

[54] **DEVICE FOR THE PRODUCTION OF
INTERMEDIATE SELVAGES IN FABRIC
WEBS**

[76] Inventor: **Bernhard Wessler**, Vreden,
Domern, Germany

[22] Filed: **Dec. 28, 1971**

[21] Appl. No.: **212,938**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 883,455, Dec. 9,
1969, abandoned.

[52] U.S. Cl. **139/54**

[51] Int. Cl. **D03d 47/40**

[58] Field of Search..... **139/54, 122 S**

[56] **References Cited**

UNITED STATES PATENTS

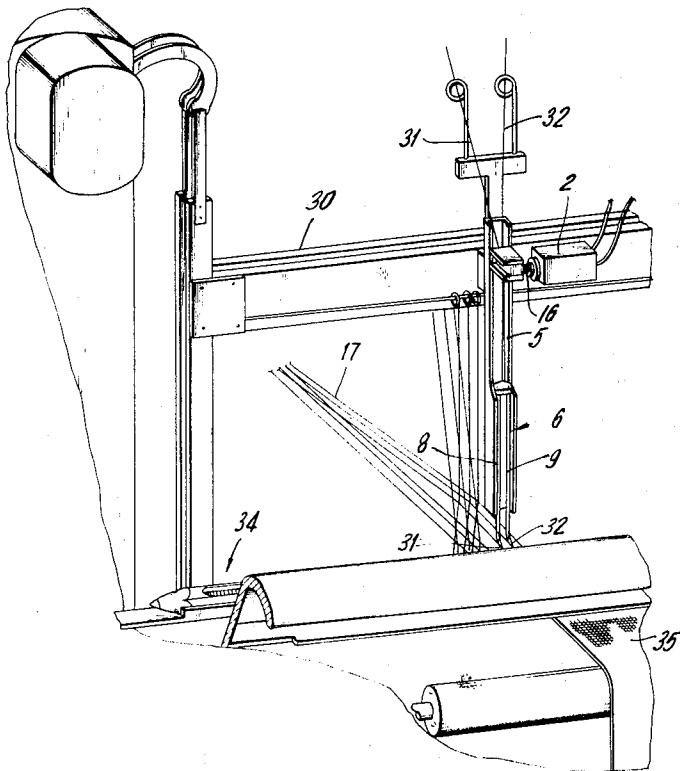
936,445 10/1909 Gordon..... 139/54

Primary Examiner—Henry S. Jaudon
Attorney—John J. McGlew et al.

[57] **ABSTRACT**

The device includes a tubular shaft cut open in its central portion to form a guide for the warp thread or threads passing through the open portion of the tubular shaft. The tubular shaft forms a support for a pair of oscillatable shafts extending toward each other, and each carrying a pair of needles so that the two pairs of needles face in opposite directions. The needles of a pair are arranged on respective opposite sides of a plane passing through a warp thread of a loom and perpendicular to the fabric web, and the device moves up and down in synchronism with the shed movement of the loom. The shafts oscillate the needles in the plane, relative to the warp thread, to form the selvage.

