

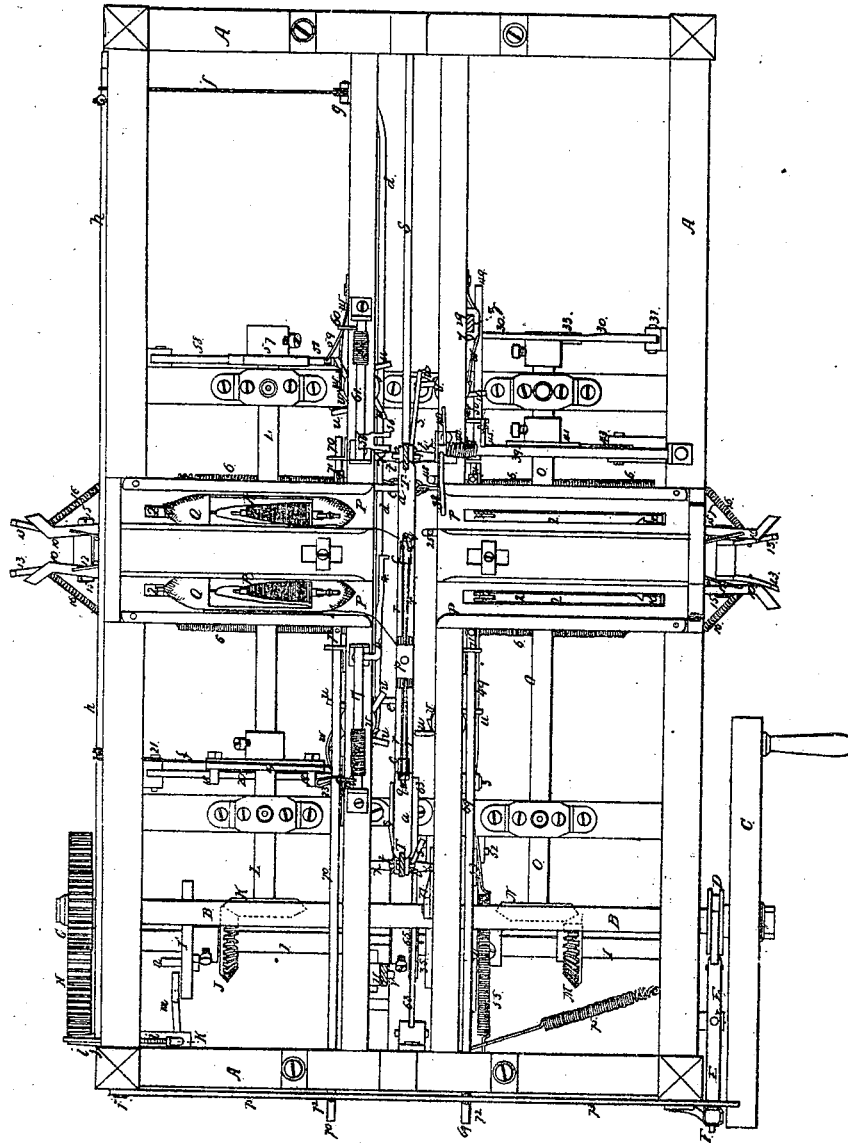
Holton, Jr. & Harris.
Making Weaver's Harness.

Sheet 1 of 6 Sheets.

No. 6,691.

Patented Sep. 4, 1849.

