E. TÜRCK AND E. BÖSEBECK.

LACE BRAIDING MACHINE.

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1,418,521. Patented June 6, 1922.

Fig.1

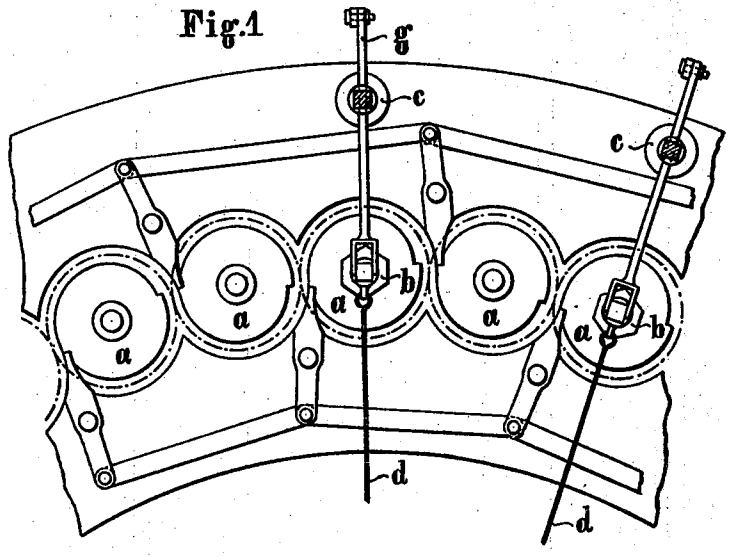


Fig.2

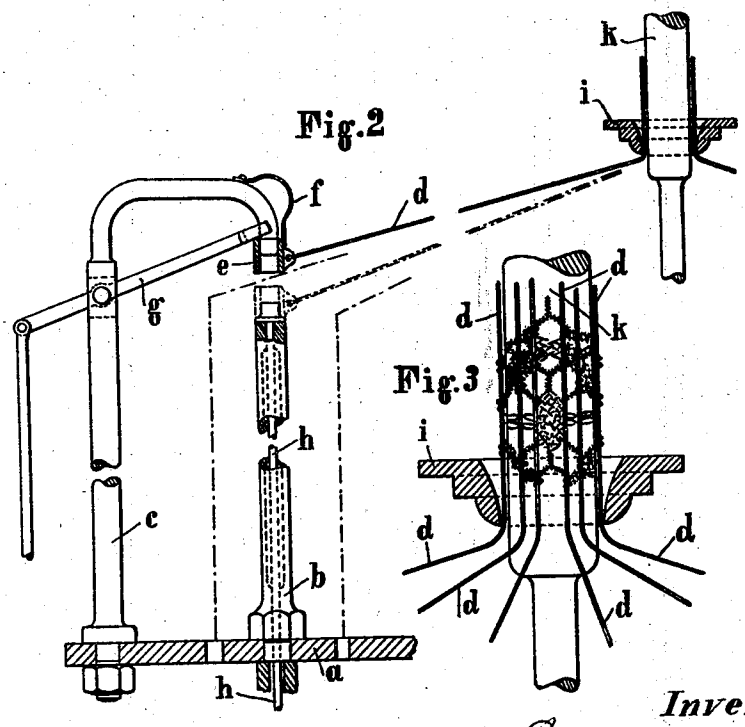


Fig.3

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LACE-BRAIDING MACHINE.

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To all whom it may concern:

Be it known that we, EUGEN TÜRCK and EMIL BÖSEBECK, both citizens of the German Republic, residing at Langerfeld, near Barmen, Germany, and Barmen, Germany, respectively, have invented certain new and useful Improvements in a Lace-Braiding Machine, of which the following is a specification.

In the manufacture of a single-thread lace fabric there have been hitherto generally employed, for forming eyes in the midst of the web, for widening various parts of the web and so on, so-called auxiliary threads which, when the fabric is produced, are braided into the web and are later removed from the latter at completion. To introduce these auxiliary threads a certain number of the bobbins provided on the machine must be employed, so that, in order to produce a given lace fabric, a machine is always required which contains more bobbins than the threads in the fabric. Moreover, it is usually very difficult and especially time-absorbing to remove the threads from the completed web, and for this work many factory-hands are required. Finally, these auxiliary threads lead to great wastage of thread material since they cannot be further utilized.

