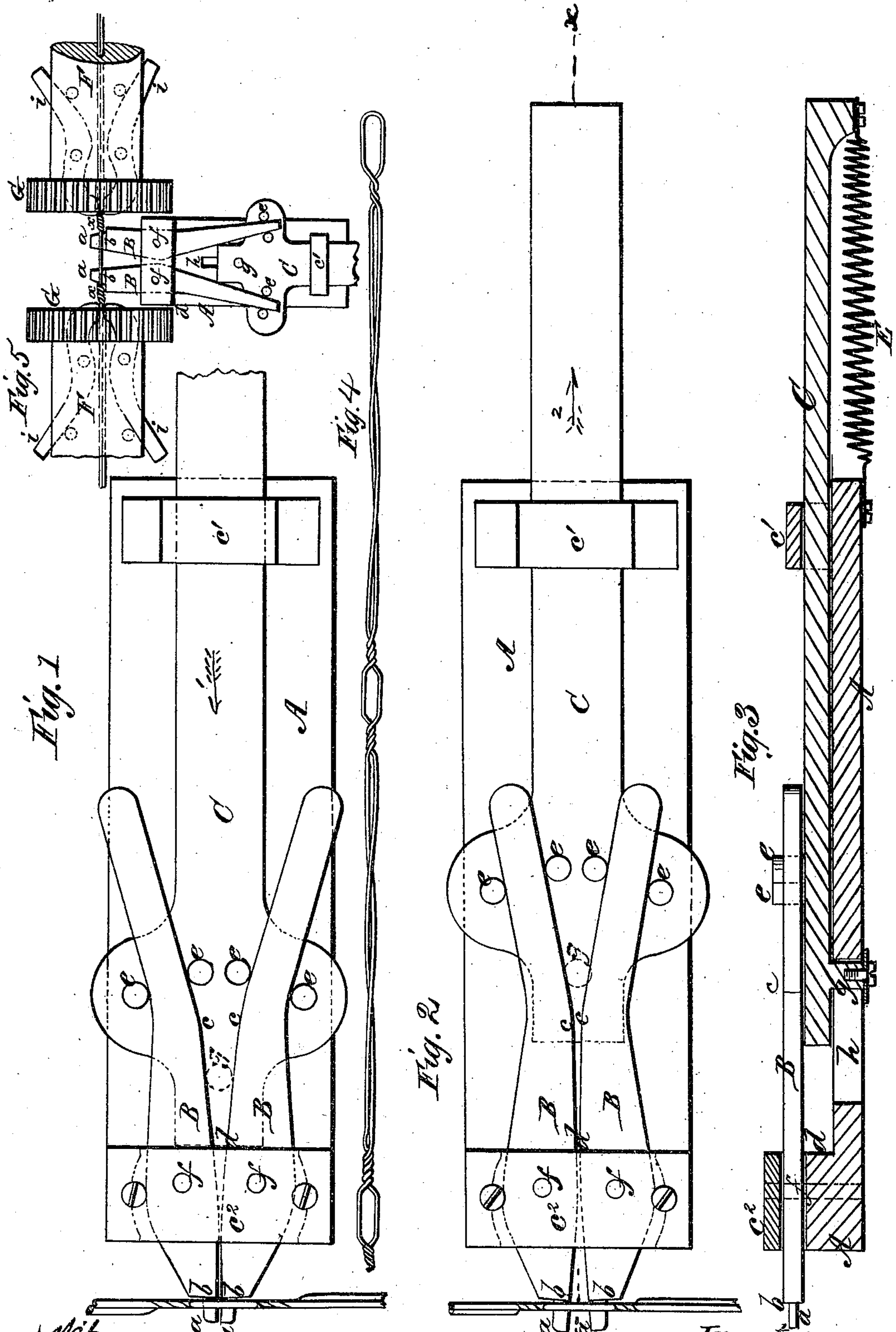
A. J. WILLIAMS.

MACHINES FOR FORMING THE WARP-EYES OF WIRE HEDDLES.

No. 195,194 Patented Sept. 11, 1877.



Witnesses.
James Martin Jr.
A. P. Theodore Lang

Inventor.
Abijah J. Williams by
Mason, Fenwick & Lawrence

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ABIJAH J. WILLIAMS, OF UTICA, NEW YORK, ASSIGNOR TO J. H. & N. A. WILLIAMS, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR FORMING THE WARP-EYES OF WIRE HEDDLES.

Specification forming part of Letters Patent No. **195,194**, dated September 11, 1877; application filed March 3, 1877.

To all whom it may concern:

Be it known that I, ABIJAH J. WILLIAMS, of Utica, in the county of Oneida and State of New York, have invented a new and useful Improvement in Machines for Forming the Warp-Eyes of Wire Heddles; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improved machine adjusted to the weaving-eye of a heddle before being operated. Fig. 2 is a similar view, with the wire heddle as it appears after being completed. Fig. 3 is a vertical longitudinal section of the same in the line *x x* of Fig. 2. Fig. 4 is a front view of a wire heddle complete and ready for use, and Fig. 5 a top view of my machine in connection with the wire-twisting mechanism.

