

- [54] SHED FORMING DEVICE IN WEAVE LOOMS

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- [22] Filed: Feb. 29, 1972

- [21] Appl. No.: 230,354

- [30]
- Foreign Application Priority Data**

Mar. 1, 1971 Norway..... 751/71

- [52] U.S. Cl..... 139/15, 139/55, 139/197

- [51] **Int. Cl.**.... **D03d 37/00**, **D03c 13/00**, **D03j 5/02**

- [58] **Field of Search**..... 139/55, 12-16,  
139/196 R, 197, 13 A

- [56]
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- [57]
- ABSTRACT**

A weave loom comprising a carrier of at least one longitudinally extending shuttle and one stationary reed having pins positioned in a plane extending parallelly to the direction of movement of the shuttle carrier for the purpose of leading warp threads on to the point at which a weft thread is to be introduced, and further comprising a tooth wheel which is freely turning on the shuttle carrier in front of each shuttle for the purpose of forming a warp thread shed, the freely turning tooth wheel being so mounted that the plane of the wheel is situated at an angle to the plane of the reed pins and the teeth of the tooth wheel are engaging the said pins.

**2 Claims, 9 Drawing Figures**

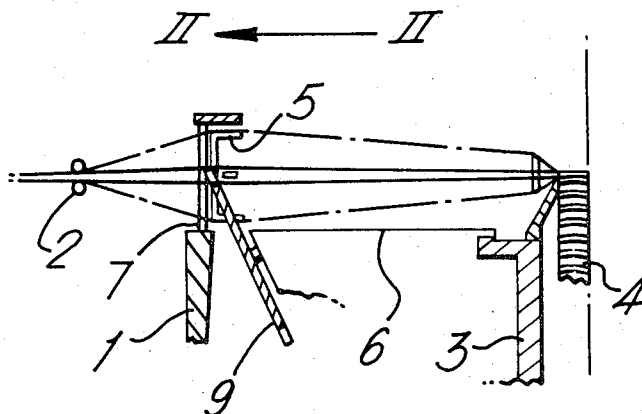


Fig. 1.

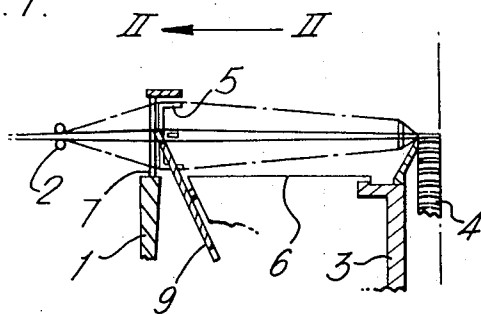


Fig. 2.

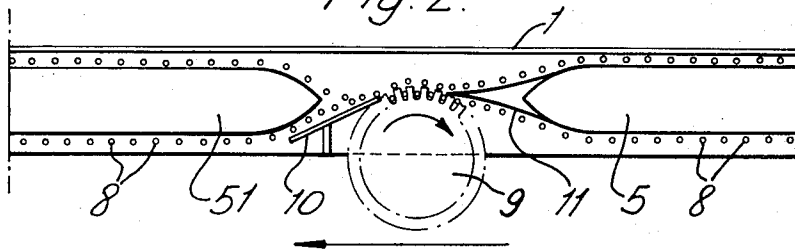


Fig. 3.

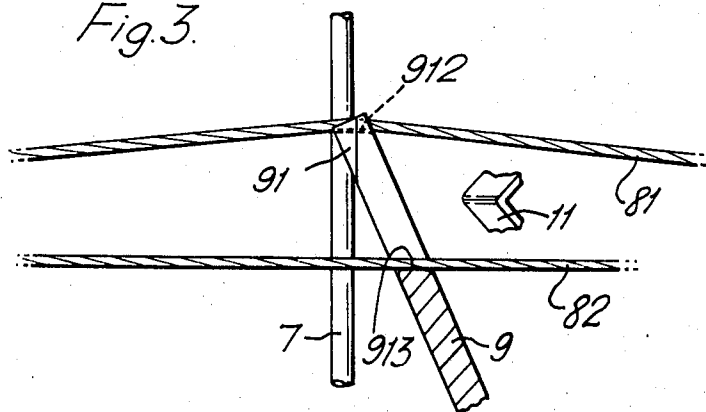


Fig. 4.