6 Claims, 9 Drawing Figures



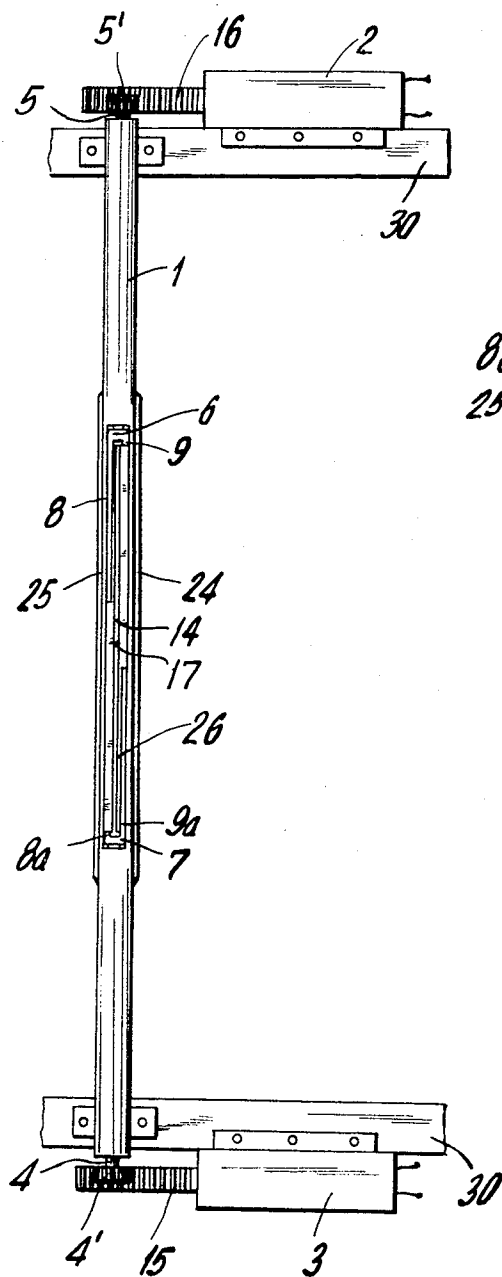


FIG. 1

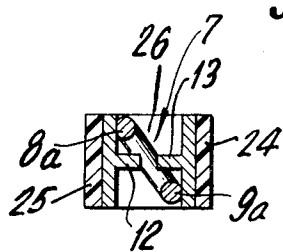


FIG. 3

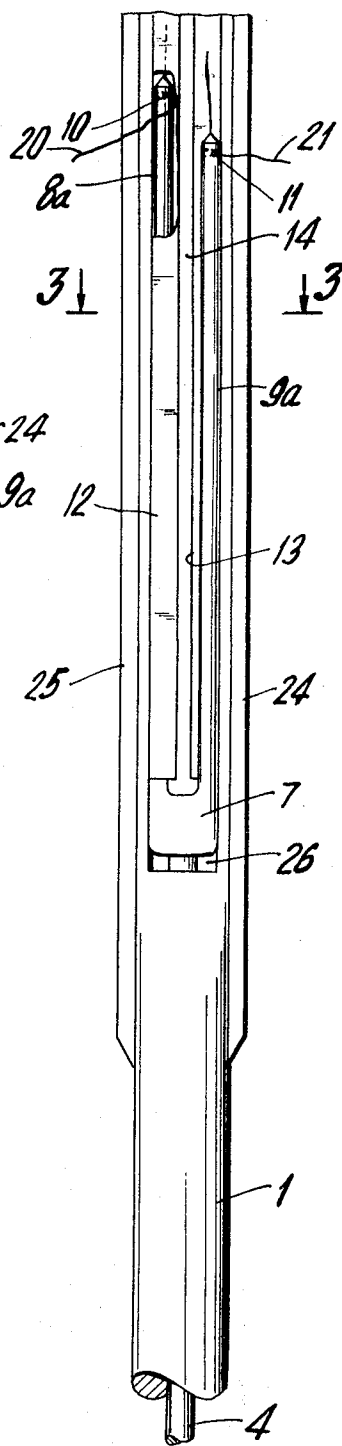


FIG. 2

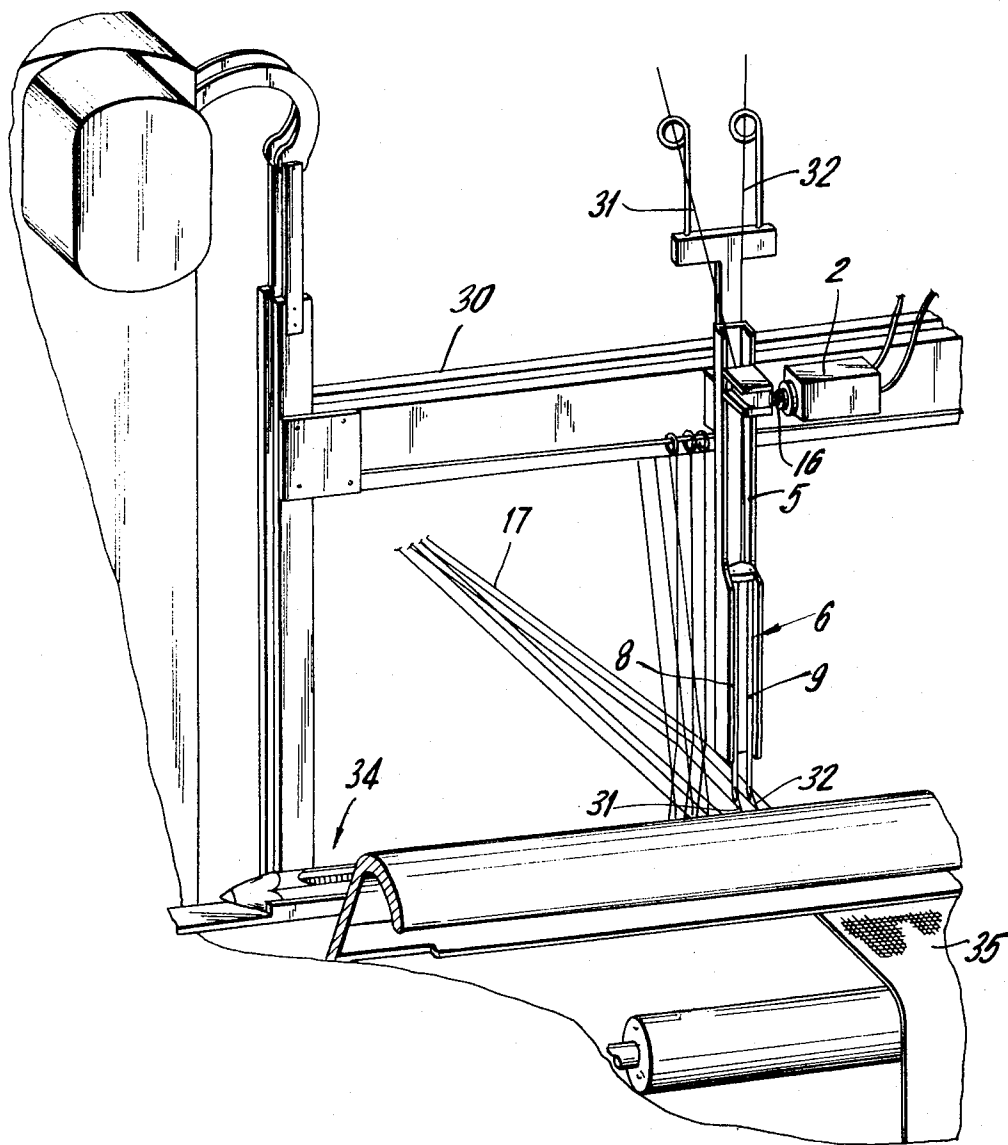


FIG. 4

Fig. 5

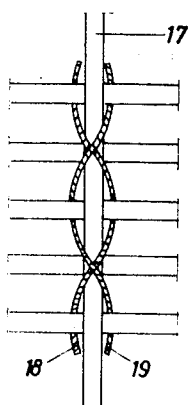


Fig. 6

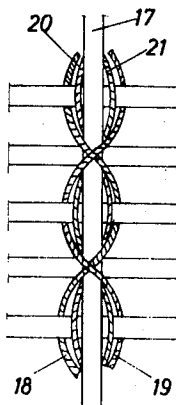


Fig. 7

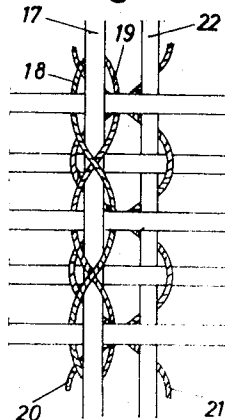


Fig. 8

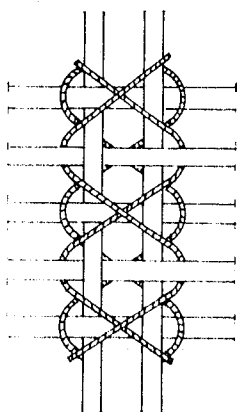
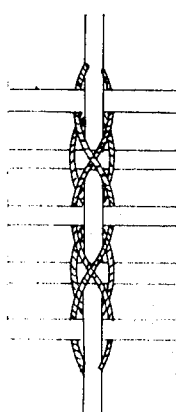


Fig. 9



INVENTOR

BERNHARD WESSELER

McGraw & Totten

ATTORNEYS

DEVICE FOR THE PRODUCTION OF INTERMEDIATE SELVAGES IN FABRIC WEBS

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 883,455, filed Dec. 9, 1969, for "DEVICE FOR THE PRODUCTION OF INTERMEDIATE SELVAGES IN FABRIC WEBS", now abandoned.

BACKGROUND OF THE INVENTION

An intermediate selvage, or a so-called center selvage, constitutes a double selvage in leno or gauze weaves, intermediate the edges of a fabric produced in two or more widths which widths are arranged side by side. Such an intermediate selvage provides the possibility of cutting the fabric thread open, in a longitudinal direction, without allowing the warp threads in the vicinity of the cut to unravel.

