Feb. 5, 1963 C. CHRISTIANSEN ET AL 3,076,482

SHUTTLE ARRANGEMENTS IN CIRCULAR LOOMS FOR HOSES OR THE LIKE

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FIG. 1.

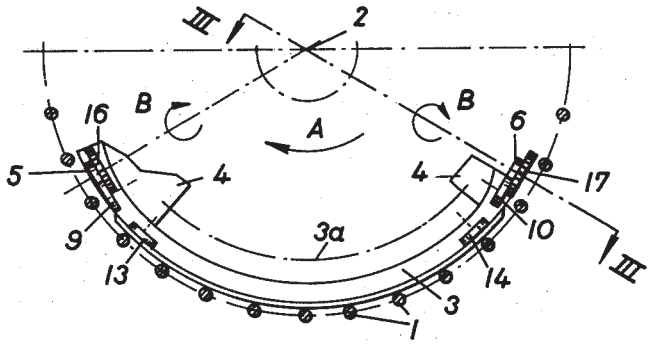


FIG. 2.

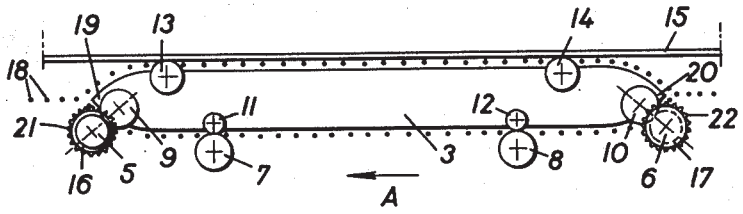
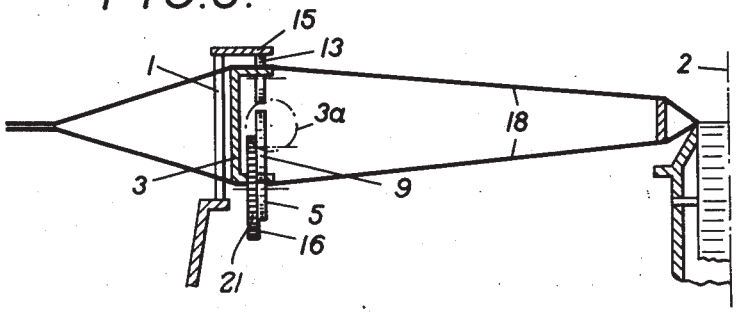


FIG. 3.



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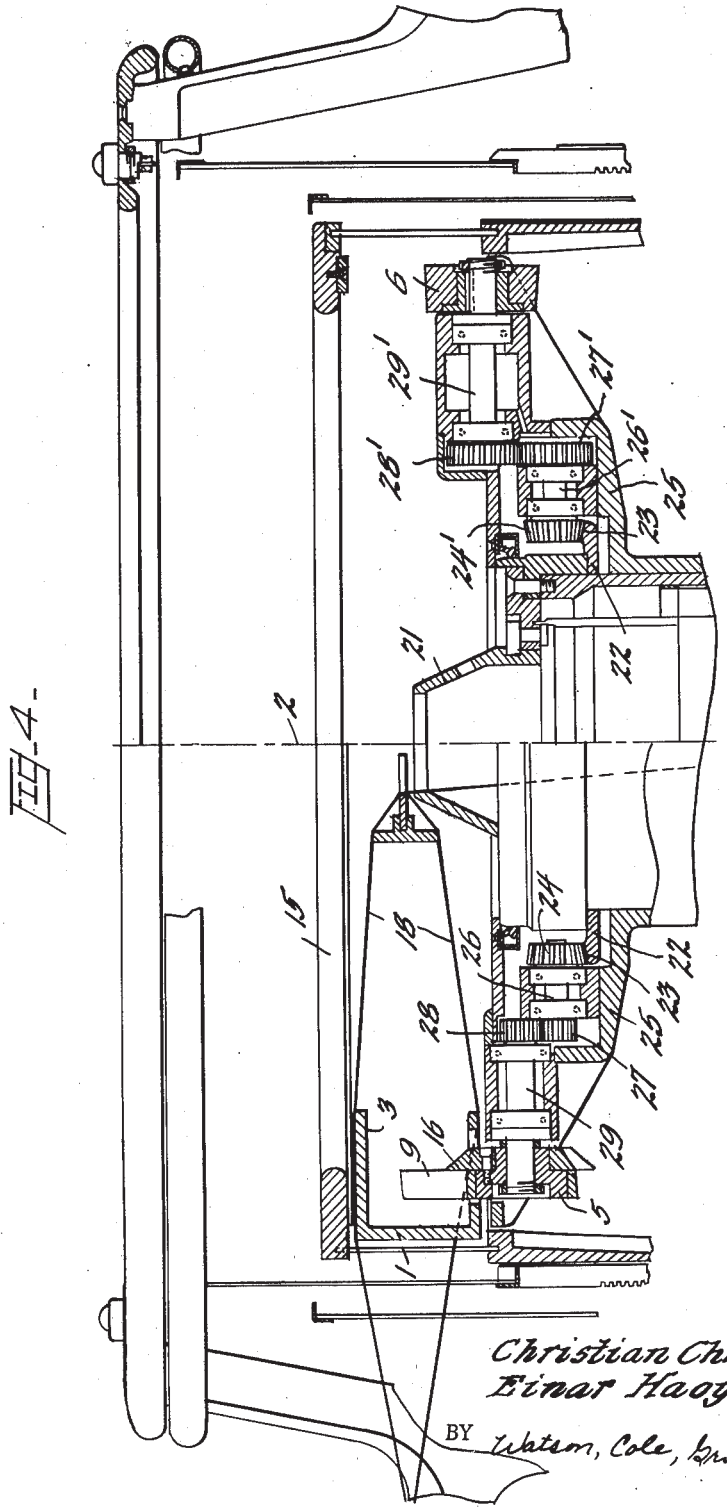

