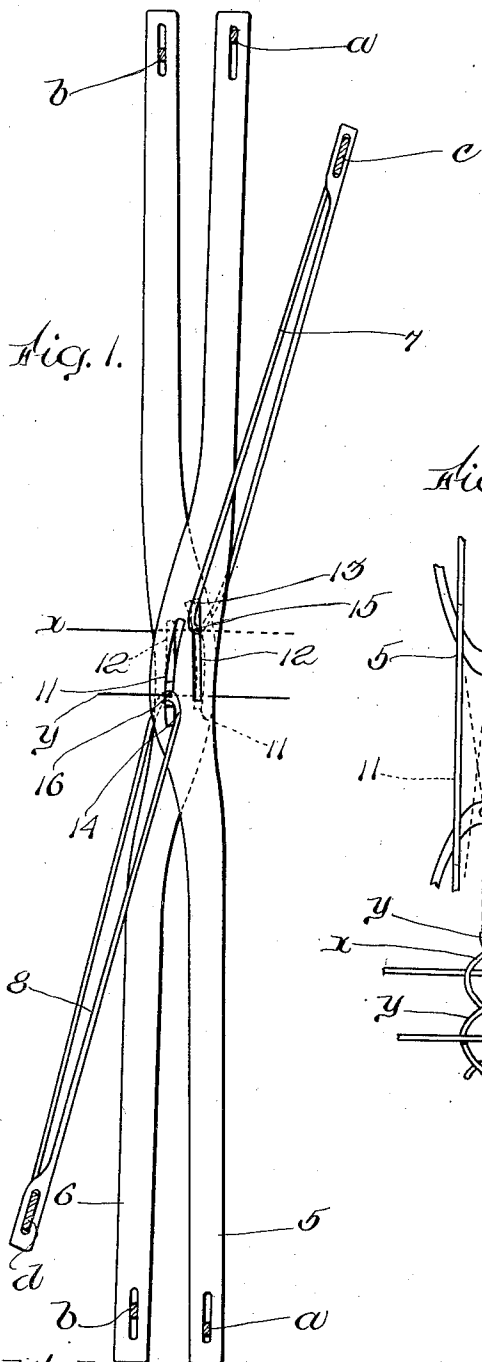


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LENO ATTACHMENT FOR LOOMS.
APPLICATION FILED JULY 15, 1912.

1,050,734.

Patented Jan. 14, 1913.



Witnesses:
L. B. Weymouth.
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Fig. 2.

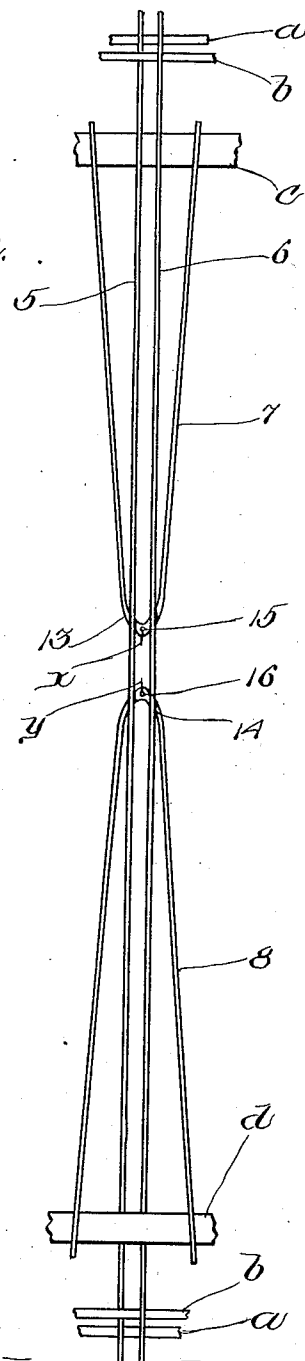
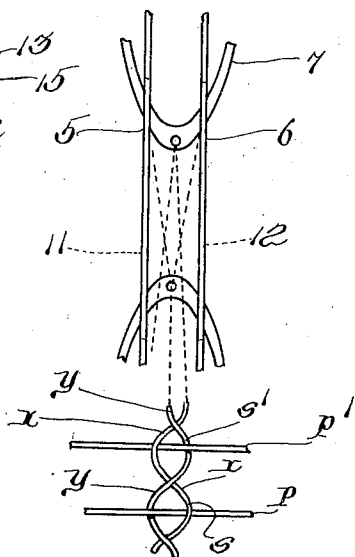


