Jan. 30, 1951 V. M. J. ANCET 2,539,984

DEVICE FOR TIGHTENING THE WEFT IN CIRCULAR LOOMS

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Fig. 1

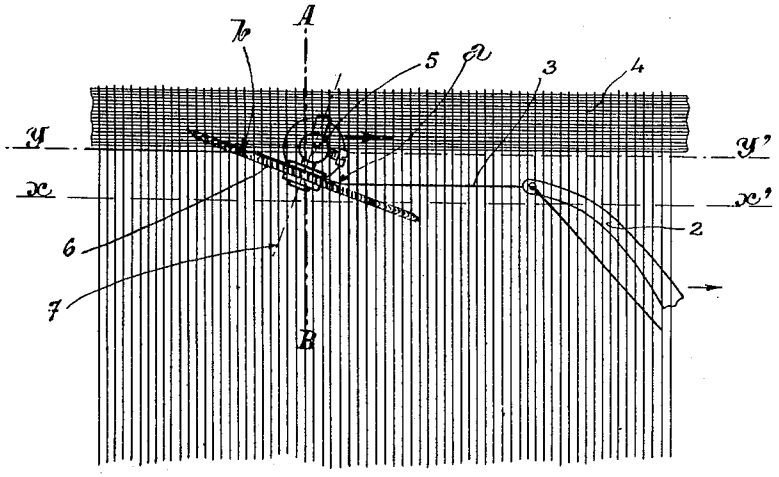
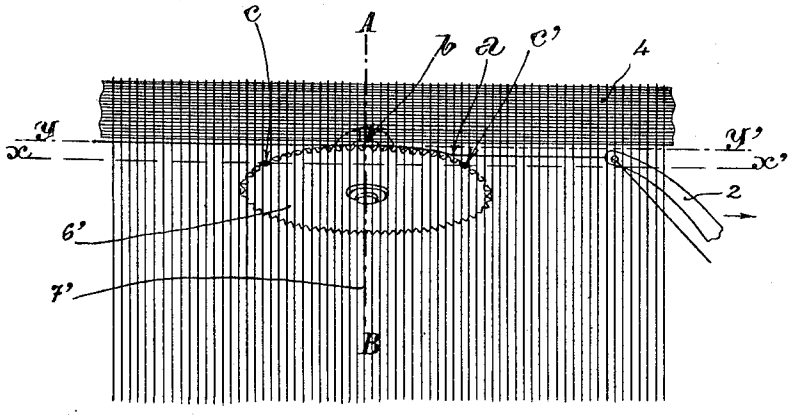


