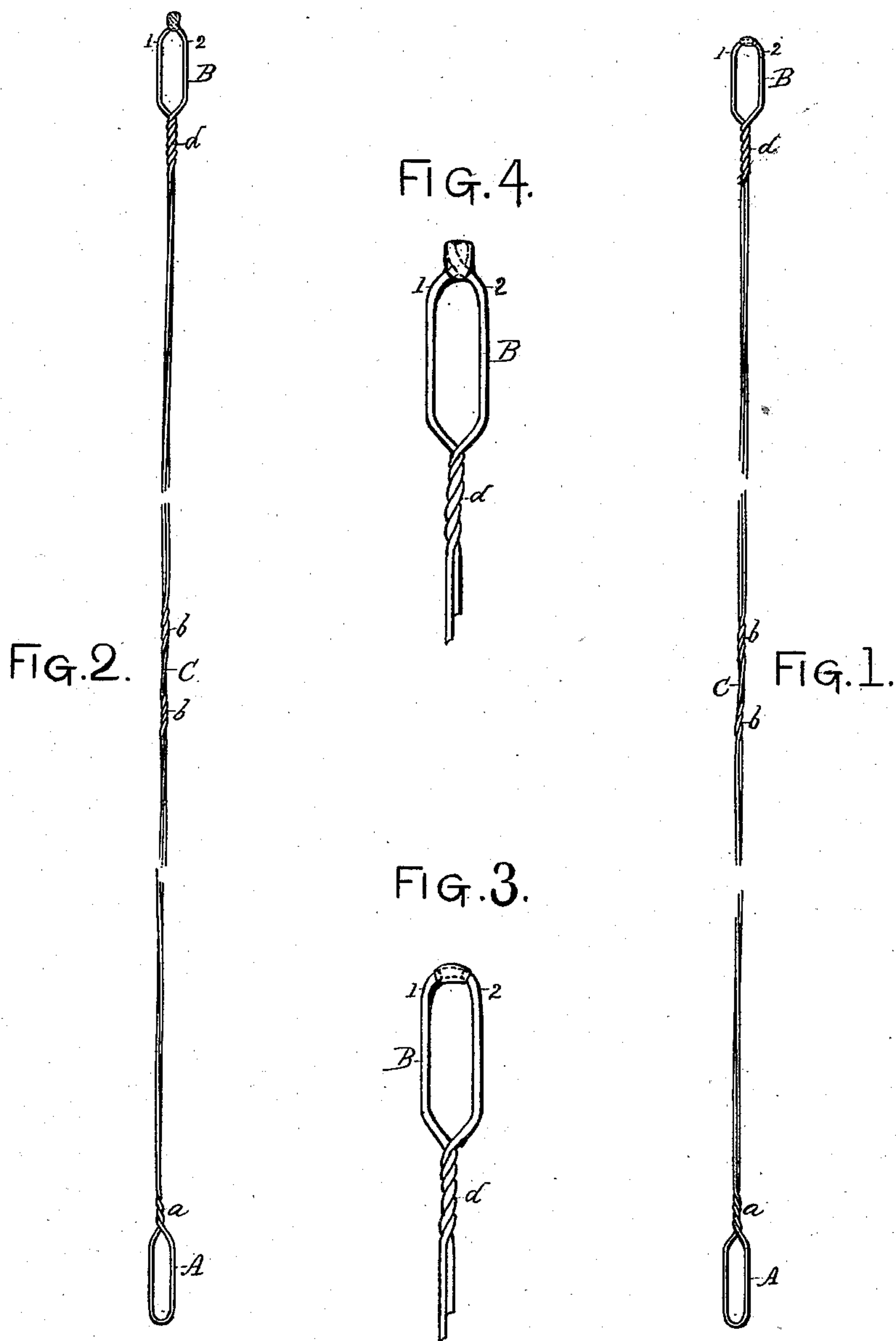


L. J. KNOWLES.
Wire Heddle for Harnesses of Fancy Looms.
No. 235,636. Patented Dec. 21, 1880.



WITNESSES:
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WIRE HEDDLE FOR HARNESSSES OF FANCY-LOOMS.

SPECIFICATION forming part of Letters Patent No. 235,636, dated December 21, 1880.

Application filed March 2, 1877.

To all whom it may concern:

Be it known that I, LUCIUS J. KNOWLES, of the city and county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Wire Heddles for Harnesses of Fancy-Looms; 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 a part of this specification, and in which—

Figure 1 represents a side view of so much of a wire heddle as is necessary to illustrate my present invention. Fig. 2 represents a side view of a wire heddle of a modified form. Fig. 3 represents, upon an enlarged scale, the upper end of the heddle shown in Fig. 1; and Fig. 4 represents, upon an enlarged scale, the upper end of the heddle shown in Fig. 2.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the operation of fancy-loom, in which a large number of harnesses are used, great difficulty was experienced in the use of wire heddles as they were constructed previous to my present invention. Such heddles were generally made by forming a loop, A, at one end, with a twist, *a*, at the inner end of the loop, and two twists, *b b*, one at each end of the eye *c* of the heddle, and another twist, *d*, at the inner end of the loop B, at the other end of the heddle, while the ends of the wire, 1 and 2, were extended and twisted together for some distance beyond the outer end of loop B. This mode of uniting the ends of the wire together by twisting them a sufficient number of times to hold securely was found very objectionable when the harness-frame had to be crowded close together. Such twisted ends were liable to become bent, and, being rough, would catch and tear not only the harness-frames, but the heddles and warp-threads. They were also liable to catch lint to such an extent that it required a great deal

of time to keep them clean, and particularly was this the case in arranging the harness for a new web.

To avoid some of the difficulties above referred to resort was had to expensive arrangements for covering the entire projecting ends of the heddles with a long sheath or shield; but this complicated arrangement, while it protected the ends of the heddles in a measure, involved other and quite as serious objections, since a heddle could not be replaced or repaired in a convenient and practical manner, the heddle-bars not being accessible.

To obviate such objections is the object of my present invention, which consists in soldering together the ends 1 and 2 of the heddle-wire after they have been bent and lapped by each other, as indicated in Figs. 1 and 3 of the drawings, or partially twisted together, as shown in Figs. 2 and 4 of the drawings.

By this mode of construction the heddles can be made with very slight projections at the outer ends of the loops B, while by the combination of solder with the ends 1 and 2 of the heddle-wire they are held securely together, and at the same time their sharp corners or ends are covered and protected by the solder.

I have been able by this mode of constructing the harness-heddles to run a loom with forty harnesses compressed into a comparatively narrow compass in the line of the warp-threads.

Having described my improvement in wire heddles for harnesses in fancy-loom, what I claim therein as new and of my invention, and desire to secure by Letters Patent, as an improved article of manufacture, is—

A wire harness-heddle having the ends 1 and 2 of the wire which form the loop B lapped or united and then soldered, substantially as shown and described.

LUCIUS J. KNOWLES.

Witnesses:

EDWIN E. MOORE,

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