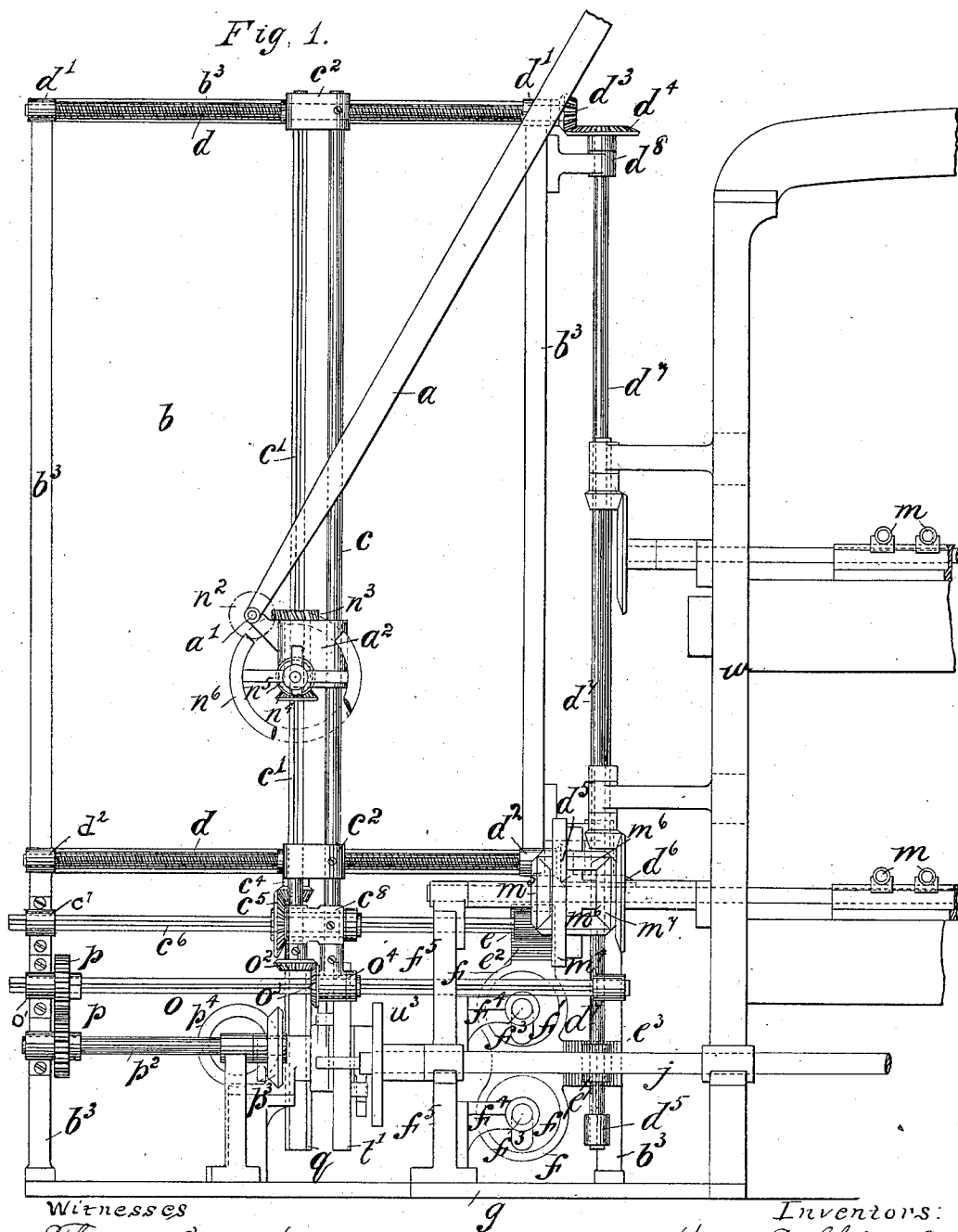
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9 Sheets—Sheet 1.

H. C. SHELDON & W. LOCKWOOD.
EMBROIDERING MACHINE.

No. 566,421.

Patented Aug. 25, 1896.



Witnesses
Thomas Durant
Aly Stewart

Inventors:
Harry C. Sheldon and
William Lockwood,
by Charles O. Church
their attys.

(No Model.)

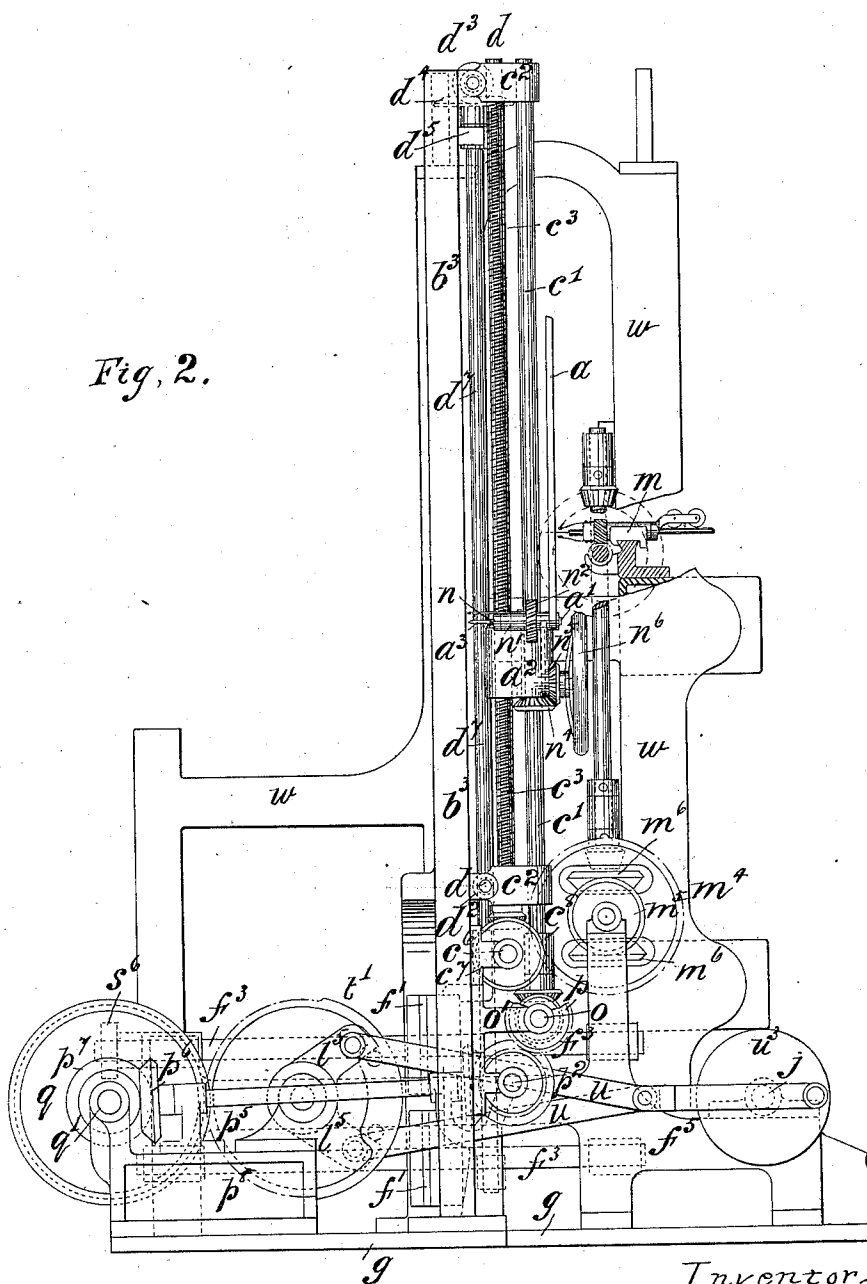
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Fig. 2.