For producing such intermediate selvages, there are known so-called intermediate selvage motions which, for example, in looms, are secured to the cross beams at the superstructure, through suitable intermediate members. In looms without superstructures, the attachment, using suitable intermediate members, can be effected from the lower or middle cross beam. Such devices are provided with needles which move up and down, that is, the needles move in a system which is fixed relative to the shed. The known devices have the disadvantage that wear is very extensive and that the entire apparatus is relatively bulky, so that it requires a considerable amount of space.

SUMMARY OF THE INVENTION

This invention relates to the production of intermediate selvages in fabric webs and, more particularly, to a novel, improved, simple and compact device for producing intermediate selvages in fabric webs and free of the disadvantages of prior art devices for this purpose.

The device forming the subject matter of the invention, while free of the disadvantages of known prior art arrangements, has the advantage that any leno or gauze weave, which is formed by the upper leno thread pair, can also be formed by the lower leno thread pair. It is therefore possible to use, as the threads, ordinary edge or warp threads, which are merely pulled through the intermediate selvage motion.

In accordance with the invention, at least two needles are arranged movably on respective opposite sides of a plane passing through the warp thread and perpendicular to the fabric web, and these needles are jointly movable up and down in synchronism with the movement of the shed by the heald frame, as well as back and forth relative to the warp thread in the plane. Preferably, two pairs of needles are used, the points of the two pairs extending in opposite directions.

In accordance with the invention, a device carrying the drive for the needles and for supporting the needles presents a guide for the warp thread or threads, and is moved in its entirety with the shed movement. Each needle pair may, in accordance with the invention, be designed as a fork, and the fork performs an oscillatory movement about its longitudinal axis. For example, each needle pair is arranged in an oscillation-providing support and is oscillated about the longitudinal axis of the fork.

The device in which the needles are mounted is designed as a shaft having an axial bore, and this shaft is cut open in its central portion to form a guide for the warp thread or threads. These threads pass through the shaft, in whose bore the shafts providing for oscillating movement of the needles are mounted.

At the forks of the needles, axle shafts are arranged and extend outwardly in the bore of the support shaft. At their outer ends, these axle shafts are connected, through the medium of suitable transmission elements, with drive devices which effect the oscillatory motion of the forks and which, in accordance with the invention, may be designed as small electromagnetic drives of the rack and pinion type.

The control of the oscillation of the needles may be derived from a variety of control devices of the loom, so that a synchronization of the movement of the loom with such oscillatory movement of the needles can be attained without difficulty.

As distinguished from known devices for this purpose, in the device embodying the invention, the entire intermediate selvage motion moves up and down in synchronism with the shed movement. That is, the entire device is brought, in one direction of movement, into the zone of the lower shed. Thereby, the needles in the upper and lower sheds can bind off.

Mounting of the invention device is effected on the mechanism which controls the opening of the shed, for example, the harness cord or heald frame, the invention device being so small in size that its arrangement on any existing loom is possible without difficulty.

The advantages attained by the invention device essentially reside in that a binding in the upper shed is achieved from above, and a binding in the lower shed is achieved from below. Also, it is possible selectively to shift the binding so that, for example, binding occurs only from above or, alternatively, only from below. The threads may be the ordinary warp threads, that is, edge threads, and the additional threads often needed up until this time are no longer necessary. In machines without shuttles, such as coming on the market increasingly in recent times, a better edge formation is attained.

An object of the invention is to provide an improved device for producing intermediate selvages in fabric webs.

Another object of the invention is to provide such a device which includes at least one pair of needles in which the respective needles are arranged on respective opposite sides of a plane passing through a warp thread of a loom perpendicular to the fabric web.

A further object of the invention is to provide such a device in which the needles conjointly move up and down in synchronism with the shed movement of the loom.

Another object of the invention is to provide such a device including means operable to oscillate the needles about an axis in the plane and relative to the warp thread.

A further object of the invention is to provide such a device which is light in weight, simple in construction, compact in size, and capable of incorporation in existing looms.

