

(No Model.)

4 Sheets—Sheet 1.

L. P. SHERMAN.

HARNESS SUPPORTING AND HEDDLE EYE SELECTING DEVICE FOR  
MACHINES FOR DRAWING IN WARP THREADS.

No. 500,965.

Patented July 4, 1893.

FIG. 3.

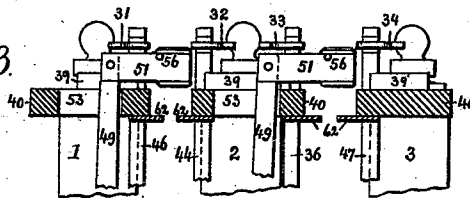
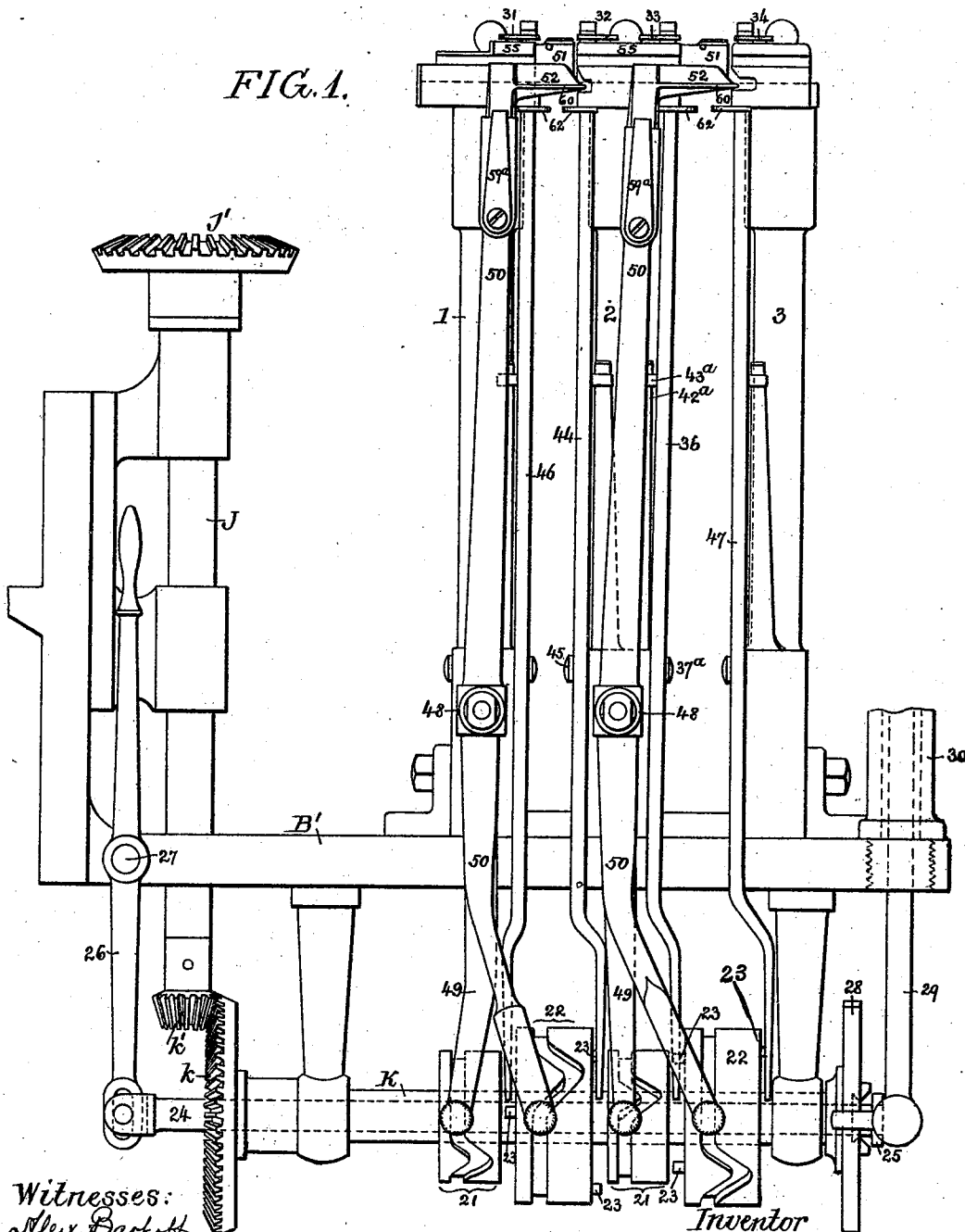


FIG. 1.



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Alex. Barkoff  
A. V. Groupes

Inventor  
Lewis P. Sherman  
by his Attorneys *Lawson & Lawson*

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FIG. 4.