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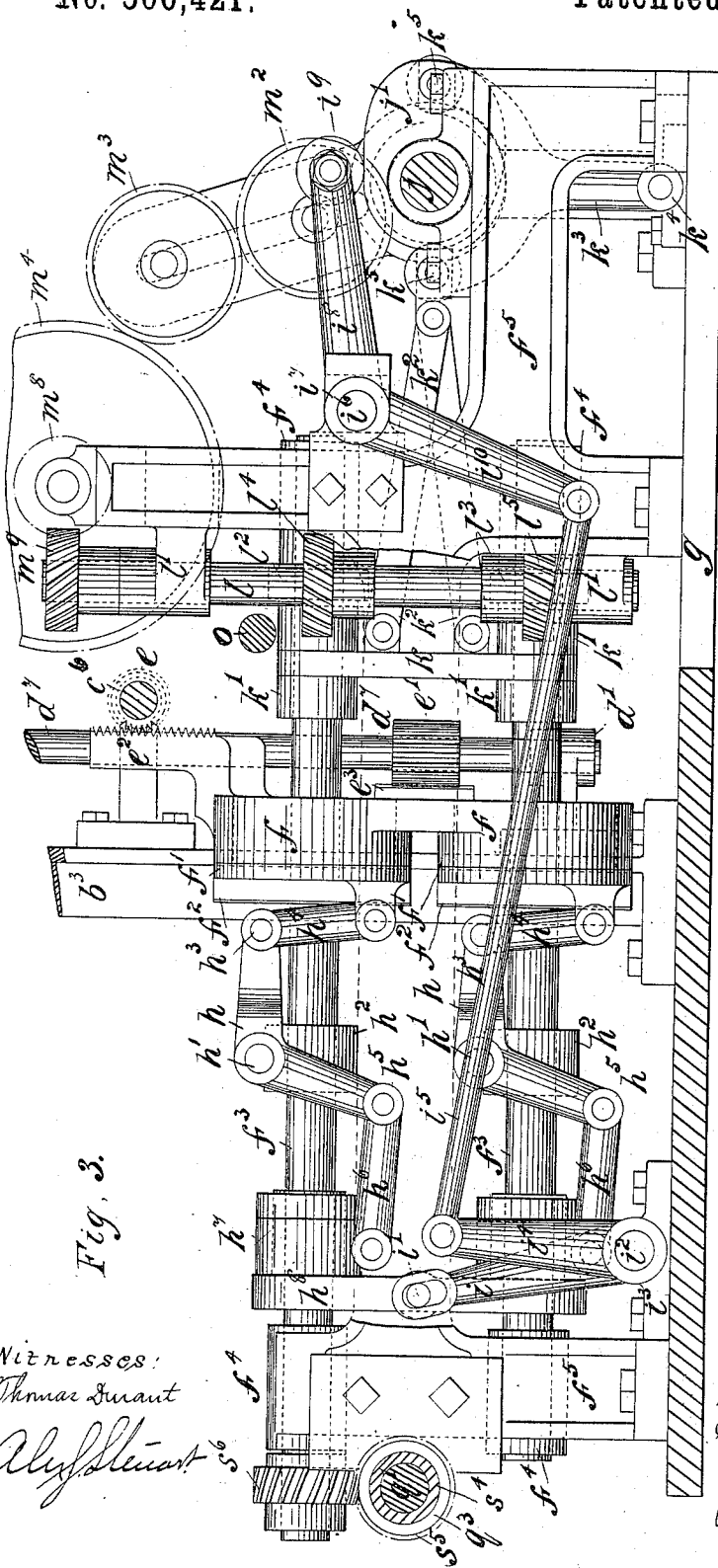
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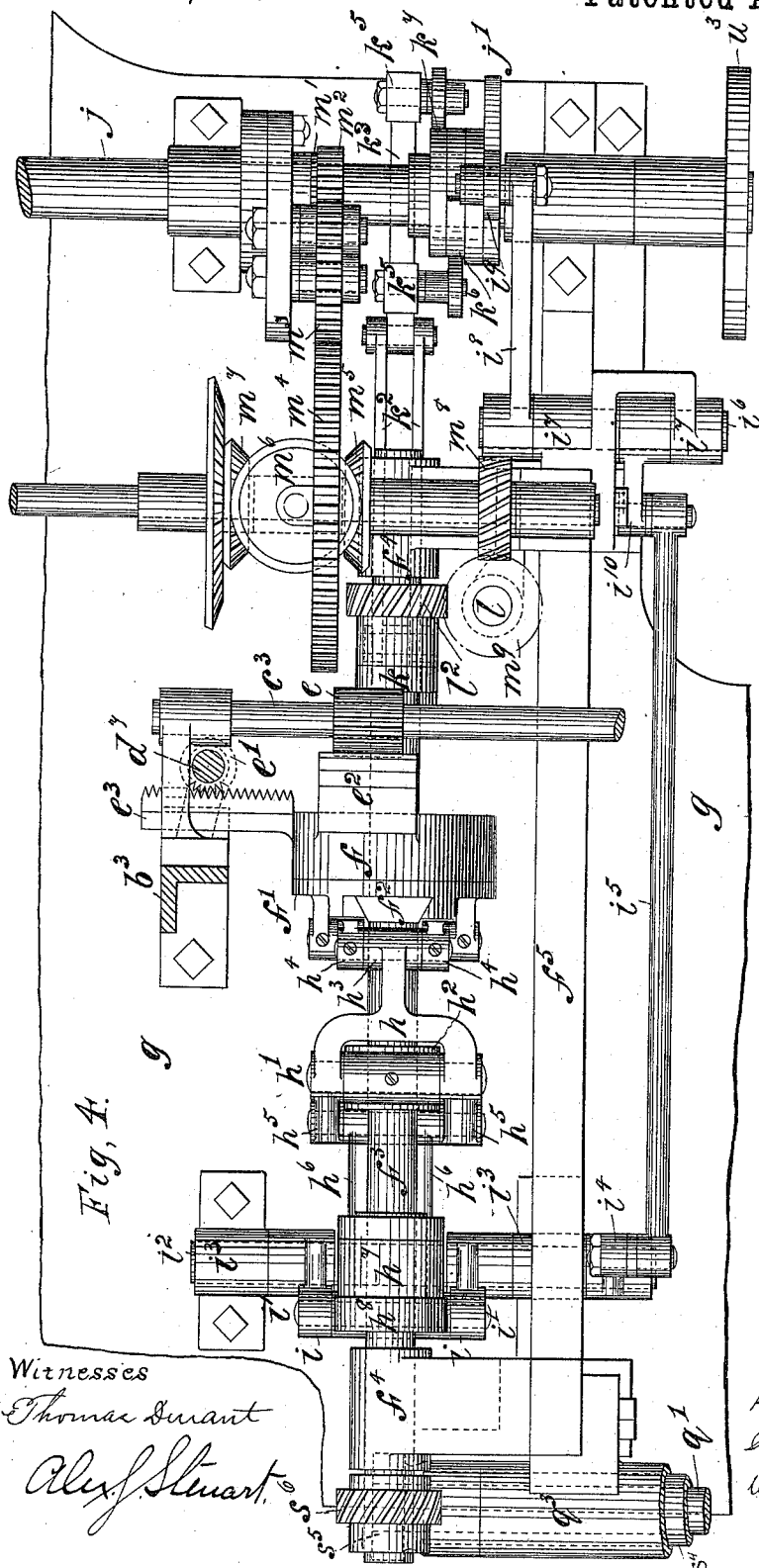
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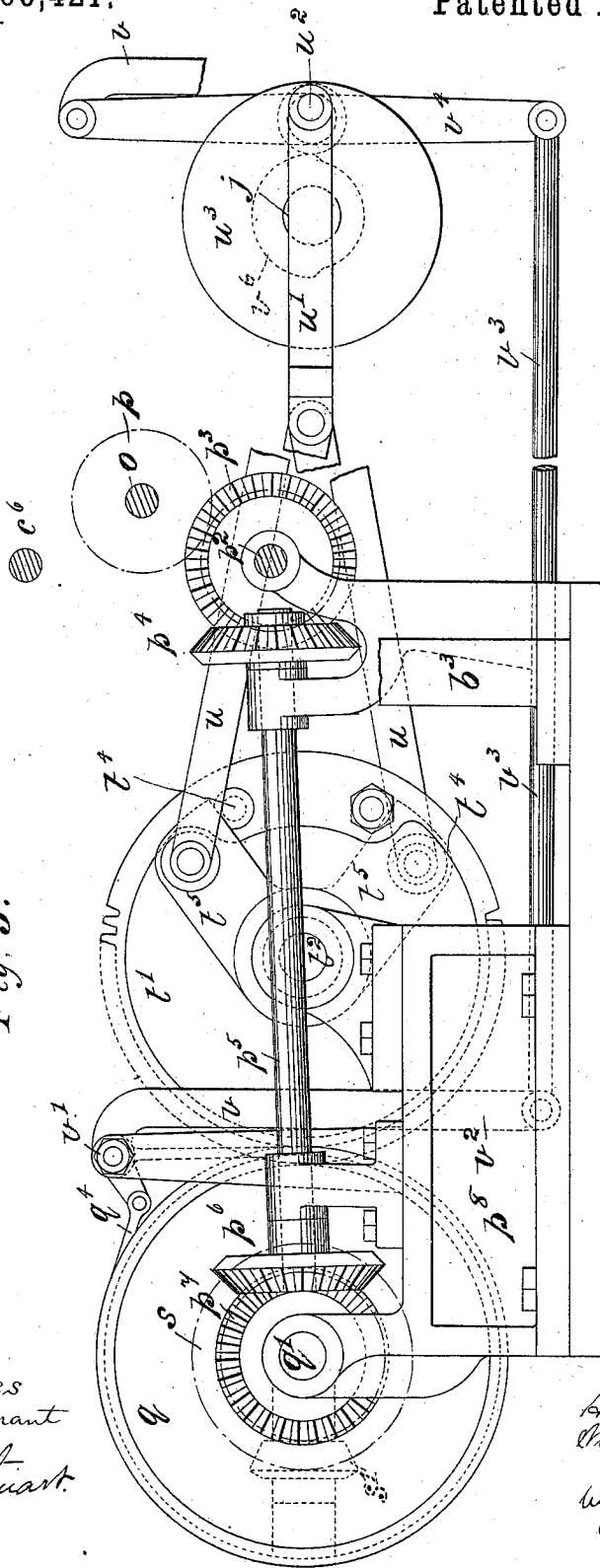
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H. C. SHELDON & W. LOCKWOOD.
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Fig. 5.



