July 8, 1941. H. PELCÉ 2,248,282

DEVICE FOR GUIDING THE SHUTTLES IN CIRCULAR WEAVING LOOMS

Filed June 20, 1940

Fig. 1.

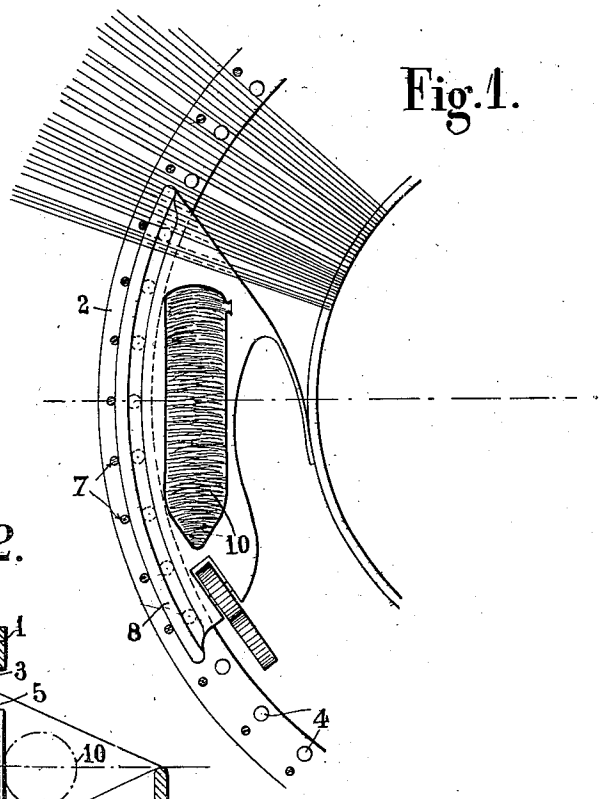


Fig. 2.

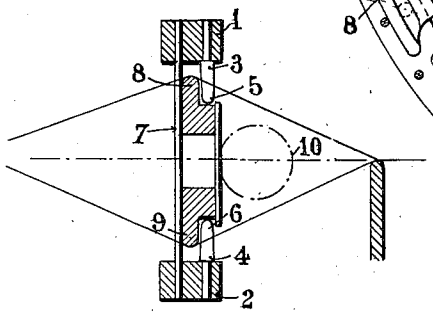


Fig. 3.

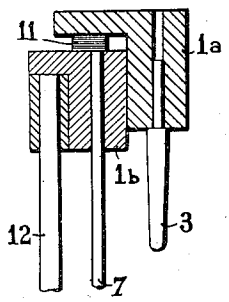
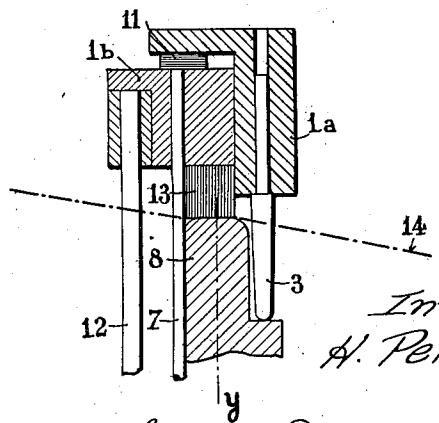


Fig. 4.



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DEVICE FOR GUIDING THE SHUTTLES IN CIRCULAR WEAVING LOOMS

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7 Claims. (Cl. 139—13)

The present invention has for object a particular arrangement of the sliding track for the shuttles in circular weaving looms, in particular in those of the type in which the warp threads are fed at right angles or approximately at right angles to the loom.

It is known that in circular looms, the guiding of the shuttles in their circular and continuous movement must be ensured as positively and as accurately as possible (contrarily to rectilinear looms having a reciprocating movement in which the shuttle is thrown and in which it is only slightly guided along its path). It is also known that said guiding must necessarily be devised in such a manner that it does not hinder the beating and crossing of the warp threads, and so that the latter cannot be damaged or cut.

