No. 776,216. PATENTED NOV. 29, 1904.

E. BUTCHER.

HEDDLE.

APPLICATION FILED FEB. 15, 1904.

NO MODEL.

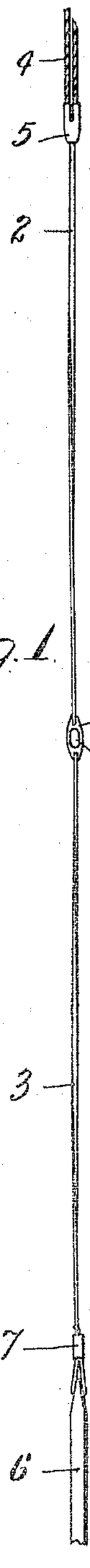


Fig. 1.

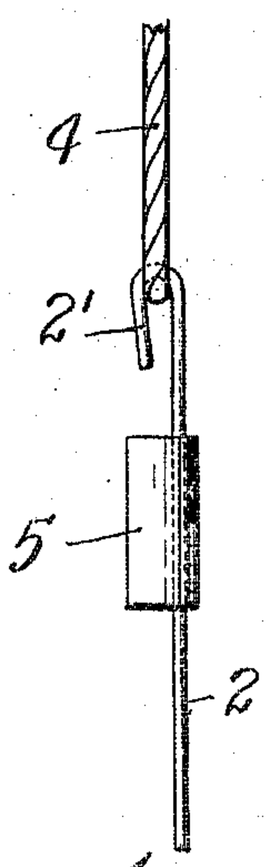


Fig. 2.

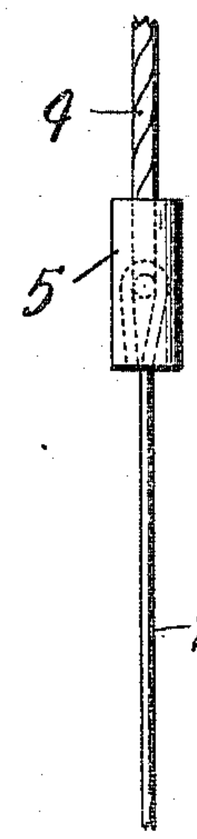


Fig. 3.

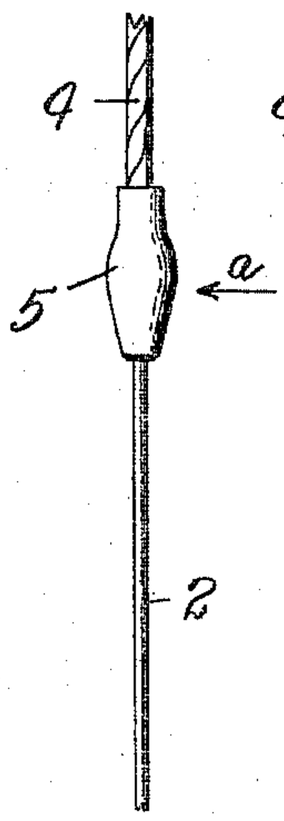


Fig. 4.

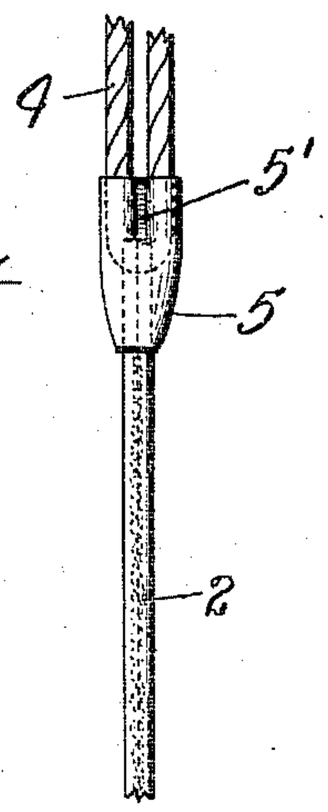


Fig. 5.

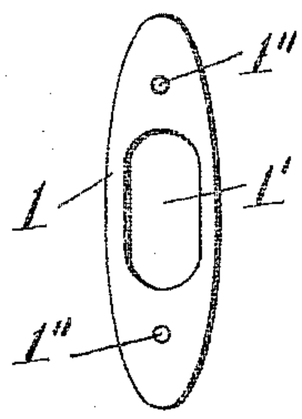


Fig. 6.

