

# UNITED STATES PATENT OFFICE.

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## SHUTTLE.

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### *To all whom it may concern:*

Be it known that we, JOSEPH EDOUARD GIROUARD and ALBERT LA CAIRE, both subjects of the King of Great Britain, residing at Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Shuttles; and we do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention pertains to novel improvements in shuttles designed particularly for use in looms.

In the use of wooden shuttles at present constructed there is always the danger of cracking of the wooden shells as a result of which splinters and nicks are formed. These splinters and nicks tear the fabric and also injure the reed. When a shell becomes defective in this manner, it must be discarded; and the cost of replacing defective shuttles is a considerable item in mill operation. The principal object of this invention is the provision of a shuttle, the shell of which is composed preferably of aluminum. This metal is preferable to other metals because of its lightness. In common with other metals, however, it has the advantage of not giving rise to splinters.

In order to prevent undue wearing between the wearing side of the metallic shell and the reed of the loom, there is provided at this wearing side a wearing plate of fibre which has preferably approximately the same coefficient of friction as wood. This wearing plate is inserted in such a manner as to be replaceable when excessively worn.

A further source of nicks in the shuttle is the tendency of the noses and attaching elements to separate from the shell. In order to avoid this tendency, the construction of the present shuttle is characterized by the avoidance of screws which might work loose and extend outside the confines of the shell. Moreover, the stems of the noses, instead of having a frictional fit in the shell as is now the case, are threaded therein. Preferably

they are threaded into those separable portions which have hitherto been held in place by screws driven from the exterior walls of the shells. Thus the threaded stems of the noses not only prevent the occurrence of nicks which may result from the slipping of a frictionally fitting stem, but also hold in place those portions of the shuttle which are separate elements from the shell.

As is well known in the art, the wearing surface has a tendency to tilt slightly out of the vertical plane in which it should normally be disposed. In order to neutralize this tendency, the wearing side of the shuttle is made lighter than the remaining side by means of a recess cut into the shell from the wearing side and terminating short of the remaining side. Because of the difference in weight in the two sides, the wearing side being lighter, the shuttle tends to adjust itself to an upright position.

Still a further object of the invention is the provision of a device within the threader for unraveling kinks that may occur in the thread and also for holding the thread taut as it leaves the shuttle. In order to accomplish these results there is disposed within the threader a brush which the thread engages in passing out of the shuttle. The friction between the thread and brush creates a tension on the thread which unravels the kinks and which also holds the thread taut while it is being woven, thus producing a fabric of first quality.

A further feature of the threader is that the thread need not be pushed therein with the finger or an auxiliary instrument while it is being threaded. There are disposed within the threader a hook at the forward end and a pair of hooks at the rear end. The latter pair or hooks are arranged in vertical alinement. In threading, the thread is first passed beneath the upper rear hook and subsequently around the forward hook. Finally, the winding of the thread off the bobbin brings it beneath the lower rear hook where it is held from slipping out of the rear end of the threader.

The invention is fully disclosed in the following description and in the accompanying drawings in which:

Figure 1 is a side elevation of the improved shuttle;

Figure 2 is an elevation of the side opposite to that shown in Figure 1;

Figure 3 is a longitudinal vertical section through the forward end;

Figure 4 is a horizontal section on the line 4-4 of Figure 3;

Figure 5 is a section on the line 5-5 of Figure 3;

Figure 6 is a section on the line 6-6 of Figure 3;

Figure 7 is a transverse section through the rear end, on the line 7-7 of Figure 11, showing diagrammatically the tendency of the shuttle to maintain an upright position;

Figure 8 is a bottom plan view;

Figure 9 is a top plan view;

Figure 10 is a longitudinal vertical section through the rear end; and,

Figure 11 is a horizontal longitudinal section of the rear end.

Reference will now be had to these views by means of like characters which are employed to designate corresponding parts throughout.

The numeral 1 indicates in general the shell of the shuttle, the ends of which are conical, and the center of which is hollow, as indicated by the numeral 2. The shell, in contrast to the usual construction, is formed of a unitary piece of aluminum in order to avoid splinters which tear the fabric and injure the reed in the case of wooden shuttles. The wearing side of the shell is formed with a dovetail groove 3 in which is contained a fibre wearing strip 4. This member is disposed on the side of the shell which engages the reed. Being non-metallic in character, it avoids the high degree of friction that would exist if this surface were of a metallic character. The coefficient of friction of the fibre is approximately the same as that of wood, and therefore avoids undue wearing of the reed by contact. The strip may obviously be replaced as required.