In looms of the type considered, said guiding is usually ensured by means of one or more circular members the cross-section of which through any radial plane passing through the axis of the loom, presents one or more recesses of T or dove-tail shape, or of any other shape such that the shoes or rails rigid with the shuttles, and which circulate in said recesses, cannot escape therefrom. These members are moreover provided with notches or slots allowing the passage of the warp threads, their crossing in the interval between the passage of the shuttles, and their withdrawal from the passage of the latter. Said members are also sometimes constituted by cut out plates or blades; they have the same general arrangement and produce the same effects.

These devices which, when they are well constructed, can ensure satisfactory guiding of the shuttles, have on the contrary, a serious inconvenience of which the warp threads suffer the consequences. In fact, experience has shown that, in looms of the type in question, it is practically impossible to prevent each warp thread from moving away more or less greatly from the radial or approximately radial plane provided for its displacement, during its beating movement. This results from the fact that said thread, unable to be held positively throughout its length, is urged, by various phenomena such as: slight differences of tension, vibrations, inertia of the thread compelling it to incurve, etc.; moreover, a slight angular displacement of the fabric often occurs which produces a corresponding displacement of the warp threads; finally, in looms in which cams secured to the shuttles participate in opening the shed, there is, at right angles to said cams, a slight displacement of the threads in the direction in which the shuttles advance.

Now, in the case of the displacement of the warp threads outside the radial plane in which their beating movement must normally take place, with the previously mentioned guiding devices, it sometimes happens that the threads thus displaced catch in said guiding members and cannot suitably withdraw; they are then on the path of the shoes or rails rigid with the shuttles which circulate at high speed and they are cut upon passage of said shuttles, which rapidly reduces the production of the loom and is prejudicial to the quality of the fabric obtained.

The device according to the present invention is adapted to remedy these inconveniences, whilst ensuring the perfect guiding of the shuttles; it is mainly characterised by the fact that the shoes of the shuttles slide between two series of pins of suitable shape arranged according to the generatrices of a cylinder co-axial with the loom, by taking a bearing on the end of said pins which hold them in the plane provided for their circulation and prevent them from moving towards the interior of the loom.

On the other hand, according to a second feature of the invention a series of pins arranged according to a cylinder having the same axis as the preceding one, but of slightly greater diameter, prevents the shuttles from moving towards the exterior of the loom; they receive and annul the effect of centrifugal force when the shuttles are in operation.

The accompanying drawing shows by way of example simply as an indication and not in a limiting sense a method of carrying out the present invention.

Fig. 1 is a plan view.

Fig. 2 is a sectional view.

Figs. 3 and 4 show, on an enlarged scale, two modifications.

Rings 1 and 2, concentric with the axis of the loom and serving as frame, carry the pins 3 and 4 of suitable shape which ensure the support and lateral guiding of the shuttles. Said pins have their end 5 or 6 rounded so that the warp threads can never take a bearing thereon, even when they are deviated from their initial direction; said threads are in fact compelled to fall either on one side or on the other of the pin.

Another very advantageous result of this arrangement is that certain weaving mishaps, such as the simultaneous drawing along of several threads by a shuttle, for instance after a thread has been broken, do not determine serious dis-

turbances, whereas in the other systems, the jamming of the shuttles can sometimes result therefrom involving important mechanical damages.

Practice allows of determining the shape and the dimensions of the pins **3** and **4**, the best suited to the nature, coarseness, tension, elasticity, speed and number of the threads as well as the number and the position of said pins. They are preferably made of hard steel, tempered and polished, for facilitating the sliding of the threads.

The cylindrical pins **7**, which are also preferably made of tempered and polished steel and which are arranged according to the generatrices of a cylindrical surface, serve as a bearing for the outer face of the sliding shoes **8** and **9** of the shuttle **10**, which are made of hard wood or compressed wood, or of a material having similar properties.

The friction of the shuttle shoes on the pins **7**, which occurs along a generatrix of each of the latter, causes less wear of the shoes than the friction on plates or other members having sharp edges of known type.

