2 Sheets, Sheet 1.

A. J. Williams.

Heddle Machine.

No 6,701. Patented Sep. 11. 1849.

Fig. 1

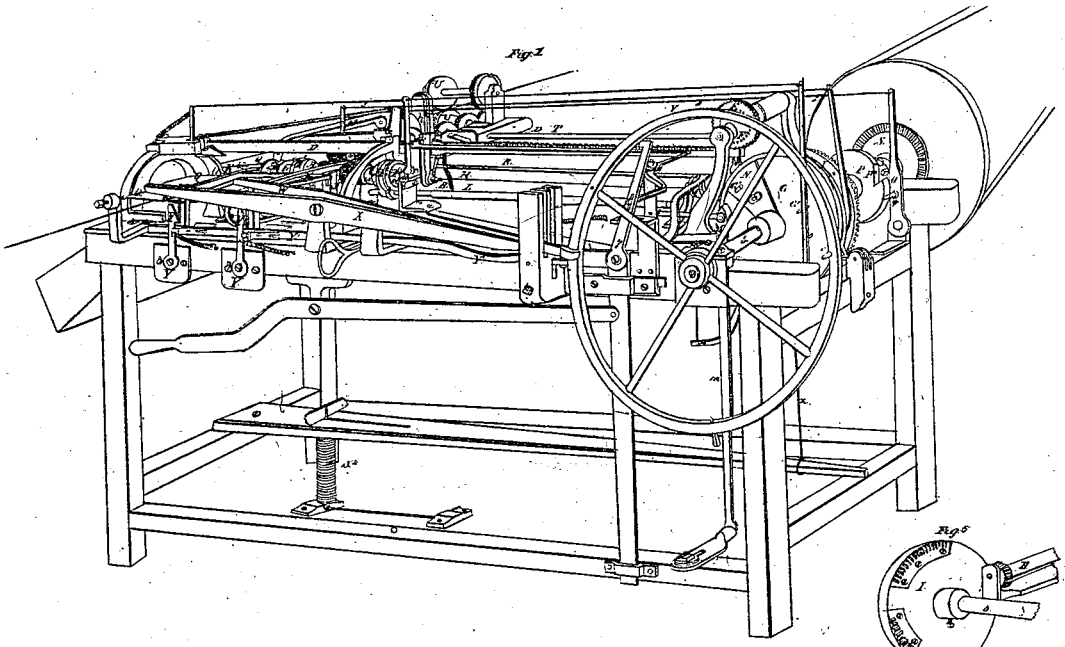


Fig. 5

Fig. 2.

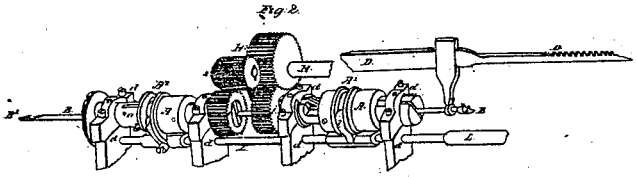


Fig. 4.

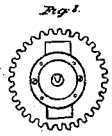


Fig. 3

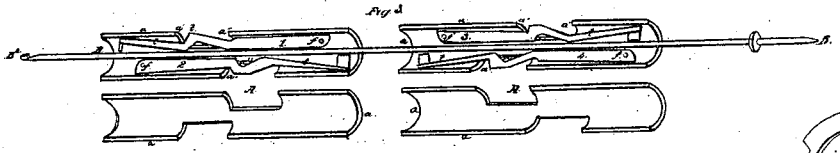


Fig. 6

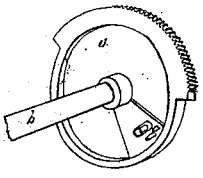


Fig. 7

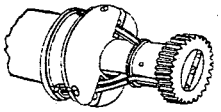


Fig. 10.

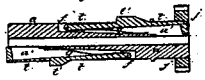
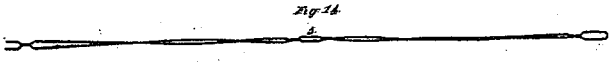


Fig. 11.

Fig. 9.

Fig. 14.