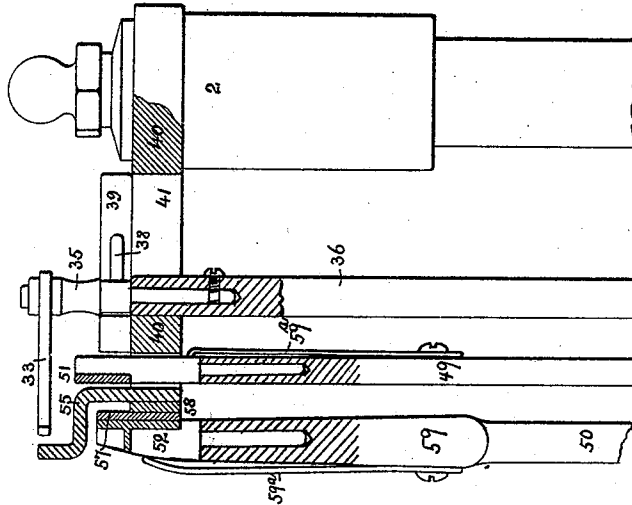
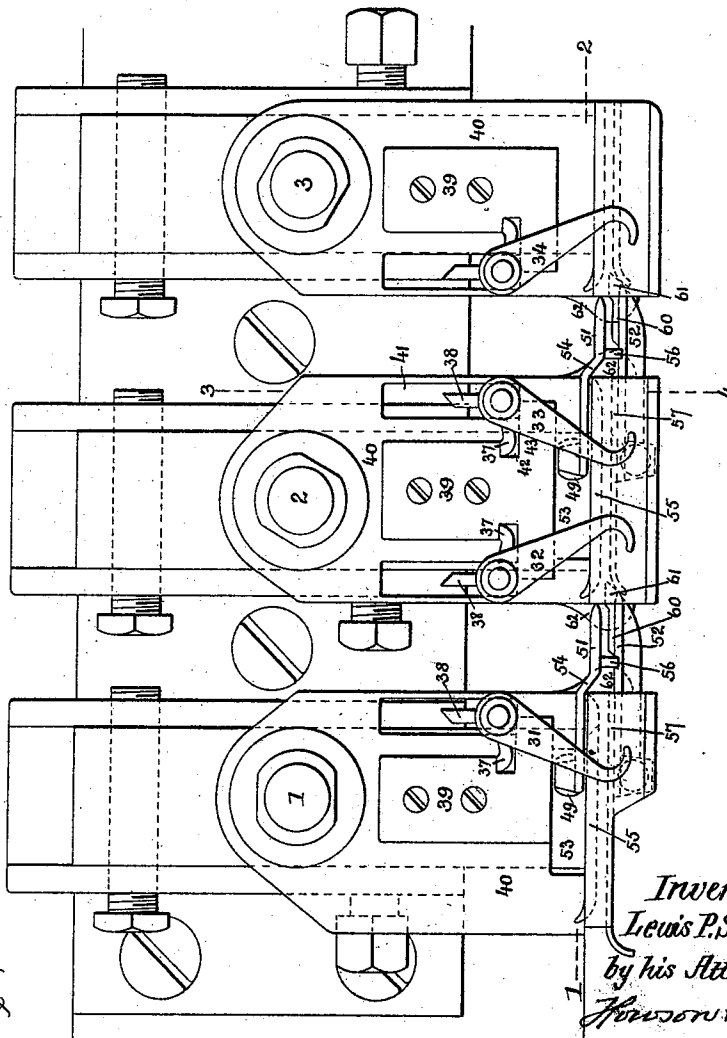


FIG. 2.



