(No Model.)

E. BUTCHER.

HEDDLE FOR JACQUARD LOOMS.

No. 587,472. Patented Aug. 3, 1897

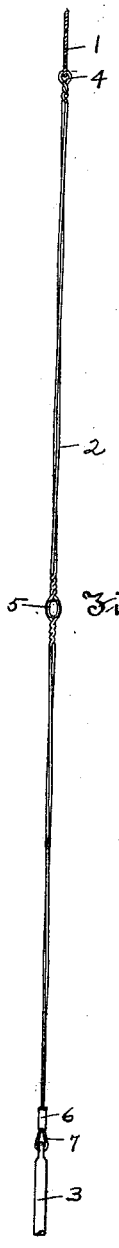

Fig. 1.

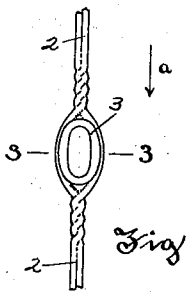

Fig. 2.

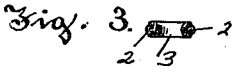

Fig. 3.

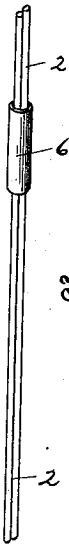

Fig. 4.

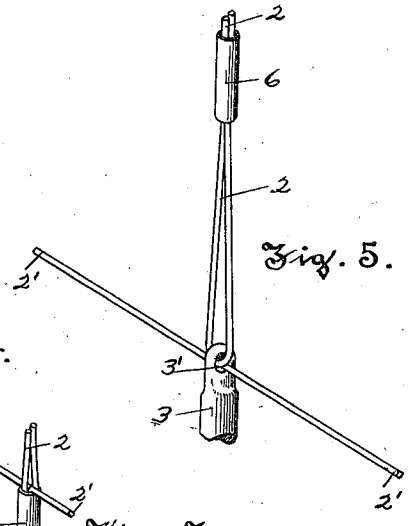

Fig. 5.

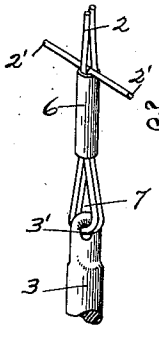

Fig. 7.

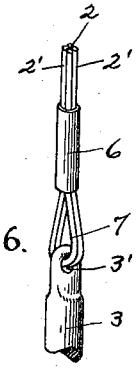

Fig. 6.

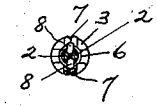

Fig. 9.

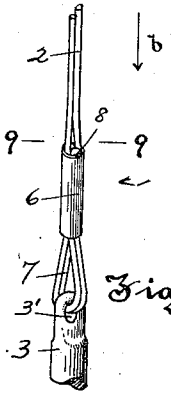

Fig. 8.

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UNITED STATES PATENT OFFICE.

EDWIN BUTCHER, OF WORCESTER, MASSACHUSETTS.

HEDDLE FOR JACQUARD LOOMS.

SPECIFICATION forming part of Letters Patent No. 587,472, dated August 3, 1897.

Application filed January 23, 1897. Serial No. 620,346. (No model.)

To all whom it may concern:

Be it known that I, EDWIN BUTCHER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Heddles for Jacquard Looms, of which the following is a specification.

My invention relates to heddles for Jacquard looms, and more particularly to an improved construction of a wire heddle intermediate the cord leading to the jacquard and the lingo and to an improved way of attaching the lingo to the lower end of the heddle. It will be understood that the threads which form the figure in weaving the fabric extend through the heddle-eyes, and that the Jacquard machine controls the raising and lowering of the heddles and the threads, according to the indications of the pattern-cards.

The object of my invention is to provide a two-strand wire heddle with an eye therein intermediate its ends for the thread to pass through, said eye consisting of an oval-shaped metal eyelet secured between the two strands; and another object of my invention is to attach the lower end of the wire heddle to the lingo by means of a tube without twisting the ends of the wire.

My invention consists in certain novel features of construction of my wire heddle and the manner of attaching the same to the lingo, as will be hereinafter fully described.