FIG. 4.

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SHUTTLE ARRANGEMENTS IN CIRCULAR LOOMS FOR HOSES OR THE LIKE

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2 Claims. (Cl. 139—13)

The present invention relates to shuttle arrangements in circular looms for the production of hoses or other cylindrical textile products, of the type wherein at least one shuttle is supported by a shuttle carrier which is mounted to perform a rotational movement about the axis of the loom and wherein the warp threads are guided to the point at which the weft thread is laid in by a stationary reed frame.

In such looms it is previously suggested to provide the shuttle with rollers adapted to cooperate with rollers mounted in the shuttle carrier in such a manner that the shuttle is securely supported at the same times as the relative position of the warp threads is secured even at the opening and closing of the shedding when the shuttle is entering and leaving the same.

The object of the present invention is to provide a shuttle arrangement wherein all forces, in particular also the centrifugal and centripetal forces to which a shuttle is subjected which is moving at a high speed along a circular path about the loom axis are adequately supported by the stationary parts of the loom.

According to the invention this object is achieved by providing the rollers mounted in the shuttle carrier near to the two ends of the shuttle with a circumferential flange extending over and adapted to co-operate with one side face of the corresponding roller mounted in the shuttle. Thus, while the weight of the shuttle during the rotational movement of the same is supported by the co-operation between the circumferences of the rollers mounted in the shuttle and the shuttle carrier, respectively, in a manner similar to that used in known looms, the forces acting in a radial direction relatively to the axis of rotation to which the shuttle is subjected, are supported by cooperation between the side faces of the shuttle rollers and the shuttle carrier roller flanges, respectively.

For the purpose of hereby also positively to secure the relative position of the warp threads when the shuttle is entering and leaving the weave shedding, the circumferential flanges referred to on the shuttle carrier rollers at the ends of the shuttle are, according to one further feature of the present invention, provided with notches along the circumference, with a notch spacing corresponding to the spacing of the warp threads prevailing in the loom in which the shuttle is to operate.

The co-operating rollers at the two ends of the shuttle between which the warp threads pass are, in previously known looms, so mounted as to be freely rotatable about their proper axes, to the effect that they are rotated by the frictional forces of the warp threads passing between them without offering substantial resistance to the passing of the warp threads. In particularly high speed shuttles, however, even this small resistance may have a braking effect and according to one further feature of the present invention at least one of the shuttle carrier rollers mounted at the ends of the shuttle is therefore provided with driving means adapted to give such rollers a positive rotational movement about its proper axis. Hereby, each warp thread received in a notch on the circumference of the roller flange is positively carried in the direction of length of the shuttle when the shuttle is entering or leaving the weave shedding respectively. Such driving means may be of any suitable construction obvious to those skilled in the art, preferably of a type deriving its motion from the driving means of the shuttle carrier.

The invention will be more fully understood by reference to the following description in connection with the accompanying drawing, which schematically illustrates an embodiment of the apparatus according to the invention, wherein only such parts of the loom which are essential to understanding of the invention are shown.

FIGURE 1 is a schematic plan view of the shuttle arrangement applied to a loom having a vertical axis.

FIGURE 2 is an unfolded schematic side elevation of the arrangement shown in FIGURE 1.

FIGURE 3 is a schematic sectional view at a larger scale, taken along the line III—III in FIGURE 1.

FIGURE 4 is a fragmentary view, partly in elevation, and partly in section, of a generally conventional loom structure incorporating this invention.