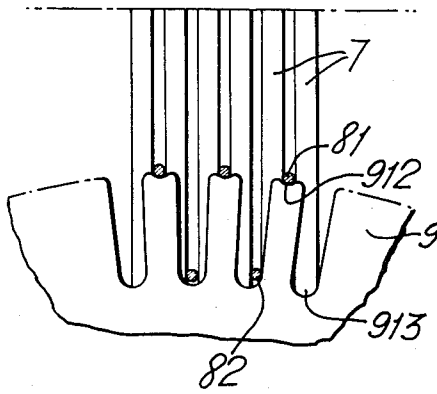


Fig. 4a.

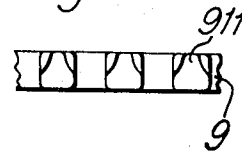


Fig. 5.

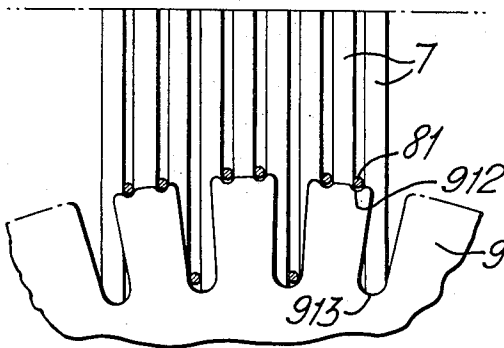
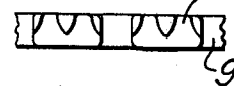


Fig. 5a.



