July 1, 1924. 1,499,603

A. BOITEL

LOOM SHUTTLE

Filed Jan. 4, 1923

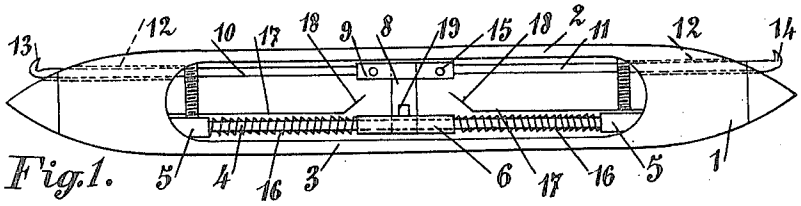


Fig. 1.

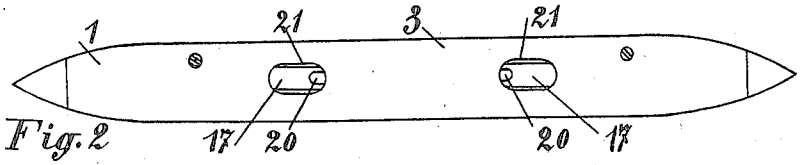


Fig. 2

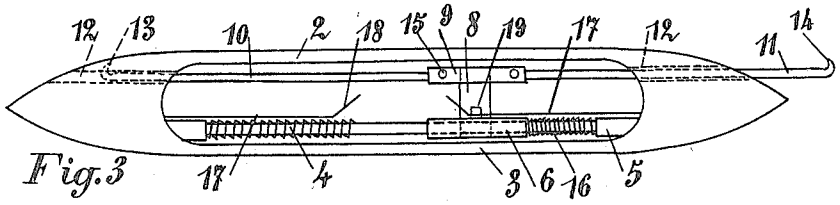


Fig. 3

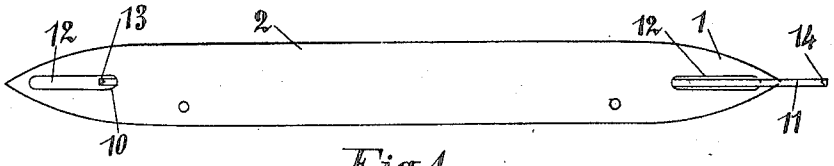


Fig. 4.

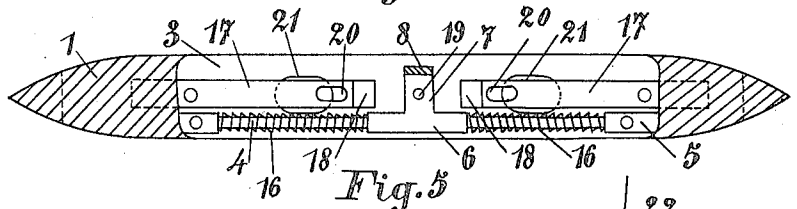


Fig. 5

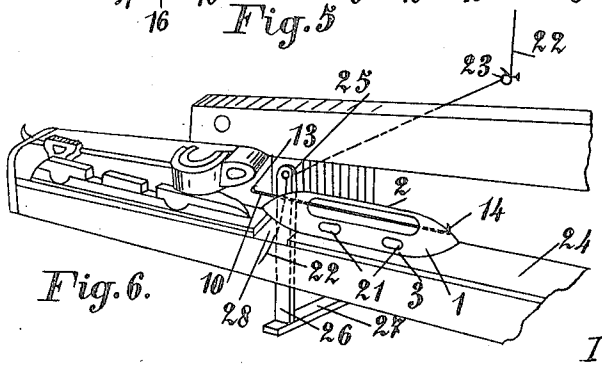


Fig. 6.

Inventor:
Alexandre Boitel
By
Dickinson & Bond
Attys

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UNITED STATES PATENT OFFICE.

ALEXANDRE BOITEL, OF PUTEAUX, FRANCE, ASSIGNOR TO GEORGES DELMOUSSE, OF PARIS, FRANCE.

LOOM SHUTTLE.

Application filed January 4, 1923. Serial No. 610,554.

To all whom it may concern:

Be it known that I, ALEXANDRE BOITEL, citizen of the French Republic, residing at Puteaux, in the Department of the Seine and State of France, have invented certain new and useful Improvements in and Relating to Loom Shuttles, of which the following is a specification.

