

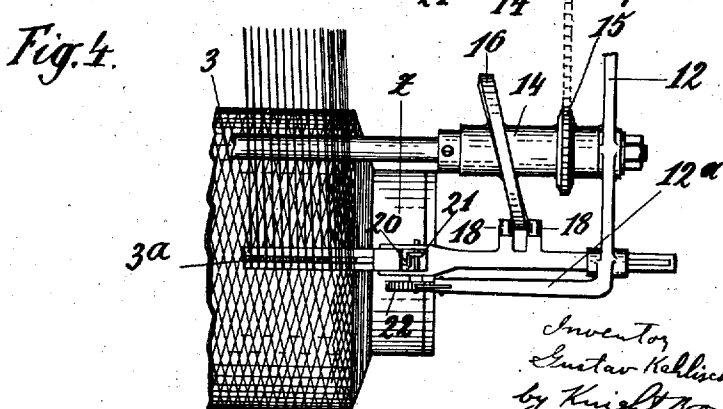
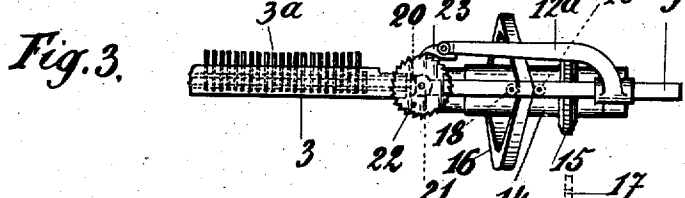
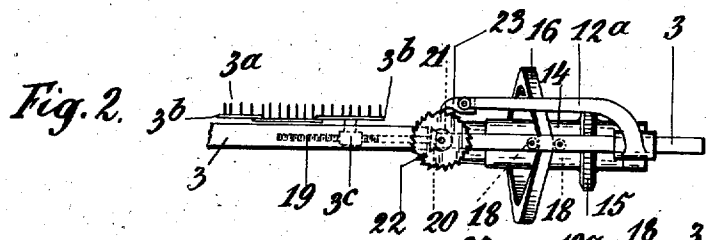
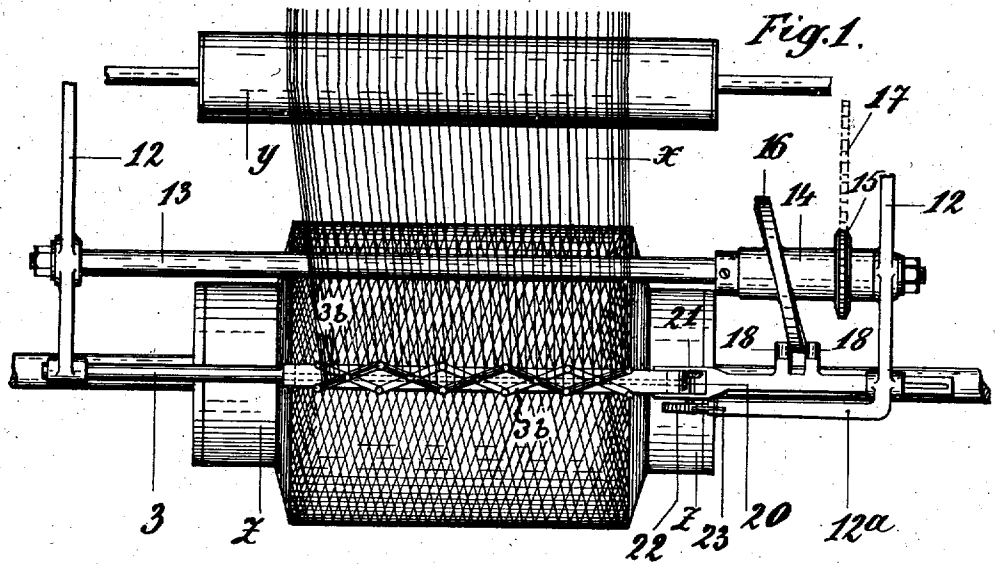
April 14, 1936.