The object of the present invention is to dispense with these auxiliary threads in the manufacture of lace fabric on single-thread braiding machines and consequently to obviate the above-described drawbacks. This is attained by employing, instead of auxiliary threads, braiding wires which at one of their ends extend into the thread-collector and at their outer ends can be raised and lowered by means of a mechanical device erected on the braiding plate. The web is drawn away over the said wires.

It is known in the operation of two-thread braiding machines (i. e., those having not a single but two threads per plate) to employ wire needles for producing eyes in the midst of the fabric. In this case however these needles consist of a comparatively thick, rigid piece of wire and by the braiding become incorporated with the fabric. This method indeed is employable in the case of two-thread machines wherein the thread-collector consists of an open member, and wherein a crown-like beater engaging the fabric from above is employed, and wherein also it is a question of a loose fabric, but is not employable in single thread braiding machines wherein the fabric is drawn off over a mandrel by means of a closed ring surrounding the latter and wherein a crown-like beater is employed which operates from below on the fabric as the latter is formed. The braided fabric tightly stretched around the mandrel could not be drawn away at all from the inbraided needles and there would be no room for them between the ring and the mandrel.

Now the present invention renders possible the employment for single thread machines of the method known for two-thread machines, owing to the employment of very fine, springy, elastic wires (steel wires), these being so braided in that they all become situated on the outside of the web and are embraced only by those loops of the braiding thread which are to be held by them. Between the ring and the mandrel there will be sufficient space for the fine wires, which scarcely exceed the thickness of the braiding threads, so that the web can pass freely and be easily drawn away from the wires owing to the latter being situated on the outside of the web, especially as the wires can always yield owing to their elasticity.

Apparatus for carrying out the invention is shown by way of example in the accompanying drawing, wherein—

Fig. 1 shows part of a braiding machine in plan,

Fig. 2 the same in vertical section, and

Fig. 3 shows the drawing-off device of the machine on a larger scale.

As seen from Fig. 1, the outfit of the single-thread lace-braiding machine is the usual one, the braiding track being constituted of round plates *a* arranged in a circle. According to the invention there is mounted on those of the plates *a* whereon an eye is to be formed a mechanical device such as will be understood particularly from Fig. 2 of the drawing. This device is mounted with its foot *b* centrally on the particular plate *a* and with its other foot *c* outside the track. Between the two upper, mutually facing ends of the two portions of the device is provided the passage for those threads of the bobbins which pass through the device, and slidable across this passage is the sleeve *e* which serves as holder for the braiding wire *d*, made, for example, of fine steel wire. The

arrangement is such that said sleeve can be disposed at one moment on the upper portion of the device and at another moment on the lower portion thereof, and in that way the wire *d* will at one time be above and at another below the thread of the bobbin running in the outer portion of the track. The sleeve *e* holding the wire *d* is safely retained by means of a spring *f* which snaps into this sleeve, while the latter can be released from the upper portion of the device by means of the lever *g* so that the sleeve slips down by gravity on to the lower part of the device. The sleeve *e* may be returned to the upper part of the device by means of a rod *h*, located inside the device and passing through the wheel-column of the particular plate. The rod *h* as well as the lever *g* receive their necessary movement from the pattern gear.

The other or free end of the fine, elastic wire *d* is conducted through the collector-ring *i*, passing between this and the mandrel *k* and projecting somewhat out of said ring *i*. The elasticity of the wires so acts that they do not turn sharply round the lower edge of the ring *i* but each passes through a large bend into its vertical position. In this way any tight-squeezing of the thread-loops around the wires at this place is avoided.

Usually the wires *d* are in the upper position indicated in Fig. 2 by the full line and a wire would be lowered into the position shown dotted only when a thread-loop is to be formed, and would immediately thereupon be raised again. The result of this is that the wires *d* become positioned entirely outside the fabric, as will be seen from Fig. 3. In this way any working-in of the wires and consequently sticking of the tubular web on the mandrel are avoided, and consequently the web can be drawn freely over the wires.