For an understanding of the principles of the invention, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is an overall elevation view of a device embodying the invention;

FIG. 2 is a partial elevation view, to a larger scale, of the device shown in FIG. 1;

FIG. 3 is a section through the device taken along the line A-B of FIG. 2;

FIG. 4 is a partial perspective view illustrating the mounting of the selvage motion on the heald frame of a loom; and

FIGS. 5 through 9 are views illustrating different possibilities of binding off the intermediate selvage.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, an intermediate selvage motion in accordance with the invention comprises, essentially, a shaft 1 and two drive devices 2 and 3 designed, for example, as electromagnetic drives of the rack and pinion type. As can be seen more clearly from FIG. 2, shaft 1 is designed as a hollow shaft, and receives drive shafts 4 and 5, with shaft 4 being represented on a larger scale in FIG. 2 while shaft 5 is visible in the upper portion of FIG. 1. At their inner facing ends, each shaft 4, 5 carries a respective fork 6, 7. Fork 6 comprises a pair of needles 8, 9 of different lengths, and fork 7 comprises a pair of needles 8a, 9a also of different lengths. The needles of each pair are provided, at their pointed ends, with eyelets 10 and 11, such as illustrated in FIG. 2.

Forks 6 and 7 are located in the central portion of shaft 1, which is cut open in its central portion, as at 26, so that the forks are freely accessible from the exterior. In the cut zone 26 of shaft 1, on either side of the shaft, there is provided a central web 12, 13 against which, on either side, one of the needles 8, 9 or, respectively, 8a, 9a rests. Between the webs 12 and 13, there is provided a passage opening 14 through which edge threads, acting as warp threads, are passed.

At the outer ends of shafts 4 and 5 there are arranged, by way of example, respective pinions 4' and 5' meshing with respective racks 15 and 16 of the associated drives 2 and 3 so that, when racks 15, 16 are reciprocated, shafts 4, 5 are oscillated. The crossing threads are threaded through the eyelets 10, 11 of the needle forks 6, 7.

As best illustrated in FIG. 4, the intermediate selvage motion, illustrated in FIGS. 1, 2 and 3, is arranged on a heald frame 30 which effects opening movement of the shed and, as the selvage motion is very small or limited, the accommodation thereof on the heald frame offers no difficulty. The selvage motion reciprocates vertically with the heald frame 30. At the same time, an oscillatory motion of the forks is attained by the drives, such as the drive 2. In FIG. 4, the crossing ends are illustrated at 31 and 32, and the shuttle of the loom is indicated at 34 with the formed fabric being indicated at 35. For clarity, webs 13 and 13 have not been shown in FIG. 4. From an inspection of FIG. 4, it will be clear that, through rotation of the needles 8 and 9, together with a reciprocation of the selvage motion, there is effected a twisting of the warp threads. In the most simple arrangement, this provides the type of selvage shown in FIG. 5. While FIG. 4 shows only one selvage motion, it will be clear that a second selvage motion can be po-

sitioned below the illustrated selvage motion, if desired, although either selvage motion can be used alone.

It will be clear that, upon corresponding movements of drives 2 and 3, forks 6, 7 execute a relatively small oscillatory movement about the central passage opening 14, so that one or the other needle, depending upon the direction of the angular movement, rests against one or the other side of shaft 1 in the region of a web 12 or 13. It will be noted that the rotary or oscillatory movement required for the binding may be relatively small, so that the resulting accelerations are not high, considering that looms run at a relatively high speed. In FIGS. 1, 2 and 3, 24 and 25 denote coverings protecting the edge threads of the fabric web.

When the shed rises along with the needle forks 6, 7 and a warp thread 17, needle fork 6 is turned substantially 90 degrees about the axis of the shaft 5, from a position corresponding to that shown in FIG. 3. With this turning of needle fork 6, the position of crossing threads 18 and 19, trained through respective eyes 10 and 11, is reversed relative to thread 17. That is, the crossing thread previously at the left of thread 17 is now at the right, and vice versa. The shed is then lowered to its lower position, and the shuttle carries a weft thread across the warp thread 17 and the crossing threads 18 and 19 tied thereto, after which the shed rises again. On this next rising of the shed, the crossing threads are returned to positions corresponding to the position of the fork legs shown in FIG. 3, thus again intersecting each other over the thread 17.

The lower fork 7, carrying the crossing threads 20 and 21, operates in an identical manner but crosses the crossing threads 20 and 21 under the thread 17 only in substantially the lowermost position of the shed. Either both forks 6 and 7 can be used, or either fork can be used independently of the other fork. When both forks are used, the thread 17 will be "tied into" the weft threads by two sets of crossing threads, namely crossing threads 18, 19 and the crossing threads 20, 21. The oscillations or turnings of the forks 6 and 7 are effected independently of each other, and both forks can be turned in the same direction, during each cycle, or in opposite directions during each cycle. In either case, the thread 17 is tied in to the weft threads crossing the thread 17 by the crossing threads.