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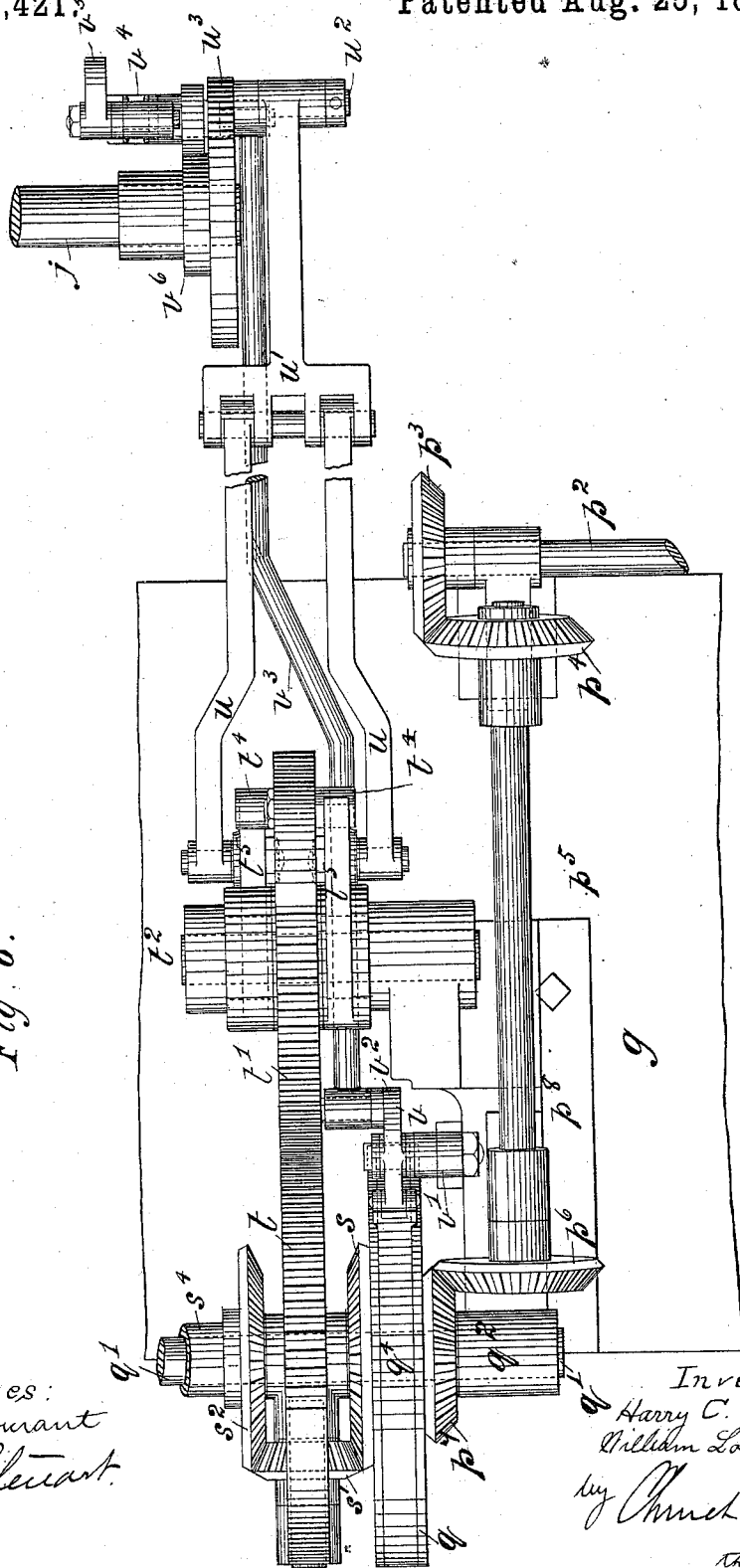
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Fig. 6.