The object of my invention is to form the weaving-eyes of wire heddles in a simpler and more perfect manner than heretofore, and without the use of the expensive and complicated mechanism heretofore used for producing them by external pressure.

The nature of my invention consists in both forming and stretching the weaving or warp eyes of wire heddles by an implement introduced into the warp-eye, or between the wires, and actuated by a slide while in the said eyes, whereby the warp-eyes are shaped and stretched, and, at the same time, the twists on each side of the eye are forced tightly together, and caused to remain so without an additional operation of flattening or compressing the twists from the outside of the eyes, as will be hereinafter described.

In the accompanying drawings, A represents a supporting and guiding plate, to which two lever-jaws, B B, and a reciprocating slide, C, are attached, as represented. Each jaw B has one-half of the eye-former *a a* constructed upon one of its ends, as shown, and at the base of the parts forming the eye-former *a a* there is a shoulder, *b*, for the wires of the heddle to bear against while the eye-former is shaping and stretching the eyes thereof. The rear portions or handles of the lever-jaws are inclined on both edges from the point *c* to their extremities, and these inclined portions cause the handles to diverge from one another. The reciprocating slide C is fitted in a guide, c^1, of the supporting-plate A, and under the handles of the lever-jaws, so as to abut against the shoulder *d* formed on the supporting-plate A, when it has made its full stroke, for the purpose of closing the jaws B B. The lever-jaws are caused to open and close as the slide moves back and forth by means of two pairs of studs or pins, *e e*, projecting out from the face of the slide, said pins forcing the outer ends of the lever-jaws apart when the slide moves in one direction, and vice versa when it moves in an opposite direction. The forming ends of the jaws close together when the slide moves in the direction of the arrow 1, and separate when the slide moves in the direction of the arrow 2. The movement of the slide for closing the jaws B B is effected by means of a spring, E, which is attached by one end to the supporting-plate and by its other end to the slide, as shown, and the movement for opening the jaws is effected by any appropriate mechanism connected with or arranged in proper relation to it. The lever-jaws are fitted to the plate A under a cap, c^2, and pivoted, as at *f f*, in such a manner that they are kept steady and firm, and still have a perfect freedom to vibrate on their pivots.

The longitudinal movement of the slide C is controlled by a stop-pin, *g*, which works loosely in an oblong slot, *h*, formed in the supporting-plate A, and this slide is kept steady in its movements by the head of the stop-pin and the guide c^1.

In Fig. 5 of the drawings ordinary jaws of wire-heddle machines are shown on each side of the eye-former, for grasping the two strands of wire; and these jaws are provided with means by which they are revolved for the purpose of twisting the said wire strands around the eye-former. In this figure, F F represent two cylinders, which contain the grasping and twisting jaws *i i i i*, and G G the gears which produce the necessary rotation in opposite directions. In this figure of the drawings, the jaws B B are represented as opened, or in the same position as in Fig. 2 of the drawings, for the purpose of effecting the

shaping of the heddle-eye and tightening the twists thereof at *x x*.

I contemplate, as a modification of the described construction, a plan in which, before the jaws holding the wire strands are released, one part of the eye-former shall first be forced to one end of the heddle eye, and then the other part to the other end of the eye, thus jamming the eye into shape and tightening the twists; and, under such operation, the jaws would be moved separately, instead of both together simultaneously. I also contemplate using an eye-former one jaw of which is fixed and the other movable. I also contemplate using an eye-former made of one piece and vibrated from end to end of the heddle-eye for the purpose of stretching it and tightening the twists.

My device may be applied to various machines now in use for the purpose of making wire heddles.

Operation: The wire is drawn into the heddle-machine by the ordinary mechanism for the purpose. Then the points of the eye former and shaper for the warp-eye are inserted between the strands of wire, and during the process of twisting the eye, or after the process is completed, and the heddle ready to be discharged from the machine, the reciprocating slide of the eye former and shaper is forced in the direction of the arrow 1 by proper mechanism, and the jaws thereby moved apart, and caused to produce a stretching effect upon the inside of the weaving or warp eye of the heddle, and a tightening of the twists at each end of the eye. This done, the jaws are closed by the spring and withdrawn from the finished eye, ready for another operation.

In practice the jaws may be used slightly apart while the wire is being twisted into a heddle-eye upon them.

What I claim as new, and desire to secure by Letters Patent, is—

The heddle-eye forming and finishing contrivance, consisting, mainly, of jaws B and an actuating-slide, C, substantially as described, adapted for forming the heddle-eye and finishing the same, as specified, and operated as set forth.

Witness my hand in the matter of my application for a patent for an improved machine for forming the warp-eyes of wire heddles this 13th day of February, 1877.

ABIJAH J. WILLIAMS.

Witnesses:

FRED. D. HAAK,

OSCAR M. DAYTON.