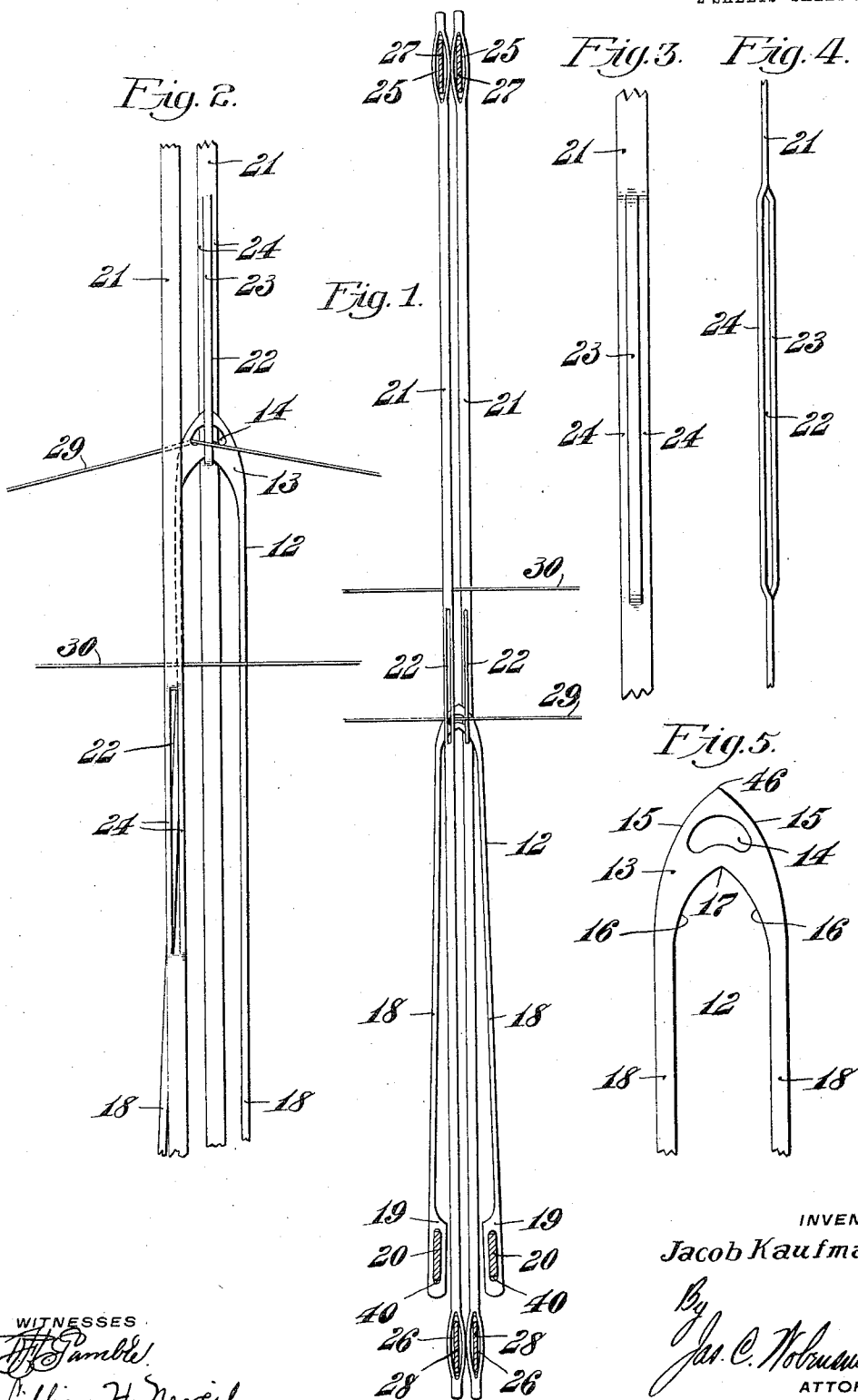


J. KAUFMANN.
 HARNESS FOR CROSS WEAVING.
 APPLICATION FILED MAR. 9, 1911.

1,037,150.

Patented Aug. 27, 1912.