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(No Model.)

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Fig. 7.

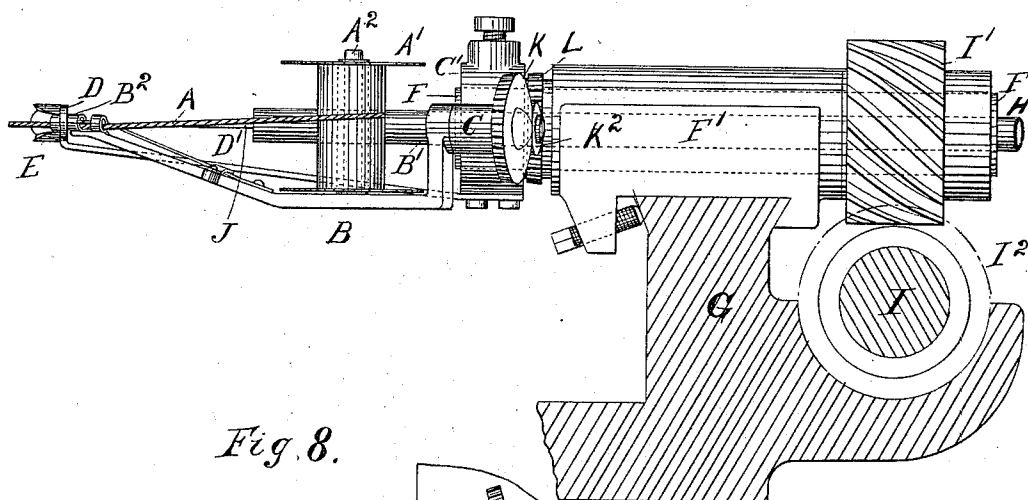
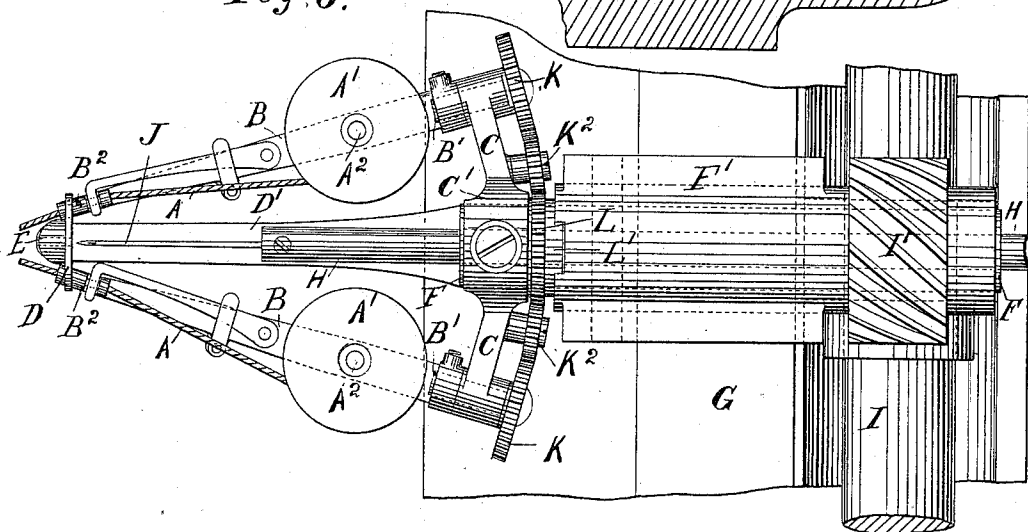


Fig. 8.



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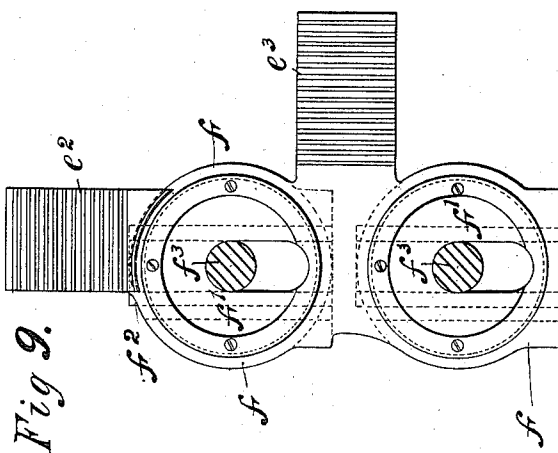
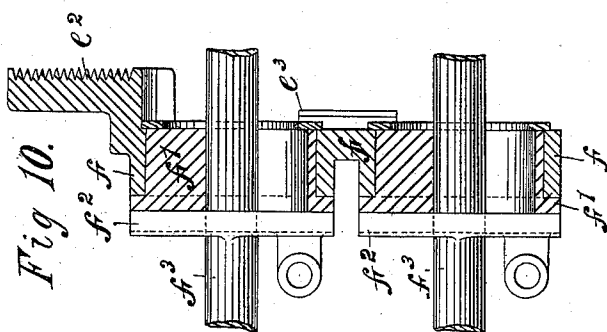
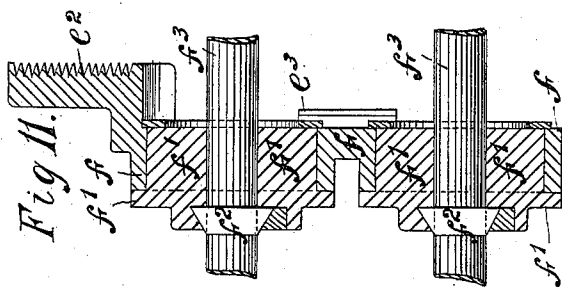
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No. 566,421.

Patented Aug. 25, 1896.



