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I. H. THOMAS ET AL

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SHUTTLE EYES

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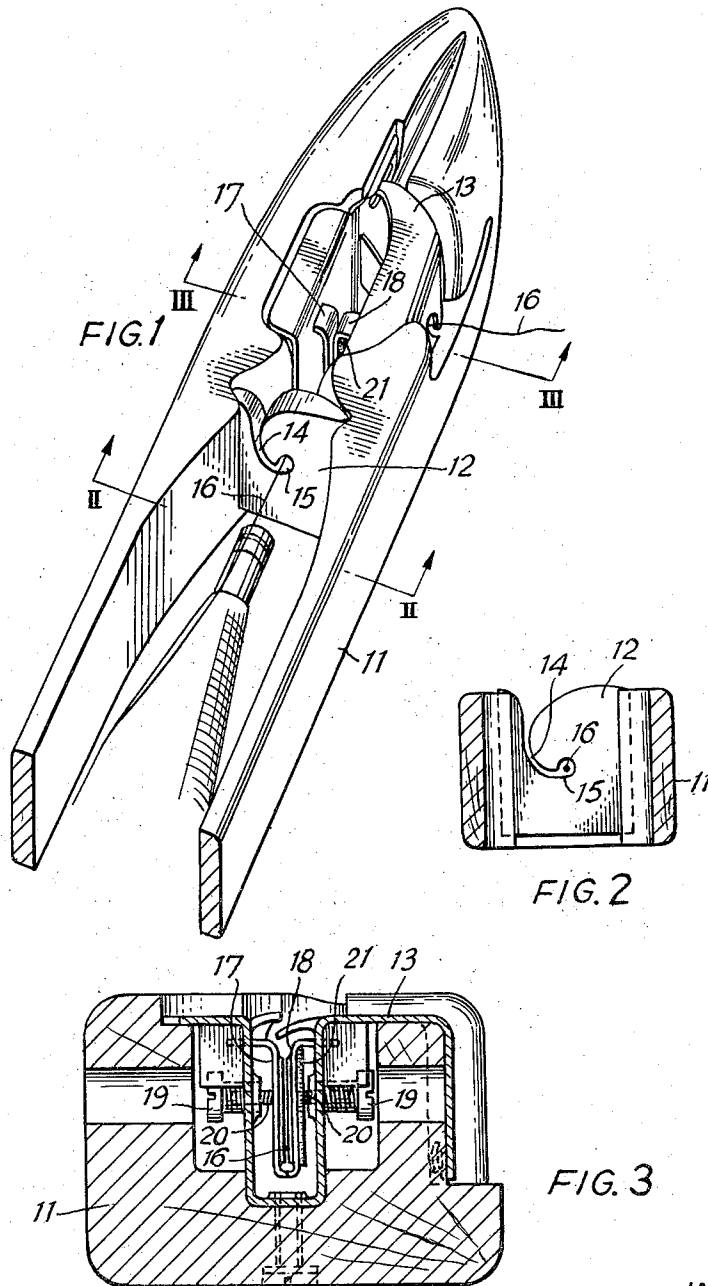


FIG. 3

INVENTORS:
IORWERTH HEFIN THOMAS
and ANDRZEJ WRZESIEN
by

Frederick Breitenfeld
Attorney

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SHUTTLE EYES

Iorwerth Hefin Thomas and Andrzej Wrzesien, West Didsbury, Manchester, England, assignors to British Cotton Industry Research Association, Didsbury, England, a British association of Shirley Institute

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This invention concerns shuttles for pirn-changing automatic looms.

Shuttles for pirn-changing automatic looms are normally provided with a special eye, for example comprising two opposed spring-loaded plates between which the weft yarn is introduced as a new pirn enters the shuttle and which serve to apply the necessary tension to the yarn when the shuttle is working, suitable means for adjusting the loading of the plate springs being provided.

It has been found that in such eyes there is a tendency for the yarn to move in a direction parallel to the faces of the opposed plates or like tension applying means, and this is undesirable, firstly because it has been shown that a small such movement can cause a high percentage tension change, and secondly because often such movement can cause the weft to escape entirely from between the plates or the like, causing a weft break.

The main object of the present invention is to avoid these disadvantages.

According to the invention a shuttle of a pirn-changing automatic loom having a special eye with opposed plates or the like for applying weft tension, is characterised by means for restraining movement of the weft yarn parallel to the faces of said plates or the like. Preferably said means consists of a member mounted transversely of the shuttle, between the pirn and the eye, having a generally spiral slot therethrough which terminates in an enlarged portion, the slot and enlarged portion being located and shaped so as to be capable of guiding the yarn, on threading of same through the eye, into said enlarged portion to be there retained in alignment with the plates or the like and restrained from undue movement parallel to the faces of the latter.

It has been found, however, when using a shuttle eye with plates adjustably spring-loaded towards each other in a pirn-changing loom shuttle, that if slack picks are to be avoided in the woven fabric, it is usually necessary for the plates to be set to give an unwinding tension as measured for example, by the "Shirley" (registered trademark) meter, which is more than twice as much as that necessary when using a conventional "mop" eye in the shuttle of a non-automatic loom or shuttle-changing automatic loom. This is thought to be due, at least in part, to the tension as measured by the meter only being effective when the shuttle is in free flight, and being substantially reduced, for example, when the shuttle is being retarded, probably because the plates of the eye are set in forced vibration.