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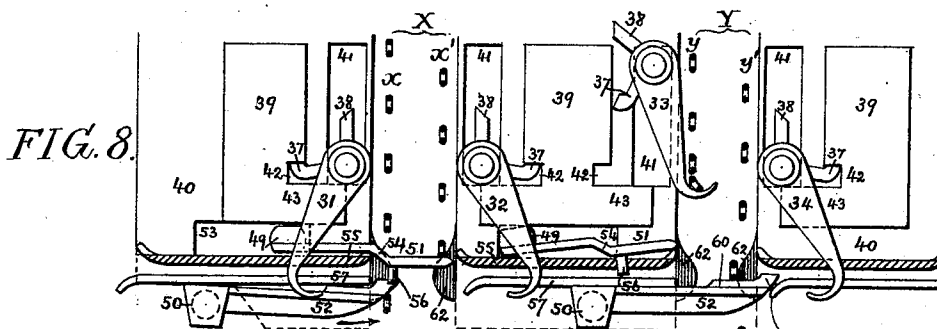
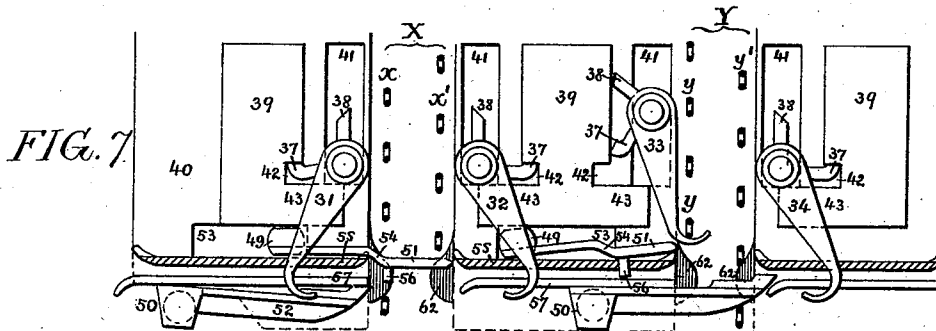
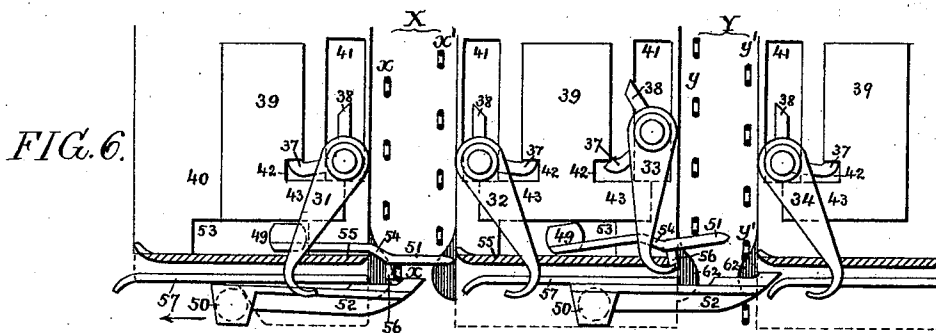
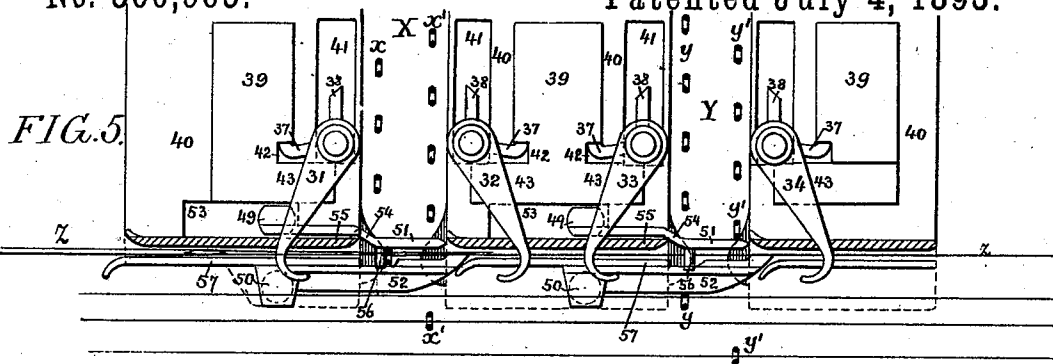
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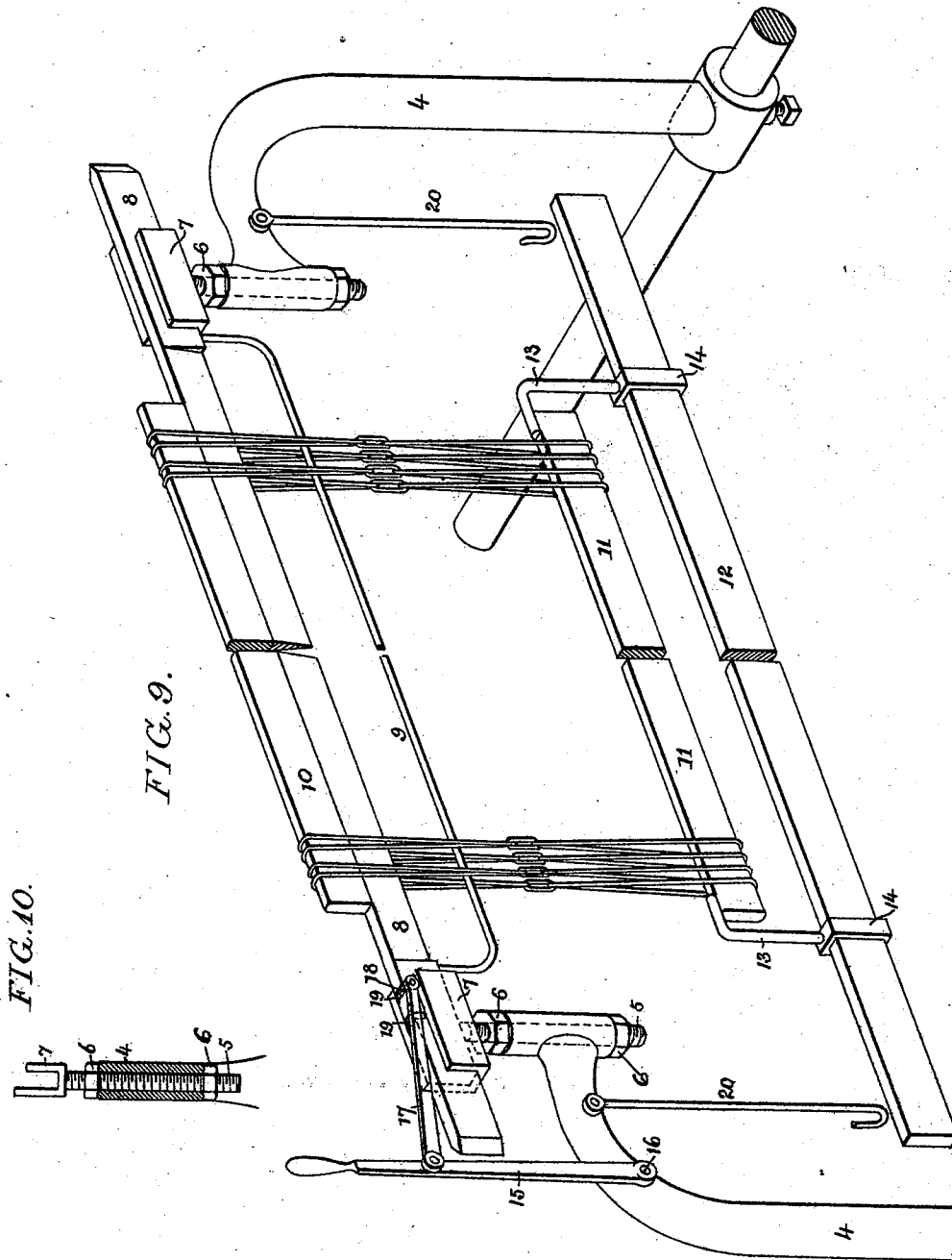
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# UNITED STATES PATENT OFFICE.

