Aug. 18, 1964 M. STEINER 3,144,882

METHOD FOR WEAVING SELVAGELESS CLOTH

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Fig. 1

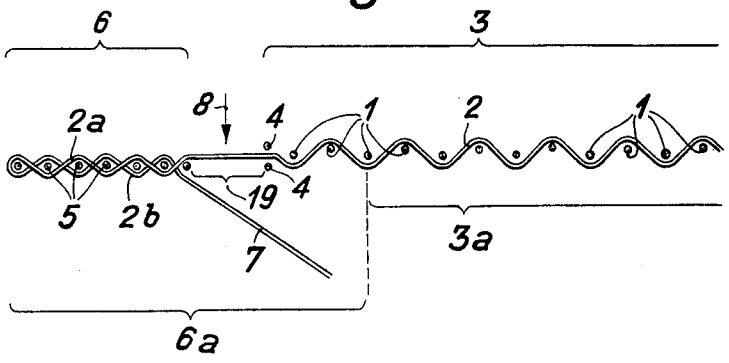


Fig. 2

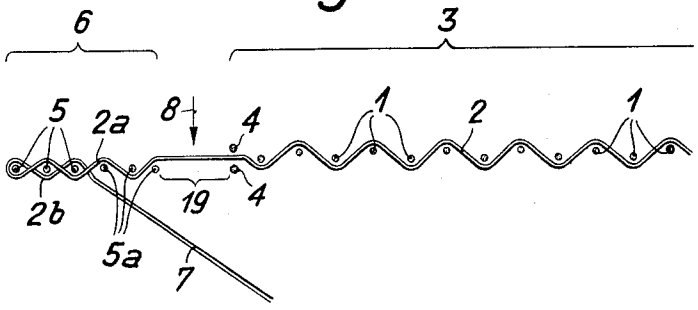
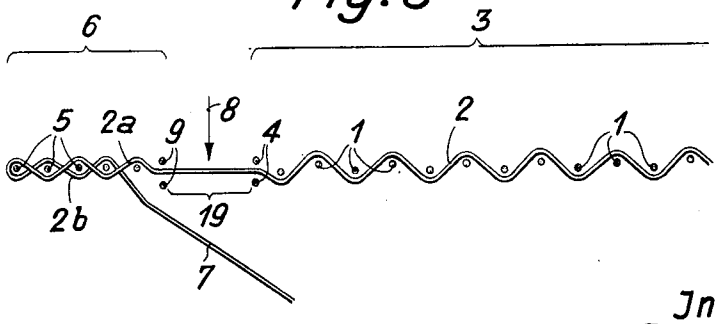


Fig. 3



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METHOD FOR WEAVING SELVAGELESS CLOTH

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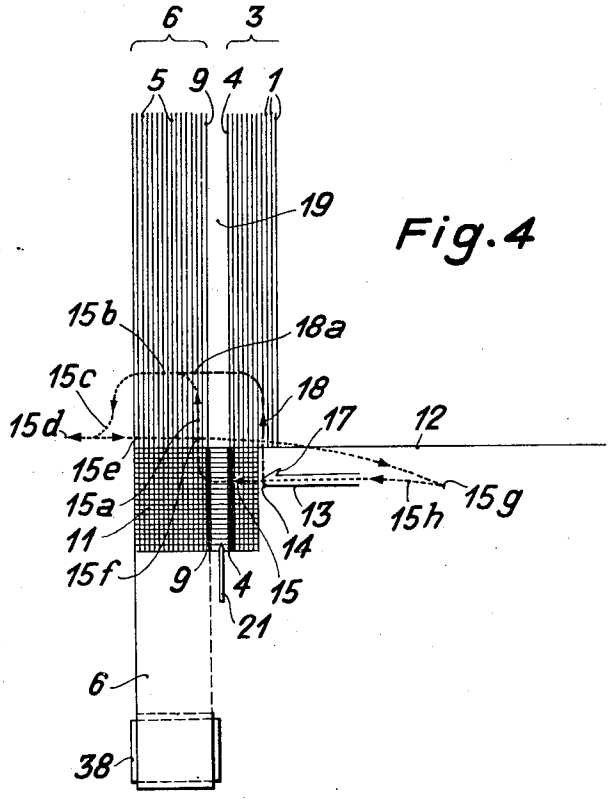

Fig. 4

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METHOD FOR WEAVING SELVAGELESS CLOTH

