

No. 661,656.

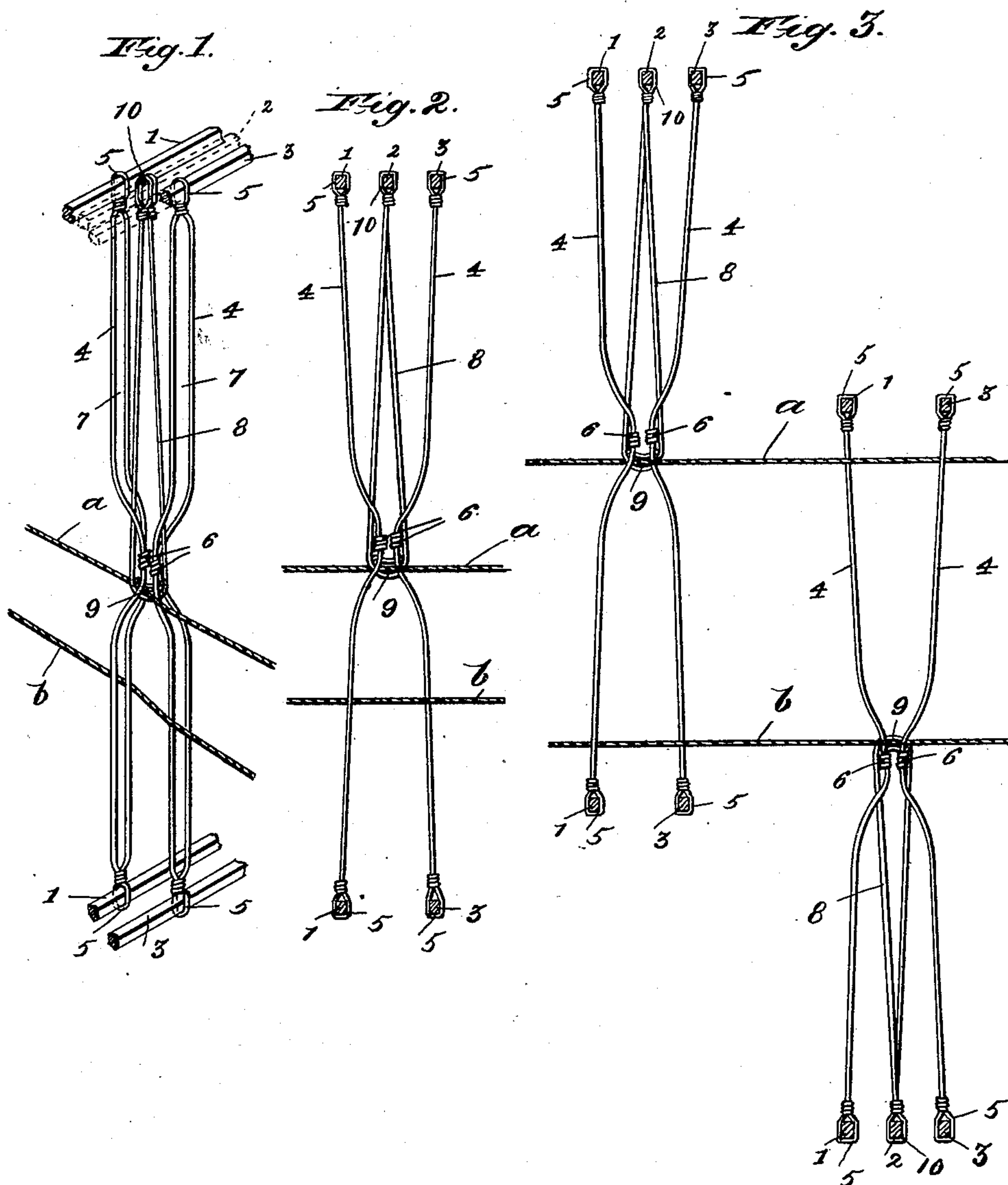
Patented Nov. 13, 1900.