2 Sheets. Sheet 1 2.

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Heddle Machine.

No. 6,701. Patented Sep. 11, 1849.

Fig. 12.

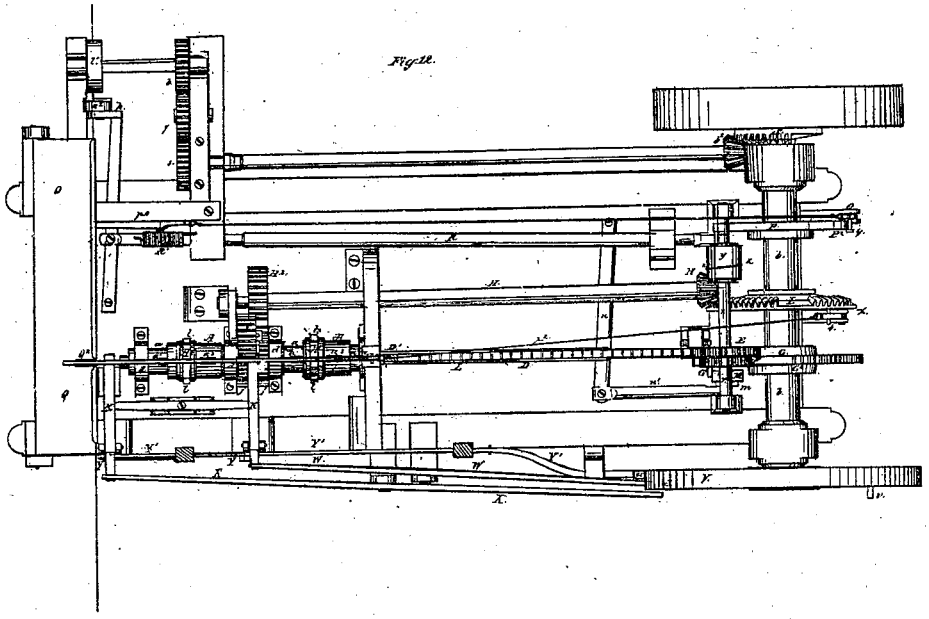
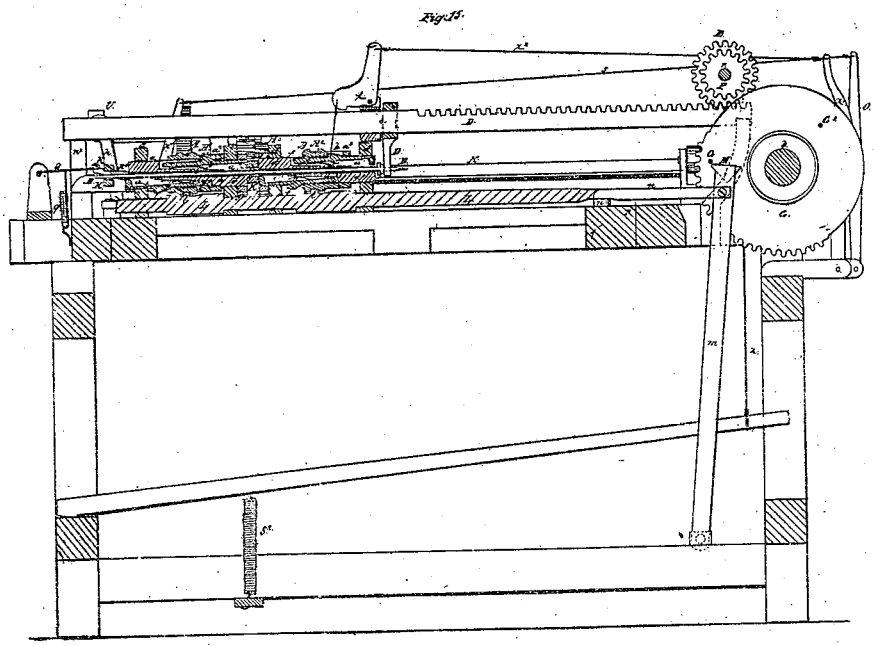


Fig. 13.



UNITED STATES PATENT OFFICE.