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Fig. 5

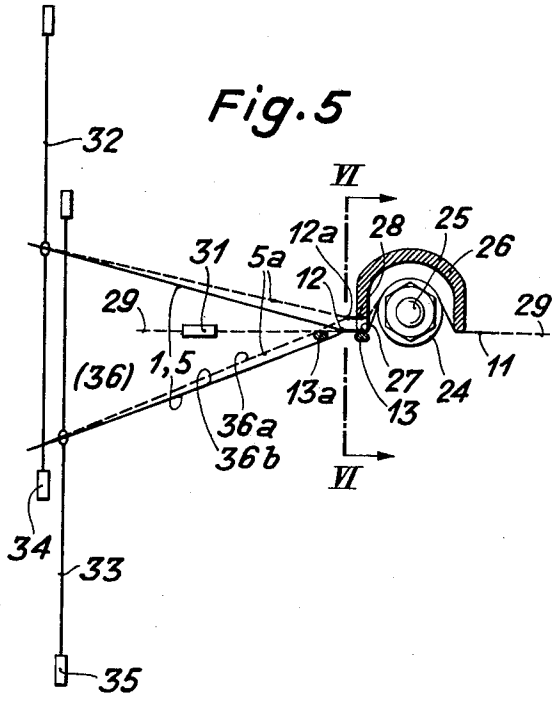
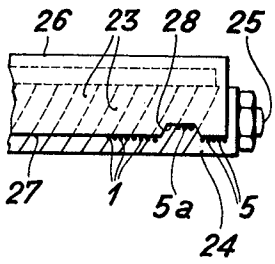


Fig. 6



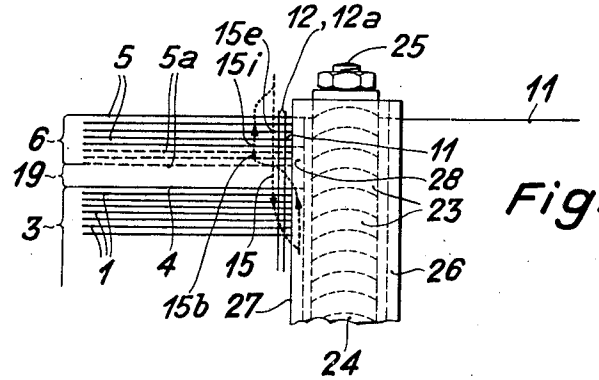


Fig. 7

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3,144,882

METHOD FOR WEAVING SELVAGELESS CLOTH

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4 Claims. (Cl. 139—54)

The present invention relates to a method for producing a fabric whose weft threads at the lateral edge of the fabric are bound by means of binding threads which are parallel to the warp threads. The weft threads are cut outside of the binding threads.

In the method according to the invention two or more adjacent binding threads which are parallel to the warp threads and placed at the location of the lateral edge of the finished cloth are wound or twisted about each other upon change of the shed. The sense of rotation of the binding threads may be changed after each or after a plurality of picks whereby the threads are equally often rotated in one direction and in the opposite direction for producing a single crossing. In this case no rotating thread spools are needed. If the direction of rotation is not changed a twisted crossing is obtained. In the latter case a special twisting apparatus is needed. With the aforedescribed single and twisted crossing instead of a screenlike crossing of the weft and warp threads a firm binding is obtained which cannot slide from the weft thread ends.

A weaving method is known wherein the weft thread ends are not tucked in but project from the cloth. The weft threads are bound by binding threads at the location of the edge of the finished cloth. The projecting ends of the weft threads may also be bound by binding threads. Thereupon the weft threads are cut outside of the binding threads which define the edge of the finished cloth.

In the method according to the invention the weft thread ends projecting beyond the binding threads are bent over and tucked into the marginal warp threads of a subsequently formed shed for producing a temporary selvage. Only a part of the bent-over length of the weft thread ends is tied in warp threads; the remaining lengths of the weft thread ends project freely. The thus formed narrow selvage is subsequently severed from the cloth.

The machine for performing the method according to the invention comprises temples having a cover provided with an edge for guiding the cloth to the temples, the edge having a recess at the lateral edge of the finished cloth and inside of the outermost marginal warp threads and having a length corresponding to the space taken by but a few warp threads so that the apex of the shed formed by a part of the warp threads which are within reach of the selvage laying or tucking needle is above the elevation of the apex of the shed formed by the remaining warp threads, permitting passage of the tucking needle below the few warp threads traveling toward said recess and limiting tucking in of weft thread ends to the outermost marginal warp threads.