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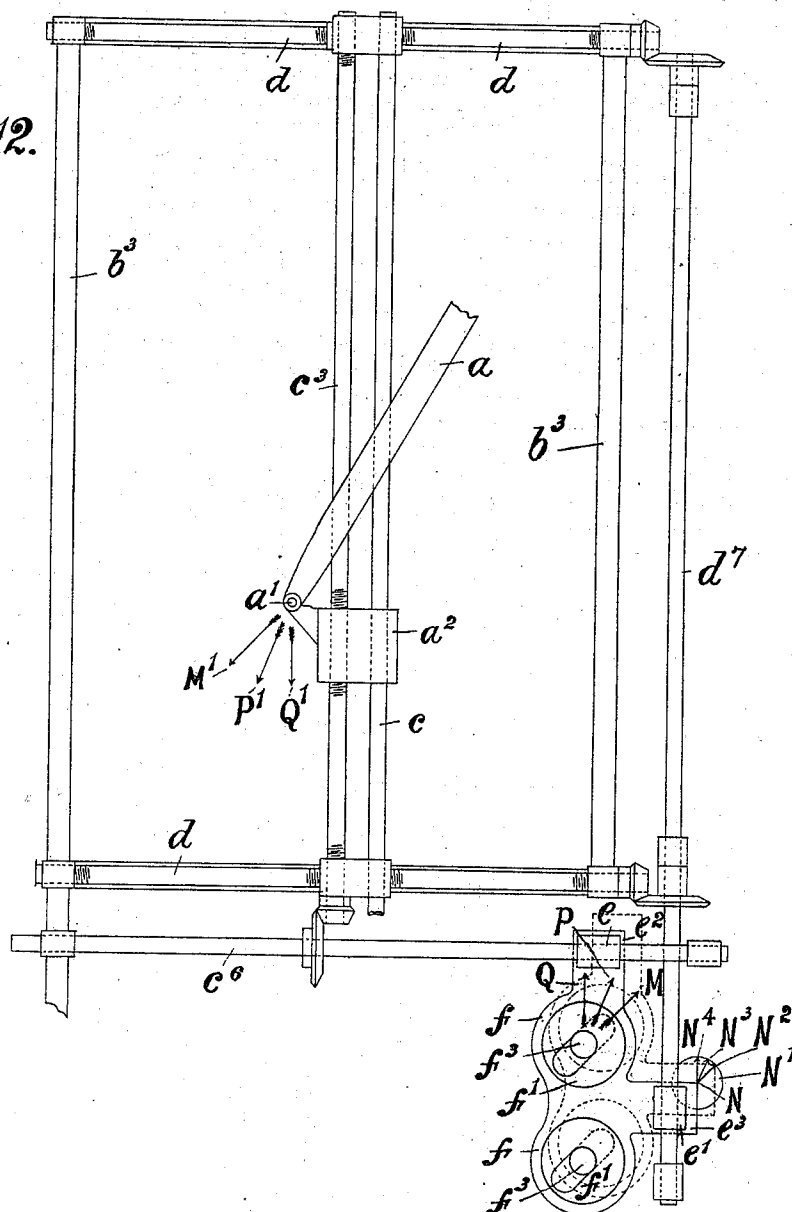
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H. C. SHELDON & W. LOCKWOOD.
EMBROIDERING MACHINE.

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Patented Aug. 25, 1896.

Fig 12.



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UNITED STATES PATENT OFFICE.

HARRY CECIL SHELDON AND WILLIAM LOCKWOOD, OF NOTTINGHAM,
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EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,421, dated August 25, 1896.

Application filed August 14, 1894. Serial No. 520,320. (No model.) Patented in England August 31, 1893, No. 16,396, and September 10, 1894, No. 17,220; in France August 16, 1894, No. 240,771; in Belgium August 16, 1894, No. 111,410; in Switzerland August 16, 1894, No. 9,197, and in Austria August 16, 1894, No. 44/6,358.

To all whom it may concern:

Be it known that we, HARRY CECIL SHELDON and WILLIAM LOCKWOOD, subjects of the Queen of England, residing at Nottingham, England, have invented certain new and useful Improvements in Embroidering-Machines, (for which we have obtained Letters Patent in Great Britain, No. 16,396, dated August 31, 1893, and No. 17,220, dated September 10, 1894; in France, No. 240,771, dated August 16, 1894; in Belgium, No. 111,410, dated August 16, 1894; in Switzerland, No. 9,197, dated August 16, 1894, and in Austria, No. 44/6,358, dated August 16, 1894,) of which the following is a specification.

This invention relates to improvements in multiple cording or braiding machines, in which the fabric to be embroidered is carried by a frame, (hereinafter called the "pantograph-frame,") and in which cording or braiding guides are employed in connection with each needle, such as and operated in the manner described, in the specification of Weiss's application, filed July 7, 1891, Serial No. 398,424. In the invention described in the specification cited the pantograph (by means of which the pantograph-frame is moved) is operated by hand in the usual manner, while the cording or braiding guides are adjusted by independent mechanism actuated by a second attendant each stitch or as required in order, in the case of cording, to adjust each cording-guide so that it is in the same relative position for each stitch in whatever direction the pantograph-frame is moved, and in the case of braiding to adjust the guides so that the braid of each guide is laid under its needle each stitch, and is secured to the tissue by the needle-thread. It is shown in the specification cited that two independent movements must be given by the attendant or attendants, first, the movement of the pantograph-frame by means of the pantograph in order to make a stitch, and, second, the adjustment of the cording or braiding guides according to the direction in which the pantograph-frame is moved.

The present invention has for its object to provide a manually-controlled mechanical ar-

range ment which will automatically move the pantograph-frame, and also adjust the position of the cording or braiding guides according to the direction in which the said frame is moved, so that the cording or braiding guides are automatically placed in the requisite position for every direction of movement of the pantograph-frame and no errors can occur. The mechanism for effecting this result is also controlled by one attendant, and a pattern on the pantograph-board can be followed by the pointer of a carriage to which the pantograph is connected as readily as heretofore. The direction in which the pantograph-frame is moved is controlled by the attendant, and this controlling or adjusting movement is simultaneously imparted to the mechanism for adjusting the position of the cording or braiding guides, so that the two movements always coincide and only one attendant is required for operating the pantograph-frame and adjusting the guides.

It also relates to improvements in cording-guides for twisting two or more strands together to form a cord simultaneously with the stitching of the same to the tissue.

The invention will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a front elevation, and Fig. 2 a side elevation, showing the general arrangement of apparatus constructed according to our invention applied to a multiple-shuttle embroidery-machine. Fig. 3 is a side elevation, and Fig. 4 is a plan, showing detail of tissue-frame-operating cam and connections. Fig. 5 is a side elevation, and Fig. 6 is a plan, showing detail of apparatus for adjusting the position of the tissue-frame-operating cam and braiding or cording guides. Fig. 7 is a side elevation, and Fig. 8 is a plan, of a cording-guide constructed according to our invention. Fig. 9 is an end elevation, and Fig. 10 a vertical section, showing detailed construction of part of the pantograph-frame-operating mechanism. Fig. 11 is a vertical section of the same, showing the radial slides or cross-heads f^2 in a horizontal position. Fig. 12 is a diagram illustrating the action of the mech-

anism for imparting universal movement to the pantograph-frame. Figs. 3, 4, 5, 6, 9, 10, and 11 are drawn to a larger scale than Figs. 1 and 2. Figs. 7 and 8 are drawn full size.

5 Like letters indicate like parts throughout the drawings.

In carrying out this invention the end of the pantograph-arm a , (see Figs. 1 and 2,) by means of which the pantograph-frame is operated, is pivoted at a' to a carriage a^2 , provided with a pointer a^3 , Fig. 2, arranged in front of the pantograph-board b , and this carriage a^2 is moved the requisite distance each stitch in any direction in a plane parallel to the said board, which direction is changed by the attendant so as to follow a large draft of the pattern with the pointer a^3 , the pattern being placed on the pantograph-board in the usual manner—that is to say, 15 the carriage a^2 is moved automatically for each stitch, and such movement will be in the same direction as the preceding movement unless the operating mechanism is readjusted in the meantime by the attendant. The attendant, although he does not move the carriage a^2 , can, by adjusting the operating mechanism, control the direction in which such movements are made, and thus cause the pointer a^3 of the carriage to follow step 20 by step the outline of a pattern on the pantograph-board, and the movements of the carriage will be communicated by the pantograph to the pantograph-frame in the same manner as if the end of the arm a were moved 25 by hand.