W. B. DIXON.
HARNESS FOR CROSS WEAVING.

(Application filed Mar. 24, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 4. Fig. 5.

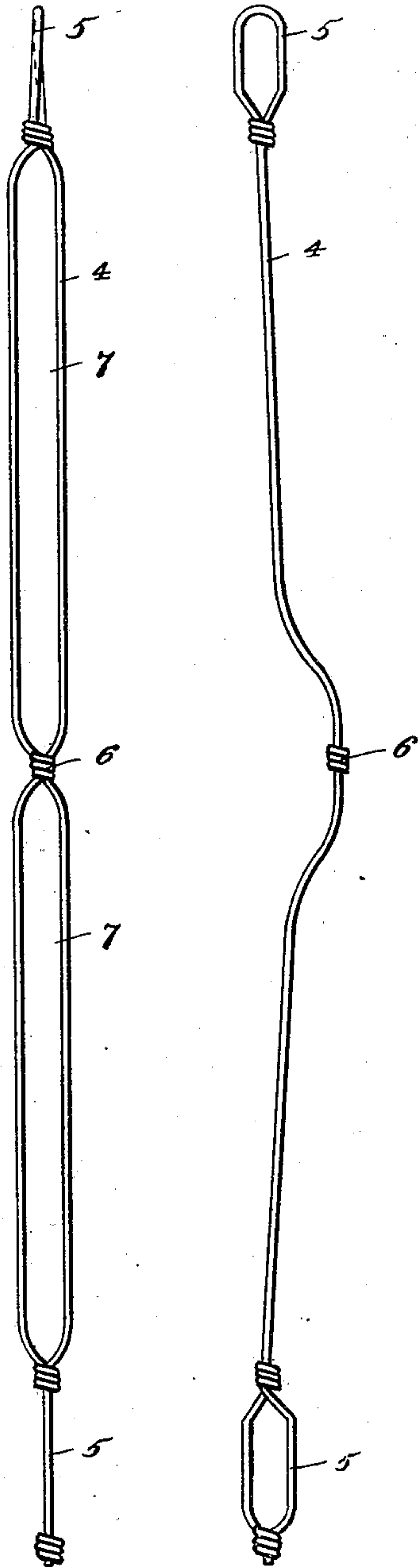


Fig. 6. Fig. 7.