A cloth made according to the invention has a narrow, temporary selvage formed by bent-over weft thread ends, only a part of whose lengths is bound by warp threads, the remaining part of the weft thread ends projecting freely. The weft threads are bound between the main part of the cloth and the narrow, temporary selvage by binding threads which are parallel to the warp threads and the temporary selvage is severed along and outside of the binding threads.

With the method according to the invention a temporary narrow selvage is produced whose width corresponds to the tucked-in part of the bent-over weft thread ends. This selvage is less wide than the bent-over length

of the weft thread ends. Therefore, it is possible to place the edge of the main part of the cloth which edge is formed by the binding threads, in a position which is within the space required by a conventional selvage where-in the weft thread ends are entirely tucked in. At equal weaving width the yarn wasted when cutting off a narrow selvage according to the invention is smaller and the main part of the cloth is wider than when producing a conventional selvage.

The method according to the invention provides a narrow but stable tucked selvage during weaving. This makes it possible to secure the edge of the main portion of the fabric by means of a simple twist binding which can be obtained by simple means, namely by doup heddles inserted in the heald shafts, instead of by a twisted crossing which affords binding-in of loose weft thread ends but requires a special twisting apparatus. The simple twist binding is sufficiently held by the narrow selvage during weaving when the binding is subjected to the warp tension. After cutting off the selvage there is no tension on the binding which forms the edge of the fabric and there is no danger of fringing. The stable narrow tucked selvage can be cut off easier and cleaner than freely protruding weft thread ends, even if the latter are bound by a twisted pair of threads.

The invention is suitable for producing cloth having cut-off weft threads and having no selvage, the main part of the cloth being confined by a simple twist binding. The invention is particularly suitable for producing dense weaves wherein a tucked selvage would be too thick and must, therefore, be cut off at a minimum of waste. The invention is also useful for producing cloth to which subsequently a layer of a different material is applied, for example cloth serving as a base for oilcloth, for bookbindings, professional clothing, and so on. Cloth to which a layer of synthetic material is applied must not have a selvage which is thicker than the main portion of the cloth to facilitate application and holding of the synthetic material. A selvage which is thicker than the main part of the cloth or hinders, for other reasons, the application of layer of different material, must be cut off. This, however, should involve a minimum of waste. This object is obtained by the present invention which considerably reduces the width of the selvage which is removed from the cloth.

The novel features which are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, and additional objects and advantages thereof will best be understood from the following description of embodiments thereof when read in connection with the accompanying drawing wherein:

FIGS. 1 to 3 illustrate on a large scale sections parallel to the weft threads of cloths produced according to the invention.

FIG. 4 is a diagrammatic plan view of warp threads, weft threads and finished cloths and parts of a weaving machine for producing a selvage according to the invention.

FIG. 5 is a vertical sectional view through a portion of a weaving machine according to the invention.

FIG. 6 is a vertical sectional view of the portion of a weaving machine shown in FIG. 5, the section being made along line VI—VI of FIG. 5.

FIG. 7 is a plan view of the portion of a weaving machine shown in FIG. 5.

Referring more particularly to FIG. 1 of the drawing, numeral 1 designates warp threads into which weft threads 2 are bound, only one weft thread being visible in FIG. 1. On the left side of the main portion 3 of the cloth a simple twist or single cross binding is formed by two warp threads 4 and produced by doup heddles.

About two warp threads are omitted at the left side of the binding threads **4**, leaving a space **19** where there are no warp threads. Warp threads **5** are at the left side of the empty space **19** which form together with the end portion **2***a* of the weft thread **2** and the bent-over tucked-in part **2***b* a tucked-in selvage **6**. Only a portion (**2***b*) of the weft thread end is bound into the warp threads **5**, the remaining portion **7** of the weft thread end freely projecting. The selvage **6** is relatively narrow. The selvage **6** is severed along the space **19** approximately at **8** outside of the lateral edge of the main portion **3** of the cloth at which edge the binding threads **4** are located.

A cloth made in the conventional manner and having the same weaving width but having completely bound-in weft thread ends **2***b*, **7** has a narrower main portion **3***a* and a selvage of the width **6***a* corresponding to the entire length of the bent-over weft thread **2***b*, **7**, which selvage is much wider than the selvage **6**.

