Nov. 17, 1959 J. J. KAUFMANN 2,913,013

HARNESS FOR CROSS WEAVING

Filed May 24, 1957

Fig. 1.

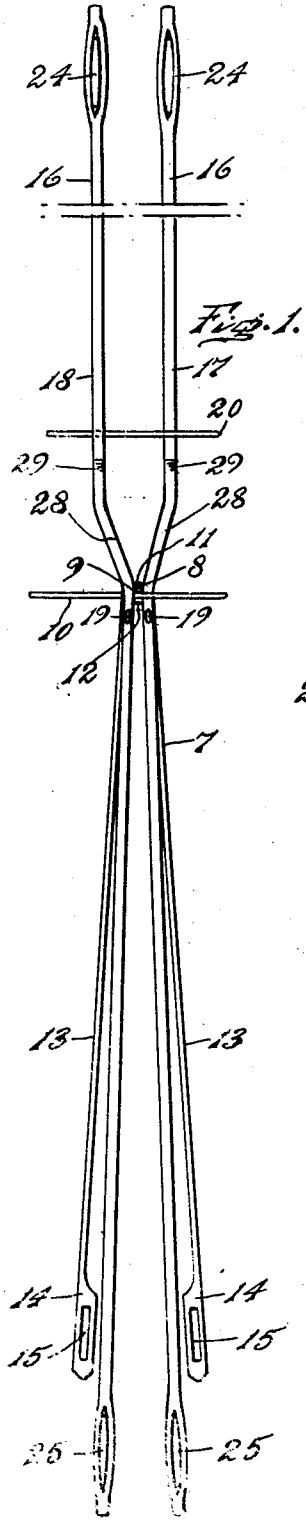


Fig. 2.

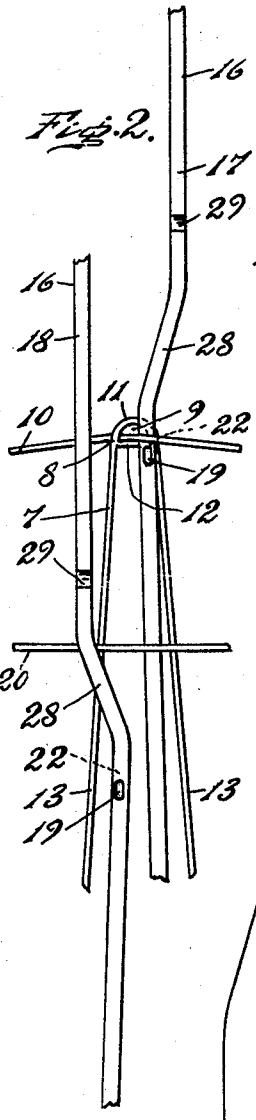


Fig. 3.

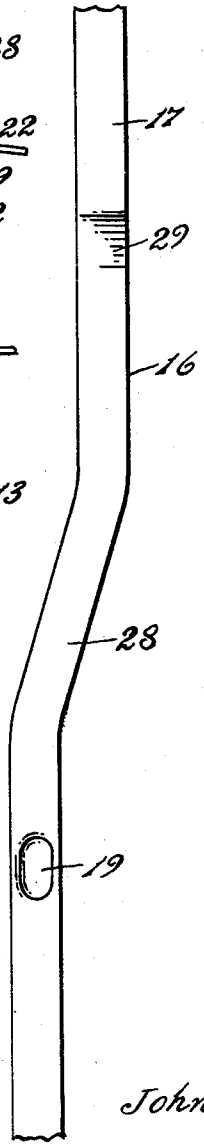
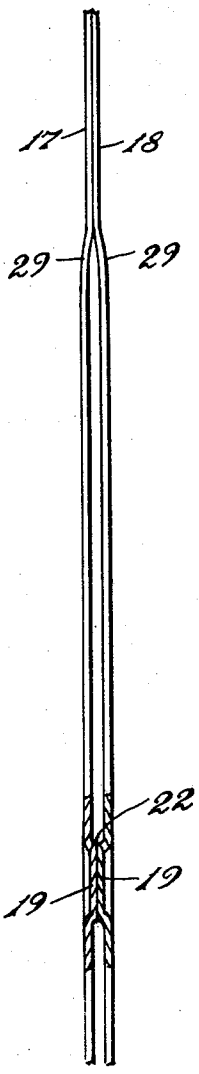


Fig. 4.



INVENTOR
John J. Kaufmann
BY
Jas. C. Wobensmith
ATTORNEY

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HARNESS FOR CROSS WEAVING

John J. Kaufmann, Jenkintown, Pa., assignor to Steel Heddle Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

Application May 24, 1957, Serial No. 661,433

1 Claim. (Cl. 139—52)

This invention relates to harness for cross weaving, that is, to harness for use in that method of weaving known as "cross weaving" sometimes called "doup weaving" or "gauze weaving" in which the warp threads, arranged in pairs, are crossed and twisted about each other at as many places in the shed as may be desirable, either for a succession of picks, or for single picks according to a pattern or design to be produced.

On August 27, 1912, there was issued to the Steel Heddle Manufacturing Company, as assignee of Jacob Kaufmann, U.S. Letters Patent No. 1,037,151, for Harness for Cross Weaving. The harness covered by that patent has been very extensively used, and the same has largely supplanted other forms of harness for cross weaving.

The present invention contemplates certain improvements in the construction and arrangement of the lifting heddles employed in such harness.