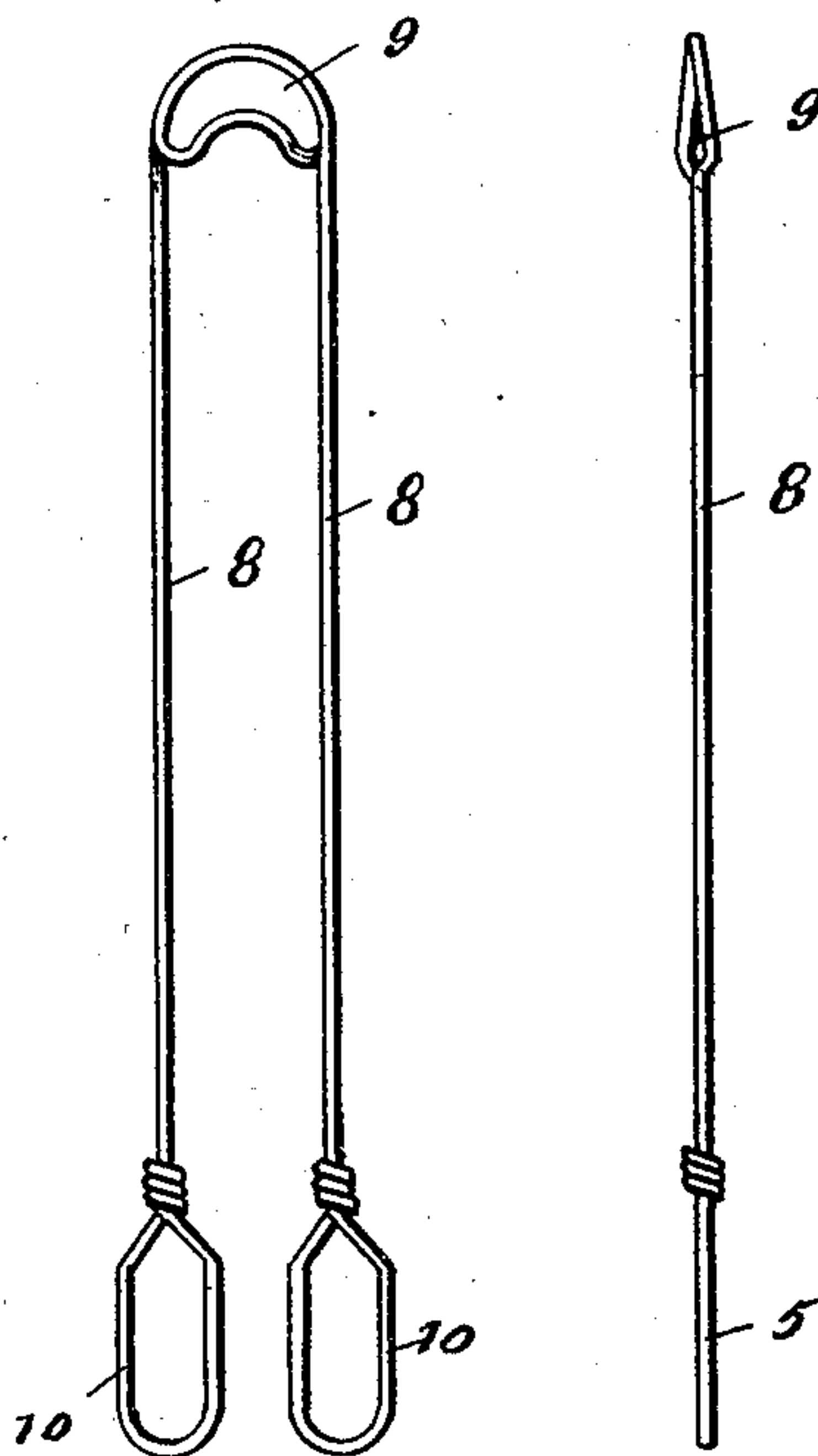
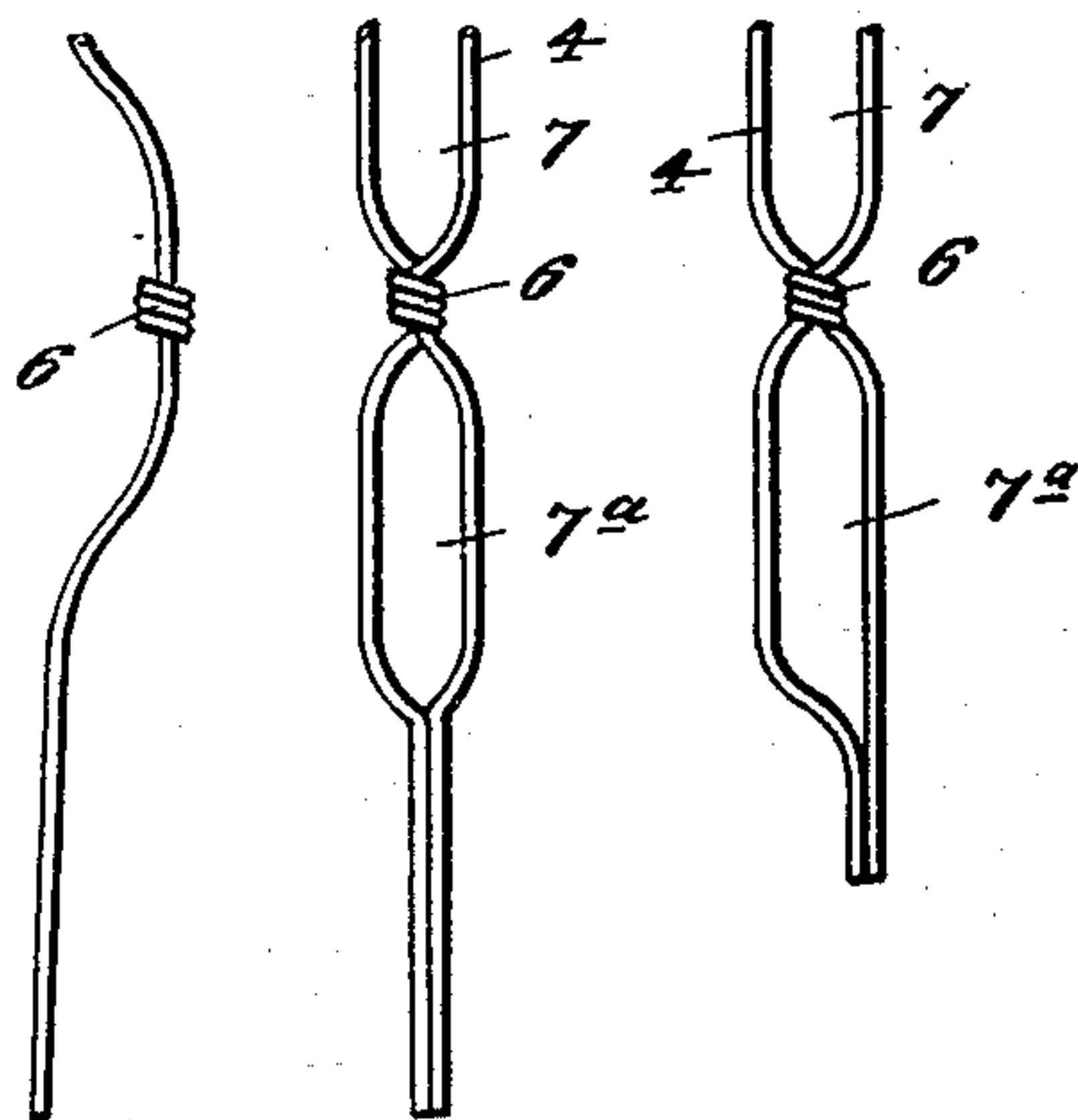