The forward end of the shell contains the feather which consists of a metallic block 5 formed in its upper edge with a slot 6 extending substantially throughout the entire length of the block and about half way into the depth thereof. At the rear end of the block is formed a pair of hooks 7 and 8 extending into the slot from one of the walls thereof. These hooks are arranged in vertical alinement, as illustrated in Figure 5, the lower hook being bent downwardly in order to prevent dislodgment of the thread which is received therebeneath. The forward portion of the block, near the forward end of the slot, is formed with still another

hook 9 projecting into the slot, as illustrated in Figure 6. This hook also projects forwardly in the manner illustrated in Figure 3.

In threading the device, the thread is slipped into the rear end of the slot and subsequently into the forward end. The advantage of the present arrangement is that it is not necessary to hold the thread with the finger while slipping it under the forward hook after it has been slipped beneath the rear hook or hooks, as is now the case. The thread is first passed beneath the upper rear hook 7 and then around the forward hook 9. Finally, the winding of the thread off the bobbin brings it beneath the lower rear hook 8, from which it cannot escape because of the downward curvature of this hook. In the absence of the upper hook 7 it would be necessary to use the finger in passing the thread beneath the lower retaining hook 8.

In the base of the block is secured a brush 10 extending into the intermediate portion of the slot 6. The thread 11 in passing out of the shuttle is tensioned because of its engagement with the brush, as a consequence of which any kinks that might occur are straightened before leaving the shuttle. In this manner irregularities in the fabric are avoided. Moreover, the brush holds the thread taut, the result of which is tightness in the fabric and a material of first quality.

In the rear end of the shell is cut a recess 12 the function of which is pointed out below. This recess is cut from the wearing side of the shell and is there covered by the wearing plate 4. The recess is traversed longitudinally of the shell by a block 13 lodged in the rear end 14. In the rear end of the hollow portion 2 is disposed a spring clip 15 comprising a pair of arms and a neck 16 which is received in a slot 17 in the block 13. Within the neck is received a plug 18, and a pin 19 is passed through the plug and the sides of the neck in order to limit the resiliency of the clip.

The bobbin 20 which is carried in the hollow portion 2 has its rear end enlarged as indicated by the numeral 21. This end is provided with a plurality of peripheral rings 22 adapted for accommodation in grooves 23 cut in the inner faces of the arms of the clip in a manner already well known in the art. A metallic loop or band is passed around the block 13 and the neck 16 of the clip in such a manner that its rear portion 25 is vertical while the top and bottom thereof are horizontal, as illustrated in Figure 10. The forward portion 26 is inclined downwardly and forwardly so as to extend into the space between the arms of the spring clip. The object of this device is to guide the rings on the enlarged end of

the spindle into the grooves 23 when a new spindle is inserted.

A further feature of the invention consists in a novel manner of attaching the ends or noses of the shuttles. Hitherto, each nose has been provided with a stem having a frictional fit in the corresponding end of the shell. A nose or a point thus secured in place is likely to separate slightly from the shell and leave a nick in the shuttle. It is well known that injurious results occur when the fabric in the loom becomes caught in said nick. In order to avoid this defect, each nose 27 of the present device has a threaded stem 28. The forward and rear stems are threaded respectively into the threader block 5 and the rear block 13. By reason of this construction, the threaded engagement prevents longitudinal shifting of the stems and noses with reference to the shell, whereby the occurrence of nicks is avoided.

In the operation of a shuttle, there is a tendency for the wearing edge thereof to tilt slightly as indicated in Figure 7. The side of the shell on which the wearing surface occurs is in this case made lighter than the remaining side by means of the recess 12 which is cut from the wearing side. This difference in weight permits the non-wearing side to drop slightly, thus compensating the tendency of the wearing side to take the angular position illustrated in Figure 7.