Furthermore, this system offers the advantage of great constructional simplicity, in particular in the embodiment illustrated in Figs. 1 and 2, in which the pins **7** serve at the same time as stay-members for the annular members **1** and **2**.

In another embodiment illustrated in Fig. 3, the upper loop **1** can be constructed in two parts so as to facilitate both the taking up of the wear and the dismantling of the shuttles. Two loops *1a* and *1b* fitted and secured together respectively carry the pins **3** and the pins **7**. An adjustable wedge **11** allows of lowering the pins **3** at will in proportion as they or the shuttle shoes wear. A warp classifying comb **12** can eventually be provided.

After having ensured the bracing of members **1** and **2**, or *1b* and **2** by another means, for instance by using the classifying comb **12**, the pins **7** can also be rotatively mounted on their axis, for instance on ball bearings, without departing from the invention. This arrangement is particularly advantageous in certain looms in which the small number of threads allows of giving the pins **7** a diameter sufficient for them to be drawn along by the shuttle shoes, so as to convert all or part of the sliding friction into rolling friction.

Some of the pins **3** and **4** can be arranged to serve at the same time as lubricating members, by placing lubricant on the shuttle shoes at the place where the latter rub against the pins.

In some particular cases the criterion of which will be the nature, coarseness and resistance to crushing of the warp threads, without departing from the invention, rings **13** (Fig. 4) can be provided, preferably made of rubber, cork, leather or other resilient material, on the upper and lower hoops so that the warp threads **14** come in contact with said rings and, that, if need be, as illustrated in Fig. 4, they are clamped between the shoes and said resilient rings; said rings can then procure one or the other of the following advantages, or both simultaneously:

1. Keep the threads closer to the line of formation of the fabric.

2. Support all or part of the vertical stresses which urge the shuttles, by relieving to the same extent the pins **3** and **4**.

When this arrangement is used, it may be advantageous, when the warp threads allow so, to arrange along the upper and lower faces of the shuttle shoes, approximately in the plane *y* (Fig. 4), rollers projecting from said shoes and the rolling movement of which on the rings **13** and threads **14** will replace the friction of the shoes on the same elements.

I claim:

1. In a circular weaving loom a guiding track for the shuttle-carrier comprising two fixed rings placed one above the other, an outer series of cylindrical vertical pins the two ends of which are respectively mounted in said rings, and two inner series of short cylindrical pins respectively secured to both rings, the short pins of one of said series extending downwardly from the upper ring and those of the other series extending upwardly from the lower ring, in combination with a shuttle-carrier having a shoe adapted to slide between said outer and inner rows of pins by pressing against the outer pins under the action of centrifugal force and by resting on the ends of the short lower pins.

2. In a circular weaving loom a guiding track for the shuttle-carrier as claimed in claim 1, the outer pins of which are mounted in the two fixed rings so as to freely rotate on themselves.

3. In a circular weaving loom a guiding track for the shuttle-carrier as claimed in claim 1, the upper ring of which comprises two annular elements adjustably assembled relatively to each other in the vertical direction, the outer pins being mounted on one of said annular elements and the short upper pins being mounted on the second of said elements.

4. In a circular weaving loom a guiding track for the shuttle-carrier as claimed in claim 1, in which some of the short upper pins are provided with lubricating means adapted to bring a lubricant on to the friction parts of the shuttle-carrier.

5. In a circular weaving loom a guiding track for the shuttle carrier as claimed in claim 1, in which said shoe of the shuttle has a T-shaped cross-section the sole of which is adapted to slide on said outer pins at the opposite side on which is guided by said short inner pins and by the heads of said inner pins, the heads of these inner pins being for that purpose rounded.

6. In a circular weaving loom a guiding track for the shuttle carrier as claimed in claim 1, in which said outer pins are rotatably mounted on said fixed rings, in combination with a warp classifying comb arranged on the external side of said rotating pins.

7. In a circular weaving loom, a guiding track for the shuttle carrier as claimed in claim 1, in which a ring or elastic material is provided for on the internal face of said fixed rings, between said outer pins and said short inner pins.

HENRI PELCÉ.