Fig. 2



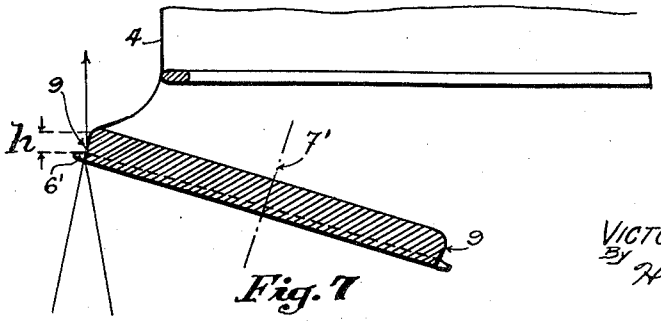


Fig. 7

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Fig. 3

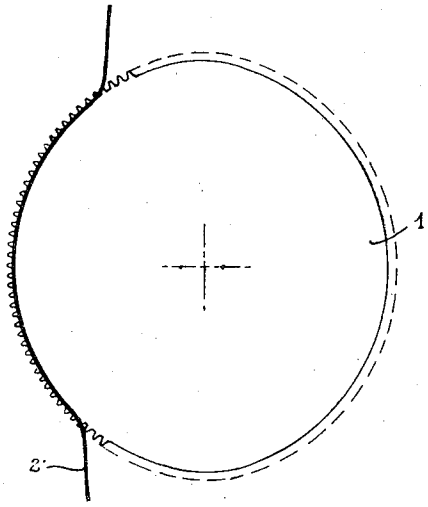


Fig. 4

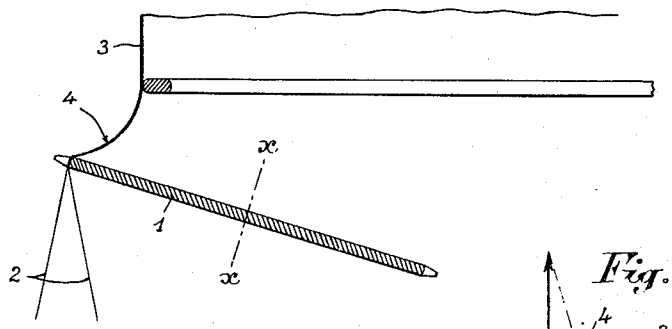


Fig. 5

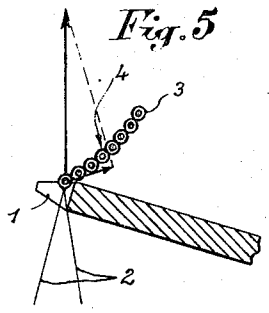
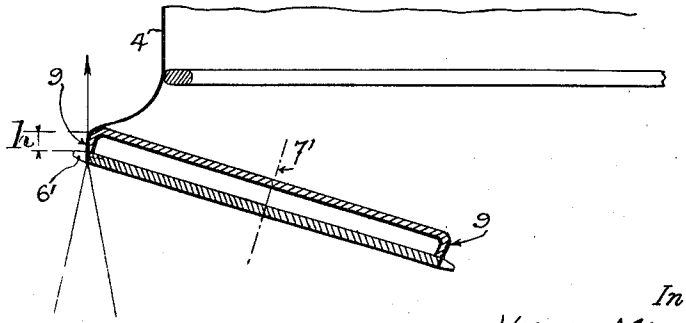


Fig. 6



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Patented Jan. 30, 1951 2,539,984

UNITED STATES PATENT OFFICE

2,539,984

DEVICE FOR TIGHTENING THE WEFT IN CIRCULAR LOOMS

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Application August 13, 1945, Serial No. 610,437
In France November 3, 1943

Section 1, Public Law 690, August 8, 1946
Patent expires November 3, 1963

3 Claims. (Cl. 139—13)

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This invention relates to devices employed in circular looms for beating up the weft thread inserted by the shuttle and is concerned more particularly with a novel beat-up device of the rotary type, which is simple and effective and performs its function without doing injury to the thread being beaten up.

It has been proposed heretofore to beat up the inserted weft thread in a circular loom by means of a sprocket wheel mounted to travel with the shuttle and having its teeth meshing with the warp threads in the shed and engaging the weft thread. In one form of such prior beat-up devices, with which I am familiar, the axis of rotation of the wheel lies parallel to a plane, which is perpendicular to a radius of the loom passing through the center of the wheel. Also the axis of the wheel makes an oblique angle with a plane through the fell of the goods and its upper end points in the direction of travel of the wheel with the shuttle. With this construction, the weft thread engaged by the teeth of the wheel and moved toward the fell of the fabric, as the wheel rotates, leaves the teeth at an angle to the plane of the wheel. As a consequence, when the thread is beaten up vigorously, the last tooth of the wheel in contact with the thread acts on the thread with an abrading action, which is liable to do injury to the thread and impair the quality of the fabric.