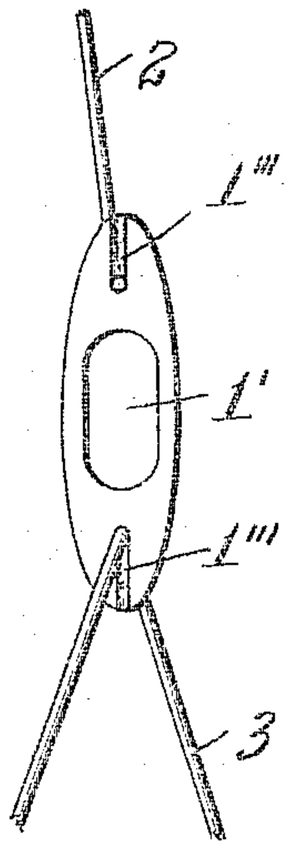


Fig. 7.

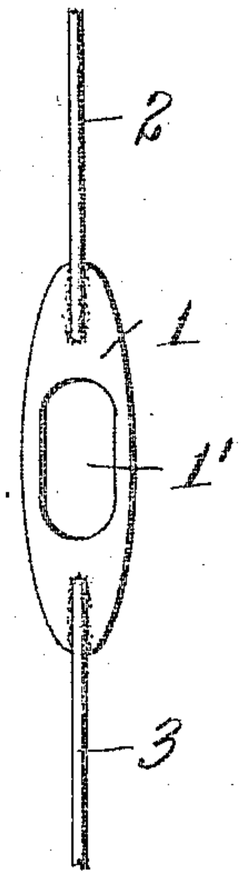


Fig. 8.

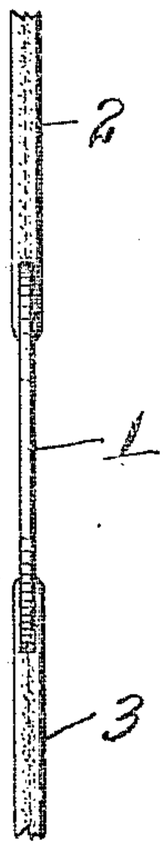


Fig. 9.

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John C. Dewey.

PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 776,216. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

EDWIN BUTCHER, OF WORCESTER, MASSACHUSETTS.

HEDDLE.

SPECIFICATION forming part of Letters Patent No. 776,216, dated November 29, 1904.

Application filed February 15, 1904. Serial No. 193,521. (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, of which the following is a specification.

My invention relates to heddles for Jacquard looms; and the object of my invention is to improve upon the construction of wire heddles as ordinarily made, and particularly that class of heddles in which the guide-eye of metal, through which a warp-thread passes, is made separate, with a central guide-opening for the warp-thread and a small hole through each end for the two separate wire strands forming the upper and lower part of the heddle. Each wire strand passes through one of the small holes in the guide-eye and is then bent to bring the two strands together and form a loop at each end of the guide-eye, the metal of which is not so hard as the wire. After each wire strand is inserted through the small hole in each end of the guide-eye and bent at about its middle point to form an attaching-loop pressure is applied to the loop end. The wire forming the loop is pressed into the guide-eye at each end thereof, so as to form a groove therein, and thus hold the guide-eye in position between the two strands of wire. Solder is then applied to the loop ends of the wire strands and the guide-eye to make a smooth surface and insure the rigid holding of the guide-eye by the wires. Each of the two strands of wire forming the upper and lower part of the heddle are preferably soldered together to form a single strand, and the free end of the upper strand is bent into hook shape to receive the loop on the cord leading to the jacquard, and a metal tube or sleeve is placed over the hook end and the loop on the cord and then compressed to bind the hook end of the wire and the loop on the cord within said tube. The free end of the wire on the lower part of the heddle is passed through the eye in the upper end of the lingo and then bent up to form a loop, and a tube or sleeve is placed thereon to secure the bent end and attach the lingo thereto, as fully shown and described in my United States Patent No. 587,472.

My invention consists in certain novel features of construction of my improvements, as will be hereinafter fully described.