This invention has for its object to provide an improved shuttle which will enable any ordinary loom working with one or more shuttles, and not provided with continuous weft feed mechanisms (operating by automatic changing of spools or shuttles, or by any other means) to work as a loom having a continuous weft feed.

Another object of this invention is to enable this working to be effected in an almost instantaneous manner, while avoiding for this purpose the necessity of any conversion or modification of the ordinary loom to be so worked, and requiring only the addition of a few accessory parts which are simple in construction and easy and rapid to put in place.

To achieve these objects this invention is based on the operation of looms having a continuous weft feed of the Seaton type according to which, weft bobbins are arranged on each side of the loom, and the weft (which is measured and cut into lengths each equal to two shoots) is presented to a specially constructed shuttle wherein the weft lengths are gripped by grippers, and are inserted into the shed by the pick of the shuttle.

The advantages of this type of looms based on this system and constructed specially for this purpose are the following:— The weft bobbins which may be very large so as to reduce the frequency of the intervention of the weaver, can be readily renewed during the working of the loom, and the weaver is not limited to the use of one single kind of weft, but has available on each side support an assortment of bobbins of weft of different colours or different materials which are presented when necessary by a suitable mechanism in the requisite order of succession.

To achieve the aforesaid objects the present invention provides an improved shuttle capable of replacing instantaneously the ordinary shuttle of all existing looms working with one or more shuttles. The function of the improved shuttle is similiar to that of the special shuttle of the looms of the Seaton type or other similar looms, but its use requires merely the simple addition, to the looms, of devices which are simple and easy to mount, for assuring the engagement by the shuttle of the weft thread or threads that are fed in a continuous manner from weft bobbins situated on each side of the loom upon movable or fixed supports mounted on the loom framing.

The improved shuttle of this invention, which is designed to enable any ordinary loom to be worked as a loom having a continuous weft feed, is constituted substantially by an ordinary shuttle of the usual shape and dimensions of a type suited to the loom in which it is to be used, but in which shuttle no spool at all is placed. The improved shuttle is characterized essentially by the feature that it comprises at each end, so as to project beyond its pointed ends, metal stems terminating in hooks. These stems are situated parallel to the axis passing through the pointed ends of the shuttle which are thus always ready to receive the impact of the picker.

Nevertheless a practical constructional form, pure and simple, of a shuttle of this kind according to this principle of construction has drawbacks due to the existence of the hooked stems projecting beyond the pointed ends of the shuttle, in this sense, that when the shuttle is picked, it frequently happens that the picker on striking the hook, has its impact deadened before reaching the pointed end of the shuttle, with the result that the shuttle is insufficiently picked and its hooks are damaged.

Furthermore the presence of a hook in front of the shuttle prevents the latter from moving forward in certain cases, with the result that the hook comes between the threads of the warp forming the shed and consequently these warp threads are broken.

In order to remedy these drawbacks it has been necessary to make improvements for the purpose of producing a practical constructional form of a shuttle according to the principle of this invention so as to realize the objects in view.

A shuttle of practical construction based on the principle of this invention is hereinafter described by way of constructional example and illustrated diagrammatically in the accompanying drawings, in which:—

Figure 1 is a plan of the improved shuttle.

Figure 2 is a side view of the improved shuttle viewed from the breast beam of the loom.

Figure 3 is a plan showing one of the hooks in operative position for engaging the weft shoot to be picked.

Figure 4 is a side view of the improved shuttle viewed from the reed of the lay, the hook being shown in operative position as in Figure 3.

Figure 5 is a longitudinal section of the improved shuttle showing the elastic parts for placing the hooks into operative position.

Figure 6 is a perspective view of the improved shuttle on its departure at the moment of engaging the weft which is to be picked into the shed.

As shown in these figures: 1 is the body of the shuttle, and 2 and 3 are its cheeks; compared with existing shuttles this improved shuttle presents no feature of novelty except its internal arrangements which comprise a guide rod 4 fixed at its ends between two metal blocks 5 bolted to the cheek 3 by means of stay bolts, screws or other devices.

On this rod there is adapted to slide with slight friction a metal sleeve 6 comprising at its middle and directed vertically downwards a projection 7 which is bent once at right angles at 8 along the width of the internal cavity of the shuttle, and is then bent again at right angles upwards and parallel to the cheek 2. It then abuts against a metal block 9 which is pierced axially with a passage into which extend the ends of two metal stems 10 and 11 which are prolonged to the outside of the shuttle and slide freely in the passages 12 formed for this purpose in the wood of the shuttle.