A. J. WILLIAMS, OF UTICA, NEW YORK.

IMPROVEMENT IN MACHINERY FOR MAKING WIRE HEDDLES.

Specification forming part of Letters Patent No. **6,701**, dated September 11, 1849.

To all whom it may concern:

Be it known that I, ABIJAH J. WILLIAMS, of the city of Utica, in the county of Oneida and State of New York, have invented a new and useful Machine for Making Wire Heddles for Weavers' Harness, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 is a perspective view of the machine arranged for operation, showing the right end and left side and top, the hooked receiving and discharging rod being arranged preparatory to receiving the wire. Fig. 2 is a perspective view of the apparatus for folding, drawing, and twisting the wire into heddles and discharging the same when finished, detached from the machine. Fig. 3 is a vertical longitudinal section of two hollow twisting-cylinders for twisting the wires into heddles drawn full size, as used in the modified form of the machine. Fig. 4 is a view of one-half of the same. Fig. 5 is a perspective view of the second driving-wheel, I, on the main shaft, with cogged segments on its sides, detached from the machine. Fig. 6 is a perspective view of the first driving-wheel, G, on the main shaft, with a cogged segment on its periphery. Fig. 7 is a perspective view of the modified form of the machine for twisting the wire into heddles, being a pair of pinchers, a grooved cylinder and thimble, and propelling cog-wheel. Fig. 8 is another modified form of machine for twisting the wire into heddles, being a cog-wheel and sliding tooth, which may be used instead of the vibrating teeth represented in Figs. 3 and 10, the tooth sliding toward the center. Fig. 9 is an end view of the sliding thimble, showing the transverse pin therein for operating the tooth when the spring is not used, as in Fig. 3. Fig. 10 is a section showing the cylinder, teeth, springs, and cog-wheel detached from the frame. Fig. 11 is a view of the sliding thimble detached in like manner. Fig. 12 is a top view of the machine. Fig. 13 is a vertical longitudinal section of the machine, drawn through the center of the twisting-cylinders. Fig. 14 is a plan of one of the heddles as finished by this machine.

Similar letters in the several figures refer to corresponding parts.

The nature of my invention and improvement consists in a certain new and useful combination and arrangement of mechanical devices by which a continuous piece of wire is cut off from the skein of wire on the reel as it is fed into the machine between rollers and seized by a hook at the middle of its length and doubled, or folded, while being drawn into the cylinders, where it is held firmly by pinchers and vibrating teeth passing between the strands while the cylinders are made to revolve and twist the wires and form the heddles, and then cause the pinchers to open, withdraw the vibrating teeth, and discharge the heddles in a finished state, as represented in Fig. 14.

The frame to contain and support the mechanism required to perform the above-named operations should be made of suitable size, strength, and material to contain and support the several parts hereinafter described. Two revolving cylinders, *a a*, for forming the heddles, are arranged upon the top of this frame, having their axes in a right line and parallel with the top of the frame, and turning in suitable bearings or boxes, *d*. These cylinders are made of any suitable metal and of any required diameter, length, and caliber for the reception of the drawing and discharging rod B, which is to move back and forth therein while drawing the wire and discharging the heddle. Each cylinder contains two grooves, *a'*, for the reception of the vibrating teeth *t*. One of the grooves extends from the left end of the cylinder as far as two-thirds its length, or according to the length of the tooth to be placed therein, as seen in Fig. 10. The other groove (which is on the opposite side of the cylinder) extends from the right end toward the left end the same distance, and is made in the same manner. Each groove is made of the required depth to receive the teeth. The portion of the groove through which the point of the tooth passes is made to extend from the periphery to the bore for the purpose of allowing the point of the tooth (when depressed by the thimble) to pass between the strands of the wire. The vibrating tooth, after being placed in the groove, is hung by a pin, *f*, at one end, connecting it to the cylinder. A spring, *g*, Figs. 10 and 13, for throwing the tooth out from the heddle, when finished, is placed in the groove, and may be attached by one of its ends to the cylinder, or