Fig. 3.



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UNITED STATES PATENT OFFICE.

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LENO ATTACHMENT FOR LOOMS.

1,050,734.

Specification of Letters Patent.

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Application filed July 15, 1912. Serial No. 709,375.

To all whom it may concern:

Be it known that I, LEWIS HAMER, of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Leno Attachments for Looms, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

10 This invention has reference to improvements in harness sets for looms, whereby cross weaving or leno weaving is facilitated.

One object of the invention is to so construct a leno attachment for looms that the jumper device and the slackener may be and preferably are dispensed with.

Another object of the invention is to so construct a leno attachment or a set of cross weaving harnesses that the drawing in of the warp threads is facilitated from the fact that the warp threads are always drawn in at the same place.

Another object of the invention is to so provide a harness set for weaving lenos or for cross weaving in general that the respective doupes may have a positive movement relative to their related heddles.

The invention consists in such novel features of construction and combination of parts as shall hereinafter be more fully described and pointed out in the claim.

In the drawings:—Figure 1 represents a side elevation of the improved leno attachment for looms, the shafts of the several harnesses being shown in section. Fig. 2 represents a front elevation of the same. Fig. 3 represents an enlarged diagrammatical view illustrating the operation of the attachment on warp threads.

40 Similar reference characters designate corresponding parts throughout.

In cross weaving, ordinarily known by the term leno weaving, it is usual to effect the crossing of the warp threads between picks whereby the warps are twisted partly around each other and appear always at the same side of the fabric. Such weaving is accomplished by the use of a set of harnesses preferably four in number comprising the doup harness carrying a loop of yarn which extends through two eyes of the heddle of the standard harness, and a pair of ordinary harness having heddles through the eyes of which respectively the crossing end or warp and the ground end or warp are carried. With such attachment, as heretofore con-

structed, the drawing of the warps through the eyes of the several harness heddles and through the doupes has been complicated and, with such prior attachment, particularly in double lift dobby looms it has been customary to use a jumper, so called, the operation of which is well known; and the slackener rod or easer, so called, which effects the easing of the doup ends or warps while preventing the undue slackening thereof.

In carrying my invention into practice I take or construct a series of harnesses or harness frames adapted to be mounted in a loom and to be independently operated in the usual manner. As illustrating my invention in its preferred form I utilize four of said harnesses designated in the drawings by the characters *a*, *b*, *c* and *d* which indicate portions of the shafts of said harnesses or similar members adapted to receive respectively the heddles 5 and 6 and the doupes 7 and 8. The heddles 5 and 6 are made of thin metal are similar in construction and are adapted to be mounted on the shafts *a*, *b* of their respective harnesses. At the central portions said heddles are wider than at the ends to form the swells 9 and 10 having slots 11 and 12 which extend in directions generally longitudinal of said heddles, the slots 11 being curved. When the harnesses *a* and *b* are mounted in the loom one of said harnesses is so arranged that the swells 9 and 10 of each pair of heddles 5 and 6 overlap, as shown in Fig. 1 of the drawing, the curved slot 11 of heddle 5 in registry approximately with the preferably straight slot 12 of heddle 6 and the similarly curved slot 11 of heddle 6 in registry with straight slot 12 of heddle 5. Said heddles are also spaced apart as shown in Fig. 2.