G. KAHLISCH

2,037,512

METHOD OF PRODUCING CROSS-WOUND WARP BEAMS AND APPARATUS THEREFOR

Original Filed July 11, 1933 2 Sheets-Sheet 1



Inventor
Gustav Kahlisch
by Knight Bros
His Attorneys

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G. KAHLISCH

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Fig. 6.

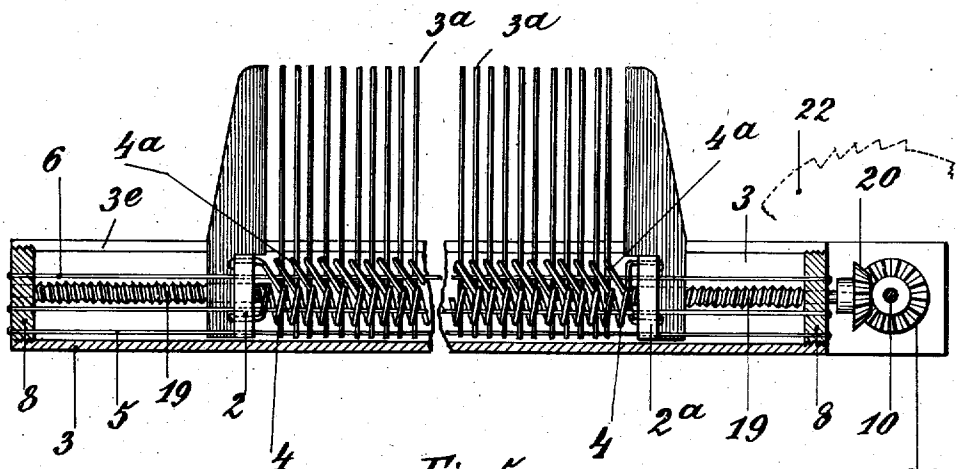
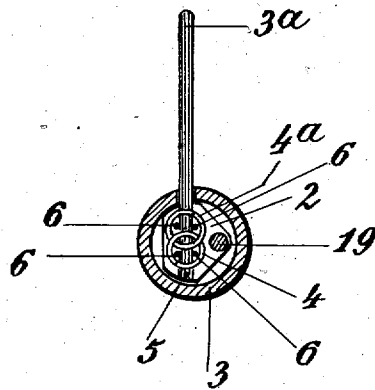


Fig. 5.



Inventor
Gustav Kahlisch
by Knight Bros
His Attorneys

UNITED STATES PATENT OFFICE

2,037,512

METHOD OF PRODUCING CROSS-WOUND
WARP BEAMS AND APPARATUS THERE-
FOR

Gustav Kahlisch, Gladbach-Rheydt, Germany

Original application July 11, 1933, Serial No.
679,957. Divided and this application January
11, 1935, Serial No. 1,422. In Germany August
17, 1932

6 Claims. (Cl. 28—37)

This invention relates to a method of building-up cross-wound warp beams, to an apparatus for carrying out the method, and to the product itself.

It is a well-known fact, that in the usual manner of building-up warp beams, that is, in which the yarn windings run parallel beside one another, difficulties arise in dyeing thoroughly the yarn body. Consequently there has been a trend toward the use of cross-wound warp beams, in order to obtain a porous permeable yarn body. Such cross-wound warp beams, however, have the drawback that the two sides of the yarn body taper off to a great extent. As a consequence, the outermost threads come to rest on a constantly decreasing diameter and thus become shorter than the remaining ones and break on account of the greater tension when running-off the beam.

The present invention, which is a division of my application for Letters Patent Serial No. 679,957, filed July 11, 1933, has for its object to do away with the drawback of the cross-wound warp beams hitherto usual, which object is obtained by making the windings at the ends more dense than in the remaining portion of the yarn body. This problem is solved by making the spaces between the dents of equal width, but running more and more threads through each space approaching the ends of the comb, for a section at each end equal in width to the traverse of the comb. If thus, for example, one thread lies in each dental space of the comb at the central part of the yarn body, one thread more is added at the beginning of the comb traverse from inside to outside in each dental space or group of dental spaces, so that, for example, in the width of the comb traverse at each end of the guiding comb in one group of dental spaces come to lie two threads, in the next group three threads, and in the next or outer group four threads. In this manner the ends of the yarn body become correspondingly solid.