Fig. 8. Fig. 9. Fig. 10.



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UNITED STATES PATENT OFFICE.

WILLIAM B. DIXON, OF PHILADELPHIA, PENNSYLVANIA.

HARNESS FOR CROSS-WEAVING.

SPECIFICATION forming part of Letters Patent No. 661,656, dated November 13, 1900.

Application filed March 24, 1897. Serial No. 628,936. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. DIXON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Harness for Cross-Weaving; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to loom-harness for use in that method of weaving known as "cross-weaving," so called for the reason that the warp-threads are crossed or twisted about each other at as many points in the shed as is desirable and either for a single pick or a succession of picks, according to the pattern or design to be produced. Harness of this type is of great advantage in the weaving of lenos and chenille fabrics, in which the crossing of the warp-threads is essential to the production of the designs commonly adopted for such fabrics.

The essential features of my improved harness may be said to consist, speaking generally, of a heddle or, more strictly, a half-heddle, which is strung upon a heddle-frame at one end and at its other or free end is strung upon or engages guides. Said guides or standards, which form an essential feature of my invention, are of peculiar form and are strung upon heddle-frames at either end in a manner similar to the mounting of the ordinary heddle, these guides or standards and the half-heddles mentioned above being so disposed with respect to each other and the warp-threads as to effect the crossing of the warps to produce the pattern desired in an expeditious and perfect manner.

