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 [33] **Switzerland**
 [31] **2573/69**

[56]

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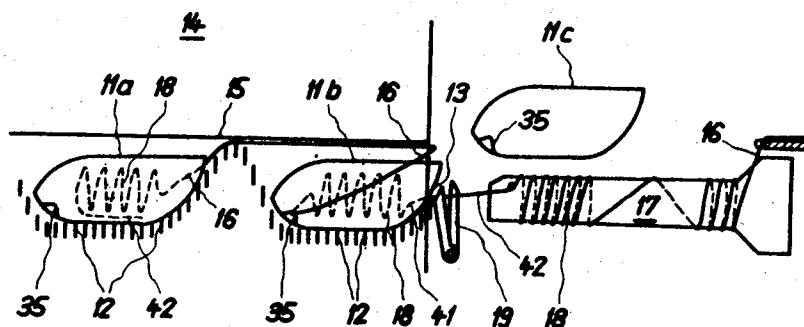
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[54] METHOD AND APPARATUS OF MAKING A SELVAGE IN A LOOM

9 Claims, 4 Drawing Figs.

[52] U.S. Cl..... 139/12,
 139/125
 [51] Int. Cl..... D03d 47/26
 [50] Field of Search..... 139/12, 13,
 196, 197, 122, 1, 127

ABSTRACT: A method of making a selvage in a wave-type loom, wherein weft threads of predetermined length are passed, always in the same arrangement, to a plurality of shuttles prior to their successive entry into the sheds formed during the weaving operation and are withdrawn from the shuttles again during their passage through the sheds, which comprises cutting the weft threads behind each second shuttle of the shuttles which follow directly one after the other when the shuttles enter the sheds, and withdrawing the threads alternately from the rear and front ends of the shuttles for the purpose of inserting the weft threads into each of the sheds. Also an apparatus for carrying out this method is disclosed.