Fig. 1



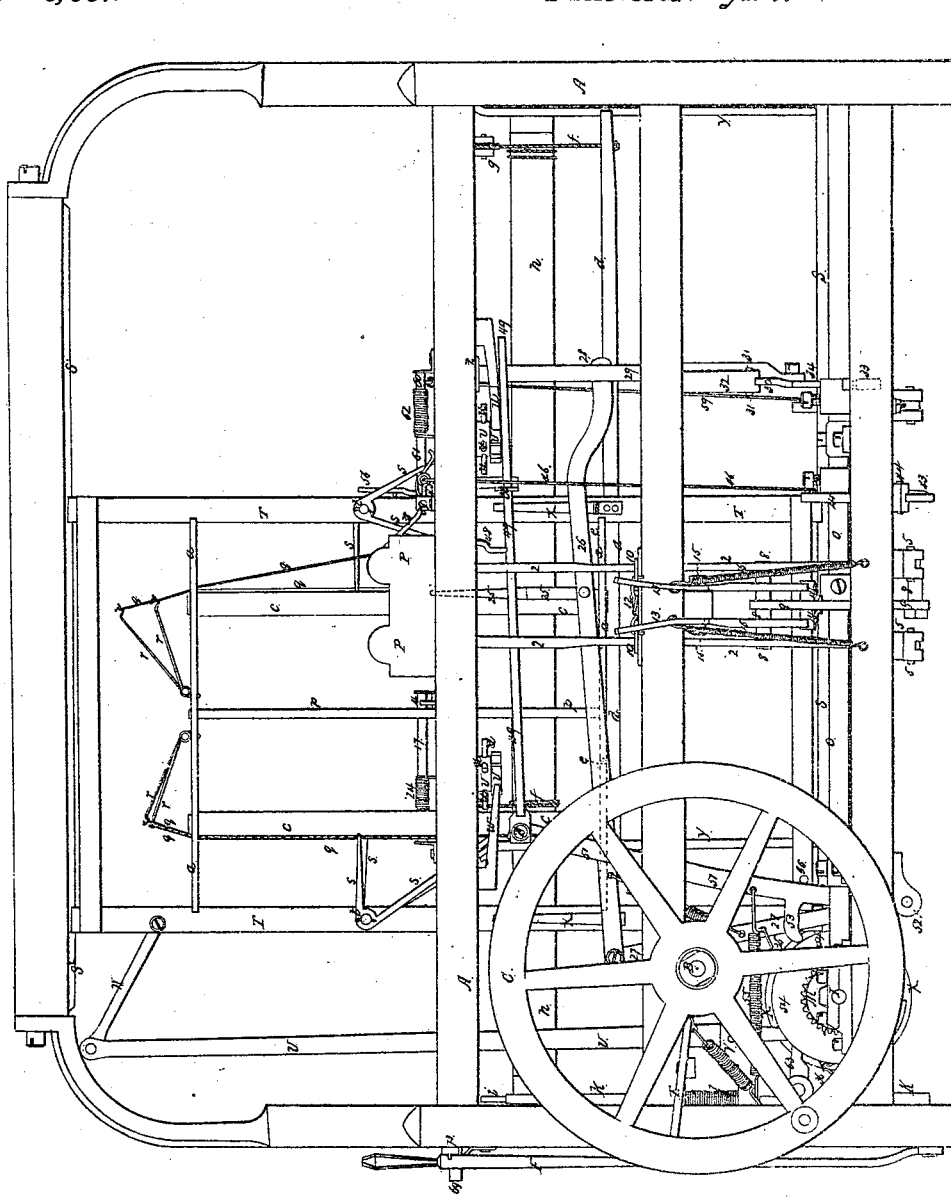
Sheet 2-6 Sheets.

Holton, Jr & Harris.
Making Weavers' Harness.

Nº 6,691.

Patented Sep. 4, 1849.

Fig 2.



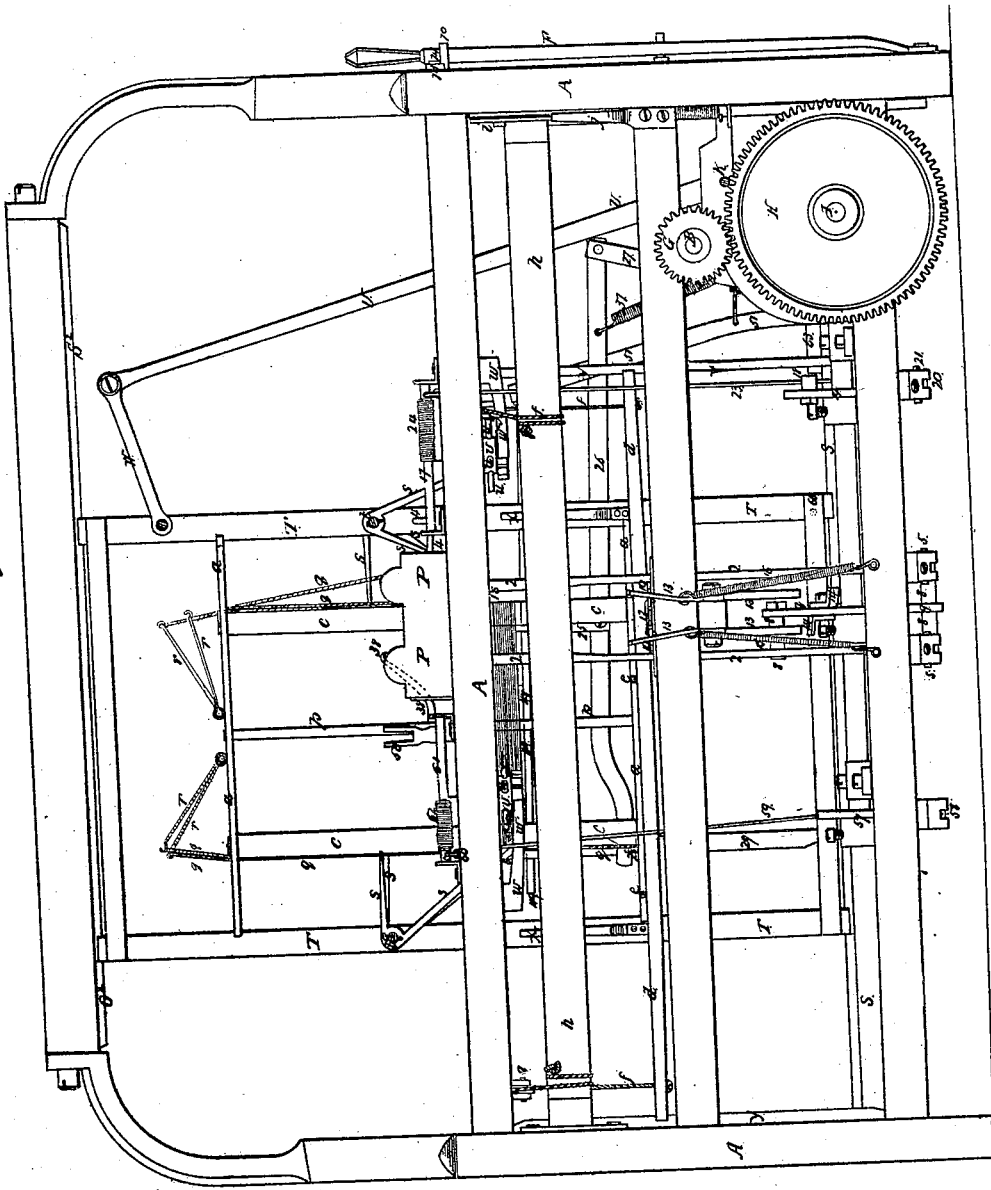
Sheet 3-6 Sheets.