2 SHEETS—SHEET 1.



WITNESSES
J. G. Samble
Lillian H. Nencil

INVENTOR
 Jacob Kaufmann

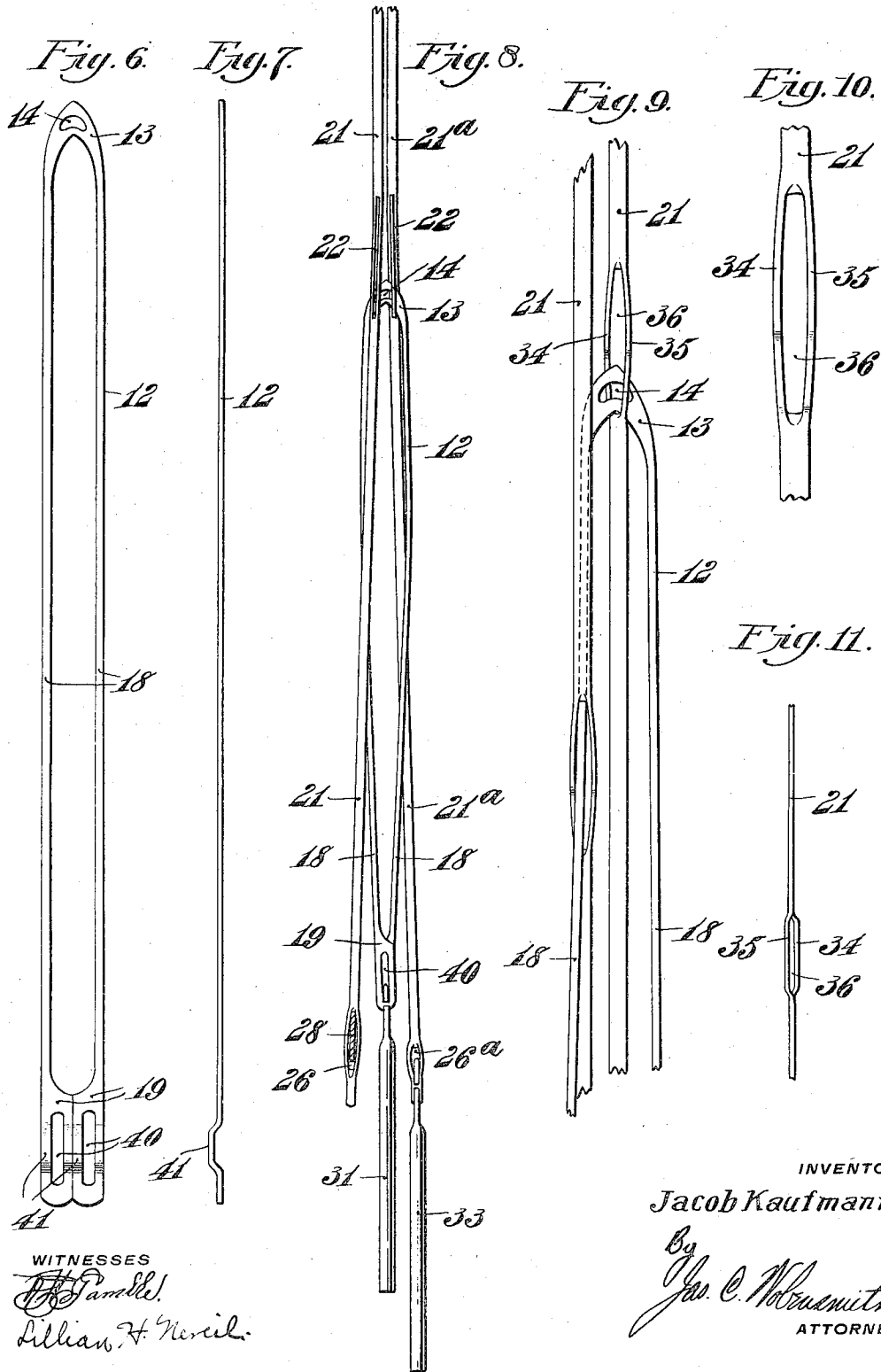
By *Jas. C. Holman*
 ATTORNEY

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WITNESSES
J. H. Samuels
Lillian H. Merrill

INVENTOR
 Jacob Kaufmann
 By *Jas. C. Krausmith*
 ATTORNEY

UNITED STATES PATENT OFFICE.