The invention further provides, that the threads to be wound on are set more densely on the whole width of the yarn ribbon, after completion of every yarn layer or group of layers. To this end the teeth of the guiding comb are automatically to be adjusted denser and denser, which may be effected by constructing the guiding comb like a foldable zig-zag comb or as a spring comb.

For, it has been found, that in winding up smooth threads, such as silk, artificial silk, twisted yarn or the like, it may easily happen that the threads, even when crossed most pronouncedly, become cobwebbed at the ends of the

yarn body, so that an uneven yarn body is obtained. If, on the contrary, the yarn ribbon becomes narrower and narrower, the ends of the yarn body do taper to some extent, but the threads are no longer capable of cobwebbing, since they have the necessary support.

In order that the invention may be clearly understood and readily carried into effect, two embodiments of the same are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a part of the apparatus in top view, in which the guiding comb is formed by a foldable zig-zag comb,

Figure 2 is an end view of the means for adjusting the foldable comb,

Figures 3 and 4 are, respectively, end view and top view of the second embodiment, in which the guiding comb is constructed as a spring comb.

Figures 5 and 6 show the spring comb on enlarged scale in cross section and end view.

It will be seen in Figures 1 and 4, that at the edge of the yarn ribbon the threads are fed more densely. Figure 4 in particular shows, that at the edge of the yarn ribbon four threads lie in the first dental space, three threads in the subsequent dental space, two threads in the next and then, uniformly, one thread in each dental space. I wish to be understood that this arrangement is only an example, because the numbers of threads as selected in practice cannot be distinctly represented in the drawings.

As already mentioned, x denotes the yarn ribbon to be wound up, which is fed by a roller y . The thread guiding comb denoted by 3 is longitudinally shiftably mounted on arms 12. The latter are rigidly mounted on a shaft 13 and swingingly arranged on the machine frame in a manner known per se, so that the thread guiding comb is retired automatically with increasing diameter of the yarn body.

The shaft 13 has loosely mounted on it a sleeve 14 which carries a sprocket wheel 15 and a cam disk 16. The sleeve 14 is driven for example by a chain 17. The cam disk 16 co-operates with two anti-friction rollers 18 of the thread guiding comb so as to impart to it a to and fro motion in the axial direction of the beam z .

In the embodiment shown in Figures 1 and 2 the part of the comb carrying the teeth 3a has a foldable zig-zag structure 3b, the one end hinge of which is formed by a nut 3c in mesh with a screw spindle 19. This spindle is mounted within the guiding comb 3, which to this end is hollow, and on its free end carries a bevel wheel 20 in mesh with a companion wheel 21 mounted

within the comb 3, see Figure 1. The shaft of bevel wheel 21 further carries a ratchet wheel 22. The right-hand arm 12, Figure 1, has a bent portion 12a which carries a spring-actuated pawl 23 engaging the ratchet wheel 22. In every motion toward the right of the comb 3 the pawl 23 actuates the ratchet wheel 22 and turns it by a small angular amount. Thereby also the bevel wheels 21, 22 and consequently also the screw-spindle 19 are turned, whereby the nut 3c is correspondingly shifted to the left, that is, the zig-zag comb is gradually folded and shortened. Consequently the teeth 3a after every traverse of the guiding comb are set more densely by a corresponding small amount, whereby the yarn layer becomes shorter and shorter.

In the embodiment illustrated in Figures 3 to 6 only the guiding comb is modified, whilst all remaining parts are of the same construction as in the embodiment shown in Figures 1 and 2.

In this embodiment the guiding comb 3 in the usual manner is formed by a tube, Figures 5 and 6, which on top is provided with a longitudinal slot 3e. On both ends of the tube are inserted end plates 8 which carry the guide wires 6 and 5 and form bearings for the screw spindle 19 which has fixed to it a bevel wheel 20. Like in the first-described embodiment, the latter is in mesh with a companion wheel 21 the shaft 10 of which carries the ratchet wheel 22. The screw spindle 19 has right-hand threads on its one half and left-hand threads on the other half and is engaged by two correspondingly threaded plates 2 and 2a. To these plates are fixed the ends of two inter-engaging coiled springs 4, 4a which tend to contract. The two plates 2, 2a each carry a strong comb tooth, in order to prevent bending of the comb teeth proper 3a. Since these teeth must be thin, seen in the longitudinal direction of the comb, they have a flat laminated cross section, see Figure 5, with the large side extending in the direction of feed of the yarn ribbon. All teeth are guided on the wire 5 in the longitudinal direction of the comb as well as by the spirals of the coiled springs 4, 4a. The springs 4, 4a in their turn are guided by the wires 6. When a compression of the springs takes place by the revolution of the screw spindle 19, the teeth gradually approach one another, whereby the yarn ribbon becomes narrower and narrower and thus the windings on the warp beam shorter and shorter.