Referring to the drawings, Figure 1 shows a wire heddle embodying my improvements and attached at its upper end to the lower end of the cord leading to the jacquard and attached at its lower end to the upper end of the lingo. Fig. 2 shows the lower end of the cord and the upper hook end of the heddle with the tube thereon before the parts are secured together. Fig. 3 corresponds to Fig. 2, but shows the tube in its operative position. Fig. 4 corresponds to Fig. 3, but shows an edge view of the tube after it has been compressed. Fig. 5 shows a side view of the tube shown in Fig. 4 looking in the direction of arrow *a*, same figure. Fig. 6 shows the metal guide-eye detached. Fig. 7 shows the metal guide-eye and the two wire strands connected thereto, with the grooves in the metal guide-eye formed by pressure on the loop ends of the wire strands. Fig. 8 shows a metal guide-eye and the two wire strands after they are attached together and soldered, and Fig. 9 is an edge view of the parts shown in Fig. 8. Figs. 2 to 9, inclusive, are shown on an enlarged scale.

In the accompanying drawings, 1 is the metal guide-eye, preferably made of sheet metal and having an opening 1′ through its central portion, forming the guide-eye for the warp-thread, and two smaller openings 1″, one at each end, to receive the wire strands 2 and 3, one of which, as 2, forms the upper part of the heddle and the other, as 3, forms the lower part.

The wire strand 2 is inserted through one of the openings 1″ in the guide-eye 1 and is bent back upon itself at about its middle portion to form a double strand, the bent portion forming a loop for attaching the end of the guide-eye 1. The strand 3 is inserted through the other opening 1″ in the guide-eye 1, also bent back upon itself to form a double strand, the bent portion forming a loop for attaching the other end of the guide-eye 1.

The loop end of the strand 2 and the loop end of the strand 3 where the guide-eye 1 is attached thereto are compressed sufficiently

to form grooves 1''' from the openings 1'' to the ends of the guide-eye 1 on each face of the guide-eye, as shown in Fig. 7.

Solder is applied to the loop ends of the strands 2 and 3 where they are connected with the guide-eye 1 to form a smooth surface at the point of connection of the strands 2 and 3 with the guide-eye 1, (see Figs. 8 and 9,) and solder is also preferably applied to the strands 2 and 3 throughout their length to form substantially one strand, as shown in Fig. 1.

The upper free end of the strand 2 is bent over to form a hook 2, as shown in Fig. 2.

The lower loop end of the cord 4 is fitted onto said hook 2', as shown in Fig. 2, and a tube 5, of yielding metal, having been first placed upon the upper end of the heddle, is moved up to extend over the hook end 2' and the lower part of the cord 4, as shown in Fig. 3. Pressure is then applied to the tube 5 to compress the same upon the upper end of the heddle and the lower end of the cord 4 and to indent the upper end of the tube between the ends forming the loop end of the cord, as shown at 5' in Fig. 5.

The lower free end of the lower strand 3 is passed through an eye or opening in the upper end of the lingo 6 and is then bent upwardly and a rigid tube 7, previously placed on the strand 3, moved down over the projecting end of the strand, and the end is bent over the upper edge of the tube to hold it in place, as fully shown and described in my Patent No. 587,472, above referred to.

It will be understood that the details of construction of my improvements in heddles may be varied, if desired.

The advantages of my improvements will be readily appreciated by those skilled in the art.

I provide a wire heddle in which the guide-eye is rigidly secured to the upper and lower strands of wire, forming the upper and lower part of the heddle, by compressing the wire loops connected with the metal eye sufficiently to force the wire into the metal eye, I reduce the thickness of the connection between the metal eye and the wire strands, and at the same time I prevent any movement of the wire strands on the guide-eye. By using solder I more securely attach the wire strands to the guide-eye and obtain a smooth surface. By means of the tube at the upper end of the heddle, which extends over the hook on the upper end of the heddle and also over the lower end of the cord and is compressed thereon, I obtain a very secure attachment between the end of the cord and the upper end of the heddle and at the same time furnish a smooth and even connection which has no projections thereon to interfere with the free up-and-down movement of the heddle at its upper end. The lower end of the heddle is constructed substantially the same as described and shown and in my United States Letters Patent above referred to.

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

1. As an improved article of manufacture, a heddle, comprising a metal guide-eye having an opening through which a warp-thread is adapted to be passed, and end openings, two strands of wire each being looped through one of the end openings and both parts thereof compressed into the metal of the eye to form a firm union between the parts of the wire and the metal of the eye, the two parts of the wire being further connected to the guide-eye and to each other beyond the guide-eye by solder.

2. The combination of a guide-eye, a heddle-cord having a loop, a strand of wire connected to the guide-eye and having a hook engaging said looped cord, and a tube of flexible material extending over and covering the hook-and-loop connection between the cord and wire, said tube being compressed upon the hook and loop at opposite sides of their point of engagement and presenting a smooth cover therefor.

EDWIN BUTCHER.

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