Mounted on or carried by the shafts of the harnesses indicated by characters *c* and *d* respectively are the doupes 7 and 8 of similar construction, made of thin resilient steel and having arms terminating respectively in the pointed ends 13 and 14 the edges of which are slightly curved to form riding edges or cams while the extreme points of said ends 13 and 14 have the thread eyes 15 and 16, as shown, of which, for the present, it may be understood that eye 15 carries the crossing end *x* and eye 16 carries the ground end *y*. The doup 7 has its pointed end 13 extending through the curved slot 11 of heddle 6 and through the straight slot 12 of heddle 5 while doup 8 has its end 14

extending through the curved slot 11 of heddle 5 and through the straight slot 12 of heddle 6 the eyes 15 and 16 being located between said heddles. The simplicity of
5 threading this device will be apparent as it is necessary only to thread the crossing end through eye 15 and the ground end through eye 16.

It is to be understood that the formation
10 of the shed results by reason of the relative vertical movement of the harnesses *c* and *d* whether said harnesses move simultaneous or successively as the ends *x*, *y* are carried by the eyes 15 and 16 of doup 7 and 8, and
15 because said ends 13 and 14 and the arms of the doup forming part thereof are free to move longitudinally through said slots 11 and 12 with the exception that as the curved portions of said doup arms forming the
20 pointed ends 13 and 14 pass through the curved slots 11, 11 of the respective heddles 5 and 6 said ends 13 and 14 and the ends *x* and *y* will be guided laterally away from the heddle 5 or 6 as the case may be.

25 In the operation of the device in a suitable loom when the harness having shafts *a*, *a* moves downward carrying with it the heddle 5, the harness having shaft *c* carrying doup 7 moves down a greater distance
30 than the shafts *a*, *a* hence one edge of pointed end 13 rides against the curved edge of slot 11 of said heddle 5 and is directed to the right hand or toward heddle 6 so that the end *x* passes to the right of end *y*, the
35 shed is formed as in shed *s*, Fig. 3. A pick *p* is now made in which the filling end is carried beneath the warp or crossing end *x* and above the warp or ground end *y*. The harness shafts *a*, *a* with the heddle 5 and the
40 shaft *c* with the doup 7 now move upward crossing the end *x* below end *y* and approximately simultaneously the shafts *b*, *b* with their heddle 6 and the shaft *d* with its
45 doup 8 move upward, the end 14 of doup 8 is diverted to the left hand or toward heddle 5 in passing through slot 11 of heddle 6 and

the warp end *y* passes on the right of warp end *x* and the shed *s'* is formed to receive the pick *p'* in which the pick end passes
50 over the warp end *y* and under the warp end *x* as in the previous pick. This crossing of the warp ends is continued in the succeeding sheds in all of which the crossing end *x* is above the pick ends while the ground end
55 *y* is below said pick ends.

As the motion of the doup is positive the use of a jumper device to bring the ground ends to the center of the shed is not necessary.

While I have herein shown and described
60 certain preferred forms of construction of the doup and heddles it is not my intention to thereby limit my invention. It is also apparent that this invention is not limited to the precise timing in the operation of
65 the doup shafts and heddle shafts as herein recited as in some kinds of weaving this may be varied.

The harness frames for carrying the doup shafts and heddle shafts are not shown here-
70 in as such frames do not necessarily form part of the present invention and, in some cases, may be dispensed with.

Having thus described my invention I claim as new and desire to secure by Letters
75 Patent.

A leno attachment for looms comprising a pair of parallel overlapping heddles having independent carriers, each of said heddles having a pair of longitudinally extend-
80 ing slots one of which is curved, and a pair of doup having a thread carrying member located between said heddles and arms extending from said member, the arms of each of said doup extending through the longi-
85 tudinal slot of one of said heddles and the curved slot of the other of said heddles, and carriers for said doup.

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Witnesses:

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