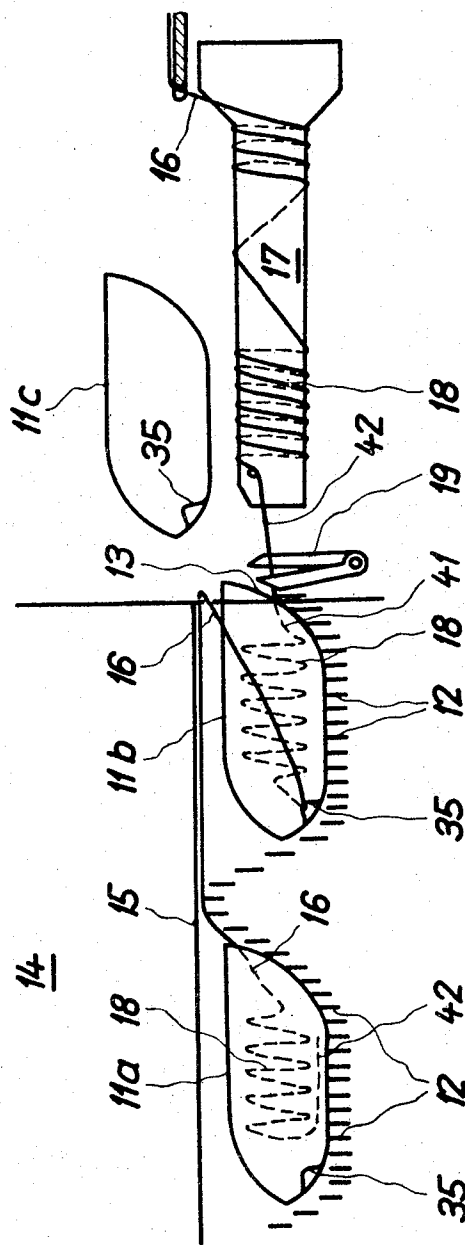


Fig. 1

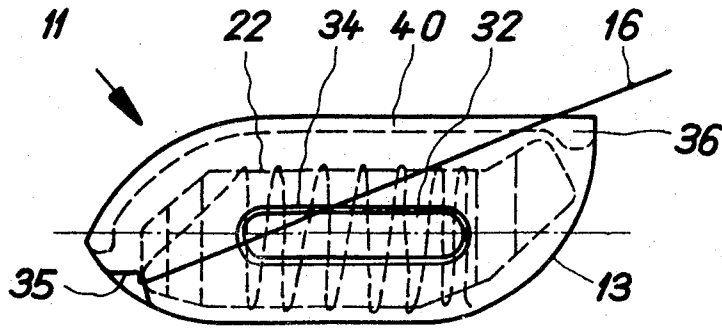


Fig. 2

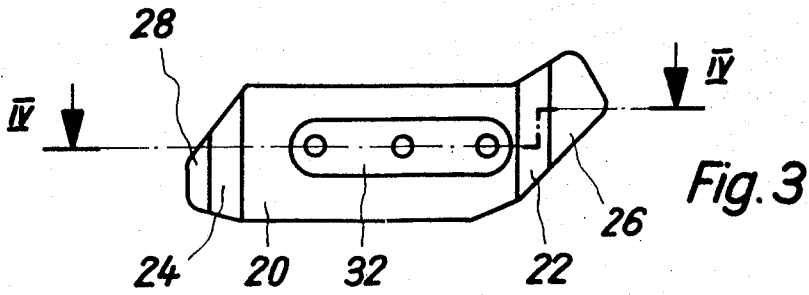


Fig. 3

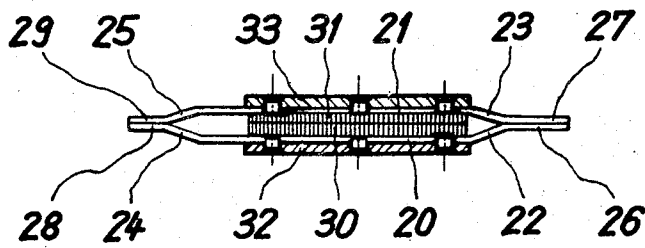


Fig. 4

METHOD AND APPARATUS OF MAKING A SELVAGE IN A LOOM

This invention relates to the manufacture of a selvage on wave-type loom and more particularly to a method of making the selvage in which weft threads of predetermined length are passed successively, always in the same order, to weft-inserting elements or shuttles prior to their entry into each of the changing sheds formed on the wave-type loom and are withdrawn alternately from the rear and front of the shuttles during passage through the sheds and to an apparatus for carrying out this method.

In the case of fabrics produced on wave-type looms, the selvage has to be artificially produced, as in the case with the majority of the other nonconventional weaving processes. The construction and mode of operation of these wave-type looms are further disclosed in my pending application, Ser. No. 724,476, filed on Apr. 26, 1968 now U.S. Pat. No. 3,500,871. Although this has resulted in the introduction of artificial selvages, the normal or conventional selvages resulting from weaving with conventional bobbin-type shuttles are still preferred by many purchasers of fabrics. This is even the case if the material has a normal selvage only on the side.

Advantageously this invention provides a method of forming a selvage, i.e., a conventional selvage of the type produced on a loom using bobbin-type shuttles, on one side of the fabric, i.e., on that side at which the weft thread insertion elements or shuttles enter each shed on the wave-type loom. Thus, this invention contemplates a method for the manufacture of a selvage on a wave-type loom which is characterized in that when the shuttles successively enter the changing sheds, the weft threads to be inserted into the sheds are cut behind each second of the shuttles, that follow directly one after the other, and the threads are withdrawn alternately from the rear and front ends of the shuttles for the purpose of inserting each of the weft threads into a shed.

This invention is also directed to an apparatus for making a selvage on a wave-type loom by the above-described method. This apparatus comprises, in combination with a wave-type loom, a plurality of shuttles which follow directly one after the other for the purpose of successively inserting weft threads of a predetermined length into each of the sheds formed during the weaving operation; said shuttles being provided with outlets for allowing the weft thread contained therein to exit alternately at the rear and front ends thereof and means outside of the sheds for cutting the thread exiting from the rear end of every second shuttle moving one after the other through the sheds.

This invention is also concerned with the shuttles used for making a selvage on a wave-type loom. One embodiment of these shuttles is characterized in that it has at least one outlet point, opening or zone which is provided with thread-braking means through which the outgoing thread is guided, one outlet opening being located at the front end of the shuttle when the shuttle is in operation on the wave-type loom.

The invention will now be described in more detail by reference to one of its embodiments and to the accompanying drawing, in which:

FIG. 1 is a schematic illustration of the point at which the insertion elements enter the sheds formed on a wave-type loom;

FIG. 2 is a side view of a weft-thread insertion element or shuttle of this invention;

FIG. 3 is a side view of the thread-brake arrangement provided inside the insertion element of the invention; and

FIG. 4 is a section of the brake arrangement taken along line IV—IV of FIG. 3.

In FIG. 1, three shuttles 11a, 11b and 11c for inserting the weft threads into the sheds formed during the weaving operation on a wave-type loom or multiphase weaving machine are shown. As the shuttles 11 are pushed into one of the sheds, they are moved to the left by bladelike reeds 12. For this purpose, the reeds 12 located at the rear edge 13 of the shuttles 11 move upwards, the reeds as a whole executing an undulato-

ry movement that progresses to the left. The shuttles 11 cannot move upwards, since they are retained by the warp threads on both sides and at the top. The shuttles are therefore pushed to the left. For the sake of clarity the warp threads are not shown in the drawing. The fabric 14 extends upwards from the beatup point or fell 15.