LEWIS P. SHERMAN, OF BIDDEFORD, ASSIGNOR TO GEORGE MOORE, OF  
BERWICK, MAINE.

HARNESS-SUPPORTING AND HEDDLE-EYE-SELECTING DEVICE FOR MACHINES FOR DRAWING IN WARP-  
THREADS.

SPECIFICATION forming part of Letters Patent No. 500,965, dated July 4, 1893.

Application filed April 26, 1892. Serial No. 430,787. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS P. SHERMAN, a citizen of the United States, and a resident of Biddeford, York county, Maine, have invented certain Improvements in Harness-Supporting and Heddle-Eye-Selecting Devices for Machines for Drawing in Warp-Threads, of which the following is a specification.

My invention relates to certain improvements in machines for drawing in warp threads, the present application being confined to certain improved constructions of the mechanism for hanging and supporting the harness, and in the mechanism for separating the heddle eyes and holding said heddle eyes in proper position for the action of the threading needle, as more fully set forth hereinafter.

The general construction of the machine, so far as relates to its operating mechanism; the mechanism for operating the needle and the thread selecting mechanism, may be similar to that shown in Letters Patent granted to me on the 28th day of December, 1886, No. 355,221, and to which reference is had for details of operating mechanism omitted in this case for the sake of clearness, or if desired, the needle operating mechanism and the thread selecting mechanism may be of the character illustrated in applications for Letters Patent filed of even date herewith, Serial Nos. 430,786 and 430,788, or of any ordinary or preferred construction.

The objective point in all heddle eye selecting mechanisms is the separation of each successive eye in the heddle from its fellows, and the clamping or holding of such eye in proper position during the passage of the needle to the warp frame at the rear of the machine, as illustrated in the above mentioned Letters Patent, and during the return of such needle with the warp thread hooked; after which the threaded heddle eye is pushed out of the path of the needle and the next succeeding eye takes its place in readiness to be threaded; the threading, of course, being alternately on the successive eyes of different heddles where two or more of such heddles are to be threaded for use in the loom.

In the accompanying drawings:—Figure 1,

is an elevation of sufficient of the reciprocating carriage B', of the machine described in the patent above referred to, to illustrate the device for operating the selecting hooks and the clamping jaws for holding the heddle eyes. Fig. 2, is a plan view on a somewhat larger scale of a portion of the mechanism shown in Fig. 1. Fig. 3, is a sectional view on the line 1—2, Fig. 2, but drawn to the same scale as Fig. 1, and the inner clamping-jaw being shown in elevation. Fig. 4, is a transverse section on the line 3—4, Fig. 2. Figs. 5, 6, 7 and 8, are diagrams illustrating the different positions assumed by the heddle eye selecting hooks and the clamping jaws. Fig. 9, is a perspective view illustrating the mechanism for operating the heddle; and Fig. 10, is a sectional view of a detail.