Holton, Jr. & Harris.
Making Weavers' Harness.

N^o. 6,691.

Patented Sept. 4, 1849.

Fig 3.



Holton, Jr & Harris.
Making Weavers' Harness.

N^o 6,691.

Patented Sept. 4, 1849.

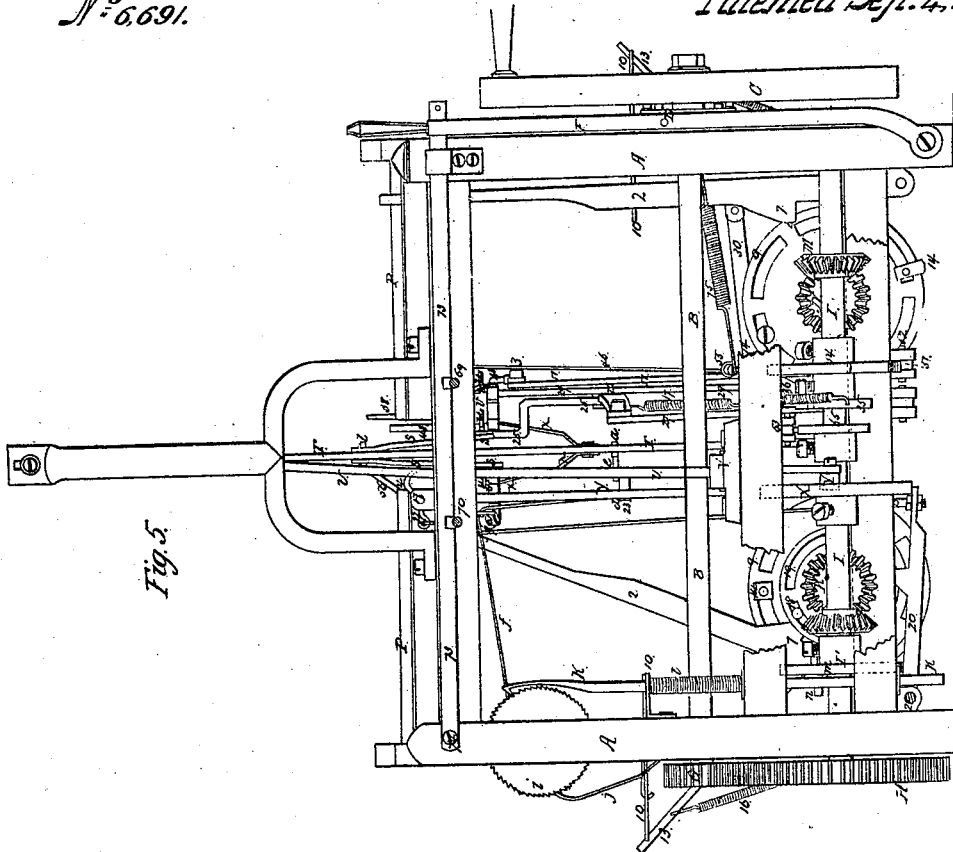


Fig. 5.