FIGS. 5 through 9 illustrate various binding possibilities. In FIG. 5, one thread 17 is over, and two crossing threads 18 and 19 are under. In FIG. 6, one thread 17 and two crossing threads 18 and 19 are over, and two crossing threads 20 and 21 are under.

In the weave illustrated in FIG. 7, one thread 17 is over and one thread 22 is under, with two crossing threads 18 and 19 over and two crossing threads 21 and 22 being under. In FIG. 8, two warp threads bind in plain weave, and four crossing threads are provided while, in the arrangement of FIG. 9, there is one warp thread in plane weave and four crossing threads.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for producing intermediate selvages in fabric webs by tying at least one stationary warp thread of a fabric web to weft threads intersecting the stationary warp thread, said device comprising, in combina-

5

tion, at least one pair of needles with each needle carrying a respective crossing thread and with the respective needles arranged on respective opposite sides of a plane passing through a stationary warp thread, of a loom, perpendicular to a fabric web of the loom; means mounting said needles for conjoint movement up and down in synchronism with the shed movement of the loom; means operable to oscillate said needles about an axis in said plane relative to said stationary thread to position the respective crossing threads alternately on opposite sides of the stationary thread; a tubular shaft, having an axial bore, oscillatably supporting each pair of needles; and means mounting said shaft for movement up and down bodily with the shed movement of the loom; the central portion of said tubular shaft being cut open to provide a guide for at least one stationary thread to extend substantially diametrically through said tubular shaft.

2. A device for producing intermediate selvages in fabric webs, as claimed in claim 1, in which there are two pairs of needles, the points of one pair of needles facing opposite to the points of the other pair of needles; each pair of needles being designed as a fork; a respective axle shaft secured to each fork and guided in said bore of said first-mentioned shaft; said means operable to oscillate said needles comprising respective driving devices each connected by a respective transmission to a respective axle shaft.

3. A device for producing intermediate selvages in woven fabric, as claimed in claim 2, in which said means operable to oscillate said needles comprises a respective gear on the outer end of each axle shaft; and a respective reciprocable rack meshing with each respective gear.

4. A device for producing intermediate selvages in fabric webs, as claimed in claim 3, including respective electromagnetic driving means operatively associated with each respective rack.

5. In a device for producing intermediate selvages in fabric webs by using crossing threads to tie a warp thread into weft threads intersecting the warp thread and of the type including at least a pair of needles each carrying a respective crossing thread, means moving needles back and forth laterally relative to a warp thread, and means moving the needles up and down rel-

6

ative to a fabric web, the improvement comprising means mounting each pair of needles for movement up and down, parallel to the length of the needles, relative to a fabric web and a warp thread; means operable to oscillate each pair of needles about an axis, extending intermediate and parallel to the needles of the pair, and lying in the plane including the warp thread and perpendicular to the plane of the fabric web, to position the respective crossing threads alternately on opposite sides of the warp thread; each pair of needles being designed as a fork, with two such forks being arranged in aligned opposing relation to each other on opposite sides of the warp thread; said moving means moving the assembly of the two forks bodily up and down with the shed of the loom.

6. In a device for producing intermediate selvages in fabric webs by using crossing threads to tie a warp thread into weft threads intersecting the warp thread, and of the type including at least a pair of needles each carrying a respective crossing thread, means moving the needles back and forth laterally relative to a warp thread, and means moving the needles up and down relative to a fabric web, the improvement comprising means mounting each pair of needles for movement up and down, parallel to the length of the needles, relative to a fabric web and a warp thread; means operable to oscillate each pair of needles about an axis, extending intermediate and parallel to the needles of the pair, and lying in the plane including the warp thread and perpendicular to the plane of the fabric web, to position the respective crossing threads alternately on opposite sides of the warp thread; each pair of needles being designed as a fork, with two such forks being arranged in opposing relation to each other; said moving means moving the assembly of the two forks bodily up and down with the shed of the loom; each fork having a respective stem extending therefrom; a shaft mounting said forks and formed with a bore receiving said stems to project outwardly from respective opposite ends of said shafts; said oscillating means including respective gear means, each including a rack, operatively connected to the outer ends of said stems; and driving means operable to reciprocate said racks to oscillate said forks.

* * * * *

50

55

60

65