The carriage B' is supported and guided upon a stationary frame and is slowly moved transversely across the machine by mechanism of any suitable character, such for instance as that illustrated in the hereinabove mentioned Letters Patent, and the shaft K (see Fig. 1) on which are mounted the operating cams, is revolved through the medium of bevel gears *k, k'* from a vertical shaft J having on its upper end a bevel gear *j'*, the teeth of which mesh with the teeth of a bevel gear on a suitably supported power driven shaft (not shown).

The mechanisms for selecting and holding the heddle eyes are supported in suitable bearings upon standards 1, 2 and 3 secured to the carriage B' and the heddles to be operated upon, (two in the present machine,) are hung, one between the standards 1 and 2, and the other between the standards 2 and 3. Before describing the selecting mechanism, however, reference will be had to Fig. 9, which illustrates the manner in which the heddles are supported and adjusted. 4, 4 are suitable posts secured at any convenient point on the stationary frame of the machine, and the upper ends of these posts are curved inwardly and are provided with vertical orifices, as shown in Figs. 9 and 10, to which are adapted threaded bolts 5, the position of which may be varied at pleasure by adjusting nuts 6, which bear against the tops and bottoms of the ver-

tical portions of the posts 4, 4. On the upper ends of the bolts 5—5 are guiding boxes 7—7, in which is placed a bar 8, the opposite ends of which are rectangular in cross section while the central portion of the bar is triangular in cross section and has inclined sides which form at the bottom of the bar a comparatively sharp edge, as shown in Fig. 9. Running parallel with the bar 8 and at a point some distance below said bar, is a second bar or rod 9 having its opposite ends bent upward and secured to the bar 8, the bar 9 being at some distance below the bar 8 and the two bars being inserted between the opposite rows of the heddle cords as shown, the bar 9 separating such cords to a slight extent and aiding the action of the selecting hooks described hereinafter; the tapered edge of the bar 8, however, is such that the cords may swing freely and be operated upon without friction on the sides of said bar. The upper bar 10 of the heddle frame rests upon the bar 8 and the lower bar 11 of the heddle frame is weighted by a cross bar 12 which is attached to the lower heddle bar 11 by hooks 13 extending from boxes 14 on said bar 12, the boxes 14 being adjustable longitudinally on said bar in order to adjust the hooks 13 to accommodate different lengths of heddle frames.

To adjust the heddle frame transversely after it has been hung in the machine in this manner, I provide at one side of the machine a handled operating lever 15 fulcrumed at 16 on one of the standards 4, and provided with a link 17, the opposite end of which carries a pin 18 adapted to enter one or other of a number of recesses 19 formed in the top of the bar 8 so that said bar 8 and the heddle frame thereon may be adjusted to any position.

When the machine is not in operation the weighted bar 12 is hung upon depending hooks 20 secured to the standards 4.

The standards 1, 2 and 3 are secured to the reciprocating carriage B' and upon said standards are fulcrumed the various levers which carry and operate the mechanism for selecting and holding the heddle eyes, and motion is imparted to such levers through the medium of cams 21 and 22 operating upon the holding jaws, and pins 23 carried by the cams 22 which operate upon the levers carrying the selecting hooks. The shaft K, in the present case, is in the form of a sleeve, and through this sleeve projects a rod 24 carrying at its outer end a separating disk or spreading ring 25 and connected at its inner end to an operating lever 26 fulcrumed at 27 to the frame, this construction of the shaft being used in connection with the thread selecting mechanism described in my application for Letters Patent filed even date herewith, Serial No. 430,788, the various movements of the thread selecting mechanism being effected through a cam 28 mounted upon the shaft K and operating upon the shaft 29 projecting through the standard 30 carrying a portion of the thread selecting mechanism; the spread-

ing ring 25 acting to vary the contour of the cam 28 in order to effect different movements of the shaft 29 for the purpose of threading each eye of the heddle with one or more threads in the body or at the selvage edge of the fabric to be made.

To act upon the two heddles and to so select an eye alternately in each heddle, four selecting hooks are used numbered respectively 31, 32, 33 and 34, the hooks 31 and 32 acting upon opposite rows of the heddle cords of one heddle and the hooks 33 and 34 acting upon the opposite rows of the other heddle, it being understood that the bars 8 and 9 of the heddle supporting mechanism pass between the opposite cords of which each heddle is formed and separate such cords into two distinct rows on which the hooks operate.

The construction of heddle is such that the upper heddle cords are doubled and the opposite ends of such a double cord are secured to successive eyes in the heddle, this feature of heddle construction being clearly set forth in Letters Patent No. 255,038, dated March 14, 1882.

The construction of each of the hooks 31, 32, 33 and 34 is precisely the same, and the description of one of said hooks will apply equally well to each of the others, the only difference being that alternate hooks are reversed to form pairs and the mechanisms for effecting the movements of the hooks are correspondingly altered on the hooks of each pair, as will be readily understood on reference to the drawings.