A further object of the invention is to enable the weft tension applied by a shuttle eye, in a shuttle according to the invention, to be substantially reduced, whilst maintaining the quality of the woven fabric.

According to a further feature of the invention, a shuttle of a pirn-changing loom having a shuttle eye with plates adjustably spring-loaded towards each other comprises not only means for restraining movement of the weft parallel to the faces of the plates, but means for restricting the movement of, and damping out forced vibration of, the plates. Preferably a pad of felt will be disposed between at least one plate and its loading element.

The invention will now be described further, by way

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of example, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of the eye end of a shuttle for a pirn-changing automatic loom according to the invention;

FIG. 2 is a sectional view on the line II—II of FIG. 1; and

FIG. 3 is a sectional view on the line III—III of FIG. 1.

FIG. 1 is the eye end of a shuttle 11 for a pirn-changing automatic loom. This end of the shuttle 11 accommodates a guide 12 and an eye 13, both rigidly mounted in position.

The guide 12 is made from a suitable durable material, conveniently of a fibrous nature. In the guide (FIG. 2) is a slot 14, of generally spiral shape, terminating in an enlarged portion 15 in alignment with the desired region of longitudinal passage of the weft 16 through the eye 13. The slot 14 and enlarged portion 15 are shaped and located as shown so that during normal running the weft 16 is retained in the portion 15, and so that during a pirn change the weft trail moves, during the first traverse of the shuttle, into the enlarged portion 15 down the slot 14. Thus little movement of the weft, vertically, can take place within the eye, nor can it become unthreaded from the eye.

The eye 13, in the particular embodiment illustrated is of a well-known type constructed from metal and having two plates 17, 18, between which the weft 16 passes. Each plate is spring-loaded towards the other by means of screws 19 threadedly engaged with the body of the eye, and having their inner ends counterbored to accommodate compression springs 20. The plate 17 is in direct contact with its spring 20 in known manner, but plate 18 is in contact with a felt pad 21 disposed between the plate 18 and its compression spring 20. The tension applied to the weft 16 is adjusted in known manner by adjusting screws 19 and thus the loading of the springs 20 on the plates 17, 18. The thickness and consistency of the felt pad 21 is such as to restrict the outward separation of the plates 17, 18, and rapidly to damp out forced vibrations thereof. Billiard cloth has been found to be a suitable material for the pad 21.

In operation it has been found that, for a particular continuous filament yarn, using a shuttle as just described, the unwinding tension was adequate at a value of from ten to twelve grams, whereas, using a conventional eye, the tension needed to be about twenty-five grams.

The benefits of the present invention are particularly valuable when using low twisted weft-yarn, such as cellulose acetate, since low tension is, in such a case, especially desirable.

The invention is, of course, not limited to the specific details of the embodiment just described. In one modified arrangement, for example, a felt pad is used behind each plate of the eye.

We claim:

1. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed tensioning plates mounted in said eye between which the weft is adapted to pass to be tensioned, resilient means for loading said plates, means between at least one of said plates and its associated resilient means for restricting the outward separation of said plates and damping out forced vibration of said plates, and a guide between said chamber and said eye in alignment with said plates, said guide having an opening of restricted dimensions for restraining movement of the weft yarn parallel to the faces of said plates.

2. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed weft tensioning plates mounted in said eye, spring means loading the outer faces of said plates, a felt

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pad between at least one of said plates and the respective spring means adapted to restrict the outwards separation of said plates and damp out forced vibration of said plates and a guide between said chamber and said eye in alignment with said plates, said guide having an opening of restricted dimensions for restraining movement of the weft yarn parallel to the faces of said plates.

3. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed weft tensioning plates mounted in said eye, spring means loading the outer faces of said plates, a billiard cloth pad between at least one of said plates and the respective spring means adapted to restrict the outward separation of said plates and damp out forced vibration of said plates and a guide between said chamber and said eye in alignment with said plates, said guide having an opening of restricted dimensions for restraining movement of the weft yarn parallel to the faces of said plates.

4. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed weft-tensioning plates mounted in said eye, spring means loading the outer faces of said plates, a felt pad between at least one of said plates and the respective spring means adapted to restrict the outward separation of said plates and damp out forced vibration of said plates, and a guide plate mounted transversely of said shuttle, rigidly but removably, between said chamber and said eye, and having formed therethrough a slot of generally spiral configuration, said slot commencing at the upper edge of said guide member whereby to receive the weft on insertion of a new shuttle, and terminating in an orifice of restricted dimensions generally centrally of said guide plate and in alignment with said weft-tensioning plates, whereby the weft is eventually received and restrained from undue movement parallel to the faces of said weft-tensioning plates.

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5. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed tensioning plates mounted in said eye between which the weft is adapted to pass to be tensioned, resilient means for loading said plates, and means between at least one of said plates and its associated resilient means for restricting the outward separation of said plates and damping out forced vibration of said plates.

6. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed weft tensioning plates mounted in said eye, spring means loading the outer faces of said plates, and a felt pad between at least one of said plates and the respective spring means adapted to restrict the outward separation of said plates and damp out forced vibration of said plates.

7. A shuttle for a pirn-changing automatic loom comprising in combination a pirn-receiving chamber, an eye, opposed weft tensioning plates mounted in said eye, spring means loading the outer faces of said plates, and a billiard cloth pad between at least one of said plates and the respective spring means adapted to restrict the outward separation of said plates and damp out forced vibration of said plates.

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