These stems terminate in hooks 13 and 14. The adjustment of their length is effected by means of set screws 15 fixing them in the block 9. This block which is fixed to the sleeve 6, is carried along by the latter in its movement along the rod 4. Damping and returning springs 16 are arranged on this rod between the sleeve 6 and the blocks 5.

Parallel to the cheek 3 and above the level of the rod 4, there are arranged spring strips 17 fixed to the ends of the shuttle by means of bolts or other devices. The free ends of these strips are bent upwards slightly at 18 so as to enable them to be raised by a finger 19 fixed to the projection 7 of the sleeve 6. This finger can thus engage in slots 20 formed for this purpose in the strips 17, according as the movable combination 6, 7, 8, 9 carrying the movable stems 10 and 11 with hooks 13 and 14 is shifted in one direction or the other relatively to the direction of travel of the shuttle 1.

Apertures 21 are provided in the cheek 3 of the shuttle to allow of disengaging the strips 17 from the finger 19 (which is engaged in the slots 20) by means of studs mounted on a fixed part of the loom on each side thereof facing the shuttle boxes. These studs extend into the apertures 21, when the lay advances, at a determined moment which is adjustable at will.

By this construction of a shuttle comprising movable hooked stems actuated by a device slidable in the interior of the shuttle, there is effected automatically the retraction of the front hook according to the direction of the pick of the shuttle, and the protrusion of the back hook at the rear of the shuttle, for the purpose of engaging the weft and picking it into the shed.

This changing of the respective position of the hooks according to the direction of the pick of the shuttle, is effected automatically and alternately at every pick of the shuttle, utilizing for this purpose of this operation the inertia of the mechanism which is movable as a whole in the interior of shuttle, and which actuates the hooked stems, on the sudden start of the shuttle due to the blow of the picker or other picking device, irrespectively of the type of the picking apparatus.

Assuming, for instance, that the shuttle 1 is in the right-hand box, then the movable mechanism is in mid-position in the shuttle, as shown in Figure 1. By the blow of the picker the shuttle is thrown suddenly towards the left, and the reaction or relative movement of the movable mechanism in the state of inertia causes the said mechanism to move towards the right and take up the position shown in Figure 3 in which it is held by the finger 19 which has entered the slot 20 in the right-hand strip 17. By this means the hook 11—14 is brought into a position of protrusion at the back of the shuttle, whereas on the contrary the hook 10—13 is wholly or approximately retracted into the shuttle so as to leave the pointed end of the latter free as in ordinary shuttles.

This position, taken up at the instant of the start of the shuttle, allows the hook 14 to engage the weft coming from the bobbin and to draw it through the shed in the form of a double shoot.

On the arrival of the shuttle in the opposite box on the left-hand side of the loom, and by the advance of the lay beating up the said shoot, the hook 14 releases automatically this shoot at the fell of the cloth, while a stud suitably fixed to a fixed part of the loom, enters the aperture 21 of the cheek 3 of the shuttle, and pushes the strip 17

gently back, thereby disengaging the finger 19 engaged in the slot 20 and allowing the opposing spring 16 to push back the sleeve 6 into mid-position (Fig. 1) so that this sleeve is ready to be "cocked" afresh in the reverse sense, when the shuttle is picked towards the right as shown in Figure 6, whereupon the hook 14 will be retracted in its turn, the hook 13 now becoming the back hook for engaging the weft coming from large bobbins arranged on each side of the loom.

These wefts may be presented to the hooks in any suitable manner, for example by means of the device illustrated in Fig. 6 in which the weft thread 22 passing down from a bobbin, passes into an eye 23 fixed to a fixed part of the loom behind the lay 24 and into an eye 25 formed in the end of a vertical bar 26 capable of being raised so as to bring the thread 22 above the level of the ledge of the lay at the moment when the shuttle has nearly moved out of the shuttle box, in order that the thread shall be situated in the path of the hook 13 which can then engage and draw it along.

The movement of the bar 26 may be produced at the proper time by means of a lever 27 upon which this bar rests, the said lever being raised and lowered by a cam mounted on one of the rotating shafts of the loom, or by any other suitable means; the lowering of the said lever bringing the thread between the fell of the cloth and the eye into a notch 28 formed in the ledge of the lay in order to allow the shuttle to pass at the beginning of its pick.