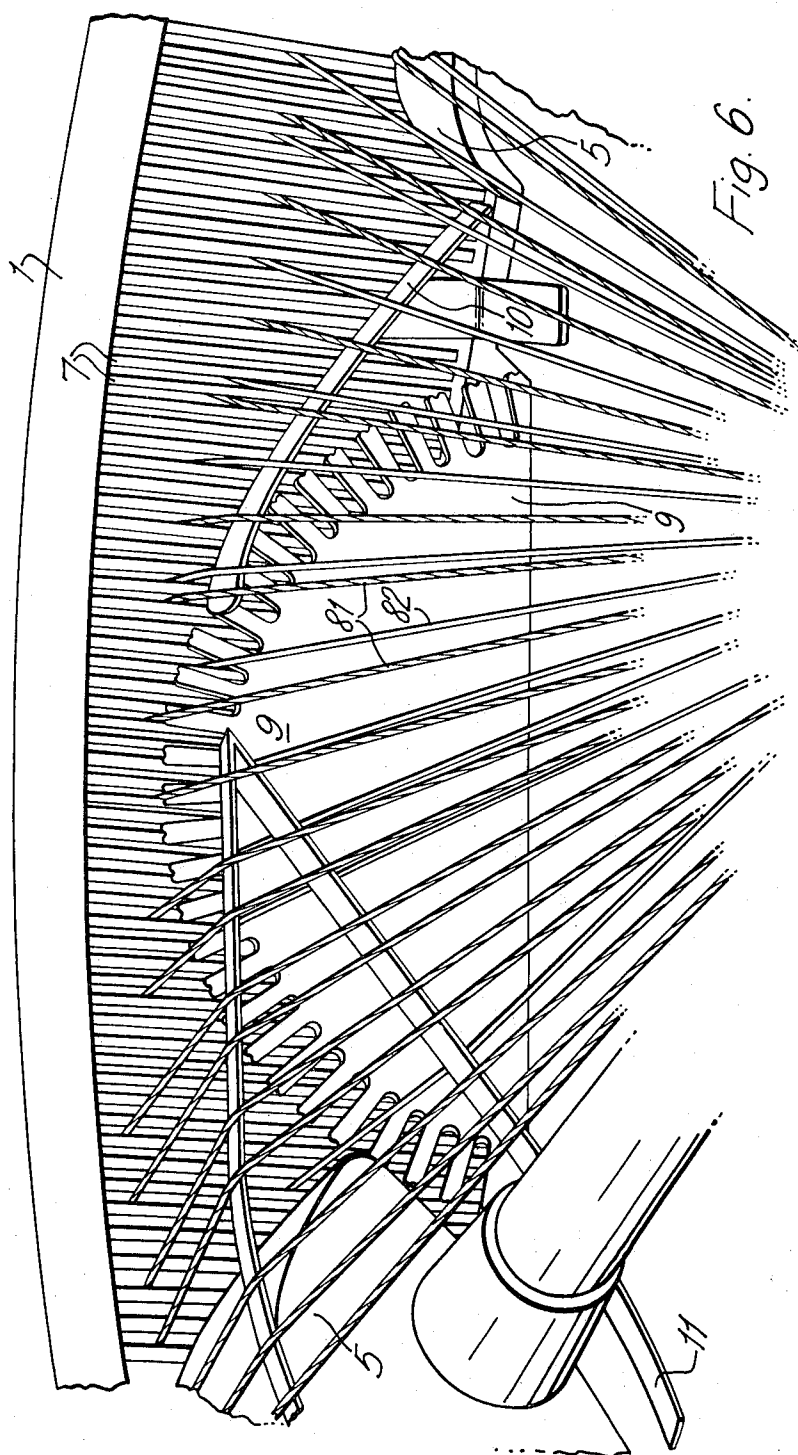
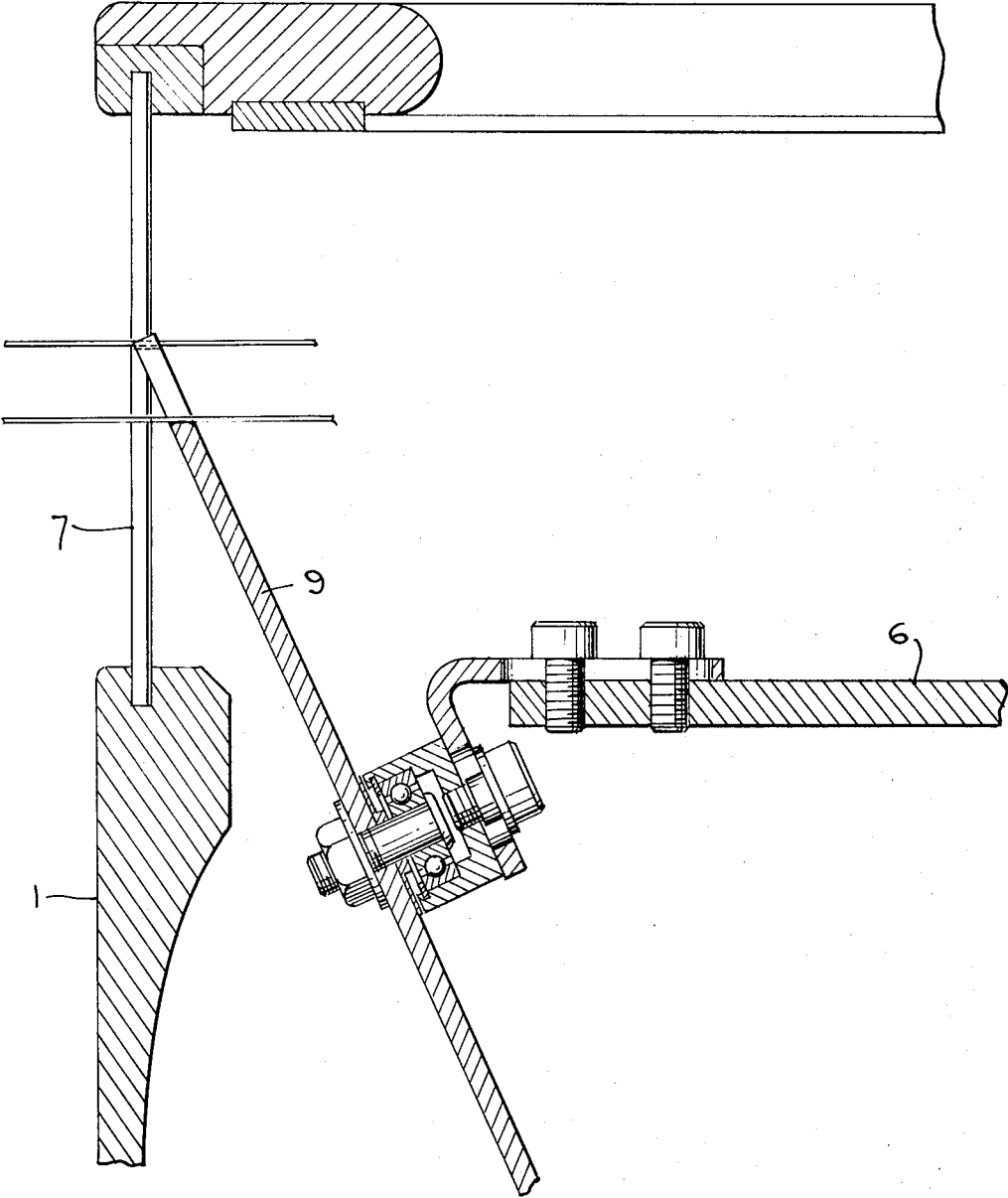