JACOB KAUFMANN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO STEEL HEDDLE MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

HARNES FOR CROSS-WEAVING.

1,037,150.

Specification of Letters Patent.

Patented Aug. 27, 1912.

Application filed March 9, 1911. Serial No. 613,409.

To all whom it may concern:

Be it known that I, JACOB KAUFMANN, 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, of which the following is a specification.

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

The principal object of my invention is to provide a metal harness for cross-weaving which will be simple, durable and efficient for all classes of cross-weaving, but which is also particularly useful in weaving the finer kinds of such fabrics to produce which it has heretofore been necessary to employ the short-lived cotton harness.

A further object of my invention is to produce a harness for cross-weaving in which all possibility of fouling of the warp threads will be eliminated.

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

Figure 1 is a vertical elevation of one set of heddles for controlling a pair of warp ends, the harness frame bars upon which the heddles are mounted being shown in section; Fig. 2 is an enlarged detail view of the central portion of the same, the heddles being shown in shifted relationship; Figs. 3 and 4 are respectively face and edge views of the central portion of the guide or lifting heddles shown in Fig. 1; Fig. 5 is an enlarged detail view of the eye end of the doup heddle or needle; Figs. 6 and 7 are respectively face and edge views of the complete doup heddle or needle detached; Fig. 8 is a view similar to Fig. 1, but showing the arrangement of the heddles for jacquard control; Fig. 9 is a view similar to Fig. 2 but show-

ing a modified form of guide or lifting heddles, and Figs. 10 and 11 are respectively face and edge views of the central portion of the guide or lifting heddle shown in Fig. 9.

Referring now more particularly to Figs. 1 to 7 of the drawings, in the particular embodiment of my invention there shown, 12 is the doup heddle or needle which is preferably made by punching and stamping from a thin flat strip of metal and has at one end an eye portion 13 lying in a single plane, and in which the eye 14 for the control of the doup warp is located. The outer margins 15 of the eye end 13 of the doup heddle 12 are curved toward and terminate in a blunt point 16, while the inner under margins 16 of the eye end 13 are similarly curved and meet in the central apex 17. Depending downwardly from the eye end 13 are two legs 18, which terminate at their lower extremities in enlarged portions 19 each of which is provided with a slot 40 for mounting on the rods 20 of the harness frame for the control of the doup heddles. The enlarged portions 19 of the lower ends of the legs of the doup heddles may if desired be provided with offsets 41 to properly space or separate the same on the rods 20. There are provided two guide heddles 21 each of which has a central eye 22 which may be formed as shown in Figs. 1, 3 and 4 by slitting and laterally expanding the central portion of the guide heddle 21 to form an offset central shank 23 and two offset side shanks 24 whereby the doup heddle may be mounted and maintained in the eye 22 in a plane parallel to the planes of the guide heddles 21 and parallel to the general extension of the warp ends, it being understood that the arrangement of the central shank 23 and the two side shanks 24 will serve to prevent the doup heddle 12 from twisting with respect to the guide or lifting heddles 21 when the same are actuated. The guide or lifting heddles 21 are provided at their upper and lower ends respectively with slots or mortises 25 and 26 for mounting on the respective upper and lower rods 27 and 28 of their individual harness frames.

The operation of the structure as so far set forth may now be explained. The doup

warp as before stated, and as shown in Figs. 1 and 2, passes through the eye 14 of the doup heddle or needle 12, while the other or standard warp passes loosely between the two guide or lifting heddles 21 so as not to be directly shifted thereby, the crossing or twisting of the threads being accomplished by the lifting of the doup thread 29 on the one side or the other, as the case may be, of the standard thread 30. The guide or lifting heddles 21 in their respective sets are raised by any of the common forms of mechanism for operating loom harness and it will be seen that accordingly as one or the other of the guide or lifting heddles 21 is raised, the doup thread 29 will be lifted to the one side or the other of the standard thread 30, and the crossing of the warp ends in the weave thus accomplished. It will be seen that the upper end or point 46 of the doup heddle 12 will be covered or protected by the central shank 23 of the guide or lifting heddle which may be operating the same, and that the possibility of fouling of the standard thread 30 will thereby be prevented, this relative location of the parts being insured by the conformation of the inner margins 16 at the upper end of doup heddle, as the apex 17 will seat itself in the lower end of the eye 22 of the guide or lifting heddle 21 and thereby properly center the upper end of the doup heddle 12 with respect thereto.