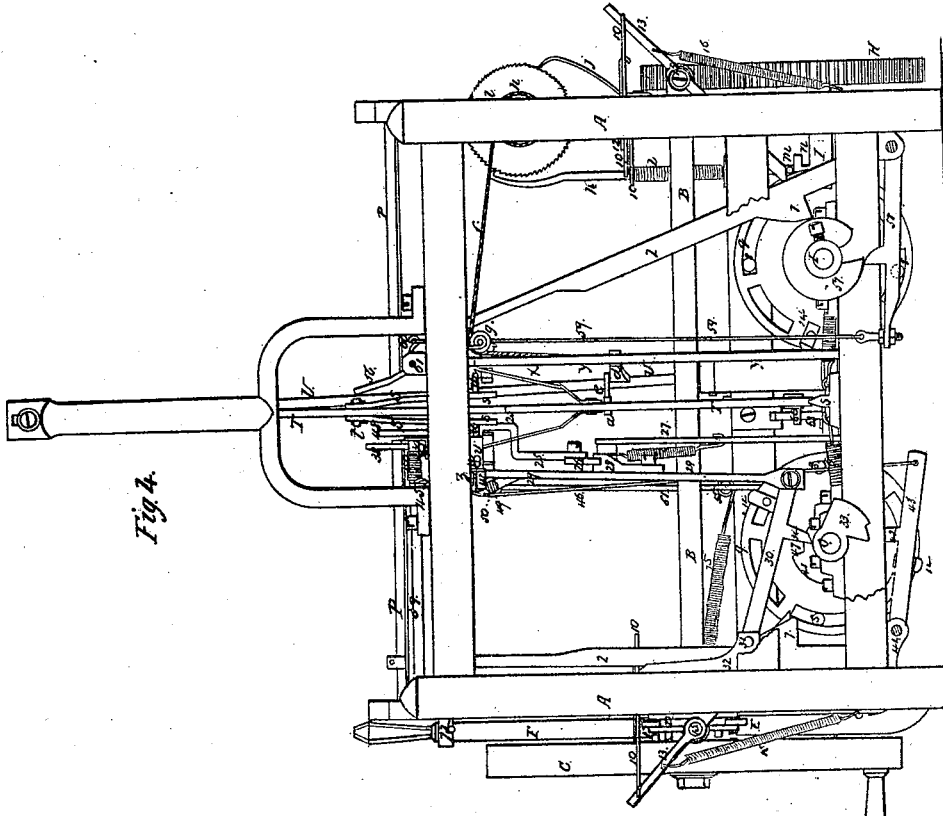
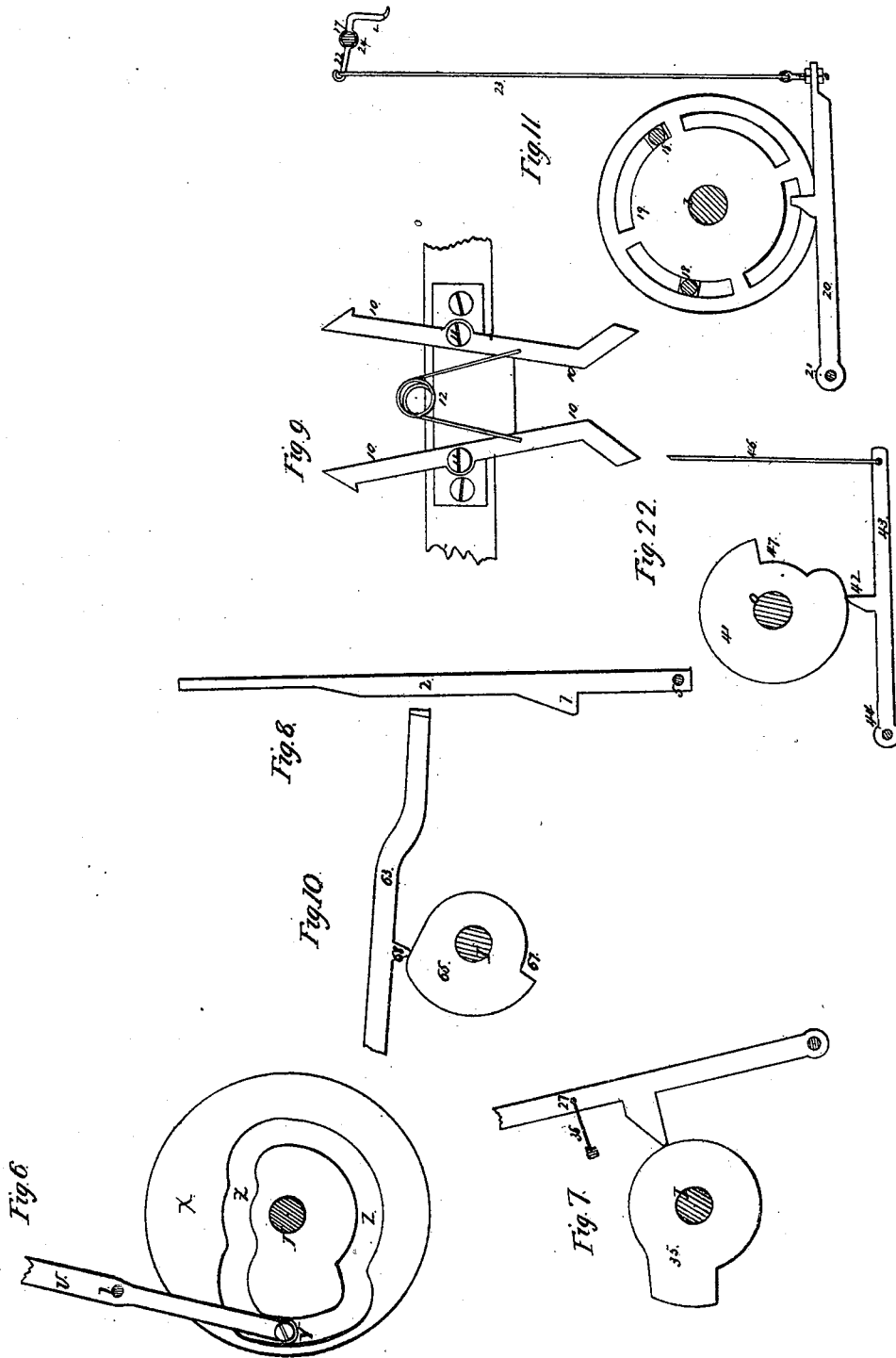


Fig. 4.

Holton, Jr. & Harris.
Making Weaver's Harness.

Nº 6,691.

Patented Sep. 4, 1849.