FIG. 7



## SHED FORMING DEVICE IN WEAVE LOOMS

The present invention relates to weave looms, both flat and circular, of the type comprising a support for at least one longitudinally extending shuttle and a stationary frame carrying reed pins located in a plane which extends parallelly to the direction of movement of the shuttle support for the purpose of leading the warp threads towards the point where the weft thread is to be inserted by means of the shuttle.

For the introduction of the weft thread, that is the passing of the shuttle in the correct relation to the individual warp threads, the warp threads must be divided so as to form a shed between them.

For the purpose of such shed forming, a number of systems are known. In the most common of such systems, each of the individual warp threads is passed through a loop or eye connected to a leaf which is movable in a direction at right angles to the general plane through the warp threads, by means of so-called heddles. Such systems are encumbered with certain inconveniences in that it is difficult to maintain the individual warp threads under an equal tension, with the consequence that the fabric produced may easily become uneven.

In U.S. Pat. No. 2,609,838 there is disclosed a circular loom having, in association with a single, nearly circular shuttle, a freely turning notched wheel, the so-called warp thread selector wheel, the teeth of which are adapted to engage the warp threads and thereby rotate during the movement of the shuttle. Accordingly, the shed is so formed that the warp threads are received by notches at the top of the teeth and in the slots between the same. Even such a system involves different tensions in the various warp threads, according to the position of the individual warp threads on top of or between the teeth, respectively.

The present invention also relates to a weave loom wherein the shed is formed by means of a freely running tooth wheel carried by a shuttle carrier, and wherein the individual warp threads are received on the top of a tooth or between two teeth.

In contrast to the system known from the patent referred to, the present system may be applied equally well to both the flat and circular looms, and to looms incorporating any number of shuttles in simultaneous operation, thus in turn placing weft threads between the same warp threads.

According to the invention, there is provided a system which is structurally simple and reliable, and which does not subject the warp threads to different tensions and which, finally, may be so shaped as to provide any type of weave. According to the invention, this is achieved so that the freely turning tooth wheel is rotating in a plane which forms an angle to the plane of the reed, and engages the same. Consequently, as the shuttle carrier, with the shuttle and the tooth wheel passing along the reed, the tooth wheel will roll off along the reed and the individual warp threads will occupy their positions on and between the teeth on the tooth wheel without any tensioning of the same.

For the purpose of hereby ensuring that warp threads situated in front of the shuttle, i.e., warp threads which have just been passed by a preceding shuttle, be correctly engaged by the tooth wheel, it is convenient to arrange a guide rail in front of the tooth wheel for the purpose of guiding all the warp threads evenly on to the

point where the tooth wheel is engaging the reed pins. Further, a wedge-formed element may be mounted behind the tooth wheel, i.e., between the same and the associated shuttle, the purpose of which element is to enlarge or widen the shed which is just formed by the tooth wheel, in order to facilitate the introduction of the shuttle in the shed. By the use of such a wedge-formed element, it is possible to use a tooth wheel wherein the notches between the teeth are not particularly deep, so that the difference in the tensioning, however small, of the individual warp threads becomes even smaller.

The accompanying drawings schematically illustrate the manner in which the system of the invention may be brought into practice.

FIG. 1 illustrates the principle of the arrangement of the tooth wheel and reed pins relative to one another in a weave loom, as seen in the direction of movement of the shuttle carrier.