The present invention is directed to the provision of a rotary beat-up wheel for use in a circular loom, which has a novel mounting, such that abrasion of the weft thread by the teeth of the wheel during the beating up is avoided. In the new device, the wheel is mounted on the warp thread side of the fell of the fabric and bears against the warp threads near the fell, the teeth of the wheel passing between the warp threads and engaging the weft thread. The axis of the wheel makes an oblique vertical angle with a plane parallel to the axis of the loom and perpendicular to the radius of the loom passing through the center of the wheel. By "vertical angle," I mean an angle in a plane intersecting the horizontal. The wheel may be so mounted that its axis lies in a plane containing the axis of the loom and thus intersects the loom axis, although that is not necessary. When a wheel of the construction and mounting described is employed in a circular loom of the type, in which the fabric and warp threads form a continuous cylindrical sheet, the curved line of contact of the wheel and the warp threads has an apex adjacent the fell of the goods and the tangent to the wheel at the apex is approximately horizontal. When the axis of the wheel intersects the axis of the loom, the tangent at the apex of the curved line of contact of the wheel and warp threads is horizontal and the device is then

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capable of use without regard to the direction of shuttle travel.

In a modified construction, the beat-up wheel of the invention is provided with means for holding the fabric immediately above the fell in such manner that the beat-up is more effective. The pressure of the wheel on the warp threads forces the threads out of their normal positions and the fabric directly above the wheel then has an inward curvature. Under such conditions, the force applied by the teeth of the wheel to the weft thread is not wholly used in forcing that thread against the last inserted thread; instead, only a component of the applied force acts to beat up the thread. To overcome this difficulty, the wheel is provided with a peripheral flange on its face toward the fell of the fabric and the flange engages the fabric adjacent the fell and holds it in such position that all of the force exerted by the teeth of the wheel on the weft thread being beaten up is applied to move that thread toward the last previously inserted thread.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which

Fig. 1 is a view in elevation showing a beat-up wheel of the prior art;

Fig. 2 is a view in elevation of the beat-up wheel of the invention;

Fig. 3 is a plan view showing the manner in which the new wheel engages the weft threads;

Fig. 4 is a partial vertical sectional view showing the manner in which the fabric is deformed by the wheel of Fig. 2;

Fig. 5 is a view similar to Fig. 4 but on a larger scale;

Fig. 6 is a vertical sectional view showing a modified form of the new wheel;

Fig. 7 is a view similar to Fig. 6 showing an alternative construction of the new wheel.

In the construction of the prior art shown in Fig. 1, the shuttle (not shown) provided with a trolley 2 having a guide eye at its free end, through which passes the weft thread 3 on its way to the fell y, y' of the fabric 4. As the thread leaves the guide eye, it lies in a horizontal line spaced a substantial distance below the fell and, in the beating-up operation, the thread is raised to the fell and forced tightly against the last previously inserted weft thread. The beating-up mechanism includes a radial arm 5 located preferably within the cylindrical sheet of warp threads and moving with the shuttle, and the arm carries a sprocket wheel 6, which engages the warp threads below the fell and the teeth of which pass between the warp threads. The axis of the wheel, indicated at 7, lies parallel to a plane perpendicular to a radius of the loom passing through the center of the wheel, and the

axis of the wheel is inclined to a vertical plane AB passing through the loom axis and has its upper end extending forwardly, that is, in the direction of travel of the radial arm with the shuttle. The wheel engages the warp threads between the horizontal line *x*, *x'* and the fell *y*, *y'* of the fabric. The weft thread is engaged by the teeth of the wheel somewhat above the line *x*, *x'* and at the point *a* and, as the wheel rotates, its teeth cause the thread to be elevated to the fell *y*, *y'*, the thread leaving the wheel at the point *b*. At the point *b*, the tooth last in contact with the weft thread forces the thread with considerable pressure against the last previously inserted weft thread and is liable to cause abrasion of the thread and damage thereto.