The carriage a^2 is carried and is capable of moving vertically on a vertical slide formed by a fixed shaft c and a revoluble shaft c' , carried in bearings in the upper and lower 30 brackets c^2 . The vertical movement is imparted to the carriage a^2 by a screw c^3 , Fig. 2, carried also in bearings in the brackets c^2 and engaging with a nut secured to or formed in the carriage a^2 .

35 The screw c^3 is connected by bevel-toothed wheels c^4 c^5 to a horizontal shaft c^6 , carried in bearings c^7 , secured to the framing b^3 , which also carries the pantograph-board b .

The toothed wheel c^5 is provided with a sleeve carried in a bearing-bracket c^8 , secured to the fixed shaft c , and this sleeve is provided with a feather-key engaging with a keyway in the shaft c^6 , so that it may move freely along the shaft when the vertical slide c c' is 40 moved horizontally.

The brackets c^2 at the upper and lower end of the vertical slide c c' are carried by screws d , each of which engages with a nut secured to or formed in each bracket, and the screws 45 d are in turn carried in bearings d' d'' d^2 d^3 , secured to the framing b^3 . The screws d are connected by bevel-toothed wheels d^3 d^4 d^5 d^6 to a vertical shaft d^7 , carried in bearings d^8 , secured to the framing b^3 , so that both screws 50 d may be rotated simultaneously, and horizontal movement consequently imparted to the vertical slide c c' and carriage a^2 . The

carriage a^2 may thus be moved vertically either upward or downward by rotating the screw c^3 . It may also be moved horizontal 70 either to the right or left by rotating the screws d d , and in any intermediate direction by rotating both the screw c^3 and the screws d d . The direction in which the screw c^3 is rotated will determine whether the movement of the carriage is to be an upward or downward direction, the direction in which the screws d d are rotated will determine whether the movement is to be toward the right or left, and the difference between the extent of the screw c^3 80 and that of the screws d d will determine the angle of the line on which the carriage will move. The carriage a^2 may be thus moved in any direction by the combined movements of the horizontal screws d d and the vertical screw c^3 , and its movement is communicated 85 to the pantograph-frame by a pantograph of the usual construction. The horizontal screws d d and vertical screw c^3 are rotated so as to move the carriage a^2 in the requisite direction 90 for each stitch by the following arrangement:

On the horizontal shaft c^6 , communicating motion to the vertical screw c^3 , is a pinion e , and on the vertical shaft d^7 , communicating motion to the horizontal screws d d , is a second pinion, e' , both pinions e e' being preferably of the same pitch and formed with fine-pointed teeth. These pinions are both alternately engaged and disengaged with two racks 95 e^2 e^3 , formed with teeth of a corresponding shape and pitch to those on the pinions, the teeth of one rack being placed at right angles to those of the other, so as to correspond to the position of the pinions.

The two racks e^2 e^3 (see Figs. 3, 4, 9, 10, and 11) are secured to a casing f , and the casing is mounted on a mechanism by means of which the racks e^2 e^3 may be moved from their normal position a given distance in any direction in a plane parallel to the axis of both 100 pinions e e' . For example, in Fig. 12 the racks e^2 e^3 are shown in their normal position. Now take any point N in the rack e^2 , and with the point N as center and the length of movement of the racks e^2 e^3 as radius describe a circle N' . Now if it be understood that the point N moves with the rack e^2 and the circumference of the circle N' be stationary the racks may be reciprocated, so that the point 105 N will be moved from the center of the circle N' radially to any point in the circumference of the circle N' and back again to its central position. For example, it may move to N^2 , as shown in dotted lines, or to N^3 or N^4 , or to any intermediate point in the circumference of the circle, and both racks will necessarily receive the same movement. The casing f is carried by two circular sheaves f' , capable of rotating within corresponding recesses in the casing f , and the two sheaves f' 110 are each mounted upon a radial slide or cross-head f^2 on one of two horizontal and parallel shafts f^3 . The shafts f^3 are carried in bearings f^4 , secured to a standard f^5 , fixed to the

base-plate g , which latter also carries the framing b^3 and the end standard w of the machine. Each sheave f' is simultaneously reciprocated on its slide f^2 by a bell-crank lever h , pivoted at h' to a boss h^2 , secured to one of the shafts f^3 . The end h^3 of each lever h is connected to its correspondingsheave f' by double links h^4 , and the ends h^5 are connected by double links h^6 to bosses h^7 , rotating concentrically with the shafts f^3 on a carriage h^8 , sliding on said shafts. The carriage h^8 is reciprocated on the shafts f^3 by arms i , provided with slots which engage with pins i' , secured to the carriage h^8 . The arms i are secured to a shaft i^2 , carried in bearings i^3 , secured to the base-plate g , and this shaft i^2 is oscillated by an arm i^4 , connected by a link i^5 to an arm i^6 , secured to a shaft i^7 , carried in bearings i^8 , secured to the standard f^5 . The shaft i^7 is oscillated by an arm i^9 , provided with an antifriction-roller i^{10} in peripheral contact with a cam j' , secured to the cam-shaft j .

When the carriage h^8 is reciprocated, the sheaves f' are alternately moved along the slides or cross-heads f^2 into an eccentric position with relation to the shafts f^3 , carrying the casing f and racks $e^2 e^3$ with them and returned to their normal position, that is, concentric with the shafts f^3 , and when in the latter position the slides f^2 may be angularly adjusted by means of the shafts f^3 , together with the mechanism for moving the sheaves f' , if it is desired to move the racks $e^2 e^3$ in a different direction for the next following stitch. It may be noted that the same angular adjustment is given to both the slides or cross-heads f^2 , so that both sheaves f' move in the same direction and carry the casing f with them.

The action of the racks $e^2 e^3$ on the pinions $e e'$ is as follows: When the sheaves f' are so operated that the racks are moved in a direction parallel to the axis of one of the pinions, no movement will be imparted to that pinion, but the whole movement will be imparted to the other pinion, and the corresponding screw c^3 or screws d , to which it imparts its motion, and the carriage a^2 will consequently be moved in a vertical or horizontal line. When the sheaves f' are so operated that the racks $e^2 e^3$ are moved in a direction which is not parallel to the axis of either of the pinions $e e'$, movement will be imparted to both the vertical screw c^3 and horizontal screws $d d$, and the carriage will move in a diagonal line corresponding to the angle of the line of movement of the racks with respect to the axis of each pinion. For example, (see Fig. 12,) the slides or cross-heads f^2 are adjusted so as to move the casing f and racks $e^2 e^3$ while the latter are in gear with the pinions $e e'$ in the direction indicated by the arrow M in the diagram, (see Fig. 12,) that is, in an upward direction at an angle of forty-five degrees with the axis of both pinions, till the said casing and racks reach the position