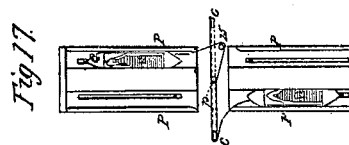
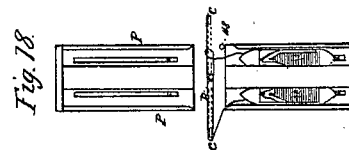
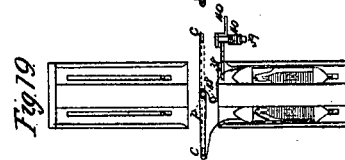
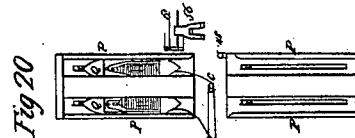
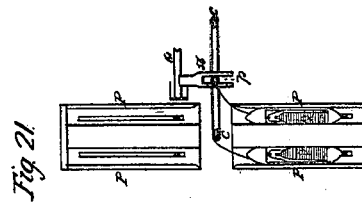
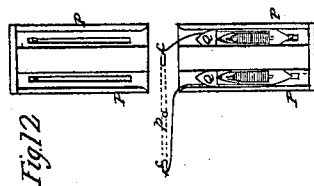
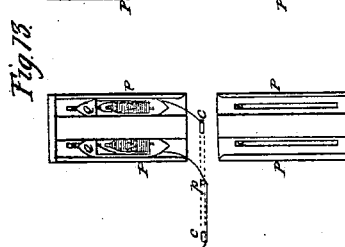
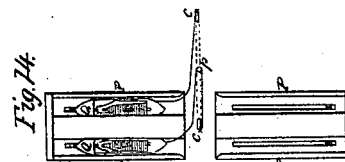
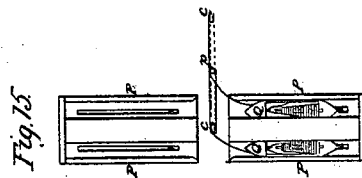
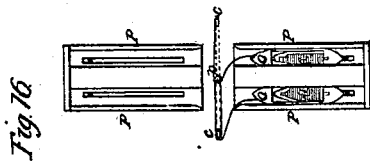


Holton Jr & Harris.
Making Weaver's Harness.

Sheet 6-6 Sheets.

No. 6,691.

Patented Sept. 4, 1849.



UNITED STATES PATENT OFFICE.

SIMEON HOLTON, JR., AND W. R. HARRIS, OF MIDDLEBURY, VERMONT.

MACHINE FOR WEAVING HARNESS FOR LOOMS.

Specification of Letters Patent No. 6,691, dated September 4, 1849.

To all whom it may concern:

Be it known that we, SIMEON HOLTON, Jr., and WILLIAM R. HARRIS, of the town of Middelbury, in the county of Addison and State of Vermont, have invented a new and useful Machine for Making Weavers' Harness by Steam or other Power, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1, is a top view of the machine—the shuttles being in the rear boxes and the center of the carriage being to the left of the center of the frame,— and the upper way removed. Fig. 2, is a front elevation of the machine—the carriage being in the same position as in Fig. 1.— Fig. 3, is a rear elevation of the machine—the carriage being in a different position from that shown in Figs. 1 and 2.— Fig. 4, is an elevation of the right end.— Fig. 5, is an elevation of the left end.— Fig. 6, is a view of the grooved face of the cam wheel X and part of the lever which it operates. Fig. 7, is a view of the cam wheel 55 on the cam shaft I for operating the vibrating pin that has the compound motion.— Fig. 8, is a side elevation of one of the picker staffs. Fig. 9 is a plan showing the spring dogs. Fig. 10, is the cam (65 on shaft I) and bar and projection 68.— Fig. 11 is the cam wheel (19) for operating the lifting finger 14.— Fig. 12 shows the position of the shuttles and harness frame at the commencement of the operation of making a heddle.— Fig. 13 shows the positions of the shuttles to form the heddle. Fig. 14 shows the position of the harness frame and twines before the shuttles are made to receive their second movement, or throw, back into the front shuttle boxes.— Fig. 15 shows the position of the shuttles and twines after the shuttles have been thrown back into the front boxes—or made to receive their second throw.— Fig. 16 shows the position of the shuttles and harness frame just before the right shuttle receives its third throw—it being in the front box. Fig. 17 shows the position of the shuttles and frame after the right shuttle has received its third throw or passed into the rear box.— Fig. 18 shows the position of the right shuttle after it has received its fourth throw, and the left shuttle its second throw—the chain and knot being now formed and only wanting the

operation of drawing it up against the rod P, to complete the heddle.— Fig. 19, shows the heddle completed—the knot, being tied and driven up against the gage rod P by the sliding driving finger 48. Fig. 20, shows the position of the harness frame after the heddle has been formed and before it has been condensed—the position of the forked condensing finger 56 being shown as raised. Fig. 21, shows the position of the shuttles and harness frame while the heddle is being condensed by the forked fingers,— the harness frame being thrown to the right in order to bring the gage rod *p* opposite the condensing finger.