In the embodiment shown in FIG. 2 the bent-over weft thread ends **2***b*, **7** are bound only by marginal threads **5** and not by all warp threads within the selvage **6**. The inner warp threads **5***a* of the selvage **6** are not bound with the bent-over weft thread ends **2***b*, **7**.

In the embodiment shown in FIG. 3 the inner edge of the selvage **6** which faces the main portion **3** of the cloth is bound by a simple twisting binding **9** produced by doup heddles. This facilitates severing of the selvage **6** at **8**.

As seen in FIG. 1 the narrow selvage **6** is placed so far to the left that the binding threads **4** at the lateral edge of the finished cloth are within the space defined by the length of the bent-over weft thread ends **2***b*, **7** and, therefore, are within the space of a corresponding conventional selvage **6***a* having entirely bound-in weft thread ends **2***b*, **7**. The main part **3** of the cloth is, therefore, broader and the selvage **6** is narrower.

Referring to FIG. 4 of the drawing, numeral **11** designates fabric or cloth. Numerals **1** and **5** designate warp threads and numeral **12** designates a just beaten up weft thread. Numeral **13** designates a selvage laying or tucking needle which is placed lower than the fabric **11**. The point **14** of the needle **13** moves along a path indicated by a dotted line **15** after beat up of weft thread.

As seen in FIG. 4 the point **14** of the tucking needle moves from the starting position shown in FIG. 4 to the left and subsequently upward (**15***a*). While traveling through the path portion **15***a* the needle **13** comes close to the warp threads **5** which are in the lower shed, pressing these warp threads slightly upward. Thereupon the path of the point **14** goes to the left (**15***b*) whereby the needle **13** enters the shed. Subsequently, the needle point **14** travels downward (**15***c*) towards the beaten-up weft thread **12** and to the left towards the end **15***d* of the needle path. The weft thread end, not shown, is now seized by the hook **17** of the needle **13** and the needle moves to the right (**15***e*), pulling along the thread end **2***b*, **7** and tucking it into the shed. Since the needle leaves the shed already when crossing the needle path portion **15***a* at **15***f* before the entire length of the bent-over weft thread end **2***b*, **7** slides from the hook **17** of the tucking needle, a narrow selvage according to FIG. 3 is produced. The remaining portion **7** of the weft thread end is not bound but hangs freely out of the cloth. Thereupon the needle travels to the reversal point **15***g* and moves therefrom through the path **15***h* to the starting position in which the needle is shown in FIG. 4.

The dash line shown in FIG. 4 illustrates the path of the selvage laying needle **13** when producing a conventional selvage of the width **6***a* in FIG. 1 having fully tied-in weft thread ends **2***b*, **7**. In this case the point of the needle **13** immediately travels upward along a path **18** from the starting position and thereupon moves to the left (**18***a*) and enters the shed already at the beginning of the path portion **18***a*. Thereupon the needle point travels along the previously described path **15***b*, **15***c*, **15***e*, **15***f*, **15***g* and **15***h*.

FIG. 4 shows the space **19** wherein there are no warp threads and which is confined between the twisted thread pairs **4** and **9**. A knife **21** is provided for cutting off the narrow selvage **6**, which is preferably wound on a roll **38** forming part of the weaving machine. The roll **38** may be frictionally connected to the main loom drive for rotation and the cut-off selvage **6** can be used for tying packages or the like.

FIGS. 5 to 7 show a device for producing narrow selvages as shown in FIGS. 1 to 3. Numeral **24** designates a temple of a weaving machine. The temple includes a plurality of needle rollers **23** which are mounted in slanted position on a shaft **25**. The temple is covered by a cover **26** having a horizontal edge **27** normal to the warp threads **1**, **5** and guiding the cloth onto the temple **24**. The edge **27** has a recess **28** which is about 3 mm. deep and placed adjacent to and inside of the outermost marginal warp threads **5**. Only a few warp threads **5***a* pass through the recess **28** and are thereby held above the weaving plane **29**. The elevation of the apex **12***a* of the shed **36***a* formed by the warp threads **5***a* is above the elevation of the apex of the shed **36***b* formed by the remaining warp threads **1** and **5**.

Numeral **31** in FIG. 5 designates a shuttle for inserting weft threads into the shed. The figure shows two heddle frames **34**, **35** carrying heddles **32** and **33**, respectively, for forming a shed **36**. The frame **34** is in upper shed position and the frame **35** is shown in low shed position.