Referring now to Figs. 1, 2 and 4, the hook 33 is secured to a spindle 35 mounted in the top of the lever 36 and also secured to such spindle at a point below the hook are two arms 37 and 38 one or other of which is always in contact with a guiding plate 39 secured to the base plate 40 carried by the post 2. The guiding plate 39 has a face running parallel with the slot 41 in the base plate 40 and near one end has a recess 42 and a shoulder 43. The lever 36 is fulcrumed at 37<sup>a</sup> to a pin on the rectangular base of the post 2 and its lower end is adapted to be engaged by a pin 23 projecting from the cam 22 so that on each rotation of the cam 22 the pin 23 will move such lever, its upper end traveling in the slot 41 and the arms 37 and 38 engaging with the faces of the guiding plate 39; the recess 42 and the shoulder 43 on the plate 39 causing an oscillating movement of the hook and its spindle 35 at the top of the lever 36. The return movement of the lever is effected through the medium of a spring 42<sup>a</sup> secured on one end to the standard 2 and acting upon a pin 43<sup>a</sup> carried by the lever 36. The swinging movement of the hook is effected by the contact of the arms 37 and 38 with the faces of the guide plate 39, as will be more readily seen on reference to Figs. 5, 6, 7 and 8; thus in Fig. 5, the arm 37 is in engagement with the recess 42 and the hook 33 is at the limit of its forward movement, the lever 36 being

pressed against the end of the slot 41 by means of the spring 42<sup>a</sup>. In Fig. 6 the pin 23 has started to act on the end of the lever 36 and the arm 37 is leaving the recess 42, and, as the end of the lever is guided in the slot 41, this action causes a rotative movement of the spindle 35 and the hook 33 to the position shown in Fig. 6. In Fig. 7, the movement has progressed so far as to cause the projection of the end of the hook into the path of one row *y* of the eyes of the heddle *Y* and in Fig. 8, the lever has been moved to its fullest extent and has reached the opposite end of the slot 41; the hook has been projected to a point just half way between the two rows of the heddle *Y* and has drawn back all of the heddle eyes to the rear; the arm 37 being in engagement with the guiding face of the plate 39 and preventing the further outward movement of the hook. In following the return movement—as a pin 23 moves farther around the spring 42<sup>a</sup> returns the lever from the position shown in Fig. 8 to the position shown in Fig. 5, and the arms 37 and 38 being again engaged by the guiding plate 39, the recess 42 and shoulder 43 effect the oscillation of the hook and move it to the position shown in Figs. 2 and 5. The mechanism for operating each of the remaining hooks 31, 32 and 34 is precisely the same; the hook 32 being carried on a lever 44 fulcrumed at 45 on the opposite side of the standard 2 and its arms 37 and 38 being acted upon by the opposite side of the guiding plate 39 in the same manner as are the guiding arms of the hook 33. The hooks 31 and 34 are mounted respectively upon levers 46 and 47 fulcrumed to the standards 1 and 3 respectively, and being operated upon by similar pins 23 carried by the cams 22, the operation of the operating device of each hook is precisely the same, the difference in time of their movement being due to the positions of the operating pins 23 on the cams 22 and the various movements of the hooks being so timed as to operate properly upon the heddle cords to release the heddle cord carrying eye which is to be threaded by the needle and to hold back all of the remaining cords until this operation has been completed. 48 represent studs projecting from the rectangular base of the standards 1 and 2 and pivoted to each of said studs, independently of each other, are two levers 49 and 50, the levers 49 carrying at their upper ends the inner clamping jaws 51 and the levers 50 carrying at their upper ends the outer clamping jaws 52. The lower ends of these levers are provided with pins or antifriction rollers which engage peripheral cam grooves in the cams 21 and 22 mounted upon the shaft *K* and the movement of the cam shaft being such that the clamping jaws will be moved to a number of positions as illustrated in the diagrams Figs. 5 to 8. Each of the levers 49 is adapted to a slot 53 in the base plate 40 and its clamping jaw 51 is swiveled thereto so that while the jaw will be given a recip-