Similar letters and figures in the several figures refer to like parts.—

The nature of our invention and improvement consists in combining, arranging, and operating certain mechanism in such manner as to form weavers' harness by machinery instead of other means heretofore used.—

It is believed that this is the first machine ever constructed for making weavers' harness that has succeeded. It has generally been made by the hands of operatives.

The following is a description of the combination and arrangement of mechanism to effect the desired object, viz. of moving the carriage frame, shuttles, fingers, and other parts of the machine for tying the knots. The mechanism, however, may be arranged in various ways on the principle substantially as represented in the annexed drawings and described in the following words,— this particular combination being minutely described and represented in order to show the principle on which the harness is made.

Article 1.—A is the frame, made of a rectangular form, of any suitable size, strength, and material for containing and supporting the several parts of the mechanism hereafter to be described, containing four shuttle boxes and metallic ways or guides on which a carriage traverses to the right and left containing the harness frame.—

B is the main shaft, to which the power is applied for propelling the machine.—

C is the loose pulley, on the main shaft around which is passed a band leading to the propelling engine, or power, connected to the main shaft by a clutch wheel D,— when the machine is required to be operated.—

E is a forked lever for engaging or disengaging the clutch wheel with or from the pulley C.

F is a shifting lever for operating the forked lever.

G is a pinion on the main shaft matching into a large cog wheel H on a cam shaft I for operating the several parts of the machine.—

J is a bevel cog wheel on the cam shaft I, matching into a bevel wheel K on a cam shaft L.

M is another bevel cog wheel on the shaft I, matching into a bevel wheel N on a cam shaft O.— P, P, P, P, are shuttle boxes.

Q Q are two shuttles made in the usual manner, each containing a bobbin R of twine for making the heddles of the harness.

S is the way on which the carriage moves to the right and left. This way is fixed permanently to the frame.

T is the carriage that carries the harness back and forth. The lower edge is grooved to fit the way on which it slides. It may, however, be provided with chaneled pulleys to turn on the way. The upper side of the carriage may be fitted to the upper way S² in the same manner U is a lever for moving the carriage.

V is its fulcrum.

W is an arm that connects the carriage T to the lever U.

X is a cam wheel on the cam shaft I for vibrating the lever U shown also in Fig. 6, in a detached position, where the eccentric groove is shown.

Y is a roller on the end of the lever U moving in the eccentric groove Z of the cam wheel X see Fig. 6.

a, a are two horizontal parallel bars, which, with the two ordinary harness shafts c, c, form a frame in which the harness is formed. The ends of these bars are notched, or grooved, to slide vertically over the sides

of the carriage T as the harness is manufactured therein. d is a pendant sustaining bar for supporting the harness frame and gradually lowering it as the work progresses, being guided in its movements by stationary guide rods y.

e, e, are two pins inserted into the lower bar a, and resting upon the sustaining bar d.

f, f, are two cords attached to the sustaining bar and passed over pulleys g, g, and leading thence around a roller h, for lowering the harness frame.

i is a ratchet wheel on the end of the roller h, for the purpose of turning it by the action of the reaching arm k Fig. 4. j, is a pall for holding the ratchet wheel from turning back after it has been moved by the reaching arm k.

k is a reaching arm for turning the ratchet wheel and roller to lower the harness frame. This arm is raised by the cam

n which strikes an arm m and contracts a spiral spring l. l is a spiral spring for drawing down the reaching arm k to turn the ratchet wheel. m is an arm operated by the pin n projecting from the cam wheel I' on the cam shaft I see Fig. 4.

p is a gage rod for gaging the size of the eye of the heddle inserted into the horizontal parallel bars a equidistant from the harness shafts c c.

q, q, q, q, are the heddle cords for keeping the heddles separated and in their proper places by being woven into the heddles; the lower ends of said cords being attached to the shafts c and the upper ends to springs r

attached to the upper horizontal bar (a) said springs being designed to keep the cords extended against the shafts c when the shuttles are not passing between said cords,

while weaving the twine from the bobbins to form the heddles. Before these cords are made fast to the springs they are passed through eyes in bent levers s, whose fulcra

are pins t inserted into the sides of the carriage T, and which are operated by coming in contact with radial pins u of ratchet

wheels v on vertical studs or pins inserted into the frame A. The bent levers s on the right are tripped in order to open the heddle cords as the carriage moves to the left

and the levers s on the left are operated to perform the same office as the carriage moves to the right—the levers operating in succession.

When the carriage moves to the right the levers on the right slip over the pins u without acting on the heddle cords. And likewise when the carriage moves to the left the levers on the left pass over the pins

without changing the positions of the said cords. These ratchet wheels are turned so as to bring the radial pins u in a proper position to be struck by the bent levers s as the carriage T moves to the right, or to the left, by means of springs x fastened to the carriage T and which strike the teeth of the ratchet wheel as the carriage moves to the right and left; and they are held from turning back by means of spring pawls w fastened to the frame.

2, 2, 2, 2, are four picker staffs for throwing the shuttles, attached to the frame by joint pins 5 which serve as their fulcra, held back by dogs 10 Fig. 9.