Other devices arranged in this manner at the two ends of the lay may be used for the same purposes. Likewise a plurality of distribution bars of the kind indicated by 26, may be arranged on each side of the loom and work in determined order in order to allow of weaving in colours; these devices may be operated by jacquard apparatus or other apparatus.

Likewise any number of weft threads may be engaged at one and the same time by one of the hooks, for the purpose of producing varied effects.

It is to be understood that modifications, changes and improvements may be made in the improved shuttle without thereby departing from the nature of this invention, with the object of providing a constructional form of the improved shuttle having hooks actuated by a movable mechanism which operates by its inertia under the action of the blow given to the shuttle at each pick.

What I claim is:

1. A shuttle enabling any loom to operate as a loom with a continuous weft feed, comprising a shuttle body, and means carried by said body and having thread hooks terminating exteriorly of the ends of the body and movable endwise thereof by inertia, whereby as the body is propelled in alternate directions, the hooks will by inertia, be alternately moved into operative and inoperative positions.

2. A shuttle enabling any loom to operate as a loom with a continuous weft feed, comprising a shuttle body, means carried by said body and having thread hooks terminating exteriorly of the ends of the body and movable endwise thereof by inertia, whereby as the body is propelled in alternate directions, the hooks will by inertia, be alternately moved into operative and inoperative positions, and resilient means urging the hooks away from their extreme operative positions.

3. A shuttle enabling any loom of the type having picker mechanism and a lay to operate as a loom with a continuous weft feed, comprising a shuttle body, means carried by said body and having thread hooks terminating exteriorly of the ends of the body and movable endwise thereof by inertia, whereby as the body is propelled in alternate directions, the hooks will by inertia be alternately moved into operative and inoperative positions, resilient means urging the hooks away from their extreme operative positions and latch means for securing said hooks in operative positions on the body and disposed for release by the lay prior to each operation of the picker mechanism.

4. A shuttle having a body, and an element movable endwise of the body and terminating at its ends in hooks which project exteriorly of the body as the element moves relatively thereto, whereby as the shuttle is propelled in alternate directions by blows imparted thereto, the device will, by inertia, be shifted endwise of the body to retract the forward hook, considered relatively to the direction of travel of the shuttle by any blow, and extend the rear hook for engagement with the weft.

5. A shuttle having a body, an element movable endwise of the body and terminating at its ends in hooks which project exteriorly of the body as the element moves relatively thereto, whereby as the shuttle is propelled in alternate directions by blows imparted thereto, the device will, by inertia, be shifted endwise of the body to retract the forward hook, considered relatively to the direction of travel of the shuttle by any blow, and extend the rear hook for engagement with the weft, resilient means for urging the element to an intermediate position and means for latching the element in its extreme endwise positions to which it is forced by inertia at the start of each travel of the shuttle disposed for automatic release at the end of each travel.

6. A shuttle enabling any loom to operate

as a loom with a continuous weft feed, comprising a shuttle body, means carried by said body and having thread hooks terminating exteriorly of the ends of the body and movable endwise thereof by inertia, whereby as the body is propelled in alternate directions, the hooks will by inertia, be alternately moved into operative and inoperative positions, and resilient means urging the hooks away from their extreme operative positions, said element being shorter than the shuttle body whereby when in said intermediate position both hooked ends will be disposed intermediate the ends of said body for protection during the application of driving blows to the body.

7. A shuttle for loom of the type having a lay and picker mechanism, said shuttle comprising a body, an element movable endwise of the body and terminating at its ends in hooks which project exteriorly of the body as the element moves relatively thereto, whereby as the body is propelled in opposite directions by the blows of the picker mechanism, the element will, by inertia, be shifted endwise of the body to retract the forward hook, considered relatively to the direction of travel of the shuttle by any blow, and extend the rear hook for engagement with the weft thread, resilient means for urging the element into an intermediate position, means for latching the element in its extreme endwise positions to which it is forced by inertia at the start of each travel of the shuttle, said latching means being exposed for release by the lay, as it advances in beating up the weft thread just laid.

In testimony whereof I affix my signature, in presence of two witnesses.

ALEXANDRE BOITEL.

Witnesses:

CAÜIS DANZEY,

MEIEN CRESPINY.