rocating motion by the oscillation of the lever it will be free to turn on such lever as a pivot. The outer end of the jaw is on a line substantially parallel with the main body of the jaw, but somewhat nearer to the opposite clamping jaw 52 and the two portions of the jaw are connected by an inclined portion 54 which rests against the inner plate 55 of the needle guard and when the jaw is thrown back to its greatest extent, as will be seen in the diagrams, the inclined face 54 in bearing against the portion 55, of the needle guard, causes the retraction of the jaw until it passes entirely in the rear of the needle guard. From the upper portion of the clamping plate of the jaw 51 extends a pin 56 which aids in holding the heddle eye in position during the passage of the needle and prevents the eye from being drawn forward while the thread is being drawn through the eye toward the front of the machine. The needle guards are stationary and comprise an inner shield plate 55 secured to each of the base plates 40 and being extended beyond the line of the hooks 31, 32, 33 and 34, as shown in Fig. 4, and the outer portion of the guide is formed by the plate 57 secured to the plate 55 and between the two is a filling piece 58 so that the needle is guided during its passage through the machine and travels in the groove or guide ways thus formed by the parts 57 and 58. The jaw 52 is swiveled on the head 59 at the upper end of the lever 50; secured to the head 59 is a spring 59<sup>a</sup>. Its free end bears against the flattened portion of the swiveled jaw 52 so that said jaw will be kept in proper position when in operation. The jaw 52 has extending from its clamping face a projecting rib 60 the outer end of which has a projection 61 and the two projecting portions being adapted to be successively brought into contact with the outer guiding face 57 of the needle guard so as to withdraw the jaw from the path of the heddle eyes. The end of the projecting portion 60 is at a short distance from the pin 56 carried by the jaw 51 and aids to hold the heddle eye being threaded in its proper position. This action moreover is aided by guiding pieces 62 secured to the base plates 40 and projecting into the path of the heddle eyes so that the cords and eyes will be guided in the proper position within the clamping jaws as shown.

In operation, the heddles to be threaded are first hung on the bar 8, the bar 9 passing through such heddles in such manner as to separate the heddle cords into two distinct rows. The bar 8 is then placed in position in the guiding box 7 and the weight bar 12 is hung to the lower heddle bar as shown in Fig. 9. The heddle can then be adjusted in proper position vertically by means of the bolts 5 and transversely by means of the operating lever 15. Where two or more heddles are to be threaded the device controlling the selection and holding of the heddle eyes are

operated in such manner that an eye in the first heddle is threaded first, the eyes of the other two heddles being held out of the path of the needle. At the next reciprocation of the needle the first eye of the second heddle is threaded and all of the eyes of the first and third or other heddles are held out of position and so on, the mechanism being exactly the same for each heddle and the timing of the movements being adjusted to suit a greater or less number of heddles.

In Figs. 5, 6, 7 and 8, I have represented the different positions which the parts assume in selecting and threading the heddle eyes,  $x$   $x'$  representing respectively the opposite rows of eyes of a heddle X, and  $y$   $y'$  representing respectively the opposite rows of eyes of a heddle Y. When the parts are in the positions illustrated in Fig. 5, the selecting hooks 31, 32, 33 and 34 are all out of operative position, and one of the eyes  $x$  of the heddle X is clamped in position between the jaws 51 and 52 and the needle Z is being drawn toward the front of the machine with the warp thread  $z$ , and all of the eyes of the heddle Y are held out of the path of the needle, the eye  $y$  of the heddle Y having been threaded previously, and preceding this eye in regular order, the eye  $x'$  and the eye  $y'$  of the heddles X and Y have been threaded and released as shown. In Fig. 6, the selecting hooks 31 and 32 and the clamping jaw 51 operating on the heddle X remain in the same position, while the clamping jaw 52 is being withdrawn in the direction of the arrow to release the eye  $x$  which has just been threaded; and in Fig. 7, the eye is shown as released and in Fig. 8, is represented as being pushed forward by the curved surface on the rear of the jaw 52, as it moves in the direction of the arrow Fig. 8, to take its former position and all of the eyes of the heddle X are held out of position by the jaw 51 in order that the needle may next operate upon the eye  $y'$  of the heddle Y.

The operation of selecting the eye  $y'$  will be understood on reference to the diagrams; thus in Fig. 6, the jaw 51 operating on the heddle Y is drawn back out of the way of the eye  $y'$  and the eye gradually moves down over the projecting guide 62 until it assumes the position shown in Fig. 8, the selecting hook 33 in Fig. 6, is starting on its rearward movement and in Fig. 7 it has been projected into the path of the eyes  $y$  for a sufficient distance to hold such eyes back and withdraw them as shown in Fig. 8. When the hook has reached the limit of its rearward movement and while the hook delays at this point the clamping jaw 51 which has been drawn all the way back as shown in Fig. 8, is returned to the position shown in Fig. 5 and the eye  $y'$  is held between the jaws 51 and 52 during the passage of the needle.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a warp drawing machine, the combination, with heddle cord selecting mechanism, of a heddle supporting device comprising a laterally and vertically adjustable supporting bar adapted to support the upper bar of the heddle frame, and a weight for the lower bar of said frame, substantially as specified.

2. The combination, with heddle cord selecting mechanism, of a supporting bar adapted to pass beneath the upper bar of the heddle frame, supports for said bar, and a bar rigidly secured to the supporting bar and adapted to separate the opposite rows of heddle cords on the heddle frame, substantially as specified.

3. The combination, with heddle cord selecting mechanism, of a supporting bar (as 8) tapered in cross section extending across the machine, supports for the ends of the bar, said bar being adapted to pass beneath the upper bar of the heddle frame and between the heddle cords on such frame, substantially as specified.