6, 6, 6, 6, are four springs for driving the staffs said springs being attached to the said staffs and to the frame, or any convenient place. When the said staffs are disengaged from the spring dogs, the springs 6 throw them forward. 7 are inclined planes on the picker staffs against which strike pins 8, projecting from cam wheels 9 on the cam shaft O, the pins 8 strike the inclined planes and move back the staffs till they are caught by spring dogs 10 turning on pins 11 inserted into the frame by which

115

120

125

130

dogs 10 the staffs 2 are held back from acting on the shuttles until the dogs are liberated from them. When the springs 6 will move the upper ends of the staffs forward, in, the arc of a circle and drive the shuttles from one set of boxes P to the opposite set.

12 is a spring for keeping the dogs extended and in contact with the staffs.

13 are levers for disengaging the dogs from the picker staffs when the shuttles are to be thrown. These levers are operated by pins 14 projecting from the sides of the cam wheel 9 and are made to act against the bent ends of the dogs 10. 15 are the fulcrum of said levers. 16 are spiral springs attached to the said levers and to the frame for drawing them back to their original positions after they have been made to act on the dogs. The aforesaid pins for operating the picker staffs and levers just mentioned are made fast in segmental openings in the cam wheels 9 and may be adjusted in said openings in any required position to produce the desired result.

4 is a lifting finger for lifting the loop side of the twine to allow the shuttle to pass through to connect the knotted side of the heddle see Fig. 11. This finger is bent and inserted into a rock shaft 17, which is operated by pins 18 inserted into a cam wheel 19—on the shaft L—which pins act upon a treadle 20; turning on a joint pin 21 and connected to an arm 22 by means of a connecting rod 23 the rock shaft being brought back to its original position after being turned by a helical spring 24 coiled around the shaft 17 and fastened to the frame.

25 is a vertical pin having a compound motion—that is to say rising and falling vertically and vibrating horizontally for the purpose of rising and catching the twine before the passage of the shuttle and after the shuttle has passed into the opposite box moving back horizontally as will be more fully described hereafter. This pin is attached to a movable bar 26 which is attached to a swinging post 27 that vibrates on a pin attached to the frame—the opposite end of said bar resting in a notched plate 28 fastened to an upright rod 29 attached to a vibrating lever 30, turning on a pin 31 passed through a box 32 fastened to the frame, which lever is raised in order to lift the pin 25 by a cam 33 on the shaft O that strikes against a projection 34 on the under side of the lever 30, the horizontal movement of the pin 25 being effected by a cam 35 on the cam shaft I striking against the vibrating post 27 said post being drawn back to its original position by means of a spring 36 attached to it and to the frame also, and the swinging bar 26 being held down upon the notched plate by a spring 27 attached to it and to the vibrating post also.

37 is a guide plate attached to the frame

through which the upright rod 29 rises and falls.

38 is a holding arm for holding the twine and preventing it from being drawn from the shuttle while the knot is being drawn up against the gage or forming rod *p*. This holding arm projects from a rock shaft 39 which is turned by means of a spring 40 coiled around the shaft and resting upon the frame as seen in Fig. 1. The shaft 39 is turned and caused to raise the arm 38 above the shuttle box by the action of a revolving cam 41 on the cam shaft O pressing against a projection 42 on the upper side of a vibrating lever or treadle 43 whose fulcrum is a pin 44 passing through one end of it and a box fastened to the frame; which treadle is connected to an arm 45 projecting from the rock shaft by means of a connecting rod 46. The said cam wheel 41 has a depression or notch 47, in its periphery, which, as it revolves, admits the projection 42 on the treadle to rise in the said notch and thus suffer the helical spring 40 to act on the shaft 39, and throw it round so as to bring the holding arm 38 down upon the twine and bottom of the shuttle box P and thus hold the twine from moving until the said arm be again raised by the action of the cam.

48 is a drawing pin for drawing the knot against the gage rod. This pin is inserted into a sliding rod 49 and is so bent that its upright portion (which catches and moves the knot) shall slide back and forth in the space between the two horizontal timbers of the frame. The sliding rod 49 into which the pin 48 is inserted is moved back and forth in an opening in a metallic plate 50, secured to the frame by means of a vibrating post 51 attached to one end of it by a joint pin 3. The other end of said vibrating post being attached to the frame by a joint pin 52 having a projection 53, on the edge which is acted on by the cam wheel 54 on the cam shaft I said vibrating rod being kept against the cam wheel by a helical spring 55 attached to it and to the frame.

56 is a forked condensing finger for closing, or condensing the heddles, and eyes upon the gage rod *p*. This finger acts when the knot is tied and drawn up and the carriage is drawn to the right by the prongs passing down over the rod and upon the heddles, said finger being operated in the same manner as the holding finger is operated by means of a cam 57, treadle 58, rod 59, arm 60, rock shaft 61, and helical spring 62.

