M. Finkle.
Heddle.

No. 49,251. Patented Aug. 8, 1865.

Fig. 1.

Fig. 2.

Witnesses:

Richard Thompson

Emil J. Hertle

Inventor.

Milton Finkle

The drawing in this patent is not in print.

UNITED STATES PATENT OFFICE.

MILTON FINKLE, OF NEW YORK, N. Y.

IMPROVEMENT IN WIRE HEDDLES FOR LOOM-HARNESS.

Specification forming part of Letters Patent No. **49,251**, dated August 8, 1865.

To all whom it may concern:

Be it known that I, MILTON FINKLE, of No. 146 West Twenty-Fourth street, in the city of New York, county and State of New York, have invented a new and Improved Heddle; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 is a front view of a heddle made according to my invention, and Fig. 2 is a side view.

This invention consists in making a heddle so that its body shall be composed of only one strand of wire or other material of which it may be made, thereby securing lightness with sufficient strength; and it also consists in so forming the eye that it shall have a smooth surface without angles in its ends, as in the wire heddle now made.

A is a heddle made of one strand of wire. Its eye is designated by the letter B, and its loops, by means of which it is secured in the heddle-frame, are designated by the letter C.

Wire heddles for weaving, as now made, consist of two strands, or of one strand doubled upon itself, the eyes and loop being made by twisting the two strands over each other in opposite directions, or from each end of the eyes and loops, so that their sides consist of separate strands which are brought together at the ends of the eyes and loops and then twisted one upon another, while those portions which lie between the eyes and loops are of course double, consisting of both the strands of wire. The eyes terminate at each of their ends in sharp angles made by bringing the two strands together in the manner just described. These angles are very disadvantageous and objectionable in weaving, because the yarn is apt to be caught in them when the harness is raising the shed in the operations of weaving, and the strands are often frayed and sometimes broken in consequence thereof. The loops have like angular terminations; but since they serve only the purpose of securing the heddle in its frame, their construction is not so objectionable in this respect.

My invention has for its object to make a heddle whose eye has a smooth inner surface without angles or crevices at its ends or elsewhere to fray or catch the yarn of the warp, and also to lessen its weight and cost by making the heddle of a single strand.

In the example of my invention here shown the heddle A is made of a single strand of wire. The loops C C, which furnish the means of securing it in the heddle-frame, are made by bending the ends of the wire so as to form oblong openings. The wire at the beginning of the loops is first bent outward, as at *e*, to make an offset from the strand equal to half the width of the loop. The loop is then completed by bending the end of the wire into the shape shown in the drawings, its extremity being brought beneath the shoulder or offset *e*, and curved or bent so as with that offset to form a half-circle; or the loop may be formed in the way shown at the upper end of the heddle in Fig. 2, the end of the wire being brought near to the offset *e* and the side of the loop left partly open. The loops are so formed and arranged that if the axial line of the strand composing the body of the heddle be extended through the loops it will be coincident with their longer axes. This is accomplished by means of the offset *e*.

The eye B is an oblong opening situated at about the middle of the length of the heddle, made by reversing the directions of the ends of the strand, and laying the portions between the curved parts *d d* over or upon each other, as seen at *a b*, Fig. 2. At each end of the eye the strand is bent to a half-circle, the portions between being straight and parallel with each other. After the eye is formed each strand is bent inward, as at *d*, to bring it into coincidence with the longer axis of the eye, the curves at *d* being also coincident with the ends of the eye.

The layers which compose the eye are connected to each other by soldering or other suitable means at the points *d d*, and also, if desired, between those points, for the purpose of preventing the parts composing the eye from springing apart by their own elasticity, or from being forced apart in the operations of weaving, or from accident. This soldering may be omitted if the eye remains compact and firm without it. This mode of constructing heddles enables me to make a great saving in stock, be-

cause they are formed of only one strand instead of two, as heretofore. I thereby also decrease their weight, and consequently less power is needed to cause the necessary reciprocations of the harness, and the wear of those parts of the loom which are connected with the harness is lessened. I also prevent the difficulty which forms a prominent objection to wire heddles as heretofore made—namely, that of catching and raising the warp—by making their eyes smooth, so that the yarn or warp-thread cannot lodge or be caught or be frayed in them.

It will be observed that I preserve the rotundity of the strand in the formation of the eye, and also form it without angles or crevices. Any material capable of being bent in the way described, and which has a smooth surface and strength enough to retain the shape given to it, may be used instead of wire, and strands of any kind of metal or metallic composition may be used.

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

1. Making weavers' heddles of a single strand of wire, substantially as and for the purpose above described.

2. Forming the eyes of wire heddles with smooth surfaces by bending the strand, substantially as above described.

3. Soldering the eyes of wire heddles for the purpose of keeping them compact and firm, substantially as above described.

MILTON FINKLE.

In presence of—

RICHARD THOMPSON.

EMIL T. HERTLE.