The uprights or posts *c*, to which the levers *g* are attached, each of the posts have inverted U-shaped portions one depending end thereof being in line vertically with the center of the tubular post *b*, such end being of a size to receive the sleeves *e*, with which the wires *d* are connected. When the rod *h* is raised by the pattern gear the sleeve will be raised and will be held upon the depending inner end of the post *c*, by the spring *f*. In operation the sleeves are moved upward by the rods *h*, the upper ends thereof being shaped to receive the sleeves *e*, and the posts or hollow vertical I-shaped standards *b* are carried by the disks *a*, and the inverted J-shaped standards or uprights are maintained by the outer plate or frame.

The alined ends of the posts are separated to provide a gap for the passage of threads from the bobbins. The sleeves are moved from the inverted U-shaped portion of the post *c*, which bridges or straddles the outer portion of the track by a lever *g*, which is oscillated by a rod that is reciprocated at the proper interval, being controlled by a pattern gear to move a wire from elevated to normal position on the rod *h*.

I claim:

1. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel for gathering up the transitional web from the bobbins, a plurality of thin, resilient wires normally held just over the transitional web with their upper ends extending upwardly between said collector-ring and mandrel, and means for shifting the lower ends of any of said wires in and out of the transitional web for generating eyes therein.

2. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel for gathering up the transitional web from the bobbins, a plurality of thin, springy steel wires normally held just over the transitional web with their upper ends extending upwardly between said collector-ring and mandrel, and means for shifting the lower ends of any of said wires in and out of the transitional web for generating eyes therein.

3. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel, a number of devices straddling the outer arcs of the track and each provided with a gap to allow of the passage of threads from the bobbins in said arcs, a plurality of thin, resilient wires normally held at their lower ends by said devices just above said gaps and at their upper ends extending upwardly between said collector-ring and mandrel, and means for shifting the lower ends of any of said wires across said gaps and returning them to their normal positions.

4. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel, a number of inverted-U formed devices straddling the outer arcs of the track, the inner limbs of each U having a gap to allow of the passage of threads from the bobbins in said arcs, a plurality of sliding members normally resiliently held by said devices just above said gaps, a plurality of

thin, resilient wires attached at their lower ends to said sliding members and at their upper ends extending upwardly between said collector-ring and mandrel, and means for sliding said sliding members across said gaps for temporary retention by said devices while the bobbin-threads pass through the gaps and then returning them to their normal positions.

5. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel, a number of inverted-U formed devices straddling the outer arcs of the track, the inner limbs of each U having a gap to allow of the passage of threads from the bobbins in said arcs, a plurality of sliding members normally resiliently held by said devices just above said gaps, a plurality of thin, resilient wires attached at their lower ends to said sliding members and at their upper ends extending upwardly between said collector-ring and mandrel, and means controlled by the pattern gear for sliding said sliding members across said gaps for temporary retention by said devices while the bobbin-threads pass through the gaps and then returning them to their normal positions.

6. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel, a number of inverted-U formed devices straddling the outer arcs of the track, the inner limbs of each U having a gap to allow of the passage of threads from the bobbins in said arcs, a plurality of sleeves normally resiliently held by said devices just above said gaps, a plurality of thin, resilient wires attached at their lower ends to said sleeves and at their upper ends extending upwardly between said collector-ring and mandrel, and means for sliding said sleeves across said gaps for temporary retention by said devices while the bobbin-threads pass through the gaps and then returning them to their normal positions.

7. A lace braiding machine, comprising in combination a track plate having a plurality of circularly arranged discs defining the track for circulating the bobbins, a centrally disposed mandrel for receiving the braided web, a collector-ring surrounding the mandrel, a plurality of sets of inverted-J and I shaped standards on the track plate, the inverted-J standards bridging outer arcs of the track and the I standards being coaxial with the discs of said arcs, the J and I standards having between them gaps to allow of the passage of threads from the bobbins in said arcs, a plurality of sleeves normally resiliently held above said gaps on the J standards, but capable of sliding on to the I standards so as to be held below the gaps, a plurality of thin, resilient wires attached at their lower ends to said sleeves and at their upper ends extending upwardly between said collector-ring and mandrel, and means influenced by the pattern gear for sliding said sleeves from the J standards on to the I standards and returning them after the passage of threads through the gaps.

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