In the drawings herewith, Figure 1 is a perspective view of a set of guides and a half-heddle with portions of the heddle-frames, to show the manner of stringing the heddles and guides and the position of the warp-threads, the heddle-frames being broken away for the sake of clearness of illustration. Fig. 2 is a view of the same parts looking across the shed, portions of the warp-threads being

shown in their relative positions. Fig. 3 is a view similar to Fig. 2, showing duplicate sets of guides and heddles, with half-heddles arranged above and below the warp-threads. Figs. 4 and 5 are front and side views, respectively, of a heddle-guide. Figs. 6 and 7 are front and side views, respectively, of a half-heddle, while Figs. 8, 9, and 10 illustrate modified forms of heddles.

For each heddle and its two guides it is necessary to have three frames 1 2 3, and upon frames 1 and 3, called "guide-frames," the guides 4 are strung. Said guides 4 are preferably formed of a single piece of wire twisted so as to form eyes 5 5 at either end, through which the bars of the frames 1 and 3 pass, as in the stringing of the ordinary heddle. Said wire is also twisted at its center, as at 6, and a portion of the guide at this point is bent or offset, as shown in Figs. 5 and 8. By this construction the portions of the guide between the central offset twist 6 and the eyes 5 at the ends of the guides are left in the form of long open loops 7, Fig. 4, which lie in a plane at right angles to the plane of the said eyes 5. In the modified forms of guide illustrated in Figs. 8, 9, and 10 the lower body-loop of the guide is considerably shortened and terminates at a point just below the central twist 6 in a smaller loop 7^a, as shown, the free ends of the wire being soldered or otherwise suitably secured to close them and make the guide-loop rigid.

The half-heddle 8 is preferably made of a single piece of wire bent at its middle, as shown in Fig. 6, to form a crescent-shaped eye 9, through which the warp-thread passes, and having its ends formed into eyes 10 10, similar to ordinary heddle-eyes, through which the bar of the heddle-frame 2 passes. In the single form of harness shown in Figs. 1 and 2 but one half-heddle, with its guides, is used; but where it is desirable to cause the crossing of a pair of warps at each alternate pick the harness is duplicated, as shown in Fig. 3.

Having described the construction of the heddle and its guides, I will now describe the disposition of the heddle and guides with respect to each other and the arrangement of the warp-threads relative to the heddles and guides.

The limbs of the heddle 8 pass through the long open loops 7 of the guides 4 on either side of the heddle, so as that the heddle straddles the twists 6 at the center of said guides, and when the eyes 5 at the ends of the limbs of the heddle 8 are strung on the bar of the middle frame 2 and said guides and heddle are interlaced the crescent-shaped eye 9 of said heddle rests upon the twists 6 of said guides 4, these guides, as has been stated, being strung upon the upper and lower bars of the frames 1 and 3. The crossing thread *a* runs from its warp-beam through the crescent-shaped eye 9 and between the divergent arms of the guides 4 4, while the warp-thread *b*, about which the crossing thread *a* is twisted, passes between the divergent arms of the guides 4 4, Fig. 1, and then through its particular heddle, which latter being of ordinary construction is not illustrated. It will be apparent that if the frame 1 be depressed the twist 6 will engage the crescent-shaped eye 9 and carry the heddle 8, with its thread *a*, down past the body-thread *b* to form the shed on one side of said body-thread, and if the frame 3 be given a like movement it will carry the heddle 8 down on the other side of said body-thread, and so a crossing of the threads will be made at each alternate pick or as often as the design calls for a crossing or twist. The long open loops 7 in the guides allow free movement of the heddle 8 when either of the guides is at rest and the other is active, while the offset in the guides at their centers, where the twist occurs, leaves ample room for the threads to pass between the heddle and guide, which is at rest, this being important when crossing threads of considerable size are used, since all danger of fouling or pinching the threads between the guides and heddle is thereby obviated.

The heddle 8 is made with the crescent-shaped eye, as shown, to give a rounded top or crown to the heddle, which will deflect the threads readily, and the inside bend or arch 10 provides a suitable seat for the central twist 6 in each of the guides when said guides are moved to operate the heddle. The limbs of the heddle 8 are bent inwardly just below the eye 9, so as to bring them into alinement with each other, and the deflection of the threads as the heddle-eye passes them is therefore very slight. The wire forming the eye 9 may be soldered together at the point where it is doubled upon itself in order to lessen the danger of the threads being caught therein.