The new beat-up device, illustrated in Fig. 2, includes a sprocket wheel 6', the axis 7' of which is in a vertical plane AB through the loom axis and makes an oblique vertical angle with a plane perpendicular to a radius of the loom passing through the center of the wheel. When the axis 7' of the wheel lies in the vertical plane AB through the loom axis, as shown, the axis of the wheel intersects the loom axis, but this arrangement is not necessary, so long as the axis of the wheel makes a vertical angle with the reference plane lying perpendicular to a radius of the loom through the center of the wheel. If the axis of the wheel does not intersect the loom axis, the wheel axis may be considered to make both a vertical angle and a horizontal angle with the reference plane.

With the construction described, the curved line of engagement, indicated at *c*, *c'*, of the wheel with the warp threads, has an apex at *b* adjacent the fell of the fabric. The weft thread is engaged by the teeth of the wheel at *a* and is raised to the apex of the line *c*, *c'*, at which point the weft thread leaves the wheel and is in contact with the previously inserted weft at the fell *y*, *y'*. With this arrangement, the last tooth of the wheel in contact with the thread does not scrape the thread, so that abrasion of the thread is avoided. When the wheel is so mounted that its axis intersects the loom axis, as shown in Fig. 2, a tangent to the line of contact *c*, *c'* at the apex *b* is horizontal and this construction is reversible, in that it may be used in a loom with the shuttle traveling in either direction.

As shown in Fig. 4, the engagement of the wheel 6' with the fabric 4 produces a concavity in the fabric immediately beyond the line of contact of the wheel and the warp threads. As a result, the thrust exerted on the weft thread being beaten up is not wholly utilized in forcing that thread toward the last previously inserted thread. This is shown more clearly in Fig. 5, in which in vertical arrow indicates the total force applied by the teeth of the wheel and the short arrow, inclined to the right, represents the component of the applied force, which is effective to move the weft thread being beaten up against the last previously inserted weft thread.

In order to insure that all the force applied by the teeth of the sprocket wheel to the weft thread being beaten up may be utilized to move that thread toward the preceding weft thread at the fell of the goods, I provide the sprocket wheel 6' with a peripheral flange 9 on the face of the wheel toward the fell of the fabric. This flange engages the fabric at and immediately above the fell and holds it in such manner that throughout the length of the fabric indicated at *h*, the thrust exerted by the teeth of the wheel is utilized entirely in forcing the weft thread being beaten up against the last previously inserted thread. The peripheral flange may be provided by a cap attached to the wheel, as shown in Fig. 6, or the flange may be an integral part of the wheel, as in the construction illustrated in Fig. 7. The flange increases in diameter in a direction away from the wheel and the shape of the flange depends upon the inclination of the axis 7' of the wheel in relation to the loom axis.

What I claim is:

1. In a circular loom, a weft beat-up device comprising a sprocket wheel mounted on the warp thread side of the fell of the fabric to bear against the warp threads near the fell, the teeth of the wheel passing between the warp threads and engagin the weft thread, means being provided for mounting the wheel in a position in which the line of engagement thereof with the sheet of warp threads is a curved lie having a point of tangency with the fell.

2. In a circular loom, a weft beat-up device comprising a sprocket wheel mounted on the warp thread side of the fell of the fabric to bear against the warp threads near the fell, the teeth of the wheel passing between the warp threads and engaging the weft thread, and the axis of the wheel making an oblique vertical angle with a plane parallel to the axis of the loom and perpendicular to a radius of the loom passing through the center of the wheel, and a peripheral flange on the face of the wheel toward the fell of the fabric, the flange engaging the fabric adjacent the fell to hold it substantially cylindrical.

3. In a circular loom, a weft beat-up device comprising a sprocket wheel mounted on the warp thread side of the fell of the fabric to bear against the warp threads near the fell, the teeth of the wheel passing between the warp threads and engaging the weft thread, and the axis of the wheel making an oblique vertical angle with a plane parallel to the axis of the loom and perpendicular to a radius of the loom passing through the center of the wheel and the axis of the wheel intersecting the axis of the loom, and a peripheral flange on the face of the wheel toward the fell of the fabric, the flange engaging the fabric adjacent the fell to hold it substantially cylindrical.

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