

(Model.)

J. BÉNAZET.
HEDDLE FOR LOOMS.

No. 462,854.

Patented Nov. 10, 1891.

Fig:2.

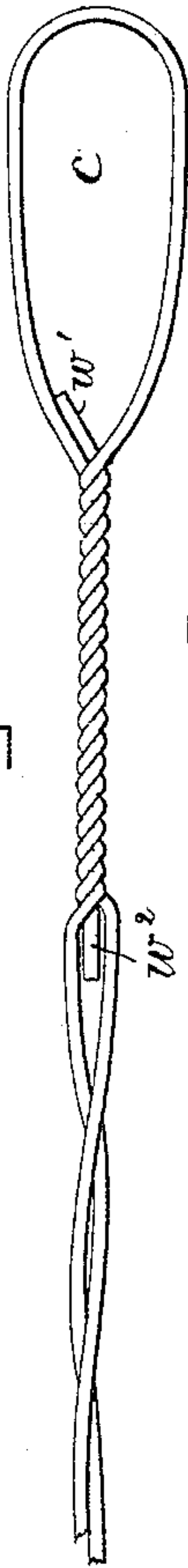


Fig:7

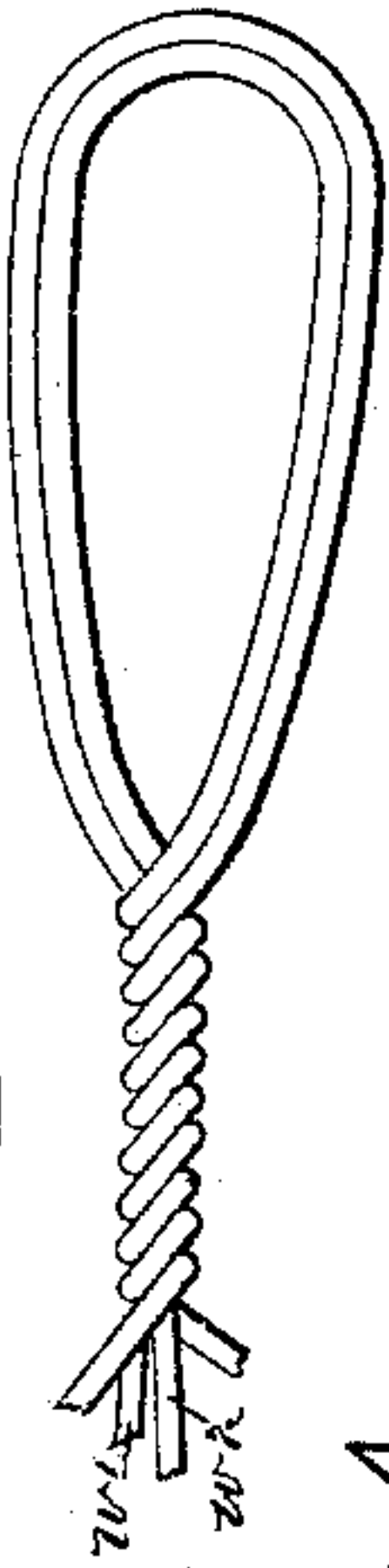


Fig:5.

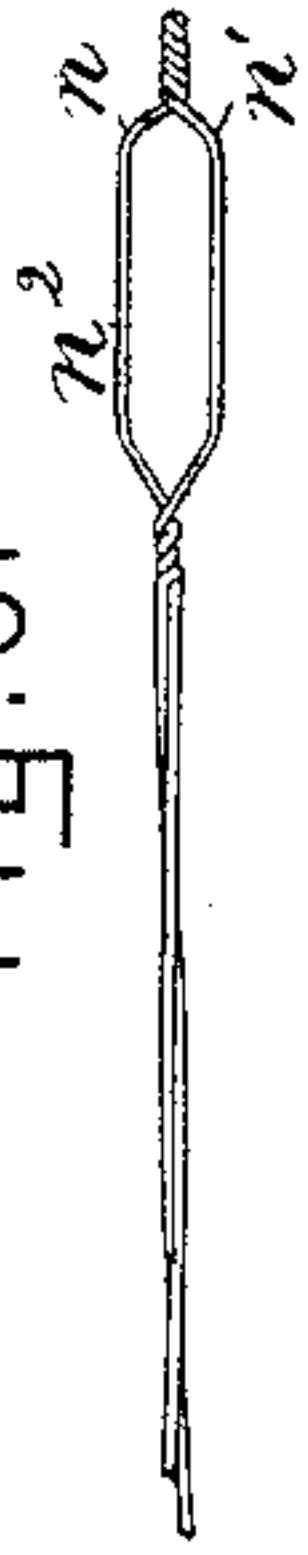


Fig:1.

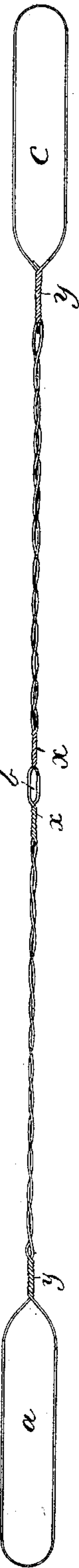


Fig:4.