The weft threads 16 are delivered from a supply bobbin (not shown) and are continuously wound on to a fixed blade or thread coil-forming member 17 to form thread coils 18. One such coil 18 is passed to each shuttle 11. This takes place by the shuttles 11 being successively pushed downwards over the blade 17 at the point where the coil 18 is located on the blade. During the subsequent lateral displacement of the shuttles 11 to the left, i.e., along the longitudinal axis of blade 17, the coils 18 remain in an orderly position in the interior of each shuttle 11. While the shuttles are passing through the sheds, the threads 16 are again successively withdrawn from the shuttles. A device for cutting the weft threads 16 is schematically shown and designated by reference numeral 19.

The insertion elements or shuttles 11 are shown in greater detail in FIG. 2. The shuttle 11 illustrated has a body of conchoidal shape. The body has two sidewalls which are interconnected along the closed edge portion or seam 40. The sidewalls are separated from each other over the remaining open part of the periphery of the shuttle. The shuttle 11 can therefore be pushed downwards over the blade 17.

Inside the shuttle 11 are retaining means in the form of two inserts for retaining a thread coil between the sidewalls. Each insert includes one of the two plates 20 and 21, details of which are shown in FIGS. 3 and 4. One plate 20 incorporates the resilient supporting arms 22 and 24, and the other plate 21 incorporates the resilient supporting arms 23 and 25. Thread-brakes or thread-braking means 26, 27 and 28, 29 are carried by these supporting arms 22, 23 and 24, 25 respectively. On their inner mutually facing sides, the plates 20 and 21 each carry a lining 30 and 31, respectively. The lining is made of bristles, satinlike material, or the like resilient materials. A retaining element 32 or 33, respectively, is secured on the outer sides of the plate 20 or 21. The shape of these retaining elements 32 and 33 is such that they fit exactly into complementary orifices or slots 34 in the sidewalls of the shuttle 11, and in this position the elements lie against the slots 34 over the entire boundary thereof. One of the slots 34 of the shuttle 11 is shown in FIG. 2.

The retaining elements 32 and 33 are rivetted or otherwise secured to the plates 20 and 21. The arms 22, 23 and 24, 25, respectively, are resilient and are biased towards each other. The arms therefore tend, on the one hand, to press the plates 20 and 21 away from each other and on the other to bias the end portions 26, 27 and 28, 29, respectively, towards each other. In this manner these end portions each form a thread-brake. The retaining elements 32 and 33 are thus held in precisely determined positions in the slot 34 in the sidewalls of the shuttle. The construction described readily enables the inserts arranged in the interior of the shuttle 11 to be inserted as required in the body of the shuttle and to be removed therefrom and thus replaced.

When the shuttle 11 is in operation, the thread coil provided of predetermined length, which (as shown in the shuttle 11 in FIG. 2) takes on the form of a row of loops which are positioned between the linings 30 and 31, is constantly withdrawn again during the travel of the shuttle over the width of the loom. The thread 16 is withdrawn either at a rear outlet point or opening via the thread-brake 26, 27, or at a forward outlet point or opening via the thread-brake 28, 29, in order to fix the position of the thread 16, emerging at the forward end of the shuttle 11, a thread guide means in the form of a notch 35 is provided at the front outlet opening in that wall of the shuttle positioned on the side where the thread emerges. The weft thread 16 emerging at the rear end of the shuttle 11 is prevented from moving out of the thread-brake 26, 27 by a thickened portion 36 provided at the rear outlet opening.

When the loom is operating, the shuttle 11a is first introduced into a shed. The weft thread is cut at the front end 42 by means of the cutting device 19. During this phase of operation, the weft thread thus runs from the rear end of the shuttle 11a to the blade 17. Because of this thread being continuously woven into the fabric, weft thread is continuously withdrawn from the coil 18 stored in the shuttle 11a through the rear end of the shuttle. In the next working cycle of the loom, the shuttle 11b is pushed into the next shed formed as illustrated in FIG. 1. Since the forward end of its coil 18 is connected to the weft thread inserted by the shuttle 11a, the weft thread emerging from this forward end is woven into the fabric and the coil 18 in the shuttle 11b is withdrawn from the front portion of this shuttle. Directly behind the shuttle 11b, the weft thread projecting from its rear end and extending to the blade 17 is cut off by cutting device or means 19, so that weft thread stored in the shuttle 11b has a free rear end 41. A coil of thread 18 is then passed to the shuttle 11c. As in the case of shuttle 11a, the thread connection or portion, projecting from the rear of this shuttle 11c, runs to the blade 17. It is not cut and is thus woven into the fabric. The thread portion at 41, cut at the rear of shuttle 11b and hanging therefrom should not, however, extend beyond the rear end of this shuttle 11b. When the weft threads are inserted by shuttles 11, the shed closes immediately after each shuttle passes through, so that the end of a thread projecting beyond the rear end would be seized by the closing shed and woven into the fabric. In this case, i.e., if the portion 41 extended beyond the rear end of the shuttle 11b, the thread coil 18, located in the shuttle 11b, would be drawn off by its two ends. For the same considerations, it follows in regard to shuttles 11a and 11c that the forward free end 42 of the weft thread should not extend beyond the rearmost portions of shuttles 11a and 11c.