it may be attached to the tooth. The tooth is forced inward toward the center of the cylinder and between the strands of the wire by means of a sliding thimble, A, Figs. 10 and 13, acting against an inclined plane, t', formed on the outer edge of the tooth, said inclined plane protruding through groove a' and extending into the recess a^3 in the sliding thimble. The internal diameter of the sliding thimble is equal to the external diameter of the cylinder. The periphery is recessed or cut through, as seen at a^3, to give room for the inclined plane t' of the tooth next the cog-wheel to move outward from the center the required distance. A circular channel or groove, A^2, is formed on the outer surface of the thimble to receive a fork, l, attached to a sliding rod, L, by which it (with the thimble) is moved back and forth for throwing the vibrating teeth in and out from the cylinder; or the tooth may be forced between the wires and from them by the sliding movement or action of the thimble by forming an inclined plane on the upper and under edges of the tooth, as seen in Fig. 3, against which the thimble acts as it is moved to the right and to the left, the inner surface of the thimble acting against the outer inclined surface of the tooth and a transverse pin, p^2, Fig. 9, in the thimble acting against the inner inclined surface, the inclined portion of the tooth passing between the inner surface of the thimble and the said pin p^2. When this arrangement is used for vibrating the tooth instead of the spring g, Fig. 10, the cylinder must be recessed, as at a'' in Fig. 3, to give room for the pin p^2, attached to the thimble, to play in. (See Fig. 9, wherein the pin p^2 is represented clearly.) On the end of the cylinder is a cogged wheel, j, matching into suitable gearing for giving it the required rotary motion to twist the wire, as seen in Figs. 1, 2, 12.

The second twisting-cylinder, with its vibrating teeth, springs, sliding thimbles, and other appendages, being made in the same manner as the cylinder and its appendages just described, it is also attached to the sliding rod L in the same manner by a fork, l. This sliding rod moves back and forth in corresponding openings in the standards or boxes d, supporting the cylinders. It is operated by a combination of levers, m n, and a rod, n', actuated by two pins, G' G^2, Figs. 1 and 13, projecting from the face of the wheel G, that strikes against a triangular block, M, fastened to one of the aforesaid levers—namely, that which is lettered m.

K K are two pinchers, which grasp and hold the wire while the operation of twisting it is going on. One of these pinchers is arranged between the cylinders a a to hold the wires during the twisting operation to form the middle eye of the heddle through which the warp passes. The other pair of pinchers is arranged at the end of the cylinder at which the wire first enters for the purpose of holding the two ends of the wire firmly during the operation of twisting. The pinchers are operated by the levers W and X, which are vibrated by pins u v, inserted into the wheel V on the main shaft b, said levers striking against the lower arms of the pinchers, causing the pinchers to close and grip the wire, and being held by spring-catches Y till the completion of the operation. The catches are disengaged from the pinchers by a sliding bar, Y', which is moved horizontally from the wheel V by means of a pin or cam, w, on the periphery of the aforesaid wheel V, the said sliding bar being brought back to its former position by the action of spring-catches Y. The skein of wire to be converted into heddles is placed on a reel. One end of the wire is passed between two feed-rollers, U U, which are turned by cogged gearing 6 7 8, driven by bevel-gearing S b^2 on the main shaft b. The wire is conducted thence through an aperture in a vertical guide-post, n^2, to a groove formed in a vibrating or hinged guide, Q, having an opening, Q^2, to admit the hook B^2 to catch the wire. The required length of wire to form the heddle, having passed through the guide-post n^2, is cut off from the skein by a vibrating shear, h, Fig. 1, operated by a cam-wheel, P, on the main shaft b, which moves horizontally a rod, R, connected to the shear h in any convenient manner. The shear, having cut the wire, is drawn back with the rod R by a spring, R'. The hinged guide Q is retained in a horizontal position and in a line with the aperture in the guide post n^2 during the operation of feeding the wire into the machine by means of a right-angled lever, p^4, attached to the frame and bearing against the under side of the hinged guide Q and held in its required position by a rod, s, attached to one of the arms of the said right-angled lever and leading thence to a vibrating lever, O, which lever O is held in its required position by the circular part of the cam-wheel P. The wire, being cut off from the skein, is then dropped (by the descent of the hinged guide Q) onto the hook of the feeding and discharging rod B. This is effected by the right-angled lever p^4 turning on its fulcrum, caused by a notch, P^2, in the cam-wheel P, into which a pin, q, projecting from the lever O, enters as the said wheel P revolves. A spring, q', or weight attached to the hinged guide Q, causes its grooved edge containing the wire to drop and deliver the wire onto the hook B^2. The wire, having been dropped into the hook on the end of the feeding and discharging rod B, is next doubled together at the middle by being drawn into the bores of the twisting-cylinders. This is done by connecting the rod B to a sliding rack, D, by a connecting-yoke, D', which causes the rack and rod B to move simultaneously. The rack is drawn back, and with it the rod and wire, by means of a cog-wheel, E, that matches into the rack D. This cog-wheel is fixed on a horizontal shaft, r, on which there is a pinion, F, operated by the cogged segment-wheel G on