Referring to the drawings, Figure 1 shows a wire heddle embodying my improvements attached at its upper end to the lower end of the cord leading to the Jacquard machine and at its lower end to the upper end of a lingo. Fig. 2 is a detached view of a heddle-eye. Fig. 3 is a transverse section through the eye on line 3 3, Fig. 2, looking in the direction of arrow *a*, same figure. Fig. 4 shows the lower end of the wire heddle with the tube thereon preparatory to attaching the lingo thereto. Fig. 5 shows the next step in attaching the lingo: The ends of the wire have been bent up and passed through the eye in the upper end of the lingo from opposite sides. Fig. 6 shows the next step: The ends of the wire have been bent up again against the main wires and inserted in the lower end of the tube, which is then drawn down on the four strands of wire, as shown. Fig. 7 shows the next step: The two free ends of the wire are bent outwardly in opposite directions to extend over the top edge of the tube. Fig. 8 shows the next step: The projecting ends of the wires are cut off close to the tube, leaving the hooked ends extending over the upper edge of the tube; and Fig. 9 is a transverse section on line 9 9, Fig. 8, looking in the direction of arrow *b*, same figure. Figs. 2 to 9, inclusive, are shown on an enlarged scale.

In the accompanying drawings, 1 is the lower end of a cord leading to the Jacquard machine, to which is attached the upper end of my wire heddle 2. The lingo 3 (only the upper part of which is shown) is of ordinary shape and construction and has an eye 3′ at its upper end, by which it is attached to the lower end of the heddle-wire 2.

The heddle-wire 2 is preferably made from a single piece or length of wire, which is bent upon itself at its middle portion intermediate its ends and then the bent or loop portion twisted to form an eye 4, through which the cord 1 is passed to attach the heddle-wire thereto.

At a point in the heddle-wire about midway between its upper and lower ends an oval-shaped eyelet 5, having its outer edge grooved or recessed, is placed between the two strands of the heddle which extend in the grooved edge of the eyelet 5, and the two strands are twisted together just above and just below the eyelet 5 to secure it in place. (See Fig. 2.)

The eyelet portion of the heddle-wire 2 is preferably tinned or coated with metal to fill any opening or joint and make a smooth and even surface which will not catch on or chafe or rub the worsted threads as the heddle-wires are raised and lowered.

Upon the lower free ends 2′ of the heddle-wire 2 is strung a tube 6, (see Fig. 4,) which has an internal diameter just large enough to receive four thicknesses of the single wire or strand from which the heddle is made. After the tube 6 is placed on the lower end of the wire heddle the free ends 2′ of the two wires are bent up and passed through the eye 3′ of the lingo 3 from opposite sides, as shown in Fig. 5. The ends 2′ are then bent up against the body or main portion of the heddle-wire 2 and the tube 6 drawn down over the four

strands of wire (see Fig. 6) as far as it can be to form the loop 7 in the lower end of the heddle-wire for the lingo 3.

The ends 2', which preferably extend upon opposite sides of the main wires of the heddle, are then bent outwardly in opposite directions to extend over the top edge of the tube 6, (see Fig. 7,) and the projecting ends are then cut off close to the tube, as shown in Fig. 8, leaving hooked ends extending over the top edge of the tube 6, (see Fig. 9,) which prevents the tube from slipping or moving up on the wires.

It will be seen that the tube 6 must remain in its place on the lower end of the heddle-wire and cannot work loose because it cannot move down by reason of the divergence of the wires to form the loop 7, and it cannot move up by reason of the hooks 8 extending over its upper edge, and by means of the tube the free ends of the wire are secured to the body or main part of the heddle to form the loop 7 for the lingo 3 without any twisting of the ends or any soldering, &c.

The advantages of my improvements in wire heddles for Jacquard looms will be readily appreciated by those skilled in the art. They are very durable and will not wear out, and the eyelet portion is smooth and even and will not rub and chafe the threads. By means of the tube the lingo can be quickly and readily attached and secured to the lower end of the wire heddle.

It will be understood that some of the details of construction of my wire heddle may be changed, if desired.

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

1. A wire heddle for Jacquard looms, having an eye or loop at its upper end, a heddle-eye intermediate its ends, and a loop or eye at its lower end, and a tube thereon to secure the lower ends of the wire to the main portion or body of the heddle, substantially as shown and described.

2. The combination with a wire heddle for Jacquard looms, having an eye or loop at its upper end, of a tube on its lower end, through which the free ends of the wire extend, and are bent over the upper edge of the tube, to secure it in place on the wire heddle, and form an eye or loop at the lower end thereof for the lingo, substantially as shown and described.

3. The combination with a wire heddle for Jacquard looms, having an eye or loop at its upper end, a heddle-eye intermediate its ends, and a loop or eye at its lower end, of a tube mounted or strung on the wire heddle just above said loop or eye, and secured thereon by bending the free ends of the wire strands over the upper edge of said tube, substantially as shown and described.

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Witnesses:
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