63 (in Figs. 2 and 10) represent a holding bar for holding the carriage from moving to the left while driving up the knot against the rod *p* said holding bar 63 being raised to such level by a cam wheel 65 on the cam shaft I that its end will be struck by a

pin 66 projecting from the carriage when the carriage is brought to the position required to form the knot the loose end of said bar 63 being let down below the levels

5 of said pin 66 when it is required to run the carriage to the left its full traverse by means of a depression 67 in the cam wheel in which a projection 68 from the bar falls. 69 and 70 Fig. 1 are two horizontal paral-
10 lel protection bars for stopping the motion of the machine when the shuttle makes a false move and the machine is in danger of being broken. These rods slide in the openings in the frame and in right angled plates
15 fastened to the frame, pins 71 are inserted into the rods against which the sides of the shuttle box (which are movable) strike as they move. Double inclined planes 72 are
20 formed in these protection rods by making a V shaped notch in each, in which the shipper bar 73 is placed, said shipper bar turning in a pin 74 inserted into the frame at one end while its opposite end is in contact with the shipper lever F by means of a
25 notch and pin, see Fig. 4.

Should one of the shuttles Q hang or stop in the space between the boxes while the carriage moves to the right or left, the harness shaft *c* will strike the shuttle and cause
30 the side of the shuttle box to turn or move toward the end of the frame and come in contact with one of the pins 71 in the sliding protection bars 69 or 70 and move it horizontally as it moves either to the right
35 or left it will lift the shipper bar 73 by one of its inclined plans 72 and disengages its outer end from the shipper lever F. A spring 75 will then vibrate horizontally the lever E to which the clutch D is attached
40 and disengage it from the driving pulley C on the main shaft B and stop the motion of the machine.

*Article 2.—Operation:—*The shuttles Q are supplied with spools or bobbins filled
45 with the harness twine and placed in the two front shuttle boxes as shown in Fig. 12. The ends of the twins are secured to the harness shafts *c, c*. The carriage is now moved to the left till the right harness shaft comes
50 opposite the ends of the partitions between the shuttle boxes—as seen in said Fig. 12,—and during the movement of the carriage to the left the heddle cords of the right shaft are opened for the passage of the shuttle be-
55 tween them while the heddle cords of the left shaft remain closed against the shaft. The motion of the carriage is then arrested. The shuttles are then thrown simultaneously from the front shuttle boxes into the rear
60 one, carrying the twine of the right shuttle between the heddle cords of the right shaft and the twine of the left shuttle between said right shaft and the center or gage rod *p* that gages the size of the eye of the heddle
65 as seen in Fig. 13. The carriage is then

moved back until the left shaft is made to occupy the position that the right shaft had at the commencement of the operation, as just described. This movement will cause the heddle cords of the left shaft to open
70 and those of the right shaft to close,—and will fold the twines over the right shaft and gage rod and at the same time lift the twine of the left shuttle to form a loop for the passage of the right shuttle while returning
75 to the front shuttle box as shown in Fig. 14. The shuttles are then thrown back into the front shuttle boxes—the left shuttle moving a little sooner than the right shuttle and
80 passing between the back bands or heddle cords of the left shaft while the right shuttle passes through the aforesaid loop and connects the eye side and loop side of the shuttle
85 as seen in Fig. 15. The carriage is then moved to the left until the gage rod is in the position that the right shaft occupied at the commencement of the operation—
90 or in other words, until it be opposite the ends of the partitions that divide the boxes as represented in Fig. 16. Another pause takes place in the movement of the carriage. The vibrating finger 25 is then raised to catch the twine as the right shuttle is thrown.
95 The right shuttle is then thrown into the opposite rear box as shown in Fig. 17. The finger 25 then moves to the right carrying the twine with it to form a loop as seen in said Fig. 17. The lifting finger 4 then catches the lower portion of the twine that
100 passes round the gage rod *p* and vibrating finger 25 and lifts it high enough to form a loop for the shuttle to pass through during its passage from the rear to the front box to form the knot as seen in Fig. 18. The
105 fingers then drop out of the way. The holding finger 35 then descends upon the twine and holds it upon the bottom of the shuttle box to prevent the twine from drawing off from the shuttle while the driving finger
110 48 drives or draws the knot against the gage rod *p* and thus completes the eye as seen in Fig. 19, which is driven down or condensed on the gage rod by means of the vibrating forked finger 56 which last operation takes
115 place after the carriage is moved back to the right as seen in Fig. 21. The before described operations complete the single eye of a heddle and are performed in about 3 or 4 seconds. The motions of the several cam
120 shafts being continuous. The harness frame, that holds the shaft *c* and gage rod *p* is then lowered to the required level according to the number of heddles desired to the inch by the cords *f* or chains unwinding from the
125 gage roll *h* which are attached to the supporting bar *d* upon which the frame rests. The several motions of the several parts of the machine required to form the knots are produced by a combination and arrange-
130 ment of mechanism as represented in the

annexed drawings; or by means of any more convenient combination and arrangement of mechanism. The prime-mover being actuated by steam, water, horse or other power
5 applied in any convenient and suitable manner.

What we claim as our invention and desire to secure by Letters Patent is—

10 The method of making weavers' harness by power machinery substantially as herein described in Article 2, of this specification and as illustrated in Figs. 12 to 21 of the drawings, inclusive, whether the carriage

containing the harness frame and the shuttles containing the twine be operated by 15 the combination of mechanism herein described, or any other, which may be substantially the same, and by which analagous results are provided.

In testimony whereof we hereunto sign 20 our names before two subscribing witnesses.

SIMEON HOLTON, JR.

WILLIAM R. HARRIS.

Witnesses:

WILLIAM P. ELLIOTT,
LUND WASHINGTON, Sr.