In the forward end of the shell is cut a slit 29 proceeding from the forward hook

9 and extending slightly rearwardly and through the non-wearing side of the shell, as illustrated in Figures 1 and 9. In the event that the thread slips from the slit, it will still remain in engagement with the hooks 8 and 9 to prevent disengagement of the thread from the threader. Some of the possible positions which may be taken by the portion of the thread intended to lie in the slit are illustrated in Figure 4.

While a specific embodiment of the invention has been illustrated and described, it is to be understood that various alterations in the details of construction may be made without departing from the spirit of the invention as indicated by the appended claim.

Having thus fully described the invention, what we claim as new and desire to protect by Letters Patent is:—

A shuttle comprising a shell, a threader lodged in the forward end thereof, said threader consisting of a metallic block having a slot in its upper surface, a pair of hooks formed at the rear end of said block and extending into the slot, said hooks being in vertical alinement, the upper hook pointing downwardly and forwardly and the lower hook pointing directly downwardly, and a third hook extending from the block into the forward end of said slot.

In witness whereof we have hereunto set our hands.

JOSEPH EDOUARD GIROUARD.  
ALBERT LA CAIRE.

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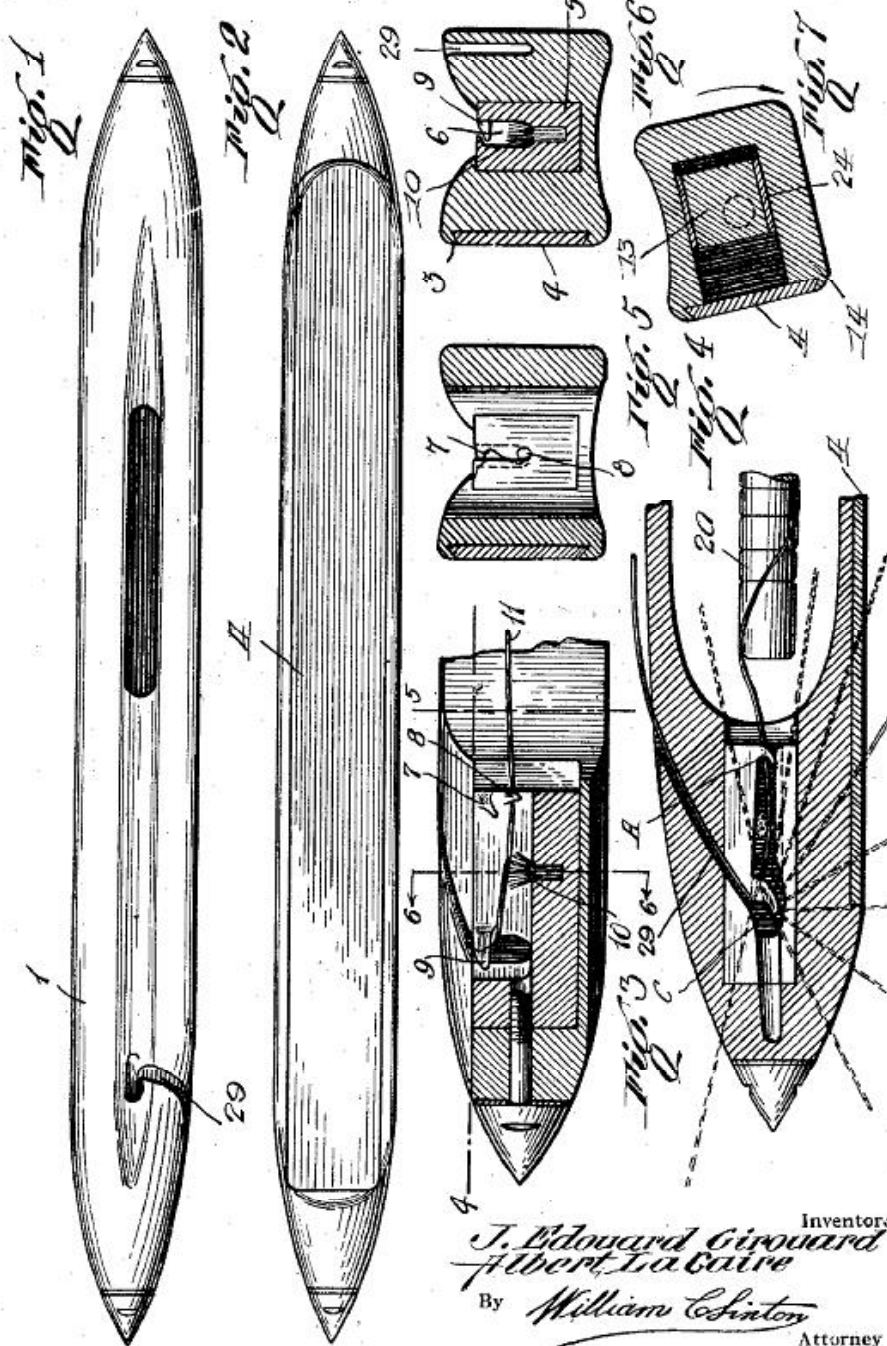
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SHUTTLE