the main shaft *b*. The cogged wheel E would answer to draw back the rack without the pinion F, but the motion might not be as quick as required. The rack is held back by a spring-catch, *x*, attached to the standard in which the rack slides, and actuated by a lever, *x'*, connecting-rod x^2, and pin 4 in wheel I. A drum, *y*, is placed on the axle or shaft *r* of the cog-wheel E, which winds up a cord, *z*, as the rack is drawn back, to which cord a weighted lever or spring, S^2, is attached for throwing the discharging-rod into the cylinders, and thus throwing out the finished heddle. The rack D and feeding-rod B having been drawn back by the action of the cogged gearing aforesaid, and the wire drawn into the cylinders, and the rack secured by the catch *x*, the thimbles A are then moved to the left, in the manner before described, by the combined action of the sliding rod L, levers *m n*, and connecting-rod *n'*, actuated by the pins G' G^2 in the wheel G, which forces the teeth between the strands of wire, as aforesaid. The pinchers K are closed upon the wire before the twisting commences, and after the wire is drawn into the cylinders *a* and the feeding-rollers commence to bring forward the wire for another heddle, the hinged guide Q being previously raised to receive it. The twisting operation then commences, which is effected by means of the segment-wheel I on the main shaft *b* turning a bevel-pinion, H^2, on the shaft H, on which there is a cog-wheel, H^3, into which gears a cog-wheel, *j*, on one of the cylinders and an intermediate pinion, 2, into which gears the cog-wheel *j* on the other cylinder, by which the cylinders are caused to turn in contrary directions. Both cog-wheels *j j* of the cylinders, however, may be made to engage with the cog-wheel H^3 on the shaft H, and be thus turned in the same direction, which will answer equally well, thus dispensing with the intermediate pinion, 2. The heddle being sufficiently twisted, the teeth *t* and pinchers K are disengaged from the same in the manner herein described. The catch *x* is then disengaged from the rack D by means of a pin, 4, in the wheel I striking against an upright lever, *x'*. The catch *x* being thus disengaged, the rack D, with the discharging-rod B attached to it, is driven to the left by the action of the spring S^2 or weight, as already described, which discharges the heddle from the cylinders beneath the wire that has been previously run into the machine for the production of the next heddle.

I do not claim making heddles of pieces of wire doubled around pins and twisted by machinery, as this has been heretofore patented; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The before-described mode of making wire heddles from a skein or hank of wire by power machinery, by cutting the wire as it is fed into the machine into suitable lengths to form, when doubled, the required heddles, and to drop said wires separately onto a horizontal reciprocating feeding and discharging hook-rod; by which each wire is doubled into two strands and drawn into the center of two revolving cylinders turning in contrary directions, wherein the strands are held by pinchers and vibrating teeth forced between them until they are twisted into the form of the required heddle, when the heddle is discharged from the cylinders by the reciprocatory movement of the hook-rod, the movements of the several parts of the machine to effect the aforesaid object being produced by a combination and arrangement of mechanism similar to that herein described and represented, or any other which may be substantially the same, and by which analogous results are produced.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

A. J. WILLIAMS.

Witnesses:

LUND WASHINGTON, Sr.,

A. E. H. JOHNSON.