In FIGURE 1 the stationary ring framework 1 is arranged coaxially to the central axis 2 of the loom and constitutes the reed for the warp thread in the loom. Surrounding the axis 2 is the stationary weaving ring 21 on which the weaving proper is effected, and which is provided with a horizontal disc shaped member 22 provided, at the circumference, with an annular toothed rack 23 engaging gears 24, 24′ mounted in a shuttle carrier 25 which is rotatably mounted about the loom axis 2 and positively rotated about the said axis by any suitable means, not shown. The gears 24, 24′ are mounted on shafts 26, 26′ each carrying at the opposite end, a further gear 27, 27′ engaging a gear 28, 28′ carried by a further shaft 29, 29′, for a purpose which will be explained later. The shuttle carrier 25 is adapted to support one or more shuttles 3 provided with mountings 4 for the support of one or more shuttle bobbins, such bobbin being indicated in FIGURE 1 merely by a dot and dash line 3*a* along the centre line of the bobbin. As shown in FIGURE 3 the shuttle is made with a cross section in the form of a U lying on one leg and is in the plane of FIGURE 1 formed according to a circle sector or circle arc and is as shown in FIGURE 2 pointed towards either end. The shuttle is supported by the shuttle carrier in the rotational movement of the latter in the direction of the arrows A in FIGURES 1 and 2 by means of a train of rollers mounted for rotation in the shuttle carrier and shuttle, respectively, on one hand and is, on the other hand, through a second train of rollers cooperating with a stationary ring secured to the reed ring.

Mounted in the shuttle carrier are four rollers 5, 6, 7 and 8, of which the rollers 5 and 6 are mounted on the shafts 29, 29′, respectively, and arranged at the forward and aft ends, respectively of the shuttle 3, and are rotated in the direction of the arrows B in FIGURE 1 through shafts, indicated in dot-and-dash lines and deriving their rotational movement from the driving means for the shuttle carrier, whereas the rollers 7 and 8 (as shown in FIG. 2) are mounted intermediate the length of the shuttle. Mounted in the shuttle 3 are six rollers of which the rollers 9 and 10 cooperate with the rollers 5 and 6, respectively, the rollers 11 and 12 cooperate with the rollers 7 and 8, respectively, while the rollers 13 and 14 cooperate with a stationary ring 15 integral with or secured to the reed ring 1 of the loom. As shown in FIGURE 2 the rollers of the two roller pairs 5, 9 and 6, 10 are so mounted relatively to each other that the pointed ends of the shuttle are firmly supported. The axes of the rollers 5 and 6 are coaxial with a line running through the axis 2 of the loom, FIGURE 1, and the lines interconnecting the centers of the rollers of the roller pairs 5, 9 and 6, 10, respectively, also pass near to the centers of the rollers 13, 14, respectively, whereby the shuttle is

securedly held between the shuttle carrier rollers and the stationary ring **15**.

For the purpose of secruing the radial position of the shuttle each of the rollers **5** and **6** is provided with a circumferential flange **16** and **17**, respectively (FIGURE 3), the inner side faces of which are in engagement with the side faces of the rollers **9** and **10**, respectively, whereby the centrifugal force exercised by the rear part of the shuttle due to the rotational movement of the same is transferred from the roller **10**, carried on the shuttle to the flange **17** of the roller **6** carried by the shuttle carrier, while the centripetal force at the forward end of the shuttle is, similarly, transferred from the roller **9** through the flange **16** to the roller **5**. In FIGURE 4 the roller **6** is shown without any flange **17**, as the oblique circumference of the roller **6** may be sufficient for the purpose.

The warp threads of the loom are indicated at **18**. By means of sheds, not shown, one part of the warp threads are opened upwardly against the stationary ring **15** just in front of the shuttle point **19**, while the remaining warp threads glide underneath the point of the shuttle, the two parts of the warp threads being again joined at the rear end **20** of the shuttle. For the purpose of securing a uniform distribution of the warp thread underneath the shuttle as the shuttle is entering the warp opening, the roller flange **16** of the roller **5** is notched as at **21**, the spacing of such notches being equal to the distance between the individual warp threads so as to secure that each individual warp thread is engaged by a notch when entering the slope of the pointed shuttle end. Similarly, the roller flange **17** of the roller **6** at the rear end of the shuttle **3** is provided with notches **22** so as to secure a uniform distribution of the warp threads as the warp shedding is closing behind the shuttle. For the purpose

of improving the distributing effect of the notched flanges **16** and **17**, the rollers **5** and **6** are positively rotated, as shown in FIG. 4, through the gear trains **24**, **24'**—**27**, **27'**, as described above.

We claim:

1. A shuttle arrangement in circular looms of the type comprising at least one shuttle which is shaped approximately according to a circle sector, a member rotatably mounted about the axis of the loom and carrying said shuttle, a stationary reed frame presenting an annular surface extending from the said reed frame towards the axis of the loom and rollers mounted for rotation in said shuttle and said shuttle carrying member, respectively, and so positioned as to locate said shuttle relatively to said annular surface and said shuttle carrying member, characterized in that at least one of said rollers mounted in said shuttle carrying member adjacent to an end of said shuttle is provided with a notched flange extending radially to the axis of such roller at the radial surface of such roller remote from the axis of the loom and so positioned relatively to one of said rollers mounted in said shuttle as to adapt the radial surface of said flange facing the loom axis to cooperate with the radial surface of said shuttle carried roller remote from the loom axis, the circumferential spacing of said notches in said roller flange corresponding to the spacing of the warp threads.

2. A shuttle arrangement as defined in claim 1, including means for positively rotating said roller having said notched flange.

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