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2 Sheets-Sheet 1



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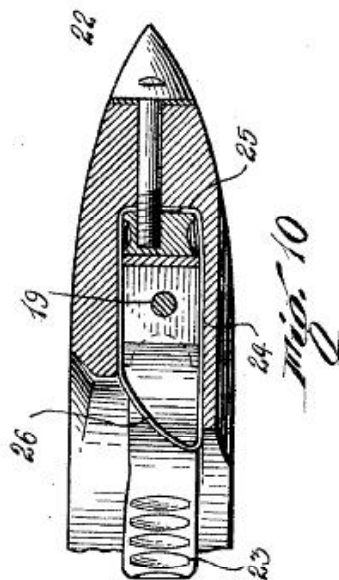
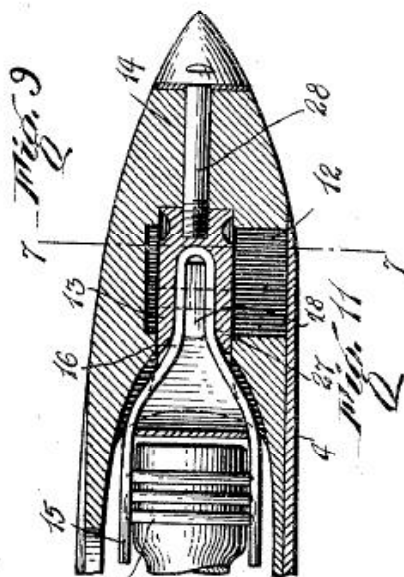
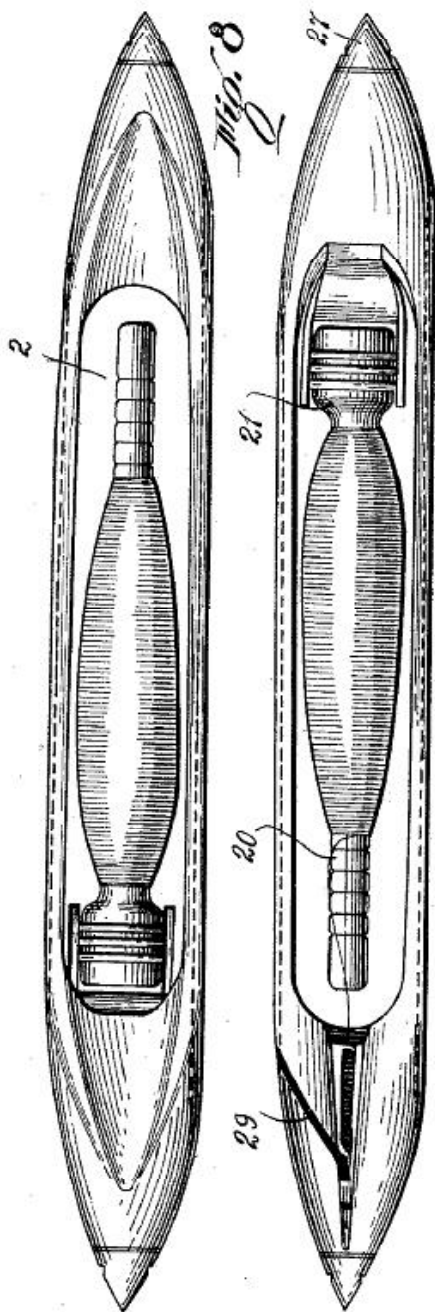
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