The path of a tucking needle **13** (FIG. 4) is shown by a dotted line in FIG. 7. When the needle travels along the portion **15***b* of the needle path it is in the position designated by **13***a* in FIG. 5, i.e., below the warp threads **5***a* forming the lower shed **36***a*. When the point of the tucking needle reaches the point **15***i* of the needle path the needle enters the shed **36***b* formed by the marginal warp threads **5**. The end of the weft thread seized by the tucking needle is, therefore, tucked into the shed **36***b* formed by the marginal warp threads **5** when the needle travels along the portion **15***e* of the needle path. Thereupon the needle **13** leaves the shed **36***b* below the warp threads **5***a* forming the lower shed **36***a* and the end **7** (FIGS. 1–3) of the weft thread hangs down.

Instead of providing single pairs of binding threads **4** and **9** two or more pairs of single crossed binding threads may be provided. The binding threads may be rotated through 180° to the right after insertion of a first weft thread and may be rotated 180° to the left after insertion of the second weft thread, and so on. The warp threads which are used as binding threads may be rotated two full revolutions to the left after the insertion of a first weft thread and may be rotated two full revolutions to the right after the insertion of the second weft thread. It is also possible to rotate the warp threads forming the binding threads through 360° to the right after the first pick and to continue rotation once more through 360° to the right after the second pick. In this case the binding threads are rotated through 360° to the left after the third pick and are once more rotated 360° to the left after the fourth pick. In any case, the binding threads are rotated equally often to the right as to the left within one twisting cycle as it is required for single crossing.

The invention is applicable to weaving of material whose warp and weft threads and particularly the warp threads forming the binding threads **4** and **9**, are cotton, wool, or other textile material, for example synthetic material. The invention can also be used when weaving wire.

I claim:

1. A method of producing selvageless cloth on a loom for weaving wherein sheds are consecutively formed in a warp, and weft threads are consecutively inserted into said sheds, the width of said warp being greater than the width of the produced cloth, said warp having marginal

warp threads, and the inserted weft threads having end portions extending beyond said marginal warp threads, said method comprising:

bending over the weft thread end portions extending beyond the marginal warp threads,

tucking said end portions between all of said marginal warp threads for forming a temporary selvage, and

cutting the weft threads inside and adjacent to said marginal warp threads for removing the temporary selvage from the cloth.

2. A method of producing selvageless cloth on a loom for weaving wherein sheds are consecutively formed in a warp, and weft threads are consecutively inserted into said sheds, the width of said warp being greater than the width of the produced cloth, said warp having marginal warp threads, and the inserted weft threads having end portions extending beyond said marginal warp threads, said method comprising:

bending over the weft thread end portions extending beyond the marginal warp threads,

tucking said end portions between at least the outer ones of said marginal warp threads to extend at least the width of the marginal warp threads for forming a temporary selvage, and

cutting the weft threads inside and adjacent to said marginal warp threads for removing the temporary selvage from the cloth.

3. A method of producing selvageless cloth on a loom for weaving wherein sheds are consecutively formed in a warp, and weft threads are consecutively inserted into said sheds, said warp having marginal warp threads, and the inserted weft threads have end portions extending beyond said marginal warp threads, said method comprising:

bending over the weft thread end portions extending beyond the marginal warp threads,

tucking part of said end portions between said marginal warp threads for forming a temporary selvage and leaving freely protruding the remaining part of said end portions,

binding the weft threads by binding threads inside of said marginal warp threads and substantially at the ends of the bent-over weft thread ends, and

cutting the weft threads between said binding threads and said marginal warp threads for removing the temporary selvage from the cloth.

4. A method of producing selvageless cloth on a loom for weaving wherein sheds are consecutively formed in a warp, and weft threads are consecutively inserted into said sheds, the width of said warp being greater than the width of the produced cloth, said warp having marginal warp threads, and the inserted weft threads having end portions extending beyond said marginal warp threads, said method comprising:

bending over the weft thread end portions extending beyond the marginal warp threads,

tucking said end portions between at least the outer ones of said marginal warp threads to extend at least the width of the marginal warp threads for forming a temporary selvage,

binding the weft threads by binding threads inside said marginal warp threads and substantially at the ends of the bent-over weft thread ends,

binding the weft threads by binding threads adjacent to the innermost marginal warp thread, and

cutting the weft threads between said binding threads adjacent to the innermost marginal warp thread and the binding threads substantially at the ends of the bent-over weft thread ends for removing the temporary selvage from the cloth.

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