FIG. 2 is a view corresponding to that of FIG. 1, as seen in the direction of the arrow II—II in FIG. 1.

The FIGS. 3 to 5 illustrate, on a larger scale, the operation of the tooth wheel.

FIGS. 4a and 5a illustrate the toothing of the tooth wheel.

FIG. 6 is a perspective view of the system as applied to a circular loom.

FIG. 7 is a showing of wheel on the carrier.

In the drawing, 1 is the stationary exterior frame of a weave loom, while 2 is a supply means of warp threads and 3 is a system for the carrying away of the weave, in the example shown as a hose 4. A shuttle is indicated at 5. The shuttle spool proper is not shown, but a shuttle carrier is shown at 6. The frame 1 accommodates the reed in the form of pins 7 which are mutually parallel and situated in a plane which extends parallelly to the direction of movement of the shuttle carrier 6, the reed serving to lead the warp threads 8 on to a position for introduction of the weft threads by means of the shuttle.

For the purpose of forming the shed between the warp threads for the passing of the shuttle, the shuttle carrier 6 carries a freely turning tooth wheel 9 which, as shown, is arranged at an angle to the plane through the pins 7 and the teeth of which engage the pins, at the same time as the individual warp threads will be received by notches at the top of the teeth or fall into the notches between the teeth, so that the shed is formed, as will be described below under reference to the FIGS. 3 to 5. As apparent from FIG. 2, in which the direction of movements of the shuttle relative to the frame 1 is indicated by an arrow, the tooth wheel 9 will rotate due to the engagement between the teeth and the stationary pins, with a velocity which directly corresponds to the shuttle velocity. Consequently, the warp threads are not subjected to any side displacement relative to the wheel and to any tensioning.

As also shown in FIG. 2, the tooth wheel 9 is mounted in front of the associated shuttle 5 and behind a preceding shuttle 51. In order to ensure a correct guiding of the warp threads which have just been passed by the shuttle 51, a guide rail 10 is mounted on the shuttle carrier 5 in front of the tooth wheel 9, see also FIG. 6, and in order to ensure an enlargement of the shed which is formed by means of the tooth wheel, sufficiently wide to facilitate the passing of the shuttle 5, a wedge formed element 11 is mounted on the shut-

the carrier 5 behind the tooth wheel 9, but in front of the shuttle.

The FIGS. 3 to 5 illustrate the manner in which the tooth wheel with its pointed teeth 912 engage the pins 7, while some warp threads 81 are received on the top of the teeth and other warp threads 82 fall into the notch between two teeth. As the warp threads are always under tension, a preliminary shed forming is hereby performed, the shedding being continued by means of the wedge formed element 11.

The FIGS. 4 and 4a, and 5 and 5a, respectively, illustrate two different types of tothing, and the corresponding form of the tooth tops, for the purpose of obtaining various types of weave, such as plain weave in FIG. 4, and a two-to-one weave in FIG. 5, the tooth top having both one point 911 for the engagement with the reed pins 7, see FIG. 3, and notches 912 each adapted to receive one warp thread 81, while the notch between neighbouring teeth, receiving one single warp thread, is indicated at 913. Obviously, the notches 913 may also be adapted to receive more than one single warp thread, by suitably shaping the notch bottom with more than one secondary notches.

FIG. 6 is a perspective view of a part of a circular

weave loom, incorporating the system of the invention. The same reference numerals as in the previous FIGS. are used, and it is shown how the various elements are positioned relatively to each other.

We claim:

1. A weave loom of the type comprising a carrier of at least one longitudinally extending shuttle and one stationary reed having pins positioned in a plane extending parallelly to the direction of movement of the shuttle carrier for the purpose of leading the warp threads on to the point at which a weft thread is to be introduced, and further comprising a tooth wheel which is mounted for free rotation on the shuttle carrier in front of each shuttle for the purpose of forming a warp thread shed, said tooth wheel being so mounted that the plane of the wheel is situated at an angle to the plane of the reed pins with the teeth of the tooth wheel engaging said pins.

2. A weave loom as claimed in claim 1, wherein the teeth of the tooth wheel are each shaped with a pointed end adapted to engage the reed pins and with at least one notch adapted to receive a warp thread.

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