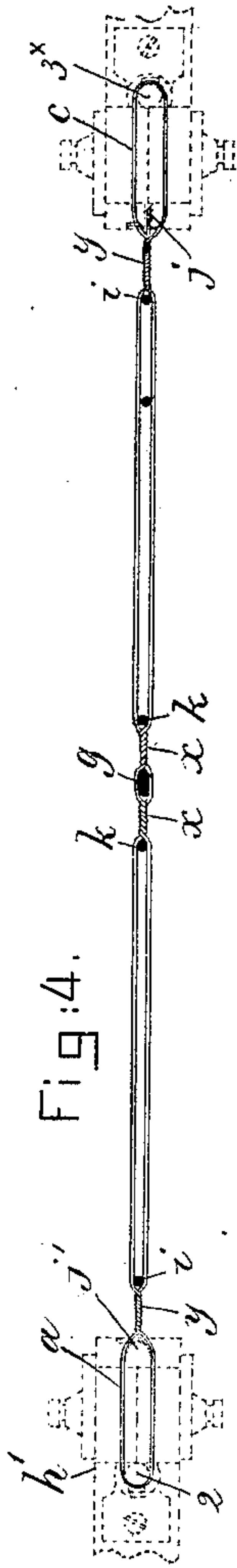


Fig:3.

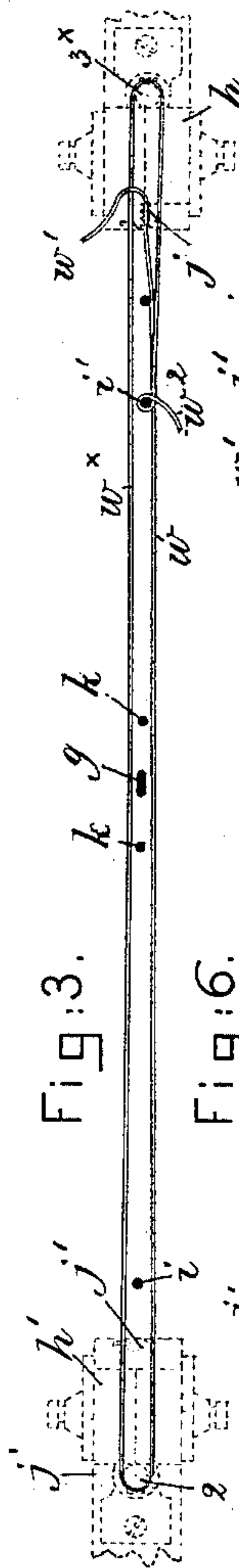
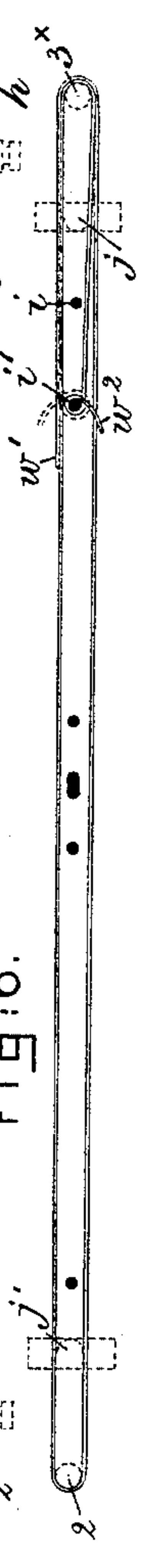


Fig:6.



Witnesses.
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UNITED STATES PATENT OFFICE.

JEAN BÉNAZET, OF RHEIMS, FRANCE.

HEDDLE FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 462,854, dated November 10, 1891.

Application filed February 25, 1891. Serial No. 382,688. (Model.) Patented in France August 26, 1886, No. 178,174, and in Belgium July 7, 1888, No. 80,488.

To all whom it may concern:

Be it known that I, JEAN BÉNAZET, a citizen of Rheims, France, but residing at present in Verviers, Belgium, have invented an
5 Improvement in Heddles for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object the production of a novel form of wire heddle.

My invention has been made the subject of patents in the following countries, viz: France, No. 178,174, dated August 26, 1886; Belgium,
15 No. 80,488, dated July 7, 1888.

In wire heddles now commonly in use one of the endmost eyes to embrace a heddle-frame bar or to be engaged by a cord, as when used in a Jacquard loom, presents the twisted
20 ends of the wire beyond and at the outer end of the eye, and such twisted projecting ends are objectionable for many reasons. In my efforts to overcome these objectionable projecting ends I have produced a wire heddle
25 in which each eye beyond the body of the heddle is continuous, the ends of the twisted wire being contained chiefly in the neck-twists of that eye, as will be described, or, in other words, one end of the wire forming the
30 improved eye is carried back on and past the other end, both ends and the main body of the wire being twisted together, as will be described.

