

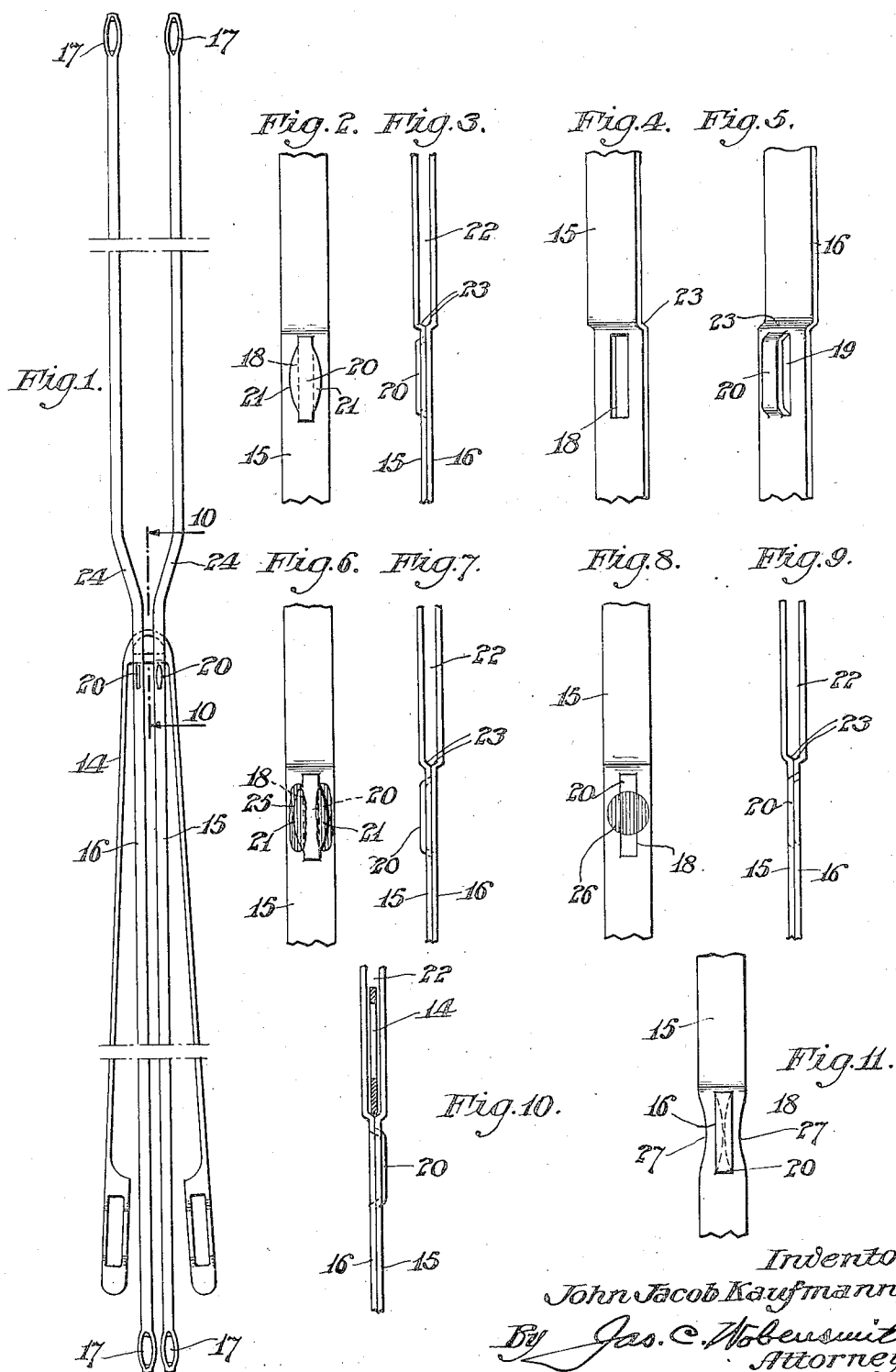
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J. J. KAUFMANN

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HARNESS FOR CROSS WEAVING

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## HARNESS FOR CROSS WEAVING

John Jacob Kaufmann, Elkins Park, Pa., assignor  
to Steel Heddle Manufacturing Company, Phil-  
adelphia, Pa., a corporation of Pennsylvania

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This invention relates to harness for cross weaving (sometimes called doup, leno, or gauze weaving), and it relates more particularly to the construction and arrangement of the standard or lifting heddles used in flat steel cross weaving harness for raising the doup needle, thereby to cause the doup thread to be elevated on one side or the other of the ground thread, as required in the formation of the weave.