shown in dotted lines. Both pinions $e e'$ will thus be rotated through an equal angular space, and the carriage a^2 will be moved by the combined action of the pinions transmitted through the connections and screws in the direction indicated by the arrow M' , that is, at an angle of forty-five degrees with both screws. The racks are now moved out of gear and returned to their normal position, and the sheaves f' being now again concentric with the shafts f^3 the slides or cross-heads f^2 may be angularly adjusted in order to move the carriage a^2 in a different direction, if desired. We will now suppose the slides or cross-heads f^2 are angularly adjusted so that the casing f and racks $e^2 e^3$ are moved in the direction indicated by the arrow P . It will be seen that the pinion e and vertical screw c^3 will be rotated through a greater angular space than the pinion e' , and the horizontal screws $d d$ and the carriage a^2 will receive more movement from the vertical screw than from the horizontal screws, and will consequently move in a direction indicated by the arrow P' . If the slides or cross-heads f^2 be now angularly adjusted so that the casing f and racks $e^2 e^3$ are moved in the direction indicated by the arrow Q , that is, vertical, it will be seen that the teeth of the rack e^3 will move parallel to the teeth of the pinion e' and no movement will be imparted to the said pinion e' , but the whole of the movement will be imparted by the rack e^2 to the pinion e and vertical screw C^3 , and the carriage a^2 will be moved in the direction indicated by the arrow Q' , that is, vertical. It will thus be seen that by the arrangement shown in the drawings the carriage a^2 is always moved on a line which is parallel to the slides or cross-heads f^2 , but in the reverse direction to the movement of the sheaves along the said slides or cross-heads, and the carriage a^2 may thus be caused to move in any direction for each stitch by the angular adjustment of the said slides or cross-heads. It may be here noted that the angular adjusting movement required for the cording or braiding guides is identical with the angular adjustment of the slides or cross-heads f^2 , and it is therefore only necessary to connect the epicyclic arrangement for adjusting the former to the shafts f^3 of the latter in order to obtain the required result.

The racks $e^2 e^3$ are moved into gear with the pinions $e e'$, preferably when the sheaves f' are concentric with the shafts f^3 , and held in gear until the movement into an eccentric position is completed. The racks $e^2 e^3$ are then moved out of gear during the return of the sheaves f' to their normal position. This may be effected by shogging the shafts f^3 longitudinally in their bearings. For this purpose a plate k , Fig. 3, provided with bearings to fit loosely on both shafts f^3 and held in position thereon by bosses k' , secured to the shafts, is connected by links k^2 to a cam-lever k^3 , pivoted at its lower end k^4 to the base-plate

g. The upper end of the lever k^3 is forked or formed with two ends k^5 , one on each side of the cam-shaft j and each end provided with an antifriction-roller in peripheral contact with cams k^6 and k^7 , respectively secured to the cam-shaft j , Fig. 4, one cam acting as a counter-cam to the other.

The two shafts f^3 are geared together by a vertical shaft l , carried in bearings l' , secured to the standard f^5 , and helical gear-wheels l^2 l^3 , secured to the shafts f^3 , gearing with similar wheels l^4 l^5 , secured to the vertical shaft l .

The cording or braiding guides m , Figs. 1 and 2, are driven by a pinion m' , Fig. 4, secured to the cam-shaft j , toothed wheels m^2 m^3 m^4 , and an epicyclic train of bevel-wheels m^5 m^6 m^7 , in the manner described in the specification of Letters Patent hereinbefore referred to.

The dead-wheel m^5 in the epicyclic train is connected by helical gear-wheels, Figs. 3 and 4, m^8 m^9 to the vertical shaft l , so that as the angular position of the slides or cross-heads f^2 f^3 f' is changed the position of the cording or braiding guides is also simultaneously adjusted by the corresponding movement of the dead-wheel m^5 .

Reciprocating motion may be communicated to the guides m by oscillating the wheel m^4 by means of an eccentric, which may be secured to the shaft j or to one of the wheels m^2 m^3 (the latter of which is in this case put out of gear with wheel m^4) and connecting the eccentric-strap to the wheel m^4 by a rod.

In connection with the pointer a^3 on the carriage a^2 (see Figs. 1 and 2) is a second pointer n , mounted on a sleeve n' and capable of rotating concentrically around the pointer a^3 . The sleeve n' is connected by helical gear-wheels n^2 n^3 to the shaft c' , connected by bevel-toothed wheels n^4 n^5 to a hand-wheel n^6 , by means of which latter the position of the pointer n is adjusted by the attendant.

The adjustable pointer n is preferably adjusted a distance from the fixed pointer a^3 equal to the length of movement of the carriage a^2 . It is also adjusted angular in relation to the slides or cross-heads f^2 f^3 , so that the carriage each time it moves shifts the fixed pointer to the point on the pantograph-board previously occupied by the adjustable pointer. The attendant is thus assisted in following a pattern on the board, as he has only to move the adjustable pointer around the fixed pointer until it reaches the point he wishes the fixed pointer to move to.

The helical gear-wheel n^3 and the bevel-wheel n^4 are mounted on a sleeve in the carriage a^2 and sliding on the shaft c' , said sleeve being provided with a feather-key engaging with a keyway in the shaft c' . The shaft c' is connected at its lower end to a horizontal shaft o , carried in bearings o' , secured to the framing b^3 , by bevel-toothed wheels o^2 o^8 , the latter of which is provided with a sleeve rotating in a bracket o^4 , secured to the fixed

shaft c , and with a feather-key engaging with a keyway in the shaft o . The shaft o may be connected by gearing to the vertical shaft l , so that as the position of the pointer n is adjusted to follow the pattern a corresponding adjusting movement is imparted to the eccentrics or sheaves f' and guides m , but where a considerable number of guides are employed and considerable power is required to adjust them and the sheaves f' we employ the following arrangement:

The movement given to the shaft o by adjusting the pointer n is communicated by the toothed wheels p p' , shaft p^2 , bevel-toothed wheels p^3 p^4 , shaft p^5 , and bevel-toothed wheels p^6 p^7 to a brake-wheel q , Figs. 2, 5, and 6, on a fixed shaft q' , carried in bearings q^2 q^3 , secured, respectively, to a bracket p^8 , mounted on the base-plate g and standard f^5 .

The brake-wheel q is provided with a second bevel-toothed wheel s , secured to its inner side, engaging with a bevel-toothed epicyclic wheel s' , which in turn engages with a bevel-toothed wheel s^2 , secured to a sleeve s^4 on the shaft q' . The sleeve s^4 is carried through the bearing q^3 , (see Figs. 3 and 4,) and at its inner end is provided with a helical gear-wheel s^5 engaging with a corresponding wheel s^6 , secured to the upper of the shafts f^3 .