Figure 1 shows a completed heddle embodying my invention; Fig. 2, a much enlarged view of that eye of the heddle in which my improvements are included. Fig. 3 represents a piece of wire held as it will be before it is twisted to form the heddle shown in
40 Fig. 1. Fig. 4 shows the wire twisted to form the end eyes and the intermediate thread-eye. Fig. 5 shows an eye such as commonly used at one end of wire heddles, which eye I have improved; and Fig. 6 shows a modification.
45 Fig. 7 is an enlarged view of a modified form of heddle-eye.

In the manufacture of my improved wire heddle I take a piece of wire w , (see Fig. 3,) place an end w' thereof in a slot of a finger j ,
50 forming part of a neck-twister block h , carry

the said wire marked w thence around a stud 2 of a second co-operating twister-block h' , as at the left in Fig. 3, the wire being led back to the other or right-hand twister-block, forming a return-strand w^x , and about a stud 3^x 55 thereon, and the end w^2 of the wire is then wrapped about a holding-pin i' , leaving a projecting end, as in Fig. 3. The two loops to be made into eyes for the ends of the heddle embrace the two fingers j j' on the twister- 60 blocks. Between the two strands of single wire, stretched, as stated, from one to the other twisting-block h h' , is placed a suitable warp-eye shaper (shown as a stud g) and also twist-limiting pins i i k k , which I prefer to 65 use, those pins i i limiting the extent of the hard twist at the inner end of each eye a c , the pin k limiting the extent or length of the harder twist at the ends of the warp-eye b . The stud g will in practice be carried by a 70 block adapted to rotate about the strands of wire while the stud is between the strands. Upon suitably rotating the carrier or hub for the stud g and the twisting-blocks, all as provided for in United States Letters Patent No. 75 407,325, granted to me July 23, 1889, the said patent showing the twisting-blocks, fingers, studs, and twist-limiting pins referred to, the strands will be twisted together, as shown in Fig. 4, and the twist having been put into the wire, 80 as in Fig. 4, the end w' of the wire is cut off at or near the finger j , and the end w^2 of the wire is removed from the pin i and cut off at or near the pin i , (shown at the right in Figs. 3 and 4,) leaving the said two ends pointing 85 in opposite directions, as in Fig. 2, where the end eye c , in which my invention is exhibited, is represented on an enlarged scale. The pins i i and k k will then be withdrawn. Preferably the two strands of wire between the 90 harder twisted parts, as the neck-twists y y and the eye-twists x x , will be further slightly twisted by rotating the twister-blocks after the pins i i and k k are retracted, leaving the heddle as in Fig. 1. 95

The patent referred to shows one form of apparatus by which to form my improved heddle; but herein the said mechanism is not claimed.

The eyes a and c may be of any usual or 100

desired shape and long or short, according to the loom in which the heddle is to be used. In the old form of heddle the two ends n n' of the wire twisted to form the eye n^2 are twisted
 5 together at the outer end of the said eye, whereas the eye c , containing my improvement, is composed of a continuous wire.

In accordance with my invention I form a loop from one end of the wire, as the end w^2 ,
 10 which is longer than the other end, and turn the end w^2 back and overlap the end w' , the said end w^2 when the neck-twist y is put in being wrapped or coiled about the end w' up
 15 and also about the body of the return-strand w^x , the neck-twist y so made containing three thicknesses, instead of two thicknesses, as at the opposite end of the heddle.

In Fig. 6 the end w^2 of the wire shown as
 20 fastened to the rod or pin i' is carried about the stud 3^x , thence around the stud 2, back around the stud 3^x , and the end w' may then be attached to the stud or pin i' , as shown by dotted lines, and the heads carrying the studs
 25 and projections j j' be then twisted, as described in Figs. 3 and 4, winding four layers or plies of the same wire into the neck-twist y , which will be made between the pin i and the projection j , the completed eye being
 30 shown enlarged in Fig. 7. It is not, therefore, intended to limit this invention to only

three layers of wire in the twist y , as there may be more than three layers.

In Fig. 6 the eye to be formed at the right and corresponding with the eye c will have
 35 two strands, as shown in Fig. 7, instead of one strand, as in Figs. 1, 2, 3, and 4.

I claim—

1. A wire heddle having at both ends continuous end eyes a c , separated from the body
 40 of the heddle by neck-twists y y , the wire from which the eye c is composed having one end carried back beyond what is to constitute the inner end of the said eye and to overlap the other end of the wire, the two over-
 45 lapped ends and the main strand w^x being twisted together, substantially as described, only at the inner end of the said eye.

2. A wire heddle having three or more thicknesses of wire at the inner end of that one of
 50 its end eyes which is made by twisting the ends of the wire together, the ends of the wire being twisted with the body of the wire at the inner end of the said end eye, substantially as represented.

In testimony whereof I have signed my
 55 name to this specification in the presence of two subscribing witnesses.

JEAN BÉNAZET.

Witnesses:

JAMES R. DANFORTH,
 J. GROTTY.