The principal object of the present invention is to provide a novel form of standard or lifting heddle for cross weaving harness which may be inexpensively constructed and in the use of which likelihood of fouling of the warp will be reduced to a minimum.

A further object of the invention is to provide, in a two-strip standard or lifting heddle, improved means for uniting the two strips to each other to form the complete heddle.

A further object of the invention is to provide, in a two-strip standard or lifting heddle, a novel form of seat for engagement with the inner under margin of the eye portion of the doup needle.

A further object of the invention is to provide a novel form of standard or lifting heddle which is particularly adaptable for use in connection with the weaving of fabrics of high count, in that the heddles are suitable for close installations in either jacquard or shaft harness.

The nature and characteristic features of the present invention will be more readily understood from the following description, taken in connection with the accompanying drawing forming part hereof, in which:

Figure 1 is an elevational view of a set of loom harness elements comprising a pair of standard or lifting heddles and a doup needle cooperating therewith, the heddles there shown embodying the main features of the present invention;

Fig. 2 is an elevational view, enlarged, of the central portion of one of the standard or lifting heddles shown in Fig. 1;

Fig. 3 is a side elevation thereof;

Fig. 4 is a perspective view, enlarged, illustrating the central portion of one of the strips for forming the composite heddle shown in Figs. 1 to 7 of the drawing;

Fig. 5 is a similar view of the central portion of the other strip;

Fig. 6 is a view similar to Fig. 2, illustrating a modified form of the invention;

Fig. 7 is a side elevation of the structure shown in Fig. 6;

Fig. 8 is a view similar to Fig. 2, illustrating another modified form of the invention;

Fig. 9 is a side elevation of the structure shown in Fig. 8.

Fig. 10 is a vertical section, enlarged, taken approximately on the line 10—10 of Fig. 1; and

Fig. 11 is a view similar to Fig. 2, illustrating another modified form of the invention.

It will, of course, be understood that the description and drawing herein contained are illustrative merely, and that various modifications and changes may be made in the structure disclosed without departing from the spirit of the invention.

As the present invention relates more particularly to the standard or lifting heddle, the needle may be of any preferred form, such, for example, as that shown in my previous Letters Patent No. 1,037,151, being preferably punched or formed from a strip of thin flat metal. It should be understood, however, that the particular formation of the doup needle forms no part of the present invention, and that the standard or lifting heddles of the present invention are applicable for use in the control of other forms of doup needles.

The preferred form of the standard or lifting heddle comprising the present invention is shown more particularly in Figs. 1 to 5, and 10 of the drawing. Each lifting heddle is made of two strips 15 and 16 of thin flat metal, each of which is provided at its respective ends with eyes or mortises 17, for attachment of the jacquard cords and lingoos, in the case of jacquard harness, or for mounting the same on the usual heddle rods in the frames, in the case of shaft harness.

The present invention resides more particularly in the manner in which the two strips 15 and 16 of which each heddle is formed are united to each other adjacent the point of engagement with the eye portion of the doup needle 14.

Referring now more particularly to Figs. 4 and 5 of the drawing, the central portion of one of the strips 15 is provided with a slot 18. The other strip 16 is complementally slitted, as at 19, and the part 20 of the slitted portion 19 is pressed out of the adjacent plane of the strip 16 a distance of approximately double the thickness of the strip 16. The pressed out portion 20 of the strip 16 is then inserted in the slot 18 of the strip 15 preferably extending through the same to the outside. The part 20, which is on the outside of the strip 15, is then manipulated to cause a portion thereof to overlap the side margins of the slot 18, as

at 21, thus effectively keying the two strips 15 and 16 to each other (see Figs. 2 and 3).

The preferred manner of manipulating the strip 15 to cause the overlap above referred to is to swage the metal of the middle part 20 of the slitted portion of the strip 16, thereby to spread the same, although it will, of course, be understood that the overlap, for the purpose of keying the two strips to each other, may be obtained in various other ways, as will be readily apparent.