What I claim and desire to secure by Letters Patent is:—

1. A method of winding warp beams, which comprises running a ribbon of yarns through a comb in such a way that more yarns pass through the dental spaces near the ends of the comb for the width of the comb traverse than in the central part of the comb, and reciprocating the comb to cross wind the yarns and to build relatively dense self supporting end sections of the wound body.

2. A method as described in claim 1, wherein the numbers of yarns in the lateral dental spaces increase gradually from the number in the central dental spaces to a maximum number in the outermost dental spaces.

3. A method of winding warp beams, which comprises running a ribbon of yarns through a comb in such a way that more yarns pass through the dental spaces near the ends of the comb for the width of the comb traverse than in the central part of the comb, reciprocating the comb to cross wind the yarns and to build relatively dense self supporting end sections of the wound body, and gradually drawing the dents of the comb closer together as the diameter of the yarn body increases, in order to taper the ends of the yarn body.

4. Apparatus for winding warp beams, comprising a yarn guiding comb adjustable in length to decrease the spacing between its dents, means for traversing said comb, and means operable in time with said traversing means for diminishing the length of said comb as the winding progresses, in order to impart a conical shape to the ends of the beam.

5. Apparatus for winding warp beams, comprising a yarn guiding comb of foldable zig-zag construction, means for traversing said comb, and means operable in time with said traversing means for gradually folding said comb as the winding progresses, to decrease the spacing between the dents, in order to impart a conical shape to the ends of the beam.

6. In an apparatus for winding warp beams, a yarn guiding comb comprising a set of teeth and a coiled spring controlling the spacing of said teeth, means for traversing said comb, and means operable in time with said traversing means for causing the contraction of said spring to diminish the spacing of said teeth gradually as the winding progresses, in order to impart a conical shape to the ends of the beam.

GUSTAV KAHLISCH.

CERTIFICATE OF CORRECTION.

Patent No. 2,037,512.

April 14, 1936.

GUSTAV KAHLISCH.

It is hereby certified that the above numbered patent was erroneously issued to the inventor said "Kahlisch" whereas said patent should have been issued to W. Schlafhorst & Co., of Munchen-Gladbach, Germany, a corporation of Germany, as assignee of the entire interest in said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of May, A. D. 1936.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.

within the comb 3, see Figure 1. The shaft of bevel wheel 21 further carries a ratchet wheel 22. The right-hand arm 12, Figure 1, has a bent portion 12a which carries a spring-actuated pawl 23 engaging the ratchet wheel 22. In every motion toward the right of the comb 3 the pawl 23 actuates the ratchet wheel 22 and turns it by a small angular amount. Thereby also the bevel wheels 21, 22 and consequently also the screw-spindle 19 are turned, whereby the nut 3c is correspondingly shifted to the left, that is, the zig-zag comb is gradually folded and shortened. Consequently the teeth 3a after every traverse of the guiding comb are set more densely by a corresponding small amount, whereby the yarn layer becomes shorter and shorter.

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4. Apparatus for winding warp beams, comprising a yarn guiding comb adjustable in length to decrease the spacing between its dents, means for traversing said comb, and means operable in time with said traversing means for diminishing the length of said comb as the winding progresses, in order to impart a conical shape to the ends of the beam.

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6. In an apparatus for winding warp beams, a yarn guiding comb comprising a set of teeth and a coiled spring controlling the spacing of said teeth, means for traversing said comb, and means operable in time with said traversing means for causing the contraction of said spring to diminish the spacing of said teeth gradually as the winding progresses, in order to impart a conical shape to the ends of the beam.

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