In the modified form of guides shown in Figs. 8, 9, and 10 the guide 4 is shortened and terminates in a short open loop 7^a just below the central twist 6, the guides in this form being strung upon one of the bars of the frame instead of being strung upon both the upper and lower bars, as in the type shown in the other figures. In the modified forms the

other features—as the offset, the central twist, &c.—are preserved.

The operation of the harness when the short heddle-guide illustrated in Figs. 8, 9, and 10 is used is the same as when the full heddle, above described, is used, the only difference between this and the other form shown being that the heddle-guides are only supported at one end instead of being strung on the frame at both ends.

Cross-weaving heddles and guides, made as shown and described, prevent all danger of fouling of the threads, are very flexible and durable, reduce the friction on the threads to a minimum, admit of high speed in the operation of the loom, and can be used with or without plain harness.

It will be understood, of course, that the frames will be operated in any suitable manner by cams and treadles, by dobby mechanism, or by a direct lift-and-pulldown switch; but as these devices are old and well known to those skilled in the art and form no part of my present invention it is not thought necessary to illustrate or describe them.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A heddle for cross-weaving formed of a single piece of wire doubled upon itself at its center to form a crescent-shaped eye for the crossing thread, the inner side of which is curved or arched to form a seat to receive a heddle-guide or heddle-operating device and having stringing-eyes at the ends of its legs lying in the same plane with said crescent-shaped eye.

2. A heddle for cross-weaving formed of a single piece of wire doubled upon itself at its center to form a crescent-shaped eye for the crossing thread, the inner side of which is curved or arched to form a seat to receive a heddle-guide or heddle-operating device the legs of said heddle being offset above said eye so as to bring them into the same plane and having stringing-eyes at their ends.

3. A guide for cross-weaving heddles formed of a single piece of wire twisted at its ends to form stringing-eyes, having long, open loops extending from said stringing-eyes at right angles thereto to receive the legs of the heddle, and having a central twist between the said loops to engage and operate the heddle.

4. A guide for cross-weaving heddles formed of a single piece of wire twisted at its ends to form stringing-eyes, having long, open loops extending from said stringing-eyes at right angles thereto to receive the legs of the heddle, and having an offset, central twist between the said loops to engage and operate the heddle.

5. In a cross-weaving harness for looms, the combination with a heddle having a crossing-thread eye, of a supporting-frame for said heddle; heddle-guides for said heddle having closed, offset portions engaging said heddle,

said guides having open loops on either side of said offset portion through which the legs of the heddle pass, whereby movement of either of said guides will operate said heddle 5 without disturbing the other guide, and operating frames on which said heddle-guides are strung.

6. In a cross-weaving harness for looms, the combination with a heddle having a crescent-shaped eye for the crossing thread, the inner side of said eye being curved or arched to form a seat for the heddle-operating guides, of a supporting-frame for said heddle; heddle-guides having closed, offset central portions engag-

ing the curved seat of said heddle-eye, said 15 guides having long, open loops on either side of said closed offset portion through which the legs of the heddle pass, and stringing-eyes at either end; whereby movement of either of said guides will operate said heddle without 20 disturbing the other guide, and operating frames on which said heddles are strung.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM B. DIXON.

Witnesses:

GILBERT ACHUFF,
JACOB P. DETWILER.

It is hereby certified that in Letters Patent No. 661,656, granted November 13, 1900, upon the application of William B. Dixon, of Philadelphia, Pennsylvania, for an improvement in "Harness for Cross-Weaving," an error appears in the printed specification requiring correction, as follows: In line 87, page 2, the word "switch" should read *witch*; and that the said Letters Patent should be read with this correction, therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 20th day of November, A. D., 1900.

[SEAL.]

THOS. RYAN,
First Assistant Secretary of the Interior.

Countersigned:

C. H. DUELL,
Commissioner of Patents.