For example, instead of spreading the middle part 20 of the slitted portion 19 as shown in Figs. 2 and 6 of the drawing, this part 20 may, as shown in Fig. 11, be left unspread and the side shanks of the slotted portion of the strip 15 may be pressed inwardly toward each other, as at 27, in back of the middle part 20 of the slitted portion of the strip 16.

At least one, but preferably both, of the strips 15 and 16 may be offset (see Figs. 2, 3, 4, 5, and 10) immediately above the slotted and slitted portions of the respective strips 15 and 16, thereby to provide a separation of said strips immediately above the point of interlock of the same, the upper end of the doup needle 14 being positioned in the space 22 provided by this separation of the strips 15 and 16. This offset is preferably rather acute, whereby shoulders 23 are provided which the inner under margin of the eye portion of the doup needle 14 is adapted to engage. Each of the lifting heddles may also be offset as at 24, in the usual manner, to permit greater freedom of the doup needle when the same is actuated by the raising of one or the other of the standard or lifting heddles.

The form of the invention shown in Figs. 6 and 7 of the drawing is the same as that shown in Figs. 1, 2, and 3, with the exception that after the standard or lifting heddle is assembled and the two strips thereof are interlocked, the interlocked portion may be soldered as at 25, thereby affording greater security should this be deemed necessary.

The form of the invention shown in Figs. 8 and 9 of the drawing differs somewhat from the forms shown in the other views, in that in this instance the pressed out slitted portion 20 extends but a distance corresponding to the thickness of the strip 15, so that when said pressed out portion 20 is inserted in the slot 18 in the other strip 15, the outer surface thereof will coincide with and lie in the same plane as that of the outer surface of the slotted strip 15.

After the two strips shown in Figs. 8 and 9 are assembled by the insertion of the slitted portion 20 of one strip in the slot 18 of the other, the two strips 15 and 16 are spot welded to each other as indicated at 26, in this instance eliminating the necessity of spreading the part 20 of the slitted portion which extends through the slot 18 of the other strip, as in the other forms.

In each of the forms of the invention, when the pressed out middle part 20 of the slitted portion of the strip 16 is inserted in the slot 18 of the strip 15, the two strips will be properly positioned with respect to each other and held in such relationship until the two strips are permanently united to each other, either by the spreading of the pressed out portion 20, by the soldering, or by the spot welding, as hereinbefore set forth.

I claim:

1. A heddle for loom harness comprising two flat strips of metal, one of said strips having a pressed out part and the other of said strips hav-

ing a slot into which said pressed out part extends, and the strips being permanently secured to each other adjacent the point of engagement thereof.

2. A heddle for loom harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending into and through said slot and extending laterally beyond the side margins of the slot to secure the strips to each other.

3. A standard or lifting heddle for cross weaving harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending through said slot and extending laterally beyond the side margins of the slot to secure the strips to each other.

4. A standard or lifting heddle for cross weaving harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending through said slot and extending laterally beyond the side margins of the slot to secure the strips to each other, and at least one of said strips having its upper portion offset out of the plane of the lower portion immediately above the slitted and slotted portions thereby to provide a seat for a portion of a doup needle.

5. A heddle for loom harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending into said slot, and said strips being soldered at the point of engagement of said slitted and slotted portions thereof.

6. A standard or lifting heddle for cross weaving harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending into said slot, and said strips being soldered at the point of engagement of said slitted and slotted portions thereof.

7. A standard or lifting heddle for cross weaving harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending into and through said slot and extending laterally beyond the side margins of the slot to secure the strips to each other, and said strips being soldered at the point of engagement of said slitted and slotted portions thereof.

8. A heddle for loom harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other strip, said pressed out part extending into said slot, and said strips being welded to each other at the point of engagement of said slitted and slotted portions thereof.

9. A standard or lifting heddle for cross weaving harness comprising two flat strips of metal, one of said strips having a slot therein, and the other of said strips being slitted to provide a pressed out part engaging the slot of the other

strip, said pressed out part extending into said slot, and said strips being welded to each other at the point of engagement of said slitted and slotted portions thereof.

5 10. A heddle for cross weaving harness comprising two flat strips of metal arranged face to face, at least one of said strips having its upper portion offset out of the plane of the lower por-

tion to provide a seat for a portion of the doup needle, and, below said offset portion, one of said strips having a pressed out part and another of said strips having a slot into which said pressed out part extends, the strips being permanently 5 secured to each other adjacent the point of engagement.

JOHN JACOB KAUFMANN.