The principal object of the present invention is to provide flat metal harness for cross weaving, of the character described in the aforesaid Patent No. 1,037,151, in which, however, by reason of certain improvements in the construction and arrangement of the lifting heddles, the harness will be considerably easier in its action, and the operation of the loom, in which the same is used, will be greatly facilitated, and a better product obtained.

By means of the present invention, if desired, the speed of the loom may be considerably increased, and faults in the cloth which sometimes occurred in the use of such harness will be largely eliminated.

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 a vertical elevation of one set of heddles for controlling a pair of warp ends in a loom harness for cross weaving;

Fig. 2 is an enlarged detail view of the central portion of the same, the heddles being shown in shifted operative relationship;

Figs. 3 and 4 are respectively face and edge views, still further enlarged, of the central portion of a guide or lifting heddle made in accordance with the present invention and illustrating the novel construction of the same.

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

In the present invention there are provided, in each set of heddles, a doup heddle or needle, and a pair of lifting heddles, each in many respects similar to those shown in the aforesaid Patent No. 1,037,151.

As shown in said patent, each doup heddle or needle **7** is preferably made by punching or stamping the same from a thin flat strip of metal, and each said doup needle has, at one end, an eye portion **8**, in which the eye **9** for controlling the doup ward **10** is located. The outer margin **11** of the eye end **8** of the doup heddle **7** is arched or curved, while the inner under margin **12** of the eye end **8** is preferably flat.

Depending downwardly, from the eye end **8** of the doup heddle **7**, are two legs **13** which terminate at their lower extremities in an enlarged portion **14**, each of which portions is provided with a mortise or slot **15** for the passage therethrough, on each face of the harness, of a bar or rod (not shown) for the positive return of the doup heddles **7** to the neutral location in the ordinary and well known manner.

As in the aforesaid Patent No. 1,037,151, there are provided, for each set of heddles, two guide or lifting heddles **16**, each of which is made of two flat strips of metal or wire **17** and **18**, fastened to each other in any preferred manner, but preferably by impressing, in each of the strips **17** and **18** from which the heddle is formed, a boss **19** which is secured, preferably by welding, to the similar boss **19** provided in the other strip of each composite heddle.

The foregoing arrangement is such that there is provided, intermediate the ends of each composite lifting heddle, a seat **22** for the inner under margin **12** of the eye portion of the doup needle **7**. The arrangement is such that, when either lifting heddle is raised as shown in Fig. 2 of the drawing, above the neutral position, it will take it the doup needle **7** and thereby raise the doup warp **10** above the standard warp **20** and on the desired side thereof according to which lifting heddle is raised, thereby to effect the crossing of the warp ends.

As in the aforesaid Patent No. 1,037,151, each composite guide or lifting heddle **16**, at or about its medial portion, and immediately above the seat **22**, is bent or offset out of a straight longitudinal extension, as at **28**, said offset of the lifting heddles, being for the purpose of providing, between the upper portions of the lifting heddles, a definite space in which the crossing of the warp ends may take place.

The upper portions of the composite lifting heddles **16** extend upwardly in substantially parallel spaced relationship to their upper end portions, which are mortised, as at **24**, for mounting the upper ends of the lifting heddles on the upper heddle rods (not shown), which are of the usual and ordinary kind mounted in heddle frames (not shown), for the manipulation of the lifting heddles in the usual and ordinary manner.

Likewise, the lower end portions of the composite lifting heddles **16** are mortised as at **25** for mounting the same on the lower heddle rods (not shown) in the usual manner.

The present invention relates more particularly to the formation of each of the composite lifting heddles **16**, at and immediately above the offset portions **28** for the purpose of insuring, at all times, freedom of movement of the doup heddle or needle **7**, and for this purpose each of the strips **17** and **18** of each of the lifting heddles **16** is bent inwardly, as at **29** (see Fig. 4) which will serve to effectively maintain the separation of the two strips **17** and **18** of each of the lifting heddles **16** in the offset portion **28**, and for a part of the straight portion immediately above the offset portion **28**, so that in the event the lifting heddles are pressed together, by reason of close installations or high counts of the warp, there will always be sufficient space between the strips **17** and **18** of each lifting heddle **16** for the free movement of the eye portion and legs of the doup heddle or needle **7**, and particularly through the medial portion of the lifting heddle **16** which is not raised.

It will be noted that by the foregoing arrangement there will be no likelihood of the doup needle being gripped or held by reason of side pressure being imparted to the lifting heddles, whereby there will always be com-

plete freedom of movement of the doup needle with respect to the lifting heddles, thus eliminating a cause of faults in the cloth, and permitting increase in the speed of the loom if desired.

I claim:

In loom harness for cross weaving, a pair of lifting heddles, and a doup needle comprising a thin flat piece of metal having an eye portion through which the doup warp extends and two legs extending downwardly therefrom, each of the lifting heddles comprising two flat strips of metal and each of said lifting heddles having a seat for engaging the eye portion of the doup needle, each of said lifting heddles being offset above its seat portion respectively diverging to the front and rear and thence extending vertically upward in separated relationship to their upper end portions thereby providing a space through which the standard warp extends and in which the crossing of the warps occurs, the respective strips of which each lifting heddle is made extending upwardly from the seat portion in separated parallel planes to a point above the offset portion thereof, thereby providing a space between the strips of each lifting heddle through which a leg of the doup needle passes, the strips of each lifting heddle being bent inwardly toward each other at the upper end of said space thereby causing the inner faces of said strip to abut above said spaces and insuring the maintenance of said space for the free movement of the doup needle, and the seat for the eye portion of the doup needle being provided by an inwardly extending impressed boss on each strip, said bosses on the strips of each lifting heddle being welded to each other.

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