It will be appreciated that cutting device or means 19 is mounted to be moved into the position shown in FIG. 1 in a programmed or controlled manner so that the weft thread exiting from each second shuttle, i.e. every other shuttle, can be cut. Also, appropriate mechanism is provided to effect the cutting action of this device.

The thread-brakes or thread-braking means including 23, 24 and 25, 26, shown in FIGS. 2 and 3, are distinguished by the simple manner in which they can be produced. They are very cheap to manufacture since they can each form a single unit with the elements 20, 21 and 22 to 25. It will be understood that each thread-braking means acts to brake or slow down withdrawal of the thread as it emerges from the interior of the shuttle.

It also will be appreciated that, in the case of shuttles which follow one directly after the other during the weaving operation, it is also possible to provide only one front thread-brake on the one shuttle and only one rear thread-brake on the other shuttle.

What is claimed is:

1. A method of making a selvage in a wave-type loom, wherein weft threads of predetermined length are passed, always in the same arrangement, to a plurality of shuttles prior to their successive entry into the sheds formed during the weaving operation and are withdrawn from the shuttles again during their passage through the sheds, which comprises cutting the weft threads behind each second shuttle of the

shuttles which follow directly one after the other when the shuttles enter the sheds, and withdrawing the threads alternately from the rear and front ends of the shuttles for the purpose of inserting the weft threads into each of the sheds.

2. The method of claim 1 in which the weft threads are cut before each of the shuttles has completely entered a shed.

3. A shuttle arrangement for use in the formation of a selvage on a wave-type loom which comprises a plurality of shuttles each having a body defining a hollow interior; retaining means positioned within said interiors for holding a predetermined length of weft thread within said shuttles, at least one outlet zone in each said shuttle for allowing the thread to exit from each shuttle as it moves through a shed, the outlet zones of said shuttles, which move during operation in immediate succession, being located alternately at the front end and at the rear end of each said successively moved shuttle.

4. The shuttle arrangement of claim 3, in which each of said retaining means includes two inserts within the interior of each said shuttle, and the predetermined length of weft thread therein takes the form of a row of loops, which are held between the two inserts, whereby during weaving withdrawing of the weft thread from the front end of a shuttle can take place by starting to withdraw the weft thread from the front end of the row of loops and withdrawing of the weft thread from the rear end of the shuttles can take place by starting to withdraw the weft thread from the rear end of the row of loops.

5. The shuttle arrangement of claim 3 in which an outlet zone with a thread-brake is provided at the front and the rear ends of each of said shuttles.

6. The shuttle arrangement of claim 5 in which said inserts provided in the interior of said body include two plates which incorporate at their rear and at their forward ends two supporting arms biased towards each other, said two thread-brakes being formed by the two portions of said plates supported at each of the outer ends of said arms, which portions are pressed towards each other by said supporting arms.

7. The shuttle arrangement of claim 3, in which in the sidewall of at least one said shuttles located on the side on which the weft thread emerges, there is a thread-guide means for guiding the thread emerging from said outlet zone.

8. In combination with a wave-type loom, an apparatus for forming a selvage on one side of the fabric produced in said loom which comprises a plurality of shuttles, adapted to have one follow directly after the other to insert a weft thread into each of the sheds formed during the weaving operation, each shuttle adapted to contain a predetermined length of weft thread therein and having at least one outlet for allowing the thread to exit therefrom during its travel through the shed, said shuttles being arranged to travel through the sheds so that the weft threads contained therein are withdrawn alternately from an outlet located at the rear and from an outlet located at the front end of respective shuttles operating as sequential pairs of shuttles which follow directly one after the other during the weaving operation, means being provided for cutting the thread exiting from the outlet located at the rear of every second shuttle of each said pair when the shuttles successively enter the warp threads whereby a selvage is formed at the side of the warp threads entered by the shuttles.

9. The apparatus of claim 8 in which each of said second shuttles has a guide means positioned adjacent its front end for fixing the position of the weft thread emerging from said front end.

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