The epicyclic wheel s' (see Figs. 5 and 6) is pivoted radially in a disk t , rotating loosely on the shaft q' , and when the brake-wheel q is rotated the epicyclic wheel s' will move round the shaft q' together with the disk t . The brake-wheel q is then locked by the brake-band q^4 , and the epicyclic wheel s' is returned to its normal position and the wheel s^2 is thus moved through an angular space equal to that given to the brake-wheel q , but in a reverse direction, and such movement of the wheel s^2 is transmitted to the shafts f^3 and the braiding-guides m . This movement occurs in the interval between every stitch, and any alteration in the position of the pointer n on the carriage a^2 is immediately communicated to the operating mechanism. The epicyclic wheel s' is returned to its normal position by the following arrangement: The disk t , in which the epicyclic wheel is pivoted, is provided at one part of its periphery with teeth which engage with the teeth of a corresponding disk t' , pivoted at t^2 to the bracket p^8 . The disk t' is provided with studs t^4 , which engage with the reciprocating arms t^5 , which, by their action on the studs t^4 , return the wheel s' to its normal position every time it is moved therefrom. The arms t^5 are mounted concentrically with the pivot t^2 , and are reciprocated by links u , connected to one end of a connecting-rod u' , the other end of which is journaled on the crank-pin u^2 of the disk u^3 , secured to the shaft j . The brake-strap q^4 is operated, so as to alternately lock and release the brake-wheel q , by a lever v , pivoted at v' to an extension of the bracket p^8 . The lower end of the lever v^2 is connected by a rod v^3

to a lever v^4 , pivoted to a bracket v^5 , secured to the framing and provided with an anti-friction-roller in peripheral contact with a cam v^6 , secured to the crank-disk u^3 .

5 In our improved cording-guide shown in Figs. 7 and 8 for twisting two or more strands together the strands A are carried by separate spools A' A', each carried by a pin A², secured to swinging frames B B. Each frame
10 B is journaled at B' in the end of an arm C of the boss C', and at the end B² they are journaled in a plate D, carried by a stay or extension D', secured also to the boss C'. The pivots B² of the frames B are made tubular,
15 so that the strands A may be passed through them, and they thus act as guides to the strands and carry them round the needle-thread. A projection or nose E, secured to the plate D and shaped as shown, also acts
20 as a further guide to the strands and assists in laying them in their proper positions. This nose E is formed with a central opening for the passage of the needle and needle-thread. The boss C' is secured to the end of
25 a spindle F, carried in a bracket F', which is adjustable on a longitudinal bar G, preferably of the section shown. The spindle F is hollow and forms a bearing for the needle-bar H, which is also hollow, so as to allow of the pas-
30 sage of the needle-thread. The spindle F is driven by a longitudinal shaft I and helical toothed wheels I' I², as described in the specification hereinbefore referred to. The spools A' and frames B rotate round the needles J
35 and needle-thread and thus twist the strands A together and also round the needle-thread, but to prevent the individual strands from being twisted or untwisted by this action it may be contracted by actuating the frames B
40 by the following epicyclic arrangement of toothed wheels: A toothed wheel K, secured to each pivot B' of the frames B, engages with an intermediate idle-wheel k^2 , pivoted to its corresponding arm C, which, in turn, en-
45 gages with a toothed wheel L, concentric with and carried by the spindle F. The wheel L is the dead-wheel of the train and is prevented from turning with the spindle F and guide conveniently, an extension L' of its boss
50 fitting into a corresponding recess in the fixed bracket F'. With this arrangement, if the wheels K and L are equal, the spools A' will be rotated around the needle-bar H, but their axes will always be parallel with the
55 same plane at every part of their revolution, said plane in the example illustrated being a vertical one. Various well-known mechanical equivalents for the epicyclic gearing may be employed for obtaining the same result.
60 The number of strands A may also be increased by increasing the number of spools A' and frames B.

We claim—

65 1. In an embroidering-machine, the combination with the pantograph-frame, the racks placed at right angles to each other and con-

nected for simultaneous movement and adjustable reciprocating mechanism for said racks, of two pinions corresponding to the position of and operated by the said racks,
70 and mechanism for communicating the combined movement of the said pinions to the pantograph-frame, substantially as described.

2. In an embroidering-machine, the combination with the two racks pinions operated by
75 the said racks, and mechanism for imparting the combined movements of the said pinions to the pantograph-frame, of a casing to carry the racks, sheaves to carry the casing, angu-
80 larly-adjustable slides or cross-heads to carry the sheaves and mechanism for reciprocating the sheaves on the slides or cross-heads, substantially as described.

3. In an embroidering-machine, the combination with the two racks, reciprocating mech-
85 anism therefor, and pinions operated by the said racks, of a carriage connected to the arm of the pantograph, a slide to carry the carriage, a screw connected to one of the pinions to move the carriage along the slide, and
90 screws connected to the other pinion for moving the slide substantially as described.

4. In an embroidery-machine, the combination with the pantograph, and pantograph-
95 frame, of a carriage in front of the pantograph-board connected to the said pantograph, and mechanism manually controlled for automatically moving the carriage for
each stitch in any direction in a plane parallel to the board, substantially as described. 100

5. In an embroidery-machine, the combination with the carriage in front of the panto-
graph-board, and operating mechanism therefor including an adjustable rack and rack-
105 reciprocating mechanism, of a fixed pointer on the said carriage, and an adjustable pointer which may be moved round the fixed pointer, the said movable pointer being connected to the adjustable rack, reciprocating mechanism, substantially as described. 110

6. In an embroidery-machine, the combination with the carriage to which the pantograph
is connected and operating mechanism therefor including a rack and a rack-reciprocating
115 mechanism having a slide or cross-head, of a fixed pointer on the said carriage, an adjustable pointer which may be moved round the fixed pointer and means for moving the same
120 a brake-wheel connected to the adjustable pointer, epicyclic train of wheels for connecting the brake-wheel to the adjustable slide or cross-head of the rack-reciprocating mechanism, and reciprocating arms for returning the epicyclic wheel to its normal position, sub-
125 stantially as described.

7. In an embroidering-machine, the combination with the angularly-adjustable slides
or cross-heads, shafts for carrying the slides
or cross-heads, sheaves sliding on the slides
or cross-heads, and rack-casing, of a carriage
130 sliding on the said shafts, levers communicating the movement of the carriage to the

sheaves, and mechanism for reciprocating the carriage, substantially as described.

8. In an embroidering-machine, the combination with the pantograph-frame, and the
5 cording or braiding devices, or two racks at right angles to each other and adjustable reciprocating mechanism therefor, two pinions corresponding to the position of and operated by the said rack, mechanism for communicating
10 the combined movements of the said pinions to the pantograph-frame, and mechanism for communicating the adjusting movement of the rack-reciprocating mechanism to the cording or braiding devices, substantially as
15 described.

9. In an embroidering-machine cording-guide, the combination with the needle-bar, of a rotary frame for carrying the spool and forming a guide for the strand a spindle on
20 which the frame is mounted, a boss secured to the spindle and forming a bearing for one end of the spool-frame, a stay or extension secured to the boss and forming a bearing for the other end of the spool-frame, and mech-

anism for operating the said spool-frame, substantially as described. 25

10. In an embroidering-machine cording-guide, the combination with the needle-bar, of a rotary frame for carrying the spool and forming a guide for the strand, and mechanism for operating the said spool-frame, substantially as described. 30

11. In an embroidering-machine cording-guide, the combination with the needle-bar, of a pivoted frame for carrying the spool and forming a guide for the strand, epicyclic gearing for operating the spool-frame and a nose or projection for laying the strand, substantially as described. 35

In testimony whereof we have hereto set
our hands in the presence of the two
subscribing witnesses. 40

HARRY CECIL SHELDON.
WILLIAM LOCKWOOD.

Witnesses:

THOMAS SMEDLEY,
MAURICE BILLSON.