In Fig. 8 there is shown an arrangement which may be used for jacquard control where it is desired to utilize the crossing of the threads to effect a pattern in the weave; in this case instead of the lower slotted ends 19 of the doup heddle 12 being mounted on separate harness frame rods, they are brought together and a single lingo 31 is hooked in the openings 40 of both legs of the doup heddle 12 which are brought together for this purpose. One of the guide or lifting heddles 21 in this instance is mounted on a harness frame rod 28 while the other heddle 21^a, which is the one controlled by the jacquard mechanism, has its lower end also provided with a lingo 33. The operation of this device in connection with a jacquard mechanism will be readily understood, it being sufficient merely to state that the heddle 21 which is controlled in the harness frame may be operated at regular intervals to cause the weaving of the doup and standard threads respectively side by side. but when the pattern is to appear in the fabric the jacquard card will at that time cause the operation of the heddle 21^a to thereby cause the doup thread to cross over to the other side of the standard thread 30. The lingo 31 and 33 will assist in the control of the respective doup and lifting heddles to the extent of returning the same to

their lowermost positions when the jacquard mechanism is inoperative.

In Fig. 9 there is shown a modified form of guide or lifting heddle 21 in which the central eye is formed by slotting and expanding the resulting shanks 34 and 35 sidewise; in this case the shanks 34 and 35 of the central eye 36 serve to maintain the doup heddle 12 in proper relationship, the said shanks 34 and 35 also being offset out of the main plane of the heddle 21 and the upper shoulder of the offsets being at a point slightly above the point of the doup heddle 12 so as to properly guide the standard thread 30 and prevent fouling of the same over the point of said doup heddle.

It will be seen that the harness herein described may be readily made by punching and stamping from thin flat metal, and that comparatively little width is required for each complete set of heddles for a pair of warp ends, so that a great many sets may be arranged in a given width and the harness employed for weaving the finer grades of cross-woven fabrics where heretofore it has been necessary to employ cotton doups with their attendant annoyances due to the quick cutting through from the friction of the passing threads.

Having thus described the nature and characteristic features of my invention what I claim as new and desire to secure by Letters Patent is:

1. Harness for cross-weaving comprising a doup heddle made of thin flat metal and having a warp eye in one end and two legs extending from the eye portion, and two guide or lifting heddles made of thin flat metal each having a centrally disposed eye, each leg of the doup heddle passing through the eye of a respective lifting heddle, and the shanks of the eye of each lifting heddle being offset out of the main plane of said lifting heddle.

2. Harness for cross-weaving comprising a doup heddle made of thin flat metal and having a warp eye in one end and two legs extending from the eye portion, and two guide or lifting heddles made of thin flat metal each having a centrally disposed eye, each leg of the doup heddle passing through the eye of a respective lifting heddle, and means for preventing rotation of the doup heddle with respect to the lifting heddles, said means comprising a central shank and two side shanks of the eye of the lifting heddle, said shanks being offset out of the main plane of the lifting heddle.

3. Harness for cross-weaving comprising a doup heddle made of thin flat metal and having a warp eye in one end and two legs extending from the eye portion, and two guide or lifting heddles made of thin flat metal each having a centrally disposed eye,

each leg of the doup heddle passing through
the eye of a respective lifting heddle, and
the inner margins of the eye portion of the
doup heddle terminating in an apex to there-
5 by center the doup heddle with respect to
the eye of the lifting heddle, the shanks of
the eye of each lifting heddle being offset
out of the main plane of said lifting heddle.

In testimony whereof, I have hereunto
signed my name in the presence of two 10
witnesses.

JACOB KAUFMANN.

Witnesses:

LILLIAN H. NEVEIL,
M. J. MARTIN.