4. The combination, with heddle cord selecting mechanism, of a supporting bar adapted to pass beneath the upper bar of the heddle frame, said supporting bar being tapered in cross section and adjustable laterally and vertically, supports for said bar, a heddle cord dividing bar adapted to pass between the heddle cords of said frame, and a weight adapted to the lower bar of said heddle frame, substantially as specified.

5. The combination, with heddle cord selecting mechanism, of a supporting bar, supports therefor a heddle frame, a weight adapted to the lower bar of the heddle frame, and adjustable hanging fingers carried by said weight, substantially as specified.

6. The combination, with heddle cord selecting mechanism, of a supporting device for heddle frames, a weight bar, and hanging fingers laterally adjustable on said weight bar and adapted to the lower bar of the heddle frame, substantially as specified.

7. The combination, with heddle cord selecting mechanism, of a notched supporting bar adapted to support the heddle frame, guiding boxes therefor, an operating pin adapted to the notches in the supporting bar, and a lever fulcrumed to the main frame and connected to said operating pin, whereby the frame may be adjusted transversely across the machine, substantially as specified.

8. The combination, with heddle cord selecting mechanism, of the fixed frame, a supporting bar for the heddle frame, guides therefor, and devices for adjusting said guides, comprising a bolt 5, passing through orifices in the fixed frame, and adjustable nuts on said bolts, substantially as specified.

9. The combination, with heddle cord selecting mechanism, of the fixed frame, a supporting bar adapted to support the heddle frame, vertically adjustable guides, as 7, for said bar, and a device for adjusting the supporting bar transversely, comprising a lever,

fulcrumed to the fixed frame, a bar extending from said lever, and a pin carried by said bar and adapted to a recess in the supporting bar, substantially as specified.

5 10. The combination, with heddle cord selecting mechanism, of a fixed frame, a supporting device for a heddle frame, a weight bar for said frame, a fixed frame, and hooks, as 20, carried by said fixed frame and adapted  
10 to support the weight bar when the machine is not in operation, substantially as specified.

11. The combination, with heddle frame supporting devices, of a heddle cord selecting mechanism, comprising a hook, an operating  
15 lever to which said hook is swiveled, arms connected to said hook, and a guiding plate with which said arms are adapted to come into contact upon the reciprocation of said hook, substantially as specified.

20 12. The combination, with heddle frame supporting devices, of a hook, a lever to which said hook is swiveled, and means for oscillating said hook, comprising arms secured to the hook, and a guiding plate with which said  
25 arms are adapted to be brought into contact, said guiding plate having a recess into which one of said arms is adapted to enter, substantially as specified.

13. The combination, with heddle frame  
30 supporting devices, of heddle cord selecting mechanism, comprising a swiveled head, a lever by which said head is carried, a base plate having a guiding slot in which the end of the lever is adapted to travel, a selecting hook  
35 and guiding arms carried by said swiveled head, and a stationary recessed guiding plate with which said arms are brought into contact on the operation of the lever, substantially as specified.

40 14. The combination, with heddle cord selecting mechanism, of clamping jaws adapted to hold the selected heddle eye in position, one of said jaws having an inclined portion, means for reciprocating said jaw, and a sta-  
45 tionary guide adapted to act upon the inclined portion of the said jaw, substantially as specified.

15. The combination, with heddle cord selecting mechanism, of clamping jaws adapted 50 to hold the selected heddle eye in position, and a pin, as 56, with which said heddle eyes are brought into contact and held, substantially as specified.

16. The combination, with heddle cord se- 55 lecting mechanism, of the pair of clamping jaws, one of said jaws having an inclined portion, an operating lever to which said jaw is swiveled, and a stationary guide adapted to act upon the inclined portion of the jaw, 60 substantially as specified.

17. The combination, with heddle cord selecting mechanism, of a pair of clamping jaws, mechanism for effecting the reciprocation of  
said jaws, a projecting portion, as 60, on one 65 of said jaws, and a stationary guide with which said projecting portion is adapted to be brought into contact, substantially as specified.

18. The combination, with heddle cord se- 70 lecting mechanism, of the clamping jaws, mechanism for reciprocating said jaws, projections, as 60 and 61, on one of said jaws and a stationary guide with which said projec-  
tions are adapted to be brought into contact, 75 substantially as specified.

19. The combination, with heddle cord selecting mechanism, of a pair of clamping jaws, an operating lever to which one of said jaws is fulcrumed, and a spring secured to said 80 lever and acting on a flattened portion of the swiveled jaw, substantially as specified.

20. The combination in a machine for draw- ing in warp threads, of a needle, heddle cord selecting mechanism, and a needle guide com- 85 prising a plate, as 57, a filling block, as 58, and a plate, as 55, extending over the filling block, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of 90 two subscribing witnesses.

LEWIS P. SHERMAN.

Witnesses:

JOHN C. HURD,

ORIN Q. SHUPLEIGH.